
TRAFFIC IMPACT STUDY

for

**Proposed Warehouse Development
67 Kennedy Road
South Windsor, Connecticut**

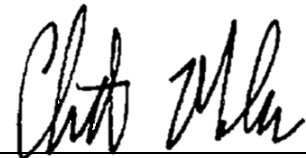
Prepared for:

Scannell Properties #644, LLC

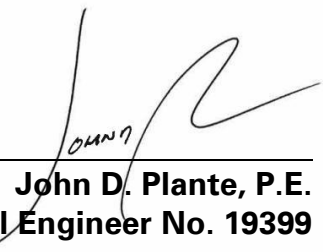


Prepared By:

**Langan CT, Inc.
555 Long Wharf Drive
New Haven, CT 06511**



**Christopher McLean, P.E.
Connecticut Licensed Professional Engineer No. 33271**



**John D. Plante, P.E.
Connecticut Licensed Professional Engineer No. 19399**

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EXECUTIVE SUMMARY

Langan has prepared this traffic impact study to identify the potential impacts of the proposed warehouse at 67 Kennedy Road in South Windsor, Connecticut (See **Figure 1**). The project site is approximately 19.2-acres of vacant land.

The project includes the construction of a ±241,800 square-foot warehouse with approximately 141 car parking spaces, 59 trailer spaces, and 25 loading docks and associated site improvements. The proposed development will have three driveways on Kennedy Road, and one exit-only truck driveway on Sullivan Avenue. The three driveways on Kennedy Road will each operate as full-movement stop-controlled driveways. The driveway on Sullivan Avenue will be exclusively for trucks and will be exit-only and right-turn only. Trucks are only to be allowed to enter the site through driveway located at the northern-most end of Kennedy Road, where a truck turn-around circle and public cul-de-sac will be constructed (See Site Plan in **Appendix A**). The proposed warehouse is expected to be operational by 2023.

No tenant has been selected for the proposed building at this time, therefore Langan used the Institute of Transportation Engineers (ITE) land-use code 150 to develop the trip generation for the proposed warehouse and site use. These trip generation volumes were used to evaluate the peak-hour and average daily traffic (ADT) for the 2023 build-year traffic operations conditions. Anticipated truck trip generation volumes were also evaluated for the peak-hour and average daily traffic. The project was designed in accordance with the South Windsor access management plan per Section 5.5.4 of the zoning regulations.

Video turning-movement and vehicle-classification were conducted in February 2022, at four roadway network intersections and used as a basis for this evaluation. According to the results of the analyses, the existing roadway is adequate to support the increase in traffic volume that will be generated by the proposed warehouse development.

Langan conducted a signal warrant analysis at the intersection of Kennedy Road and Sullivan Avenue using the traffic counts conducted in February 2022 as the basis for the analysis. The analysis revealed that under existing conditions, the intersection warrants a traffic signal. Under build conditions, a signal would also be warranted.

1.0 INTRODUCTION

Langan has prepared this traffic impact study to identify the potential impacts of the proposed warehouse at 67 Kennedy Road in South Windsor, Connecticut (See **Figure 1** for the Location Map). The 19.2-acre vacant site is on the northwest corner of Kennedy Road and Sullivan Avenue. Commercial uses exist to the west of the development site, Kennedy Road borders the site to the east, Sullivan Avenue borders the site to the south, and train tracks owned by Conrail to the north.

The proposed warehouse development will include a ±241,800 square-foot building with approximately 141 car parking spaces, 59 trailer spaces, and 25 loading docks and associated landscaping, utility improvements and stormwater systems (See Site Plan in **Appendix A**). The proposed development is anticipated to be in operation in 2023.

2.0 SITE ACCESS AND STUDY LOCATIONS

Site Access

The proposed development will have three driveway connections to Kennedy Road, and one driveway access to Sullivan Avenue. The three driveways on Kennedy Road will operate as full-movement stop-controlled driveways. The driveway on Sullivan Avenue will be for exiting truck traffic only and will only allow right turns. Trucks will be expected to enter the site through the driveway located at the northern-most end of Kennedy Road, where a truck turn circle will be constructed for ease of entry. A cul-de-sac at the end of Kennedy Road is also proposed to provide sufficient space to turn around for public vehicles. A cul-de-sac does not currently exist on Kennedy Road.

Study Locations

Four key intersections were evaluated in this study (See **Figure 2**).

- John Fitch Boulevard (US-5) and Sullivan Avenue (Route 194)
- Sullivan Avenue (Route 194) & Rye Street
- Sullivan Avenue (Route 194) & Kennedy Road
- Sullivan Avenue (Route 194) & Ayers Road

3.0 EXISTING CONDITIONS

Area Roadway Network

John Fitch Boulevard (U.S. Route 5) is a four lane, north-south principal arterial under state jurisdiction. The north and south lanes are separated by a 12-foot wide painted median with guardrails. *U.S. Route 5* provides two 12-foot wide thru travel lanes in each direction, with a 6-foot shoulder that varies along the length of the road on the outside of each travel lane, with a posted speed limit of 50 MPH.

Sullivan Avenue (Route 194) from John Fitch Boulevard to Rye Street is a four lane, east-west minor arterial under state jurisdiction. Sullivan Avenue provides two 11-foot wide travel lanes in each direction with 4-foot wide shoulders on both sides of the road. The stretch of Sullivan Avenue from Rye Street to Ayers Road is a two lane, east-west minor arterial that provides one 12-foot wide travel lanes in each direction with variable width shoulders on both sides of the road. Sullivan Avenue in the vicinity of the project has a posted speed limit of 40 MPH.

Rye Street is a two-lane northeast-southwest urban collector under local jurisdiction. Rye Street provides one 11-foot wide travel lane in each direction with 3-foot wide shoulders in either direction. Rye Street in the vicinity of the project has a posted speed limit of 35 MPH.

Kennedy Road is a two-lane north-south local road. Kennedy Road provides one 12-foot wide travel lane in each direction with a shoulder on the west side of the road that starts to taper 175 feet in advance of the stop bar into a width of 9 feet. The east side of the road provides no shoulder. Kennedy Road has a speed limit of 30 MPH, with no sign posted.

Study Intersections

John Fitch Boulevard (US-5) and Sullivan Avenue (Route 194) is a signalized four-way intersection with the following geometry:

- John Fitch Boulevard Northbound – one left-turn only lane with approximately 250 feet of storage, two thru-only lanes, and one right-turn only lane with approximately 250 feet of storage.
- John Fitch Boulevard Southbound – two left-turn only lanes with approximately 575 feet of storage, one thru lane, and one shared right-turn/thru lane where the right-turn lane splits off and becomes an exclusive channelized right-turn lane approximately 75 feet in advance of the stop bar.
- Sullivan Avenue (Route 194) Eastbound – one shared right-turn/thru lane.

- Sullivan Avenue (Route 194) Westbound – one left-turn only lane, one thru lane, and one right-turn only lane.

Sullivan Avenue (Route 194) & Rye Street is a signalized four-way intersection with the following geometry:

- 135 Sullivan Avenue Driveway Northbound – one left-turn only lane, and one shared right-turn/thru lane.
- Rye Street Southbound – one shared right-turn/left-turn/thru lane.
- Sullivan Avenue (Route 194) Eastbound – one left-turn only lane, one thru lane, and one shared right-turn/thru lane.
- Sullivan Avenue (Route 194) Westbound – one left-turn only lane, and one shared right-turn/thru lane.

Sullivan Avenue (Route 194) & Kennedy Road is an unsignalized four-way intersection with the following geometry:

- 425 Sullivan Avenue Driveway Northbound – one stop-controlled shared right-turn/thru/left-turn lane.
- Kennedy Road Southbound – one stop-controlled shared right-turn/thru/left-turn lane.
- Sullivan Avenue (Route 194) Eastbound – one free flow shared right-turn/thru/left-turn lane.
- Sullivan Avenue (Route 194) Westbound – one free flow shared right-turn/thru/left-turn lane.

Sullivan Avenue (Route 194) & Ayers Road is a signalized “T” intersection with the following geometry:

- Sullivan Avenue Northbound – one left-turn only lane and one thru lane.
- Sullivan Avenue Southbound – one left-turn only lane and one thru lane.
- Ayers Road Westbound – one left-turn only lane, and one right-turn only lane.

4.0 INTERSECTION CAPACITY ANALYSIS MEASURES

Langan conducted capacity analyses for the existing, background and build traffic conditions to assess quality of traffic flow. Capacity analyses provide an indication of the adequacy of the road and intersections to serve traffic demands.

Level of Service Criteria

Level of Service (LOS) is the term used to denote the different operating conditions that occur at an intersection under various traffic volume demands. LOS is a qualitative

measure that considers a number of factors including road geometry, speed and travel delay. LOS provides an index to the operational qualities of an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The LOS designation is reported differently for signalized intersections and unsignalized intersections.

For signalized intersections, the analysis considers the operation of all traffic entering the intersection. For unsignalized intersections, however, the analysis considers the operation of all movements that are in conflict with other movements such as mainline left turns and traffic exiting the side street. An overall LOS is given for signalized intersections. For unsignalized intersections, LOS is given for each specific approach.

The evaluation criteria used to analyze the study area intersections are based on the Highway Capacity Manual (HCM) 6th Edition, published by the Transportation Research Board (TRB). SYNCHRO Plus SimTraffic 10 was used to facilitate computer calculation for the capacity analyses at each intersection.

The HCM 6th Edition defines level of service for signalized intersections as follows:

<u>Level of Service</u>	<u>Control Delay per Vehicle (sec/veh)</u>
A	≤10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	>80

The HCM defines level of service for unsignalized intersections as follows:

<u>Level of Service</u>	<u>Control Delay per Vehicle (sec/veh)</u>
A	≤10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	> 50

5.0 METHODOLOGY AND ANALYSIS

To assess the potential traffic impact of the proposed development, Langan employed a five-step methodology outlined below and described in detail in subsequent sections 5.1 through 5.5:

- Step One: Determine the existing peak-hour traffic volumes and evaluate existing traffic operating conditions for the study intersections.
- Step Two: Project the existing peak-hour traffic volumes (Step One) to create 2023 Background peak-hour traffic volumes (including approved or pending developments in the area) and evaluate traffic operating conditions for the study intersections.
- Step Three: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.
- Step Four: Combine the Background traffic volumes (Step Two) with the assigned proposed traffic (Step Three) to establish 2023 Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts.
- Step Five: Investigate the safety conditions within the area roadway network.

5.1 Step One: Determine the existing peak-hour traffic volumes and evaluate traffic operating conditions for the study intersections.

Existing Peak-Hour Traffic Volumes

Video turning-movement counts (TMC's) and vehicle classification counts were conducted on Wednesday, February 2022 to determine the existing peak-hour traffic volumes. The TMC's and vehicle classification counts were conducted on a weekday during the morning (6:30 a.m. to 9:00 a.m.) and evening (3:30 p.m. to 6:00 p.m.) peak periods of the development. During these study periods, the peak-hours of the adjacent roadway network generally occurred from 7:30 to 8:30 a.m. and 4:15 to 5:15 p.m.

2022 Existing Traffic Operating Conditions

The traffic operating conditions for the study area intersections were analyzed during the roadway peak-hour periods using the 2022 existing traffic volumes. **Figure 3** illustrates the 2022 existing peak-hour traffic volumes. A summary of the traffic operating conditions is provided in **Tables 3 and 4**. Detailed reports can be found in **Appendix B**.

5.2 Step Two: Project the existing peak-hour traffic volumes (Step One) to create 2023 Background peak-hour traffic volumes (Including approved or pending developments in the area) and evaluate traffic operating conditions for the study intersections.

Background Peak-Hour Traffic Volumes

Background traffic growth was estimated based on historical data available from ConnDOT in the vicinity of the project. A review of the ConnDOT data indicates that traffic volumes in South Windsor have fluctuated over the last several years, but generally decreased. In order to be conservative and consistent with other approved traffic studies in South Windsor, a growth rate of 0.5% annually was applied to the existing traffic volumes to develop the 2023 background ambient growth peak-hour traffic volumes shown on **Figure 4A**.

In addition to applying this growth rate, we also considered approved or pending developments in the area that may add substantial traffic volume to the study area intersections. Based on discussions with the town of South Windsor, there are two previously approved developments which are to be included in our background traffic conditions. One is a multi-building commercial development at 150 Sullivan Avenue and the other is the Sullivan Avenue Plaza Zone Change and General Plan located at 955 Sullivan Avenue. Both the development's background traffic volumes are shown in **Figures 4B and Figure 4C**, respectively.

2023 Background Traffic Operating Conditions

The traffic operating conditions for the study area intersections were analyzed during the peak-hour periods using the 2023 background traffic volumes illustrated in **Figure 4**. A summary of the traffic operating conditions is provided in **Tables 3 and 4**. Detailed reports can be found in **Appendix C**.

5.3 Step Three: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.

The project includes the construction of a ±241,800 square-foot warehouse with approximately 141 car parking spaces, 59 trailer spaces, and 25 loading docks and associated site improvements (See Site Plan in **Appendix A**).

Site Operations

The proposed development will have three driveway connections to Kennedy Road, and one driveway access to Sullivan Avenue. The three driveways on Kennedy Road will

operate as full-movement stop-controlled driveways. The driveway on Sullivan Avenue will be exclusively for trucks and will be exit-only and right-turn only. Trucks are only to be allowed to enter the site through driveway located at the northern-most end of Kennedy Road, where a truck turn-around circle will be constructed.

Site Access & Circulation

All traffic for the site is to enter through the intersection of Kennedy Road and Sullivan Avenue. Passenger car traffic will then enter their designated parking area, located on the east side of the building, at either the south Kennedy Road Driveway, or the middle Kennedy Road Driveway. Trucks will enter their designated parking/loading areas, located on the west side of the building, through the northern Kennedy Road Driveway where a truck turn-around and public cul-de-sac will be constructed. The site design is intended to separate truck traffic and passenger car traffic as much as possible, allowing for ease of access to their separate parking areas. In addition, providing safer conditions for employee foot traffic walking to and from their vehicles in the passenger car/employee parking lot. Passenger cars will be allowed to exit the parking area at any of the Kennedy Road driveway connections, and exit onto Sullivan Avenue through the intersection of Sullivan Avenue & Kennedy Road. Exiting trucks heading westbound will exit through the right-turn only and exit-only driveway on Sullivan Avenue at the southwest corner of the site. Eastbound exiting trucks will access Kennedy Road from the north side of the building and turn left onto Sullivan Avenue.

The proposed site plan is aligned with the access management plan implemented by South Windsor in Section 5.5.4 of the zoning regulations. As part of the project, an access easement will be granted to 330 Sullivan Avenue to the west for a potential future driveway connection to Sullivan Avenue. The location of this future driveway will allow 330 Sullivan to access Sullivan Avenue directly across from Schwier Road, forming a four-way intersection. Additionally, all access from the 67 Kennedy Road development will access Sullivan Avenue via Kennedy Road and will not create an additional curb cut on Sullivan Avenue.

Peak-Hour Trip Generation

No tenant has been selected for the proposed building at this time, therefore the anticipated number of peak-hour trips generated by the proposed facility is based on rates established in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. Land Use Code 150: Warehouse was selected based on a representative trip generation estimate and the intended building use. Overall, the number of trips the proposed development is expected to generate is 53 for the morning peak hour, and 55 for the evening peak hour. **Table 1** below identifies the anticipated peak-hour trip generation of the proposed development using ITE data. Detailed trip generation information is included in **Appendix E**.

TABLE 1 ANTICIPATED TRIP GENERATION – 67 KENNEDY RD WAREHOUSE							
USE	LAND USE CODE¹	AM PEAK HOUR			PM PEAK HOUR		
		ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Warehousing (241,800 SF)	150	41	12	53	15	40	55

¹ Land Use Codes based on ITE Trip Generation Manual 11th Edition

The site-generated traffic peak-hour volumes were distributed to and from the site onto the roadway network based on anticipated travel patterns of employees and journey to work data obtained for the town of South Windsor. The anticipated percent distribution of the site generated trips is illustrated in **Figure 5**. **Figure 6** illustrates the assignment of the peak-hour site-generated trips, indicated in **Table 1**, into the area roadway network.

Truck Trip Generation & Distribution

The anticipated number of truck trips to be generated by the proposed facility is based on rates established in the ITE Trip Generation Manual 11th Edition. Again, Land Use Code 150: Warehousing was selected. Overall, the number of truck trips the proposed development is expected to generate is 7 trips for the morning peak hour, 10 trips for the evening peak hour, and 138 trips throughout a typical weekday. **Table 2** below identifies the anticipated peak hour and daily truck trip generation of the proposed development using ITE data.

TABLE 2 ANTICIPATED TRUCK TRIP GENERATION – 67 KENNEDY RD WAREHOUSE				
USE	LAND USE CODE¹	AM PEAK HOUR	PM PEAK HOUR	DAILY ADT
		TOTAL	TOTAL	TOTAL
Warehousing (241,800 SF)	150	7	10	138

¹ Land Use Codes based on ITE Trip Generation Manual 11th Edition

The site has been designed to have all truck traffic access the site via the Kennedy Road & Sullivan Avenue intersection, and continue to the end of Kennedy Road where they will enter the property through the northern-most Kennedy Road driveway. Trucks will then continue through the site counter-clockwise to their designated trailer parking spaces or loading docks located on the west side of the building. Exiting trucks heading westbound will exit through the right-turn only and exit-only driveway on Sullivan Avenue at the southwest corner of the site. Eastbound exiting trucks will access Kennedy Road from the north side of the building and turn left onto Sullivan Avenue. Queuing space for entering trucks is provided along the north wall of the building, with space for approximately 7 trucks (WB-67).

Trucks are anticipated to use only state roads, with the exception of Kennedy Road, in accessing the site. Regional truck access is available from Interstate 291, Interstate 84, and Interstate 91 to the south, east and west. Trucks can drive to and from the site to these regional truck routes via Route 5 and Route 194 (Sullivan Avenue).

5.4 Step Four: Combine the Background traffic volumes (Step Two) with the assigned proposed traffic (Step Three) to establish 2023 Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts.

Build Traffic Volumes

To evaluate the impacts of the proposed development, the proposed trip assignment volumes (**Figure 6**), as distributed on the roadway network, are combined with the background traffic volumes (**Figure 4**). **Figure 7** illustrates the 2023 build traffic volumes in the roadway network during the peak-hour periods.

Build Traffic Operating Conditions

The resulting traffic volumes illustrated in **Figure 7** were evaluated to determine the effective operating conditions of the study area intersections without any proposed improvements. **Tables 3 and 4** compare the traffic operating conditions for the study area intersections during the peak-hour periods. **Appendix D** provides detailed reports for the 2023 build conditions.

Queuing Evaluation

In addition to the traffic operating conditions, we evaluated the resulting vehicular queuing for all conditions to assess the impacts at study intersections. In evaluating queuing length, the industry standard is to utilize the 50th and the 95th percentile queue lengths developed by the analysis. The 50th percentile queue represents the average or typical vehicular queue that can be expected during the peak-hour. The 95th percentile queue length represents the queuing experience during the highest peak periods, which accounts for 5% of the analysis period. Queues are calculated in feet, and approximately 25 feet of queue is equal to a single vehicle.

Tables 3 and 4 provide the expected 50th and 95th percentile queue lengths for the analyzed periods. For most analyzed intersections, queue lengths do not increase more than four car lengths. Any increase in queuing due to the proposed development is minimal and the existing roadway network can fully accommodate the anticipated queues.

TABLE 3 CAPACITY ANALYSIS SUMMARY - WEEKDAY A.M. PEAK-HOUR																		
INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	EXISTING CONDITIONS					BACKGROUND CONDITIONS					BUILD CONDITIONS				
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)
							50th%	95th%				50th%	95th%				50th%	95th%
John Fitch Boulevard & Sullivan Ave	ACTUATED-UNCOORDINATED	Overall		C	24.4	0.67			C	25.4	0.7			C	25.5	0.7		
		EB-LTR	±540'	D	53.7	0.43	31'	64'	D	54.9	0.44	32'	64'	E	55.1	0.45	32'	64'
		WB-L	>1000'	D	51.6	0.65	96'	157'	D	53.1	0.69	115'	181'	D	53.4	0.7	118'	185'
		WB-LT	>1000'	D	50.6	0.64	96'	156'	D	53	0.69	118'	184'	D	53.1	0.69	121'	187'
		WB-R	590'	A	3.7	0.42	0'	25'	A	3.6	0.43	0'	26'	A	3.6	0.43	0'	25'
		NB-L	250'	D	47.2	0.05	3'	16'	D	47.5	0.05	3'	16'	D	47.5	0.05	3'	16'
		NB-TT	>1000'	C	24	0.29	82'	127'	C	24.9	0.3	86'	128'	C	25.1	0.3	87'	128'
		NB-R	275'	B	10.9	0.66	0'	74'	B	10.6	0.68	0'	79'	B	10.6	0.7	0'	83'
		SB-LL	600'	D	45	0.67	109'	134'	D	46.4	0.7	119'	141'	D	46.5	0.7	122'	144'
		SB-TTR	>1000'	B	11.5	0.26	72'	121'	B	11.9	0.27	77'	121'	B	12	0.27	77'	121'
Rye Street & Sullivan Ave	ACTUATED-UNCOORDINATED	Overall		A	9	0.6			B	10.3	0.64			B	10.4	0.64		
		EB-L	120'	A	4.7	0.32	19'	39'	A	5.8	0.39	20'	45'	A	5.9	0.39	20'	45'
		EB-TTR	>1000'	A	6.1	0.24	34'	76'	A	6.5	0.26	38'	89'	A	6.6	0.28	41'	95'
		WB-L	125'	A	3.4	0.01	1'	4'	A	3.8	0.02	1'	5'	A	3.8	0.02	1'	5'
		WB-TR	>1000'	B	12.2	0.44	90'	160'	B	14.3	0.55	117'	213'	B	14.5	0.56	120'	219'
		NB-L	75'	C	29.1	0.14	4'	15'	C	28.9	0.14	4'	15'	C	28.9	0.14	4'	15'
		NB-TR	±120'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	A	0	0.01	0'	0'
		SB-LTR	>1000'	B	13.4	0.6	9'	51'	B	15	0.64	15'	58'	B	15.1	0.64	15'	59'
Sullivan Ave & Ayers Road	ACTUATED-UNCOORDINATED	Overall		B	15	0.63			B	16.5	0.64			B	16.6	0.64		
		WB-L	±550'	C	28.1	0.63	61'	140'	C	29.5	0.64	78'	142'	C	29.5	0.64	78'	142'
		WB-R	130'	A	8.2	0.09	0'	18'	A	7.5	0.13	0'	22'	A	7.6	0.13	0'	22'
		NB-T	±750'	B	12.6	0.48	64'	225'	B	15.3	0.57	131'	274'	B	15.7	0.58	135'	284'
		NB-R	275'	A	6.2	0.01	0'	9'	A	6.3	0.01	0'	9'	A	6.3	0.01	0'	9'
		SB-L	260'	A	5.4	0.06	3'	14'	A	5.6	0.1	5'	19'	A	5.6	0.1	5'	19'
		SB-T	±540'	B	11.1	0.36	45'	162'	B	13.2	0.44	95'	202'	B	13.3	0.45	96'	204'
Sullivan Ave & Kennedy Road	UNSIGNALIZED	EB	-	A	8.5	0.11		10'	A	8.8	0.123		10'	A	9	0.155		13'
		WB	-	A	7.9	0.005		0'	A	8.1	0.006		0'	A	8.1	0.006		0'
		NB	-	C	17.3	0.017		3'	C	20.4	0.021		3'	C	22.9	0.024		3'
		SB	-	B	13.7	0.10		8'	C	15.5	0.119		10'	C	18.3	0.185		18'

TABLE 4 CAPACITY ANALYSIS SUMMARY - WEEKDAY P.M. PEAK-HOUR																		
INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	EXISTING CONDITIONS					BACKGROUND CONDITIONS					BUILD CONDITIONS				
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)
							50th%	95th%				50th%	95th%				50th%	95th%
John Fitch Boulevard & Sullivan Ave	ACTUATED- UNCOORDINATED	Overall		C	23.2	0.67			C	24.3	0.7			C	24.7	0.69		
		EB-LTR	±540'	D	50.8	0.38	26'	58'	D	52.2	0.39	28'	58'	D	52.7	0.39	28'	58'
		WB-L	>1000'	D	48.6	0.59	84'	150'	D	50.5	0.65	107'	181'	D	51	0.67	116'	193'
		WB-LT	>1000'	D	48.1	0.59	86'	153'	D	49.4	0.64	108'	181'	D	49.7	0.65	115'	191'
		WB-R	590'	A	3.9	0.49	0'	35'	A	3.8	0.49	0'	36'	A	3.8	0.49	0'	36'
		NB-L	250'	D	46.3	0.04	2'	13'	D	47	0.04	2'	13'	D	47	0.04	2'	13'
		NB-TT	>1000'	C	24.4	0.41	125'	184'	C	25.7	0.43	136'	185'	C	26.1	0.43	140'	185'
		NB-R	275'	B	12.1	0.67	0'	59'	B	11.7	0.7	0'	63'	B	11.3	0.69	0'	64'
		SB-LL	600'	D	43.8	0.67	104'	163'	D	45.3	0.69	115'	172'	D	45.7	0.69	118'	173'
		SB-TTR	>1000'	B	10.4	0.23	60'	136'	B	11	0.24	66'	137'	B	11.2	0.24	69'	137'
Rye Street & Sullivan Ave	ACTUATED- UNCOORDINATED	Overall		B	13	0.67			B	16.5	0.74			B	17.1	0.75		
		EB-L	120'	A	5.6	0.29	17'	38'	A	7.1	0.37	22'	41'	A	7.5	0.39	22'	41'
		EB-TTR	>1000'	A	7.1	0.24	38'	89'	A	7.9	0.27	49'	101'	A	8	0.28	50'	102'
		WB-L	125'	A	4.2	0.01	1'	3'	A	4.2	0.01	1'	3'	A	4.2	0.01	1'	3'
		WB-TR	>1000'	B	15.1	0.55	136'	229'	B	18.7	0.66	183'	279'	B	19.8	0.7	198'	302'
		NB-L	75'	C	25	0.09	5'	18'	C	24.5	0.07	5'	18'	C	24.5	0.07	5'	18'
		NB-TR	±120'	B	18.7	0.01	0'	6'	B	18.7	0.01	0'	6'	B	18.7	0.01	0'	6'
		SB-LTR	>1000'	C	26.1	0.67	47'	100'	D	35.6	0.74	77'	156'	D	36.2	0.75	78'	158'
Sullivan Ave & Ayers Road	ACTUATED- UNCOORDINATED	Overall		B	19.3	0.66			C	21.9	0.74			C	22.2	0.76		
		WB-L	±550'	C	30.9	0.66	84'	138'	C	31.2	0.66	85'	140'	C	31.2	0.66	85'	140'
		WB-R	130'	A	6.6	0.2	0'	24'	A	6.5	0.24	0'	26'	A	6.5	0.24	0'	27'
		NB-T	±750'	B	18.7	0.65	153'	315'	C	22.7	0.74	189'	432'	C	23	0.75	192'	436'
		NB-R	275'	A	6.1	0.02	0'	10'	A	6.3	0.02	0'	11'	A	6.3	0.02	0'	11'
		SB-L	260'	A	6.3	0.19	10'	30'	A	7.1	0.26	11'	34'	A	7.2	0.26	12'	34'
		SB-T	±540'	B	18.8	0.65	160'	372'	C	22.4	0.74	194'	456'	C	23	0.76	201'	469'
Sullivan Ave & Kennedy Road	UNSIGNALIZED	EB	-	A	9.3	0.08		8'	A	9.6	0.083		8'	A	9.7	0.096		8'
		WB	-	A	8.3	0.002		0'	A	8.6	0.002		0'	A	8.6	0.002		0'
		NB	-	C	18.5	0.12		10'	C	22.6	0.146		13'	C	24.9	0.162		15'
		SB	-	C	18.9	0.3		30'	C	23.6	0.361		40'	D	33.2	0.565		80'

Analysis Results

The analysis of the study intersections reveals that all the signalized intersections analyzed will maintain overall acceptable or background operating conditions for the 2023 build scenario. Individual movements and lane groups may change slightly in level of service, delay, and queue length; however, overall levels of service at these signalized intersections analyzed remain unchanged or acceptable, with nominal impacts to intersection delays. The level of service for each individual movement is maintained from the background conditions to the build conditions, with the exception of the eastbound movement during the morning peak period at the intersection of John Fitch Boulevard and Sullivan Avenue. This movement goes from LOS D under the background conditions to LOS E under the build conditions, however, the delay for this movement only increases by 0.2 seconds, from 54.9 seconds to 55.1 seconds.

5.5 Step Five: Investigate the safety conditions within the area roadway network.

Intersection Sight Distance

Langan evaluated the intersection sight distances (ISD) at the proposed site driveways on Kennedy Road and Sullivan Avenue to confirm that they will meet the town of South Windsor requirements for entering and exiting vehicles based on standards from ConnDOT Highway Design Manual Section 11-2. Sight distances requirements for the town of South Windsor are based on minimum requirements established by the Connecticut Highway Design Manual and the American Association of State Highway and Transportation Officials (AASHTO) as outlined in *A Policy on Geometric Design of Highways and Streets*, 6th Edition (also known as the AASHTO Green Book). As shown in **Table 5**, the proposed intersection sight distances (ISDs) provided at the site driveways meet AASHTO's minimum requirements.

TABLE 5
INTERSECTION SIGHT DISTANCE SUMMARY

LOCATION	Design Speed	Intersection Sight Distance			
		Passenger Car		Combination Truck	
		Required	Provided	Required	Provided
Middle Kennedy Rd Driveway & Kennedy Road					
Looking Left (Kennedy Road Southbound)	30 mph ¹	±335 ft	>335 ft	-	-
Looking Right (Kennedy Road Northbound)	30 mph ¹	±335 ft	>335 ft	-	-
Southern Kennedy Rd Driveway & Kennedy Road					
Looking Left (Kennedy Road Southbound)	30 mph ¹	±335 ft	>335 ft	-	-
Looking Right (Kennedy Road Northbound)	30 mph ¹	±335 ft	To Sullivan Ave	-	-
Southern Sullivan Avenue Exit Only Driveway & Sullivan Avenue					
Looking Left (Sullivan Avenue Westbound)	40 mph ²	-	-	±560 ft	600 ft

¹ Design speed of 30 MPH based on speed limit of Kennedy Road (30 MPH)

² Design speed of 40 MPH based on speed limit of Sullivan Avenue (40 MPH)

Accidents

The most recent three years of accident data were requested via the online UConn Crash Data Repository website in order to conduct an accident analysis in the project vicinity. The collected data included accidents from 2019 to 2021 and accidents included various types of crashes which are behaviors typical at signalized intersections. Specifically at the intersection of Sullivan Avenue and Kennedy Road, only four accidents were reported in these three years, with a low average rate of 1.33 accidents per year.

Across the study area, twenty-four of the reported accidents resulted in injuries, with no fatalities. The majority of accidents occurred during dry weather conditions (75%) and during daylight hours (80%). The majority of accidents (46) occurred at the intersection of John Fitch Boulevard (Route 5) and Sullivan Avenue, with an average rate of 15.33 accidents per year. **Table 6** provides a summary of the study area accident history.

TABLE 6
ACCIDENT DATA SUMMARY (2019 - 2021)

INTERSECTION	NUMBER OF ACCIDENTS		SEVERITY			CONDITIONS			
	Total	Average Per Year	Property Damage Only	Personal Injury	Fatality	Clear (Dry)	Rain/Snow	Day	Night
Sullivan Ave & John Fitch Boulevard	46	15.33	31 (67%)	15 (33%)	0 (0%)	32 (70%)	14 (30%)	38 (83%)	8 (17%)
Sullivan Ave & Rye Street	8	2.67	4 (50%)	4 (50%)	0 (0%)	6 (75%)	2 (25%)	6 (75%)	2 (25%)
Sullivan Ave & Kennedy Road	4	1.33	2 (50%)	2 (50%)	0 (0%)	4 (100%)	0 (0%)	2 (50%)	2 (50%)
Sullivan Ave & Ayers Road	6	2.00	3 (50%)	3 (50%)	0 (0%)	6 (100%)	0 (0%)	5 (83%)	1 (17%)
TOTAL	64	21.33	40 (63%)	24 (38%)	0 (0%)	48 (75%)	16 (25%)	51 (80%)	13 (20%)

Source: UConn Crash Data Repository (2019 - 2021)

Signal Warrant Analysis

A signal warrant analysis of the intersection of Sullivan Avenue (Route 194) and Kennedy Road was performed as part of this traffic study. The traffic volumes used as the basis of this analysis are from the traffic counts conducted in February 2022.

This analysis is based on criteria outlined in Chapter 4C of the Manual on Uniform Traffic Control Devices (MUTCD) and the anticipated traffic volumes at this location. All warrants were evaluated to determine whether the proposed conditions meet these warrants. Additionally, we evaluated the intersection under existing conditions to see if it currently warrants a signal today. **Table 7** depicts the analysis of Warrants 1, 2 and 3 under existing conditions, and **Table 8** depicts the analysis of Warrants 1, 2 and 3 under proposed conditions.

- Warrant 1 (Eight-Hour Vehicular Volume) states that volume thresholds must be met for one of two conditions, or a reduced combination of both conditions, for a period of eight hours on a given day.
- Warrant 2 (Four-Hour Vehicular Volume) is met if the plot point of the volumes (minor street higher-volume approach VPH versus major street total VPH) falls above a designated curve for four hours of a given day.
- Warrant 3 (Peak Hour) is satisfied if the plot point of the volumes of the peak hour falls above the designated curve.

The signal warrant analysis was conducted using one approach lane for the major street (Sullivan Avenue) and minor street (Kennedy Road) approaches. Automatic traffic recorder (ATR) counts were collected on the westbound approach (east of Kennedy Road) and the

southbound approach (north of Sullivan Avenue) to record weekday traffic conditions over 24 hours. The counts were conducted on a Wednesday in February 2022 and the two-way average daily traffic (ADT) on Sullivan Avenue was 10,232 vehicles-per-day (VPD). Sullivan Avenue eastbound experienced an ADT of 5,189 VPD and westbound experienced an ADT of 5,043 VPD.

**TABLE 7 - SIGNAL WARRANT SUMMARY – EXISTING CONDITIONS
NUMBER OF HOURS WARRANTS MET**

Location	Warrant 1, Eight-Hour Vehicular Volume (Condition A 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition A 80% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 80% Factor) Satisfied	Warrant 2 Four-Hour Vehicular Volume (100% Factor) Satisfied	Warrant 3 Peak Hour (100% Factor) Satisfied
Sullivan Avenue & Kennedy Road	5	11	6		11	7

**TABLE 8 - SIGNAL WARRANT SUMMARY – BUILD CONDITIONS
NUMBER OF HOURS WARRANTS MET**

Location	Warrant 1, Eight-Hour Vehicular Volume (Condition A 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition A 80% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 80% Factor) Satisfied	Warrant 2 Four-Hour Vehicular Volume (100% Factor) Satisfied	Warrant 3 Peak Hour (100% Factor) Satisfied
Sullivan Avenue & Kennedy Road	7	12	8		11	7

As shown in **Table 7**, 11 hours of Warrant 1 volumes were met under the existing conditions. As shown in **Table 8**, 12 hours of Warrant 1 volumes were met under the proposed conditions. Therefore, a traffic signal is warranted at this intersection under existing conditions, and with the anticipated increase in traffic volumes due to the development, a signal would also be warranted under the proposed conditions. As this intersection is on a state road, ConnDOT will review the intersection signal warrants. Details of the warrant analysis are included in **Appendix F**.

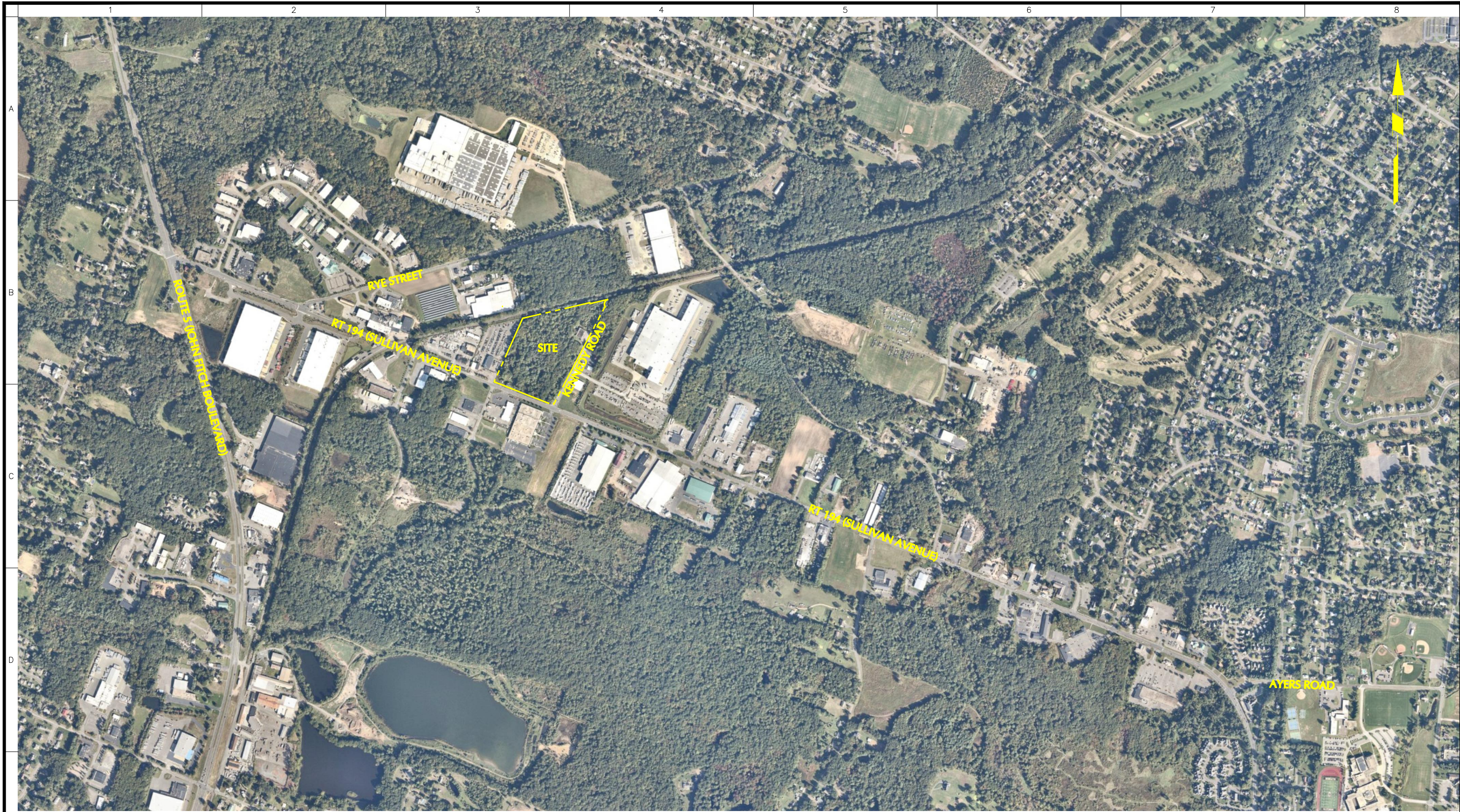
6.0 SUMMARY AND CONCLUSIONS

This evaluation identifies the potential traffic impacts generated by the proposed development on the surrounding area road network. We performed a capacity analysis for the existing, background, and build scenarios for four area roadway network intersections. Our evaluation indicates that, in general, the existing roadway infrastructure is adequate to support the nominal increase in traffic volume generated by the proposed warehouse development. Overall, the intersections analyzed will maintain acceptable or background traffic operating conditions. As part of this study, Langan conducted a signal warrant analysis at the intersection of Kennedy Road and Sullivan Avenue. Under existing conditions, this intersection warrants a traffic signal based on criteria outlined in Chapter 4C of the Manual on Uniform Traffic Control Devices (MUTCD). As would be expected, under build conditions, a signal would continue to be warranted. As this intersection is on a state road, ConnDOT will review the intersection signal warrants.

\\langan.com\data\NH\data3\140246301\Project Data\Discipline\Traffic\Reports\Traffic Impact Study\140246301 - 67 Kennedy Rd - Traffic Impact Study.docx

Figures

Figure 1	Location Map
Figure 2	Study Intersections Map
Figure 3	2022 Existing Traffic Volumes
Figure 4	2023 Background Traffic Volumes
Figure 4A	2023 Background Ambient Growth Traffic Volumes
Figure 4B	952 Sullivan Avenue Background Traffic Volumes
Figure 4C	150 Sullivan Avenue Background Traffic Volumes
Figure 5	Trip Distribution
Figure 6	Trip Assignment
Figure 7	2023 Build Peak-Hour Traffic Volumes



REFERENCE:
NEARMAPS - IMAGE TAKEN 10/1/2021

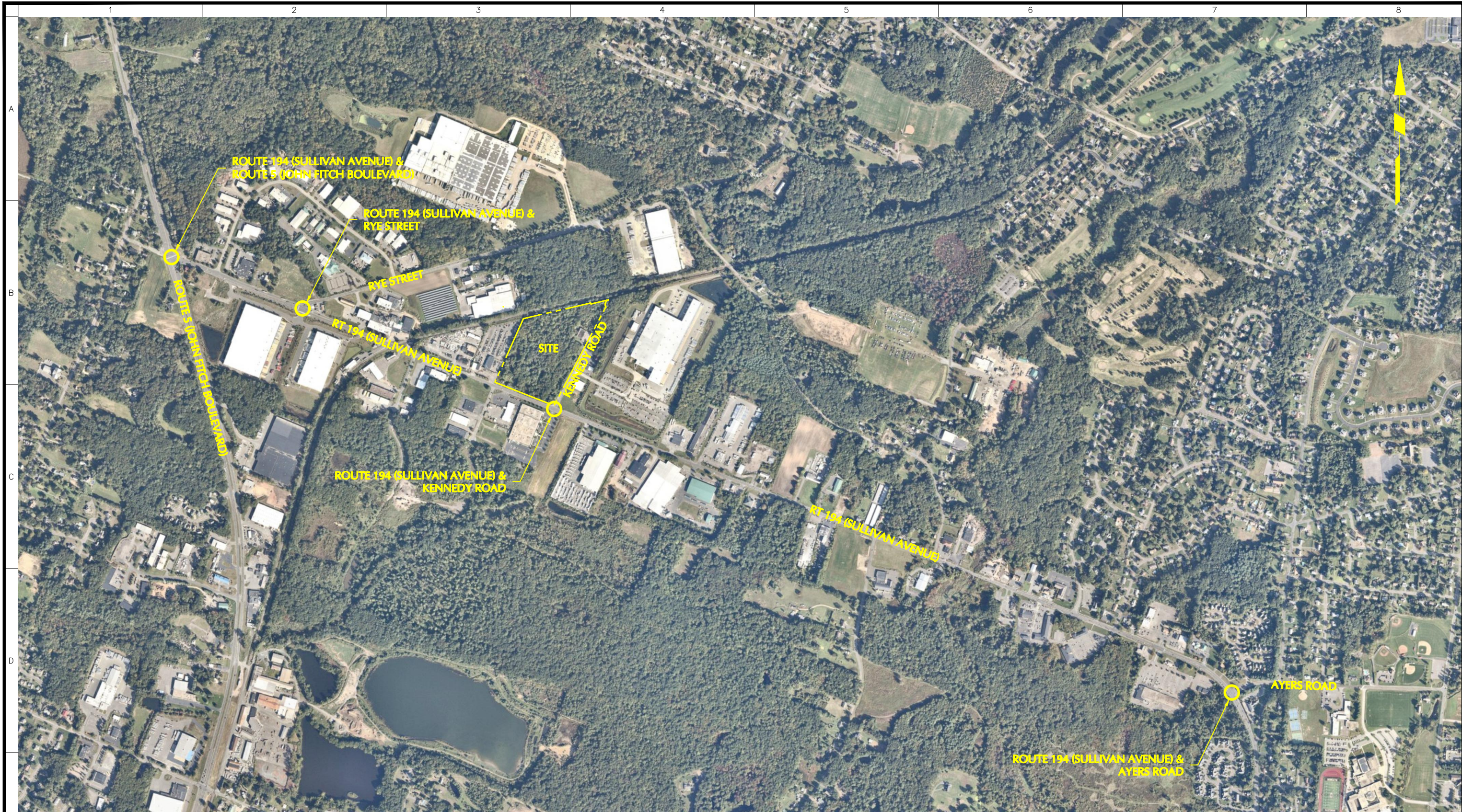
LANGAN
Langan Engineering and
Environmental Services, Inc.
555 Long Wharf Drive
New Haven, CT 06511
T: 203.562.5771 F: 203.789.6142 www.langan.com

Project
67 KENNEDY ROAD
SOUTH WINDSOR
HARTFORD COUNTY CONNECTICUT

Drawing Title
**SITE LOCATION
MAP**

Project No.
140246301
Date
02/22/2022
Drawn By
CWA
Checked By
CJM

Drawing No.
FIG. 1
Sheet **0** of **1**



REFERENCE:
NEARMAPS - IMAGE TAKEN 10/1/2021

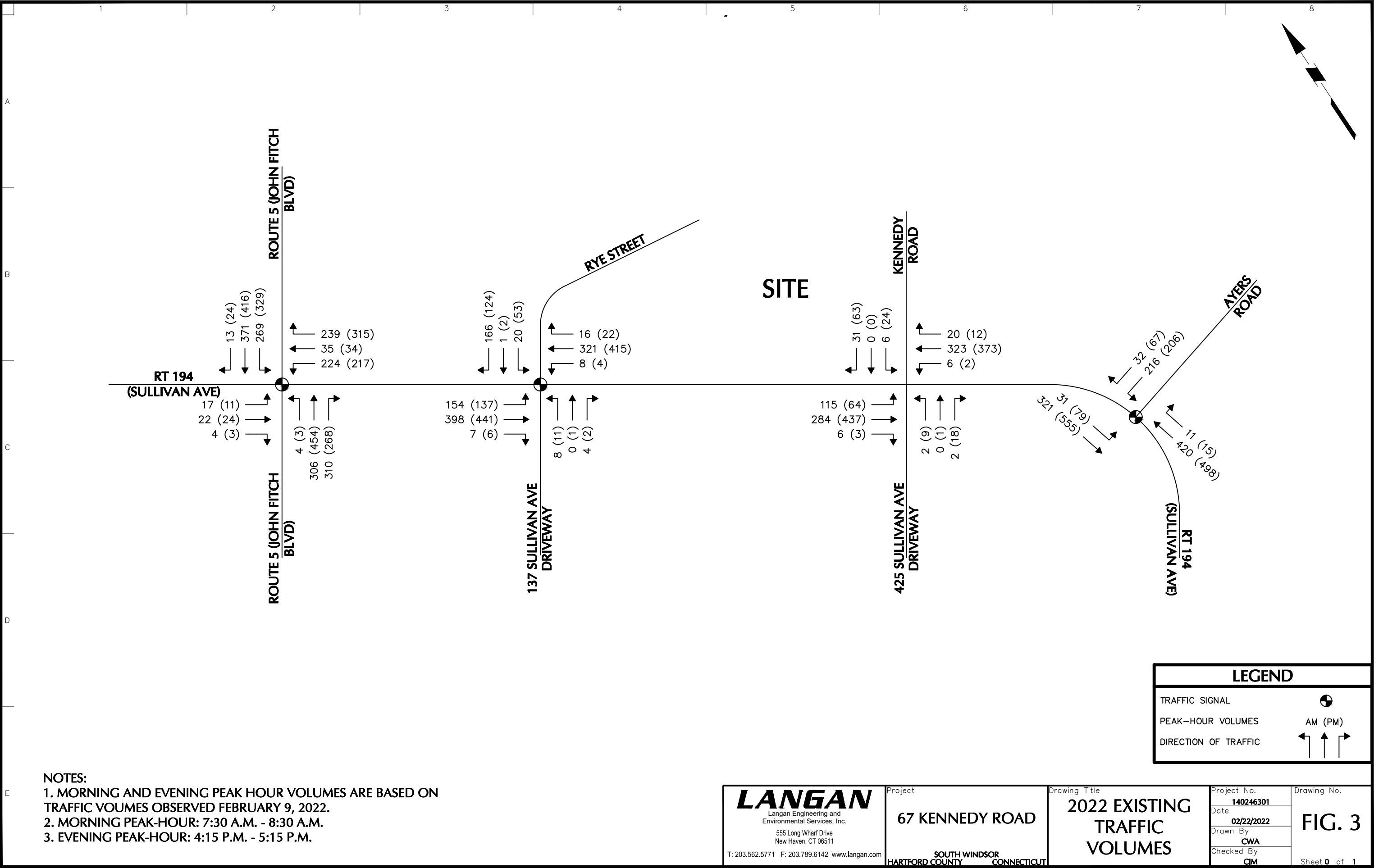
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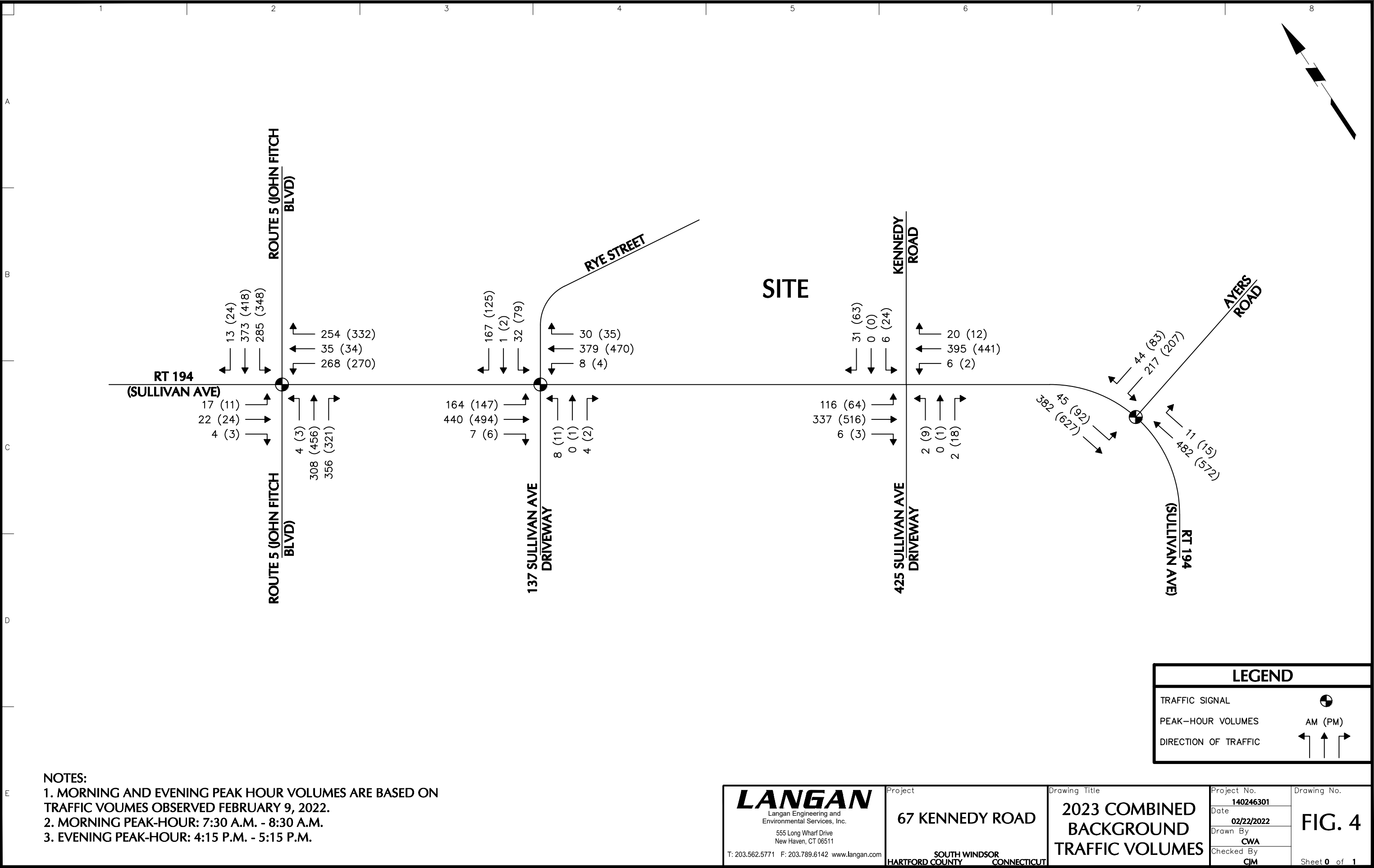
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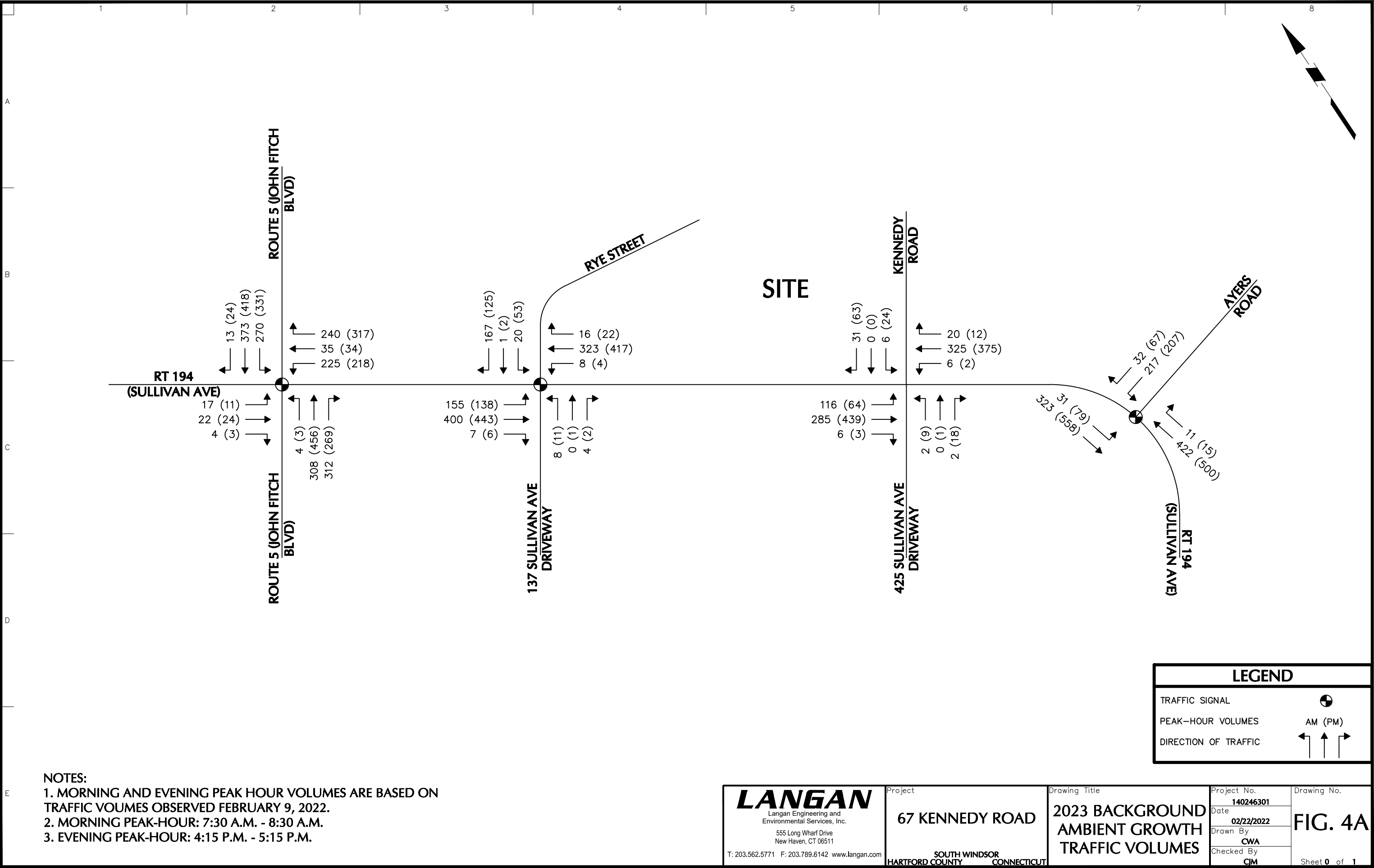
Drawing Title
**STUDY
INTERSECTIONS
MAP**

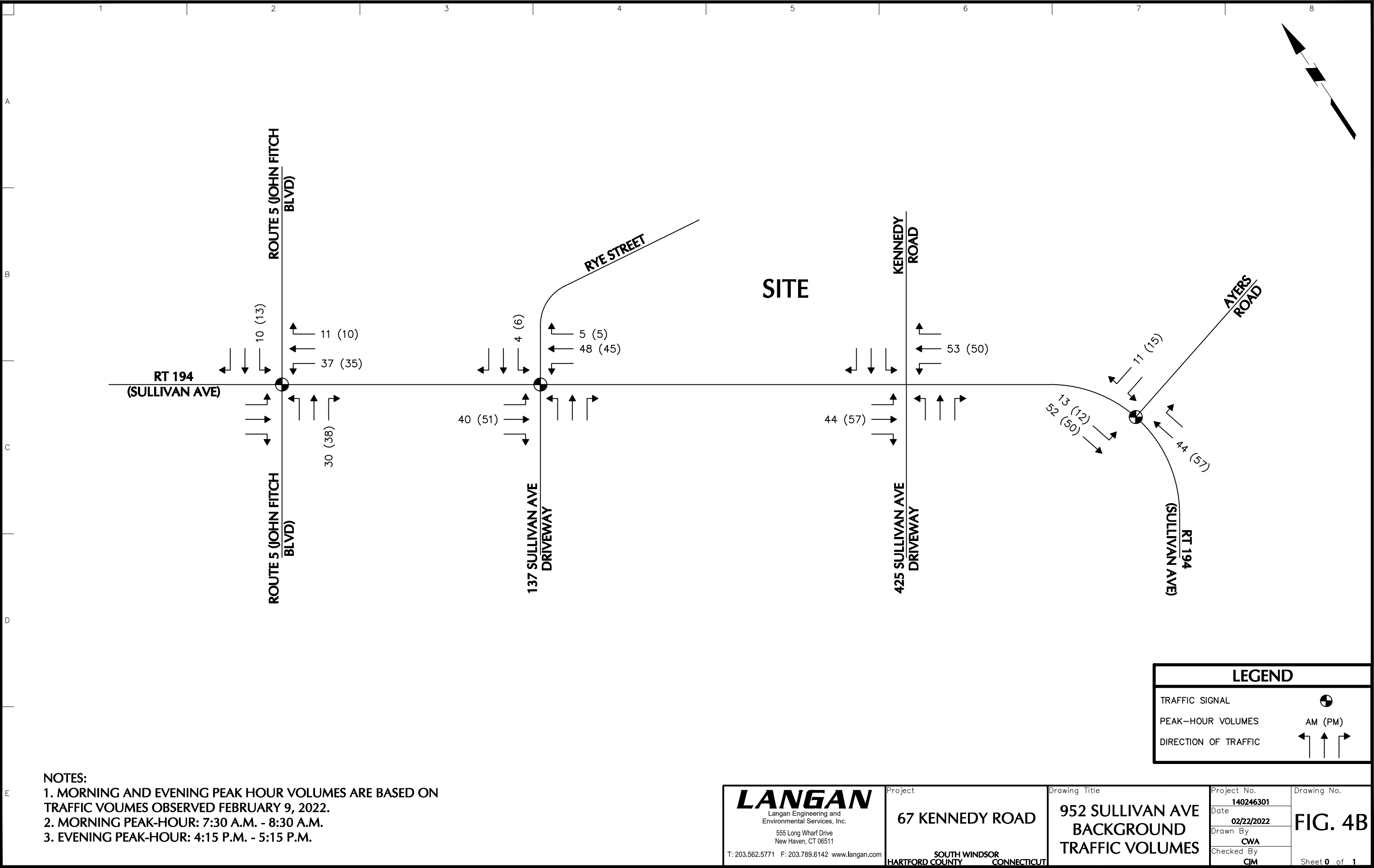
Project No.
140246301
Date
02/22/2022
Drawn By
CWA
Checked By
CJM

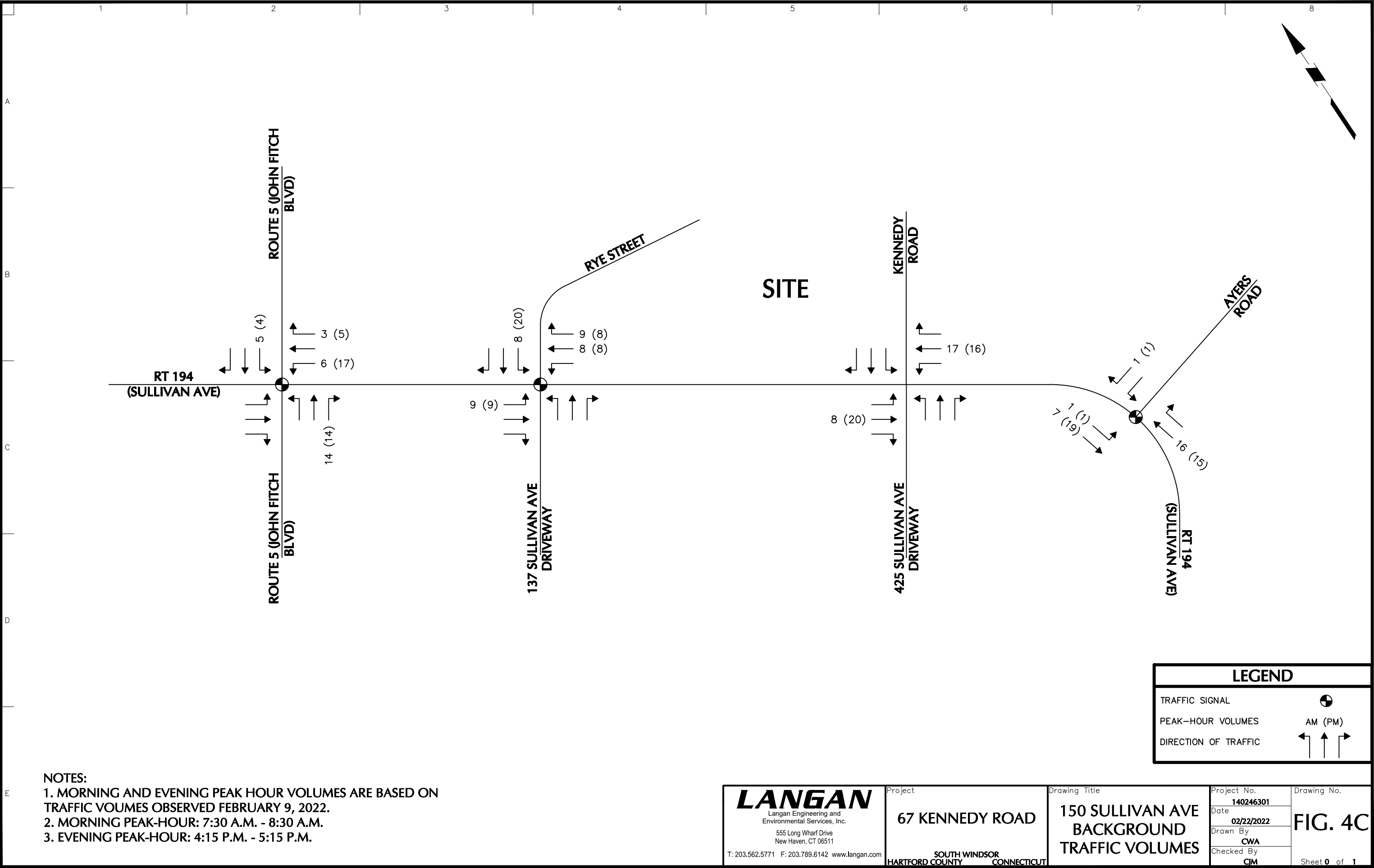
Drawing No.
FIG. 2
Sheet **0** of **1**











NOTES:

1. MORNING AND EVENING PEAK HOUR VOLUMES ARE BASED ON TRAFFIC VOLUMES OBSERVED FEBRUARY 9, 2022.
2. MORNING PEAK-HOUR: 7:30 A.M. - 8:30 A.M.
3. EVENING PEAK-HOUR: 4:15 P.M. - 5:15 P.M.

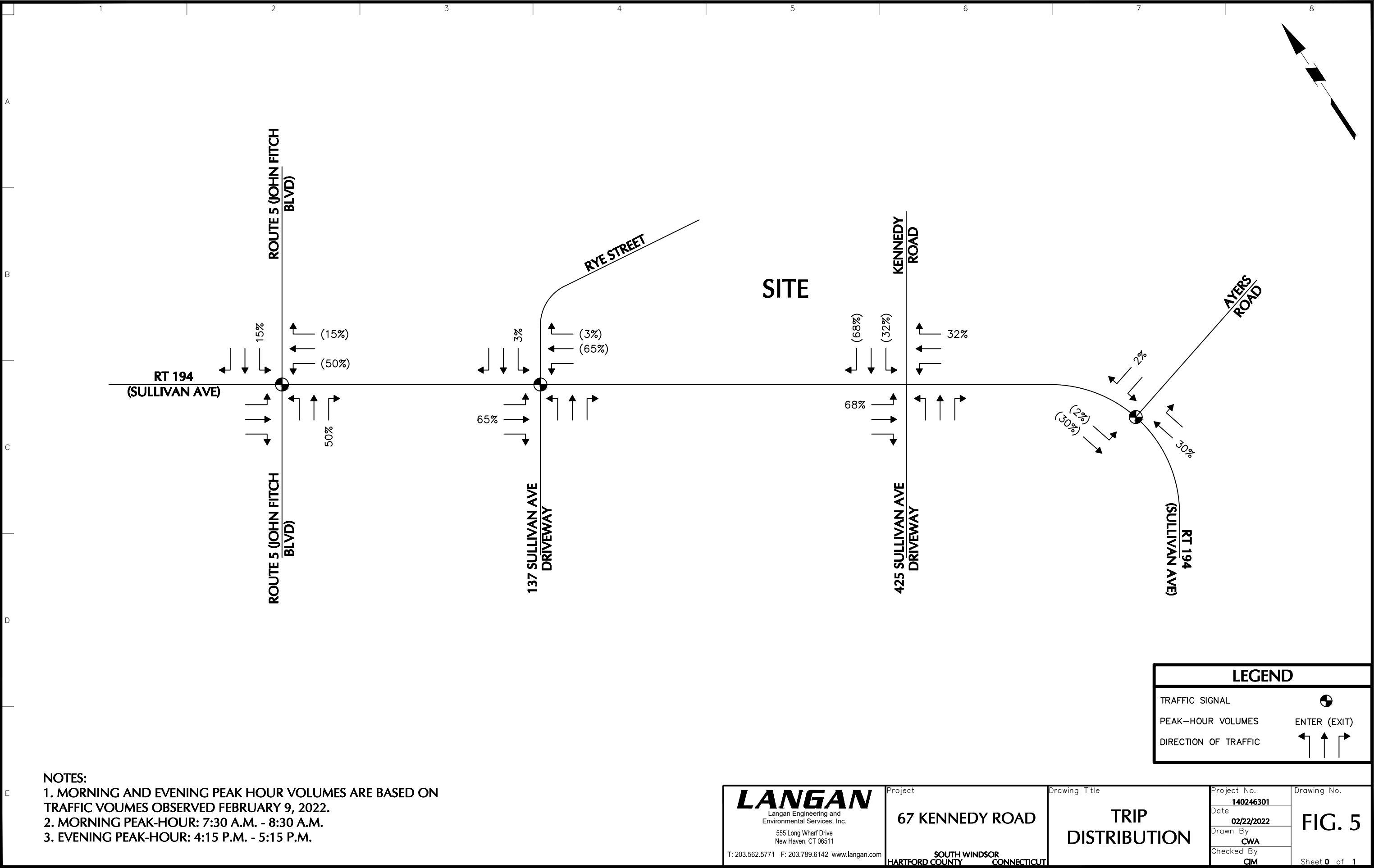
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T: 203.562.5771 F: 203.789.6142 www.langan.com

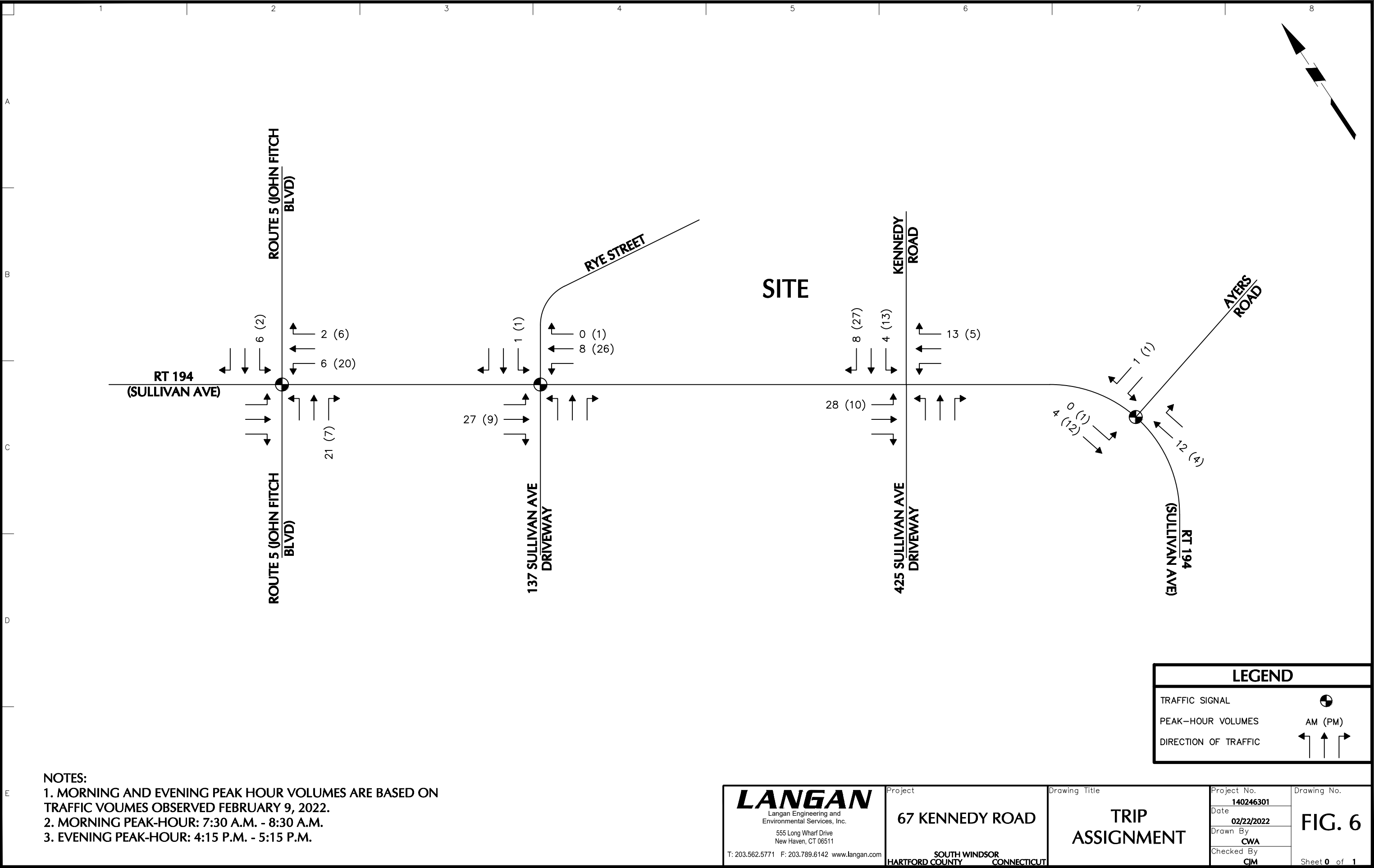
Project: 67 KENNEDY ROAD
SOUTH WINDSOR
HARTFORD COUNTY CONNECTICUT

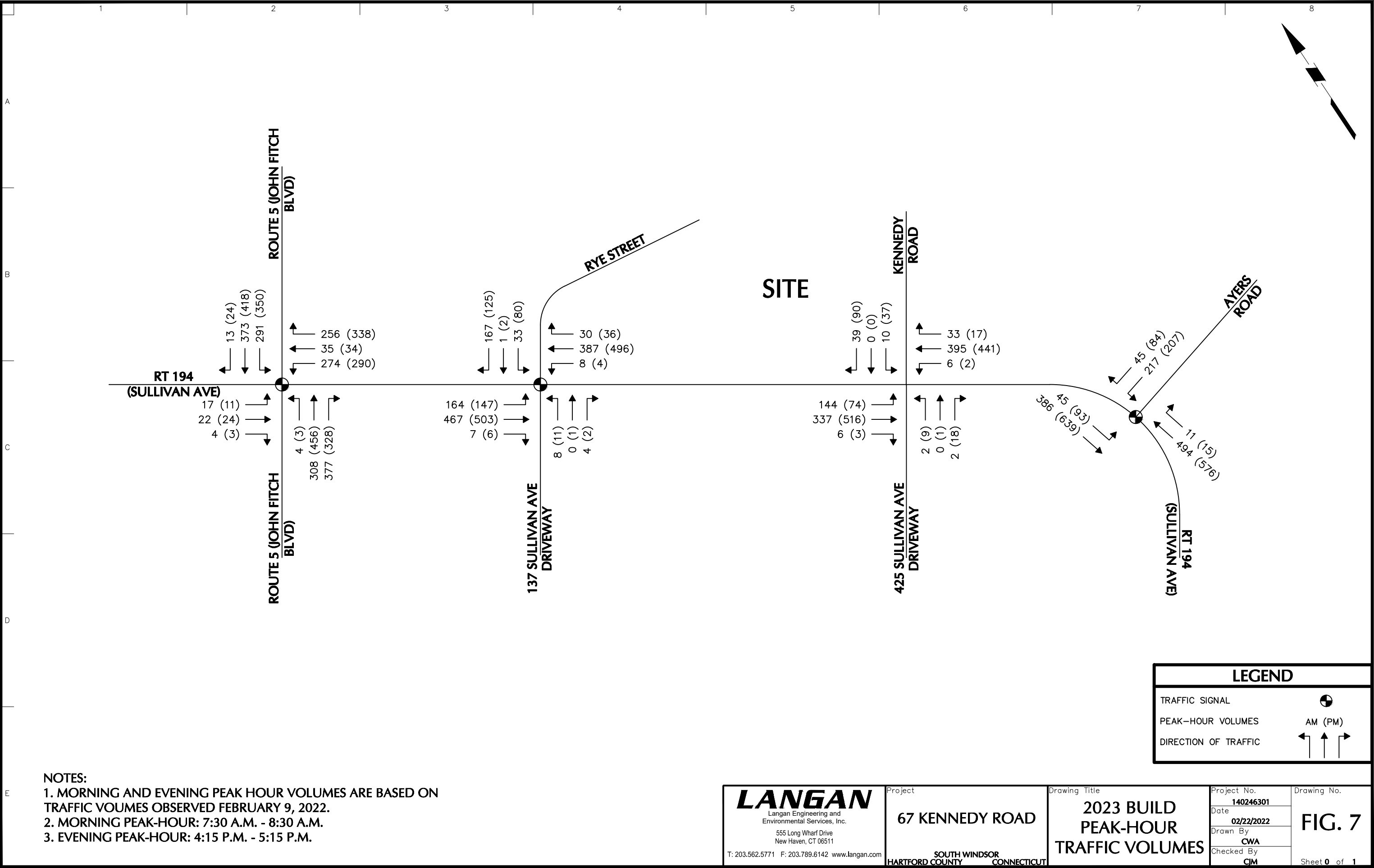
Drawing Title: 150 SULLIVAN AVE BACKGROUND TRAFFIC VOLUMES

Project No. 140246301
Date: 02/22/2022
Drawn By: CWA
Checked By: CJM

Drawing No. FIG. 4C
Sheet 0 of 1







Appendix A

Overall Site Plan

ZONING TABLE		
ZONE: INDUSTRIAL ZONE (I)		
ITEM	REQUIRED/ ALLOWED	PROPOSED
LOT AREA	30,000 SF	838,308 SF (19.245 AC)
LOT FRONTAGE	100'	1,989.6'
LOT DEPTH	150'	691.7'
FRONT YARD	50' / 35' (1)	60.0'
SIDE YARD	10'	91.4'
REAR YARD	25'	N/A
BUILDING HEIGHT	40'/2 STORIES	<40'
PARKING	SEE TABLE	345
INTERIOR LANDSCAPING	10%	10.2%
LOT COVERAGE	50%	28.8%
IMPERVIOUS COVERAGE	65%	54.6%

NOTES:
(1) 50' ALONG SULLIVAN AVENUE AND 35' ALONG KENNEDY ROAD

PARKING REQUIREMENTS*				
USE	FORMULA	PROPOSED AREA	PROPOSED EMPLOYEES	REQUIRED
OFFICE	4.5 SP/1,000 GSF	6,000 GSF	N/A	27
WAREHOUSE	1 SP/1,250 GSF + 1 PER EMPLOYEE	235,800 GSF	55**	244
TOTAL				271

USE	FORMULA	PROPOSED AREA	PROPOSED EMPLOYEES	REQUIRED
OFFICE	4.5 SP/1,000 GSF	6,000 GSF	N/A	27
WAREHOUSE	1 SP/1,250 GSF + 1 PER EMPLOYEE	235,800 GSF	55**	244
TOTAL				271

PARKING PROVIDED	
LOCATION	QUANTITY
AUTO PARKING	141
TRAILER SPACES	59
'RESERVE PARKING'***	130
TOTAL	330

LOCATION	QUANTITY
AUTO PARKING	141
TRAILER SPACES	59
'RESERVE PARKING'***	130
TOTAL	330

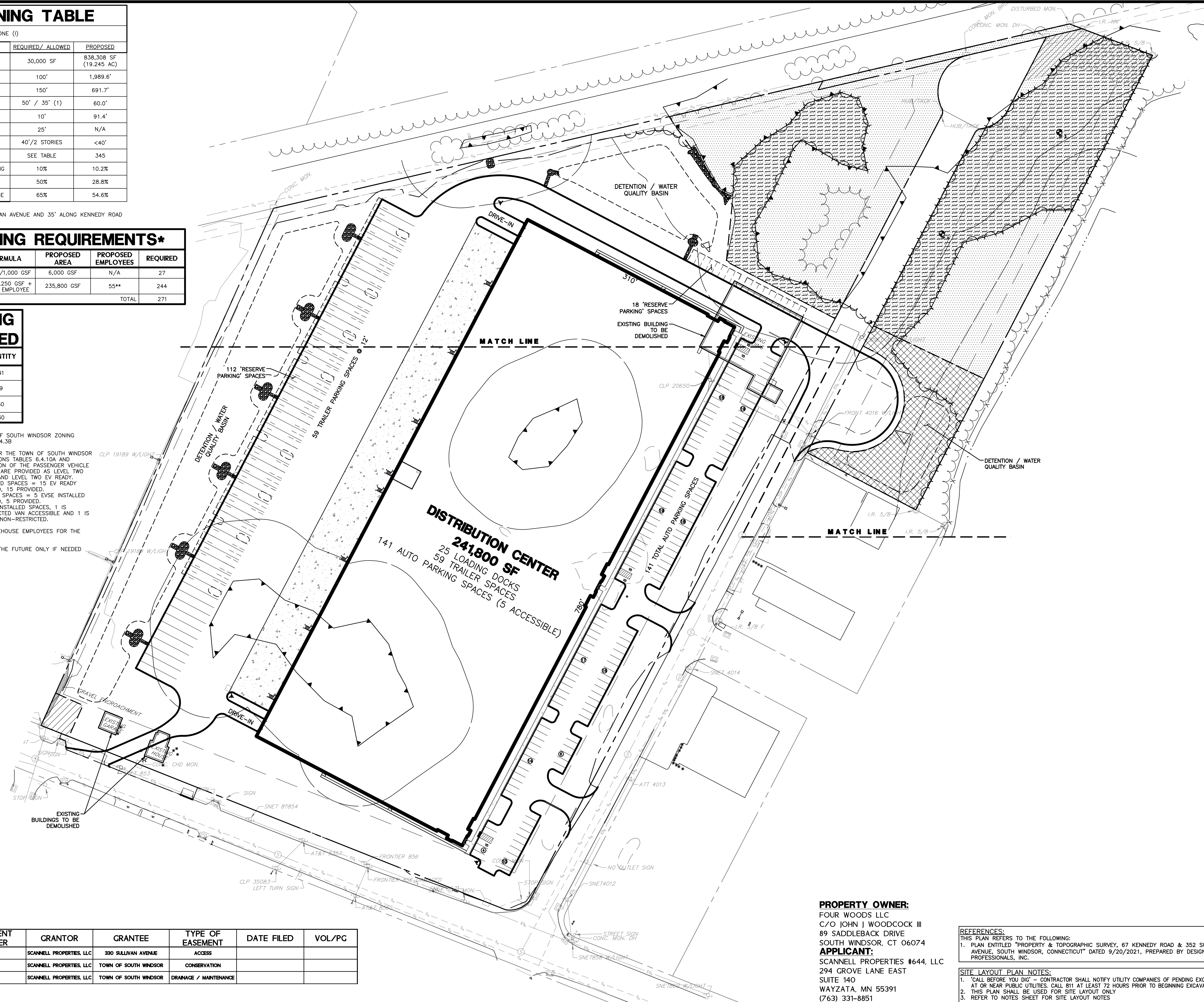
PARKING NOTES:
* PER THE TOWN OF SOUTH WINDSOR ZONING
REGULATIONS TABLE 6.4.3B

ADDITIONALLY, PER THE TOWN OF SOUTH WINDSOR ZONING REGULATIONS TABLES 6.4.10A AND 6.4.10B, A FOUR (4) SPACE PASSENGER VEHICLE PARKING SPACES ARE PROVIDED AT LEVEL TWO EYSE INSTALLED AND LEVEL TWO EY EASY. 10% OF PROPOSED SPACES = 15 EV EASY SPACES REQUIRED, 15 PROVIDED. 3% OF REQUIRED SPACES = 5 EVSE INSTALLED SPACES REQUIRED, 5 PROVIDED. OF THE 5 EVSE INSTALLED SPACES, 1 IS HANDICAP RESTRICTED VAN ACCESSIBLE AND 1 IS VAN ACCESSIBLE NON-RESTRICTED.

** NUMBER OF WAREHOUSE EMPLOYEES FOR THE LARGEST SHIFT

*** TO BE BUILT IN THE FUTURE ONLY IF NEEDED

EASEMENT NUMBER	GRANTOR	GRANTEE	TYPE OF EASEMENT	DATE FILED	VOL/PG
1	SCANNELL PROPERTIES, LLC	330 SULLIVAN AVENUE	ACCESS		
2	SCANNELL PROPERTIES, LLC	TOWN OF SOUTH WINDSOR	CONSERVATION		
3	SCANNELL PROPERTIES, LLC	TOWN OF SOUTH WINDSOR	DRAINAGE / MAINTENANCE		

**PROPERTY OWNER:**

FOUR WOODS LLC
C/O JOHN J WOODCOCK III
89 SADDLEBACK DRIVE
SOUTH WINDSOR, CT 06074

SCANNELL PRO
884 GROVE LA

WAYZATA, MN 55391

(763) 331-8851

REFERENCES:

THIS PLAN REFERS TO THE FOLLOWING:

1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC SURVEY, 67 KENNEDY ROAD & 352 SULLIVAN AVENUE, SOUTH WINDSOR, CONNECTICUT" DATED 9/20/2021, PREPARED BY DESIGN PROFESSIONALS, INC.

SITE LAYOUT PLAN NOTES:

1. 'CALL BEFORE YOU DIG' - CONTRACTOR SHALL NOTIFY UTILITY COMPANIES OF PENDING EXCAVATION AT OR NEAR PUBLIC UTILITIES. CALL 811 AT LEAST 72 HOURS PRIOR TO BEGINNING EXCAVATION.
2. THIS PLAN SHALL BE USED FOR SITE LAYOUT ONLY
3. REFER TO NOTES SHEET FOR SITE LAYOUT NOTES

SHEET

C-OS1

**67 KENNEDY ROAD
WAREHOUSE &
DISTRIBUTION CENTER
LIVAN AVENUE, 67 & 68 KENNEDY
WILTH AVENUE, CONNECTICUT 06106
95 87300352 49800067 & 49800068**

74
0068

PREPARED FOR:
Scannell Properties #644,
294 Grove Lane East
Suite 140
Wayzata, MN 55391
763-331-8851 T

- The plan is invalid unless it bears the seal or stamp and original signature of the Professional Engineer, Land Surveyor, or Landscape Architect
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Design professionals
CIVIL & TRAFFIC ENGINEERS • LAND SURVEYORS
BIOMANERS • LANDSCAPE ARCHITECTS

21 JEFFREY DRIVE
P.O. BOX 167
SOUTH WINDSOR, CT 06074
860-239-8755 • F
860-239-8757 • F
www.designprofessionalsinc.com

Appendix B

Capacity Analysis – 2022 Existing Traffic Conditions

2022 Existing Weekday A.M.

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	22	4	224	35	239	4	306	310	269	371	13
Future Volume (vph)	17	22	4	224	35	239	4	306	310	269	371	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		590	250		275	600		125
Storage Lanes	0		0	1		1	1		1	2		0
Taper Length (ft)	25			25			160			125		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.987				0.850			0.850		0.995	
Flt Protected		0.981		0.950	0.965		0.950			0.950		
Satd. Flow (prot)	0	1714	0	1491	1522	1482	1805	3312	1455	3303	3263	0
Flt Permitted		0.981		0.950	0.965		0.950			0.950		
Satd. Flow (perm)	0	1714	0	1491	1522	1482	1805	3312	1455	3303	3263	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				291			352		3	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		542			1551			985			1218	
Travel Time (s)		9.2			26.4			22.4			27.7	
Peak Hour Factor	0.80	0.80	0.80	0.82	0.82	0.82	0.88	0.88	0.88	0.75	0.75	0.75
Heavy Vehicles (%)	4%	4%	40%	15%	13%	9%	0%	9%	11%	6%	7%	100%
Adj. Flow (vph)	21	28	5	273	43	291	5	348	352	359	495	17
Shared Lane Traffic (%)				42%								
Lane Group Flow (vph)	0	54	0	158	158	291	5	348	352	359	512	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	Over	Prot	NA	
Protected Phases	8	8		4	4	1	5	2	4	1	6	
Permitted Phases						4						
Detector Phase	8	8		4	4	1	5	2	4	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	5.0	5.0	15.0	9.0	5.0	5.0	
Minimum Split (s)	10.1	10.1		15.1	15.1	12.1	11.4	22.5	15.1	12.1	22.5	
Total Split (s)	15.0	15.0		25.0	25.0	25.0	15.0	40.0	25.0	25.0	40.0	
Total Split (%)	11.2%	11.2%		18.7%	18.7%	18.7%	11.2%	29.9%	18.7%	18.7%	29.9%	
Maximum Green (s)	9.9	9.9		18.9	18.9	17.9	8.6	34.0	18.9	17.9	35.5	
Yellow Time (s)	3.0	3.0		4.2	4.2	3.0	3.0	5.0	4.2	3.0	3.5	
All-Red Time (s)	2.1	2.1		1.9	1.9	4.1	3.4	1.0	1.9	4.1	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1		6.1	6.1	7.1	6.4	6.0	6.1	7.1	4.5	
Lead/Lag				Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.0	1.0		2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	11.0
Total Split (s)	29.0
Total Split (%)	22%
Maximum Green (s)	24.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effect Green (s)		6.7		15.3	15.3	31.2	5.4	34.6	15.3	15.2	56.2	
Actuated g/C Ratio		0.07		0.16	0.16	0.33	0.06	0.37	0.16	0.16	0.60	
v/c Ratio		0.43		0.65	0.64	0.42	0.05	0.29	0.66	0.67	0.26	
Control Delay		53.7		51.6	50.6	3.7	47.2	24.0	10.9	45.0	11.5	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		53.7		51.6	50.6	3.7	47.2	24.0	10.9	45.0	11.5	
LOS		D		D	D	A	D	C	B	D	B	
Approach Delay		53.7			28.4			17.6			25.3	
Approach LOS		D			C			B			C	
Queue Length 50th (ft)		31		96	96	0	3	82	0	109	72	
Queue Length 95th (ft)		64		157	156	25	16	127	74	134	121	
Internal Link Dist (ft)		462			1471			905			1138	
Turn Bay Length (ft)						590	250		275	600		
Base Capacity (vph)		186		305	311	726	168	1220	577	641	1957	
Starvation Cap Reductn		0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0		0	0	0	0	0	0	0	0	
Storage Cap Reductn		0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.29		0.52	0.51	0.40	0.03	0.29	0.61	0.56	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 134

Actuated Cycle Length: 93.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 24.4

Intersection LOS: C

Intersection Capacity Utilization 50.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: John Fitch Boulevard & Sullivan Ave

 Ø1	 Ø2	 Ø4	 Ø7	 Ø8
25 s	40 s	25 s	29 s	15 s
 Ø5	 Ø6			
15 s	40 s			

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

Lane Group	Ø7
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	398	7	8	321	16	8	0	4	20	1	166
Future Volume (vph)	154	398	7	8	321	16	8	0	4	20	1	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	75			100			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.993			0.850			0.880	
Flt Protected	0.950			0.950			0.950				0.995	
Satd. Flow (prot)	1597	3382	0	1805	1711	0	1180	1214	0	0	1432	0
Flt Permitted	0.456			0.460			0.404				0.964	
Satd. Flow (perm)	767	3382	0	874	1711	0	502	1214	0	0	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			3			592			202	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1551			2930			119			1066	
Travel Time (s)		26.4			49.9			2.7			24.2	
Peak Hour Factor	0.78	0.78	0.78	0.85	0.85	0.85	0.80	0.80	0.80	0.82	0.82	0.82
Heavy Vehicles (%)	13%	6%	31%	0%	10%	15%	53%	0%	33%	18%	0%	16%
Adj. Flow (vph)	197	510	9	9	378	19	10	0	5	24	1	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	519	0	9	397	0	10	5	0	0	227	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Detector Phase	1	6		5	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		4.5	18.0		9.0	9.0		9.0	9.0	
Minimum Split (s)	9.0	25.3		9.0	25.3		14.0	14.0		14.0	14.0	
Total Split (s)	10.0	42.3		10.0	42.3		20.0	20.0		20.0	20.0	
Total Split (%)	9.9%	41.8%		9.9%	41.8%		19.7%	19.7%		19.7%	19.7%	
Maximum Green (s)	6.0	35.0		6.0	35.0		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.3		3.0	4.3		3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.0	7.3		4.0	7.3		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	2.5		1.5	2.5		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave
Lanes, Volumes, Timings

2022 Existing AM

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	24.0
Total Split (s)	29.0
Total Split (%)	29%
Maximum Green (s)	24.5
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	47.6	43.2		42.8	35.0		9.9	9.9			9.9	
Actuated g/C Ratio	0.71	0.64		0.64	0.52		0.15	0.15			0.15	
v/c Ratio	0.32	0.24		0.01	0.44		0.14	0.01			0.60	
Control Delay	4.7	6.1		3.4	12.2		29.1	0.0			13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	4.7	6.1		3.4	12.2		29.1	0.0			13.4	
LOS	A	A		A	B		C	A			B	
Approach Delay		5.7			12.0			19.4			13.4	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	19	34		1	90		4	0			9	
Queue Length 95th (ft)	39	76		4	160		15	0			51	
Internal Link Dist (ft)		1471			2850			39			986	
Turn Bay Length (ft)	120			125								
Base Capacity (vph)	619	2180		661	895		112	731			467	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.32	0.24		0.01	0.44		0.09	0.01			0.49	

Intersection Summary

Area Type: Other

Cycle Length: 101.3

Actuated Cycle Length: 67

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 9.0

Intersection LOS: A

Intersection Capacity Utilization 58.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave

			
Ø1	Ø2	Ø3	Ø4
10 s	42.3 s	29 s	20 s
			
Ø5	Ø6		
10 s	42.3 s		

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2022 Existing AM

Lane Group	Ø3
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
Lanes, Volumes, Timings

2022 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	284	6	6	323	20	2	0	2	6	0	31
Future Volume (vph)	115	284	6	6	323	20	2	0	2	6	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.992			0.932			0.888	
Flt Protected		0.986			0.999			0.976			0.992	
Satd. Flow (prot)	0	1746	0	0	1749	0	0	1728	0	0	1378	0
Flt Permitted		0.986			0.999			0.976			0.992	
Satd. Flow (perm)	0	1746	0	0	1749	0	0	1728	0	0	1378	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2930			1375			96			777	
Travel Time (s)		49.9			23.4			2.2			17.7	
Peak Hour Factor	0.87	0.87	0.87	0.90	0.90	0.90	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	5%	8%	4%	0%	8%	5%	0%	0%	0%	19%	0%	22%
Adj. Flow (vph)	132	326	7	7	359	22	3	0	3	8	0	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	465	0	0	388	0	0	6	0	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	53.5%						ICU Level of Service A					
Analysis Period (min)	15											

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
HCM 6th TWSC

2022 Existing AM

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	115	284	6	6	323	20	2	0	2	6	0	31
Future Vol, veh/h	115	284	6	6	323	20	2	0	2	6	0	31
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	90	90	90	80	80	80	80	80	80
Heavy Vehicles, %	5	8	4	0	8	5	0	0	0	19	0	22
Mvmt Flow	132	326	7	7	359	22	3	0	3	8	0	39
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	381	0	0	333	0	0	998	989	330	979	981	370
Stage 1	-	-	-	-	-	-	594	594	-	384	384	-
Stage 2	-	-	-	-	-	-	404	395	-	595	597	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.1	6.5	6.2	7.29	6.5	6.42
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.29	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.29	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.5	4	3.3	3.671	4	3.498
Pot Cap-1 Maneuver	1161	-	-	1238	-	-	224	249	716	214	251	633
Stage 1	-	-	-	-	-	-	495	496	-	606	615	-
Stage 2	-	-	-	-	-	-	627	608	-	463	495	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1161	-	-	1238	-	-	187	213	716	189	214	633
Mov Cap-2 Maneuver	-	-	-	-	-	-	187	213	-	189	214	-
Stage 1	-	-	-	-	-	-	426	427	-	521	611	-
Stage 2	-	-	-	-	-	-	584	604	-	397	426	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.4			0.1			17.3			13.7		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	297	1161	-	-	1238	-	-	458				
HCM Lane V/C Ratio	0.017	0.114	-	-	0.005	-	-	0.101				
HCM Control Delay (s)	17.3	8.5	0	-	7.9	0	-	13.7				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0.4	-	-	0	-	-	0.3				

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2022 Existing AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	216	32	420	11	31	321
Future Volume (vph)	216	32	420	11	31	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	130		275	260	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				40	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	1792	1615	1770	1827
Flt Permitted	0.950				0.441	
Satd. Flow (perm)	1736	1568	1792	1615	821	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		34		12		
Link Speed (mph)	30		40			40
Link Distance (ft)	548		753			538
Travel Time (s)	12.5		12.8			9.2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	3%	6%	0%	2%	4%
Adj. Flow (vph)	232	34	452	12	33	345
Shared Lane Traffic (%)						
Lane Group Flow (vph)	232	34	452	12	33	345
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	4	4	2		1	2
Permitted Phases				2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	6.5	6.5	28.0	28.0	2.5	28.0
Minimum Split (s)	11.0	11.0	34.0	34.0	7.0	34.0
Total Split (s)	24.0	24.0	34.0	34.0	12.0	34.0
Total Split (%)	34.3%	34.3%	48.6%	48.6%	17.1%	48.6%
Maximum Green (s)	19.5	19.5	28.0	28.0	7.5	28.0
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	1.0	1.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	6.0	6.0	4.5	6.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	3.0	3.0	1.5	3.0
Recall Mode	None	None	Max	Max	None	Max

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2022 Existing AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Act Effct Green (s)	11.5	11.5	28.7	28.7	31.9	28.7
Actuated g/C Ratio	0.21	0.21	0.53	0.53	0.59	0.53
v/c Ratio	0.63	0.09	0.48	0.01	0.06	0.36
Control Delay	28.1	8.2	12.6	6.2	5.4	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	8.2	12.6	6.2	5.4	11.1
LOS	C	A	B	A	A	B
Approach Delay	25.5		12.4			10.6
Approach LOS	C		B			B
Queue Length 50th (ft)	61	0	64	0	3	45
Queue Length 95th (ft)	140	18	225	9	14	162
Internal Link Dist (ft)	468		673			458
Turn Bay Length (ft)		130		275	260	
Base Capacity (vph)	639	599	948	860	630	966
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.06	0.48	0.01	0.05	0.36

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 54.2

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 15.0

Intersection LOS: B

Intersection Capacity Utilization 46.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Sullivan Ave & Ayers Road



2022 Existing Weekday P.M.

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	24	3	217	34	315	3	454	268	329	416	24
Future Volume (vph)	11	24	3	217	34	315	3	454	268	329	416	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		590	250		275	600		125
Storage Lanes	0		0	1		1	1		1	2		0
Taper Length (ft)	25			25			160			125		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.989				0.850			0.850		0.992	
Flt Protected		0.986		0.950	0.965		0.950			0.950		
Satd. Flow (prot)	0	1797	0	1603	1657	1538	1805	3438	1369	3273	3359	0
Flt Permitted		0.986		0.950	0.965		0.950			0.950		
Satd. Flow (perm)	0	1797	0	1603	1657	1538	1805	3438	1369	3273	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				362			315		5	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		542			1551			985			1218	
Travel Time (s)		9.2			26.4			22.4			27.7	
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.85	0.85	0.85	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	0%	7%	0%	5%	0%	5%	18%	7%	7%	0%
Adj. Flow (vph)	14	30	4	249	39	362	4	534	315	358	452	26
Shared Lane Traffic (%)				43%								
Lane Group Flow (vph)	0	48	0	142	146	362	4	534	315	358	478	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	Over	Prot	NA	
Protected Phases	8	8		4	4	1	5	2	4	1	6	
Permitted Phases						4						
Detector Phase	8	8		4	4	1	5	2	4	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	5.0	5.0	15.0	9.0	5.0	5.0	
Minimum Split (s)	10.1	10.1		15.1	15.1	12.1	11.4	22.5	15.1	12.1	22.5	
Total Split (s)	15.0	15.0		25.0	25.0	25.0	15.0	40.0	25.0	25.0	40.0	
Total Split (%)	11.2%	11.2%		18.7%	18.7%	18.7%	11.2%	29.9%	18.7%	18.7%	29.9%	
Maximum Green (s)	9.9	9.9		18.9	18.9	17.9	8.6	34.0	18.9	17.9	35.5	
Yellow Time (s)	3.0	3.0		4.2	4.2	3.0	3.0	5.0	4.2	3.0	3.5	
All-Red Time (s)	2.1	2.1		1.9	1.9	4.1	3.4	1.0	1.9	4.1	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1		6.1	6.1	7.1	6.4	6.0	6.1	7.1	4.5	
Lead/Lag				Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.0	1.0		2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	11.0
Total Split (s)	29.0
Total Split (%)	22%
Maximum Green (s)	24.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effect Green (s)		6.3		13.7	13.7	29.6	5.4	34.6	13.7	15.1	56.2	
Actuated g/C Ratio		0.07		0.15	0.15	0.32	0.06	0.38	0.15	0.16	0.61	
v/c Ratio		0.38		0.59	0.59	0.49	0.04	0.41	0.67	0.67	0.23	
Control Delay		50.8		48.6	48.1	3.9	46.3	24.4	12.1	43.8	10.4	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		50.8		48.6	48.1	3.9	46.3	24.4	12.1	43.8	10.4	
LOS		D		D	D	A	D	C	B	D	B	
Approach Delay		50.8			23.6			19.9			24.7	
Approach LOS		D			C			B			C	
Queue Length 50th (ft)		26		84	86	0	2	125	0	104	60	
Queue Length 95th (ft)		58		150	153	35	13	184	59	163	136	
Internal Link Dist (ft)		462			1471			905			1138	
Turn Bay Length (ft)						590	250		275	600		
Base Capacity (vph)		199		335	346	780	171	1294	535	648	2057	
Starvation Cap Reductn		0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0		0	0	0	0	0	0	0	0	
Storage Cap Reductn		0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.24		0.42	0.42	0.46	0.02	0.41	0.59	0.55	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 134

Actuated Cycle Length: 91.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 23.2

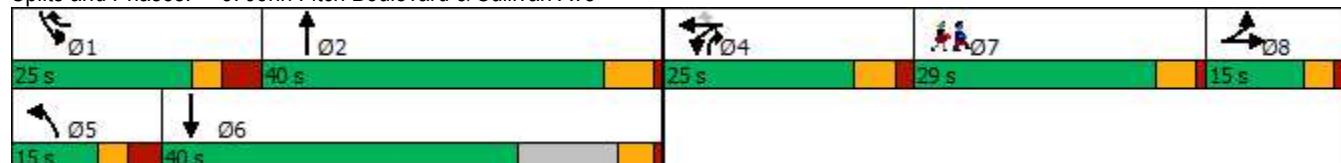
Intersection LOS: C

Intersection Capacity Utilization 51.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: John Fitch Boulevard & Sullivan Ave



3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

Lane Group	Ø7
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	441	6	4	415	22	11	1	2	53	2	124
Future Volume (vph)	137	441	6	4	415	22	11	1	2	53	2	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	75			100			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.992			0.900			0.906	
Flt Protected	0.950			0.950			0.950				0.985	
Satd. Flow (prot)	1583	3235	0	1444	1795	0	1626	1536	0	0	1521	0
Flt Permitted	0.371			0.480			0.492				0.899	
Satd. Flow (perm)	618	3235	0	730	1795	0	842	1536	0	0	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			3			2			94	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1551			2930			119			1066	
Travel Time (s)		26.4			49.9			2.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83
Heavy Vehicles (%)	14%	11%	40%	25%	4%	24%	11%	0%	17%	16%	50%	9%
Adj. Flow (vph)	146	469	6	5	472	25	13	1	2	64	2	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	146	475	0	5	497	0	13	3	0	0	215	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Detector Phase	1	6		5	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		4.5	18.0		9.0	9.0		9.0	9.0	
Minimum Split (s)	9.0	25.3		9.0	25.3		14.0	14.0		14.0	14.0	
Total Split (s)	10.0	42.3		10.0	42.3		20.0	20.0		20.0	20.0	
Total Split (%)	9.9%	41.8%		9.9%	41.8%		19.7%	19.7%		19.7%	19.7%	
Maximum Green (s)	6.0	35.0		6.0	35.0		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.3		3.0	4.3		3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.0	7.3		4.0	7.3		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	2.5		1.5	2.5		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave
Lanes, Volumes, Timings

2022 Existing PM

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	24.0
Total Split (s)	29.0
Total Split (%)	29%
Maximum Green (s)	24.5
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	47.6	43.1		42.9	35.1		12.2	12.2				12.2
Actuated g/C Ratio	0.69	0.62		0.62	0.51		0.18	0.18				0.18
v/c Ratio	0.29	0.24		0.01	0.55		0.09	0.01				0.67
Control Delay	5.6	7.1		4.2	15.1		25.0	18.7				26.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Total Delay	5.6	7.1		4.2	15.1		25.0	18.7				26.1
LOS	A	A		A	B		C	B				C
Approach Delay		6.7			14.9			23.8				26.1
Approach LOS		A			B			C				C
Queue Length 50th (ft)	17	38		1	136		5	0				47
Queue Length 95th (ft)	38	89		3	229		18	6				100
Internal Link Dist (ft)		1471			2850			39				986
Turn Bay Length (ft)	120			125								
Base Capacity (vph)	507	2013		529	909		182	334				374
Starvation Cap Reductn	0	0		0	0		0	0				0
Spillback Cap Reductn	0	0		0	0		0	0				0
Storage Cap Reductn	0	0		0	0		0	0				0
Reduced v/c Ratio	0.29	0.24		0.01	0.55		0.07	0.01				0.57

Intersection Summary

Area Type: Other

Cycle Length: 101.3

Actuated Cycle Length: 69.3

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 13.0

Intersection LOS: B

Intersection Capacity Utilization 61.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave

 Ø1	 Ø2	 Ø3	 Ø4
10 s	42.3 s	29 s	20 s
 Ø5	 Ø6		
10 s	42.3 s		

Lane Group	Ø3
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave Lanes, Volumes, Timings

2022 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	437	3	2	373	12	9	1	18	24	0	63
Future Volume (vph)	64	437	3	2	373	12	9	1	18	24	0	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.996			0.911			0.902	
Flt Protected		0.994						0.985			0.986	
Satd. Flow (prot)	0	1704	0	0	1795	0	0	1636	0	0	1595	0
Flt Permitted		0.994						0.985			0.986	
Satd. Flow (perm)	0	1704	0	0	1795	0	0	1636	0	0	1595	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2930			1375			96			777	
Travel Time (s)		49.9			23.4			2.2			17.7	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	54%	4%	75%	0%	4%	49%	3%	0%	5%	11%	0%	4%
Adj. Flow (vph)	71	486	3	2	397	13	11	1	23	30	0	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	560	0	0	412	0	0	35	0	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.7%											
Analysis Period (min)	15											
	ICU Level of Service B											

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
HCM 6th TWSC

2022 Existing PM

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	64	437	3	2	373	12	9	1	18	24	0	63
Future Vol, veh/h	64	437	3	2	373	12	9	1	18	24	0	63
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	80	80	80	80	80	80
Heavy Vehicles, %	54	4	75	0	4	49	3	0	5	11	0	4
Mvmt Flow	71	486	3	2	397	13	11	1	23	30	0	79
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	410	0	0	489	0	0	1077	1044	488	1050	1039	404
Stage 1	-	-	-	-	-	-	630	630	-	408	408	-
Stage 2	-	-	-	-	-	-	447	414	-	642	631	-
Critical Hdwy	4.64	-	-	4.1	-	-	7.13	6.5	6.25	7.21	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.21	5.5	-
Follow-up Hdwy	2.686	-	-	2.2	-	-	3.527	4	3.345	3.599	4	3.336
Pot Cap-1 Maneuver	917	-	-	1085	-	-	196	231	574	197	232	642
Stage 1	-	-	-	-	-	-	468	478	-	603	600	-
Stage 2	-	-	-	-	-	-	589	597	-	448	477	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	917	-	-	1085	-	-	158	206	574	173	207	642
Mov Cap-2 Maneuver	-	-	-	-	-	-	158	206	-	173	207	-
Stage 1	-	-	-	-	-	-	418	427	-	539	599	-
Stage 2	-	-	-	-	-	-	516	596	-	384	426	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0			18.5			18.9		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	301	917	-	-	1085	-	-	367				
HCM Lane V/C Ratio	0.116	0.078	-	-	0.002	-	-	0.296				
HCM Control Delay (s)	18.5	9.3	0	-	8.3	0	-	18.9				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.4	0.3	-	-	0	-	-	1.2				

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2022 Existing PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	206	67	498	15	79	555
Future Volume (vph)	206	67	498	15	79	555
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	130		275	260	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				40	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1599	1827	1615	1770	1881
Flt Permitted	0.950				0.315	
Satd. Flow (perm)	1770	1599	1827	1615	587	1881
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		81		17		
Link Speed (mph)	30		40			40
Link Distance (ft)	548		753			538
Travel Time (s)	12.5		12.8			9.2
Peak Hour Factor	0.83	0.83	0.88	0.88	0.94	0.94
Heavy Vehicles (%)	2%	1%	4%	0%	2%	1%
Adj. Flow (vph)	248	81	566	17	84	590
Shared Lane Traffic (%)						
Lane Group Flow (vph)	248	81	566	17	84	590
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	4	4	2		1	2
Permitted Phases				2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	6.5	6.5	28.0	28.0	2.5	28.0
Minimum Split (s)	11.0	11.0	34.0	34.0	7.0	34.0
Total Split (s)	24.0	24.0	34.0	34.0	12.0	34.0
Total Split (%)	34.3%	34.3%	48.6%	48.6%	17.1%	48.6%
Maximum Green (s)	19.5	19.5	28.0	28.0	7.5	28.0
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	1.0	1.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	6.0	6.0	4.5	6.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	3.0	3.0	1.5	3.0
Recall Mode	None	None	Max	Max	None	Max

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2022 Existing PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Act Effect Green (s)	12.6	12.6	28.6	28.6	34.3	28.6
Actuated g/C Ratio	0.21	0.21	0.48	0.48	0.58	0.48
v/c Ratio	0.66	0.20	0.65	0.02	0.19	0.65
Control Delay	30.9	6.6	18.7	6.1	6.3	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	6.6	18.7	6.1	6.3	18.8
LOS	C	A	B	A	A	B
Approach Delay	25.0		18.4			17.3
Approach LOS	C		B			B
Queue Length 50th (ft)	84	0	153	0	10	160
Queue Length 95th (ft)	138	24	#315	10	30	#372
Internal Link Dist (ft)	468		673			458
Turn Bay Length (ft)		130		275	260	
Base Capacity (vph)	591	588	877	784	505	903
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.14	0.65	0.02	0.17	0.65

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 59.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.3

Intersection LOS: B

Intersection Capacity Utilization 54.5%

ICU Level of Service A

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 12: Sullivan Ave & Ayers Road



Appendix C

Capacity Analysis – 2023 Background Traffic Conditions

2023 Background Weekday A.M.

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	22	4	268	35	254	4	308	356	285	373	13
Future Volume (vph)	17	22	4	268	35	254	4	308	356	285	373	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		590	250		275	600		125
Storage Lanes	0		0	1		1	1		1	2		0
Taper Length (ft)	25			25			160			125		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.987				0.850			0.850		0.995	
Flt Protected		0.981		0.950	0.963		0.950			0.950		
Satd. Flow (prot)	0	1714	0	1491	1518	1482	1805	3312	1455	3303	3263	0
Flt Permitted		0.981		0.950	0.963		0.950			0.950		
Satd. Flow (perm)	0	1714	0	1491	1518	1482	1805	3312	1455	3303	3263	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				310			405		3	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		542			1551			985			1218	
Travel Time (s)		9.2			26.4			22.4			27.7	
Peak Hour Factor	0.80	0.80	0.80	0.82	0.82	0.82	0.88	0.88	0.88	0.75	0.75	0.75
Heavy Vehicles (%)	4%	4%	40%	15%	13%	9%	0%	9%	11%	6%	7%	100%
Adj. Flow (vph)	21	28	5	327	43	310	5	350	405	380	497	17
Shared Lane Traffic (%)				44%								
Lane Group Flow (vph)	0	54	0	183	187	310	5	350	405	380	514	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	Over	Prot	NA	
Protected Phases	8	8		4	4	1	5	2	4	1	6	
Permitted Phases						4						
Detector Phase	8	8		4	4	1	5	2	4	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	5.0	5.0	15.0	9.0	5.0	5.0	
Minimum Split (s)	10.1	10.1		15.1	15.1	12.1	11.4	22.5	15.1	12.1	22.5	
Total Split (s)	15.0	15.0		25.0	25.0	25.0	15.0	40.0	25.0	25.0	40.0	
Total Split (%)	11.2%	11.2%		18.7%	18.7%	18.7%	11.2%	29.9%	18.7%	18.7%	29.9%	
Maximum Green (s)	9.9	9.9		18.9	18.9	17.9	8.6	34.0	18.9	17.9	35.5	
Yellow Time (s)	3.0	3.0		4.2	4.2	3.0	3.0	5.0	4.2	3.0	3.5	
All-Red Time (s)	2.1	2.1		1.9	1.9	4.1	3.4	1.0	1.9	4.1	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1		6.1	6.1	7.1	6.4	6.0	6.1	7.1	4.5	
Lead/Lag				Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.0	1.0		2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Background AM

Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	11.0
Total Split (s)	29.0
Total Split (%)	22%
Maximum Green (s)	24.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effect Green (s)		6.7		17.2	17.2	33.8	5.4	34.4	17.2	15.9	56.7	
Actuated g/C Ratio		0.07		0.18	0.18	0.35	0.06	0.36	0.18	0.17	0.59	
v/c Ratio		0.44		0.69	0.69	0.43	0.05	0.30	0.68	0.70	0.27	
Control Delay		54.9		53.1	53.0	3.6	47.5	24.9	10.6	46.4	11.9	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		54.9		53.1	53.0	3.6	47.5	24.9	10.6	46.4	11.9	
LOS		D		D	D	A	D	C	B	D	B	
Approach Delay		54.9			30.5			17.4			26.6	
Approach LOS		D			C			B			C	
Queue Length 50th (ft)		32		115	118	0	3	86	0	119	77	
Queue Length 95th (ft)		64		181	184	26	16	128	79	141	121	
Internal Link Dist (ft)		462			1471			905			1138	
Turn Bay Length (ft)						590	250		275	600		
Base Capacity (vph)		181		296	301	749	163	1184	613	621	1923	
Starvation Cap Reductn		0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0		0	0	0	0	0	0	0	0	
Storage Cap Reductn		0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.30		0.62	0.62	0.41	0.03	0.30	0.66	0.61	0.27	

Intersection Summary

Area Type: Other

Cycle Length: 134

Actuated Cycle Length: 96.3

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 25.4

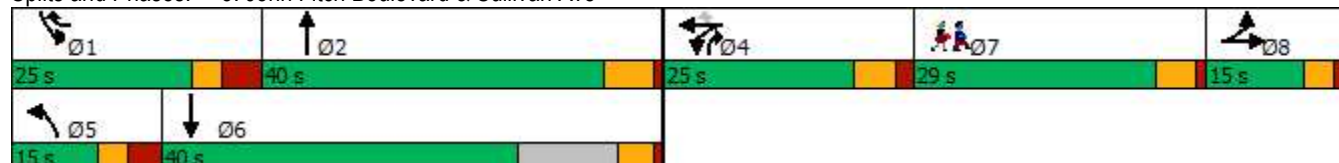
Intersection LOS: C

Intersection Capacity Utilization 51.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: John Fitch Boulevard & Sullivan Ave



Lane Group	Ø7
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	440	7	8	379	30	8	0	4	32	1	167
Future Volume (vph)	164	440	7	8	379	30	8	0	4	32	1	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	75			100			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.989			0.850			0.887	
Flt Protected	0.950			0.950			0.950				0.992	
Satd. Flow (prot)	1597	3386	0	1805	1703	0	1180	1214	0	0	1438	0
Flt Permitted	0.389			0.436			0.385				0.942	
Satd. Flow (perm)	654	3386	0	828	1703	0	478	1214	0	0	1366	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			4			575			204	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1551			2930			119			1066	
Travel Time (s)		26.4			49.9			2.7			24.2	
Peak Hour Factor	0.78	0.78	0.78	0.85	0.85	0.85	0.80	0.80	0.80	0.82	0.82	0.82
Heavy Vehicles (%)	13%	6%	31%	0%	10%	15%	53%	0%	33%	18%	0%	16%
Adj. Flow (vph)	210	564	9	9	446	35	10	0	5	39	1	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	573	0	9	481	0	10	5	0	0	244	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Detector Phase	1	6		5	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		4.5	18.0		9.0	9.0		9.0	9.0	
Minimum Split (s)	9.0	25.3		9.0	25.3		14.0	14.0		14.0	14.0	
Total Split (s)	10.0	42.3		10.0	42.3		20.0	20.0		20.0	20.0	
Total Split (%)	9.9%	41.8%		9.9%	41.8%		19.7%	19.7%		19.7%	19.7%	
Maximum Green (s)	6.0	35.0		6.0	35.0		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.3		3.0	4.3		3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.0	7.3		4.0	7.3		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	2.5		1.5	2.5		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	24.0
Total Split (s)	29.0
Total Split (%)	29%
Maximum Green (s)	24.5
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	47.9	43.5		42.9	35.1		10.4	10.4				10.4
Actuated g/C Ratio	0.71	0.64		0.63	0.52		0.15	0.15				0.15
v/c Ratio	0.39	0.26		0.02	0.55		0.14	0.01				0.64
Control Delay	5.8	6.5		3.8	14.3		28.9	0.0				15.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Total Delay	5.8	6.5		3.8	14.3		28.9	0.0				15.0
LOS	A	A		A	B		C	A				B
Approach Delay		6.3			14.1			19.3				15.0
Approach LOS		A			B			B				B
Queue Length 50th (ft)	20	38		1	117		4	0				15
Queue Length 95th (ft)	45	89		5	213		15	0				58
Internal Link Dist (ft)		1471			2850			39				986
Turn Bay Length (ft)	120			125								
Base Capacity (vph)	545	2171		628	882		106	716				461
Starvation Cap Reductn	0	0		0	0		0	0				0
Spillback Cap Reductn	0	0		0	0		0	0				0
Storage Cap Reductn	0	0		0	0		0	0				0
Reduced v/c Ratio	0.39	0.26		0.01	0.55		0.09	0.01				0.53

Intersection Summary

Area Type: Other

Cycle Length: 101.3

Actuated Cycle Length: 67.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave

			
Ø1	Ø2	Ø3	Ø4
10 s	42.3 s	29 s	20 s
			
Ø5	Ø6		
10 s	42.3 s		

Lane Group	Ø3
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave Lanes, Volumes, Timings

2023 Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	337	6	6	395	20	2	0	2	6	0	31
Future Volume (vph)	116	337	6	6	395	20	2	0	2	6	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.994			0.932			0.888	
Flt Protected		0.988			0.999			0.976			0.992	
Satd. Flow (prot)	0	1748	0	0	1751	0	0	1728	0	0	1378	0
Flt Permitted		0.988			0.999			0.976			0.992	
Satd. Flow (perm)	0	1748	0	0	1751	0	0	1728	0	0	1378	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2930			1375			96			777	
Travel Time (s)		49.9			23.4			2.2			17.7	
Peak Hour Factor	0.87	0.87	0.87	0.90	0.90	0.90	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	5%	8%	4%	0%	8%	5%	0%	0%	0%	19%	0%	22%
Adj. Flow (vph)	133	387	7	7	439	22	3	0	3	8	0	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	0	0	468	0	0	6	0	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	60.2%				ICU Level of Service B							
Analysis Period (min)	15											

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
HCM 6th TWSC

2023 Background AM

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	116	337	6	6	395	20	2	0	2	6	0	31
Future Vol, veh/h	116	337	6	6	395	20	2	0	2	6	0	31
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	90	90	90	80	80	80	80	80	80
Heavy Vehicles, %	5	8	4	0	8	5	0	0	0	19	0	22
Mvmt Flow	133	387	7	7	439	22	3	0	3	8	0	39
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	461	0	0	394	0	0	1141	1132	391	1122	1124	450
Stage 1	-	-	-	-	-	-	657	657	-	464	464	-
Stage 2	-	-	-	-	-	-	484	475	-	658	660	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.1	6.5	6.2	7.29	6.5	6.42
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.29	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.29	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.5	4	3.3	3.671	4	3.498
Pot Cap-1 Maneuver	1084	-	-	1176	-	-	179	205	662	170	207	569
Stage 1	-	-	-	-	-	-	457	465	-	547	567	-
Stage 2	-	-	-	-	-	-	568	561	-	426	463	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1084	-	-	1176	-	-	146	171	662	148	173	569
Mov Cap-2 Maneuver	-	-	-	-	-	-	146	171	-	148	173	-
Stage 1	-	-	-	-	-	-	385	392	-	461	562	-
Stage 2	-	-	-	-	-	-	525	557	-	358	390	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.2			0.1			20.4			15.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	239	1084	-	-	1176	-	-	389				
HCM Lane V/C Ratio	0.021	0.123	-	-	0.006	-	-	0.119				
HCM Control Delay (s)	20.4	8.8	0	-	8.1	0	-	15.5				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.1	0.4	-	-	0	-	-	0.4				

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Background AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	217	44	482	11	45	382
Future Volume (vph)	217	44	482	11	45	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	130		275	260	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				40	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	1792	1615	1770	1827
Flt Permitted	0.950				0.374	
Satd. Flow (perm)	1736	1568	1792	1615	697	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		47		12		
Link Speed (mph)	30		40			40
Link Distance (ft)	548		753			538
Travel Time (s)	12.5		12.8			9.2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	3%	6%	0%	2%	4%
Adj. Flow (vph)	233	47	518	12	48	411
Shared Lane Traffic (%)						
Lane Group Flow (vph)	233	47	518	12	48	411
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	4	4	2		1	2
Permitted Phases				2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	6.5	6.5	28.0	28.0	2.5	28.0
Minimum Split (s)	11.0	11.0	34.0	34.0	7.0	34.0
Total Split (s)	24.0	24.0	34.0	34.0	12.0	34.0
Total Split (%)	34.3%	34.3%	48.6%	48.6%	17.1%	48.6%
Maximum Green (s)	19.5	19.5	28.0	28.0	7.5	28.0
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	1.0	1.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	6.0	6.0	4.5	6.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	3.0	3.0	1.5	3.0
Recall Mode	None	None	Max	Max	None	Max

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Background AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Act Effect Green (s)	11.9	11.9	28.7	28.7	33.0	28.7
Actuated g/C Ratio	0.21	0.21	0.51	0.51	0.58	0.51
v/c Ratio	0.64	0.13	0.57	0.01	0.10	0.44
Control Delay	29.5	7.5	15.3	6.3	5.6	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	7.5	15.3	6.3	5.6	13.2
LOS	C	A	B	A	A	B
Approach Delay	25.8		15.1			12.4
Approach LOS	C		B			B
Queue Length 50th (ft)	78	0	131	0	5	95
Queue Length 95th (ft)	142	22	274	9	19	202
Internal Link Dist (ft)	468		673			458
Turn Bay Length (ft)		130		275	260	
Base Capacity (vph)	613	584	909	825	568	927
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.08	0.57	0.01	0.08	0.44

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 56.5

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 16.5

Intersection LOS: B

Intersection Capacity Utilization 53.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Sullivan Ave & Ayers Road



2023 Background Weekday P.M.

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	24	3	270	34	332	3	456	321	348	418	24
Future Volume (vph)	11	24	3	270	34	332	3	456	321	348	418	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		590	250		275	600		125
Storage Lanes	0		0	1		1	1		1	2		0
Taper Length (ft)	25			25			160			125		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.989				0.850			0.850		0.992	
Flt Protected		0.986		0.950	0.963		0.950			0.950		
Satd. Flow (prot)	0	1797	0	1603	1649	1538	1805	3438	1369	3273	3359	0
Flt Permitted		0.986		0.950	0.963		0.950			0.950		
Satd. Flow (perm)	0	1797	0	1603	1649	1538	1805	3438	1369	3273	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				382			378		5	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		542			1551			985			1218	
Travel Time (s)		9.2			26.4			22.4			27.7	
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.85	0.85	0.85	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	0%	7%	0%	5%	0%	5%	18%	7%	7%	0%
Adj. Flow (vph)	14	30	4	310	39	382	4	536	378	378	454	26
Shared Lane Traffic (%)				44%								
Lane Group Flow (vph)	0	48	0	174	175	382	4	536	378	378	480	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	Over	Prot	NA	
Protected Phases	8	8		4	4	1	5	2	4	1	6	
Permitted Phases						4						
Detector Phase	8	8		4	4	1	5	2	4	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	5.0	5.0	15.0	9.0	5.0	5.0	
Minimum Split (s)	10.1	10.1		15.1	15.1	12.1	11.4	22.5	15.1	12.1	22.5	
Total Split (s)	15.0	15.0		25.0	25.0	25.0	15.0	40.0	25.0	25.0	40.0	
Total Split (%)	11.2%	11.2%		18.7%	18.7%	18.7%	11.2%	29.9%	18.7%	18.7%	29.9%	
Maximum Green (s)	9.9	9.9		18.9	18.9	17.9	8.6	34.0	18.9	17.9	35.5	
Yellow Time (s)	3.0	3.0		4.2	4.2	3.0	3.0	5.0	4.2	3.0	3.5	
All-Red Time (s)	2.1	2.1		1.9	1.9	4.1	3.4	1.0	1.9	4.1	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1		6.1	6.1	7.1	6.4	6.0	6.1	7.1	4.5	
Lead/Lag				Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.0	1.0		2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Background PM

Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	11.0
Total Split (s)	29.0
Total Split (%)	22%
Maximum Green (s)	24.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		6.3		15.7	15.7	32.3	5.4	34.5	15.7	15.9	56.9	
Actuated g/C Ratio		0.07		0.17	0.17	0.34	0.06	0.37	0.17	0.17	0.60	
v/c Ratio		0.39		0.65	0.64	0.49	0.04	0.43	0.70	0.69	0.24	
Control Delay		52.2		50.5	49.4	3.8	47.0	25.7	11.7	45.3	11.0	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		52.2		50.5	49.4	3.8	47.0	25.7	11.7	45.3	11.0	
LOS		D		D	D	A	D	C	B	D	B	
Approach Delay		52.2			25.8			20.0			26.1	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)		28		107	108	0	2	136	0	115	66	
Queue Length 95th (ft)		58		181	181	36	13	185	63	172	137	
Internal Link Dist (ft)		462			1471			905			1138	
Turn Bay Length (ft)						590	250		275	600		
Base Capacity (vph)		193		325	334	805	166	1255	579	629	2023	
Starvation Cap Reductn		0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0		0	0	0	0	0	0	0	0	
Storage Cap Reductn		0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25		0.54	0.52	0.47	0.02	0.43	0.65	0.60	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 134

Actuated Cycle Length: 94.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 24.3

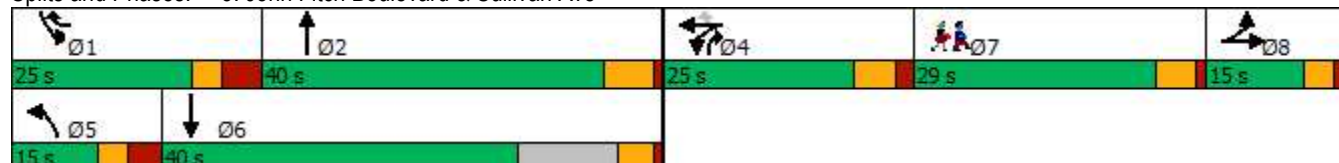
Intersection LOS: C

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: John Fitch Boulevard & Sullivan Ave



Lane Group	Ø7
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	494	6	4	470	35	11	1	2	79	2	125
Future Volume (vph)	147	494	6	4	470	35	11	1	2	79	2	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	75			100			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.990			0.900			0.918	
Flt Protected	0.950			0.950			0.950				0.981	
Satd. Flow (prot)	1583	3236	0	1444	1785	0	1626	1536	0	0	1528	0
Flt Permitted	0.298			0.454			0.507				0.873	
Satd. Flow (perm)	497	3236	0	690	1785	0	868	1536	0	0	1359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			4			2			65	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1551			2930			119			1066	
Travel Time (s)		26.4			49.9			2.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83
Heavy Vehicles (%)	14%	11%	40%	25%	4%	24%	11%	0%	17%	16%	50%	9%
Adj. Flow (vph)	156	526	6	5	534	40	13	1	2	95	2	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	532	0	5	574	0	13	3	0	0	248	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Detector Phase	1	6		5	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		4.5	18.0		9.0	9.0		9.0	9.0	
Minimum Split (s)	9.0	25.3		9.0	25.3		14.0	14.0		14.0	14.0	
Total Split (s)	10.0	42.3		10.0	42.3		20.0	20.0		20.0	20.0	
Total Split (%)	9.9%	41.8%		9.9%	41.8%		19.7%	19.7%		19.7%	19.7%	
Maximum Green (s)	6.0	35.0		6.0	35.0		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.3		3.0	4.3		3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.0	7.3		4.0	7.3		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	2.5		1.5	2.5		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	24.0
Total Split (s)	29.0
Total Split (%)	29%
Maximum Green (s)	24.5
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	47.8	43.3		42.8	35.0		15.0	15.0			15.0	
Actuated g/C Ratio	0.66	0.60		0.59	0.48		0.21	0.21			0.21	
v/c Ratio	0.37	0.27		0.01	0.66		0.07	0.01			0.74	
Control Delay	7.1	7.9		4.2	18.7		24.5	18.7			35.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	7.1	7.9		4.2	18.7		24.5	18.7			35.6	
LOS	A	A		A	B		C	B			D	
Approach Delay		7.8			18.6			23.4			35.6	
Approach LOS		A			B			C			D	
Queue Length 50th (ft)	22	49		1	183		5	0			77	
Queue Length 95th (ft)	41	101		3	279		18	6			#156	
Internal Link Dist (ft)		1471			2850			39			986	
Turn Bay Length (ft)	120			125								
Base Capacity (vph)	418	1938		485	866		180	320			333	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.37	0.27		0.01	0.66		0.07	0.01			0.74	

Intersection Summary

Area Type: Other

Cycle Length: 101.3

Actuated Cycle Length: 72.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 16.5

Intersection LOS: B

Intersection Capacity Utilization 67.4%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave

			
Ø1	Ø2	Ø3	Ø4
10 s	42.3 s	29 s	20 s
			
Ø5	Ø6		
10 s	42.3 s		

Lane Group	Ø3
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave Lanes, Volumes, Timings

2023 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	516	3	2	441	12	9	1	18	24	0	63
Future Volume (vph)	64	516	3	2	441	12	9	1	18	24	0	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.996			0.911			0.902	
Flt Protected		0.995						0.985			0.986	
Satd. Flow (prot)	0	1720	0	0	1799	0	0	1636	0	0	1595	0
Flt Permitted		0.995						0.985			0.986	
Satd. Flow (perm)	0	1720	0	0	1799	0	0	1636	0	0	1595	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2930			1375			96			777	
Travel Time (s)		49.9			23.4			2.2			17.7	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	54%	4%	75%	0%	4%	49%	3%	0%	5%	11%	0%	4%
Adj. Flow (vph)	71	573	3	2	469	13	11	1	23	30	0	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	647	0	0	484	0	0	35	0	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	71.5%						ICU Level of Service C					
Analysis Period (min)	15											

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
HCM 6th TWSC

2023 Background PM

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	64	516	3	2	441	12	9	1	18	24	0	63
Future Vol, veh/h	64	516	3	2	441	12	9	1	18	24	0	63
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	80	80	80	80	80	80
Heavy Vehicles, %	54	4	75	0	4	49	3	0	5	11	0	4
Mvmt Flow	71	573	3	2	469	13	11	1	23	30	0	79
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	482	0	0	576	0	0	1236	1203	575	1209	1198	476
Stage 1	-	-	-	-	-	-	717	717	-	480	480	-
Stage 2	-	-	-	-	-	-	519	486	-	729	718	-
Critical Hdwy	4.64	-	-	4.1	-	-	7.13	6.5	6.25	7.21	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.21	5.5	-
Follow-up Hdwy	2.686	-	-	2.2	-	-	3.527	4	3.345	3.599	4	3.336
Pot Cap-1 Maneuver	857	-	-	1007	-	-	152	186	512	153	187	585
Stage 1	-	-	-	-	-	-	419	437	-	550	558	-
Stage 2	-	-	-	-	-	-	538	554	-	401	436	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	857	-	-	1007	-	-	119	163	512	132	164	585
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	163	-	132	164	-
Stage 1	-	-	-	-	-	-	368	384	-	483	556	-
Stage 2	-	-	-	-	-	-	464	552	-	336	383	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0			22.6			23.6		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	239	857	-	-	1007	-	-	301				
HCM Lane V/C Ratio	0.146	0.083	-	-	0.002	-	-	0.361				
HCM Control Delay (s)	22.6	9.6	0	-	8.6	0	-	23.6				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.5	0.3	-	-	0	-	-	1.6				

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Background PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	207	83	572	15	92	627
Future Volume (vph)	207	83	572	15	92	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	130		275	260	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				40	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1599	1827	1615	1770	1881
Flt Permitted	0.950				0.240	
Satd. Flow (perm)	1770	1599	1827	1615	447	1881
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		100		17		
Link Speed (mph)	30		40			40
Link Distance (ft)	548		753			538
Travel Time (s)	12.5		12.8			9.2
Peak Hour Factor	0.83	0.83	0.88	0.88	0.94	0.94
Heavy Vehicles (%)	2%	1%	4%	0%	2%	1%
Adj. Flow (vph)	249	100	650	17	98	667
Shared Lane Traffic (%)						
Lane Group Flow (vph)	249	100	650	17	98	667
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	4	4	2		1	2
Permitted Phases				2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	6.5	6.5	28.0	28.0	2.5	28.0
Minimum Split (s)	11.0	11.0	34.0	34.0	7.0	34.0
Total Split (s)	24.0	24.0	34.0	34.0	12.0	34.0
Total Split (%)	34.3%	34.3%	48.6%	48.6%	17.1%	48.6%
Maximum Green (s)	19.5	19.5	28.0	28.0	7.5	28.0
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	1.0	1.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	6.0	6.0	4.5	6.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	3.0	3.0	1.5	3.0
Recall Mode	None	None	Max	Max	None	Max

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Background PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Act Effect Green (s)	12.7	12.7	28.6	28.6	34.5	28.6
Actuated g/C Ratio	0.21	0.21	0.48	0.48	0.58	0.48
v/c Ratio	0.66	0.24	0.74	0.02	0.26	0.74
Control Delay	31.2	6.5	22.7	6.3	7.1	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	6.5	22.7	6.3	7.1	22.4
LOS	C	A	C	A	A	C
Approach Delay	24.1		22.3			20.4
Approach LOS	C		C			C
Queue Length 50th (ft)	85	0	189	0	11	194
Queue Length 95th (ft)	140	26	#432	11	34	#456
Internal Link Dist (ft)	468		673			458
Turn Bay Length (ft)		130		275	260	
Base Capacity (vph)	589	599	873	781	436	899
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.17	0.74	0.02	0.22	0.74

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 59.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 21.9

Intersection LOS: C

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 12: Sullivan Ave & Ayers Road



Appendix D

Capacity Analysis – 2023 Build Traffic Conditions

2023 Build Weekday A.M.

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	22	4	274	35	256	4	308	377	291	373	13
Future Volume (vph)	17	22	4	274	35	256	4	308	377	291	373	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		590	250		275	600		125
Storage Lanes	0		0	1		1	1		1	2		0
Taper Length (ft)	25			25			160			125		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.987				0.850			0.850		0.995	
Flt Protected		0.981		0.950	0.963		0.950			0.950		
Satd. Flow (prot)	0	1714	0	1491	1517	1482	1805	3312	1455	3303	3263	0
Flt Permitted		0.981		0.950	0.963		0.950			0.950		
Satd. Flow (perm)	0	1714	0	1491	1517	1482	1805	3312	1455	3303	3263	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				312			428		3	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		542			1551			985			1218	
Travel Time (s)		9.2			26.4			22.4			27.7	
Peak Hour Factor	0.80	0.80	0.80	0.82	0.82	0.82	0.88	0.88	0.88	0.75	0.75	0.75
Heavy Vehicles (%)	4%	4%	40%	15%	13%	9%	0%	9%	11%	6%	7%	100%
Adj. Flow (vph)	21	28	5	334	43	312	5	350	428	388	497	17
Shared Lane Traffic (%)				44%								
Lane Group Flow (vph)	0	54	0	187	190	312	5	350	428	388	514	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	Over	Prot	NA	
Protected Phases	8	8		4	4	1	5	2	4	1	6	
Permitted Phases						4						
Detector Phase	8	8		4	4	1	5	2	4	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	5.0	5.0	15.0	9.0	5.0	5.0	
Minimum Split (s)	10.1	10.1		15.1	15.1	12.1	11.4	22.5	15.1	12.1	22.5	
Total Split (s)	15.0	15.0		25.0	25.0	25.0	15.0	40.0	25.0	25.0	40.0	
Total Split (%)	11.2%	11.2%		18.7%	18.7%	18.7%	11.2%	29.9%	18.7%	18.7%	29.9%	
Maximum Green (s)	9.9	9.9		18.9	18.9	17.9	8.6	34.0	18.9	17.9	35.5	
Yellow Time (s)	3.0	3.0		4.2	4.2	3.0	3.0	5.0	4.2	3.0	3.5	
All-Red Time (s)	2.1	2.1		1.9	1.9	4.1	3.4	1.0	1.9	4.1	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1		6.1	6.1	7.1	6.4	6.0	6.1	7.1	4.5	
Lead/Lag				Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.0	1.0		2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	11.0
Total Split (s)	29.0
Total Split (%)	22%
Maximum Green (s)	24.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		6.7		17.5	17.5	34.5	5.4	34.4	17.5	16.2	57.0	
Actuated g/C Ratio		0.07		0.18	0.18	0.36	0.06	0.36	0.18	0.17	0.59	
v/c Ratio		0.45		0.70	0.69	0.43	0.05	0.30	0.70	0.70	0.27	
Control Delay		55.1		53.4	53.1	3.6	47.5	25.1	10.6	46.5	12.0	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		55.1		53.4	53.1	3.6	47.5	25.1	10.6	46.5	12.0	
LOS		E		D	D	A	D	C	B	D	B	
Approach Delay		55.1			30.7			17.4			26.8	
Approach LOS		E			C			B			C	
Queue Length 50th (ft)		32		118	121	0	3	87	0	122	77	
Queue Length 95th (ft)		64		185	187	25	16	128	83	144	121	
Internal Link Dist (ft)		462			1471			905			1138	
Turn Bay Length (ft)						590	250		275	600		
Base Capacity (vph)		179		294	299	750	162	1175	630	617	1920	
Starvation Cap Reductn		0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0		0	0	0	0	0	0	0	0	
Storage Cap Reductn		0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.30		0.64	0.64	0.42	0.03	0.30	0.68	0.63	0.27	

Intersection Summary

Area Type: Other

Cycle Length: 134

Actuated Cycle Length: 96.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 25.5

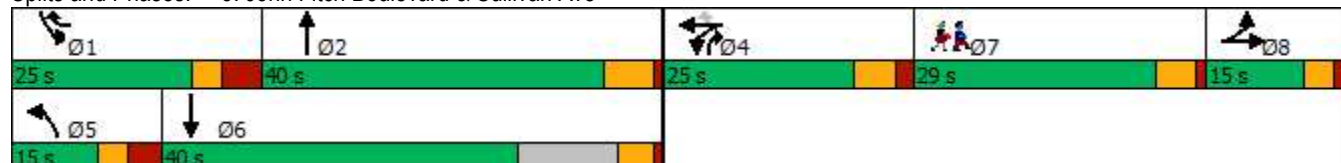
Intersection LOS: C

Intersection Capacity Utilization 52.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: John Fitch Boulevard & Sullivan Ave



3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

Lane Group	Ø7
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	467	7	8	387	30	8	0	4	33	1	167
Future Volume (vph)	164	467	7	8	387	30	8	0	4	33	1	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	75			100			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.989			0.850			0.888	
Flt Protected	0.950			0.950			0.950				0.992	
Satd. Flow (prot)	1597	3387	0	1805	1703	0	1180	1214	0	0	1440	0
Flt Permitted	0.382			0.422			0.385				0.941	
Satd. Flow (perm)	642	3387	0	802	1703	0	478	1214	0	0	1366	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			4			567			204	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1551			2930			119			1066	
Travel Time (s)		26.4			49.9			2.7			24.2	
Peak Hour Factor	0.78	0.78	0.78	0.85	0.85	0.85	0.80	0.80	0.80	0.82	0.82	0.82
Heavy Vehicles (%)	13%	6%	31%	0%	10%	15%	53%	0%	33%	18%	0%	16%
Adj. Flow (vph)	210	599	9	9	455	35	10	0	5	40	1	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	608	0	9	490	0	10	5	0	0	245	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Detector Phase	1	6		5	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		4.5	18.0		9.0	9.0		9.0	9.0	
Minimum Split (s)	9.0	25.3		9.0	25.3		14.0	14.0		14.0	14.0	
Total Split (s)	10.0	42.3		10.0	42.3		20.0	20.0		20.0	20.0	
Total Split (%)	9.9%	41.8%		9.9%	41.8%		19.7%	19.7%		19.7%	19.7%	
Maximum Green (s)	6.0	35.0		6.0	35.0		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.3		3.0	4.3		3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.0	7.3		4.0	7.3		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	2.5		1.5	2.5		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	24.0
Total Split (s)	29.0
Total Split (%)	29%
Maximum Green (s)	24.5
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	47.9	43.5		42.9	35.0		10.4	10.4			10.4	
Actuated g/C Ratio	0.71	0.64		0.63	0.52		0.15	0.15			0.15	
v/c Ratio	0.39	0.28		0.02	0.56		0.14	0.01			0.64	
Control Delay	5.9	6.6		3.8	14.5		28.9	0.0			15.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	5.9	6.6		3.8	14.5		28.9	0.0			15.1	
LOS	A	A		A	B		C	A			B	
Approach Delay		6.4			14.3			19.3			15.1	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	20	41		1	120		4	0			15	
Queue Length 95th (ft)	45	95		5	219		15	0			59	
Internal Link Dist (ft)		1471			2850			39			986	
Turn Bay Length (ft)	120			125								
Base Capacity (vph)	538	2172		613	882		106	710			461	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.39	0.28		0.01	0.56		0.09	0.01			0.53	

Intersection Summary

Area Type: Other

Cycle Length: 101.3

Actuated Cycle Length: 67.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 10.4

Intersection LOS: B

Intersection Capacity Utilization 63.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave

 Ø1	 Ø2	 Ø3	 Ø4
10 s	42.3 s	29 s	20 s
 Ø5	 Ø6		
10 s	42.3 s		

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

Lane Group	Ø3
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave Lanes, Volumes, Timings

2023 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	337	6	6	395	33	2	0	2	10	0	39
Future Volume (vph)	144	337	6	6	395	33	2	0	2	10	0	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.990			0.932			0.893	
Flt Protected		0.985			0.999			0.976			0.990	
Satd. Flow (prot)	0	1745	0	0	1746	0	0	1728	0	0	1384	0
Flt Permitted		0.985			0.999			0.976			0.990	
Satd. Flow (perm)	0	1745	0	0	1746	0	0	1728	0	0	1384	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2930			1375			96			777	
Travel Time (s)		49.9			23.4			2.2			17.7	
Peak Hour Factor	0.87	0.87	0.87	0.90	0.90	0.90	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	5%	8%	4%	0%	8%	5%	0%	0%	0%	19%	0%	22%
Adj. Flow (vph)	166	387	7	7	439	37	3	0	3	13	0	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	560	0	0	483	0	0	6	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	62.5%						ICU Level of Service B					
Analysis Period (min)	15											

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
HCM 6th TWSC

2023 Build AM

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	144	337	6	6	395	33	2	0	2	10	0	39
Future Vol, veh/h	144	337	6	6	395	33	2	0	2	10	0	39
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	90	90	90	80	80	80	80	80	80
Heavy Vehicles, %	5	8	4	0	8	5	0	0	0	19	0	22
Mvmt Flow	166	387	7	7	439	37	3	0	3	13	0	49
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	476	0	0	394	0	0	1219	1213	391	1196	1198	458
Stage 1	-	-	-	-	-	-	723	723	-	472	472	-
Stage 2	-	-	-	-	-	-	496	490	-	724	726	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.1	6.5	6.2	7.29	6.5	6.42
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.29	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.29	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.5	4	3.3	3.671	4	3.498
Pot Cap-1 Maneuver	1071	-	-	1176	-	-	159	183	662	151	187	563
Stage 1	-	-	-	-	-	-	421	434	-	542	562	-
Stage 2	-	-	-	-	-	-	559	552	-	391	433	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1071	-	-	1176	-	-	122	145	662	127	149	563
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	145	-	127	149	-
Stage 1	-	-	-	-	-	-	337	348	-	434	558	-
Stage 2	-	-	-	-	-	-	507	548	-	312	347	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.7			0.1			22.9			18.3		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	206	1071	-	-	1176	-	-	331				
HCM Lane V/C Ratio	0.024	0.155	-	-	0.006	-	-	0.185				
HCM Control Delay (s)	22.9	9	0	-	8.1	0	-	18.3				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.1	0.5	-	-	0	-	-	0.7				

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Build AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	217	45	494	11	45	386
Future Volume (vph)	217	45	494	11	45	386
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	130		275	260	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				40	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	1792	1615	1770	1827
Flt Permitted	0.950				0.363	
Satd. Flow (perm)	1736	1568	1792	1615	676	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		48		12		
Link Speed (mph)	30		40			40
Link Distance (ft)	548		753			538
Travel Time (s)	12.5		12.8			9.2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	3%	6%	0%	2%	4%
Adj. Flow (vph)	233	48	531	12	48	415
Shared Lane Traffic (%)						
Lane Group Flow (vph)	233	48	531	12	48	415
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	4	4	2		1	2
Permitted Phases				2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	6.5	6.5	28.0	28.0	2.5	28.0
Minimum Split (s)	11.0	11.0	34.0	34.0	7.0	34.0
Total Split (s)	24.0	24.0	34.0	34.0	12.0	34.0
Total Split (%)	34.3%	34.3%	48.6%	48.6%	17.1%	48.6%
Maximum Green (s)	19.5	19.5	28.0	28.0	7.5	28.0
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	1.0	1.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	6.0	6.0	4.5	6.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	3.0	3.0	1.5	3.0
Recall Mode	None	None	Max	Max	None	Max

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Build AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Act Effect Green (s)	11.9	11.9	28.7	28.7	33.0	28.7
Actuated g/C Ratio	0.21	0.21	0.51	0.51	0.58	0.51
v/c Ratio	0.64	0.13	0.58	0.01	0.10	0.45
Control Delay	29.5	7.6	15.7	6.3	5.6	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	7.6	15.7	6.3	5.6	13.3
LOS	C	A	B	A	A	B
Approach Delay	25.7		15.5			12.5
Approach LOS	C		B			B
Queue Length 50th (ft)	78	0	135	0	5	96
Queue Length 95th (ft)	142	22	284	9	19	204
Internal Link Dist (ft)	468		673			458
Turn Bay Length (ft)		130		275	260	
Base Capacity (vph)	613	585	909	825	558	927
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.08	0.58	0.01	0.09	0.45

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 56.5

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 16.6

Intersection LOS: B

Intersection Capacity Utilization 53.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: Sullivan Ave & Ayers Road



2023 Build Weekday P.M.

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	24	3	290	34	338	3	456	328	350	418	24
Future Volume (vph)	11	24	3	290	34	338	3	456	328	350	418	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		590	250		275	600		125
Storage Lanes	0		0	1		1	1		1	2		0
Taper Length (ft)	25			25			160			125		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	0.95
Frt		0.989				0.850			0.850		0.992	
Flt Protected		0.986		0.950	0.962		0.950			0.950		
Satd. Flow (prot)	0	1797	0	1603	1645	1538	1805	3438	1369	3273	3359	0
Flt Permitted		0.986		0.950	0.962		0.950			0.950		
Satd. Flow (perm)	0	1797	0	1603	1645	1538	1805	3438	1369	3273	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				389			386		5	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		542			1551			985			1218	
Travel Time (s)		9.2			26.4			22.4			27.7	
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.85	0.85	0.85	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	0%	7%	0%	5%	0%	5%	18%	7%	7%	0%
Adj. Flow (vph)	14	30	4	333	39	389	4	536	386	380	454	26
Shared Lane Traffic (%)				44%								
Lane Group Flow (vph)	0	48	0	186	186	389	4	536	386	380	480	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	Over	Prot	NA	
Protected Phases	8	8		4	4	1	5	2	4	1	6	
Permitted Phases						4						
Detector Phase	8	8		4	4	1	5	2	4	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	5.0	5.0	15.0	9.0	5.0	5.0	
Minimum Split (s)	10.1	10.1		15.1	15.1	12.1	11.4	22.5	15.1	12.1	22.5	
Total Split (s)	15.0	15.0		25.0	25.0	25.0	15.0	40.0	25.0	25.0	40.0	
Total Split (%)	11.2%	11.2%		18.7%	18.7%	18.7%	11.2%	29.9%	18.7%	18.7%	29.9%	
Maximum Green (s)	9.9	9.9		18.9	18.9	17.9	8.6	34.0	18.9	17.9	35.5	
Yellow Time (s)	3.0	3.0		4.2	4.2	3.0	3.0	5.0	4.2	3.0	3.5	
All-Red Time (s)	2.1	2.1		1.9	1.9	4.1	3.4	1.0	1.9	4.1	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.1		6.1	6.1	7.1	6.4	6.0	6.1	7.1	4.5	
Lead/Lag				Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.0	1.0		2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

Lane Group	Ø7
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	7
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	11.0
Total Split (s)	29.0
Total Split (%)	22%
Maximum Green (s)	24.0
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		6.3		16.5	16.5	33.3	5.4	34.5	16.5	16.0	56.9	
Actuated g/C Ratio		0.07		0.17	0.17	0.35	0.06	0.36	0.17	0.17	0.60	
v/c Ratio		0.39		0.67	0.65	0.49	0.04	0.43	0.69	0.69	0.24	
Control Delay		52.7		51.0	49.7	3.8	47.0	26.1	11.3	45.7	11.2	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		52.7		51.0	49.7	3.8	47.0	26.1	11.3	45.7	11.2	
LOS		D		D	D	A	D	C	B	D	B	
Approach Delay		52.7			26.5			20.1			26.5	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)		28		116	115	0	2	140	0	118	69	
Queue Length 95th (ft)		58		193	191	36	13	185	64	173	137	
Internal Link Dist (ft)		462			1471			905			1138	
Turn Bay Length (ft)						590	250		275	600		
Base Capacity (vph)		191		321	330	816	164	1242	583	622	2005	
Starvation Cap Reductn		0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0		0	0	0	0	0	0	0	0	
Storage Cap Reductn		0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.25		0.58	0.56	0.48	0.02	0.43	0.66	0.61	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 134

Actuated Cycle Length: 95.4

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 24.7

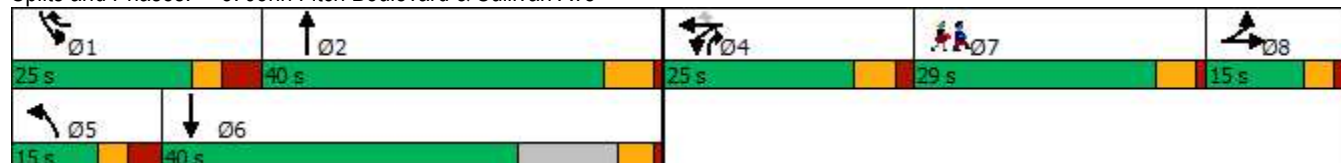
Intersection LOS: C

Intersection Capacity Utilization 54.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: John Fitch Boulevard & Sullivan Ave



3: John Fitch Boulevard & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

Lane Group	Ø7
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	503	6	4	496	36	11	1	2	80	2	125
Future Volume (vph)	147	503	6	4	496	36	11	1	2	80	2	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	75			100			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.990			0.900			0.918	
Flt Protected	0.950			0.950			0.950				0.981	
Satd. Flow (prot)	1583	3236	0	1444	1785	0	1626	1536	0	0	1527	0
Flt Permitted	0.275			0.450			0.507				0.872	
Satd. Flow (perm)	458	3236	0	684	1785	0	868	1536	0	0	1358	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			4			2			64	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1551			2930			119			1066	
Travel Time (s)		26.4			49.9			2.7			24.2	
Peak Hour Factor	0.94	0.94	0.94	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83
Heavy Vehicles (%)	14%	11%	40%	25%	4%	24%	11%	0%	17%	16%	50%	9%
Adj. Flow (vph)	156	535	6	5	564	41	13	1	2	96	2	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	541	0	5	605	0	13	3	0	0	249	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Detector Phase	1	6		5	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		4.5	18.0		9.0	9.0		9.0	9.0	
Minimum Split (s)	9.0	25.3		9.0	25.3		14.0	14.0		14.0	14.0	
Total Split (s)	10.0	42.3		10.0	42.3		20.0	20.0		20.0	20.0	
Total Split (%)	9.9%	41.8%		9.9%	41.8%		19.7%	19.7%		19.7%	19.7%	
Maximum Green (s)	6.0	35.0		6.0	35.0		15.0	15.0		15.0	15.0	
Yellow Time (s)	3.0	4.3		3.0	4.3		3.2	3.2		3.2	3.2	
All-Red Time (s)	1.0	3.0		1.0	3.0		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.0	7.3		4.0	7.3		5.0	5.0			5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	2.5		1.5	2.5		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	24.0
Total Split (s)	29.0
Total Split (%)	29%
Maximum Green (s)	24.5
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None

6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	47.8	43.3		42.8	35.0		15.0	15.0			15.0	
Actuated g/C Ratio	0.66	0.60		0.59	0.48		0.21	0.21			0.21	
v/c Ratio	0.39	0.28		0.01	0.70		0.07	0.01			0.75	
Control Delay	7.5	8.0		4.2	19.8		24.5	18.7			36.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	7.5	8.0		4.2	19.8		24.5	18.7			36.2	
LOS	A	A		A	B		C	B			D	
Approach Delay		7.9			19.7			23.4			36.2	
Approach LOS		A			B			C			D	
Queue Length 50th (ft)	22	50		1	198		5	0			78	
Queue Length 95th (ft)	41	102		3	302		18	6			#158	
Internal Link Dist (ft)		1471			2850			39			986	
Turn Bay Length (ft)	120			125								
Base Capacity (vph)	396	1938		482	866		180	320			332	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.39	0.28		0.01	0.70		0.07	0.01			0.75	

Intersection Summary

Area Type: Other

Cycle Length: 101.3

Actuated Cycle Length: 72.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 17.1

Intersection LOS: B

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: 137 Sullivan Ave Driveway/Rye Street & Sullivan Ave

 Ø1	 Ø2	 Ø3	 Ø4
10 s	42.3 s	29 s	20 s
 Ø5	 Ø6		
10 s	42.3 s		

Lane Group	Ø3
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave Lanes, Volumes, Timings

2023 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	516	3	2	441	17	9	1	18	37	0	90
Future Volume (vph)	74	516	3	2	441	17	9	1	18	37	0	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.995			0.911			0.904	
Flt Protected		0.994						0.985			0.986	
Satd. Flow (prot)	0	1707	0	0	1790	0	0	1636	0	0	1597	0
Flt Permitted		0.994						0.985			0.986	
Satd. Flow (perm)	0	1707	0	0	1790	0	0	1636	0	0	1597	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		2930			1375			96			777	
Travel Time (s)		49.9			23.4			2.2			17.7	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	54%	4%	75%	0%	4%	49%	3%	0%	5%	11%	0%	4%
Adj. Flow (vph)	82	573	3	2	469	18	11	1	23	46	0	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	658	0	0	489	0	0	35	0	0	159	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	75.5%											
Analysis Period (min)	15											
	ICU Level of Service D											

8: 425 Sullivan Ave Driveway/Kennedy Road & Sullivan Ave
HCM 6th TWSC

2023 Build PM

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	74	516	3	2	441	17	9	1	18	37	0	90
Future Vol, veh/h	74	516	3	2	441	17	9	1	18	37	0	90
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	80	80	80	80	80	80
Heavy Vehicles, %	54	4	75	0	4	49	3	0	5	11	0	4
Mvmt Flow	82	573	3	2	469	18	11	1	23	46	0	113
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	487	0	0	576	0	0	1278	1230	575	1233	1222	478
Stage 1	-	-	-	-	-	-	739	739	-	482	482	-
Stage 2	-	-	-	-	-	-	539	491	-	751	740	-
Critical Hdwy	4.64	-	-	4.1	-	-	7.13	6.5	6.25	7.21	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.21	5.5	-
Follow-up Hdwy	2.686	-	-	2.2	-	-	3.527	4	3.345	3.599	4	3.336
Pot Cap-1 Maneuver	853	-	-	1007	-	-	142	179	512	147	181	583
Stage 1	-	-	-	-	-	-	408	427	-	549	557	-
Stage 2	-	-	-	-	-	-	525	552	-	389	426	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	853	-	-	1007	-	-	102	153	512	124	155	583
Mov Cap-2 Maneuver	-	-	-	-	-	-	102	153	-	124	155	-
Stage 1	-	-	-	-	-	-	350	366	-	471	555	-
Stage 2	-	-	-	-	-	-	422	550	-	318	366	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0			24.9			33.2		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	216	853	-	-	1007	-	-	281				
HCM Lane V/C Ratio	0.162	0.096	-	-	0.002	-	-	0.565				
HCM Control Delay (s)	24.9	9.7	0	-	8.6	0	-	33.2				
HCM Lane LOS	C	A	A	-	A	A	-	D				
HCM 95th %tile Q(veh)	0.6	0.3	-	-	0	-	-	3.2				

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Build PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	207	84	576	15	93	639
Future Volume (vph)	207	84	576	15	93	639
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	130		275	260	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				40	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1599	1827	1615	1770	1881
Flt Permitted	0.950				0.236	
Satd. Flow (perm)	1770	1599	1827	1615	440	1881
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		101		17		
Link Speed (mph)	30		40			40
Link Distance (ft)	548		753			538
Travel Time (s)	12.5		12.8			9.2
Peak Hour Factor	0.83	0.83	0.88	0.88	0.94	0.94
Heavy Vehicles (%)	2%	1%	4%	0%	2%	1%
Adj. Flow (vph)	249	101	655	17	99	680
Shared Lane Traffic (%)						
Lane Group Flow (vph)	249	101	655	17	99	680
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	4	4	2		1	2
Permitted Phases				2	2	
Detector Phase	4	4	2	2	1	2
Switch Phase						
Minimum Initial (s)	6.5	6.5	28.0	28.0	2.5	28.0
Minimum Split (s)	11.0	11.0	34.0	34.0	7.0	34.0
Total Split (s)	24.0	24.0	34.0	34.0	12.0	34.0
Total Split (%)	34.3%	34.3%	48.6%	48.6%	17.1%	48.6%
Maximum Green (s)	19.5	19.5	28.0	28.0	7.5	28.0
Yellow Time (s)	3.5	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	1.0	1.0	2.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	6.0	6.0	4.5	6.0
Lead/Lag			Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	3.0	3.0	1.5	3.0
Recall Mode	None	None	Max	Max	None	Max

12: Sullivan Ave & Ayers Road Lanes, Volumes, Timings

2023 Build PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Act Effect Green (s)	12.7	12.7	28.6	28.6	34.5	28.6
Actuated g/C Ratio	0.21	0.21	0.48	0.48	0.58	0.48
v/c Ratio	0.66	0.24	0.75	0.02	0.26	0.76
Control Delay	31.2	6.5	23.0	6.3	7.2	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	6.5	23.0	6.3	7.2	23.0
LOS	C	A	C	A	A	C
Approach Delay	24.1		22.5			21.0
Approach LOS	C		C			C
Queue Length 50th (ft)	85	0	192	0	12	201
Queue Length 95th (ft)	140	27	#436	11	34	#469
Internal Link Dist (ft)	468		673			458
Turn Bay Length (ft)		130		275	260	
Base Capacity (vph)	589	599	873	780	433	898
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.17	0.75	0.02	0.23	0.76

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 59.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 59.4%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 12: Sullivan Ave & Ayers Road



Appendix E

Trip Generation Analysis

Land Use: 150

Warehousing

Description

A warehouse is primarily devoted to the storage of materials, but it may also include office and maintenance areas. High-cube transload and short-term storage warehouse (Land Use 154), high-cube fulfillment center warehouse (Land Use 155), high-cube parcel hub warehouse (Land Use 156), and high-cube cold storage warehouse (Land Use 157) are related uses.

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 California, Connecticut, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, and Texas.

Source Numbers

184, 331, 406, 411, 443, 579, 583, 596, 598, 611, 619, 642, 752, 869, 875, 876, 914, 940, 1050

Warehousing (150)

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

Setting/Location: General Urban/Suburban

Number of Studies: 31

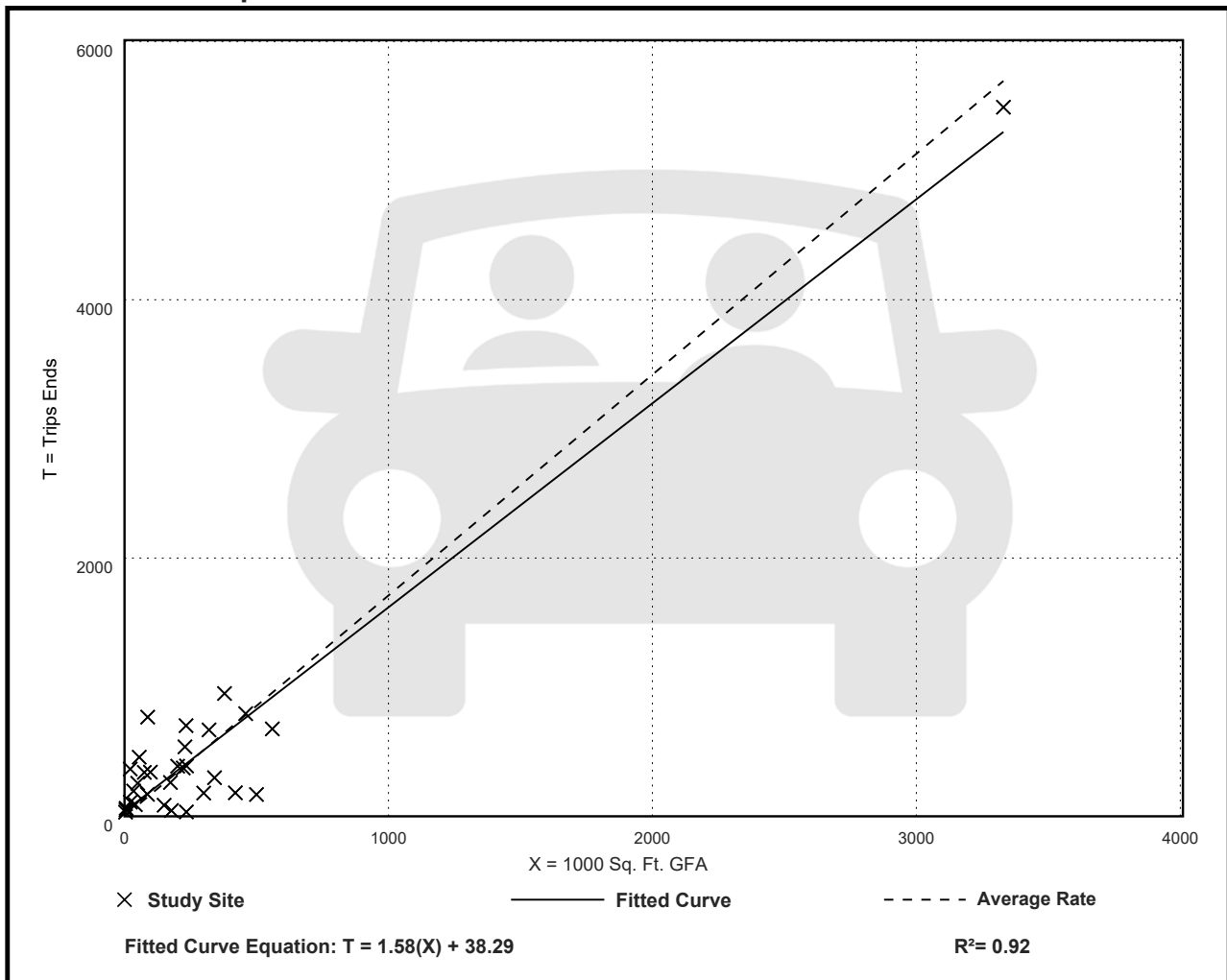
Avg. 1000 Sq. Ft. GFA: 292

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.71	0.15 - 16.93	1.48

Data Plot and Equation



$$\text{Trips} = 1.58 \times (241.8) + 38.29 = 420 \text{ Total Trips}$$

Warehousing (150)

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: 36

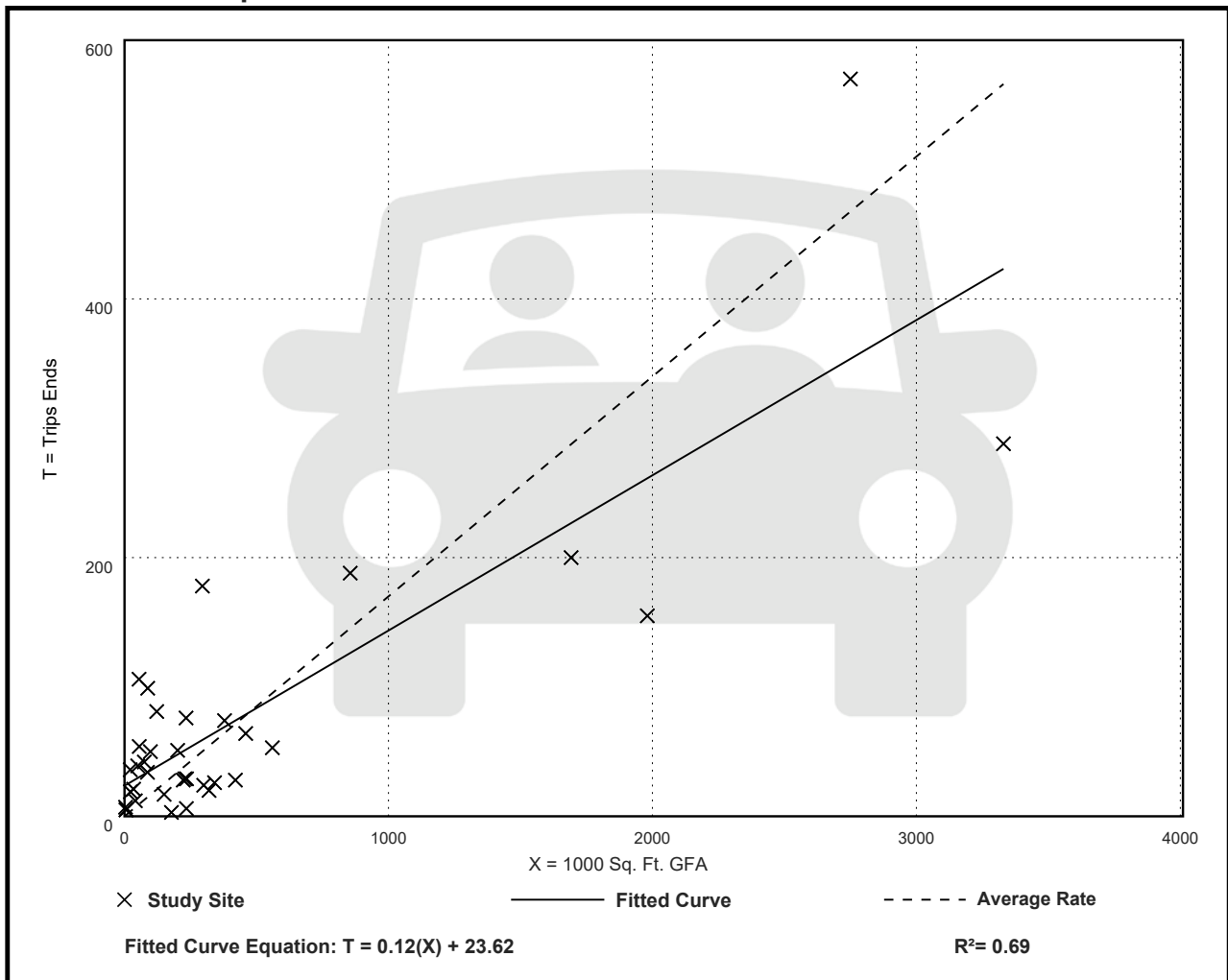
Avg. 1000 Sq. Ft. GFA: 448

Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.19

Data Plot and Equation



$$\text{Trips} = 0.12 \times (241.8) + 23.62 = 53 \text{ Total Trips}$$

Warehousing (150)

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: 49

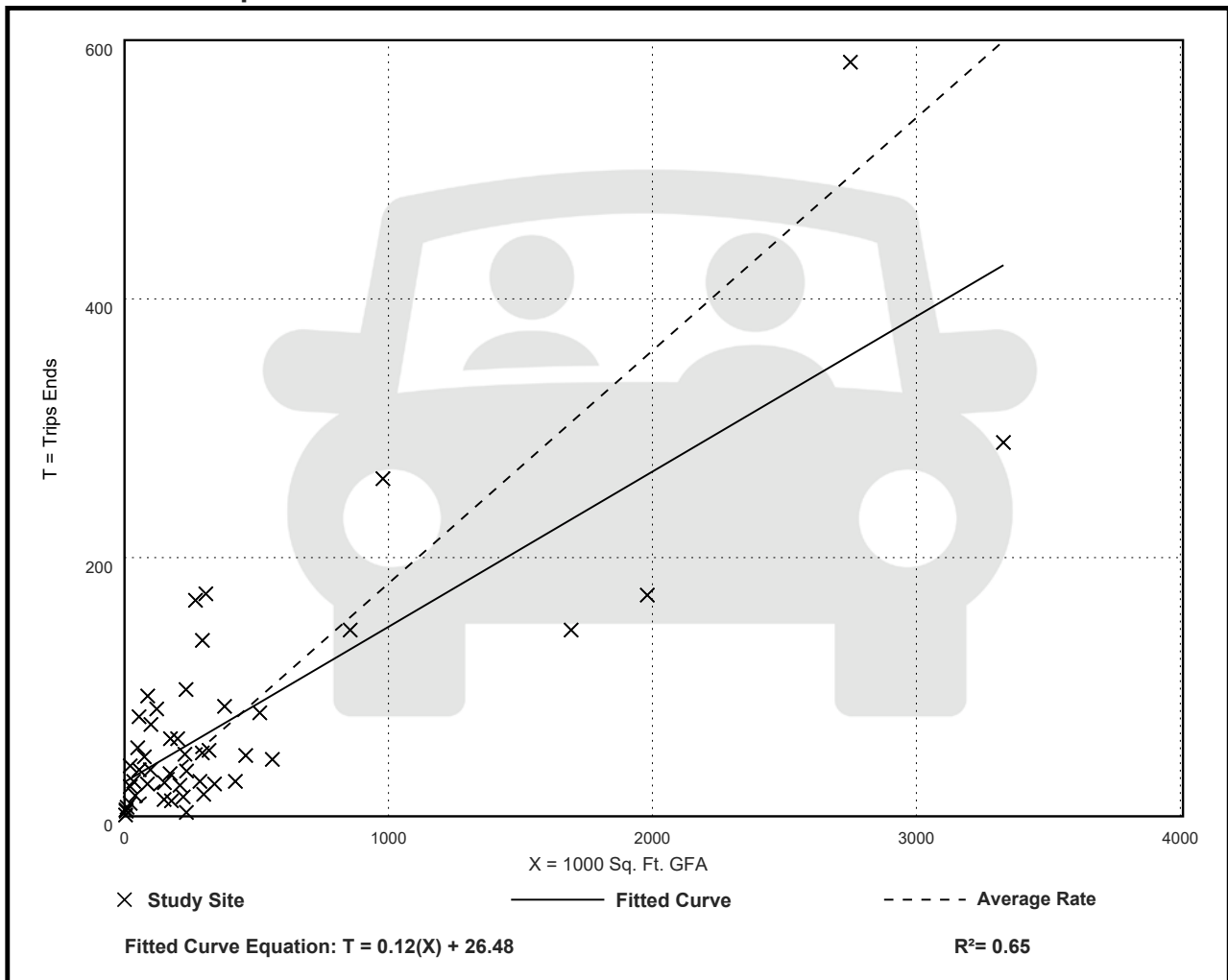
Avg. 1000 Sq. Ft. GFA: 400

Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.18	0.01 - 1.80	0.18

Data Plot and Equation



$$\text{Trips} = 0.12(241.8) + 24.68 = 55 \text{ Total Trips}$$

Warehousing (150)

Truck Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 12

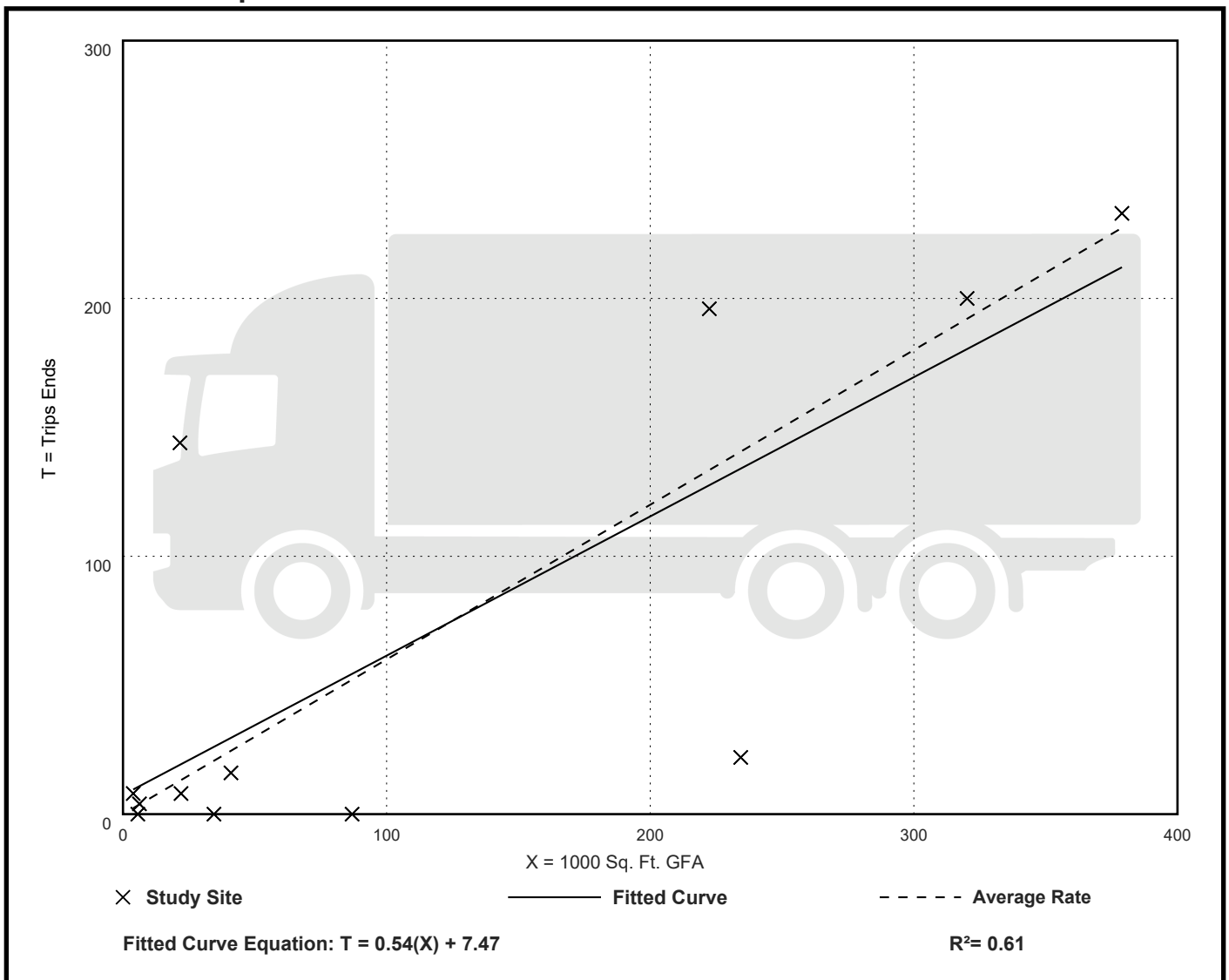
Avg. 1000 Sq. Ft. GFA: 115

Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.60	0.00 - 6.66	0.86

Data Plot and Equation



Truck Trips = $0.54 \times (241.8) + 7.47 = 138$ Truck Trips

TRUCK ADT		
TIME	PERCENTAGE	TOTAL
12:00 - 1:00 AM	0.3%	1
1:00 - 2:00 AM	0.2%	0
2:00 - 3:00 AM	1.3%	2
3:00 - 4:00 AM	1.3%	2
4:00 - 5:00 AM	2.4%	3
5:00 - 6:00 AM	3.5%	5
6:00 - 7:00 AM	4.4%	6
7:00 - 8:00 AM	5.3%	8
8:00 - 9:00 AM	5.5%	8
9:00 - 10:00 AM	9.9%	14
10:00 - 11:00 AM	9.7%	13
11:00 - 12:00 PM	11.2%	15
12:00 - 1:00 PM	6.8%	9
1:00 - 2:00 PM	8.0%	11
2:00 - 3:00 PM	6.1%	8
3:00 - 4:00 PM	9.3%	13
4:00 - 5:00 PM	6.9%	10
5:00 - 6:00 PM	3.9%	5
6:00 - 7:00 PM	0.9%	1
7:00 - 8:00 PM	0.6%	1
8:00 - 9:00 PM	1.6%	2
9:00 - 10:00 PM	0.8%	1
10:00 - 11:00 PM	0.0%	0
11:00 - 12:00 AM	0.2%	0
	Total	138

Appendix F

Signal Warrant Analysis

Existing Intersection

Signal Warrant Summary - Sullivan Ave and Kennedy Road

Time	2022 Existing Major Street Volumes (Sullivan Ave EB & WB Approaches)	2022 Existing Minor Street Volumes (Kennedy Road SB Approach)	Warrant 1, Eight-Hour Vehicular Volume (Condition A 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition A 80% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 80% Factor) Satisfied	Warrant 2, Four-Hour Vehicular Volume (100% Factor) Satisfied	Warrant 3, Peak Hour (100% Factor) Satisfied
12:00 AM	144	42						
1:00	108	64						
2:00	118	138						
3:00	146	100						
4:00	188	34						
5:00	382	34						
6:00	784	46						
7:00	1224	92		X		X	X	
8:00	1212	258	X	X	X	X	X	X
9:00	1096	394	X	X	X	X	X	X
10:00	1114	132		X	X	X	X	
11:00	1308	88		X		X	X	X
12:00 PM	1348	72				X		
1:00	1324	82		X		X	X	
2:00	1454	116		X		X	X	X
3:00	1610	116		X		X	X	X
4:00	1740	172	X	X	X	X	X	X
5:00	1596	200	X	X	X	X	X	X
6:00	1204	196	X	X	X	X	X	
7:00	818	56						
8:00	656	94				X		
9:00	386	82						
10:00	282	214						
11:00	222	70						
Numbers of Hours Warrant Thresholds Exceeded:			5	11	6		11	7

Notes:

- 1) Existing volumes taken from counts collected by Traffic DataBank from 2/9/2022.
- 2) As shown in the table above, the traffic volumes satisfy traffic signal warrants 1-3 outlined in the MUTCD guidelines.

Proposed Warehouse
Signal Warrant Summary - Sullivan Ave and Kennedy Road

Time	2022 Existing Major Street Volumes (Sullivan Ave EB & WB Approaches)	2023 Background Major Street Volumes (Sullivan Ave EB & WB Approaches)	Trip Generation Entering Volumes (Added to Sullivan Ave EB & WB Approaches)	2023 Build Major Street Volumes (Sullivan Ave EB & WB Approaches)	2022 Existing Minor Street Volumes (Kennedy Road SB Approach)	2023 Background Minor Street Volumes (Kennedy Road SB Approach)	Trip Generation Exiting Volumes (Kennedy Road SB Approach)	2023 Build Minor Street Volumes (Kennedy Road SB Approach)	Warrant 1, Eight-Hour Vehicular Volume (Condition A 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 100% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition A 80% Factor) Satisfied	Warrant 1, Eight-Hour Vehicular Volume (Condition B 80% Factor) Satisfied	Warrant 2, Four-Hour Vehicular Volume (100% Factor) Satisfied	Warrant 3, Peak Hour (100% Factor) Satisfied
12:00 AM	144	145	1	146	42	42	1	43						
1:00	108	109	2	111	64	64	2	66						
2:00	118	119	1	120	138	139	1	140						
3:00	146	147	2	149	100	101	2	103						
4:00	188	189	5	194	34	34	5	39						
5:00	382	384	13	397	34	34	13	47						
6:00	784	788	25	813	46	46	25	71				X		
7:00	1224	1230	27	1257	92	92	27	119		X		X	X	
8:00	1212	1218	26	1244	258	259	26	285	X	X	X	X	X	X
9:00	1096	1101	30	1131	394	396	30	426	X	X	X	X	X	X
10:00	1114	1120	25	1145	132	133	25	158	X	X	X	X	X	
11:00	1308	1315	31	1346	88	88	31	119		X		X	X	X
12:00 PM	1348	1355	36	1391	72	72	36	108		X		X		
1:00	1324	1331	26	1357	82	82	26	108		X		X	X	
2:00	1454	1461	30	1491	116	117	30	147		X	X	X	X	X
3:00	1610	1618	38	1656	116	117	38	155	X	X	X	X	X	X
4:00	1740	1749	31	1780	172	173	31	204	X	X	X	X	X	X
5:00	1596	1604	28	1632	200	201	28	229	X	X	X	X	X	X
6:00	1204	1210	16	1226	196	197	16	213	X	X	X	X	X	
7:00	818	822	5	827	56	56	5	61				X		
8:00	656	659	3	662	94	94	3	97				X		
9:00	386	388	9	397	82	82	9	91						
10:00	282	283	4	287	214	215	4	219						
11:00	222	223	4	227	70	70	4	74						
Numbers of Hours Warrant Thresholds Exceeded:									7	12	8		11	7

- Notes:
- 1) Existing volumes taken from counts collected by Traffic DataBank from 2/9/2022. A growth rate of 0.5% has been used to project 2022 volumes to 2023.
 - 2) Trip Generation Entering Volumes were added to the 2022 Background Major Street Volumes to obtain the 2023 Build Major Street Volumes.
 - 3) Trip Generation Exiting Volumes were added to the 2022 Background Minor Street Volumes to obtain the 2023 Build Minor Street Volumes.
 - 2) As shown in the table above, the traffic volumes satisfy traffic signal warrants 1-3 outlined in the MUTCD guidelines.