



July 27, 2018

Mr. Jason DiIulio
Facilities Engineer
Regeneron Pharmaceuticals, Inc.
81 Columbia Turnpike
Rensselaer, NY 12144

Re: Regeneron Pharmaceuticals, Inc., Tempel Lane Campus; Revised Phasing Plan; CHA Project No. 33295

Dear Mr. DiIulio:

This memo is provided to update the March 2018 Traffic Impact Study (TIS) completed for Regeneron Pharmaceuticals, Inc. for the Tempel Lane site in East Greenbush, NY to reflect proposed changes in the development sequencing of the project and minor changes in the development program, and to address the Town Engineer's comment letter dated 7/20/18.

The purpose of this memo is to identify the effects of these changes on the traffic mitigation measures and sequence of implementation as previously identified and approved by the Town of East Greenbush.

Background

The March 2018 TIS analyzed the site with 208,000 SF of warehouse, 165,000 SF of manufacturing, and an 1,150-employee office/laboratory space for R&D. The project was proposed at the time to be constructed in the following phases:

- Phase 1 – 208,000 SF Warehouse (while a smaller warehouse was referenced in the text of the March 2018 TIS, the trip generation utilized in the analyses was based on 208,000 SF as noted in Table 4 in the TIS)
- Phase 2 – 1,150 employee office/laboratory space
- Phase 3 and 3a – 165,000 SF Manufacturing

Development Program Changes

Subsequent to the completion of the March 2018 TIS, there have been several changes to the development program at Regeneron's Temple Lane Campus pertaining both to the configuration of uses and the sequencing of construction. These changes are as follows:

- Modified construction phasing;
- Increased building size of the final constructed size of the warehouse in Phase 1;
- Increased building size and number of employees for the manufacturing use; and
- Decreased number of employees for the office/lab use.

The current phasing plan will now have the manufacturing constructed in Phase 2 and the office/lab constructed in Phase 3. It is assumed that the construction of both of these phases will begin in 2018, with the manufacturing being completed first in early 2020 and the office/lab completed in late 2020.

A comparison of the previously approved SFEIS, the March 2018 TIS, and the current proposed development is provided in Table 1. As shown, the total number of employees for the current proposed development scenario is the same as the March 2018 TIS.

Table 1
Comparison of Development Program

Development Phase	Approved SFEIS Development Scenario	March 2018 TIS	Current Proposed Development Scenario
Phase 1	Warehouse 187,000 SF* / 150 employees	Warehouse 208,000 SF / 150 employees	Warehouse 212,300 SF / 145 employees
Phase 2	Office/Lab 750 employees	Office/Lab 1,150 employees	Manufacturing 184,000 SF / 300 employees
Phase 3	Manufacturing 165,000 SF / 200 employees	Manufacturing 165,000 SF / 200 employees	Office/Lab 1,055 employees
Total Employees	1,100	1,500	1,500

* Was analyzed with 208,000 SF

In addition, the preferred site access connection to 3rd Avenue Extension is now to extend Tempel Lane to 3rd Avenue Extension opposite Cedar Crest Drive (Alternative 2 in the March 2018 TIS), rather than a private access on 3rd Avenue Extension opposite of Woodlawn Avenue (Alternative 1 in March 2018 TIS). The extension of Tempel Lane to 3rd Avenue Extension is also NYSDOT's preference as stated in their June 12, 2018 review letter. This connection will be completed prior to the opening of the office/lab (Phase 3).

This memo will evaluate the effect of the changes in Regeneron's site phasing plan and the changes in their site plan.

Site Generated Traffic

To be consistent with the Original October 2016 TIS and the March 2018 TIS update, the ITE Trip Generation Manual, 9th Edition was used to calculate the trip generation for the increase in size of the manufacturing



and warehouse components of the project, using land use code (LUC) 140 and LUC 150, respectively. ITE LUC 760 was used for the reduction in the number of office/lab employees.

Warehouse

While the building footprint of the Warehouse (166,350 SF) is referenced in the March 2018 TIS, the trip generation utilized in the analyses was based on the gross floor area (208,000 SF) as noted in Table 4 in the March 2018 TIS. Table 2 below shows the trip generation of the warehouse facility based on the previous development concepts as well as for the current size of the facility (212,300 SF). Table 2 also shows the estimated trip generation based on employment rather than building size. The ITE trip generation data for this land use has a better statistical correlation of trips based on employment than based on building size. However, the estimated trip generation using the data correlated to employment is lower than based on building size. As this use is already approved, is currently under construction, and to be consistent with the October 2016 TIS and the March 2018 TIS, the gross SF calculations were used for this update. The final warehouse gross SF that has been constructed on the site is 212,300 SF. This increase in size results in 2 additional AM trips and 1 additional PM trip to the study network.

Table 2
Warehouse Trip Generation Estimates

Land Use	Weekday AM			Weekday PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Warehouse 166,350 SF	86	23	109	21	62	83
Warehouse 208,000 SF (March 2018 TIS)	97	26	123	24	71	95
Warehouse 145 Employees	53	21	74	30	56	86
Warehouse 212,300 SF	99	26	125	24	72	96

It should be noted that there will be an office component to the warehouse to accommodate 145 desks for the warehouse employees, and not additional employees. ITE's LUC 150 for warehouse states that, "Warehouses are primarily devoted to the storage of materials, but they may also include office and maintenance areas." As the office space will be used for the warehouse employees, not additional employees, and can be included in the warehouse trip generation, the office space was not broken out as part of the trip generation.

Manufacturing

Due to the significant difference between the building footprint and the gross floor area for the manufacturing, the trip generation for this use was reviewed based on the gross floor area of the building, the building footprint, and the number of employees. A summary of the trip generation based on these variables and the trip generation from the March 2018 TIS is provided in Table 3. As shown, the trip generation based on the manufacturing building footprint (184,000 SF) aligns with the trip generation based on the number of employees (300) for the site, with the total trips within four trips of each other. The trip



generation based on the gross floor area (346,110 SF) is not consistent with the trip generation based on the number of employees (approximately 115 trip difference). The ITE trip generation data for this land use shows a better statistical correlation of peak-hour trip generation to employment rather than building size. The ITE trip data points of actual trip generation at comparably-sized manufacturing sites are also lower than the calculated values using building size as the independent variable. Based on these considerations it is concluded that total gross floor area would not be an appropriate basis for estimating the trips for this land use.

To be consistent with the October 2016 TIS and the March 2018 TIS, the trip generation of the manufacturing component of the project was based on the size of the building footprint (SF) for this update. The trip generation estimate resulting from this method is also comparable to the employment-based estimate. The increase in the manufacturing size results in 14 additional AM and PM peak hour trips when compared to the estimate used in the March 2018 TIS.

Table 3
Manufacturing Trip Generation Estimates

Land Use	Weekday AM			Weekday PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Manufacturing 165,000 SF (March 2018 TIS)	94	26	120	43	77	120
Manufacturing 184,000 SF (Current Update)	105	29	134	48	86	134
Manufacturing 300 Employees	100	37	137	61	77	138
Manufacturing 346,110 SF	197	56	253	91	162	253

Office/Lab

The office/lab component of the site is now estimated to accommodate 1,055 employees versus the 1,150 employees in the March 2018 TIS. This reduction in staff levels is estimated to reduce the trip generation by 31 trips in the AM peak hour and 39 trips in the PM peak hour, as shown in Table 4.

Table 4
Office/Lab Trip Generation Estimates

Land Use	Weekday AM			Weekday PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Office/lab 1,150 Employees	387	63	450	47	425	472
Office/lab 1,055 Employees	360	59	419	43	390	433



Full Build - Trip Generation

Table 5
Revised Trip Generation – July 2018

Land Use	Weekday AM			Weekday PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Warehouse 212,300 SF	99	26	125	24	72	96
Manufacturing 184,000 SF	105	29	134	48	86	134
Office/Lab 1,055 Employees	360	59	419	43	390	433
July 2018 Total	564	114	678	115	548	663
March 2018 Total	578	115	693	114	573	687
Difference in Trip Generation	-14	-1	-15	1	-25	-24

While the number of employees will remain the same as the March 2018 TIS at the Tempel Lane site, the number of estimated site trips is estimated to be reduced, due to the reallocation of employees to different uses. As shown in Table 5, it is estimated that there will be 15 fewer AM and 24 fewer PM peak hour trips with the change in the site plan. It is therefore concluded that the findings of the Full Build Analysis from the March 2018 TIS will remain the same and do not need to be updated as a result of this change to the development program.

However, the higher warehouse and manufacturing trip generation numbers were used for this memo update for the purposes of analyzing the changed construction phasing (i.e., manufacturing facility preceding the office/lab facility). This will provide a conservative analysis, to determine what, if any, mitigation described in Section 5.3 of the March 2018 TIS, is required for site traffic associated with the combined warehouse and manufacturing site traffic (Phase 2).

Site Plan Phasing

Phase 1

Phase 1 of the Regeneron site plan consists of a 212,300 SF warehouse. This phase has been approved by the Town of East Greenbush and is currently under construction. No mitigation was identified for this phase at the study area intersections. Site traffic on the Regeneron driveway access to Tempel Lane will be monitored after completion of Phase 1 to confirm that the site trips are consistent with the Tempel Lane Campus – Supplemental Final Environmental Impact Statement which was approved by the Town of East Greenbush in May 2017. If the site trip generation exceeds the projected trip generation by 10%, then Regeneron will install automatic traffic recorders (ATRs) to count hourly traffic volumes over the course of an entire day on each approach of the NY Route 151 & Tempel Lane intersection and conduct a signal warrant evaluation at this location. Recommendations based on this analysis will then be provided.



Phase 2

Phase 2 of the Regeneron site plan consists of the warehouse constructed in Phase 1 and 184,000 SF of manufacturing. It is estimated that the warehouse and manufacturing will generate 259 total trips (204 in, 55 out) during the AM peak hour and 230 total trips (72 in, 158 out) during the PM peak hour. The traffic operations for this construction phase were tested without an access to 3rd Avenue Extension, as Tempel Lane would not be extended by the time the manufacturing was open. The site trips for Phase 2 were distributed to the study intersections based on the directional distribution used for Phase 1, which are provided in Appendix A. To determine what, if any, improvements will be needed for Phase 2, the study intersections were analyzed for the AM and PM peak hours.

It was found that all movements for Phase 2 will operate at the same LOS as No-Build with the exception of the following:

AM Peak Hour

- US Route 4 & I-90 Eastbound Ramps
 - Eastbound right – LOS B to LOS C
- US Route 4 & Grandview Drive/Greenbush Commons
 - Southbound left – LOS B to LOS C

PM Peak Hour

- US Route 4 & Grandview Drive/Greenbush Commons
 - Northbound thru/right – Increase of approximately 9 seconds of LOS F delay
- Red Mill Road (NY Route 151) & Tempel Lane
 - Southbound left/right – LOS C to LOS D

As shown in Tables 6 and 7, while there is a change in LOS when compared to No-Build for these movements, all are still estimated to operate at LOS D or better with the exception of the northbound thru/right movement at US Route 4 & Grandview Drive/Greenbush Commons which is over capacity in the PM No-Build condition. As it is estimated that there will be less than 10 seconds of added delay per vehicle for the northbound thru/right movement at US Route 4 & Grandview Drive/Greenbush Commons, mitigation is not recommended for this Phase. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted for these locations for Phase 2 of the development.

Left-Turn Lane Warrants

A left-turn lane warrant was reviewed for the Red Mill Road (NY Route 151) & Tempel Lane intersection for the Phase 2 development, and is provided in Appendix A. Since the measured 85th percentile speeds on Red Mill Road varied between 48 and 55 mph (eastbound and westbound, respectively), the volumes were compared to the guideline for both a 50 mph and 60mph operating speed. It was found that a left-turn lane is warranted for both the AM and PM peak hours for both conditions.

While a left-turn lane is warranted for this phase, due to the low volume of the movement (58 AM, 25 PM) and the acceptable LOS for the movement (LOS A for both peak periods), it is recommended that the installation of this left-turn lane be deferred until Phase 3 so that all turn lanes would be installed concurrently (eastbound left-turn, westbound right-turn, and southbound left-turn) with the installation of the traffic signal in Phase 3.



The Tempel Lane & Hotel Access Road left-turn lane warrant was not reviewed as it is not warranted in the full build-out of the site. The Tempel Lane & Regeneron Access and 3rd Avenue Extension & Tempel Lane left-turn lane warrants were not reviewed since Tempel Lane will not be extended for Phase 2.

Signal Warrants

A signal warrant analysis was reviewed for the Red Mill Road (NY Route 151) & Tempel Lane intersection for the Phase 2 development and is provided in Appendix A. Hourly volumes were developed for Red Mill Road using the hourly distribution patterns from the ATR data collected on Red Mill Road applied to the peak hour traffic estimated for the Phase 2 Build conditions. For Tempel Lane, hourly volumes were estimated by applying the hourly volume distributions presented in the *Village at Tempel Farms Traffic Impact Study* (CME, 2006) to the peak hour volumes for the existing traffic on Tempel lane and the site generated trips for the hotel that was recently constructed. Hourly volumes for the proposed Regeneron site were estimated by applying the hourly volume distribution at the existing campus on Discovery Drive to the peak hour site generated traffic.

As with the full build-out of the site, only the peak hour warrant is met for two hours of the day. It is not recommended that a signal be installed based on only meeting the peak hour warrant for this Phase. It is recommended that the signal be installed concurrently with the installation of the turn lanes for the Phase 3 development. However, the intersection will be monitored after the completion of Phase 2 for the installation of a traffic signal. It should be noted that the intersection will also be monitored for a signal after the completion of Phase 1 if the volumes on the Regeneron site driveway exceed the projected trip generation by 10% per Resolution 52-2017.

The signal warrant for the 3rd Avenue Extension & Tempel Lane intersection was not reviewed since Tempel Lane will not be extended for Phase 2.

Phase 3

Phase 3 of the Regeneron site plan includes the warehouse constructed in Phase 1, manufacturing constructed in Phase 2, and an office/lab building with 1,055 employees. For this phase, Tempel Lane will be extended to 3rd Avenue Extension opposite of Cedar Crest Drive, providing a northbound left/thru lane and a right-turn lane at the intersection. In addition, all mitigation recommended in the March 2018 TIS will be implemented, which includes the following:

- US Route 4 & Grandview Drive/Greenbush Commons
 - Optimization of signal splits
- US Route 4 & 3rd Avenue Extension
 - Optimization of signal splits
- Red Mill Road (NY Route 151 & Tempel Lane)
 - Construct an eastbound left-turn lane, westbound right-turn lane, and southbound right-turn lane consistent with the proposed geometry in the Village at Tempel Farms Traffic Impact Study
 - Construct a traffic signal (with pedestrian equipment)
- 3rd Avenue Extension & Tempel Lane
 - Construct an eastbound and westbound two-way-left-turn lane
 - Monitor the intersection for the installation of a traffic signal



- US Route 4 & Red Mill Road (NY Route 151)
 - Modify the roundabout to include two lanes northbound and southbound consistent with the improvements identified in the Village at Tempel Farms and Route 4 Corridor studies.
 - Modify the eastbound approach to allow a left-turn movement from both lanes
- US Route 4 & Hotel Access (Hampton Inn)
 - Construct a southbound right-turn lane on Route 4
- Tempel Lane
 - Construct a southbound left-turn lane on Tempel Lane at the Regeneron Access

At the Tempel Lane & Regeneron Access, the following lane geometry will be provided:

- Southbound left-turn lane
- Southbound thru lane
- Northbound thru/right lane
- Westbound left/right lane
- Two inbound lanes to Regeneron

Intersection Monitoring Recommendations

Since the project will be constructed in phases, it is recommended that a traffic monitoring program be implemented. This would include bi-annual traffic counts at the site to confirm the trip generation after each phase of development. For Phase 1, if the site trip generation exceeds the projected trip generation by 10%, then Regeneron will install automatic traffic recorders (ATRs) to count hourly traffic volumes over the course of an entire day on each approach of the NY Route 151 & Tempel Lane intersection and conduct a signal warrant evaluation at this location. Recommendations based on this analysis will then be provided. For phases 2 and 3, intersections that are noted to be monitored in the future for traffic signal installation (Phase 2 – NY Route 151 & Tempel Lane, Phase 3 – 3rd Avenue Extension & Tempel Lane/ Cedar Crest Drive) would also be included in the traffic monitoring program to determine if they meet signal warrant criteria. The bi-annual traffic monitoring program conducted at the site entrance and above referenced intersections will provide the opportunity to confirm that traffic volumes and patterns are consistent with those estimated, or if volumes vary than those estimated, to revise the phased mitigation plan, as needed. The traffic monitoring program will no longer be necessary if traffic evaluations conducted in two consecutive years after the site is completely occupied indicates that the proposed development does not warrant the installation of traffic signals at the intersections noted above.



Table 6
Regeneron
2020 No-Build & Build Analysis Phase 2
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.80	23.9	C	EB	22.5	C
	EB R	0.64	19.0	B				EB R	0.72	20.8	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.15	11.3	B	NB	12.7	B
	NB T	0.64	12.5	B				NB T	0.65	12.8	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.39	15.4	B	SB	14.1	B
	SB R	0.06	3.5	A				SB R	0.06	3.4	A			
OVERALL						15.5	B						16.1	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.29	18.4	B	EB	15.6	B
	WB R	0.51	14.4	B				WB R	0.51	14.5	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB L	0.71	14.9	B	NB	12.5	B
	NB R	0.44	6.9	A				NB T	0.45	7.0	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.68	12.0	B	SB	7.1	A
	SB T	0.25	4.6	A				SB R	0.27	4.7	A			
OVERALL						11.1	B						11.2	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.86	28.7	C	EB	26.5	C
	EB R	0.23	18.8	B				EB R	0.24	19.9	B			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.47	25.2	C	NB	10.8	B
	NB T	0.45	6.8	A				NB T	0.45	6.9	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.66	14.2	B	SB	14.3	B
	SB TR	0.64	14.1	B				SB TR	0.66	14.4	B			
OVERALL						15.1	B						15.5	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	29.7	C	EB	29.3	C
	EB R	0.08	27.9	C				EB R	0.08	28.4	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	36.2	D	EB	36.2	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.12	9.4	A	NB	25.0	C
	NB TR	0.86	25.3	C				NB TR	0.87	26.0	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.81	20.4	C	SB	12.7	B
	SB TR	0.44	10.6	B				SB TR	0.46	10.8	B			
	SB R	0.05	7.8	A				SB R	0.05	7.8	A			
OVERALL						19.5	B						19.8	B
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.16	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.16	5.6	A			
	WB L	0.45	7.9	A	WB	7.6	A	WB L	0.45	8.1	A	WB	7.7	A
	WB T	0.45	7.2	A				WB T	0.45	7.3	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.41	12.6	B	NB	12.2	B
	NB R	0.13	10.7	B				NB R	0.13	10.9	B			
OVERALL						7.9	A						8.1	A

Table 6
Regeneron
2020 No-Build & Build Analysis Phase 2
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A				EB L	0.07	8.8	A			
Tempel Lane	SB LR	0.08	15.4	C				SB LR	0.23	19.6	C			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.06	12.4	B			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.15	9.5	A			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.01	7.4	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB L							WB L	0.07	9.4	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B	EB	11.6	B	EB L	0.32	13.6	B	EB	11.8	B
	EB TR	0.23	8.5	A				EB TR	0.25	8.7	A			
Luther Road (NY Route 151)	WB LT	0.60	21.0	C	WB	32.5	C	WB LT	0.65	22.6	C	WB	39.3	D
	WB R	0.95	37.4	D				WB R	0.99	46.7	D			
US Route 4	NB L	0.13	17.1	B	NB	20.5	C	NB L	0.20	17.9	B	NB	23.9	C
	NB TR	0.94	20.7	C				NB TR	0.96	24.5	C			
	SB L	0.27	14.7	B	SB	9.2	A	SB L	0.30	15.1	B	SB	10.2	B
	SB TR	0.59	7.7	A				SB TR	0.62	8.6	A			
OVERALL			19.1				B		22.1				C	
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A	WB	8.1	A	EB LTR	0.05	8.3	A	WB	8.3	A
	WB L	0.10	10.3	B				WB L	0.10	10.3	B			
	WB LTR	0.10	7.0	A				WB LTR	0.10	7.0	A			
US Route 4	NB LT	0.52	6.5	A	NB	6.3	A	NB LT	0.53	6.5	A	NB	6.3	A
	NB TR	0.52	6.1	A				NB TR	0.53	6.1	A			
	SB LT	0.42	8.2	A	SB	7.3	A	SB LT	0.45	8.1	A	SB	7.2	A
	SB TR	0.42	6.3	A				SB TR	0.45	6.3	A			
OVERALL			6.8				A		6.8				A	

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 7
Regeneron
2020 No-Build & Build Analysis Phase 2
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.31	18.5	B	EB	34.8	C
	EB R	0.91	36.2	D				EB R	0.93	39.8	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.42	19.2	B	NB	19.5	B
	NB T	0.64	19.1	B				NB T	0.67	19.6	B			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.64	26.3	C	SB	22.3	C
	SB R	0.14	3.5	A				SB R	0.14	3.7	A			
OVERALL						23.8	C						24.8	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	WB	11.8	B	WB L	0.13	18.9	B	WB	12.3	B
	WB R	0.33	10.8	B				WB R	0.34	11.1	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.74	18.4	B	NB	15.8	B
	NB R	0.38	9.1	A				NB R	0.41	9.2	A			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.86	15.0	B	SB	8.5	A
	SB T	0.45	5.2	A				SB T	0.46	5.2	A			
OVERALL						11.2	B						11.6	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.90	26.0	C	EB	23.3	C
	EB R	0.35	16.7	B				EB R	0.35	16.9	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.40	25.7	C	NB	14.0	B
	NB T	0.62	11.5	B				NB T	0.64	11.9	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.64	17.4	B	SB	17.4	B
	SB TR	0.63	17.4	B				SB TR	0.64	17.5	B			
OVERALL						17.7	B						17.9	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.88	61.6	E	EB	53.7	D
	EB R	0.23	30.2	C				EB R	0.23	30.2	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.79	78.5	E	WB	78.5	E
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.30	11.9	B	NB	58.6	E
	NB TR	1.01	54.4	F				NB TR	1.04	63.0	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.40	26.9	C	SB	15.9	B
	SB T	0.48	15.7	B				SB T	0.48	15.8	B			
	SB R	0.19	12.9	B				SB R	0.19	12.9	B			
OVERALL						37.6	D						41.1	D
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.23	6.8	A	EB	6.8	A
	EB R	0.23	6.6	A				EB R	0.24	6.8	A			
	WB L	0.33	7.9	A	WB	7.5	A	WB L	0.34	8.2	A	WB	7.8	A
	WB T	0.32	7.0	A				WB T	0.32	7.3	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.24	8.7	A	NB	8.9	A
	NB R	0.27	9.0	A				NB R	0.28	9.0	A			
OVERALL						7.5	A						7.7	A

Table 7
Regeneron
2020 No-Build & Build Analysis Phase 2
PM Peak Hour

Intersection	Level of Service														
	No-Build							Build							
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS	
Unsignalized Intersections															
Red Mill Road (NY Route 151) & Tempel Lane															
NYS Route 151	EB L	0.01	8.1	A				EB L	0.02	8.2	A				
Tempel Lane	SB LR	0.27	21.1	C				SB LR	0.63	34.5	D				
US Route 4 & Hotel Access															
Hotel Access	EB R	0.05	17.8	C				EB R	0.26	22.0	C				
Tempel Lane & Hotel Access															
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.07	9.3	A				
Tempel Lane	SB L	0.00	0.0	A				SB L	0.04	7.4	A				
Tempel Lane & Regeneron Access															
Regeneron Access	WB L							WB L	0.18	9.5	A				
Roundabout Intersections															
US Route 4 & Red Mill Road/Luther Road (NY Route 151)															
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C	EB	23.3	C	EB L	0.80	30.3	C	EB	29.0	C	
	EB TR	0.81	22.7	C				EB TR	0.87	27.8	C				
Luther Road (NY Route 151)	WB LT	0.25	12.7	B	WB	10.1	B	WB LT	0.28	13.4	B	WB	11.0	B	
	WB R	0.34	8.6	A				WB R	0.36	9.5	A				
US Route 4	NB L	0.09	17.6	B	NB	22.8	C	NB L	0.12	18.3	B	NB	33.8	C	
	NB TR	0.91	23.0	C				NB TR	0.98	34.7	C				
	SB L	0.48	12.9	B	SB	12.4	B	SB L	0.53	13.3	B	SB	13.7	B	
	SB TR	0.90	12.1	B				SB TR	0.91	13.9	B				
OVERALL							16.4	B						20.6	C
US Route 4 & Mannix Road															
Mannix Road	EB LTR	0.17	10.4	B	EB	10.4	B	EB LTR	0.18	10.5	B	EB	10.5	B	
	WB L	0.42	12.0	B				WB L	0.43	12.2	B				
	WB LTR	0.42	9.2	A				WB LTR	0.43	9.4	A				
US Route 4	NB LT	0.41	6.6	A	NB	6.0	A	NB LT	0.43	6.6	A	NB	6.0	A	
	NB TR	0.41	5.4	A				NB TR	0.43	5.5	A				
	SB LT	0.69	10.7	B	SB	10.4	B	SB LT	0.70	10.8	B	SB	10.5	B	
	SB TR	0.69	10.1	B				SB TR	0.70	10.3	B				
OVERALL							8.8	A						8.9	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Tempel Lane Pavement Recommendations

The March 2018 TIS provided pavement recommendations for Tempel Lane for each phase of development based on a November 2016 pavement evaluation for the roadway. The recommendations from this pavement evaluation were approved by the Town of East Greenbush as part of the Tempel Lane Campus – Supplemental Final Environmental Impact Statement. The following were the recommendations for each phase of the development:

- Phase 1 – The existing 1" of top course of pavement will be milled, and a 1.5" top course asphalt layer will be placed on the milled pavement with the warehouse construction
- Phase 2 – Tempel Lane will be box widened to 32 feet, and an additional 1.5" of top course will be provided. Improvements will also include drainage improvements such as regrading/reshaping of ditches and/or installation of edge drains
- Phase 3 – No additional improvements

The 2016 pavement evaluation was conducted prior to the start of construction for the warehouse and two freeze/thaw cycles have occurred since the evaluation. As a result, further degradation of Tempel Lane has occurred since the evaluation. In addition, additional existing pavement has been uncovered, increasing the known existing width of Tempel Lane to 32'. Due to the further deterioration of Tempel Lane and the increased known width of Tempel Lane, the proposed improvements to Tempel Lane have been revised, and are as follows:

- Phase 1 – Spot repairs where pavement is currently crumbling
- Phase 2 – Spot repairs where needed
- Phase 3 – Full depth reclamation with new asphalt top course for existing roadway (32' width)

It should be noted that construction vehicles will need to utilize Tempel Lane for the construction of Phases 2 and 3. Due to the heavy construction equipment that will be utilizing the roadway, it is recommended that the Tempel Lane full depth reclamation with new asphalt top course be completed after this traffic is removed in Phase 3. This is a change from Stantec's Pavement Evaluation memo which included the full depth reclamation and new top course in Phase 2. At the time of that memo, it was thought that all construction vehicles could utilize the north utility corridor for Phases 2 and 3.

Due to existing ROW and environmental constraints, the shared use path that was recommended in the October 2016 TIS will not be constructed for Phase 3, but will be considered in the future. As mentioned in the March 2018 TIS, pedestrians and bicyclists will be accommodated on the shoulder of Tempel Lane, which is consistent with the accommodations on 3rd Avenue Extension and Red Mill Road. Pedestrian accommodations, including pedestrian signals, pushbuttons and curb ramps will be included in the signal design/turn lane reconstruction at Tempel Lane & Red Mill Road.

A summary of the timeline for the proposed Phasing mitigation and pavement improvements are shown in Table 8.



Table 8
Phased Mitigation Improvements

	No-Build	Phase 1 Warehouse	Phase 2 Manufacturing	Phase 3 Office
Tempel Lane Extension to 3rd Avenue Extension opposite of Cedar Crest Drive	-	-	-	Extend Tempel Lane to 3rd Ave Ext, Provide NB left/thru lane and right-turn lane
Tempel Lane & Route 151	-	Monitor for Installation of Traffic Signal if Site Dwy volumes 10% greater than approved volumes	Monitor for Installation of Traffic Signal	EB Left-turn lane, WB right-turn lane, SB right-turn lane, Install Signal (w/ped equipment)
Route 4 & Route 151	-	-	-	Expand Rndbt to 2-lanes NB/SB, modify EB approach to allow left-turn from both lanes
Route 4 & Hotel Access (right-in/right-out)	Tempel Farms - Connect to Route 4 (already constructed)	-	-	Construct SB right-turn lane
Route 4 & I-90 EB Off-Ramp	-	-	-	-
Route 4 & I-90 WB Off-Ramp	NYSDOT - Construct Traffic Signal	-	-	-
Route 4 & 3rd Ave Ext	-	-	-	Optimize Timings
Route 4 & Grandview	-	-	-	Optimize Timings
3rd Ave Ext & Tempel Lane	-	-	-	Monitor for Installation of Traffic Signal, construct EB/WB TWLTL
Tempel Lane & Hotel Access	-	-	-	-
Tempel Lane & Regeneron Access	-	Monitor Site Traffic Volumes	Monitor Site Traffic Volumes	Monitor Site Traffic Volumes, construct SB left-turn lane
Tempel Lane (from site to Route 151)	-	Spot Repairs	Spot Repairs	Full Depth Reclamation with New Asphalt Top Course

Updates to the March 2018 TIS

The following provides an update to the March 2018 TIS to address the Town Engineers comments in the review letter dated 07/20/2018, that were not addressed in the preceding sections. Only the comments pertaining to the final preferred alternative (Extension of Tempel Lane to 3rd Avenue Extension opposite of Cedar Crest Drive) are addressed in this document, as the comments related to the other alternative (Private Regeneron access at Woodlawn Avenue & 3rd Avenue Extension) are no longer applicable.

The following Tables, Exhibits, and Figures from the March 2018 TIS have been provided within this memo or in Appendix B for this update:

- Table 9 – No-Build & Build Analysis Alternative 2 (AM Peak Hour)
- Table 10 – No-Build & Build Analysis Alternative 2 (PM Peak Hour)
- Table 13 – No-Build & Build Analysis Alternative 2 - Mitigation (AM Peak Hour)
- Table 14 – No-Build & Build Analysis Alternative 2 - Mitigation (PM Peak Hour)
- Exhibit 2 - Phase Mitigation Improvements
- Table 20 – Sight Distance (3rd Avenue Extension & Tempel Lane) (provided for reference)
- Figure 7 – Site Trip Assignment Alternative 2 – AM Peak Hour
- Figure 8 – Site Trip Assignment Alternative 2 – PM Peak Hour (provided for reference)
- Figure 10 – 2020 Build Peak Hour Traffic Volumes Alternative 2 (provided for reference)
- Figure E-5 - 3rd Avenue Extension & Cedar Crest Drive / Tempel Lane
- AASHTO Guide for Left-turn Lanes on Two-Lane Highways – 3rd Ave Ext & Tempel Lane
- AASHTO Guide for Left-turn Lanes on Two-Lane Highways – NY 151 & Tempel Lane (50 mph and 60 mph)
- AASHTO Guide for Left-turn Lanes on Two-Lane Highways – Tempel Lane & Regeneron Access
- AASHTO Guide for Left-turn Lanes on Two-Lane Highways – Tempel Lane & Tempel Farms (Hotel Access)
- HCM Reports for Build Analysis 2 with Mitigation – 3rd Avenue Extension & Cedar Crest Drive / Tempel Lane

3rd Avenue Extension & Cedar Crest Drive / Tempel Lane Extension

In the March 2018 TIS, the northbound left-turn movement from Tempel Lane was conservatively modeled in the Build with Mitigation condition to only allow one-stage turning. It was noted in the TIS that with the proposed two way left-turn lane (TWLTL), vehicles will be able to use the median to make a two-stage left-turn if they are unable to find a simultaneous gap on 3rd Avenue Extension in both directions, which will help improve operations for the northbound left/thru movement. With the one-stage analysis, the northbound left/thru movement was estimated to operate at LOS F during the AM peak hour and LOS E during the PM peak hour. While the TIS provides a conservative estimate of the northbound left/thru movement operations, the Town's Engineer recommended that the intersection be modeled with the two-stage left-turn to show the improved operations if the two-stage left-turn is utilized. As shown in Tables 13 and 14 in Appendix B, the northbound left-turn is estimated to operate at LOS D in the AM peak hour and LOS C in the PM peak hour with the two-stage left-turn. As shown, if a vehicle utilizes the TWLTL to make a left-turn, operations will improve for the northbound left/thru movement. In this case, traffic signal control



may not be needed. However, the recommended mitigation remains the same as the March 2018 TIS for this intersection which includes the following:

- Construct eastbound and westbound TWLTL
- Monitor traffic volumes at the intersection for the installation of a traffic signal after the completion of Phase 3

An assessment of available right-of-way (ROW) for the construction of the TWLTL was conducted as part of this Memo. Based on available Rensselaer County 2017 parcel boundary maps, the proposed improvement can be accommodated within the existing ROW. The property boundaries have been placed on the intersection concept figure E-5 in Appendix B. Additional assessment of ROW impacts for the TWLTL will be required during the design phase of the roadway improvements.

Sight distance was also revisited for this memo for the extension of Tempel Lane to the 3rd Avenue Extension and Cedar Crest Drive intersection based on the Town Engineer's comments. Per AASHTO's *A Policy on Geometric Design of Highway and Streets*, 2011, for the following situations, it is advisable to check the availability of sight distance for crossing maneuvers:

- Where left or right-turns or both are not permitted from a particular approach and the crossing maneuver is the only legal maneuver
- Where the crossing vehicle would cross the equivalent width of more than six lanes
- Where substantial volume of heavy vehicles cross the highway and steep grades that might slow the vehicle while its back portion is still in the intersection are present on the departure roadway on the far side of the intersection

As none of these situations are present at the 3rd Avenue Extension & Cedar Crest Drive/ Tempel Lane intersection, and only the TWLTL is being added to the mainline (3-lanes to cross total), the right-turn from stop distance is sufficient for the crossing maneuver per AASHTO. As the left-turn sight distance requirements are greater than the right-turn requirements, and the left-turn requirements are met for this intersection, there is sufficient sight distance for the crossing maneuver.

The following is Table 20 from the March 2018 TIS for reference:



Table 20
Sight Distance
3rd Avenue Extension & Tempel Lane / Cedar Crest Drive

	Intersection Sight Distance				Stopping Sight Distance	
	Right-turn from Tempel Lane / (DL)	Left-turn from Tempel Lane		Left-turn from Major Road (Ds)	SSD EB	SSD WB
		Looking Left (DL)	Looking Right (DR)			
Available	>1000 ft.	>1000 ft.	650 ft.	>1000 ft.	>1000 ft.	585 ft.
Recommended	480 ft.	555 ft.	555 ft.	405 ft.	425 ft.	425 ft.

Regeneron Access

A security gate will be constructed on Regeneron's access Road from Tempel Lane. The lift-arm gate will be located approximately 450' from Tempel Lane as shown in the Tempel Lane Campus Paving, Layout, & materials Plan (Area E) in Appendix B. With the two-lanes provided from Tempel Lane, this provides queueing space for approximately 36 vehicles. One lane will be reserved for Regeneron employees, the other will mainly be utilized by contractors and guests. Regeneron employees currently swipe their security badge at a card reader which lifts the gate arm, the average time to get through the gate is 3 to 5 seconds. Radio transponders are planned for future installation at the gates, which will help increase the processing time for Regeneron employees. During the AM peak hour, 578 vehicles are estimated to enter the Regeneron site, or approximately 9-10 vehicles per minute. It is estimated that all vehicles will be processed within this minute, and there is sufficient storage space (approximately 450' or 18 vehicles per lane), if a queue were to form.

Contractors and guests are required to stop at the security gate. Average time at the window is approximately 2 minutes for these users. At Regeneron's Discovery Drive facility, which is larger than the proposed Tempel Lane campus, the 150' of available storage is typically sufficient to process this traffic, with only a few instances of the queue backing up to the mainline during a typical month. It is estimated that the queue for Tempel Lane will be consistent with or shorter than the one observed for Discovery Drive.

Tempel Farms Analysis

Per direction from NYSDOT, the Tempel Farms development had been removed from the March 2018 TIS, as it was unknown when, if ever, the Tempel Farms site will be built with its required mitigation. This analysis without Tempel Farms was consistent with the Sensitivity Analysis from the October 2016 TIS, which identifies Regeneron's impacts without the Tempel Farms proposed mitigation and site traffic. In order to receive approval for the SEQRA amendment, a separate analysis has been conducted for a scenario with the Tempel Farms development and proposed mitigation included. To be consistent with the March 2018 TIS, the full build out site trips that were utilized for that report were utilized for this update with Tempel Farms. As noted in the Trip Generation section, the site trips for the current site plan



are estimated to be slightly less than the March 2018 TIS volumes, but this difference will not have an impact on the findings and mitigation recommendations.

No-Build Conditions – With Tempel Farms

The traffic volumes for the 2020 No-Build – With Tempel Farms scenario are the same as those represented in the October 2016 TIS for this update. The Village at Tempel Farms Traffic Impact Study identified improvements to the study area intersections to mitigate the impacts of that project. These improvements were included in the No-Build analysis for this scenario and are as follows:

- A right-in/right-out access on Route 4 to the Hotel Access Road between the I-90 Exit 9 Eastbound Ramps and Route 151 will be built with a 12-foot southbound right-turn lane
- Tempel Lane will be extended to 3rd Avenue Extension
- A single lane roundabout will be built at the Tempel Lane & Tempel Farms (Hotel Access Road) driveway
- A two-lane roundabout, which is consistent with the Route 4 Corridor Study (two lanes northbound and southbound), will be built at the Route 4 & Route 151 intersection. The new lane configuration will allow for a left/thru lane and thru/right lane on the northbound and southbound approaches, and a left-turn lane and left/thru/right lane on the eastbound approach. The westbound approach will remain the same as existing with a left/thru/right lane
- At Route 151 & Tempel Lane, a signal will be installed and an eastbound left-turn lane, westbound right-turn lane, and southbound right-turn lane will be built
- At 3rd Avenue Extension & Tempel Lane, a northbound right-turn lane will be installed and a two-way left-turn lane will be installed on 3rd Avenue Extension

At the intersection of US Route 4 & I-90 Westbound Ramps, a signal will be installed by NYSDOT as part of a Safety Improvement Project, which was included in the No-Build analysis. This is a change from the October 2016 TIS where the intersection was to be striped to restrict westbound left-turns, as proposed in the Route 4 Corridor Study.

To determine No-Build traffic operating conditions at the study area intersections, a capacity analysis was performed using SYNCHRO 10 software. The roundabout analyses were performed using Sidra 7 software. This is an update to the October 2016 TIS where SYNCHRO 8 and Sidra 6 software was used. The update in software resulted in minor differences in delay for the Existing and No-Build conditions when compared to the October 2016 TIS.

A summary of the No-Build LOS and Delay is provided in Tables 9 and 10.

Build Condition – with Tempel Farms

As mentioned above, the traffic volumes for the Build Condition – with Tempel Farms scenario were developed by combining the 2020 No-Build volumes with the site generated traffic for the full build out of the site that were presented in the March 2018 TIS. Using the No-Build geometry and existing signal timings, the study intersections were analyzed using the projected Build volumes for the Regeneron Tempel Lane site.



As shown in Tables 9 and 10, the addition of the traffic generated by the Regeneron project reduces the LOS for some movements at study area intersections when compared to the No-Build scenario with Tempel Farms and associated improvements. In many cases, the traffic operations will continue to be within acceptable LOS thresholds.

The following are the changes:

AM Peak Hour

- US Route 4 & 3rd Avenue Extension
 - Eastbound right – LOS B to LOS C
- 3rd Avenue Extension & Cedar Crest Drive /Tempel Lane
 - Northbound left – LOS C to LOS E
- US Route 4 & Red Mill Road (NY Route 151)
 - Westbound right – LOS B to LOS C
 - Northbound thru/right – LOS A to LOS B

PM Peak Hour

- Red Mill Road (NY Route 151) & Tempel Lane
 - Eastbound left – LOS A to LOS B
 - Eastbound thru – LOS A to LOS B
 - Southbound left – LOS B to LOS C
- US Route 4 & I-90 Eastbound Ramps
 - Eastbound Right – Increase in LOS F delay (approximately 3 seconds/vehicle)
 - Northbound left – LOS B to LOS C
 - Northbound thru – LOS B to LOS C
- US Route 4 & I-90 Westbound Ramps
 - Westbound left – LOS B to LOS C
 - Northbound right - LOS A to LOS B
- US Route 4 & 3rd Avenue Extension
 - Eastbound left – LOS C to LOS D
 - Northbound left – LOS C to LOS D
 - Northbound thru – LOS B to LOS C
 - Southbound thru – LOS B to LOS C
 - Southbound thru/right – LOS B to LOS C
- US Route 4 & Grandview Drive/Greenbush Commons
 - Northbound thru/right – Increase in LOS F delay (approximately 45 seconds/vehicle)
- 3rd Avenue Extension & Barracks Road
 - Northbound left – LOS A to LOS B
- US Route 4 & Hotel Access
 - Eastbound right – LOS E to LOS F
- 3rd Avenue Extension & Cedar Crest Drive/Tempel Lane
 - Northbound left – LOS C to LOS E
 - Northbound right – LOS B to LOS C
 - Southbound left/thru/right – LOS C to LOS D

- US Route 4 & Red Mill Road (NY Route 151)
 - Eastbound left – Increase in LOS F delay (approximately 157 seconds/vehicle)
 - Eastbound left/thru/right – Increase in LOS F delay (158 seconds/vehicle)
 - Westbound right – LOS A to LOS B
 - Northbound left/thru – LOS B to LOS C
 - Southbound left/thru – LOS B to LOS C
- Tempel Lane & Tempel Farms
 - Eastbound left/thru/right – LOS A to LOS B
 - Northbound left/thru/right – LOS A to LOS B
 - Southbound left/thru/right – LOS A to LOS B

At the new intersection of Tempel Lane & the Regeneron access, the westbound left/right movement is estimated to operate at LOS F and the southbound left is estimated to operate at LOS A during the PM Peak Hour. For the AM peak hour, all movements are estimated to operate at LOS C or better.

Table 9
Regeneron
2020 No-Build & Build Analysis with Tempel Farms
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	24.3	C	EB	22.5	C	EB L	0.69	22.7	C	EB	24.0	C
	EB R	0.69	20.2	C				EB R	0.80	25.2	C			
US Route 4	NB L	0.17	11.3	B	NB	12.8	B	NB L	0.23	14.2	B	NB	16.8	B
	NB T	0.66	12.9	B				NB T	0.71	17.0	B			
	SB T	0.37	15.4	B	SB	14.0	B	SB T	0.42	19.1	B	SB	17.4	B
	SB R	0.06	3.5	A				SB R	0.06	3.3	A			
OVERALL						16.1	B						19.4	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.27	17.5	B	EB	14.5	B	WB L	0.37	18.3	B	EB	15.2	B
	WB R	0.49	13.5	B				WB R	0.53	13.8	B			
US Route 4	NB T	0.74	16.0	B	NB	13.3	B	NB L	0.74	16.1	B	NB	13.4	B
	NB R	0.50	7.6	A				NB T	0.52	7.8	A			
	SB L	0.67	11.7	B	SB	7.1	A	SB T	0.68	11.8	B	SB	7.2	A
	SB T	0.27	4.8	A				SB R	0.27	4.8	A			
OVERALL						11.4	B						11.7	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.87	28.9	C	EB	27.0	C	EB L	0.89	31.7	C	EB	29.5	C
	EB R	0.20	19.4	B				EB R	0.22	21.3	C			
US Route 4	NB L	0.29	22.8	C	NB	9.7	A	NB L	0.47	30.7	C	NB	12.4	B
	NB T	0.49	7.6	A				NB T	0.49	8.4	A			
	SB T	0.67	14.9	B	SB	15.0	B	SB T	0.69	16.6	B	SB	17.3	B
	SB TR	0.67	15.1	B				SB TR	0.73	18.0	B			
OVERALL						15.7	B						18.2	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	30.8	C	EB	30.4	C	EB LT	0.20	32.4	C	EB	31.9	C
	EB R	0.08	29.4	C				EB R	0.09	31.0	C			
Grandview Drive	WB LTR	0.72	37.8	D	EB	37.8	D	WB LTR	0.73	40.3	D	EB	40.3	D
US Route 4	NB L	0.12	9.4	A	NB	26.9	C	NB L	0.14	10.0	A	NB	30.2	C
	NB TR	0.88	27.9	C				NB TR	0.90	31.3	C			
	SB L	0.85	22.3	C				SB L	0.89	28.3	C			
	SB TR	0.45	10.8	B	SB	13.1	B	SB TR	0.51	11.5	B	SB	14.6	B
OVERALL						20.9	C						22.8	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.16	5.4	A	EB	5.4	A	EB T	0.23	5.5	A	EB	5.5	A
	EB R	0.17	5.4	A				EB R	0.23	5.5	A			
	WB L	0.47	7.9	A	WB	7.6	A	WB L	0.50	8.6	A	WB	7.8	A
	WB T	0.48	7.3	A				WB T	0.50	7.2	A			
Barracks Road	NB L	0.39	13.0	B	NB	12.6	B	NB L	0.41	14.3	B	NB	13.9	B
	NB R	0.11	11.2	B				NB R	0.14	12.5	B			
OVERALL						7.9	A						8.1	A

Table 9
Regeneron
2020 No-Build & Build Analysis with Tempel Farms
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
3rd Avenue Extension & Cedar Crest Drive/ Tempel Lane														
3rd Avenue Ext														
Tempel Lane														
Cedar Crest Drive														
OVERALL														
Unsignalized Intersections														
US Route 4 & Hotel Access														
Hotel Access	EB R	0.18	12.5	B				EB R	0.23	13.0	B			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.00	8.6	A				EB L	0.00	8.6	A			
	WB L	0.02	8.0	A				WB L	0.16	8.9	A			
Tempel Lane	NB LT	0.31	19.9	C				NB LT	0.64	48.5	E			
	NB R	0.06	10.3	B				NB R	0.11	11.1	B			
Cedar Crest Drive	SB LTR	0.04	15.8	C				SB LTR	0.07	23.9	C			
Tempel Lane & Regeneron Access														
Regeneron Access								WB LR	0.41	24.3	C			
Tempel Lane								SB L	0.27	9.6	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.32	13.5	B	EB	11.7	B	EB L	0.36	13.6	B	EB	11.9	B
	EB LTR	0.32	9.5	A				EB LTR	0.36	9.8	A			
Luther Road (NY Route 151)	WB LT	0.56	16.2	B	WB	16.3	B	WB LT	0.67	19.4	B	WB	20.2	C
	WB R	0.75	16.3	B				WB R	0.82	20.7	C			
US Route 4	NB LT	0.56	11.7	B	NB	10.4	B	NB LT	0.63	14.0	B	NB	12.0	B
	NB TR	0.56	9.2	A				NB TR	0.63	10.2	B			
	SB LT	0.46	12.4	B	SB	9.8	A	SB LT	0.53	15.1	B	SB	12.1	B
	SB TR	0.46	7.6	A				SB TR	0.53	9.5	A			
OVERALL						11.9	B						14.0	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.2	A	EB	8.2	A	EB LTR	0.05	8.3	A	EB	8.3	A
	WB L	0.10	10.2	B	WB	8.5	A	WB L	0.10	10.3	B	WB	8.6	A
	WB LTR	0.10	6.9	A				WB LTR	0.10	7.0	A			
US Route 4	NB LT	0.52	6.4	A	NB	6.2	A	NB LT	0.53	6.5	A	NB	6.3	A
	NB TR	0.52	6.0	A				NB TR	0.53	6.1	A			
	SB LT	0.43	8.1	A	SB	7.2	A	SB LT	0.44	8.1	A	SB	7.2	A
	SB TR	0.43	6.3	A				SB TR	0.44	6.3	A			
OVERALL						6.8	A						6.8	A
Tempel Lane & Tempel Farms Access														
Tempel Farms Access	EB LTR	0.15	6.5	A	EB	6.5	A	EB LTR	0.16	7.0	A	EB	7.0	A
	WB LTR	0.11	6.5	A	WB	6.5	A	WB LTR	0.39	7.5	A	WB	7.5	A
Tempel Lane	NB LTR	0.16	7.2	A	NB	7.2	A	NB LT	0.30	6.9	A	NB	6.9	A
	SB LTR	0.13	7.1	A	SB	7.1	A	SB LT	0.21	7.4	A	SB	7.4	A
OVERALL						6.8	A						7.2	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 10
Regeneron
2020 No-Build & Build Analysis with Tempel Farms
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.33	20.9	C	EB	68.9	E	EB L	0.34	22.5	C	EB	72.2	E
	EB R	1.08	81.8	F				EB R	1.09	85.1	F			
US Route 4	NB L	0.51	20.0	B	NB	19.4	B	NB L	0.64	21.6	C	NB	20.7	C
	NB T	0.68	19.3	B				NB T	0.74	20.5	C			
	SB T	0.68	26.9	C	SB	23.2	C	SB T	0.70	28.3	C	SB	24.4	C
	SB R	0.14	3.8	A				SB R	0.15	4.4	A			
OVERALL						35.0	D						36.1	D
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.28	20.0	B	EB	13.7	B	WB L	0.31	21.3	C	EB	14.2	B
	WB R	0.34	11.3	B				WB R	0.34	11.2	B			
US Route 4	NB T	0.74	18.8	B	NB	16.0	B	NB T	0.75	20.0	B	NB	17.0	B
	NB R	0.45	9.5	A				NB R	0.57	11.4	B			
	SB L	0.87	16.0	B	SB	8.8	A	SB L	0.89	19.2	B	SB	9.8	A
	SB T	0.48	5.4	A				SB T	0.47	5.2	A			
OVERALL						12.0	B						13.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.91	31.5	C	EB	27.8	C	EB L	0.94	45.7	D	EB	38.5	D
	EB R	0.34	18.6	B				EB R	0.33	18.6	B			
US Route 4	NB L	0.41	29.8	C	NB	16.0	B	NB L	0.53	38.9	D	NB	22.8	C
	NB T	0.67	13.9	B				NB T	0.73	20.1	C			
	SB T	0.68	19.3	B	SB	19.4	B	SB T	0.74	25.7	C	SB	25.8	C
	SB TR	0.68	19.4	B				SB TR	0.74	25.9	C			
OVERALL						20.5	C						28.7	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.4	D	EB LT	0.88	61.6	E	EB	53.3	D
	EB R	0.25	30.4	C				EB R	0.25	30.4	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.79	78.5	E	WB	78.5	E
US Route 4	NB L	0.33	12.7	B	NB	68.5	E	NB L	0.34	12.9	B	NB	110.2	F
	NB TR	1.07	73.7	F				NB TR	1.19	118.4	F			
	SB L	0.40	26.9	C	SB	16.6	B	SB L	0.40	26.9	C	SB	16.7	B
	SB T	0.54	16.7	B				SB T	0.56	16.9	B			
	SB R	0.19	12.9	B				SB R	0.19	12.9	B			
OVERALL						44.7	D						63.7	E
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.29	6.6	A	EB	6.6	A	EB T	0.29	6.4	A	EB	6.4	A
	EB R	0.29	6.6	A				EB R	0.29	6.4	A			
	WB L	0.37	8.1	A	WB	7.5	A	WB L	0.42	7.7	A	WB	7.4	A
	WB T	0.35	6.9	A				WB T	0.42	7.2	A			
Barracks Road	NB L	0.19	9.5	A	NB	9.8	A	NB L	0.20	10.2	B	NB	10.6	B
	NB R	0.29	10.1	B				NB R	0.30	10.9	B			
OVERALL						7.6	A						7.6	A

Table 10
Regeneron
2020 No-Build & Build Analysis with Tempel Farms
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
3rd Avenue Extension & Cedar Crest Drive/ Tempel Lane														
3rd Avenue Ext														
Tempel Lane														
Cedar Crest Drive														
OVERALL														
Unsignalized Intersections														
US Route 4 & Hotel Access														
Hotel Access	EB R	0.78	47.7	E				EB R	1.28	181.3	F			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.01	8.1	A				EB L	0.01	8.1	A			
	WB L	0.07	8.9	A				WB L	0.10	9.1	A			
Tempel Lane	NB LT	0.27	20.3	C				NB LT	0.72	43.8	E			
	NB R	0.08	12.1	B				NB R	0.37	15.4	C			
Cedar Crest Drive	SB LTR	0.03	17.8	C				SB LTR	0.06	27.1	D			
Tempel Lane & Regeneron Access														
Regeneron Acces	WB LR							WB LR	0.97	54.2	F			
Tempel Lane	SB L							SB L	0.04	7.7	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	1.04	65.9	F	EB	60.9	E	EB L	1.43	222.4	F	EB	218.2	F
	EB LTR	1.04	56.8	F				EB LTR	1.43	214.8	F			
Luther Road (NY Route 151)	WB LT	0.36	13.1	B	WB	11.3	B	WB LT	0.39	14.0	B	WB	12.2	B
	WB R	0.36	9.8	A				WB R	0.38	10.6	B			
US Route 4	NB LT	0.65	17.7	B	NB	15.3	B	NB LT	0.74	21.9	C	NB	19.3	B
	NB TR	0.65	13.3	B				NB TR	0.74	17.1	B			
	SB LT	0.81	19.4	B	SB	16.2	B	SB LT	0.91	26.8	C	SB	22.9	C
	SB TR	0.81	13.3	B				SB TR	0.91	19.5	B			
OVERALL						25.4	C						68.4	E
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.19	10.9	B	EB	10.9	B	EB LTR	0.19	11.1	B	EB	11.1	B
	WB L	0.43	12.4	B	WB	10.9	B	WB L	0.43	12.4	B	WB	10.9	B
	WB LTR	0.43	9.5	A				WB LTR	0.43	9.6	A			
US Route 4	NB LT	0.44	6.6	A	NB	6.0	A	NB LT	0.44	6.6	A	NB	6.0	A
	NB TR	0.44	5.5	A				NB TR	0.44	5.5	A			
	SB LT	0.74	11.4	B	SB	11.1	B	SB LT	0.75	11.7	B	SB	11.5	B
	SB TR	0.74	10.9	B				SB TR	0.75	11.2	B			
OVERALL						9.2	A						9.4	A
Tempel Lane & Tempel Farms Access														
Tempel Farms Access	EB LTR	0.36	7.2	A	EB	7.2	A	EB LTR	0.54	12.9	B	EB	12.9	B
	WB LTR	0.37	7.8	A	WB	7.8	A	WB LTR	0.44	8.1	A	WB	8.1	A
Tempel Lane	NB LTR	0.33	8.6	A	NB	8.6	A	NB LT	0.42	10.1	B	NB	10.1	B
	SB LTR	0.26	9.1	A	SB	9.1	A	SB LT	0.71	15.0	B	SB	15.0	B
OVERALL						8.1	A						11.9	B

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Build with Mitigation Condition – with Tempel Farms

To mitigate the operational impacts associated with the addition of the Regeneron project-generated traffic noted above, the following improvements are proposed:

- US Route 4 & Grandview Drive/Greenbush Commons
 - Optimization of signal splits
- US Route 4 & 3rd Avenue Extension
 - Optimization of signal splits
- 3rd Avenue Extension & Tempel Lane
 - Installation of a traffic signal
 - Convert the TWLTL's to left-turn lanes
- Tempel Lane & Regeneron Access
 - Install westbound right-turn lane
 - Install southbound left-turn lane

As shown in Tables 11 and 12, the No-Build movement LOS will be maintained with these improvements, with the exception of the following:

AM Peak Hour

- US Route 4 & 3rd Avenue Extension
 - Eastbound right – LOS B to LOS C
- US Route 4 & Grandview Drive/ Greenbush Commons
 - Northbound left – LOS A to LOS B
 - Northbound thru/right – LOS C to LOS D
- US Route 4 & Red Mill Road (NY Route 151)
 - Westbound right – LOS B to LOS C
 - Northbound thru/right – LOS A to LOS B

PM Peak Hour

- Red Mill Road (NY Route 151) & Tempel Lane
 - Eastbound left – LOS A to LOS B
 - Eastbound thru – LOS A to LOS B
 - Southbound left – LOS B to LOS C
- US Route 4 & I-90 Eastbound Ramps
 - Eastbound Right – Increase in LOS F delay (approximately 3 seconds/vehicle)
 - Northbound left – LOS B to LOS C
 - Northbound thru – LOS B to LOS C
- US Route 4 & I-90 Westbound Ramps
 - Westbound left – LOS B to LOS C
 - Northbound right - LOS A to LOS B
- US Route 4 & 3rd Avenue Extension
 - Northbound left – LOS C to LOS D
 - Southbound thru – LOS B to LOS C
 - Southbound thru/right – LOS B to LOS C



- US Route 4 & Grandview Drive/Greenbush Commons
 - Westbound left/thru/right – LOS E to LOS F
 - Northbound thru/right – Increase in LOS F delay (approximately 28 seconds/vehicle)
- 3rd Avenue Extension & Barracks Road
 - Northbound left – LOS A to LOS B
- US Route 4 & Hotel Access
 - Eastbound right – LOS E to LOS F
- US Route 4 & Red Mill Road (NY Route 151)
 - Eastbound left – Increase in LOS F delay (approximately 157 seconds/vehicle)
 - Eastbound left/thru/right – Increase in LOS F delay (158 seconds/vehicle)
 - Westbound right – LOS A to LOS B
 - Northbound left/thru – LOS B to LOS C
 - Southbound left/thru – LOS B to LOS C
- Tempel Lane & Tempel Farms
 - Eastbound left/thru/right – LOS A to LOS B
 - Northbound left/thru/right – LOS A to LOS B
 - Southbound left/thru/right – LOS A to LOS B

At the new intersection of Tempel Lane & the Regeneron access all movements are estimated to operate at LOS D or better for both peak hours.

It is noted that that traffic operations at many of the locations where there will be a change in LOS will continue to provide acceptable operations, with LOS ranging from LOS B to LOS D. Locations where this is not the case are discussed as follows.

US Route 4 & Grandview Drive/Greenbush Commons

The northbound approach operates over capacity under the No-Build condition during the PM peak hour. Any increase in traffic volume results in an impact since the system is already over capacity. The addition of the Regeneron site traffic causes the northbound approach to have an increase in LOS F delay. For the mitigation analysis, the signal timings were optimized. With optimization, overall delay and northbound delay are improved, but the northbound movement does not get fully back to No-Build delay with 28 seconds of added delay in the Build with Mitigation condition (73.7 sec/veh No-Build, 101.7 sec/veh Build). The optimization does impact the westbound approach which goes from LOS E to LOS F. However, it is a low volume approach, and the 50th and 95th percentile queues are 31' and 78', respectively.

During the AM peak hour, there is minor increase in delay for the northbound movements due to reallocation of green time in the signal optimization. Both movements are still estimated to operate at LOS D or better which is considered acceptable for signalized movement. The northbound left-turn delay is estimated to increase approximately 1 second and the northbound thru/right movement is estimated to increase approximately 4 seconds.

Since there are existing operational deficiencies at the intersection in the PM No-Build condition, unrelated to the Regeneron project, capital improvements should be considered and programmed in this portion of the US Route 4 corridor. The only improvement that will fully alleviate the congestion at this location is the



construction of an additional northbound through lane on US Route 4, which is a major corridor-wide improvement that the Town of East Greenbush, the Town of North Greenbush, and NYSDOT should consider. Other mitigation measures were considered for this intersection, including a roundabout and signal coordination with adjacent signals. A roundabout does not appear to be feasible at this location as the footprint of a two-lane roundabout would have ROW impacts and impacts to the operation of properties on the east side of US Route 4. Coordination on US Route 4 between the Grandview Drive and 3rd Avenue Extension intersections was tested, and it could reduce the queues and delay for the northbound approach during the PM peak hour slightly. However, it does increase delay on the minor approaches. Implementing a coordinated system would have to be reviewed in a larger context than this study since there are other signals within the corridor that are not included in the study area. As a result, no additional mitigation measures are recommended for this intersection as a result of this project. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

US Route 4 & Hotel Access

The eastbound right-turn movement is estimated to operate at LOS E under the PM No-Build condition. With the addition of the Regeneron site traffic the LOS is estimated to be LOS F. It is assumed that if there are delays for the eastbound right-turn movement, traffic may utilize the signalized intersection at US Route 4 & Red Mill Road (NY Route 151) instead to exit Tempel Lane to help reduce their delay. This is consistent with the Village at Tempel Farms Traffic Impact Study, which included Tempel Farms site traffic and Mill Creek development site traffic, and was projected to operate at LOS F during the PM peak hour. It should be noted that traffic can also use the signal at 3rd Avenue Extension & Tempel Lane as an alternate route to their destination. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

3rd Avenue Ext & Tempel Lane:

With both the Tempel Farms site traffic and the Regeneron site traffic, the northbound left-turn movement is estimated to operate at LOS E during both the AM and PM peak hours. Since the four-hour warrant, eight-hour warrant, and peak hour warrant were met for this location in the October 2016 TIS, and the volume is now estimated to be higher for the current site plan, it is recommended that a traffic signal be installed. With the installation of the signal, all movements are estimated to operate at LOS B or better.

Route 4 & Route 151:

No-Build traffic operations of the eastbound approach to this roundabout will be LOS F in the scenario with Tempel Farms site traffic included with the other background growth. The addition of the Regeneron site traffic is estimated to increase the delay for this approach. The addition of an eastbound right slip-ramp could help reduce delay for the approach; however, due to the underground stormwater storage tanks located adjacent to the roundabout, this type of improvement was deemed unfeasible.

With no feasible physical improvements that will alleviate the delay on the eastbound approach of the roundabout, Travel Demand Management (TDM) strategies, such as carpooling incentives, alternate work hours, and transit accommodations will be offered by Regeneron to its employees at the Tempel Lane campus. These are consistent with current Regeneron policies used at their existing main campus on Discovery Drive, where flex hours are available to office employees, with their workday starting anywhere



from 6am to 9am. These types of TDM measures are also consistent with the CDTC's regional Congestion Management Plan. These TDM measures will reduce the site trip load during the peak hour of the adjacent street traffic. As noted in the DEIS for the East Greenbush Tech Park – Phase 2, this condition is expected to be limited to the PM peak, with acceptable operations estimated for the remainder of the day. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at this location.

At the remaining locations where there is a change in LOS, there are minor increases in delay, with 9 seconds of additional delay being the maximum difference between No-Build and Build with Mitigation. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted at the locations where No-Build LOS cannot be maintained.

Improvement Phasing Analysis – Tempel Farms

All mitigation measures for the combined Regeneron and Tempel Farms condition are recommended to be implemented in Phase 3 with the opening of the office/lab facilities. However, it is recommended that the intersection of 3rd Avenue Extension & Tempel Lane be monitored for the installation of a traffic signal for Phase 1 (only if the trip generation at the site driveway is greater than 10% of the approved site traffic) and Phase 2 of the development since a signal will not be installed with the Tempel Farms development. It should be noted, that since the warehouse will be opening this year (2018), and the manufacturing is estimated to be completed by early 2020, both uses will likely be open before Tempel Farms is constructed.

A summary of the mitigation improvements is provided in Table 13.



Table 11
Regeneron
2020 No-Build & Build Analysis with Tempel Farms - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151	EB L	0.10	7.0	A	EB	4.9	A	EB L	0.18	7.4	A	EB	5.2	A
	EB T	0.30	4.6	A				EB T	0.29	4.7	A			
	WB T	0.75	11.8	B	WB	10.2	B	WB T	0.75	12.7	B	WB	10.3	B
	WB R	0.16	4.4	A				WB R	0.26	4.9	A			
Tempel Lane	SB L	0.46	14.0	B	SB	13.8	B	SB L	0.55	15.4	B	SB	15.1	B
	SB R	0.03	10.7	B				SB R	0.03	10.6	B			
OVERALL						9.2	A						9.6	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	24.3	C	EB	22.5	C	EB L	0.69	22.7	C	EB	24.0	C
	EB R	0.69	20.2	C				EB R	0.80	25.2	C			
US Route 4	NB L	0.17	11.3	B	NB	12.8	B	NB L	0.23	14.2	B	NB	16.8	B
	NB T	0.66	12.9	B				NB T	0.71	17.0	B			
	SB T	0.37	15.4	B	SB	14.0	B	SB T	0.42	19.1	B	SB	17.4	B
	SB R	0.06	3.5	A				SB R	0.06	3.3	A			
OVERALL						16.1	B						19.4	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.27	17.5	B	WB	14.5	B	WB L	0.37	18.3	B	WB	15.2	B
	WB R	0.49	13.5	B				WB R	0.53	13.8	B			
US Route 4	NB T	0.74	16.0	B	NB	13.3	B	NB T	0.74	16.1	B	NB	13.4	B
	NB R	0.50	7.6	A				NB R	0.52	7.8	A			
	SB L	0.67	11.7	B	SB	7.1	A	SB T	0.68	11.8	B	SB	7.2	A
	SB T	0.27	4.8	A				SB R	0.27	4.8	A			
OVERALL						11.4	B						11.7	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.87	28.9	C	EB	27.0	C	EB L	0.89	31.2	C	EB	29.0	C
	EB R	0.20	19.4	B				EB R	0.22	20.8	C			
US Route 4	NB L	0.29	22.8	C	NB	9.7	A	NB L	0.47	30.5	C	NB	12.3	B
	NB T	0.49	7.6	A				NB T	0.49	8.4	A			
	SB T	0.67	14.9	B	SB	15.0	B	SB T	0.70	16.8	B	SB	17.5	B
	SB TR	0.67	15.1	B				SB TR	0.74	18.3	B			
OVERALL						15.7	B						18.2	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	30.8	C	EB	30.4	C	EB LT	0.20	31.6	C	EB	31.1	C
	EB R	0.08	29.4	C				EB R	0.09	30.2	C			
Grandview Drive	WB LTR	0.72	37.8	D	EB	37.8	D	WB LTR	0.72	38.8	D	WB	38.8	D
US Route 4	NB L	0.12	9.4	A	NB	26.9	C	NB L	0.14	10.2	B	NB	34.1	C
	NB TR	0.88	27.9	C				NB TR	0.92	35.4	D			
	SB L	0.85	22.3	C	SB	13.1	B	SB L	0.88	27.0	C	SB	14.4	B
	SB TR	0.45	10.8	B				SB TR	0.51	11.5	B			
	SB R	0.05	7.9	A				SB R	0.05	7.9	A			
OVERALL						20.9	C						23.8	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.16	5.4	A	EB	5.4	A	EB T	0.23	5.5	A	EB	5.5	A
	EB R	0.17	5.4	A				EB R	0.23	5.5	A			
	WB L	0.47	7.9	A	WB	7.6	A	WB L	0.50	8.6	A	WB	7.8	A
	WB T	0.48	7.3	A				WB T	0.50	7.2	A			
Barracks Road	NB L	0.39	13.0	B	NB	12.6	B	NB L	0.41	14.3	B	NB	13.9	B
	NB R	0.11	11.2	B				NB R	0.14	12.5	B			
OVERALL						7.9	A						8.1	A

Table 11
Regeneron
2020 No-Build & Build Analysis with Tempel Farms - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
3rd Avenue Extension & Cedar Crest Drive/ Tempel Lane														
3rd Avenue Ext	EB L	0.00	6.5	A				EB L	0.00	6.5	A	EB	10.1	B
	EB TR	0.71	10.2	B				EB TR	0.71	10.2	B			
	WB L	0.33	6.0	A				WB L	0.33	6.0	A	WB	4.7	A
	WB TR	0.53	4.3	A				WB TR	0.53	4.3	A			
Tempel Lane	NB LT	0.28	12.7	B				NB LT	0.28	12.7	B	NB	11.6	B
	NB R	0.18	9.6	A				NB R	0.18	9.6	A			
Cedar Crest Drive	SB LTR	0.04	11.6	B				SB LTR	0.04	11.6	B	SB	11.6	B
OVERALL													7.5	A
Unsignalized Intersections														
US Route 4 & Hotel Access														
Hotel Access	EB R	0.18	12.5	B				EB R	0.23	13.0	B			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.00	8.6	A										
	WB L	0.02	8.0	A										
Tempel Lane	NB LT	0.31	19.9	C										
	NB R	0.06	10.3	B										
Cedar Crest Drive	SB LTR	0.04	15.8	C										
Tempel Lane & Regeneron Access														
Regeneron Access	WB L	0.32	29.9	D				WB L	0.32	29.9	D			
	WB R	0.08	10.5	B				WB R	0.08	10.5	B			
Tempel Lane	SB L	0.27	9.6	A				SB L	0.27	9.6	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.32	13.5	B	EB	11.7	B	EB L	0.36	13.6	B	EB	11.9	B
	EB LTR	0.32	9.5	A				EB LTR	0.36	9.8	A			
Luther Road (NY Route 151)	WB LT	0.56	16.2	B	WB	16.3	B	WB LT	0.67	19.4	B	WB	20.2	C
	WB R	0.75	16.3	B				WB R	0.82	20.7	C			
US Route 4	NB LT	0.56	11.7	B	NB	10.4	B	NB LT	0.63	14.0	B	NB	12.0	B
	NB TR	0.56	9.2	A				NB TR	0.63	10.2	B			
	SB LT	0.46	12.4	B	SB	9.8	A	SB LT	0.53	15.1	B	SB	12.1	B
	SB TR	0.46	7.6	A				SB TR	0.53	9.5	A			
OVERALL						11.9	B						14.0	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.2	A	EB	8.2	A	EB LTR	0.05	8.3	A	EB	8.3	A
	WB L	0.10	10.2	B				WB L	0.10	10.3	B			
	WB LTR	0.10	6.9	A	WB	8.5	A	WB LTR	0.10	7.0	A	WB	8.6	A
US Route 4	NB LT	0.52	6.4	A	NB	6.2	A	NB LT	0.53	6.5	A	NB	6.3	A
	NB TR	0.52	6.0	A				NB TR	0.53	6.1	A			
	SB LT	0.43	8.1	A	SB	7.2	A	SB LT	0.44	8.1	A	SB	7.2	A
	SB TR	0.43	6.3	A				SB TR	0.44	6.3	A			
OVERALL						6.8	A						6.8	A
Tempel Lane & Tempel Farms Access														
Tempel Farms Access	EB LTR	0.15	6.5	A	EB	6.5	A	EB LTR	0.16	7.0	A	EB	7.0	A
	WB LTR	0.11	6.5	A	WB	6.5	A	WB LTR	0.39	7.5	A	WB	7.5	A
Tempel Lane	NB LTR	0.16	7.2	A	NB	7.2	A	NB LT	0.30	6.9	A	NB	6.9	A
	SB LTR	0.13	7.1	A	SB	7.1	A	SB LT	0.21	7.4	A	SB	7.4	A
OVERALL						6.8	A						7.2	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 12
Regeneron
2020 No-Build & Build Analysis with Tempel Farms - Mitigation
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151	EB L	0.13	8.1	A	EB	7.5	A	EB L	0.17	10.4	B	EB	10.1	B
	EB T	0.55	7.4	A				EB T	0.60	10.1	B			
	WB T	0.69	13.3	B	WB	10.3	B	WB T	0.73	16.7	B	WB	12.3	B
	WB R	0.23	4.6	A				WB R	0.21	4.1	A			
Tempel Lane	SB L	0.77	15.8	B	SB	15.3	B	SB L	0.85	20.6	C	SB	19.6	B
	SB R	0.05	9.1	A				SB R	0.07	8.5	A			
OVERALL						10.5	B						13.9	B
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.33	20.9	C	EB	68.9	E	EB L	0.34	22.5	C	EB	72.2	E
	EB R	1.08	81.8	F				EB R	1.09	85.1	F			
US Route 4	NB L	0.51	20.0	B	NB	19.4	B	NB L	0.64	21.6	C	NB	20.7	C
	NB T	0.68	19.3	B				NB T	0.74	20.5	C			
	SB T	0.68	26.9	C	SB	23.2	C	SB T	0.70	28.3	C	SB	24.4	C
	SB R	0.14	3.8	A				SB R	0.15	4.4	A			
OVERALL						35.0	D						36.1	D
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.28	20.0	B	WB	13.7	B	WB L	0.31	21.3	C	WB	14.2	B
	WB R	0.34	11.3	B				WB R	0.34	11.2	B			
US Route 4	NB T	0.74	18.8	B	NB	16.0	B	NB T	0.75	20.0	B	NB	17.0	B
	NB R	0.45	9.5	A				NB R	0.57	11.4	B			
	SB L	0.87	16.0	B	SB	8.8	A	SB L	0.89	19.2	B	SB	9.8	A
	SB T	0.48	5.4	A				SB T	0.47	5.2	A			
OVERALL						12.0	B						13.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.91	31.5	C	EB	27.8	C	EB L	0.94	33.6	C	EB	29.4	C
	EB R	0.34	18.6	B				EB R	0.33	17.7	B			
US Route 4	NB L	0.41	29.8	C	NB	16.0	B	NB L	0.53	38.4	D	NB	22.1	C
	NB T	0.67	13.9	B				NB T	0.74	19.5	B			
	SB T	0.68	19.3	B	SB	19.4	B	SB T	0.75	26.4	C	SB	26.5	C
	SB TR	0.68	19.4	B				SB TR	0.75	26.7	C			
OVERALL						20.5	C						26.0	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.4	D	EB LT	0.92	73.1	E	EB	62.4	E
	EB R	0.25	30.4	C				EB R	0.26	32.9	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.83	92.2	F	WB	92.2	F
US Route 4	NB L	0.33	12.7	B	NB	68.5	E	NB L	0.33	12.3	B	NB	94.8	F
	NB TR	1.07	73.7	F				NB TR	1.15	101.7	F			
	SB L	0.40	26.9	C	SB	16.6	B	SB L	0.42	28.5	C	SB	16.1	B
	SB T	0.54	16.7	B				SB T	0.54	16.1	B			
	SB R	0.19	12.9	B				SB R	0.18	12.4	B			
OVERALL						44.7	D						58.2	E
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.29	6.6	A	EB	6.6	A	EB T	0.29	6.4	A	EB	6.4	A
	EB R	0.29	6.6	A				EB R	0.29	6.4	A			
	WB L	0.37	8.1	A	WB	7.5	A	WB L	0.42	7.7	A	WB	7.4	A
	WB T	0.35	6.9	A				WB T	0.42	7.2	A			
Barracks Road	NB L	0.19	9.5	A	NB	9.8	A	NB L	0.20	10.2	B	NB	10.6	B
	NB R	0.29	10.1	B				NB R	0.30	10.9	B			
OVERALL						7.6	A						7.6	A

Table 12
Regeneron
2020 No-Build & Build Analysis with Tempel Farms - Mitigation
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
3rd Avenue Extension & Cedar Crest Drive/ Tempel Lane														
3rd Avenue Ext								EB L	0.02	7.3	A	EB	13.2	B
								EB TR	0.80	13.3	B			
								WB L	0.25	8.3	A			
								WB TR	0.36	5.1	A			
Tempel Lane								NB LT	0.45	16.2	B	NB	14.6	B
								NB R	0.42	13.0	B			
Cedar Crest Drive								SB LTR	0.03	13.2	B	SB	13.2	B
OVERALL													11.2	B
Unsignalized Intersections														
US Route 4 & Hotel Access														
Hotel Access	EB R	0.78	47.7	E				EB R	1.28	181.3	F			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.01	8.1	A										
	WB L	0.07	8.9	A										
Tempel Lane	NB LT	0.27	20.3	C										
	NB R	0.08	12.1	B										
Cedar Crest Drive	SB LTR	0.03	17.8	C										
Tempel Lane & Regeneron Access														
Regeneron Acces	WB LR							WB LR	0.65	23.7	C			
								WB R	0.32	11.0	B			
Tempel Lane	SB L							SB L	0.04	7.7	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	1.04	65.9	F	EB	60.9	E	EB L	1.43	222.4	F	EB	218.2	F
	EB LTR	1.04	56.8	F				EB LTR	1.43	214.8	F			
Luther Road (NY Route 151)	WB LT	0.36	13.1	B	WB	11.3	B	WB LT	0.39	14.0	B	WB	12.2	B
	WB R	0.36	9.8	A				WB R	0.38	10.6	B			
US Route 4	NB LT	0.65	17.7	B	NB	15.3	B	NB LT	0.74	21.9	C	NB	19.3	B
	NB TR	0.65	13.3	B				NB TR	0.74	17.1	B			
	SB LT	0.81	19.4	B	SB	16.2	B	SB LT	0.91	26.8	C	SB	22.9	C
	SB TR	0.81	13.3	B				SB TR	0.91	19.5	B			
OVERALL						25.4	C						68.4	E
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.19	10.9	B	EB	10.9	B	EB LTR	0.19	11.1	B	EB	11.1	B
	WB L	0.43	12.4	B				WB L	0.43	12.4	B			
	WB LTR	0.43	9.5	A				WB LTR	0.43	9.6	A			
US Route 4	NB LT	0.44	6.6	A	NB	6.0	A	NB LT	0.44	6.6	A	NB	6.0	A
	NB TR	0.44	5.5	A				NB TR	0.44	5.5	A			
	SB LT	0.74	11.4	B	SB	11.1	B	SB LT	0.75	11.7	B	SB	11.5	B
	SB TR	0.74	10.9	B				SB TR	0.75	11.2	B			
OVERALL						9.2	A						9.4	A
Tempel Lane & Tempel Farms Access														
Tempel Farms Access	EB LTR	0.36	7.2	A	EB	7.2	A	EB LTR	0.54	12.9	B	EB	12.9	B
	WB LTR	0.37	7.8	A				WB LTR	0.44	8.1	A			
Tempel Lane	NB LTR	0.33	8.6	A	NB	8.6	A	NB LT	0.42	10.1	B	NB	10.1	B
	SB LTR	0.26	9.1	A				SB LT	0.71	15.0	B			
OVERALL						8.1	A						11.9	B

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 13
Phased Mitigation Improvements
w/ Tempel Farm

	No-Build	Phase 1 Warehouse	Phase 2 Manufacturing	Phase 3 Office/Lab
Tempel Lane Extension	Extend Tempel Lane to 3rd Ave Ext, Provide NB left/thru lane and right-turn lane	-	-	-
Tempel Lane & Route 151	EB Left-turn lane, WB right-turn lane, SB right-turn lane, Install Signal (w/ped equipment)	-	-	-
Route 4 & Route 151	Expand Rndbt to 2-lanes NB/SB, modify EB approach to allow left-turn from both lanes	-	-	-
Route 4 & Hotel Access (right-in/right-out)	Connect to Route 4 (already constructed) & SB Right-Turn Lane	-	-	-
Route 4 & I-90 EB Off-Ramp	-	-	-	-
Route 4 & I-90 WB Off-Ramp	NYS DOT - Construct Traffic Signal	-	-	-
Route 4 & 3rd Ave Ext	-	-	-	Optimize Timings
Route 4 & Grandview	-	-	-	Optimize Timings
3rd Ave Ext & Tempel Lane	EB/WB TWLTL	Monitor for Installation of Traffic Signal if Site Dwy volumes 10% greater than approved volumes	Monitor for Installation of Traffic Signal	Install Traffic Signal, convert TWLTL to left-turn lanes
Tempel Lane & Regeneron Access	-	Monitor Site Traffic Volumes	Monitor Site Traffic Volumes	Monitor Site Traffic Volumes, Install SB left-turn lane and WB right-turn lane
Tempel Lane & Hotel Access	1-Lane Rdnbt	-	-	-
Tempel Lane (from site to Route 151)	-	Spot Repairs	Spot Repairs	Full Depth Reclamation with New Asphalt Top Course

Fair Share Funding Assessment

Many of the physical improvements identified for the study area are common to both the Regeneron Tempel Lane campus project and the Tempel Farms development. However, the implementation of these improvements will be governed by the site development schedules for these two developments. The following mitigation measures that were conditions of approval for the Tempel Farms development will need to be implemented by Regeneron as part of their site mitigation, as the Regeneron site will most likely be built prior to the construction of Tempel Farms:

- Tempel Lane Extension to 3rd Avenue Extension
- Tempel Lane & Red Mill Road (NY Route 151) – Eastbound left-turn lane, westbound right-turn lane, southbound right-turn lane, install traffic signal (with ped signals)
- Route 4 & Red Mill Road (NY Route 151) – Expand roundabout to 2-lanes northbound/southbound and modify eastbound approach to allow left-turn from both lanes
- Route 4 & Hotel Access (Hampton Inn) – Connect Tempel Lane (already constructed) to Route 4 and provide a southbound right-turn lane
- 3rd Avenue Extension & Tempel Lane – Construct an eastbound/westbound TWLTL

Since both the Regeneron Tempel Lane campus and the Tempel Farms development have mutual responsibility for, and benefit from, these common improvements, the proportion of site traffic from each development that is contributing to the operations at the impacted intersections was identified. This distribution of site traffic could be used as a basis for allocating funding contributions toward the improvement costs. Below in Table 14 is a summary of the above improvements and the number of site trips entering the intersection from both developments. While the Tempel Farms study did not include pavement improvements to the existing Tempel Lane section in their TIS, due to the significant amount of volume they will be adding to the existing section, a comparison of site trips for the existing portion of Tempel Lane is provided.

Table 14
Fair Share Funding Assessment

Location	Improvement	Regeneron Site Trips	Percentage of Total	Tempel Farms Trips	Percentage of Total	Combined Site Trip Total
Tempel Lane Extension	Extend Tempel Lane to 3rd Ave Ext, provide NB Left/thru lane and right-turn lane at intersection	310	55%	255	45%	565
Tempel Lane & Route 151	EB Left-turn lane, WB right-turn lane, SB right-turn lane, and Signal	194	28%	489	72%	683
Route 4 & Route 151	Expand roundabout to 2-lanes NB/SB, modify EB approach to allow LT from both lanes	303	35%	553	65%	856
Route 4 & Hotel Access (right-in/right-out)	Install SB right-turn lane	383	34%	744	66%	1127
3rd Ave Ext & Tempel Lane	Install TWLTL	310	58%	229	42%	539
Tempel Lane (from site to Route 151)	Full depth reclamation with new asphalt top course	377	33%	752	67%	1129

Conclusion

Analysis without Tempel Farms

Subsequent to the completion of the March 2018 TIS, there have been several changes to the development program at Regeneron's Temple Lane Campus pertaining both to the configuration of uses and the sequencing of construction. These changes are as follows:

- Modified construction phasing;
- Increased building size of the final constructed size of the warehouse in Phase 1;
- Increased building size and number of employees for the manufacturing use; and
- Decreased number of employees for the office/lab use.

The current phasing plan will now have the manufacturing constructed in Phase 2 and the office/lab constructed in Phase 3. It is assumed that the construction of both of these phases will begin in 2018, with the manufacturing being completed first in early 2020 and the office/lab completed in late 2020. In addition, the preferred connection to 3rd Avenue Extension is now to extend Tempel Lane to 3rd Avenue Extension opposite Cedar Crest Drive (Alternative 2 in the March 2018 TIS), rather than a private access on 3rd Avenue Extension opposite of Woodlawn Avenue (Alternative 1 in March 2018 TIS).

While the number of employees will remain the same as the March 2018 TIS at the Tempel Lane site, the number of estimated site trips is estimated to be reduced, due to the reallocation of employees to different uses. It is estimated that there will be 15 fewer AM and 24 fewer PM peak hour trips with the change in the site plan. It is therefore concluded that the findings of the Full Build Analysis from the March 2018 TIS will remain the same and do not need to be updated as a result of this change to the development program.

However, the higher warehouse and manufacturing trip generation numbers (Phase 2) were used for this memo update for the purposes of analyzing the changed construction phasing (i.e., manufacturing facility preceding the office/lab facility). This will provide a conservative analysis, to determine what, if any, mitigation described in Section 5.3 of the March 2018 TIS, is required for site traffic associated with the combined warehouse and manufacturing site traffic (Phase 2). It is estimated that the warehouse and manufacturing will generate 259 total trips (204 in, 55 out) during the AM peak hour and 230 total trips (72 in, 158 out) during the PM peak hour. The traffic operations for this construction phase were tested without an access to 3rd Avenue Extension, as Tempel Lane would not be extended by the time the manufacturing was open.

While there is a change in LOS when comparing the Phase 2 development to the No-Build Condition for some movements, all are still estimated to operate at LOS D or better with the exception of the northbound thru/right movement at US Route 4 & Grandview Drive/Greenbush commons which is over capacity in the PM No-Build condition. As it is estimated that there will be less than 10 seconds of added delay per vehicle for the northbound thru/right movement at US Route 4 & Grandview Drive/Greenbush, mitigation is not recommended for Phase 2. It is requested that an exception from the NYSDOT policy to maintain the same LOS as No-Build in the Build Condition be granted for these locations for Phase 2 of the development.



The following Mitigation is recommended for the revised phased development plan:

Phase 1

- Tempel Lane & Route 151 – Monitor for installation of traffic signal if site driveway volumes are 10% greater than approved volumes
- Tempel Lane & Regeneron Access – Monitor site traffic volumes
- Spot repairs on Tempel Lane where pavement is currently crumbling

Phase 2

- Tempel Lane & Route 151 – Monitor for installation of traffic signal
- Tempel Lane & Regeneron Access – Monitor site traffic volumes
- Spot repairs on Tempel Lane where needed

Phase 3

- Extend Tempel Lane to 3rd Avenue Extension opposite of Cedar Crest Drive and provide a northbound left/thru lane and a right-turn lane
- US Route 4 & Grandview Drive/Greenbush Commons
 - o Optimization of signal splits
- US Route 4 & 3rd Avenue Extension
 - o Optimization of signal splits
- Red Mill Road (NY Route 151 & Tempel Lane)
 - o Construct an eastbound left-turn lane, westbound right-turn lane, and southbound right-turn lane consistent with the proposed geometry in the Village at Tempel Farms Traffic Impact Study
 - o Construct a traffic signal (with pedestrian equipment)
- 3rd Avenue Extension & Tempel Lane
 - o Construct an eastbound and westbound TWLTL
 - o Monitor for installation of traffic signal
- US Route 4 & Red Mill Road (NY Route 151)
 - o Modify the roundabout to include two lanes northbound and southbound consistent with the improvements identified in the Village at Tempel Farms and Route 4 Corridor studies.
 - o Modify the eastbound approach to allow left-turn from both lanes
- US Route 4 & Hotel Access (Hampton Inn)
 - o Construct a southbound right-turn lane on Route 4
- Tempel Lane & Regeneron Access
 - o Monitor site traffic volumes
- Tempel Lane
 - o Construct a southbound left-turn lane on Tempel Lane at the Regeneron Access
 - o Full depth reclamation with new asphalt top course for existing roadway (32' width)

Analysis with Tempel Farms

In order to receive approval for the SEQRA amendment, a separate analysis has been conducted for a scenario with the Tempel Farms development and proposed mitigation included. To be consistent with the March 2018 TIS, the full build out site trips that were utilized for that report were utilized for this update with Tempel Farms. As noted in the Trip Generation section, the site trips for the current site plan are estimated to be slightly less than the March 2018 TIS volumes, but this difference will not have an impact on the findings and mitigation recommendations.

Capacity analyses of the study area were conducted to estimate the operations of the adjacent roadway system with and without the project generated traffic. The addition of the project generated traffic does reduce the LOS for some of the movements at the study area intersections. As a result, geometric and traffic control improvements have been identified to mitigate these impacts.

The analysis assumed the improvements associated with the Tempel Farm project would be constructed under the No-Build condition. The following additional improvements have been identified at the study area intersections:

Phase 1

- 3rd Avenue Extension & Tempel Lane - Monitor for installation of traffic signal if site driveway volumes are 10% greater than approved volumes
- Tempel Lane & Regeneron Access – Monitor site traffic volumes
- Spot repairs on Tempel Lane where pavement is currently crumbling

Phase 2

- 3rd Avenue Extension & Tempel Lane – Monitor for installation of traffic signal
- Tempel Lane & Regeneron Access – Monitor site traffic volumes
- Spot repairs on Tempel Lane where needed

Phase 3

- US Route 4 & Grandview Drive/Greenbush Commons – Optimize signal timings
- US Route 4 & 3rd Avenue Extension – Optimize signal timings
- 3rd Avenue Extension & Tempel Lane
 - Installation of a traffic signal
 - Convert TWLTL's to LT lanes
- Tempel Lane & Regeneron Access
 - Monitor site traffic volumes
 - Install SB left-turn lane
 - Install WB right-turn lane
- Tempel Lane - Full depth reclamation with new asphalt top course



Fair Share Funding Assessment

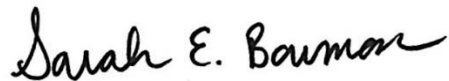
Many of the physical improvements identified for the study area are common to both the Regeneron Tempel Lane campus project and the Tempel Farms development. However, the implementation of these improvements will be governed by the site development schedules for these two developments. The following mitigation measures that were conditions of approval for the Tempel Farms development will need to be implemented by Regeneron as part of their site mitigation, as the Regeneron site will most likely be built prior to the construction of Tempel Farms:

- Tempel Lane Extension to 3rd Avenue Extension
- Tempel Lane & Red Mill Road (NY Route 151) – Eastbound left-turn lane, westbound right-turn lane, southbound right-turn lane, install traffic signal (with ped signals)
- Route 4 & Red Mill Road (NY Route 151) – Expand roundabout to 2-lanes northbound/southbound and modify eastbound approach to allow left-turn from both lanes
- Route 4 & Hotel Access (Hampton Inn) – Connect Tempel Lane (already constructed) to Route 4 and provide a southbound right-turn lane
- 3rd Avenue Extension & Tempel Lane – Construct an eastbound/westbound TWLTL

Since both the Regeneron Tempel Lane campus and the Tempel Farms development have mutual responsibility for, and benefit from, these common improvements, the proportion of site traffic from each development that is contributing to the operations at the impacted intersections was identified. This distribution of site traffic could be used as a basis for allocating funding contributions toward the improvement costs. While the Tempel Farms study did not include pavement improvements to the existing Tempel Lane section in their TIS, due to the significant amount of volume they will be adding to the existing section, a comparison of site trips for the existing portion of Tempel Lane was also provided.

Please let me know if you have any questions or need any additional information.

Sincerely,



Sarah E. Bowman, P.E., PTOE
Traffic Squad Leader – East Region

SEB/

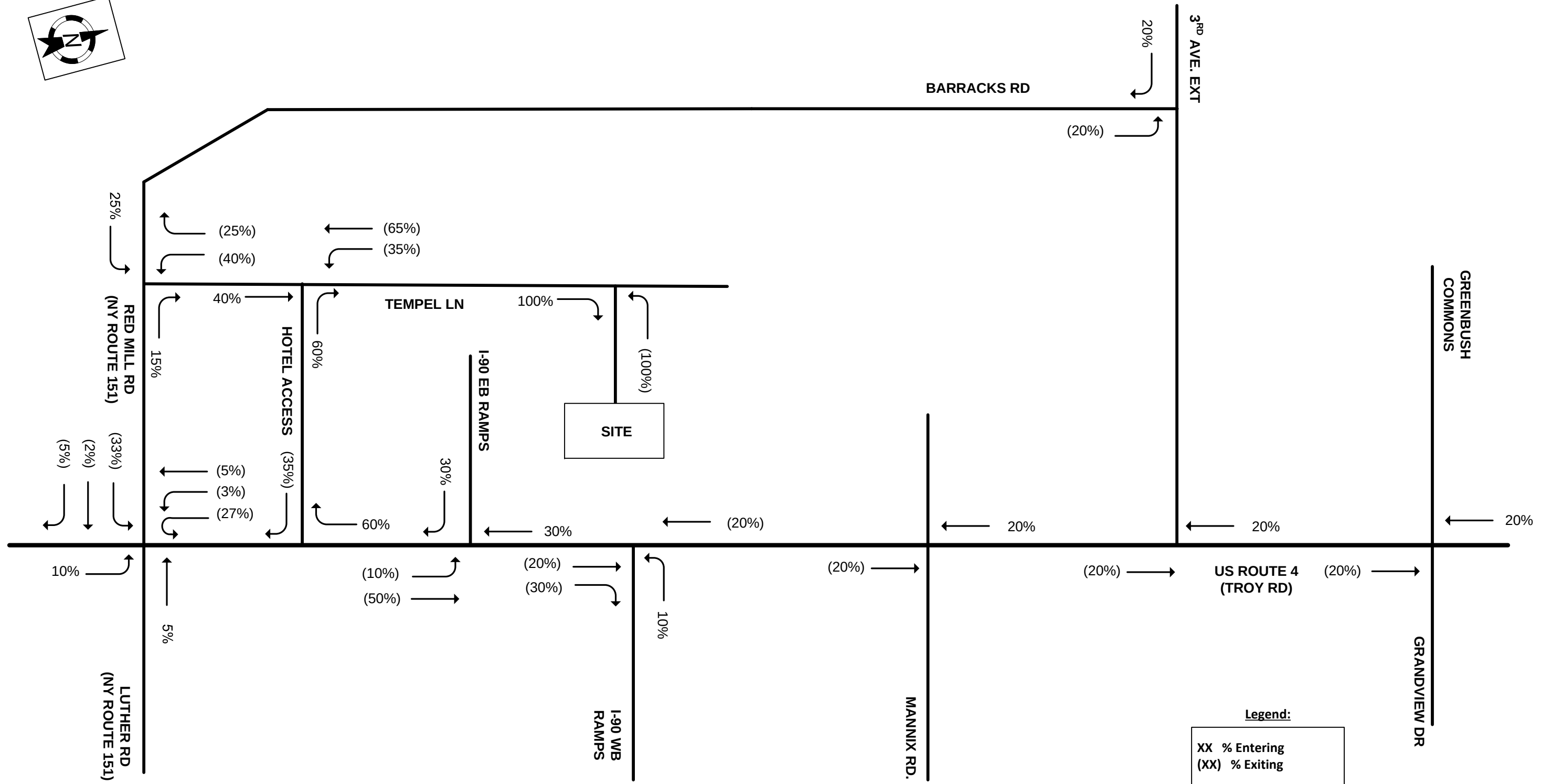
Enclosure

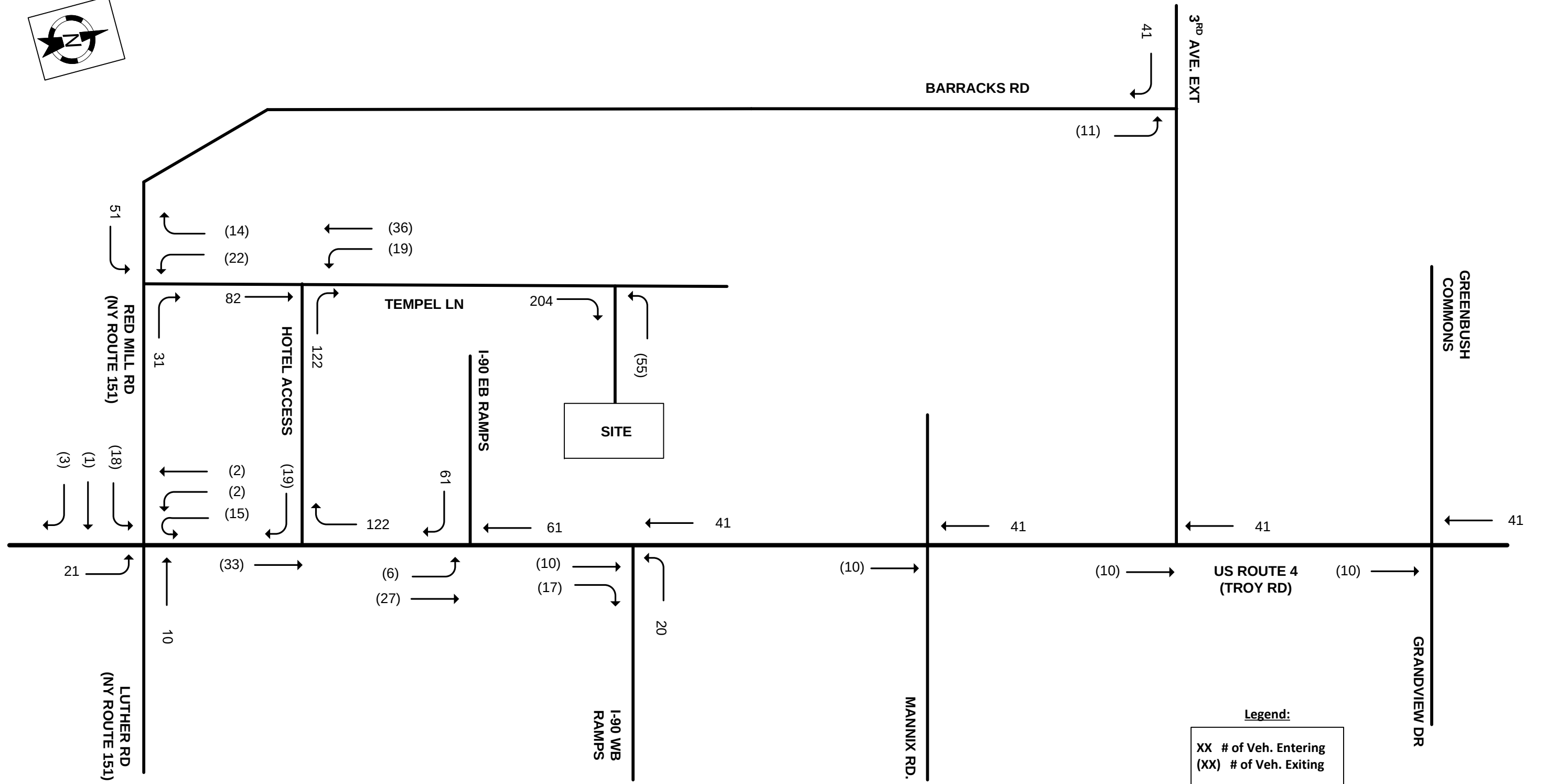
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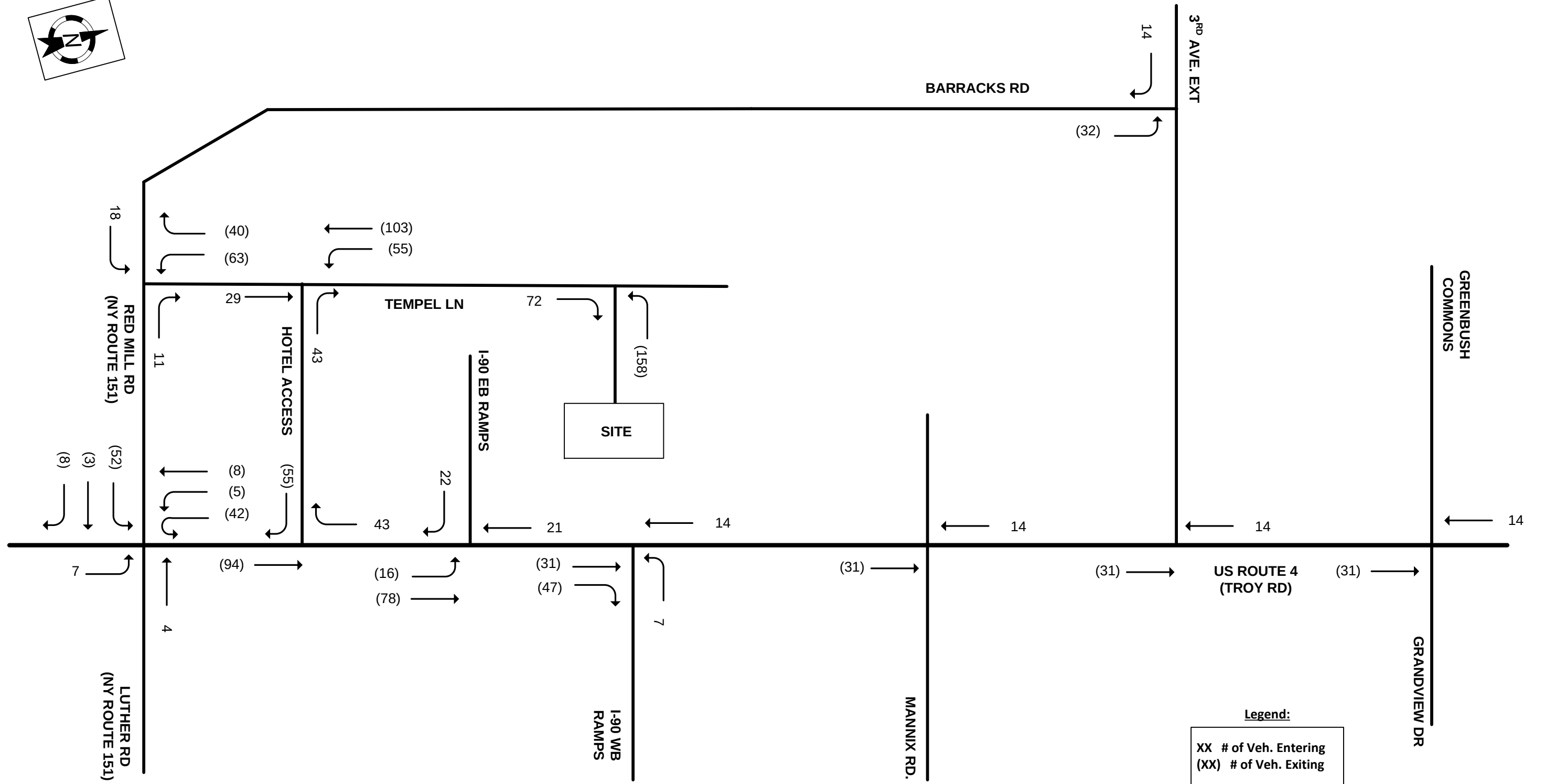


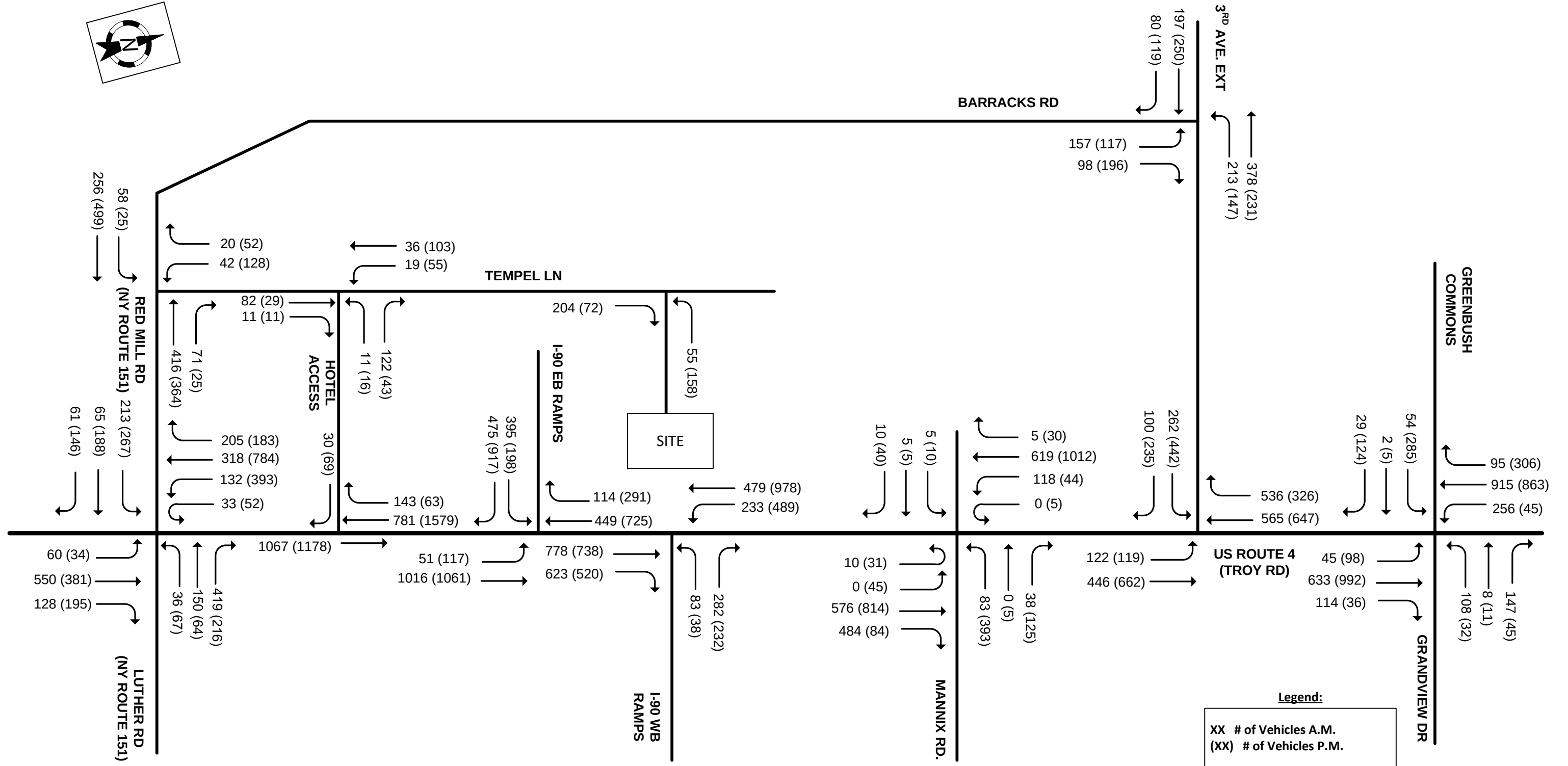
Appendix A - Revised Phasing Analysis (No-Tempel Farms)

Phase 2 Analysis









HCM 2010 TWSC
1: US Route 4 & Hotel Access

07/27/2018

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗↘	
Traffic Vol, veh/h	0	30	0	1067	781	143
Future Vol, veh/h	0	30	0	1067	781	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	33	0	1160	849	155
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	502	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	516	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	516	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.4	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	516	-	-		
HCM Lane V/C Ratio	-	0.063	-	-		
HCM Control Delay (s)	-	12.4	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0.2	-	-		

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/27/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	395	475	51	1016	449	114		
Future Volume (veh/h)	395	475	51	1016	449	114		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1792	1696	1827	1792	1681		
Adj Flow Rate, veh/h	444	386	57	1142	504	62		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	1	6	12	4	6	13		
Cap, veh/h	557	534	378	1757	1278	980		
Arrive On Green	0.31	0.31	0.04	0.51	0.38	0.38		
Sat Flow, veh/h	1792	1524	1616	3563	3495	1429		
Grp Volume(v), veh/h	444	386	57	1142	504	62		
Grp Sat Flow(s),veh/h/ln	1792	1524	1616	1736	1703	1429		
Q Serve(g_s), s	14.9	14.5	1.3	15.9	7.1	0.9		
Cycle Q Clear(g_c), s	14.9	14.5	1.3	15.9	7.1	0.9		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	557	534	378	1757	1278	980		
V/C Ratio(X)	0.80	0.72	0.15	0.65	0.39	0.06		
Avail Cap(c_a), veh/h	957	874	1177	2383	2338	1425		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.7	18.5	11.1	11.9	15.0	3.4		
Incr Delay (d2), s/veh	3.2	2.3	0.2	0.9	0.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.8	6.4	0.6	7.7	3.4	0.7		
LnGrp Delay(d),s/veh	23.9	20.8	11.3	12.8	15.4	3.4		
LnGrp LOS	C	C	B	B	B	A		
Approach Vol, veh/h	830			1199	566			
Approach Delay, s/veh	22.5			12.7	14.1			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.6	30.6				39.2		26.4
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	3.3	9.1				17.9		16.9
Green Ext Time (p_c), s	0.1	7.1				15.3		3.5
Intersection Summary								
HCM 2010 Ctrl Delay			16.1					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/27/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	83	282	788	623	233	479		
Future Volume (veh/h)	83	282	788	623	233	479		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1845	1863	1881	1545	1776		
Adj Flow Rate, veh/h	99	273	938	409	277	570		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84		
Percent Heavy Veh, %	0	3	2	1	23	7		
Cap, veh/h	346	532	1318	902	405	2079		
Arrive On Green	0.19	0.19	0.37	0.37	0.15	0.62		
Sat Flow, veh/h	1810	1568	3632	1599	1471	3463		
Grp Volume(v), veh/h	99	273	938	409	277	570		
Grp Sat Flow(s),veh/h/ln	1810	1568	1770	1599	1471	1687		
Q Serve(g_s), s	2.4	7.2	11.8	7.8	5.3	4.1		
Cycle Q Clear(g_c), s	2.4	7.2	11.8	7.8	5.3	4.1		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	346	532	1318	902	405	2079		
V/C Ratio(X)	0.29	0.51	0.71	0.45	0.68	0.27		
Avail Cap(c_a), veh/h	522	684	1702	1075	612	2920		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	18.0	13.8	13.9	6.6	10.0	4.6		
Incr Delay (d2), s/veh	0.4	0.8	1.0	0.4	2.1	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.3	3.3	5.9	5.0	2.3	1.8		
LnGrp Delay(d),s/veh	18.4	14.5	14.9	7.0	12.0	4.7		
LnGrp LOS	B	B	B	A	B	A		
Approach Vol, veh/h	372		1347			847		
Approach Delay, s/veh	15.6		12.5			7.1		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.7	24.4				37.0		15.0
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	15.0	25.0				45.0		15.0
Max Q Clear Time (g_c+I), s	17.3	13.8				6.1		9.2
Green Ext Time (p_c), s	0.5	5.6				3.8		0.6
Intersection Summary								
HCM 2010 Ctrl Delay			11.2					
HCM 2010 LOS			B					

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	256	416	71	42	20
Future Vol, veh/h	58	256	416	71	42	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	6	4	0	0	0
Mvmt Flow	67	298	484	83	49	23
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	567	0	-	0	958	526
Stage 1	-	-	-	-	526	-
Stage 2	-	-	-	-	432	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1015	-	-	-	288	556
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	659	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1015	-	-	-	265	556
Mov Cap-2 Maneuver	-	-	-	-	265	-
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	659	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.6	0		19.6		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1015	-	-	-	319	
HCM Lane V/C Ratio	0.066	-	-	-	0.226	
HCM Control Delay (s)	8.8	0	-	-	19.6	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9	

HCM 2010 TWSC
14: Tempel Ln & Hotel Access

07/27/2018

Intersection

Int Delay, s/veh 5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	11	122	82	11	19	36
Future Vol, veh/h	11	122	82	11	19	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	133	89	12	21	39

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	176	95	0
Stage 1	95	-	-
Stage 2	81	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	814	962	-
Stage 1	929	-	-
Stage 2	942	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	803	962	-
Mov Cap-2 Maneuver	803	-	-
Stage 1	916	-	-
Stage 2	942	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	2.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	946	1491
HCM Lane V/C Ratio	-	-	0.153	0.014
HCM Control Delay (s)	-	-	9.5	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/27/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑			↑↑	↑	↑		
Traffic Volume (veh/h)	197	80	213	378	157	98		
Future Volume (veh/h)	197	80	213	378	157	98		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1860	1900	1900	1874	1900	1810		
Adj Flow Rate, veh/h	229	41	248	440	183	48		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	3	3	1	1	0	5		
Cap, veh/h	1427	251	566	951	451	383		
Arrive On Green	0.47	0.47	0.47	0.47	0.25	0.25		
Sat Flow, veh/h	3098	530	829	2088	1810	1538		
Grp Volume(v), veh/h	133	137	339	349	183	48		
Grp Sat Flow(s),veh/h/ln	1767	1767	1211	1621	1810	1538		
Q Serve(g_s), s	1.6	1.6	6.2	5.2	3.1	0.9		
Cycle Q Clear(g_c), s	1.6	1.6	7.8	5.2	3.1	0.9		
Prop In Lane		0.30	0.73		1.00	1.00		
Lane Grp Cap(c), veh/h	839	839	747	769	451	383		
V/C Ratio(X)	0.16	0.16	0.45	0.45	0.41	0.13		
Avail Cap(c_a), veh/h	1464	1464	1188	1342	1499	1274		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	5.4	5.4	7.1	6.4	11.4	10.5		
Incr Delay (d2), s/veh	0.2	0.2	0.9	0.9	1.3	0.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.8	0.8	2.6	2.5	1.7	0.4		
LnGrp Delay(d),s/veh	5.6	5.6	8.1	7.3	12.6	10.9		
LnGrp LOS	A	A	A	A	B	B		
Approach Vol, veh/h	270			688	231			
Approach Delay, s/veh	5.6			7.7	12.2			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		22.2				22.2		14.0
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		30.0				30.0		30.0
Max Q Clear Time (g_c+I1), s		3.6				9.8		5.1
Green Ext Time (p_c), s		2.7				7.4		1.6
Intersection Summary								
HCM 2010 Ctrl Delay			8.1					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/27/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	262	100	122	446	565	536		
Future Volume (veh/h)	262	100	122	446	565	536		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1749	1782	1712	1776	1863	1900		
Adj Flow Rate, veh/h	305	99	142	519	657	488		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	7	5	11	7	2	2		
Cap, veh/h	355	410	303	1142	997	737		
Arrive On Green	0.21	0.21	0.06	0.64	0.51	0.51		
Sat Flow, veh/h	1666	1515	1630	1776	2035	1437		
Grp Volume(v), veh/h	305	99	142	519	598	547		
Grp Sat Flow(s),veh/h/ln	1666	1515	1630	1776	1770	1609		
Q Serve(g_s), s	12.2	0.0	0.0	10.2	17.3	17.4		
Cycle Q Clear(g_c), s	12.2	0.0	0.0	10.2	17.3	17.4		
Prop In Lane	1.00	1.00	1.00			0.89		
Lane Grp Cap(c), veh/h	355	410	303	1142	908	826		
V/C Ratio(X)	0.86	0.24	0.47	0.45	0.66	0.66		
Avail Cap(c_a), veh/h	960	960	679	1279	1274	1159		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	26.3	19.8	24.8	6.3	12.4	12.5		
Incr Delay (d2), s/veh	2.4	0.1	0.4	0.6	1.8	1.9		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.8	1.9	2.6	5.1	8.8	8.0		
LnGrp Delay(d),s/veh	28.7	19.9	25.2	6.9	14.2	14.4		
LnGrp LOS	C	B	C	A	B	B		
Approach Vol, veh/h	404			661	1145			
Approach Delay, s/veh	26.5			10.8	14.3			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	40.6		19.8		49.6		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	20.0	50.0		40.0		50.0		
Max Q Clear Time (g_c+I), s	12.0	19.4		14.2		12.2		
Green Ext Time (p_c), s	0.2	16.3		0.6		7.0		
Intersection Summary								
HCM 2010 Ctrl Delay			15.5					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/27/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	2	29	108	8	147	45	633	114	256	915	95
Future Volume (veh/h)	54	2	29	108	8	147	45	633	114	256	915	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1864	1776	1900	1819	1900	1900	1728	1900	1845	1845	1863
Adj Flow Rate, veh/h	56	2	27	112	8	113	47	659	114	267	953	42
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	7	0	0	0	0	11	11	3	3	2
Cap, veh/h	285	9	322	173	25	131	386	762	132	328	2064	933
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.53	0.53	0.09	0.59	0.59
Sat Flow, veh/h	966	41	1509	534	115	611	1810	1436	248	1757	3505	1583
Grp Volume(v), veh/h	58	0	27	233	0	0	47	0	773	267	953	42
Grp Sat Flow(s),veh/h/ln	1007	0	1509	1260	0	0	1810	0	1685	1757	1752	1583
Q Serve(g_s), s	0.0	0.0	1.3	12.1	0.0	0.0	1.1	0.0	35.8	5.8	13.8	1.0
Cycle Q Clear(g_c), s	4.5	0.0	1.3	16.5	0.0	0.0	1.1	0.0	35.8	5.8	13.8	1.0
Prop In Lane	0.97		1.00	0.48		0.48	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	294	0	322	328	0	0	386	0	893	328	2064	933
V/C Ratio(X)	0.20	0.00	0.08	0.71	0.00	0.00	0.12	0.00	0.87	0.81	0.46	0.05
Avail Cap(c_a), veh/h	447	0	503	502	0	0	733	0	1123	561	2337	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.6	0.0	28.3	35.2	0.0	0.0	9.3	0.0	18.3	18.5	10.4	7.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.1	0.0	0.0	0.1	0.0	7.6	1.9	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.5	5.7	0.0	0.0	0.5	0.0	18.4	3.8	6.7	0.4
LnGrp Delay(d),s/veh	29.7	0.0	28.4	36.2	0.0	0.0	9.4	0.0	26.0	20.4	10.8	7.8
LnGrp LOS	C		C	D			A		C	C	B	A
Approach Vol, veh/h	85			233			820			1262		
Approach Delay, s/veh	29.3			36.2			25.0			12.7		
Approach LOS	C			D			C			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.1	52.7		24.2	7.8	58.0		24.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	60.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I), s	17.8	37.8		6.5	3.1	15.8		18.5				
Green Ext Time (p_c), s	0.3	9.9		0.2	0.0	16.0		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay	19.8											
HCM 2010 LOS	B											

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰		↱			↱
Traffic Vol, veh/h	55	0	0	204	0	0
Future Vol, veh/h	55	0	0	204	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	0	0	222	0	0
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	112	-	0	0	222	0
Stage 1	111	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	-	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	-	-	-	2.218	-
Pot Cap-1 Maneuver	885	0	-	-	1347	-
Stage 1	914	0	-	-	-	-
Stage 2	1022	0	-	-	-	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver	885	-	-	-	1347	-
Mov Cap-2 Maneuver	885	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.4	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	885		1347	-	
HCM Lane V/C Ratio	-	0.068		-	-	
HCM Control Delay (s)	-	9.4		0	-	
HCM Lane LOS	-	A		A	-	
HCM 95th %tile Q(veh)	-	0.2		0	-	

LANE SUMMARY

 **Site: 1 [Mannix - 2020 Build Phase 2 AM]**

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	599	2.9	1135	0.528	100	6.5	LOS A	4.3	110.7	Full	1600	0.0	0.0
Lane 2 ^d	632	1.2	1197	0.528	100	6.1	LOS A	4.4	110.2	Full	1600	0.0	0.0
Approach	1231	2.1		0.528		6.3	LOS A	4.4	110.7				
East: Mannix Road													
Lane 1	68	4.9	693	0.099	100	10.3	LOS B	0.4	11.4	Full	1600	0.0	0.0
Lane 2 ^d	73	1.9	741	0.099	100	7.0	LOS A	0.4	11.3	Full	1600	0.0	0.0
Approach	141	3.4		0.099		8.6	LOS A	0.4	11.4				
North: US Route 4													
Lane 1 ^d	439	14.4	980	0.448	100	8.1	LOS A	2.8	78.4	Full	1600	0.0	0.0
Lane 2	415	20.2	928	0.448	100	6.3	LOS A	2.8	81.1	Full	1600	0.0	0.0
Approach	854	17.2		0.448		7.2	LOS A	2.8	81.1				
West: Mannix Road													
Lane 1 ^d	24	5.7	471	0.051	100	8.3	LOS A	0.2	4.8	Full	1600	0.0	0.0
Approach	24	5.7		0.051		8.3	LOS A	0.2	4.8				
Intersection	2251	7.9		0.528		6.8	LOS A	4.4	110.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Route 151 - 2020 Build Phase 2 AM]

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	71	18.7	352	0.202	100	17.9	LOS B	0.7	21.5	Full	1600	0.0	0.0
Lane 2 ^d	788	5.1	819	0.963	100	24.5	LOS C	18.9	492.8	Full	1600	0.0	0.0
Approach	859	6.3		0.963		23.9	LOS C	18.9	492.8				
East: Route 151													
Lane 1	217	10.2	336	0.647	100	22.6	LOS C	4.4	118.1	Full	1600	0.0	0.0
Lane 2 ^d	487	6.0	494	0.986	100	46.7	LOS D	18.2	477.4	Full	1600	0.0	0.0
Approach	705	7.3		0.986		39.3	LOS D	18.2	477.4				
North: US Route 4													
Lane 1	192	4.8	638	0.301	100	15.1	LOS B	1.8	45.6	Full	1600	0.0	0.0
Lane 2 ^d	608	3.4	986	0.617	100	8.6	LOS A	6.1	155.7	Full	1600	0.0	0.0
Approach	800	3.8		0.617		10.2	LOS B	6.1	155.7				
West: Route 151													
Lane 1 ^d	249	0.0	786	0.316	100	13.6	LOS B	1.6	39.2	Full	1600	0.0	0.0
Lane 2	147	8.9	585	0.250	100	8.7	LOS A	1.1	29.7	Full	1600	0.0	0.0
Approach	395	3.3		0.316		11.8	LOS B	1.6	39.2				
Intersection	2759	5.4		0.986		22.1	LOS C	18.9	492.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗↘	
Traffic Vol, veh/h	0	69	0	1178	1579	63
Future Vol, veh/h	0	69	0	1178	1579	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	75	0	1280	1716	68
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	892	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	286	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	286	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 286		-	-		
HCM Lane V/C Ratio	- 0.262		-	-		
HCM Control Delay (s)	- 22		-	-		
HCM Lane LOS	- C		-	-		
HCM 95th %tile Q(veh)	- 1		-	-		

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/27/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	198	917	117	1061	725	291		
Future Volume (veh/h)	198	917	117	1061	725	291		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	208	687	123	1117	763	164		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	8	1	1	1	1	1		
Cap, veh/h	668	742	290	1662	1183	1166		
Arrive On Green	0.40	0.40	0.07	0.46	0.33	0.33		
Sat Flow, veh/h	1675	1599	1792	3668	3668	1599		
Grp Volume(v), veh/h	208	687	123	1117	763	164		
Grp Sat Flow(s),veh/h/ln	1675	1599	1792	1787	1787	1599		
Q Serve(g_s), s	7.5	35.0	3.8	21.4	15.9	2.7		
Cycle Q Clear(g_c), s	7.5	35.0	3.8	21.4	15.9	2.7		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	668	742	290	1662	1183	1166		
V/C Ratio(X)	0.31	0.93	0.42	0.67	0.64	0.14		
Avail Cap(c_a), veh/h	668	742	887	1831	1831	1456		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	18.1	22.1	18.2	18.3	25.0	3.6		
Incr Delay (d2), s/veh	0.3	17.6	1.0	1.3	1.3	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.5	19.1	1.9	10.7	8.1	3.0		
LnGrp Delay(d),s/veh	18.5	39.8	19.2	19.6	26.3	3.7		
LnGrp LOS	B	D	B	B	C	A		
Approach Vol, veh/h	895			1240	927			
Approach Delay, s/veh	34.8			19.5	22.3			
Approach LOS	C			B	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.8	35.1				46.8		41.0
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	5.8	17.9				23.4		37.0
Green Ext Time (p_c), s	0.3	11.1				12.9		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			24.8					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/27/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	38	232	738	520	489	978		
Future Volume (veh/h)	38	232	738	520	489	978		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1827	1845	1845	1881	1881	1900		
Adj Flow Rate, veh/h	41	220	794	320	526	1052		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh, %	4	3	3	1	1	0		
Cap, veh/h	314	652	1080	781	608	2295		
Arrive On Green	0.18	0.18	0.31	0.31	0.24	0.64		
Sat Flow, veh/h	1740	1568	3597	1599	1792	3705		
Grp Volume(v), veh/h	41	220	794	320	526	1052		
Grp Sat Flow(s),veh/h/ln	1740	1568	1752	1599	1792	1805		
Q Serve(g_s), s	1.1	5.2	11.0	7.0	9.5	8.1		
Cycle Q Clear(g_c), s	1.1	5.2	11.0	7.0	9.5	8.1		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	314	652	1080	781	608	2295		
V/C Ratio(X)	0.13	0.34	0.74	0.41	0.86	0.46		
Avail Cap(c_a), veh/h	352	687	1353	906	944	3252		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	18.7	10.8	16.8	8.9	9.7	5.1		
Incr Delay (d2), s/veh	0.2	0.3	1.6	0.3	5.3	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.5	2.3	5.5	4.2	5.4	4.0		
LnGrp Delay(d),s/veh	18.9	11.1	18.4	9.2	15.0	5.2		
LnGrp LOS	B	B	B	A	B	A		
Approach Vol, veh/h	261		1114			1578		
Approach Delay, s/veh	12.3		15.8			8.5		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	17.8	21.8				39.6		14.8
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.0	21.0				49.0		11.0
Max Q Clear Time (g_c+1), s	11.5	13.0				10.1		7.2
Green Ext Time (p_c), s	1.3	3.7				8.4		0.3
Intersection Summary								
HCM 2010 Ctrl Delay			11.6					
HCM 2010 LOS			B					

Intersection						
Int Delay, s/veh	5.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	499	364	25	128	52
Future Vol, veh/h	25	499	364	25	128	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	4	0
Mvmt Flow	27	542	396	27	139	57
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	423	0	-	0	1006	410
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	596	-
Critical Hdwy	4.1	-	-	-	6.44	6.2
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.2	-	-	-	3.536	3.3
Pot Cap-1 Maneuver	1147	-	-	-	265	646
Stage 1	-	-	-	-	666	-
Stage 2	-	-	-	-	547	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1147	-	-	-	256	646
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	547	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		34.5		
HCM LOS				D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1147	-	-	-	310	
HCM Lane V/C Ratio	0.024	-	-	-	0.631	
HCM Control Delay (s)	8.2	0	-	-	34.5	
HCM Lane LOS	A	A	-	-	D	
HCM 95th %tile Q(veh)	0.1	-	-	-	4	

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/27/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↔↔			↔↔	↗	↗		
Traffic Volume (veh/h)	250	119	147	231	117	196		
Future Volume (veh/h)	250	119	147	231	117	196		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1888	1900	1900		
Adj Flow Rate, veh/h	272	47	160	251	127	131		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	1	1	0	0		
Cap, veh/h	1172	200	495	757	528	471		
Arrive On Green	0.38	0.38	0.38	0.38	0.29	0.29		
Sat Flow, veh/h	3181	526	757	2079	1810	1615		
Grp Volume(v), veh/h	158	161	213	198	127	131		
Grp Sat Flow(s),veh/h/ln	1805	1807	1117	1633	1810	1615		
Q Serve(g_s), s	1.8	1.9	3.2	2.6	1.6	1.9		
Cycle Q Clear(g_c), s	1.8	1.9	5.1	2.6	1.6	1.9		
Prop In Lane		0.29	0.75		1.00	1.00		
Lane Grp Cap(c), veh/h	685	686	631	620	528	471		
V/C Ratio(X)	0.23	0.24	0.34	0.32	0.24	0.28		
Avail Cap(c_a), veh/h	1780	1782	1359	1610	1784	1593		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.4	6.4	7.5	6.7	8.2	8.3		
Incr Delay (d2), s/veh	0.4	0.4	0.7	0.6	0.5	0.7		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.9	1.0	1.5	1.3	0.9	0.9		
LnGrp Delay(d),s/veh	6.8	6.8	8.2	7.3	8.7	9.0		
LnGrp LOS	A	A	A	A	A	A		
Approach Vol, veh/h	319			411	258			
Approach Delay, s/veh	6.8			7.8	8.9			
Approach LOS	A			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		16.6				16.6		13.9
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		30.0				30.0		30.0
Max Q Clear Time (g_c+I1), s		3.9				7.1		3.9
Green Ext Time (p_c), s		3.3				4.5		1.8
Intersection Summary								
HCM 2010 Ctrl Delay			7.7					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/27/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations					 			
Traffic Volume (veh/h)	442	235	119	662	647	326		
Future Volume (veh/h)	442	235	119	662	647	326		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1817	1835	1792	1881	1863	1900		
Adj Flow Rate, veh/h	456	194	123	682	667	287		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	3	2	6	1	1	1		
Cap, veh/h	509	548	307	1059	1047	450		
Arrive On Green	0.29	0.29	0.06	0.56	0.43	0.43		
Sat Flow, veh/h	1730	1560	1707	1881	2505	1038		
Grp Volume(v), veh/h	456	194	123	682	489	465		
Grp Sat Flow(s),veh/h/ln	1730	1560	1707	1881	1770	1680		
Q Serve(g_s), s	17.7	2.4	0.0	17.4	15.1	15.1		
Cycle Q Clear(g_c), s	17.7	2.4	0.0	17.4	15.1	15.1		
Prop In Lane	1.00	1.00	1.00			0.62		
Lane Grp Cap(c), veh/h	509	548	307	1059	768	729		
V/C Ratio(X)	0.90	0.35	0.40	0.64	0.64	0.64		
Avail Cap(c_a), veh/h	989	981	697	1344	1264	1200		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	23.7	16.8	25.4	10.5	15.5	15.5		
Incr Delay (d2), s/veh	2.3	0.1	0.3	1.4	1.9	2.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	8.7	4.7	2.3	9.3	7.7	7.4		
LnGrp Delay(d),s/veh	26.0	16.9	25.7	11.9	17.4	17.5		
LnGrp LOS	C	B	C	B	B	B		
Approach Vol, veh/h	650			805	954			
Approach Delay, s/veh	23.3			14.0	17.4			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	35.4		25.6		44.4		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	20.0	50.0		40.0		50.0		
Max Q Clear Time (g_c+I2), s	17.1			19.7		19.4		
Green Ext Time (p_c), s	0.1	13.2		0.9		9.5		
Intersection Summary								
HCM 2010 Ctrl Delay			17.9					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/27/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	5	124	32	11	45	98	992	36	45	863	306
Future Volume (veh/h)	285	5	124	32	11	45	98	992	36	45	863	306
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1863	1900	1900	1900	1900	1882	1900	1900	1827	1881
Adj Flow Rate, veh/h	300	5	103	34	12	18	103	1044	37	47	908	166
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	0	0	0	1	1	0	4	1
Cap, veh/h	342	5	440	51	21	8	345	1003	36	117	1878	865
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.04	0.56	0.56	0.03	0.54	0.54
Sat Flow, veh/h	993	17	1583	0	77	30	1810	1807	64	1810	3471	1599
Grp Volume(v), veh/h	305	0	103	64	0	0	103	0	1081	47	908	166
Grp Sat Flow(s),veh/h/ln	1009	0	1583	106	0	0	1810	0	1871	1810	1736	1599
Q Serve(g_s), s	0.0	0.0	5.4	0.0	0.0	0.0	2.7	0.0	60.0	1.2	17.6	5.7
Cycle Q Clear(g_c), s	30.0	0.0	5.4	30.0	0.0	0.0	2.7	0.0	60.0	1.2	17.6	5.7
Prop In Lane	0.98		1.00	0.53		0.28	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	346	0	440	81	0	0	345	0	1039	117	1878	865
V/C Ratio(X)	0.88	0.00	0.23	0.79	0.00	0.00	0.30	0.00	1.04	0.40	0.48	0.19
Avail Cap(c_a), veh/h	346	0	440	81	0	0	604	0	1039	402	1928	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	30.1	40.6	0.0	0.0	11.7	0.0	24.0	26.1	15.4	12.7
Incr Delay (d2), s/veh	21.4	0.0	0.1	37.9	0.0	0.0	0.2	0.0	39.0	0.8	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.1	0.0	2.4	2.8	0.0	0.0	1.4	0.0	41.8	0.8	8.4	2.6
LnGrp Delay(d),s/veh	61.6	0.0	30.2	78.5	0.0	0.0	11.9	0.0	63.0	26.9	15.8	12.9
LnGrp LOS	E		C	E			B		F	C	B	B
Approach Vol, veh/h	408			64			1184			1121		
Approach Delay, s/veh	53.7			78.5			58.6			15.9		
Approach LOS	D			E			E			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	65.0		35.0	9.6	63.4		35.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	60.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I), s	13.2	62.0		32.0	4.7	19.6		32.0				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.1	16.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	41.1											
HCM 2010 LOS	D											

Intersection						
Int Delay, s/veh	3.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	16	43	29	11	55	103
Future Vol, veh/h	16	43	29	11	55	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	47	32	12	60	112
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	270	38	0	0	44	0
Stage 1	38	-	-	-	-	-
Stage 2	232	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	719	1034	-	-	1564	-
Stage 1	984	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	690	1034	-	-	1564	-
Mov Cap-2 Maneuver	690	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.3	0		2.6		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	911	1564	-	
HCM Lane V/C Ratio	-	-	0.07	0.038	-	
HCM Control Delay (s)	-	-	9.3	7.4	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-	

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	158	0	0	72	0	0
Future Vol, veh/h	158	0	0	72	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	0	0	78	0	0
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	40	39	0	0	78	0
Stage 1	39	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	972	1033	-	-	1520	-
Stage 1	983	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	972	1033	-	-	1520	-
Mov Cap-2 Maneuver	972	-	-	-	-	-
Stage 1	983	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	9.5	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	972	1520	-	
HCM Lane V/C Ratio	-	-	0.177	-	-	
HCM Control Delay (s)	-	-	9.5	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.6	0	-	

LANE SUMMARY

 **Site: 1 [Mannix - 2020 Build Phase 2 PM]**

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	525	3.4	1230	0.427	100	6.6	LOS A	3.4	88.0	Full	1600	0.0	0.0
Lane 2 ^d	534	3.7	1249	0.427	100	5.5	LOS A	3.4	88.4	Full	1600	0.0	0.0
Approach	1059	3.5		0.427		6.0	LOS A	3.4	88.4				
East: Mannix Road													
Lane 1	273	2.0	641	0.427	100	12.2	LOS B	2.1	53.8	Full	1600	0.0	0.0
Lane 2 ^d	296	1.0	695	0.427	100	9.4	LOS A	2.2	54.3	Full	1600	0.0	0.0
Approach	570	1.5		0.427		10.7	LOS B	2.2	54.3				
North: US Route 4													
Lane 1	593	0.9	849	0.698	100	10.8	LOS B	5.9	148.5	Full	1600	0.0	0.0
Lane 2 ^d	593	0.9	849	0.698	100	10.3	LOS B	5.9	148.5	Full	1600	0.0	0.0
Approach	1186	0.9		0.698		10.5	LOS B	5.9	148.5				
West: Mannix Road													
Lane 1 ^d	61	0.0	345	0.176	100	10.5	LOS B	0.7	18.4	Full	1600	0.0	0.0
Approach	61	0.0		0.176		10.5	LOS B	0.7	18.4				
Intersection	2875	2.0		0.698		8.9	LOS A	5.9	148.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Project: V:\Projects\ANY\K4\33295\Data\Other\Traffic\2018 Work\2018 Sidra\Roundabout Analysis - Phase 2 06-18.sip7

LANE SUMMARY

 **Site: 1 [Route 151 - 2020 Build Phase 2 PM]**

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	38	0.0	332	0.115	100	18.3	LOS B	0.4	11.0	Full	1600	0.0	0.0
Lane 2 ^d	626	0.7	638	0.981	100	34.7	LOS C	18.0	452.5	Full	1600	0.0	0.0
Approach	664	0.6		0.981		33.8	LOS C	18.0	452.5				
East: Route 151													
Lane 1	143	6.1	521	0.276	100	13.4	LOS B	1.4	35.9	Full	1600	0.0	0.0
Lane 2 ^d	235	3.0	644	0.364	100	9.5	LOS A	2.1	52.9	Full	1600	0.0	0.0
Approach	378	4.2		0.364		11.0	LOS B	2.1	52.9				
North: US Route 4													
Lane 1	484	0.0	921	0.525	100	13.3	LOS B	4.2	104.6	Full	1600	0.0	0.0
Lane 2 ^d	1051	0.8	1151	0.913	100	13.9	LOS B	23.0	580.0	Full	1600	0.0	0.0
Approach	1535	0.6		0.913		13.7	LOS B	23.0	580.0				
West: Route 151													
Lane 1	291	1.0	363	0.802	100	30.3	LOS C	6.3	158.9	Full	1600	0.0	0.0
Lane 2 ^d	363	1.9	416	0.872	100	27.8	LOS C	8.5	216.2	Full	1600	0.0	0.0
Approach	654	1.5		0.872		29.0	LOS C	8.5	216.2				
Intersection	3232	1.2		0.981		20.6	LOS C	23.0	580.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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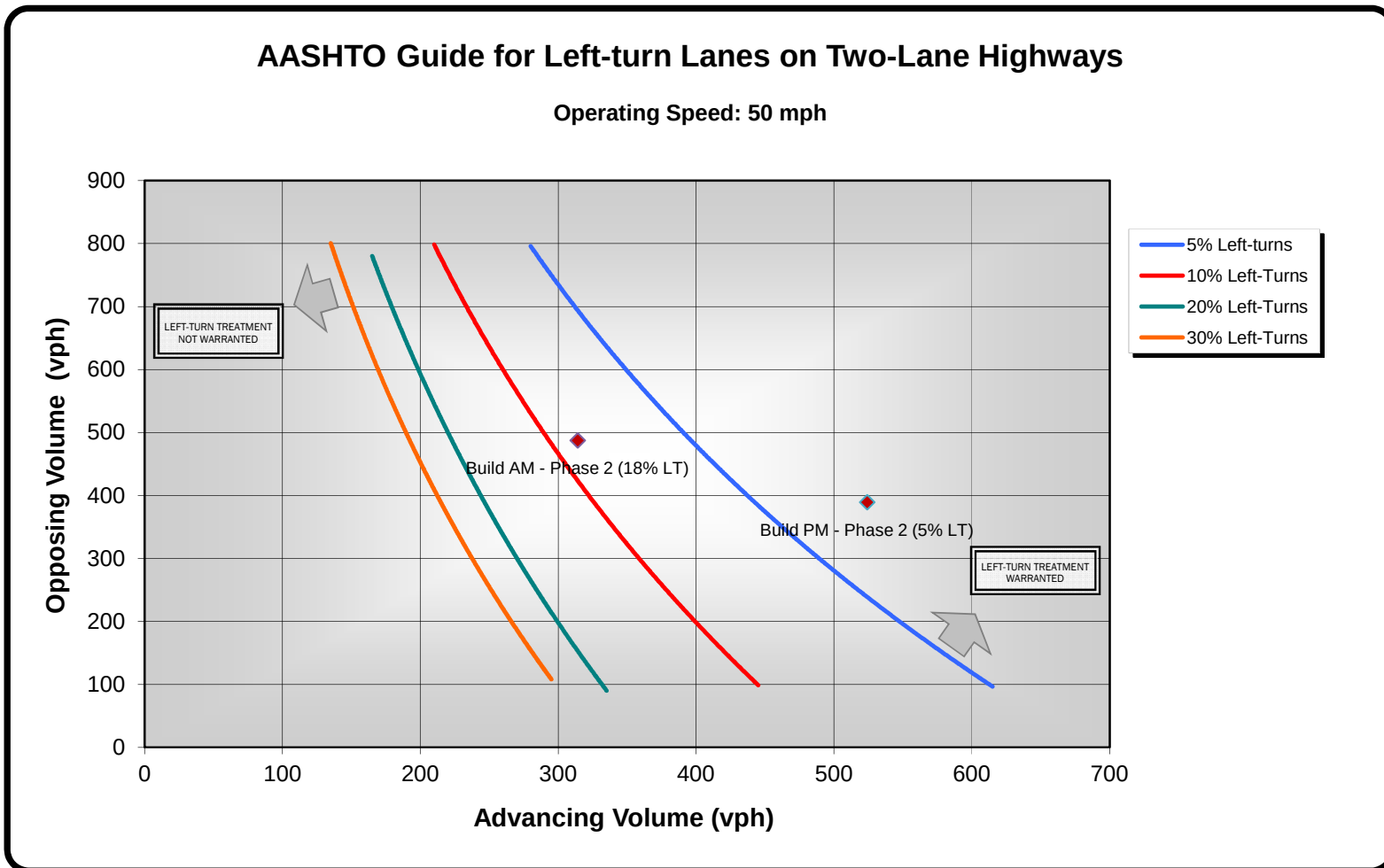
Project: V:\Projects\ANY\K4\33295\Data\Other\Traffic\2018 Work\2018 Sidra\Roundabout Analysis - Phase 2 06-18.sip7

PROJECT NAME: Regeneron Mill Creek
LOCATION: NY 151 & Tempel Lane

DATE: 7/25/2017
CHA PROJ. #: 33295

DESCRIPTION:

Phase 2 Volumes



source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23

TRAFFIC SIGNAL WARRANT SUMMARY

Project : **Regeneron**
 Location: **Tempel & NYS Route 151**
East Greenbush, NY

Analyst: **SEB**
 Date: **July 25, 2018**
 Checked By: _____
 CHA Project No. **33295**

Intersection: **Tempel Lane & Red Mill Road (NY Route 151)**

Major Street: **Red Mill Road (NY Route 151)**
 Minor Street: **Tempel Lane**

Number of Approach Lanes: **1**
 Number of Approach Lanes: **1**

Critical Approach Speed: **45** mph
 Posted Speed Limit: **45** mph

Number of Intersection Approaches: **3**

Volume Level Criteria

1. Is the critical speed of major street traffic > 40 mph ? ☒ Yes ☐ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

Population: **16,500**

If Question 1 or 2 above is answered "Yes", then use "70%" volume level Use: **70** %

Traffic Volume Input

Analysis Condition: **Build Sensitivity Analysis**

Data Source: **ATR Data & Trip Gen**

	Hourly Volumes												
	6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	461	801	756	484	397	440	504	464	583	623	858	913	526
Minor Street (Highest Approach)	20	33	60	41	61	94	92	69	91	119	178	146	75
Pedestrian Volume Crossing Major Street (Total of all crossings)													

Notes:

Phase 2

WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No

Satisfied: ☐ Yes ☒ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied. Should be applied only after adequate trial of other alternatives that would cause less delay and inconvenience to traffic has failed to solve the traffic problem.

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

source: Table 4C-1, USMUTCD, 2009

	Minimum Volume Requirements <i>(based on input criteria)</i>	Hourly Volumes												
		6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	350	461	801	756	484	397	440	504	464	583	623	858	913	526
Minor Street (Highest Approach)	105	20	33	60	41	61	94	92	69	91	119	178	146	75

satisfied?

☒

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☒

Warrant Criteria Satisfied for Condition A ? NO

Number of Hours Satisfied: 3

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

source: Table 4C-1, USMUTCD, 2009

	Minimum Volume Requirements <i>(based on input criteria)</i>	Hourly Volumes												
		6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	525	461	801	756	484	397	440	504	464	583	623	858	913	526
Minor Street (Highest Approach)	53	20	33	60	41	61	94	92	69	91	119	178	146	75

satisfied?

☒

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Warrant Criteria Satisfied for Condition B ? NO

Number of Hours Satisfied: 6

WARRANT 1- EIGHT-HOUR VEHICULAR VOLUME (Con't)

Combination of Conditions A & B

Condition A

	Minimum Volume Requirements <i>(based on input criteria)</i>	Hourly Volumes												
		6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	280	461	801	756	484	397	440	504	464	583	623	858	913	526
Minor Street (Highest Approach)	84	20	33	60	41	61	94	92	69	91	119	178	146	75
satisfied?							☑	☑		☑	☑	☑	☑	

satisfied?

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Warrant Criteria 80% Satisfied for Condition A ? **NO**

Number of Hours Satisfied: **6**

Condition B

	Minimum Volume Requirements <i>(based on input criteria)</i>	Hourly Volumes												
		6-7 am	7-8 am	8-9 am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
Major Street (Both Approaches)	420	461	801	756	484	397	440	504	464	583	623	858	913	526
Minor Street (Highest Approach)	42.4	20	33	60	41	61	94	92	69	91	119	178	146	75

satisfied?

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Warrant Criteria 80% Satisfied for Condition B ? **YES**

Number of Hours Satisfied: **9**

Warrant Criteria 80% Satisfied for Conditions A and B? **NO**

Number of Hours Satisfied: **6**

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

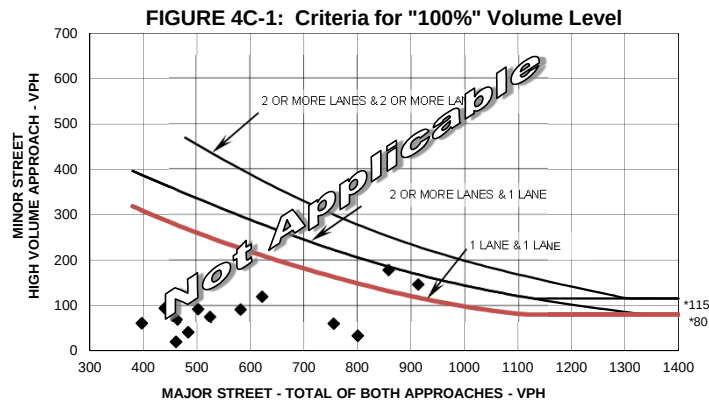
Applicable: ☒ Yes ☐ No

Satisfied: ☐ Yes ☒ No

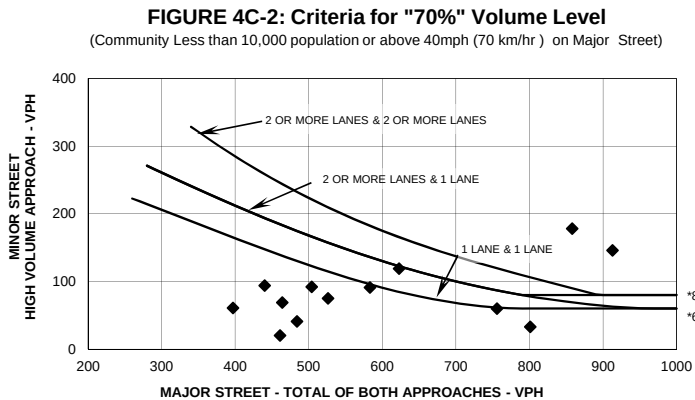
Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Volumes		
Hour	Major Street	Minor Street
6-7 am	461	20
7-8 am	801	33
8-9 am	756	60
9-10am	484	41
10-11am	397	61
11-12pm	440	94
12-1pm	504	92
1-2pm	464	69
2-3pm	583	91
3-4pm	623	119
4-5pm	858	178
5-6pm	913	146
6-7pm	526	75

Plot four volume combinations on the applicable figure below.



* Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes & 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes & 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.

Source: USMUTCD, 2009

WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

The Peak Hour Volume signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

CONDITION A

Criteria

1. Total Stopped Time Delay on Minor Approach

Average Delay per vehicle (sec):	AM	19.6	PM	33.8
Peak Hour Volume:		62		180
Total 1-hour stopped delay (veh-hrs):		0.3		1.7
Volume Criteria		4		4

Criteria: 4 veh-hrs for 1-lane approach; or
5 veh-hrs for 2-lane approach

2. Minor-Street Approach Volume

Minor Street Volume:	180
Number of Approach Lanes:	1
Volume Criteria:	100

Criteria: 100 vph for 1 lane; 150 vph for 2 lanes

3. Intersection Peak-Hour Volume

Total Entering Volume:	1,093
Number of Approaches:	3
Volume Criteria:	650

Criteria: 650 vph for 3 approaches; or
800 vph for 4 or more approaches

Criteria 1 Satisfied? Yes ☒ No
Criteria 2 Satisfied? ☒ Yes No
Criteria 3 Satisfied? ☒ Yes No

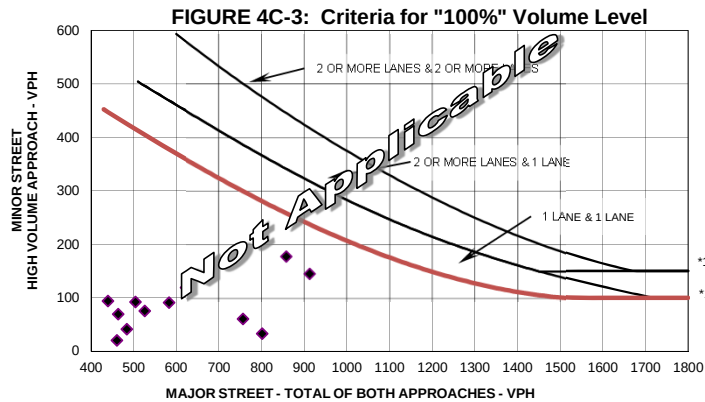
Note: All 3 criteria need to be satisfied for Condition A to be met

CONDITION B

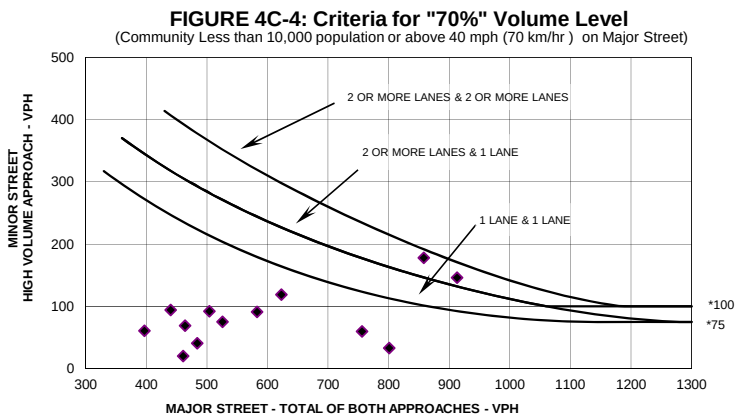
Speed on mainline is above 40 mph or community less than 10,000 - use criteria for 70% volume level

Volumes		
Hour	Major Street	Minor Street
6-7 am	461	20
7-8 am	801	33
8-9 am	756	60
9-10am	484	41
10-11am	397	61
11-12pm	440	94
12-1pm	504	92
1-2pm	464	69
2-3pm	583	91
3-4pm	623	119
4-5pm	858	178
5-6pm	913	146
6-7pm	526	75

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.

Source: USMUTCD, 2009

Appendix B - Updates to March 2018 TIS

Table 9
Regeneron
2020 No-Build & Build Analysis Alternative 2
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.71	21.2	C	EB	21.7	C
	EB R	0.64	19.0	B				EB R	0.78	22.3	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.18	13.1	B	NB	14.8	B
	NB T	0.64	12.5	B				NB T	0.66	14.9	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.39	17.5	B	SB	15.8	B
	SB R	0.06	3.5	A				SB R	0.06	3.3	A			
OVERALL						15.5	B						17.4	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.30	18.1	B	EB	15.2	B
	WB R	0.51	14.4	B				WB R	0.53	14.1	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB L	0.69	15.0	B	NB	12.5	B
	NB R	0.44	6.9	A				NB T	0.47	7.3	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.68	11.9	B	SB	7.3	A
	SB T	0.25	4.6	A				SB R	0.25	4.8	A			
OVERALL						11.1	B						11.3	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.88	30.5	C	EB	28.3	C
	EB R	0.23	18.8	B				EB R	0.23	20.8	C			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.45	28.0	C	NB	11.4	B
	NB T	0.45	6.8	A				NB T	0.45	7.4	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.66	15.0	B	SB	15.6	B
	SB TR	0.64	14.1	B				SB TR	0.71	16.3	B			
OVERALL						15.1	B						16.9	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	30.3	C	EB	29.9	C
	EB R	0.08	27.9	C				EB R	0.09	29.0	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	37.1	D	EB	37.1	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.13	9.6	A	NB	26.0	C
	NB TR	0.86	25.3	C				NB TR	0.87	27.0	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.84	21.4	C	SB	13.1	B
	SB TR	0.44	10.6	B				SB TR	0.50	11.2	B			
OVERALL						19.5	B						20.3	C
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.22	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.22	5.6	A			
	WB L	0.45	7.9	A	WB	7.6	A	WB L	0.48	8.6	A	WB	7.8	A
	WB T	0.45	7.2	A				WB T	0.47	7.1	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.40	13.7	B	NB	13.3	B
	NB R	0.13	10.7	B				NB R	0.14	11.9	B			
OVERALL						7.9	A						8.0	A

Table 9
Regeneron
2020 No-Build & Build Analysis Alternative 2
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A				EB L	0.07	9.2	A			
Tempel Lane	SB LR	0.08	15.4	C				SB LR	0.29	23.3	C			
	-	-	-	-				-	-	-	-			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.09	13.2	B			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.00	8.8	A				EB L	0.00	8.7	A			
								WB L	0.14	8.7	A			
Tempel Lane								NB LT	0.64	80.5	F			
								NB R	0.07	10.7	B			
Cedar Crest Drive	SB LR	0.04	14.8	B				SB LTR	0.07	22.9	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.28	11.0	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.02	7.7	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.33	19.4	C			
Tempel Lane	SB L							SB L	0.25	9.2	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B				EB L	0.33	13.6	B			
	EB TR	0.23	8.5	A	EB	11.6	B	EB TR	0.27	8.7	A	EB	11.8	B
Luther Road (NY Route 151)	WB LT	0.60	21.0	C				WB LT	0.71	22.8	C			
	WB R	0.95	37.4	D	WB	32.5	C	WB R	0.95	38.5	D	WB	32.8	C
US Route 4	NB L	0.13	17.1	B				NB L	0.41	20.2	C			
	NB TR	0.94	20.7	C	NB	20.5	C	NB TR	0.94	20.9	C	NB	20.8	C
	SB L	0.27	14.7	B				SB L	0.35	16.7	B			
	SB TR	0.59	7.7	A	SB	9.2	A	SB TR	0.69	11.9	B	SB	13.1	B
OVERALL						19.1	B						20.4	C
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A				EB LTR	0.05	8.1	A			
	WB L	0.10	10.3	B				WB L	0.10	10.2	B			
	WB LTR	0.10	7.0	A	WB	8.6	A	WB LTR	0.10	6.9	A	WB	8.5	A
US Route 4	NB LT	0.52	6.5	A				NB LT	0.52	6.4	A			
	NB TR	0.52	6.1	A	NB	6.3	A	NB TR	0.52	6.0	A	NB	6.2	A
	SB LT	0.42	8.2	A				SB LT	0.43	8.2	A			
	SB TR	0.42	6.3	A	SB	7.3	A	SB TR	0.43	6.3	A	SB	7.2	A
OVERALL						6.8	A						6.8	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 10
Regeneron
2020 No-Build & Build Analysis Alternative 2
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.32	19.1	B	EB	33.0	C
	EB R	0.91	36.2	D				EB R	0.91	37.1	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.52	19.8	B	NB	20.0	B
	NB T	0.64	19.1	B				NB T	0.70	20.0	C			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.64	27.2	C	SB	23.0	C
	SB R	0.14	3.5	A				SB R	0.15	4.2	A			
OVERALL						23.8	C						24.6	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	EB	11.8	B	WB L	0.13	19.2	B	EB	12.0	B
	WB R	0.33	10.8	B				WB R	0.33	10.7	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.72	18.6	B	NB	15.9	B
	NB R	0.38	9.1	A				NB R	0.50	10.4	B			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.88	16.6	B	SB	9.2	A
	SB T	0.45	5.2	A				SB T	0.44	5.1	A			
OVERALL						11.2	B						12.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.93	35.9	D	EB	30.6	C
	EB R	0.35	16.7	B				EB R	0.34	16.6	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.46	32.3	C	NB	18.7	B
	NB T	0.62	11.5	B				NB T	0.67	16.2	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.68	21.9	C	SB	22.0	C
	SB TR	0.63	17.4	B				SB TR	0.68	22.1	C			
OVERALL						17.7	B						23.7	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.88	61.6	E	EB	53.6	D
	EB R	0.23	30.2	C				EB R	0.24	30.3	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.79	78.5	E	WB	78.5	E
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.30	11.9	B	NB	86.3	F
	NB TR	1.01	54.4	F				NB TR	1.12	92.9	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.40	26.9	C	SB	15.9	B
	SB T	0.48	15.7	B				SB T	0.49	15.9	B			
	SB R	0.19	12.9	B				SB R	0.19	12.9	B			
OVERALL						37.6	D						53.8	D
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.25	6.4	A	EB	6.4	A
	EB R	0.23	6.6	A				EB R	0.25	6.4	A			
	WB L	0.33	7.9	A	WB	7.5	A	WB L	0.38	7.5	A	WB	7.4	A
	WB T	0.32	7.0	A				WB T	0.39	7.2	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.19	9.4	A	NB	9.7	A
	NB R	0.27	9.0	A				NB R	0.28	9.9	A			
OVERALL						7.5	A						7.5	A

Table 10
Regeneron
2020 No-Build & Build Analysis Alternative 2
PM Peak Hour

Intersection	Level of Service													
	No-Build							Build						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.1	A				EB L	0.01	8.2	A			
Tempel Lane	SB LR	0.27	21.1	C				SB LR	1.02	96.1	F			
	-	-	-	-				-	-	-	-			
US Route 4 & Hotel Access														
Hotel Access	EB R	0.05	17.8	C				EB R	0.59	34.2	D			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.01	8.2	A				EB L	0.01	8.1	A			
								WB L	0.04	8.6	A			
Tempel Lane								NB LT	0.64	49.0	E			
								NB R	0.28	13.7	B			
Cedar Crest Drive	SB LR	0.02	13.5	B				SB LTR	0.04	20.6	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.08	10.4	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.10	7.6	A			
Tempel Lane & Regeneron Access														
Regeneron Acces	WB LR							WB LR	0.72	19.2	C			
Tempel Lane	SB L							SB L	0.04	7.5	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C				EB L	1.01	60.4	F			
	EB TR	0.81	22.7	C	EB	23.3	C	EB TR	1.03	57.8	F	EB	59.0	E
Luther Road (NY Route 151)	WB LT	0.25	12.7	B				WB LT	0.30	14.0	B			
	WB R	0.34	8.6	A	WB	10.1	B	WB R	0.38	10.5	B	WB	11.9	B
US Route 4	NB L	0.09	17.6	B				NB L	0.16	19.2	B			
	NB TR	0.91	23.0	C	NB	22.8	C	NB TR	1.06	57.8	F	NB	55.0	E
	SB L	0.48	12.9	B				SB L	0.59	13.8	B			
	SB TR	0.90	12.1	B	SB	12.4	B	SB TR	0.94	17.1	B	SB	15.9	B
OVERALL						16.4	B						32.6	C
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.17	10.4	B				EB LTR	0.18	10.5	B			
	WB L	0.42	12.0	B				WB L	0.42	12.0	B			
	WB LTR	0.42	9.2	A	WB	10.5	B	WB LTR	0.42	9.2	A	WB	10.5	B
US Route 4	NB LT	0.41	6.6	A				NB LT	0.41	6.6	A			
	NB TR	0.41	5.4	A	NB	6.0	A	NB TR	0.41	5.4	A	NB	6.0	A
	SB LT	0.69	10.7	B				SB LT	0.70	10.9	B			
	SB TR	0.69	10.1	B	SB	10.4	B	SB TR	0.70	10.3	B	SB	10.6	B
OVERALL						8.8	A						8.9	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 13
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151								EB L	0.13	6.1	A	EB	4.1	A
								EB T	0.28	3.6	A			
								WB T	0.73	10.6	B	WB	9.3	A
								WB R	0.20	5.0	A			
Tempel Lane								SB L	0.32	14.2	B	SB	14.0	B
								SB R	0.01	11.1	B			
OVERALL													7.9	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.80	23.5	C	EB	21.6	C	EB L	0.71	21.2	C	EB	21.7	C
	EB R	0.64	19.0	B				EB R	0.78	22.3	C			
US Route 4	NB L	0.13	11.0	B	NB	12.4	B	NB L	0.18	13.1	B	NB	14.8	B
	NB T	0.64	12.5	B				NB T	0.66	14.9	B			
	SB T	0.34	14.8	B	SB	13.4	B	SB T	0.39	17.5	B	SB	15.8	B
	SB R	0.06	3.5	A				SB R	0.06	3.3	A			
OVERALL						15.5	B						17.4	B
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.22	17.9	B	EB	15.1	B	WB L	0.30	18.1	B	WB	15.2	B
	WB R	0.51	14.4	B				WB R	0.53	14.1	B			
US Route 4	NB T	0.71	14.8	B	NB	12.5	B	NB T	0.69	15.0	B	NB	12.5	B
	NB R	0.44	6.9	A				NB R	0.47	7.3	A			
	SB L	0.68	11.9	B	SB	7.1	A	SB T	0.68	11.9	B	SB	7.3	A
	SB T	0.25	4.6	A				SB R	0.25	4.8	A			
OVERALL						11.1	B						11.3	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.85	27.5	C	EB	25.4	C	EB L	0.88	30.0	C	EB	27.8	C
	EB R	0.23	18.8	B				EB R	0.23	20.4	C			
US Route 4	NB L	0.45	23.7	C	NB	10.5	B	NB L	0.45	27.9	C	NB	11.4	B
	NB T	0.45	6.8	A				NB T	0.45	7.4	A			
	SB T	0.64	13.9	B	SB	14.0	B	SB T	0.67	15.1	B	SB	15.8	B
	SB TR	0.64	14.1	B				SB TR	0.71	16.6	B			
OVERALL						15.1	B						16.9	B
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.20	29.2	C	EB	28.8	C	EB LT	0.20	29.3	C	EB	28.9	C
	EB R	0.08	27.9	C				EB R	0.09	28.0	C			
Grandview Drive	WB LTR	0.71	35.6	D	EB	35.6	D	WB LTR	0.71	35.7	D	WB	35.7	D
US Route 4	NB L	0.12	9.3	A	NB	24.4	C	NB L	0.13	9.6	A	NB	27.5	C
	NB TR	0.86	25.3	C				NB TR	0.89	28.6	C			
	SB L	0.80	19.7	B	SB	12.5	B	SB L	0.84	21.2	C	SB	13.0	B
	SB TR	0.44	10.6	B				SB TR	0.50	11.2	B			
OVERALL						19.5	B						20.6	C

Table 13
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
AM Peak Hour

Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.15	5.5	A	EB	5.5	A	EB T	0.22	5.6	A	EB	5.6	A
	EB R	0.15	5.5	A				EB R	0.22	5.6	A			
	WB L	0.45	7.9	A				WB L	0.48	8.6	A			
	WB T	0.45	7.2	A				WB T	0.47	7.1	A			
Barracks Road	NB L	0.38	12.3	B	NB	11.9	B	NB L	0.40	13.7	B	NB	13.3	B
	NB R	0.13	10.7	B				NB R	0.14	11.9	B			
OVERALL						7.9	A						8.0	A
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.5	A										
Tempel Lane	SB LR	0.08	15.4	C										
	-	-	-	-										
US Route 4 & Hotel Access														
Hotel Access	EB R	0.02	11.5	B				EB R	0.08	11.7	B			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.00	8.8	A				EB L	0.00	8.7	A			
								WB L	0.14	8.7	A			
Tempel Lane								NB LT	0.34	29.6	D			
								NB R	0.07	10.7	B			
Cedar Crest Drive	SB LR	0.04	14.8	B				SB LTR	0.07	22.1	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.01	8.6	A				WB LR	0.28	11.0	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.02	7.7	A			
Tempel Lane & Regeneron Access														
Regeneron Access	WB LR							WB LR	0.33	19.3	C			
Tempel Lane	SB L							SB L	0.25	9.2	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.29	13.5	B	EB	11.6	B	EB L	0.28	13.6	B	EB	11.6	B
	EB TR	0.23	8.5	A				EB LTR	0.28	9.3	A			
Luther Road (NY Route 151)	WB LT	0.60	21.0	C	WB	32.5	C	WB LT	0.62	17.4	B	WB	18.6	B
	WB R	0.95	37.4	D				WB R	0.82	19.4	B			
US Route 4	NB L	0.13	17.1	B	NB	20.5	C	NB LT	0.57	11.6	B	NB	10.5	B
	NB TR	0.94	20.7	C				NB TR	0.57	9.4	A			
	SB L	0.27	14.7	B				SB LT	0.48	12.5	B			
	SB TR	0.59	7.7	A				SB TR	0.48	8.4	A			
OVERALL						19.1	B						12.7	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.05	8.1	A	EB	8.1	A	EB LTR	0.05	8.1	A	EB	8.1	A
	WB L	0.10	10.3	B				WB L	0.10	10.2	B			
	WB LTR	0.10	7.0	A				WB LTR	0.10	6.9	A			
US Route 4	NB LT	0.52	6.5	A	NB	6.3	A	NB LT	0.52	6.4	A	NB	6.2	A
	NB TR	0.52	6.1	A				NB TR	0.52	6.0	A			
	SB LT	0.42	8.2	A				SB LT	0.43	8.2	A			
	SB TR	0.42	6.3	A				SB TR	0.43	6.3	A			
OVERALL						6.8	A						6.8	A

*Movement; Volume to Capacity Ratio; Level of Service; Approach

Table 14
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
PM Peak Hour

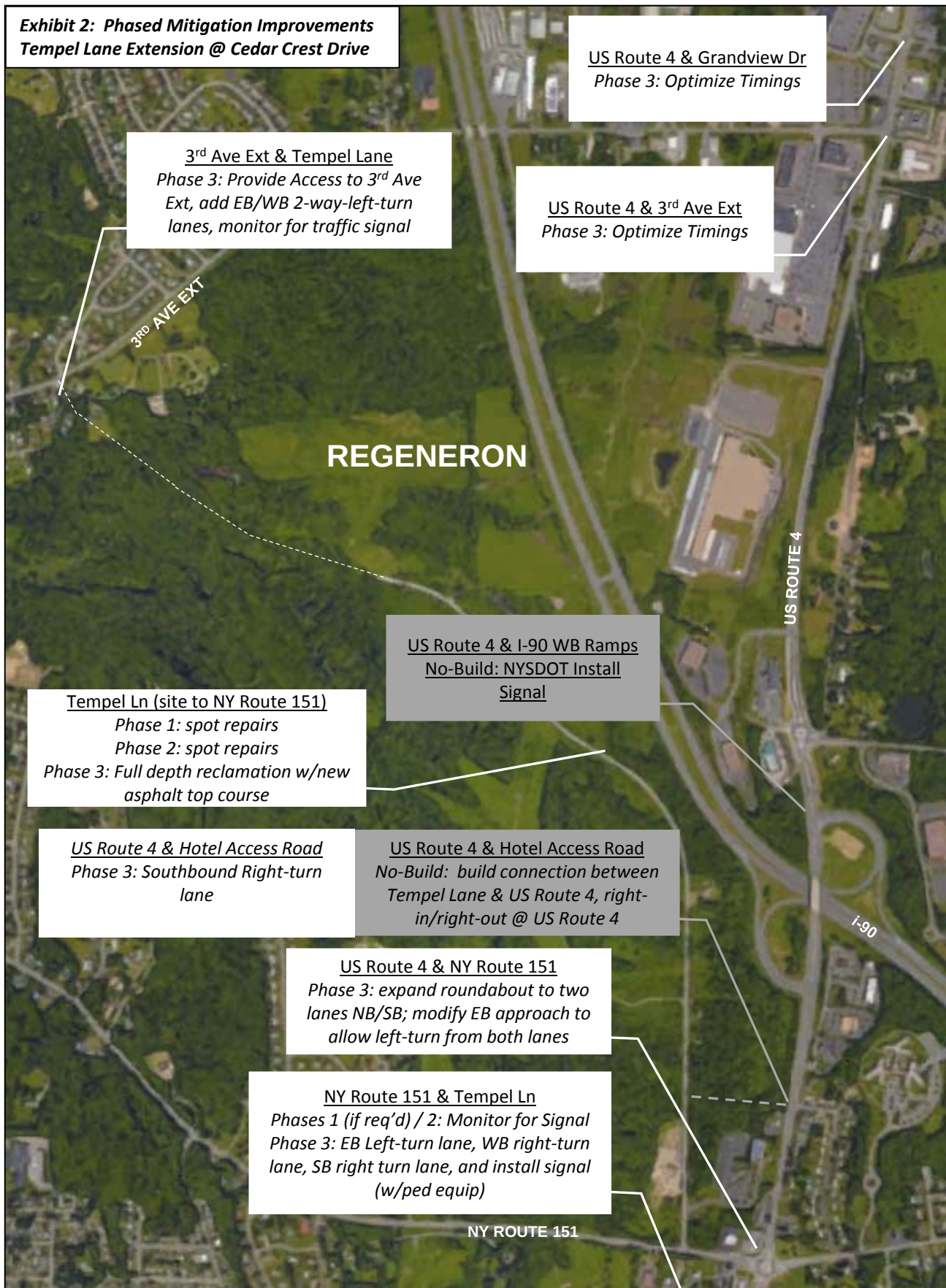
Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
Signalized Intersections														
NYS Route 151 & Tempel Lane														
NYS Route 151								EB L	0.04	7.4	A	EB	6.9	A
								EB T	0.58	6.9	A			
								WB T	0.69	11.6	B	WB	11.0	B
								WB R	0.04	3.8	A			
Tempel Lane								SB L	0.68	13.8	B	SB	13.5	B
								SB R	0.05	9.6	A			
OVERALL													9.8	A
US Route 4 & I-90 Eastbound Ramps														
I-90 EB Off-Ramp	EB L	0.31	17.6	B	EB	31.8	C	EB L	0.32	19.1	B	EB	33.0	C
	EB R	0.91	36.2	D				EB R	0.91	37.1	D			
US Route 4	NB L	0.38	18.9	B	NB	19.0	B	NB L	0.52	19.8	B	NB	20.0	B
	NB T	0.64	19.1	B				NB T	0.70	20.0	C			
	SB T	0.64	25.9	C	SB	21.9	C	SB T	0.64	27.2	C	SB	23.0	C
	SB R	0.14	3.5	A				SB R	0.15	4.2	A			
OVERALL						23.8	C						24.6	C
US Route 4 & I-90 Westbound Ramps														
I-90 WB Off-Ramp	WB L	0.10	18.5	B	EB	11.8	B	WB L	0.13	19.2	B	EB	12.0	B
	WB R	0.33	10.8	B				WB R	0.33	10.7	B			
US Route 4	NB T	0.72	18.1	B	NB	15.6	B	NB T	0.72	18.6	B	NB	15.9	B
	NB R	0.38	9.1	A				NB R	0.50	10.4	B			
	SB L	0.85	14.1	B	SB	8.2	A	SB L	0.88	16.6	B	SB	9.2	A
	SB T	0.45	5.2	A				SB T	0.44	5.1	A			
OVERALL						11.2	B						12.0	B
US Route 4 & 3rd Avenue Extension														
3rd Avenue Ext	EB L	0.89	25.6	C	EB	22.9	C	EB L	0.92	26.5	C	EB	23.6	C
	EB R	0.35	16.7	B				EB R	0.33	15.8	B			
US Route 4	NB L	0.40	25.2	C	NB	13.7	B	NB L	0.46	31.5	C	NB	18.3	B
	NB T	0.62	11.5	B				NB T	0.67	15.9	B			
	SB T	0.63	17.3	B	SB	17.3	B	SB T	0.68	21.9	C	SB	22.0	C
	SB TR	0.63	17.4	B				SB TR	0.68	22.0	C			
OVERALL						17.7	B						21.4	C
US Route 4 & Grandview Drive/Greenbush Commons														
Greenbush Commons	EB LT	0.88	61.6	E	EB	53.7	D	EB LT	0.92	73.1	E	EB	62.9	E
	EB R	0.23	30.2	C				EB R	0.25	32.8	C			
Grandview Drive	WB LTR	0.79	78.5	E	WB	78.5	E	WB LTR	0.83	92.2	F	WB	92.2	F
US Route 4	NB L	0.29	11.8	B	NB	50.6	D	NB L	0.29	11.4	B	NB	72.8	E
	NB TR	1.01	54.4	F				NB TR	1.09	78.2	F			
	SB L	0.40	26.9	C	SB	15.8	B	SB L	0.42	28.5	C	SB	15.3	B
	SB T	0.48	15.7	B				SB T	0.47	15.2	B			
OVERALL						37.6	D						49.2	D

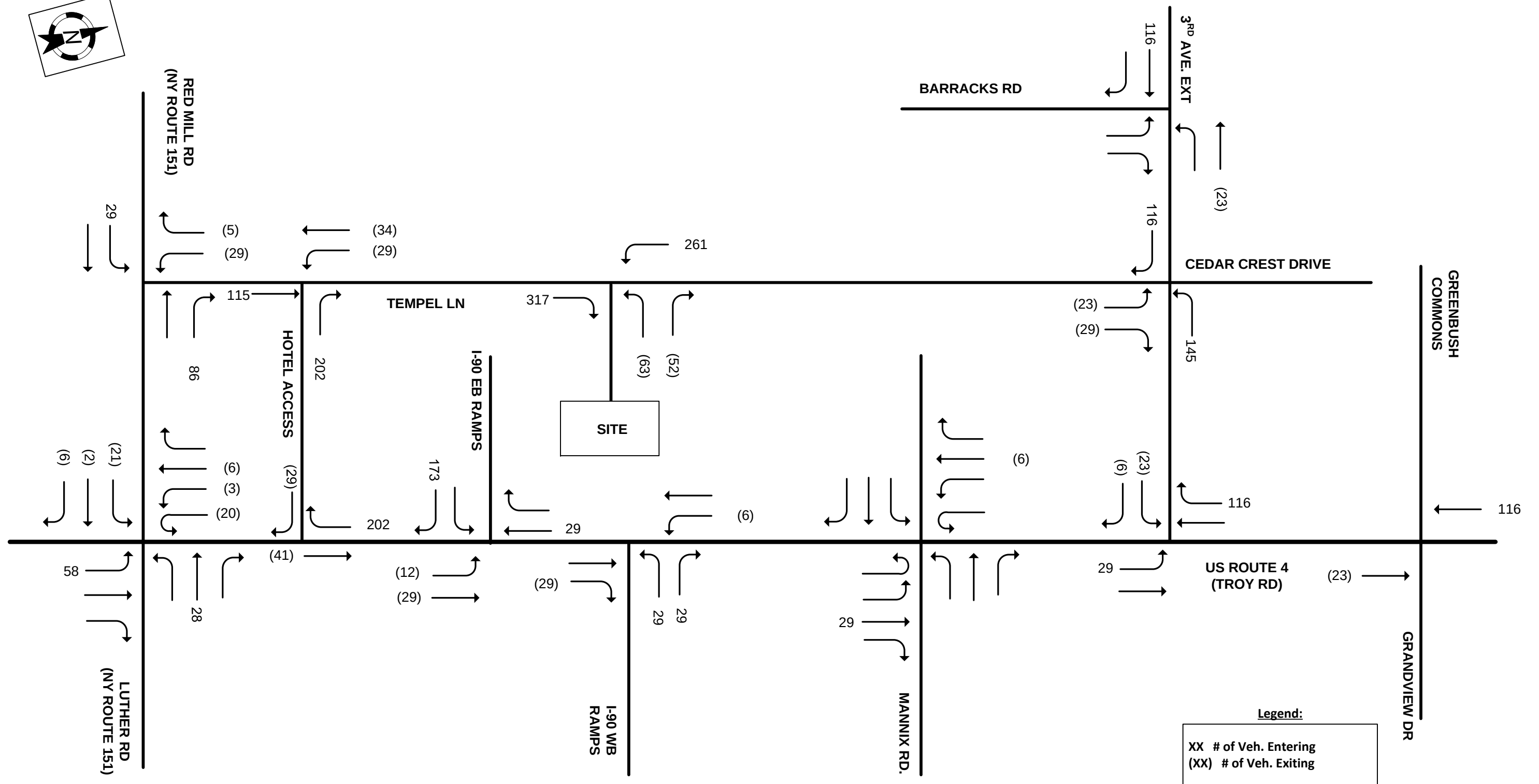
Table 14
Regeneron
2020 No-Build & Build Analysis Alternative 2 - Mitigation
PM Peak Hour

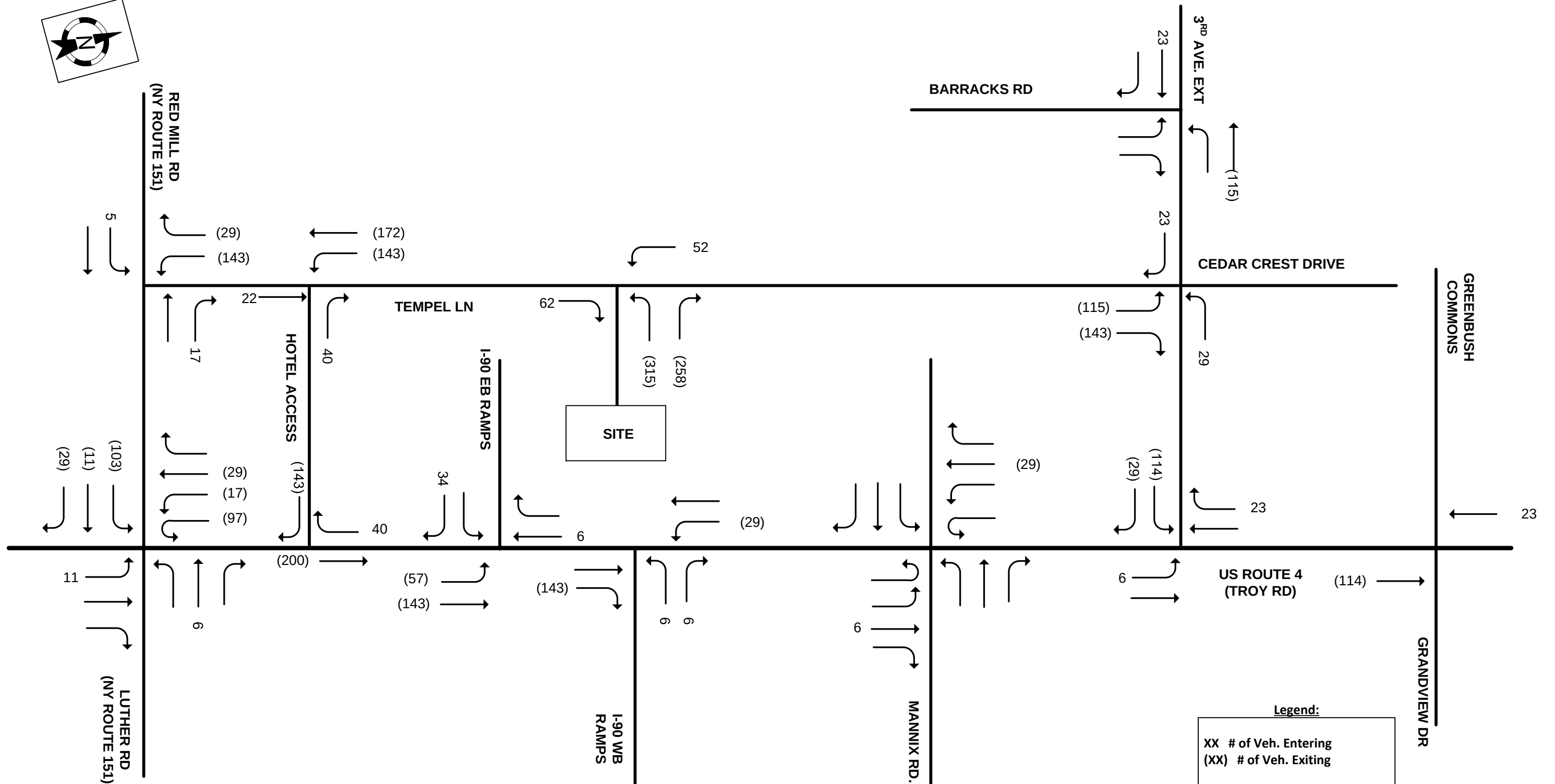
Intersection	Level of Service													
	No-Build							Build w/Mitigation						
	Mvmt*	v/c	Delay	LOS	App	Delay	LOS	Mvmt	v/c	Delay	LOS	App	Delay	LOS
3rd Avenue Extension & Barracks Road														
3rd Avenue Ext	EB T	0.23	6.5	A	EB	6.5	A	EB T	0.25	6.4	A	EB	6.4	A
	EB R	0.23	6.6	A				EB R	0.25	6.4	A			
	WB L	0.33	7.9	A				WB L	0.38	7.5	A			
	WB T	0.32	7.0	A				WB T	0.39	7.2	A			
Barracks Road	NB L	0.18	8.5	A	NB	8.8	A	NB L	0.19	9.4	A	NB	9.7	A
	NB R	0.27	9.0	A				NB R	0.28	9.9	A			
OVERALL						7.5	A						7.5	A
Unsignalized Intersections														
Red Mill Road (NY Route 151) & Tempel Lane														
NYS Route 151	EB L	0.01	8.1	A										
Tempel Lane	SB LR	0.27	21.1	C										
	-	-	-	-										
US Route 4 & Hotel Access														
Hotel Access	EB R	0.05	17.8	C				EB R	0.56	31.2	D			
3rd Avenue Ext & Cedar Crest Drive/Tempel Lane														
3rd Avenue Ext	EB L	0.01	8.2	A				EB L	0.01	8.1	A			
								WB L	0.04	8.6	A			
Tempel Lane								NB LT	0.40	22.5	C			
								NB R	0.28	13.7	B			
Cedar Crest Drive	SB LR	0.02	13.5	B				SB LTR	0.04	20.5	C			
Tempel Lane & Hotel Access														
Hotel Access	WB LR	0.02	8.6	A				WB LR	0.08	10.4	B			
Tempel Lane	SB L	0.00	0.0	A				SB L	0.10	7.6	A			
Tempel Lane & Regeneron Access														
Regeneron Acces	WB LR							WB LR	0.72	19.2	C			
Tempel Lane	SB L							SB L	0.04	7.5	A			
Roundabout Intersections														
US Route 4 & Red Mill Road/Luther Road (NY Route 151)														
Red Mill Road (NY Route 151)	EB L	0.65	24.2	C	EB	23.3	C	EB L	0.92	40.2	D	EB	37.3	D
	EB TR	0.81	22.7	C				EB LTR	0.94	34.8	C			
Luther Road (NY Route 151)	WB LT	0.25	12.7	B	WB	10.1	B	WB LT	0.29	13.5	B	WB	11.3	B
	WB R	0.34	8.6	A				WB R	0.37	9.8	A			
US Route 4	NB L	0.09	17.6	B	NB	22.8	C	NB LT	0.59	14.4	B	NB	13.5	B
	NB TR	0.91	23.0	C				NB TR	0.59	12.7	B			
	SB L	0.48	12.9	B				SB LT	0.72	12.6	B			
	SB TR	0.90	12.1	B				SB TR	0.72	7.9	A			
OVERALL						16.4	B						16.9	B
US Route 4 & Mannix Road														
Mannix Road	EB LTR	0.17	10.4	B	EB	10.4	B	EB LTR	0.18	10.5	B	EB	10.5	B
	WB L	0.42	12.0	B				WB L	0.42	12.0	B			
	WB LTR	0.42	9.2	A				WB LTR	0.42	9.2	A			
US Route 4	NB LT	0.41	6.6	A	NB	6.0	A	NB LT	0.41	6.6	A	NB	6.0	A
	NB TR	0.41	5.4	A				NB TR	0.41	5.4	A			
	SB LT	0.69	10.7	B				SB LT	0.70	10.9	B			
	SB TR	0.69	10.1	B				SB TR	0.70	10.3	B			
OVERALL						8.8	A						8.9	A

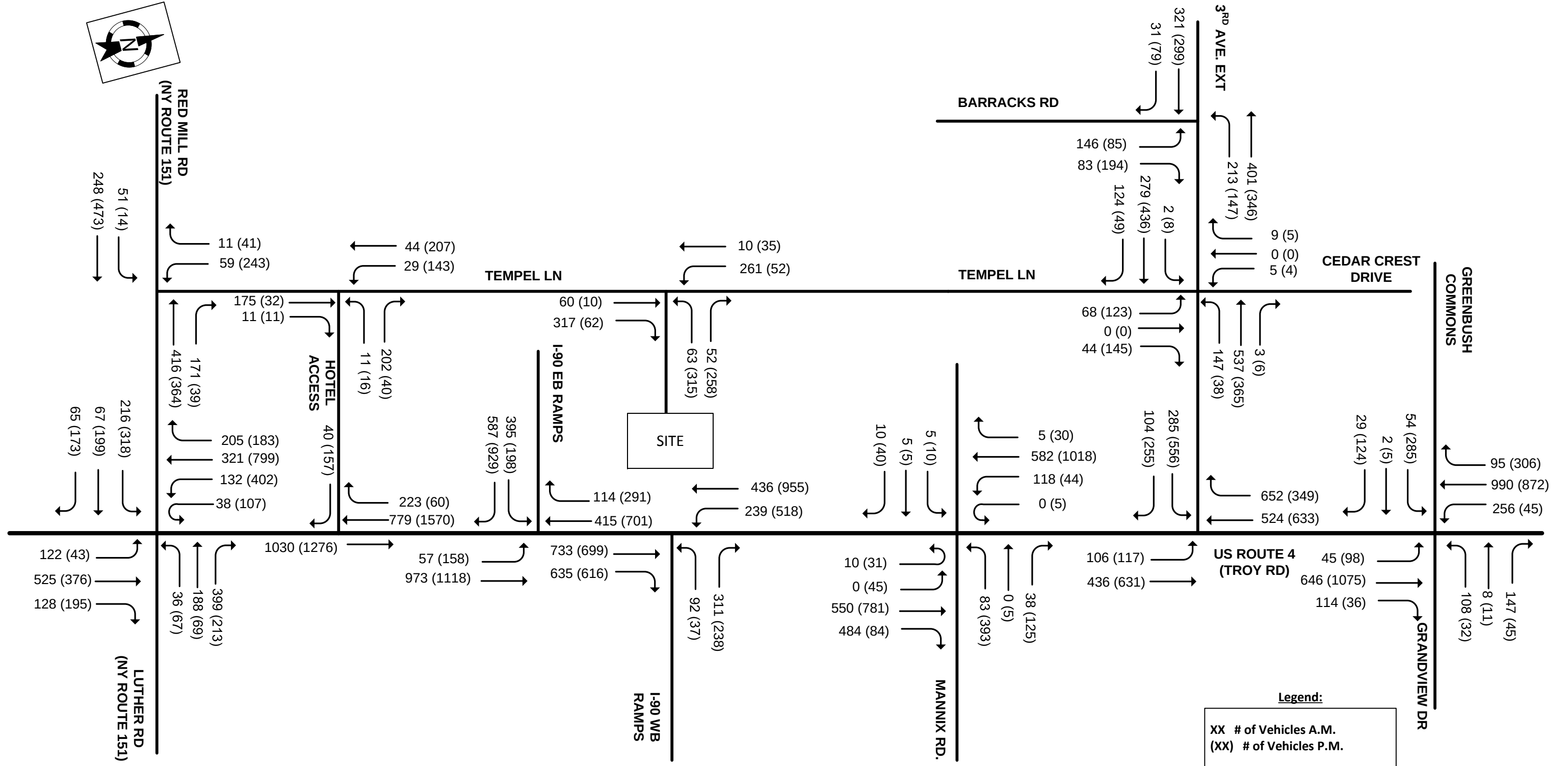
*Movement; Volume to Capacity Ratio; Level of Service; Approach

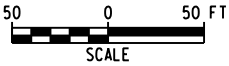
**Exhibit 2: Phased Mitigation Improvements
Tempel Lane Extension @ Cedar Crest Drive**











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INTERSECTION IMPROVEMENT
CONCEPT

REGENERON TEMPEL LANE CAMPUS
EAST GREENBUSH, NY

FIGURE
E-5

DATE: 01/18

PROJECT NAME: Regeneron Mill Creek
LOCATION: 3rd Ave Ext & Tempel Lane

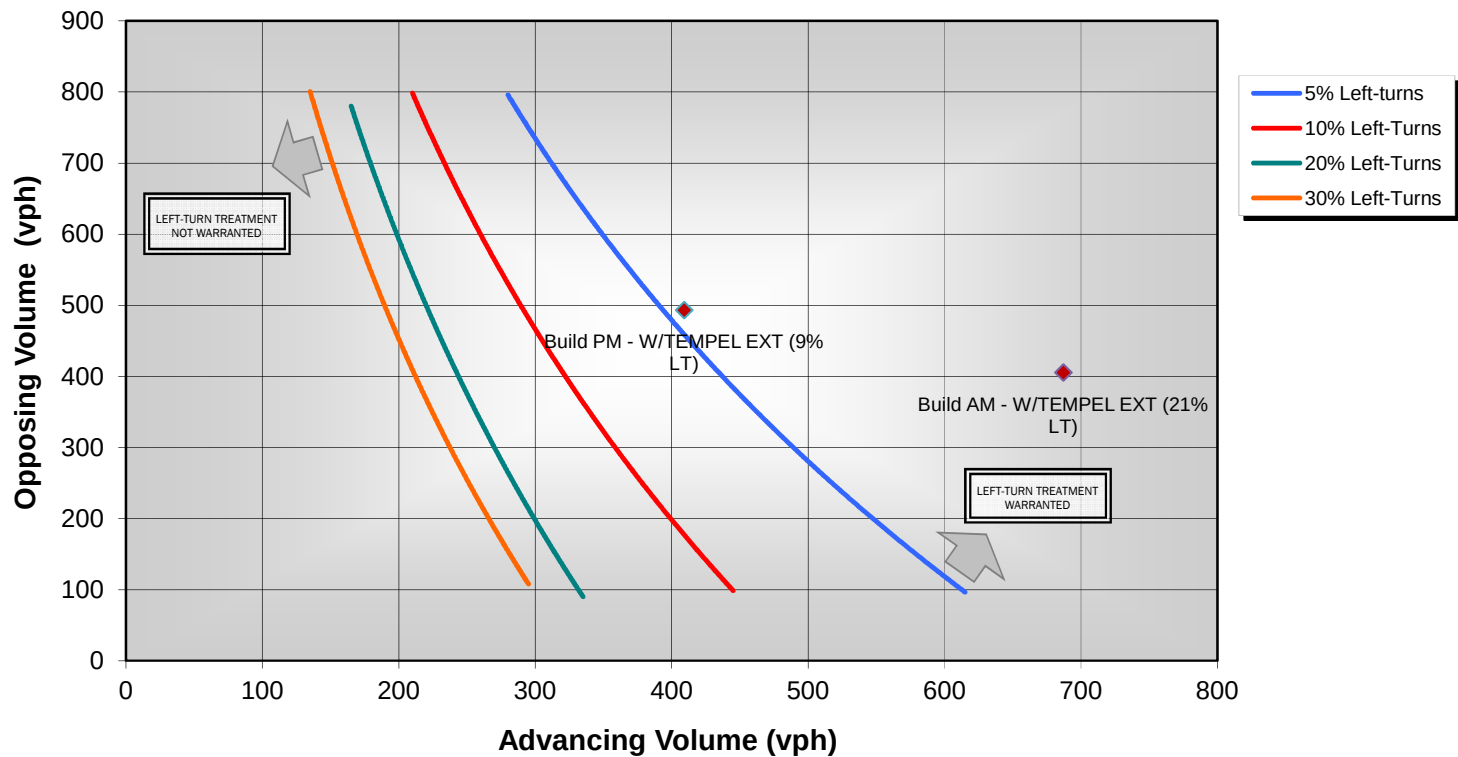
DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:

Full Build Out - Alternative 2

AASHTO Guide for Left-turn Lanes on Two-Lane Highways

Operating Speed: 50 mph



source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23

PROJECT NAME: Regeneron Mill Creek
LOCATION: NY 151 & Tempel Lane

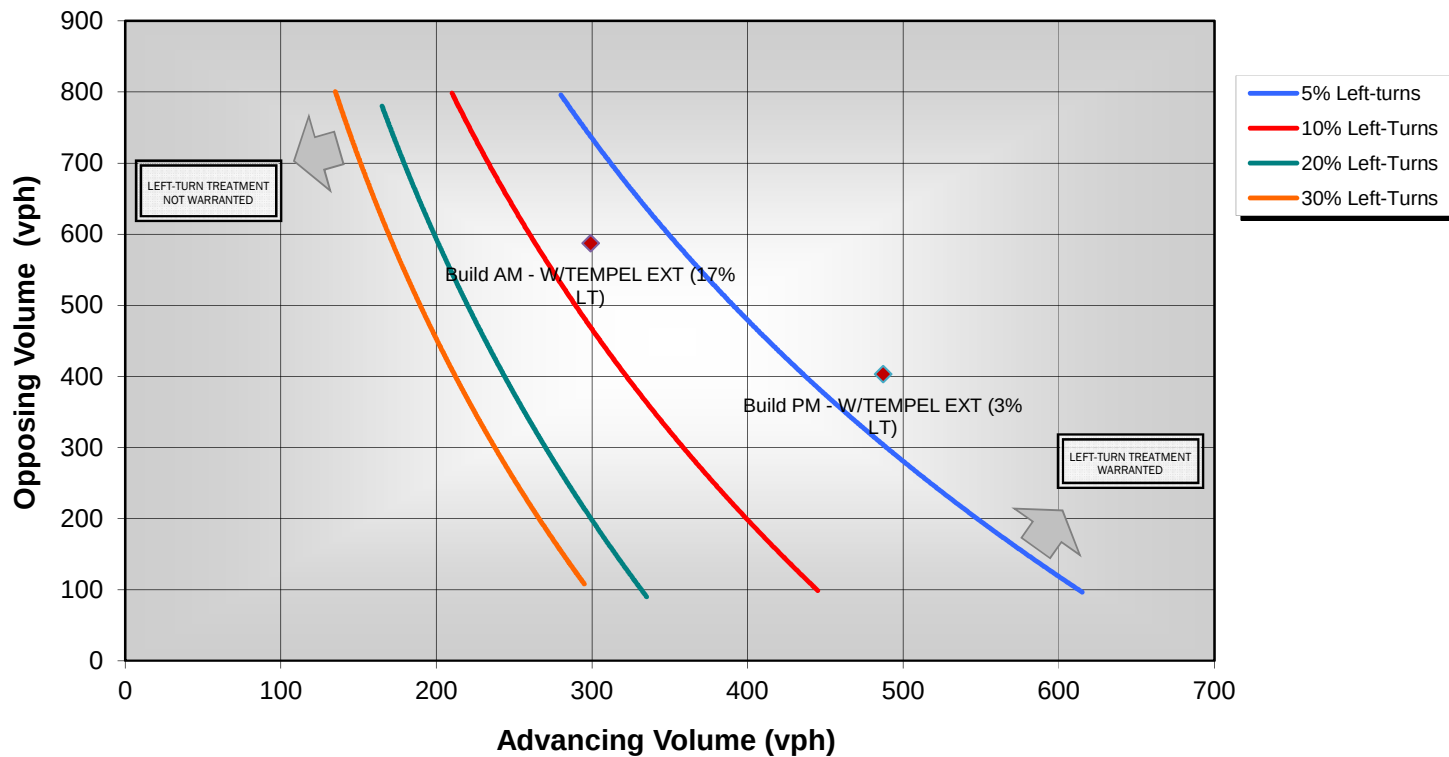
DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:

Full Build Out - Alternative 2

AASHTO Guide for Left-turn Lanes on Two-Lane Highways

Operating Speed: 50 mph



source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23

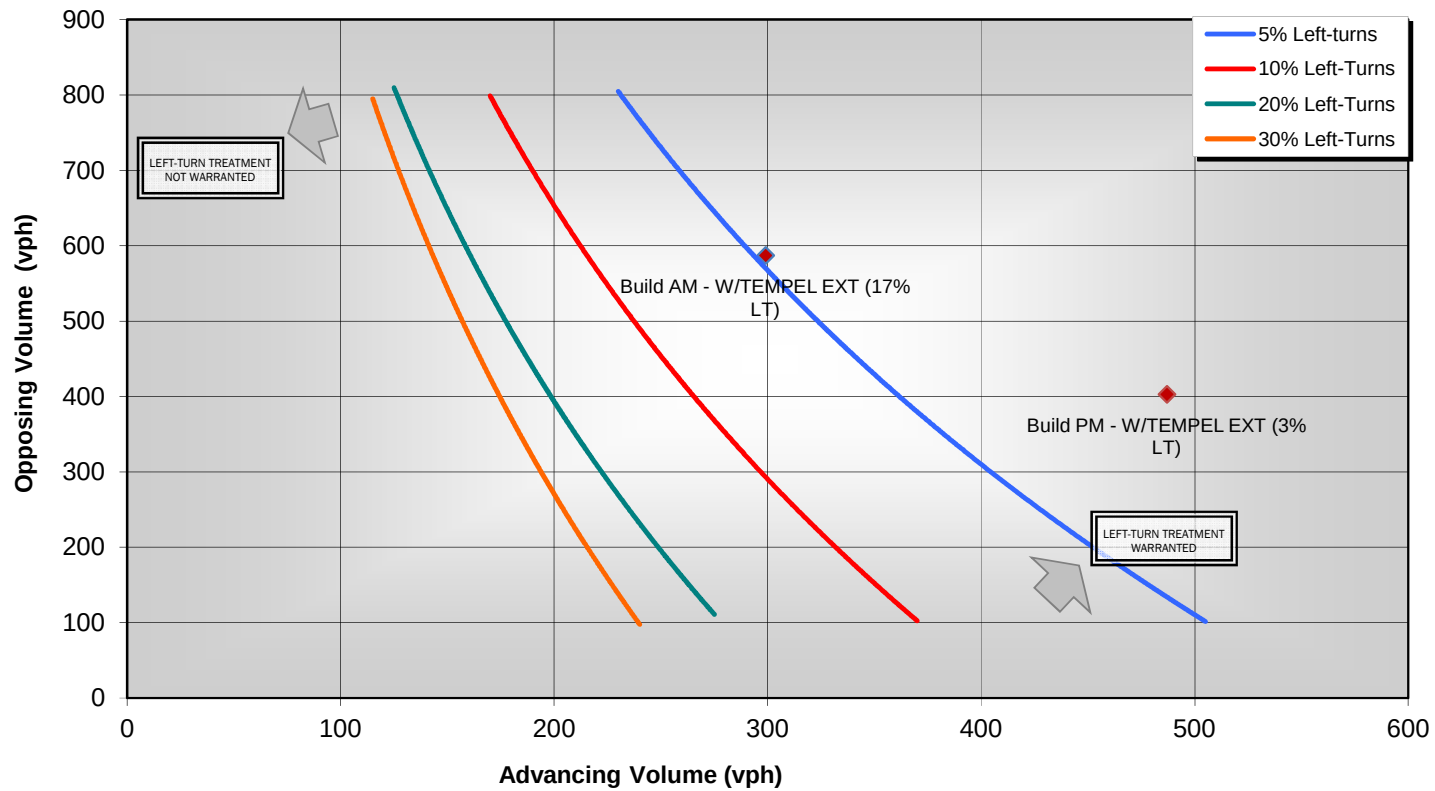
PROJECT NAME: Regeneron Mill Creek
LOCATION: NY 151 & Tempel Lane

DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:
Full Build Out - Alternative 2

AASHTO Guide for Left-turn Lanes on Two-Lane Highways

Operating Speed: 60 mph



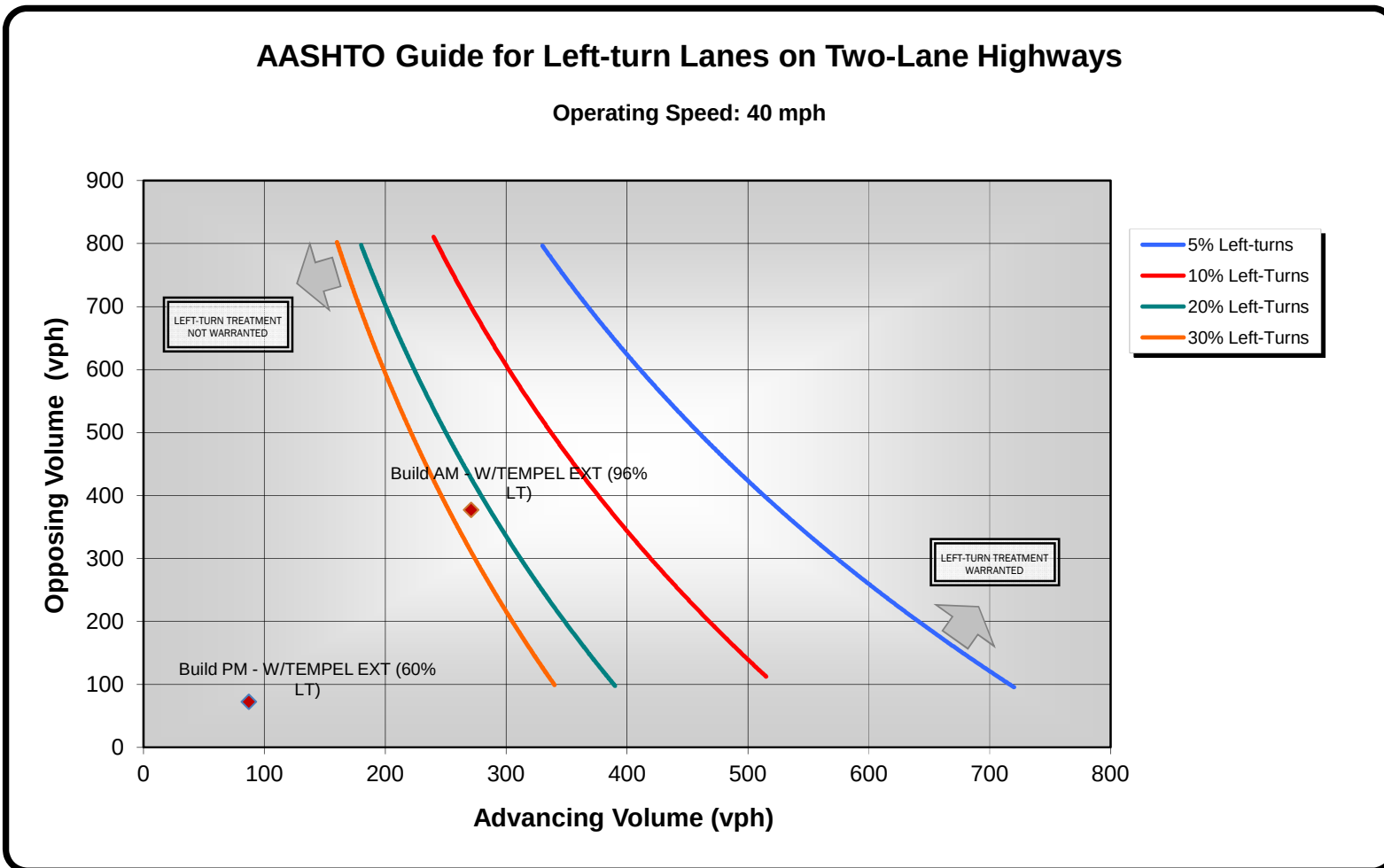
source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23

PROJECT NAME: Regeneron Mill Creek
LOCATION: Tempel Lane & Regeneron Access

DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:

Full Build Out Alternative 2



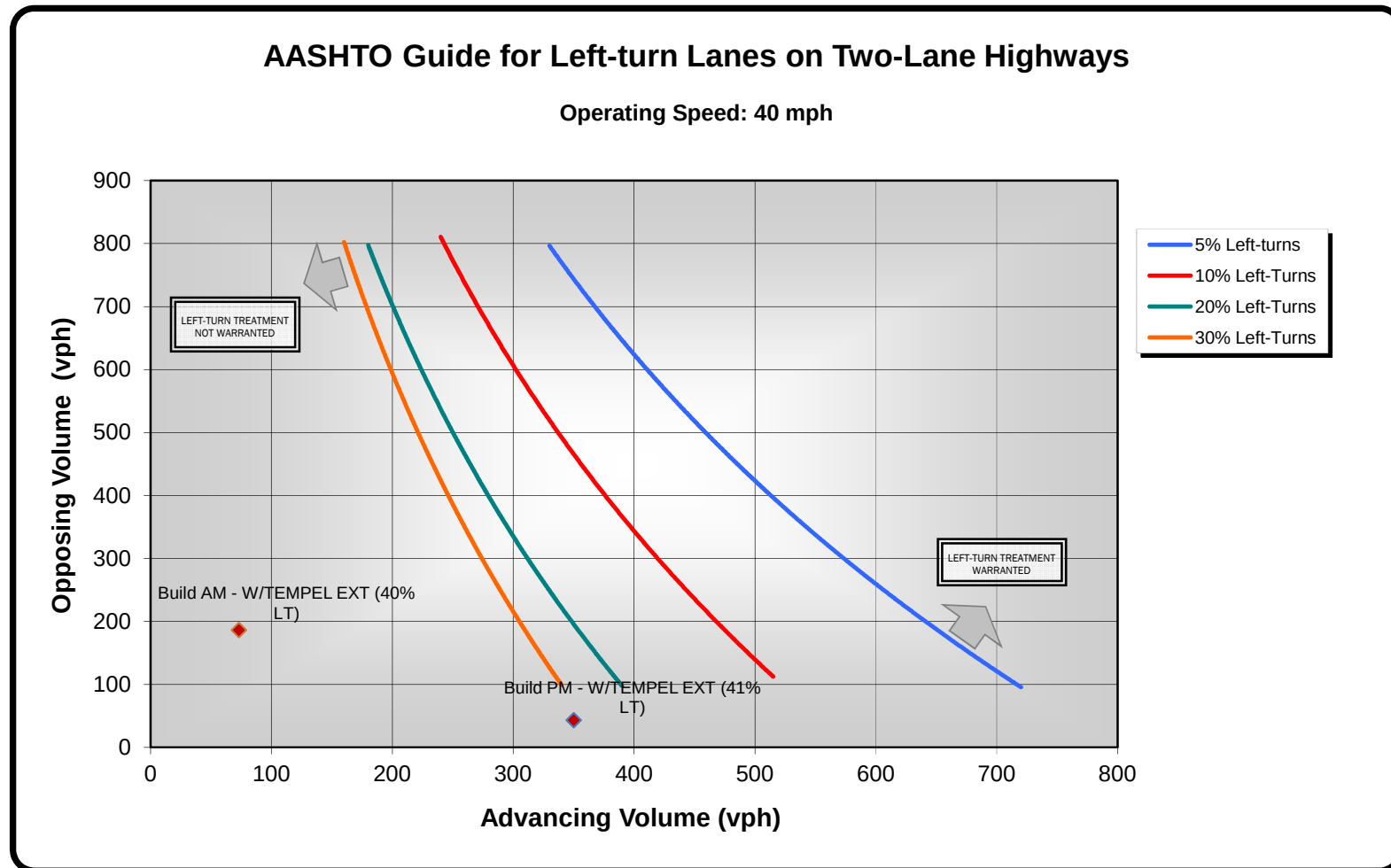
source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23

PROJECT NAME: Regeneron Mill Creek
LOCATION: Tempel Lane & Tempel Farm (Hotel Access)

DATE: 1/24/2018
CHA PROJ. #: 33295

DESCRIPTION:

Full Build Out Alternative 2



source: A Policy on Geometric Design of Highways and Streets, 6th Edition; American Association of State Highway and Transportation Officials (2011): Table 9-23

HCM 2010 TWSC
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

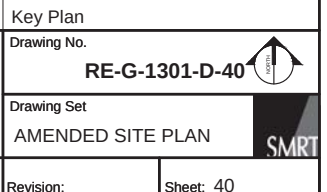
07/27/2018

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	279	124	147	537	3	68	0	44	5	0	9
Future Vol, veh/h	2	279	124	147	537	3	68	0	44	5	0	9
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	150	-	-	150	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	303	135	160	584	3	74	0	48	5	0	10
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	587	0	0	438	0	0	1286	1282	371	1305	1348	586
Stage 1	-	-	-	-	-	-	375	375	-	906	906	-
Stage 2	-	-	-	-	-	-	911	907	-	399	442	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	988	-	-	1122	-	-	141	165	675	137	151	510
Stage 1	-	-	-	-	-	-	646	617	-	331	355	-
Stage 2	-	-	-	-	-	-	328	355	-	627	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	988	-	-	1122	-	-	123	141	675	113	129	510
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	239	-	113	129	-
Stage 1	-	-	-	-	-	-	645	616	-	330	304	-
Stage 2	-	-	-	-	-	-	276	304	-	581	575	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.9			22.2			22.1		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	219		675	988	-	-	1122	-	-	226		
HCM Lane V/C Ratio	0.338		0.071	0.002	-	-	0.142	-	-	0.067		
HCM Control Delay (s)	29.6		10.7	8.7	-	-	8.7	-	-	22.1		
HCM Lane LOS	D		B	A	-	-	A	-	-	C		
HCM 95th %tile Q(veh)	1.4		0.2	0	-	-	0.5	-	-	0.2		

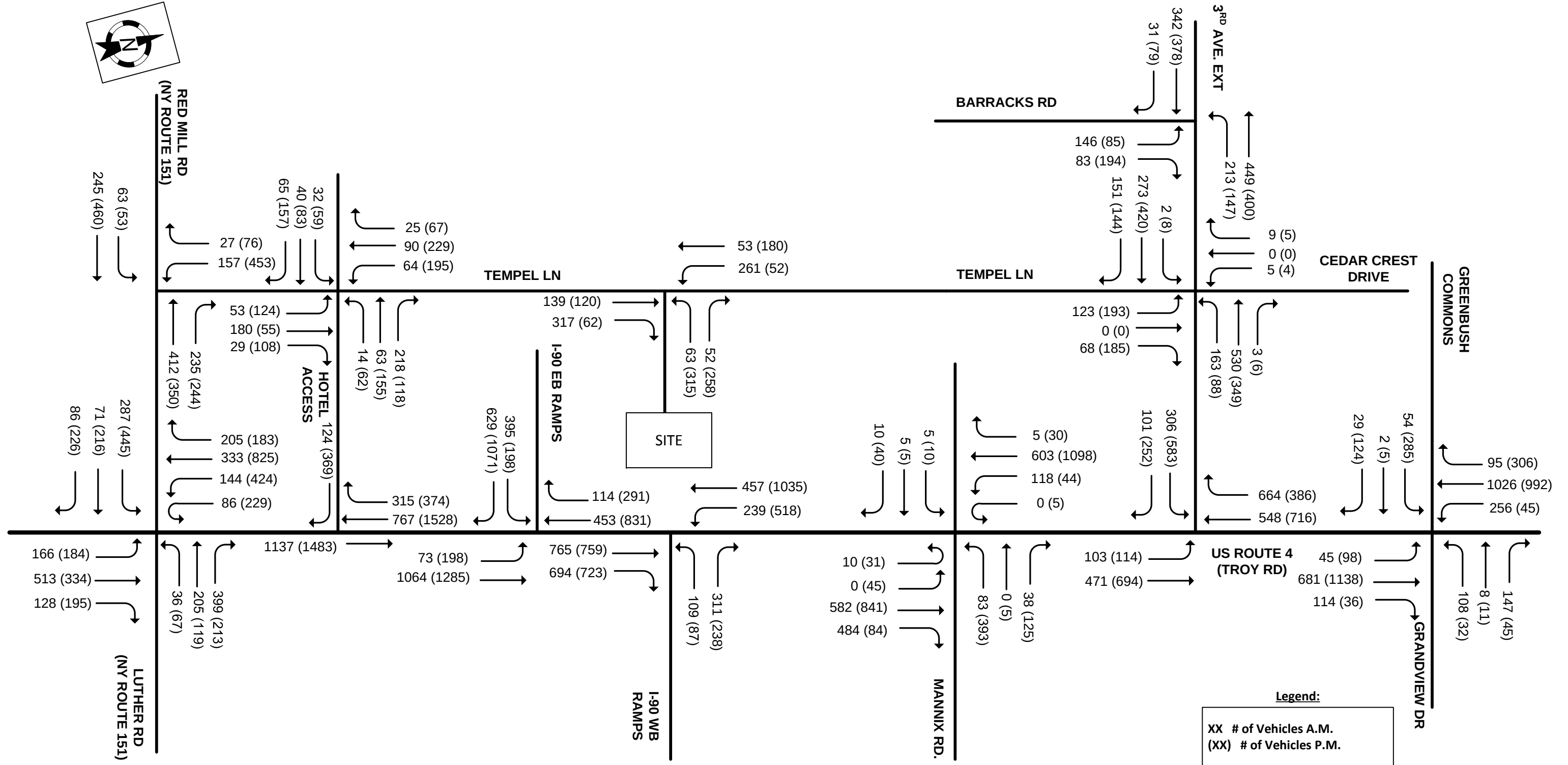
HCM 2010 TWSC
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/27/2018

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	436	49	38	365	6	123	0	145	4	0	5
Future Vol, veh/h	8	436	49	38	365	6	123	0	145	4	0	5
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	150	-	-	150	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	474	53	41	397	7	134	0	158	4	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	404	0	0	527	0	0	1004	1005	501	1081	1028	401
Stage 1	-	-	-	-	-	-	519	519	-	483	483	-
Stage 2	-	-	-	-	-	-	485	486	-	598	545	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1155	-	-	1040	-	-	220	241	570	195	234	649
Stage 1	-	-	-	-	-	-	540	533	-	565	553	-
Stage 2	-	-	-	-	-	-	563	551	-	489	519	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1155	-	-	1040	-	-	210	230	570	136	223	649
Mov Cap-2 Maneuver	-	-	-	-	-	-	338	345	-	136	223	-
Stage 1	-	-	-	-	-	-	536	529	-	560	531	-
Stage 2	-	-	-	-	-	-	536	530	-	351	515	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.8			17.7			20.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	338		570	1155	-	-	1040	-	-	242		
HCM Lane V/C Ratio	0.396		0.277	0.008	-	-	0.04	-	-	0.04		
HCM Control Delay (s)	22.5		13.7	8.1	-	-	8.6	-	-	20.5		
HCM Lane LOS	C		B	A	-	-	A	-	-	C		
HCM 95th %tile Q(veh)	1.8		1.1	0	-	-	0.1	-	-	0.1		



Tempel Farms Analysis



HCM 2010 TWSC
1: US Route 4 & Hotel Access

07/26/2018

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗	↗
Traffic Vol, veh/h	0	95	0	1096	767	113
Future Vol, veh/h	0	95	0	1096	767	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	103	0	1191	834	123
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	417	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	585	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	585	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.5	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	585	-	-		
HCM Lane V/C Ratio	-	0.177	-	-		
HCM Control Delay (s)	-	12.5	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0.6	-	-		

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	395	456	61	1035	424	114		
Future Volume (veh/h)	395	456	61	1035	424	114		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1792	1696	1827	1792	1681		
Adj Flow Rate, veh/h	444	369	69	1163	476	63		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	1	6	12	4	6	13		
Cap, veh/h	554	537	395	1770	1280	979		
Arrive On Green	0.31	0.31	0.04	0.51	0.38	0.38		
Sat Flow, veh/h	1792	1524	1616	3563	3495	1429		
Grp Volume(v), veh/h	444	369	69	1163	476	63		
Grp Sat Flow(s),veh/h/ln	1792	1524	1616	1736	1703	1429		
Q Serve(g_s), s	15.1	13.7	1.6	16.4	6.7	1.0		
Cycle Q Clear(g_c), s	15.1	13.7	1.6	16.4	6.7	1.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	554	537	395	1770	1280	979		
V/C Ratio(X)	0.80	0.69	0.17	0.66	0.37	0.06		
Avail Cap(c_a), veh/h	946	871	1178	2358	2313	1412		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	21.0	18.3	11.1	12.0	15.0	3.4		
Incr Delay (d2), s/veh	3.3	1.9	0.2	0.9	0.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.9	6.0	0.7	8.0	3.2	0.8		
LnGrp Delay(d),s/veh	24.3	20.2	11.3	12.9	15.4	3.5		
LnGrp LOS	C	C	B	B	B	A		
Approach Vol, veh/h	813			1232	539			
Approach Delay, s/veh	22.5			12.8	14.0			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.9	30.9				39.8		26.5
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	3.6	8.7				18.4		17.1
Green Ext Time (p_c), s	0.2	6.7				15.4		3.4
Intersection Summary								
HCM 2010 Ctrl Delay			16.1					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/26/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	80	282	765	665	233	457		
Future Volume (veh/h)	80	282	765	665	233	457		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1845	1863	1881	1545	1776		
Adj Flow Rate, veh/h	95	273	911	435	277	544		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84		
Percent Heavy Veh, %	0	3	2	1	23	7		
Cap, veh/h	357	553	1237	874	414	2040		
Arrive On Green	0.20	0.20	0.35	0.35	0.16	0.60		
Sat Flow, veh/h	1810	1568	3632	1599	1471	3463		
Grp Volume(v), veh/h	95	273	911	435	277	544		
Grp Sat Flow(s),veh/h/ln	1810	1568	1770	1599	1471	1687		
Q Serve(g_s), s	2.2	6.9	11.4	8.5	5.3	3.8		
Cycle Q Clear(g_c), s	2.2	6.9	11.4	8.5	5.3	3.8		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	357	553	1237	874	414	2040		
V/C Ratio(X)	0.27	0.49	0.74	0.50	0.67	0.27		
Avail Cap(c_a), veh/h	395	586	1474	981	855	3278		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	17.2	12.8	14.4	7.1	9.8	4.7		
Incr Delay (d2), s/veh	0.4	0.7	1.6	0.4	1.9	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.1	3.0	5.7	5.4	2.3	1.8		
LnGrp Delay(d),s/veh	17.5	13.5	16.0	7.6	11.7	4.8		
LnGrp LOS	B	B	B	A	B	A		
Approach Vol, veh/h	368		1346			821		
Approach Delay, s/veh	14.5		13.3			7.1		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.9	22.6				35.5		14.9
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.6	21.0				49.0		11.0
Max Q Clear Time (g_c+I), s	17.3	13.4				5.8		8.9
Green Ext Time (p_c), s	0.7	4.3				3.7		0.3
Intersection Summary								
HCM 2010 Ctrl Delay			11.4					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

10: Red Mill Rd & Tempel Ln

07/26/2018

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	34	245	412	149	128	22		
Future Volume (veh/h)	34	245	412	149	128	22		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1792	1827	1900	1900	1900		
Adj Flow Rate, veh/h	40	285	479	137	149	10		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	0	6	4	0	0	0		
Cap, veh/h	386	966	642	856	323	363		
Arrive On Green	0.05	0.54	0.35	0.35	0.18	0.18		
Sat Flow, veh/h	1810	1792	1827	1615	1810	1615		
Grp Volume(v), veh/h	40	285	479	137	149	10		
Grp Sat Flow(s),veh/h/ln	1810	1792	1827	1615	1810	1615		
Q Serve(g_s), s	0.4	3.1	8.2	1.5	2.6	0.2		
Cycle Q Clear(g_c), s	0.4	3.1	8.2	1.5	2.6	0.2		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	386	966	642	856	323	363		
V/C Ratio(X)	0.10	0.30	0.75	0.16	0.46	0.03		
Avail Cap(c_a), veh/h	558	1520	1033	1202	1023	987		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.9	4.5	10.1	4.3	13.0	10.7		
Incr Delay (d2), s/veh	0.1	0.2	1.8	0.1	1.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.2	1.5	4.3	1.0	1.4	0.2		
LnGrp Delay(d),s/veh	7.0	4.6	11.8	4.4	14.0	10.7		
LnGrp LOS	A	A	B	A	B	B		
Approach Vol, veh/h		325	616		159			
Approach Delay, s/veh		4.9	10.2		13.8			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				24.1		11.3	6.6	17.4
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.1		4.6	2.4	10.2
Green Ext Time (p_c), s				1.5		0.4	0.0	2.3
Intersection Summary								
HCM 2010 Ctrl Delay			9.2					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/26/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑			↑↑	↑	↑		
Traffic Volume (veh/h)	226	31	213	426	146	83		
Future Volume (veh/h)	226	31	213	426	146	83		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1851	1900	1900	1875	1900	1810		
Adj Flow Rate, veh/h	263	23	248	495	170	42		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	3	3	1	1	0	5		
Cap, veh/h	1601	139	548	1016	435	369		
Arrive On Green	0.49	0.49	0.49	0.49	0.24	0.24		
Sat Flow, veh/h	3368	284	784	2163	1810	1538		
Grp Volume(v), veh/h	140	146	362	381	170	42		
Grp Sat Flow(s),veh/h/ln	1759	1801	1241	1621	1810	1538		
Q Serve(g_s), s	1.6	1.7	6.3	5.8	2.9	0.8		
Cycle Q Clear(g_c), s	1.6	1.7	8.0	5.8	2.9	0.8		
Prop In Lane		0.16	0.68		1.00	1.00		
Lane Grp Cap(c), veh/h	860	880	771	792	435	369		
V/C Ratio(X)	0.16	0.17	0.47	0.48	0.39	0.11		
Avail Cap(c_a), veh/h	1430	1464	1180	1318	1471	1251		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	5.2	5.2	6.9	6.3	11.8	10.9		
Incr Delay (d2), s/veh	0.2	0.2	1.0	1.0	1.2	0.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.8	0.9	2.8	2.8	1.6	0.4		
LnGrp Delay(d),s/veh	5.4	5.4	7.9	7.3	13.0	11.2		
LnGrp LOS	A	A	A	A	B	B		
Approach Vol, veh/h	286			743	212			
Approach Delay, s/veh	5.4			7.6	12.6			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		23.0				23.0		13.9
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		30.0				30.0		30.0
Max Q Clear Time (g_c+I1), s		3.7				10.0		4.9
Green Ext Time (p_c), s		2.9				8.0		1.4
Intersection Summary								
HCM 2010 Ctrl Delay			7.9					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations					 			
Traffic Volume (veh/h)	283	95	74	471	548	548		
Future Volume (veh/h)	283	95	74	471	548	548		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1749	1782	1712	1776	1863	1900		
Adj Flow Rate, veh/h	329	87	86	548	637	500		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	7	5	11	7	2	2		
Cap, veh/h	377	429	295	1123	957	748		
Arrive On Green	0.23	0.23	0.06	0.63	0.51	0.51		
Sat Flow, veh/h	1666	1515	1630	1776	1985	1479		
Grp Volume(v), veh/h	329	87	86	548	596	541		
Grp Sat Flow(s),veh/h/ln	1666	1515	1630	1776	1770	1602		
Q Serve(g_s), s	13.5	0.0	0.0	11.6	17.8	17.9		
Cycle Q Clear(g_c), s	13.5	0.0	0.0	11.6	17.8	17.9		
Prop In Lane	1.00	1.00	1.00			0.92		
Lane Grp Cap(c), veh/h	377	429	295	1123	895	810		
V/C Ratio(X)	0.87	0.20	0.29	0.49	0.67	0.67		
Avail Cap(c_a), veh/h	939	939	663	1251	1247	1129		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	26.4	19.4	22.6	6.9	13.1	13.1		
Incr Delay (d2), s/veh	2.5	0.1	0.2	0.7	1.8	2.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	6.5	1.7	1.5	5.9	9.1	8.3		
LnGrp Delay(d),s/veh	28.9	19.4	22.8	7.6	14.9	15.1		
LnGrp LOS	C	B	C	A	B	B		
Approach Vol, veh/h	416			634	1137			
Approach Delay, s/veh	27.0			9.7	15.0			
Approach LOS	C			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	40.9		21.1		49.9		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	20.0	50.0		40.0		50.0		
Max Q Clear Time (g_c+I2), s	12.0	19.9		15.5		13.6		
Green Ext Time (p_c), s	0.1	16.0		0.6		7.4		
Intersection Summary								
HCM 2010 Ctrl Delay		15.7						
HCM 2010 LOS		B						

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	2	29	108	8	147	45	658	114	256	910	95
Future Volume (veh/h)	54	2	29	108	8	147	45	658	114	256	910	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1864	1776	1900	1819	1900	1900	1728	1900	1845	1845	1863
Adj Flow Rate, veh/h	56	2	25	112	8	113	47	685	114	267	948	43
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	7	0	0	0	0	11	11	3	3	2
Cap, veh/h	280	9	322	171	24	130	389	778	129	313	2088	943
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.54	0.54	0.09	0.60	0.60
Sat Flow, veh/h	959	41	1509	533	112	607	1810	1445	240	1757	3505	1583
Grp Volume(v), veh/h	58	0	25	233	0	0	47	0	799	267	948	43
Grp Sat Flow(s),veh/h/ln1000		0	1509	1253	0	0	1810	0	1685	1757	1752	1583
Q Serve(g_s), s	0.0	0.0	1.2	12.6	0.0	0.0	1.1	0.0	38.9	5.9	14.0	1.1
Cycle Q Clear(g_c), s	4.7	0.0	1.2	17.3	0.0	0.0	1.1	0.0	38.9	5.9	14.0	1.1
Prop In Lane	0.97		1.00	0.48		0.48	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	289	0	322	325	0	0	389	0	907	313	2088	943
V/C Ratio(X)	0.20	0.00	0.08	0.72	0.00	0.00	0.12	0.00	0.88	0.85	0.45	0.05
Avail Cap(c_a), veh/h	427	0	485	480	0	0	722	0	1082	535	2250	1017
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	0.0	29.4	36.6	0.0	0.0	9.4	0.0	18.9	19.7	10.5	7.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.1	0.0	0.0	0.1	0.0	9.0	2.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.5	5.9	0.0	0.0	0.5	0.0	20.2	4.1	6.8	0.5
LnGrp Delay(d),s/veh	30.8	0.0	29.4	37.8	0.0	0.0	9.4	0.0	27.9	22.3	10.8	7.9
LnGrp LOS	C		C	D			A		C	C	B	A
Approach Vol, veh/h	83		233			846			1258			
Approach Delay, s/veh	30.4		37.8			26.9			13.1			
Approach LOS	C		D			C			B			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	32.2	55.3		25.0	7.8	60.7		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	60.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I1), s	17.9	40.9		6.7	3.1	16.0		19.3				
Green Ext Time (p_c), s	0.3	9.4		0.2	0.0	15.8		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay			20.9									
HCM 2010 LOS			C									

HCM 2010 TWSC
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/26/2018

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	273	35	18	530	3	100	0	39	5	0	9
Future Vol, veh/h	2	273	35	18	530	3	100	0	39	5	0	9
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	150	-	-	150	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	297	38	20	576	3	109	0	42	5	0	10
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	579	0	0	335	0	0	943	939	316	959	957	578
Stage 1	-	-	-	-	-	-	320	320	-	618	618	-
Stage 2	-	-	-	-	-	-	623	619	-	341	339	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	995	-	-	1224	-	-	243	264	724	237	258	516
Stage 1	-	-	-	-	-	-	692	652	-	477	481	-
Stage 2	-	-	-	-	-	-	474	480	-	674	640	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	995	-	-	1224	-	-	235	259	724	220	253	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	362	-	220	253	-
Stage 1	-	-	-	-	-	-	691	651	-	476	473	-
Stage 2	-	-	-	-	-	-	457	472	-	633	639	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.3			17.2			15.8		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	350		724	995	-	-	1224	-	-	349		
HCM Lane V/C Ratio	0.311		0.059	0.002	-	-	0.016	-	-	0.044		
HCM Control Delay (s)	19.9		10.3	8.6	-	-	8	-	-	15.8		
HCM Lane LOS	C		B	A	-	-	A	-	-	C		
HCM 95th %tile Q(veh)	1.3		0.2	0	-	-	0	-	-	0.1		

LANE SUMMARY

 **Site: 1 [Mannix - 2020 No-Build w/ Tempel Farms AM]**

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	586	2.9	1135	0.516	100	6.4	LOS A	4.2	106.5	Full	1600	0.0	0.0
Lane 2 ^d	618	1.2	1197	0.516	100	6.0	LOS A	4.2	105.9	Full	1600	0.0	0.0
Approach	1205	2.0		0.516		6.2	LOS A	4.2	106.5				
East: Mannix Road													
Lane 1	68	4.9	707	0.097	100	10.2	LOS B	0.4	11.2	Full	1600	0.0	0.0
Lane 2 ^d	73	1.9	754	0.097	100	6.9	LOS A	0.4	11.1	Full	1600	0.0	0.0
Approach	141	3.4		0.097		8.5	LOS A	0.4	11.2				
North: US Route 4													
Lane 1 ^d	426	14.2	982	0.434	100	8.1	LOS A	2.7	74.5	Full	1600	0.0	0.0
Lane 2	403	20.2	928	0.434	100	6.3	LOS A	2.7	77.1	Full	1600	0.0	0.0
Approach	829	17.1		0.434		7.2	LOS A	2.7	77.1				
West: Mannix Road													
Lane 1 ^d	24	5.7	480	0.050	100	8.2	LOS A	0.2	4.7	Full	1600	0.0	0.0
Approach	24	5.7		0.050		8.2	LOS A	0.2	4.7				
Intersection	2199	7.9		0.516		6.8	LOS A	4.2	106.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Route 151 - 2020 No-Build w/ Tempel Farms AM]

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	412	8.6	742	0.555	100	11.7	LOS B	3.5	92.8	Full	1600	0.0	0.0
Lane 2 ^d	461	5.9	830	0.555	100	9.2	LOS A	3.6	93.1	Full	1600	0.0	0.0
Approach	872	7.2		0.555		10.4	LOS B	3.6	93.1				
East: Route 151													
Lane 1	249	9.7	442	0.563	100	16.2	LOS B	3.3	87.8	Full	1600	0.0	0.0
Lane 2 ^d	464	6.0	616	0.753	100	16.3	LOS B	6.5	169.8	Full	1600	0.0	0.0
Approach	713	7.3		0.753		16.3	LOS B	6.5	169.8				
North: US Route 4													
Lane 1	400	4.4	871	0.459	100	12.4	LOS B	3.3	84.4	Full	1600	0.0	0.0
Lane 2 ^d	460	2.9	1002	0.459	100	7.6	LOS A	3.4	86.7	Full	1600	0.0	0.0
Approach	859	3.6		0.459		9.8	LOS A	3.4	86.7				
West: Route 151													
Lane 1 ^d	266	0.0	833	0.319	100	13.5	LOS B	1.6	40.4	Full	1600	0.0	0.0
Lane 2	218	7.3	682	0.319	100	9.5	LOS A	1.5	40.5	Full	1600	0.0	0.0
Approach	484	3.3		0.319		11.7	LOS B	1.6	40.5				
Intersection	2928	5.5		0.753		11.9	LOS B	6.5	169.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY



Site: 1 [Tempel Lane & Tempel Farm - No-Build AM]

Tempel Lane & Tempel Farm Roundabout
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tempel Lane													
Lane 1 ^d	160	2.0	983	0.163	100	7.2	LOS A	0.9	21.9	Full	1600	0.0	0.0
Approach	160	2.0		0.163		7.2	LOS A	0.9	21.9				
East: Tempel Farm													
Lane 1 ^d	101	2.0	933	0.108	100	6.5	LOS A	0.5	13.9	Full	1600	0.0	0.0
Approach	101	2.0		0.108		6.5	LOS A	0.5	13.9				
North: Tempel Lane													
Lane 1 ^d	126	2.0	956	0.132	100	7.1	LOS A	0.7	17.2	Full	1600	0.0	0.0
Approach	126	2.0		0.132		7.1	LOS A	0.7	17.2				
West: Tempel Farm													
Lane 1 ^d	149	2.0	982	0.152	100	6.5	LOS A	0.8	20.6	Full	1600	0.0	0.0
Approach	149	2.0		0.152		6.5	LOS A	0.8	20.6				
Intersection	536	2.0		0.163		6.8	LOS A	0.9	21.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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HCM 2010 TWSC
1: US Route 4 & Hotel Access

07/26/2018

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗	↗
Traffic Vol, veh/h	0	226	0	1283	1528	334
Future Vol, veh/h	0	226	0	1283	1528	334
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	246	0	1395	1661	363
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	831	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	314	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	314	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	47.7	0	0			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	314	-	-		
HCM Lane V/C Ratio	-	0.782	-	-		
HCM Control Delay (s)	-	47.7	-	-		
HCM Lane LOS	-	E	-	-		
HCM 95th %tile Q(veh)	-	6.2	-	-		

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	198	1037	141	1142	825	291		
Future Volume (veh/h)	198	1037	141	1142	825	291		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	208	776	148	1202	868	165		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	8	1	1	1	1	1		
Cap, veh/h	632	720	291	1764	1271	1172		
Arrive On Green	0.38	0.38	0.07	0.49	0.36	0.36		
Sat Flow, veh/h	1675	1599	1792	3668	3668	1599		
Grp Volume(v), veh/h	208	776	148	1202	868	165		
Grp Sat Flow(s),veh/h/ln	1675	1599	1792	1787	1787	1599		
Q Serve(g_s), s	8.2	35.0	4.6	23.8	19.2	2.9		
Cycle Q Clear(g_c), s	8.2	35.0	4.6	23.8	19.2	2.9		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	632	720	291	1764	1271	1172		
V/C Ratio(X)	0.33	1.08	0.51	0.68	0.68	0.14		
Avail Cap(c_a), veh/h	632	720	835	1764	1733	1378		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.6	25.5	18.6	17.9	25.5	3.7		
Incr Delay (d2), s/veh	0.4	56.3	1.4	1.4	1.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.8	29.5	2.3	12.0	9.7	3.1		
LnGrp Delay(d),s/veh	20.9	81.8	20.0	19.3	26.9	3.8		
LnGrp LOS	C	F	B	B	C	A		
Approach Vol, veh/h	984			1350	1033			
Approach Delay, s/veh	68.9			19.4	23.2			
Approach LOS	E			B	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.8	39.0				51.8		41.0
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	6.6	21.2				25.8		37.0
Green Ext Time (p_c), s	0.4	11.8				12.7		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			35.0					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/26/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	81	232	759	580	489	1035		
Future Volume (veh/h)	81	232	759	580	489	1035		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1827	1845	1845	1881	1881	1900		
Adj Flow Rate, veh/h	87	221	816	356	526	1113		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh, %	4	3	3	1	1	0		
Cap, veh/h	313	651	1096	787	603	2306		
Arrive On Green	0.18	0.18	0.31	0.31	0.24	0.64		
Sat Flow, veh/h	1740	1568	3597	1599	1792	3705		
Grp Volume(v), veh/h	87	221	816	356	526	1113		
Grp Sat Flow(s),veh/h/ln	1740	1568	1752	1599	1792	1805		
Q Serve(g_s), s	2.4	5.3	11.5	8.0	9.6	8.9		
Cycle Q Clear(g_c), s	2.4	5.3	11.5	8.0	9.6	8.9		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	313	651	1096	787	603	2306		
V/C Ratio(X)	0.28	0.34	0.74	0.45	0.87	0.48		
Avail Cap(c_a), veh/h	347	682	1335	897	928	3209		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	19.5	11.0	17.0	9.1	10.0	5.2		
Incr Delay (d2), s/veh	0.5	0.3	1.8	0.4	6.0	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.2	2.3	5.8	4.8	8.4	4.4		
LnGrp Delay(d),s/veh	20.0	11.3	18.8	9.5	16.0	5.4		
LnGrp LOS	B	B	B	A	B	A		
Approach Vol, veh/h	308		1172			1639		
Approach Delay, s/veh	13.7		16.0			8.8		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	18.0	22.2				40.2		14.9
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.0	21.0				49.0		11.0
Max Q Clear Time (g_c+1), s	11.6	13.5				10.9		7.3
Green Ext Time (p_c), s	1.3	3.7				9.1		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			12.0					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

10: Red Mill Rd & Tempel Ln

07/26/2018

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	48	460	350	227	310	47		
Future Volume (veh/h)	48	460	350	227	310	47		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1827	1900		
Adj Flow Rate, veh/h	52	500	380	204	337	26		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	1	0	0	4	0		
Cap, veh/h	389	902	549	873	437	496		
Arrive On Green	0.06	0.48	0.29	0.29	0.25	0.25		
Sat Flow, veh/h	1810	1881	1900	1615	1740	1615		
Grp Volume(v), veh/h	52	500	380	204	337	26		
Grp Sat Flow(s),veh/h/ln	1810	1881	1900	1615	1740	1615		
Q Serve(g_s), s	0.7	7.0	6.6	2.5	6.7	0.4		
Cycle Q Clear(g_c), s	0.7	7.0	6.6	2.5	6.7	0.4		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	389	902	549	873	437	496		
V/C Ratio(X)	0.13	0.55	0.69	0.23	0.77	0.05		
Avail Cap(c_a), veh/h	531	1519	1023	1275	936	959		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	8.0	6.9	11.7	4.5	12.9	9.1		
Incr Delay (d2), s/veh	0.2	0.5	1.6	0.1	2.9	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.3	3.7	3.6	1.7	3.5	0.5		
LnGrp Delay(d),s/veh	8.1	7.4	13.3	4.6	15.8	9.1		
LnGrp LOS	A	A	B	A	B	A		
Approach Vol, veh/h		552	584		363			
Approach Delay, s/veh		7.5	10.3		15.3			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				22.8		14.3	7.1	15.7
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				9.0		8.7	2.7	8.6
Green Ext Time (p_c), s				2.8		0.9	0.0	2.1
Intersection Summary								
HCM 2010 Ctrl Delay			10.5					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/26/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑			↑↑	↘	↗		
Traffic Volume (veh/h)	355	79	147	285	85	194		
Future Volume (veh/h)	355	79	147	285	85	194		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1888	1900	1900		
Adj Flow Rate, veh/h	386	58	160	310	92	125		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	1	1	0	0		
Cap, veh/h	1325	198	455	855	483	431		
Arrive On Green	0.42	0.42	0.42	0.42	0.27	0.27		
Sat Flow, veh/h	3247	470	629	2119	1810	1615		
Grp Volume(v), veh/h	220	224	231	239	92	125		
Grp Sat Flow(s),veh/h/ln	1805	1817	1030	1632	1810	1615		
Q Serve(g_s), s	2.6	2.6	3.6	3.2	1.3	2.0		
Cycle Q Clear(g_c), s	2.6	2.6	6.2	3.2	1.3	2.0		
Prop In Lane		0.26	0.69		1.00	1.00		
Lane Grp Cap(c), veh/h	759	764	624	686	483	431		
V/C Ratio(X)	0.29	0.29	0.37	0.35	0.19	0.29		
Avail Cap(c_a), veh/h	1692	1704	1206	1530	1697	1514		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	6.1	6.1	7.3	6.3	9.1	9.3		
Incr Delay (d2), s/veh	0.4	0.5	0.8	0.6	0.4	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.4	1.4	1.7	1.5	0.7	1.0		
LnGrp Delay(d),s/veh	6.6	6.6	8.1	6.9	9.5	10.1		
LnGrp LOS	A	A	A	A	A	B		
Approach Vol, veh/h	444			470	217			
Approach Delay, s/veh	6.6			7.5	9.8			
Approach LOS	A			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2					6	8	
Phs Duration (G+Y+Rc), s	18.4					18.4	13.5	
Change Period (Y+Rc), s	5.0					5.0	5.0	
Max Green Setting (Gmax), s	30.0					30.0	30.0	
Max Q Clear Time (g_c+I1), s	4.6					8.2	4.0	
Green Ext Time (p_c), s	4.7					5.2	1.5	
Intersection Summary								
HCM 2010 Ctrl Delay			7.6					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations					 			
Traffic Volume (veh/h)	469	223	108	694	716	363		
Future Volume (veh/h)	469	223	108	694	716	363		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1817	1835	1792	1881	1863	1900		
Adj Flow Rate, veh/h	484	190	111	715	738	325		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	3	2	6	1	1	1		
Cap, veh/h	531	558	271	1065	1080	475		
Arrive On Green	0.31	0.31	0.05	0.57	0.45	0.45		
Sat Flow, veh/h	1730	1560	1707	1881	2486	1053		
Grp Volume(v), veh/h	484	190	111	715	546	517		
Grp Sat Flow(s),veh/h/ln	1730	1560	1707	1881	1769	1677		
Q Serve(g_s), s	21.1	3.0	0.0	20.9	19.2	19.2		
Cycle Q Clear(g_c), s	21.1	3.0	0.0	20.9	19.2	19.2		
Prop In Lane	1.00	1.00	1.00			0.63		
Lane Grp Cap(c), veh/h	531	558	271	1065	798	757		
V/C Ratio(X)	0.91	0.34	0.41	0.67	0.68	0.68		
Avail Cap(c_a), veh/h	881	874	618	1198	1127	1068		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	26.2	18.4	29.5	11.9	17.1	17.1		
Incr Delay (d2), s/veh	5.3	0.1	0.4	1.9	2.2	2.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	10.9	5.3	2.3	11.3	9.7	9.3		
LnGrp Delay(d),s/veh	31.5	18.6	29.8	13.9	19.3	19.4		
LnGrp LOS	C	B	C	B	B	B		
Approach Vol, veh/h	674			826	1063			
Approach Delay, s/veh	27.8			16.0	19.4			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	40.4		29.1		49.4		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	20.0	50.0		40.0		50.0		
Max Q Clear Time (g_c+I2), s	12.0	21.2		23.1		22.9		
Green Ext Time (p_c), s	0.1	14.2		1.0		9.7		
Intersection Summary								
HCM 2010 Ctrl Delay			20.5					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	5	124	32	11	45	98	1024	36	45	969	306
Future Volume (veh/h)	285	5	124	32	11	45	98	1024	36	45	969	306
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1863	1900	1900	1900	1900	1882	1900	1900	1827	1881
Adj Flow Rate, veh/h	300	5	109	34	12	18	103	1078	37	47	1020	166
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	0	0	0	1	1	0	4	1
Cap, veh/h	342	5	440	51	21	8	311	1005	34	117	1878	865
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.04	0.56	0.56	0.03	0.54	0.54
Sat Flow, veh/h	993	17	1583	0	77	30	1810	1809	62	1810	3471	1599
Grp Volume(v), veh/h	305	0	109	64	0	0	103	0	1115	47	1020	166
Grp Sat Flow(s),veh/h/ln	1009	0	1583	106	0	0	1810	0	1871	1810	1736	1599
Q Serve(g_s), s	0.0	0.0	5.8	0.0	0.0	0.0	2.7	0.0	60.0	1.2	20.6	5.7
Cycle Q Clear(g_c), s	30.0	0.0	5.8	30.0	0.0	0.0	2.7	0.0	60.0	1.2	20.6	5.7
Prop In Lane	0.98		1.00	0.53		0.28	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	346	0	440	81	0	0	311	0	1039	117	1878	865
V/C Ratio(X)	0.88	0.00	0.25	0.79	0.00	0.00	0.33	0.00	1.07	0.40	0.54	0.19
Avail Cap(c_a), veh/h	346	0	440	81	0	0	570	0	1039	402	1928	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	30.3	40.6	0.0	0.0	12.4	0.0	24.0	26.1	16.1	12.7
Incr Delay (d2), s/veh	21.4	0.0	0.1	37.9	0.0	0.0	0.2	0.0	49.7	0.8	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.1	0.0	2.5	2.8	0.0	0.0	1.4	0.0	44.9	0.8	9.9	2.6
LnGrp Delay(d),s/veh	61.6	0.0	30.4	78.5	0.0	0.0	12.7	0.0	73.7	26.9	16.7	12.9
LnGrp LOS	E		C	E			B		F	C	B	B
Approach Vol, veh/h	414			64			1218			1233		
Approach Delay, s/veh	53.4			78.5			68.5			16.6		
Approach LOS	D			E			E			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	65.0		35.0	9.6	63.4		35.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	60.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I), s	13.2	62.0		32.0	4.7	22.6		32.0				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.1	17.8		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	44.7											
HCM 2010 LOS	D											

HCM 2010 TWSC
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/26/2018

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	420	121	59	349	6	78	0	42	4	0	5
Future Vol, veh/h	8	420	121	59	349	6	78	0	42	4	0	5
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	150	-	-	150	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	457	132	64	379	7	85	0	46	4	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	386	0	0	589	0	0	1054	1055	523	1075	1118	383
Stage 1	-	-	-	-	-	-	541	541	-	511	511	-
Stage 2	-	-	-	-	-	-	513	514	-	564	607	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1172	-	-	986	-	-	204	226	554	197	207	664
Stage 1	-	-	-	-	-	-	525	521	-	545	537	-
Stage 2	-	-	-	-	-	-	544	535	-	510	486	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1172	-	-	986	-	-	191	210	554	171	192	664
Mov Cap-2 Maneuver	-	-	-	-	-	-	319	326	-	171	192	-
Stage 1	-	-	-	-	-	-	521	517	-	541	502	-
Stage 2	-	-	-	-	-	-	505	500	-	464	482	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.3			17.4			17.8		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	319		554	1172	-	-	986	-	-	291		
HCM Lane V/C Ratio	0.266		0.082	0.007	-	-	0.065	-	-	0.034		
HCM Control Delay (s)	20.3		12.1	8.1	-	-	8.9	-	-	17.8		
HCM Lane LOS	C		B	A	-	-	A	-	-	C		
HCM 95th %tile Q(veh)	1		0.3	0	-	-	0.2	-	-	0.1		

LANE SUMMARY

 **Site: 1 [Mannix - 2020 No Build w/ Tempel Farms PM]**

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	536	3.4	1229	0.437	100	6.6	LOS A	3.6	91.6	Full	1600	0.0	0.0
Lane 2 ^d	545	3.7	1248	0.437	100	5.5	LOS A	3.6	92.0	Full	1600	0.0	0.0
Approach	1082	3.5		0.437		6.0	LOS A	3.6	92.0				
East: Mannix Road													
Lane 1	273	2.0	630	0.433	100	12.4	LOS B	2.2	54.9	Full	1600	0.0	0.0
Lane 2 ^d	297	1.0	686	0.433	100	9.5	LOS A	2.2	55.5	Full	1600	0.0	0.0
Approach	570	1.5		0.433		10.9	LOS B	2.2	55.5				
North: US Route 4													
Lane 1	624	0.9	849	0.735	100	11.4	LOS B	6.7	168.8	Full	1600	0.0	0.0
Lane 2 ^d	624	0.9	848	0.735	100	10.9	LOS B	6.7	168.8	Full	1600	0.0	0.0
Approach	1248	0.9		0.735		11.1	LOS B	6.7	168.8				
West: Mannix Road													
Lane 1 ^d	61	0.0	326	0.187	100	10.9	LOS B	0.8	19.7	Full	1600	0.0	0.0
Approach	61	0.0		0.187		10.9	LOS B	0.8	19.7				
Intersection	2960	2.0		0.735		9.2	LOS A	6.7	168.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Project: V:\Projects\ANY\K4\33295\Data\Other\Traffic\2018 Work\2018 Sidra\Tempel Farms\Roundabout Analysis - Tempel Farms.sip7

LANE SUMMARY

Site: 1 [Route 151 - 2020 No-Build w/ Tempel Farms PM]

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	354	0.5	547	0.647	100	17.7	LOS B	4.6	115.4	Full	1600	0.0	0.0
Lane 2 ^d	410	0.5	633	0.647	100	13.3	LOS B	4.9	122.5	Full	1600	0.0	0.0
Approach	764	0.5		0.647		15.3	LOS B	4.9	122.5				
East: Route 151													
Lane 1	197	4.4	549	0.358	100	13.1	LOS B	1.9	48.6	Full	1600	0.0	0.0
Lane 2 ^d	232	3.0	644	0.360	100	9.8	LOS A	2.0	50.6	Full	1600	0.0	0.0
Approach	428	3.7		0.360		11.3	LOS B	2.0	50.6				
North: US Route 4													
Lane 1	783	0.3	962	0.814	100	19.4	LOS B	13.1	327.6	Full	1600	0.0	0.0
Lane 2 ^d	867	0.8	1066	0.814	100	13.3	LOS B	13.4	336.5	Full	1600	0.0	0.0
Approach	1650	0.5		0.814		16.2	LOS B	13.4	336.5				
West: Route 151													
Lane 1	365	1.0	350	1.043	100	65.9	LOS F	16.1	405.7	Full	1600	0.0	0.0
Lane 2 ^d	445	2.0	426	1.043	100	56.8	LOS F	18.5	470.4	Full	1600	0.0	0.0
Approach	810	1.5		1.043		60.9	LOS E	18.5	470.4				
Intersection	3652	1.1		1.043		25.4	LOS C	18.5	470.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Tempel Lane & Tempel Farm - No-Build PM]

Tempel Lane & Tempel Farm Roundabout
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tempel Lane													
Lane 1 ^d	288	2.0	882	0.327	100	8.6	LOS A	2.0	51.1	Full	1600	0.0	0.0
Approach	288	2.0		0.327		8.6	LOS A	2.0	51.1				
East: Tempel Farm													
Lane 1 ^d	321	2.0	860	0.373	100	7.8	LOS A	2.4	60.4	Full	1600	0.0	0.0
Approach	321	2.0		0.373		7.8	LOS A	2.4	60.4				
North: Tempel Lane													
Lane 1 ^d	191	2.0	752	0.255	100	9.1	LOS A	1.4	36.4	Full	1600	0.0	0.0
Approach	191	2.0		0.255		9.1	LOS A	1.4	36.4				
West: Tempel Farm													
Lane 1 ^d	325	2.0	905	0.359	100	7.2	LOS A	2.3	58.6	Full	1600	0.0	0.0
Approach	325	2.0		0.359		7.2	LOS A	2.3	58.6				
Intersection	1125	2.0		0.373		8.1	LOS A	2.4	60.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗	↗
Traffic Vol, veh/h	0	124	0	1137	767	315
Future Vol, veh/h	0	124	0	1137	767	315
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	135	0	1236	834	342
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	417	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	585	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	585	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 585		-	-		
HCM Lane V/C Ratio	- 0.23		-	-		
HCM Control Delay (s)	- 13		-	-		
HCM Lane LOS	- B		-	-		
HCM 95th %tile Q(veh)	- 0.9		-	-		

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	395	629	73	1064	453	114		
Future Volume (veh/h)	395	629	73	1064	453	114		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1792	1696	1827	1792	1681		
Adj Flow Rate, veh/h	444	501	82	1196	509	63		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	1	6	12	4	6	13		
Cap, veh/h	645	623	358	1676	1210	1022		
Arrive On Green	0.36	0.36	0.05	0.48	0.36	0.36		
Sat Flow, veh/h	1792	1524	1616	3563	3495	1429		
Grp Volume(v), veh/h	444	501	82	1196	509	63		
Grp Sat Flow(s),veh/h/ln	1792	1524	1616	1736	1703	1429		
Q Serve(g_s), s	16.1	22.1	2.3	20.7	8.6	1.0		
Cycle Q Clear(g_c), s	16.1	22.1	2.3	20.7	8.6	1.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	645	623	358	1676	1210	1022		
V/C Ratio(X)	0.69	0.80	0.23	0.71	0.42	0.06		
Avail Cap(c_a), veh/h	822	774	1020	2049	2010	1358		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.8	19.9	13.9	15.6	18.6	3.2		
Incr Delay (d2), s/veh	1.9	5.4	0.3	1.5	0.5	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	8.2	10.1	1.0	10.1	4.1	0.9		
LnGrp Delay(d),s/veh	22.7	25.2	14.2	17.0	19.1	3.3		
LnGrp LOS	C	C	B	B	B	A		
Approach Vol, veh/h	945			1278	572			
Approach Delay, s/veh	24.0			16.8	17.4			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.7	33.1				42.8		33.4
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	4.3	10.6				22.7		24.1
Green Ext Time (p_c), s	0.2	7.2				14.1		3.4
Intersection Summary								
HCM 2010 Ctrl Delay			19.4					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/26/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	109	311	765	694	239	457		
Future Volume (veh/h)	109	311	765	694	239	457		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1845	1863	1881	1545	1776		
Adj Flow Rate, veh/h	130	297	911	455	285	544		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84		
Percent Heavy Veh, %	0	3	2	1	23	7		
Cap, veh/h	355	558	1235	872	417	2047		
Arrive On Green	0.20	0.20	0.35	0.35	0.16	0.61		
Sat Flow, veh/h	1810	1568	3632	1599	1471	3463		
Grp Volume(v), veh/h	130	297	911	455	285	544		
Grp Sat Flow(s),veh/h/ln	1810	1568	1770	1599	1471	1687		
Q Serve(g_s), s	3.2	7.6	11.5	9.2	5.5	3.8		
Cycle Q Clear(g_c), s	3.2	7.6	11.5	9.2	5.5	3.8		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	355	558	1235	872	417	2047		
V/C Ratio(X)	0.37	0.53	0.74	0.52	0.68	0.27		
Avail Cap(c_a), veh/h	392	589	1463	975	848	3255		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	17.7	13.0	14.5	7.3	9.8	4.7		
Incr Delay (d2), s/veh	0.6	0.8	1.7	0.5	2.0	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.6	3.4	5.9	5.8	2.4	1.8		
LnGrp Delay(d),s/veh	18.3	13.8	16.1	7.8	11.8	4.8		
LnGrp LOS	B	B	B	A	B	A		
Approach Vol, veh/h	427		1366			829		
Approach Delay, s/veh	15.2		13.4			7.2		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	13.1	22.7				35.8		15.0
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.0	21.0				49.0		11.0
Max Q Clear Time (g_c+I), s	17.5	13.5				5.8		9.6
Green Ext Time (p_c), s	0.7	4.3				3.7		0.2
Intersection Summary								
HCM 2010 Ctrl Delay			11.7					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

10: Red Mill Rd & Tempel Ln

07/26/2018

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	63	245	412	235	157	27		
Future Volume (veh/h)	63	245	412	235	157	27		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1792	1827	1900	1900	1900		
Adj Flow Rate, veh/h	73	285	479	220	183	12		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	0	6	4	0	0	0		
Cap, veh/h	407	988	637	860	333	412		
Arrive On Green	0.07	0.55	0.35	0.35	0.18	0.18		
Sat Flow, veh/h	1810	1792	1827	1615	1810	1615		
Grp Volume(v), veh/h	73	285	479	220	183	12		
Grp Sat Flow(s),veh/h/ln	1810	1792	1827	1615	1810	1615		
Q Serve(g_s), s	0.8	3.2	8.8	2.8	3.5	0.2		
Cycle Q Clear(g_c), s	0.8	3.2	8.8	2.8	3.5	0.2		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	407	988	637	860	333	412		
V/C Ratio(X)	0.18	0.29	0.75	0.26	0.55	0.03		
Avail Cap(c_a), veh/h	518	1421	966	1151	957	968		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.2	4.5	10.9	4.8	14.0	10.6		
Incr Delay (d2), s/veh	0.2	0.2	1.8	0.2	1.4	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.4	1.6	4.7	1.7	1.9	0.2		
LnGrp Delay(d),s/veh	7.4	4.7	12.7	4.9	15.4	10.6		
LnGrp LOS	A	A	B	A	B	B		
Approach Vol, veh/h		358	699		195			
Approach Delay, s/veh		5.2	10.3		15.1			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				25.9		12.0	7.7	18.2
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.2		5.5	2.8	10.8
Green Ext Time (p_c), s				1.5		0.4	0.0	2.4
Intersection Summary								
HCM 2010 Ctrl Delay			9.6					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/26/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	342	31	213	449	146	83		
Future Volume (veh/h)	342	31	213	449	146	83		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1849	1900	1900	1875	1900	1810		
Adj Flow Rate, veh/h	398	28	248	522	170	48		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	3	3	1	1	0	5		
Cap, veh/h	1721	121	511	1032	416	354		
Arrive On Green	0.52	0.52	0.52	0.52	0.23	0.23		
Sat Flow, veh/h	3424	233	689	2082	1810	1538		
Grp Volume(v), veh/h	209	217	355	415	170	48		
Grp Sat Flow(s),veh/h/ln	1757	1808	1064	1621	1810	1538		
Q Serve(g_s), s	2.6	2.6	7.9	6.6	3.2	1.0		
Cycle Q Clear(g_c), s	2.6	2.6	10.5	6.6	3.2	1.0		
Prop In Lane		0.13	0.70		1.00	1.00		
Lane Grp Cap(c), veh/h	908	934	705	838	416	354		
V/C Ratio(X)	0.23	0.23	0.50	0.50	0.41	0.14		
Avail Cap(c_a), veh/h	1335	1373	979	1232	1375	1169		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	5.2	5.2	7.4	6.2	12.9	12.1		
Incr Delay (d2), s/veh	0.3	0.3	1.2	1.0	1.4	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.3	1.3	3.1	3.1	1.7	0.4		
LnGrp Delay(d),s/veh	5.5	5.5	8.6	7.2	14.3	12.5		
LnGrp LOS	A	A	A	A	B	B		
Approach Vol, veh/h	426			770	218			
Approach Delay, s/veh	5.5			7.8	13.9			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		25.4				25.4		14.1
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		30.0				30.0		30.0
Max Q Clear Time (g_c+I1), s		4.6				12.5		5.2
Green Ext Time (p_c), s		4.5				8.0		1.5
Intersection Summary								
HCM 2010 Ctrl Delay			8.1					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations					 			
Traffic Volume (veh/h)	306	101	103	471	548	664		
Future Volume (veh/h)	306	101	103	471	548	664		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1749	1782	1712	1776	1863	1900		
Adj Flow Rate, veh/h	356	97	120	548	637	602		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	7	5	11	7	2	2		
Cap, veh/h	400	440	256	1124	918	821		
Arrive On Green	0.24	0.24	0.05	0.63	0.52	0.52		
Sat Flow, veh/h	1666	1515	1630	1776	1863	1583		
Grp Volume(v), veh/h	356	97	120	548	637	602		
Grp Sat Flow(s),veh/h/ln	1666	1515	1630	1776	1770	1583		
Q Serve(g_s), s	16.3	0.0	0.0	12.9	21.3	23.2		
Cycle Q Clear(g_c), s	16.3	0.0	0.0	12.9	21.3	23.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	400	440	256	1124	918	821		
V/C Ratio(X)	0.89	0.22	0.47	0.49	0.69	0.73		
Avail Cap(c_a), veh/h	846	847	587	1128	1124	1006		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	28.9	21.2	30.2	7.7	14.2	14.7		
Incr Delay (d2), s/veh	2.8	0.1	0.5	0.7	2.3	3.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.7	2.1	2.5	6.5	10.9	10.8		
LnGrp Delay(d),s/veh	31.7	21.3	30.7	8.4	16.6	18.0		
LnGrp LOS	C	C	C	A	B	B		
Approach Vol, veh/h	453			668	1239			
Approach Delay, s/veh	29.5			12.4	17.3			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	45.8		23.9		54.8		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	20.0	50.0		40.0		50.0		
Max Q Clear Time (g_c+I), s	12.0	25.2		18.3		14.9		
Green Ext Time (p_c), s	0.1	15.6		0.6		7.4		
Intersection Summary								
HCM 2010 Ctrl Delay			18.2					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	2	29	108	8	147	45	681	114	256	1026	95
Future Volume (veh/h)	54	2	29	108	8	147	45	681	114	256	1026	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1864	1776	1900	1819	1900	1900	1727	1900	1845	1845	1863
Adj Flow Rate, veh/h	56	2	30	112	8	113	47	709	115	267	1069	43
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	7	0	0	0	0	11	11	3	3	2
Cap, veh/h	275	9	323	168	23	129	348	787	128	302	2117	956
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.54	0.54	0.09	0.60	0.60
Sat Flow, veh/h	950	40	1509	531	108	601	1810	1451	235	1757	3505	1583
Grp Volume(v), veh/h	58	0	30	233	0	0	47	0	824	267	1069	43
Grp Sat Flow(s),veh/h/ln	990	0	1509	1240	0	0	1810	0	1686	1757	1752	1583
Q Serve(g_s), s	0.0	0.0	1.6	13.4	0.0	0.0	1.1	0.0	43.0	6.6	17.1	1.1
Cycle Q Clear(g_c), s	5.0	0.0	1.6	18.4	0.0	0.0	1.1	0.0	43.0	6.6	17.1	1.1
Prop In Lane	0.97		1.00	0.48		0.48	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	284	0	323	320	0	0	348	0	915	302	2117	956
V/C Ratio(X)	0.20	0.00	0.09	0.73	0.00	0.00	0.14	0.00	0.90	0.89	0.51	0.04
Avail Cap(c_a), veh/h	401	0	461	452	0	0	663	0	1030	500	2141	967
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	0.0	31.0	38.6	0.0	0.0	9.9	0.0	20.1	22.4	11.1	7.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.6	0.0	0.0	0.1	0.0	11.2	5.9	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.7	6.3	0.0	0.0	0.6	0.0	22.8	7.5	8.3	0.5
LnGrp Delay(d),s/veh	32.4	0.0	31.0	40.3	0.0	0.0	10.0	0.0	31.3	28.3	11.5	8.0
LnGrp LOS	C		C	D			A		C	C	B	A
Approach Vol, veh/h	88			233			871			1379		
Approach Delay, s/veh	31.9			40.3			30.2			14.6		
Approach LOS	C			D			C			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.9	58.3		26.0	7.9	64.3		26.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	60.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I), s	19.6	45.0		7.0	3.1	19.1		20.4				
Green Ext Time (p_c), s	0.3	8.3		0.2	0.0	18.0		0.6				
Intersection Summary												
HCM 2010 Ctrl Delay	22.8											
HCM 2010 LOS	C											

HCM 2010 TWSC
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/26/2018

Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	273	151	163	530	3	123	0	68	5	0	9
Future Vol, veh/h	2	273	151	163	530	3	123	0	68	5	0	9
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	150	-	-	150	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	297	164	177	576	3	134	0	74	5	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	579	0	0	461	0	0	1320	1316	379	1352	1397	578
Stage 1	-	-	-	-	-	-	383	383	-	932	932	-
Stage 2	-	-	-	-	-	-	937	933	-	420	465	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	995	-	-	1100	-	-	134	158	668	127	141	516
Stage 1	-	-	-	-	-	-	640	612	-	320	345	-
Stage 2	-	-	-	-	-	-	318	345	-	611	563	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	995	-	-	1100	-	-	~ 115	132	668	99	118	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	209	227	-	99	118	-
Stage 1	-	-	-	-	-	-	639	611	-	319	289	-
Stage 2	-	-	-	-	-	-	262	289	-	542	562	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.1	35.2	23.9
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	209	668	995	-	-	1100	-	-	206
HCM Lane V/C Ratio	0.64	0.111	0.002	-	-	0.161	-	-	0.074
HCM Control Delay (s)	48.5	11.1	8.6	-	-	8.9	-	-	23.9
HCM Lane LOS	E	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	3.8	0.4	0	-	-	0.6	-	-	0.2

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

HCM 2010 TWSC
34: Tempel Lane & Regeneron

07/26/2018

Intersection						
Int Delay, s/veh	6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	63	52	139	317	261	53
Future Vol, veh/h	63	52	139	317	261	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	57	151	345	284	58
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	950	324	0	0	496	0
Stage 1	324	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	289	717	-	-	1068	-
Stage 1	733	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	210	717	-	-	1068	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	531	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	24.3	0	8			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	309	1068	-	
HCM Lane V/C Ratio	-	-	0.405	0.266	-	
HCM Control Delay (s)	-	-	24.3	9.6	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.9	1.1	-	

LANE SUMMARY

 **Site: 1 [Mannix - 2020 Build w/ Tempel Farms AM]**

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	603	2.9	1135	0.531	100	6.5	LOS A	4.4	111.7	Full	1600	0.0	0.0
Lane 2 ^d	635	1.2	1197	0.531	100	6.1	LOS A	4.4	111.1	Full	1600	0.0	0.0
Approach	1238	2.1		0.531		6.3	LOS A	4.4	111.7				
East: Mannix Road													
Lane 1	68	4.9	689	0.099	100	10.3	LOS B	0.4	11.5	Full	1600	0.0	0.0
Lane 2 ^d	73	1.9	738	0.099	100	7.0	LOS A	0.4	11.4	Full	1600	0.0	0.0
Approach	141	3.4		0.099		8.6	LOS A	0.4	11.5				
North: US Route 4													
Lane 1 ^d	429	14.3	981	0.438	100	8.1	LOS A	2.7	75.7	Full	1600	0.0	0.0
Lane 2	406	20.2	928	0.438	100	6.3	LOS A	2.7	78.3	Full	1600	0.0	0.0
Approach	836	17.1		0.438		7.2	LOS A	2.7	78.3				
West: Mannix Road													
Lane 1 ^d	24	5.7	478	0.051	100	8.3	LOS A	0.2	4.8	Full	1600	0.0	0.0
Approach	24	5.7		0.051		8.3	LOS A	0.2	4.8				
Intersection	2239	7.8		0.531		6.8	LOS A	4.4	111.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Route 151 - 2020 Build w/ Tempel Farms AM]

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	432	10.7	685	0.630	100	14.0	LOS B	4.3	118.0	Full	1600	0.0	0.0
Lane 2 ^d	508	5.8	806	0.630	100	10.2	LOS B	4.5	118.4	Full	1600	0.0	0.0
Approach	940	8.0		0.630		12.0	LOS B	4.5	118.4				
East: Route 151													
Lane 1	281	9.2	418	0.674	100	19.4	LOS B	4.4	118.9	Full	1600	0.0	0.0
Lane 2 ^d	464	6.0	564	0.822	100	20.7	LOS C	8.0	209.3	Full	1600	0.0	0.0
Approach	745	7.2		0.822		20.2	LOS C	8.0	209.3				
North: US Route 4													
Lane 1	412	4.2	780	0.528	100	15.1	LOS B	4.4	113.4	Full	1600	0.0	0.0
Lane 2 ^d	481	3.0	911	0.528	100	9.5	LOS A	4.5	116.2	Full	1600	0.0	0.0
Approach	893	3.6		0.528		12.1	LOS B	4.5	116.2				
West: Route 151													
Lane 1 ^d	285	0.0	802	0.356	100	13.6	LOS B	1.9	46.5	Full	1600	0.0	0.0
Lane 2	232	7.2	653	0.356	100	9.8	LOS A	1.8	47.3	Full	1600	0.0	0.0
Approach	517	3.2		0.356		11.9	LOS B	1.9	47.3				
Intersection	3095	5.7		0.822		14.0	LOS B	8.0	209.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Tempel Lane & Tempel Farm - Build AM]

Tempel Lane & Tempel Farm Roundabout
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tempel Lane													
Lane 1 ^d	285	2.0	950	0.300	100	6.9	LOS A	1.8	45.6	Full	1600	0.0	0.0
Approach	285	2.0		0.300		6.9	LOS A	1.8	45.6				
East: Tempel Farm													
Lane 1 ^d	321	2.0	815	0.394	100	7.5	LOS A	2.5	63.7	Full	1600	0.0	0.0
Approach	321	2.0		0.394		7.5	LOS A	2.5	63.7				
North: Tempel Lane													
Lane 1 ^d	195	2.0	951	0.205	100	7.4	LOS A	1.1	29.2	Full	1600	0.0	0.0
Approach	195	2.0		0.205		7.4	LOS A	1.1	29.2				
West: Tempel Farm													
Lane 1 ^d	149	2.0	909	0.164	100	7.0	LOS A	0.9	22.3	Full	1600	0.0	0.0
Approach	149	2.0		0.164		7.0	LOS A	0.9	22.3				
Intersection	949	2.0		0.394		7.2	LOS A	2.5	63.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Intersection						
Int Delay, s/veh	17.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗↗	↗
Traffic Vol, veh/h	0	369	0	1483	1528	374
Future Vol, veh/h	0	369	0	1483	1528	374
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	401	0	1612	1661	407
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	831	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0 ~ 314	0	-	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	- ~ 314	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	181.3	0		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 314		-	-		
HCM Lane V/C Ratio	- 1.277		-	-		
HCM Control Delay (s)	- 181.3		-	-		
HCM Lane LOS	- F		-	-		
HCM 95th %tile Q(veh)	- 18.9		-	-		
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	198	1071	198	1285	831	291		
Future Volume (veh/h)	198	1071	198	1285	831	291		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	208	800	208	1353	875	168		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	8	1	1	1	1	1		
Cap, veh/h	611	736	324	1825	1258	1146		
Arrive On Green	0.36	0.36	0.10	0.51	0.35	0.35		
Sat Flow, veh/h	1675	1599	1792	3668	3668	1599		
Grp Volume(v), veh/h	208	800	208	1353	875	168		
Grp Sat Flow(s),veh/h/ln	1675	1599	1792	1787	1787	1599		
Q Serve(g_s), s	8.6	35.0	6.7	28.6	20.2	3.2		
Cycle Q Clear(g_c), s	8.6	35.0	6.7	28.6	20.2	3.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	611	736	324	1825	1258	1146		
V/C Ratio(X)	0.34	1.09	0.64	0.74	0.70	0.15		
Avail Cap(c_a), veh/h	611	736	805	1825	1675	1332		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	22.1	25.9	19.5	18.5	26.7	4.3		
Incr Delay (d2), s/veh	0.4	59.2	2.1	2.0	1.6	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.1	31.5	3.5	14.6	10.2	3.3		
LnGrp Delay(d),s/veh	22.5	85.1	21.6	20.5	28.3	4.4		
LnGrp LOS	C	F	C	C	C	A		
Approach Vol, veh/h	1008			1561	1043			
Approach Delay, s/veh	72.2			20.7	24.4			
Approach LOS	E			C	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.2	39.8				55.0		41.0
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	8.7	22.2				30.6		37.0
Green Ext Time (p_c), s	0.5	11.6				11.1		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			36.1					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/26/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	87	238	759	723	518	1035		
Future Volume (veh/h)	87	238	759	723	518	1035		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1827	1845	1845	1881	1881	1900		
Adj Flow Rate, veh/h	94	227	816	443	557	1113		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh, %	4	3	3	1	1	0		
Cap, veh/h	301	673	1084	771	629	2356		
Arrive On Green	0.17	0.17	0.31	0.31	0.26	0.65		
Sat Flow, veh/h	1740	1568	3597	1599	1792	3705		
Grp Volume(v), veh/h	94	227	816	443	557	1113		
Grp Sat Flow(s),veh/h/ln	1740	1568	1752	1599	1792	1805		
Q Serve(g_s), s	2.7	5.5	12.0	11.4	11.4	8.9		
Cycle Q Clear(g_c), s	2.7	5.5	12.0	11.4	11.4	8.9		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	301	673	1084	771	629	2356		
V/C Ratio(X)	0.31	0.34	0.75	0.57	0.89	0.47		
Avail Cap(c_a), veh/h	333	702	1282	862	887	3082		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.7	10.9	17.9	10.6	11.2	5.0		
Incr Delay (d2), s/veh	0.6	0.3	2.1	0.7	8.0	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.4	2.4	6.1	6.8	9.6	4.4		
LnGrp Delay(d),s/veh	21.3	11.2	20.0	11.4	19.2	5.2		
LnGrp LOS	C	B	B	B	B	A		
Approach Vol, veh/h	321		1259			1670		
Approach Delay, s/veh	14.2		17.0			9.8		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	19.7	22.7				42.5		14.9
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.0	21.0				49.0		11.0
Max Q Clear Time (g_c+1.5), s	13.4	14.0				10.9		7.5
Green Ext Time (p_c), s	1.3	3.7				9.1		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			13.0					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

10: Red Mill Rd & Tempel Ln

07/26/2018

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	53	460	350	244	453	76		
Future Volume (veh/h)	53	460	350	244	453	76		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1827	1900		
Adj Flow Rate, veh/h	58	500	380	204	492	43		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	1	0	0	4	0		
Cap, veh/h	343	832	517	975	577	629		
Arrive On Green	0.06	0.44	0.27	0.27	0.33	0.33		
Sat Flow, veh/h	1810	1881	1900	1615	1740	1615		
Grp Volume(v), veh/h	58	500	380	204	492	43		
Grp Sat Flow(s),veh/h/ln	1810	1881	1900	1615	1740	1615		
Q Serve(g_s), s	0.9	8.9	8.1	2.5	11.7	0.7		
Cycle Q Clear(g_c), s	0.9	8.9	8.1	2.5	11.7	0.7		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	343	832	517	975	577	629		
V/C Ratio(X)	0.17	0.60	0.73	0.21	0.85	0.07		
Avail Cap(c_a), veh/h	443	1273	857	1265	785	822		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	10.2	9.4	14.7	4.0	13.8	8.5		
Incr Delay (d2), s/veh	0.2	0.7	2.0	0.1	6.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.5	4.7	4.5	2.1	6.7	0.9		
LnGrp Delay(d),s/veh	10.4	10.1	16.7	4.1	20.6	8.5		
LnGrp LOS	B	B	B	A	C	A		
Approach Vol, veh/h		558	584		535			
Approach Delay, s/veh		10.1	12.3		19.6			
Approach LOS		B	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				24.6		19.7	7.6	17.1
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				10.9		13.7	2.9	10.1
Green Ext Time (p_c), s				2.7		1.1	0.0	2.0
Intersection Summary								
HCM 2010 Ctrl Delay			13.9					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/26/2018

									
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Lane Configurations									
Traffic Volume (veh/h)	378	79	147	400	85	194			
Future Volume (veh/h)	378	79	147	400	85	194			
Number	2	12	1	6	3	18			
Initial Q (Qb), veh	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1900	1900	1900	1886	1900	1900			
Adj Flow Rate, veh/h	411	62	160	435	92	123			
Adj No. of Lanes	2	0	0	2	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	1	1	0	0			
Cap, veh/h	1405	211	408	1009	465	415			
Arrive On Green	0.45	0.45	0.45	0.45	0.26	0.26			
Sat Flow, veh/h	3245	472	542	2348	1810	1615			
Grp Volume(v), veh/h	234	239	288	307	92	123			
Grp Sat Flow(s),veh/h/ln	1805	1817	1173	1631	1810	1615			
Q Serve(g_s), s	2.8	2.8	3.5	4.3	1.3	2.1			
Cycle Q Clear(g_c), s	2.8	2.8	6.3	4.3	1.3	2.1			
Prop In Lane		0.26	0.56		1.00	1.00			
Lane Grp Cap(c), veh/h	805	810	690	727	465	415			
V/C Ratio(X)	0.29	0.29	0.42	0.42	0.20	0.30			
Avail Cap(c_a), veh/h	1607	1618	1222	1452	1611	1438			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	5.9	6.0	6.8	6.4	9.8	10.1			
Incr Delay (d2), s/veh	0.4	0.4	0.9	0.8	0.4	0.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	1.5	2.1	2.0	0.7	1.0			
LnGrp Delay(d),s/veh	6.4	6.4	7.7	7.2	10.2	10.9			
LnGrp LOS	A	A	A	A	B	B			
Approach Vol, veh/h	473			595	215				
Approach Delay, s/veh	6.4			7.4	10.6				
Approach LOS	A			A	B				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs	2					6	8		
Phs Duration (G+Y+Rc), s	20.0					20.0	13.7		
Change Period (Y+Rc), s	5.0					5.0	5.0		
Max Green Setting (Gmax), s	30.0					30.0	30.0		
Max Q Clear Time (g_c+I1), s	4.8					8.3	4.1		
Green Ext Time (p_c), s	5.1					6.7	1.5		
Intersection Summary									
HCM 2010 Ctrl Delay			7.6						
HCM 2010 LOS			A						

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	583	252	114	694	716	386		
Future Volume (veh/h)	583	252	114	694	716	386		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1817	1835	1792	1881	1862	1900		
Adj Flow Rate, veh/h	601	215	118	715	738	340		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	3	2	6	1	1	1		
Cap, veh/h	637	642	223	984	1001	461		
Arrive On Green	0.37	0.37	0.04	0.52	0.43	0.43		
Sat Flow, veh/h	1730	1560	1707	1881	2448	1084		
Grp Volume(v), veh/h	601	215	118	715	554	524		
Grp Sat Flow(s),veh/h/ln	1730	1560	1707	1881	1769	1671		
Q Serve(g_s), s	30.9	4.7	0.0	26.9	24.1	24.2		
Cycle Q Clear(g_c), s	30.9	4.7	0.0	26.9	24.1	24.2		
Prop In Lane	1.00	1.00	1.00			0.65		
Lane Grp Cap(c), veh/h	637	642	223	984	752	710		
V/C Ratio(X)	0.94	0.33	0.53	0.73	0.74	0.74		
Avail Cap(c_a), veh/h	753	746	520	1023	961	908		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	28.1	18.5	38.2	16.9	22.1	22.1		
Incr Delay (d2), s/veh	17.5	0.1	0.7	3.2	3.5	3.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	17.8	7.2	2.9	14.8	12.4	11.8		
LnGrp Delay(d),s/veh	45.7	18.6	38.9	20.1	25.7	25.9		
LnGrp LOS	D	B	D	C	C	C		
Approach Vol, veh/h	816			833	1078			
Approach Delay, s/veh	38.5			22.8	25.8			
Approach LOS	D			C	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	44.1		38.9		53.1		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	20.0	50.0		40.0		50.0		
Max Q Clear Time (g_c+I2), s	12.0	26.2		32.9		28.9		
Green Ext Time (p_c), s	0.1	13.0		0.9		8.5		
Intersection Summary								
HCM 2010 Ctrl Delay			28.7					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	5	124	32	11	45	98	1138	36	45	992	306
Future Volume (veh/h)	285	5	124	32	11	45	98	1138	36	45	992	306
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1863	1900	1900	1900	1900	1882	1900	1900	1827	1881
Adj Flow Rate, veh/h	300	5	111	34	12	18	103	1198	37	47	1044	166
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	0	0	0	1	1	0	4	1
Cap, veh/h	342	5	440	51	21	8	305	1009	31	117	1878	865
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.04	0.56	0.56	0.03	0.54	0.54
Sat Flow, veh/h	993	17	1583	0	77	30	1810	1816	56	1810	3471	1599
Grp Volume(v), veh/h	305	0	111	64	0	0	103	0	1235	47	1044	166
Grp Sat Flow(s),veh/h/ln	1009	0	1583	106	0	0	1810	0	1872	1810	1736	1599
Q Serve(g_s), s	0.0	0.0	5.9	0.0	0.0	0.0	2.7	0.0	60.0	1.2	21.3	5.7
Cycle Q Clear(g_c), s	30.0	0.0	5.9	30.0	0.0	0.0	2.7	0.0	60.0	1.2	21.3	5.7
Prop In Lane	0.98		1.00	0.53		0.28	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	346	0	440	81	0	0	305	0	1040	117	1878	865
V/C Ratio(X)	0.88	0.00	0.25	0.79	0.00	0.00	0.34	0.00	1.19	0.40	0.56	0.19
Avail Cap(c_a), veh/h	346	0	440	81	0	0	563	0	1040	402	1928	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	30.3	40.6	0.0	0.0	12.6	0.0	24.0	26.1	16.3	12.7
Incr Delay (d2), s/veh	21.4	0.0	0.1	37.9	0.0	0.0	0.2	0.0	94.3	0.8	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.1	0.0	2.6	2.8	0.0	0.0	1.4	0.0	57.9	0.8	10.3	2.6
LnGrp Delay(d),s/veh	61.6	0.0	30.4	78.5	0.0	0.0	12.9	0.0	118.4	26.9	16.9	12.9
LnGrp LOS	E		C	E			B		F	C	B	B
Approach Vol, veh/h	416			64			1338			1257		
Approach Delay, s/veh	53.3			78.5			110.2			16.7		
Approach LOS	D			E			F			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	65.0		35.0	9.6	63.4		35.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	60.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I), s	13.2	62.0		32.0	4.7	23.3		32.0				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.1	18.1		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	63.7											
HCM 2010 LOS	E											

HCM 2010 TWSC
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/26/2018

Intersection												
Int Delay, s/veh	8.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	420	144	88	349	6	193	0	185	4	0	5
Future Vol, veh/h	8	420	144	88	349	6	193	0	185	4	0	5
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	150	-	-	150	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	457	157	96	379	7	210	0	201	4	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	386	0	0	614	0	0	1131	1132	536	1229	1207	383
Stage 1	-	-	-	-	-	-	554	554	-	575	575	-
Stage 2	-	-	-	-	-	-	577	578	-	654	632	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1172	-	-	965	-	-	~ 181	203	545	155	183	664
Stage 1	-	-	-	-	-	-	517	514	-	503	503	-
Stage 2	-	-	-	-	-	-	502	501	-	456	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1172	-	-	965	-	-	~ 165	181	545	90	164	664
Mov Cap-2 Maneuver	-	-	-	-	-	-	291	298	-	90	164	-
Stage 1	-	-	-	-	-	-	513	510	-	499	453	-
Stage 2	-	-	-	-	-	-	448	451	-	286	470	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.8			29.9			27.1		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	291		545	1172	-	-	965	-	-	173		
HCM Lane V/C Ratio	0.721		0.369	0.007	-	-	0.099	-	-	0.057		
HCM Control Delay (s)	43.8		15.4	8.1	-	-	9.1	-	-	27.1		
HCM Lane LOS	E		C	A	-	-	A	-	-	D		
HCM 95th %tile Q(veh)	5.1		1.7	0	-	-	0.3	-	-	0.2		
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		

Intersection						
Int Delay, s/veh	31.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	315	258	120	62	52	180
Future Vol, veh/h	315	258	120	62	52	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	342	280	130	67	57	196
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	474	164	0	0	197	0
Stage 1	164	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	549	881	-	-	1376	-
Stage 1	865	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	524	881	-	-	1376	-
Mov Cap-2 Maneuver	524	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	54.2	0	1.7			
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	641	1376	-	
HCM Lane V/C Ratio	-	-	0.972	0.041	-	
HCM Control Delay (s)	-	-	54.2	7.7	0	
HCM Lane LOS	-	-	F	A	A	
HCM 95th %tile Q(veh)	-	-	14.2	0.1	-	

LANE SUMMARY

 **Site: 1 [Mannix - 2020 Build w/ Tempel Farms PM]**

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	540	3.4	1228	0.439	100	6.6	LOS A	3.6	92.8	Full	1600	0.0	0.0
Lane 2 ^d	548	3.7	1248	0.439	100	5.5	LOS A	3.6	93.2	Full	1600	0.0	0.0
Approach	1088	3.5		0.439		6.0	LOS A	3.6	93.2				
East: Mannix Road													
Lane 1	273	2.0	627	0.434	100	12.4	LOS B	2.2	55.2	Full	1600	0.0	0.0
Lane 2 ^d	297	1.0	684	0.434	100	9.6	LOS A	2.2	55.9	Full	1600	0.0	0.0
Approach	570	1.5		0.434		10.9	LOS B	2.2	55.9				
North: US Route 4													
Lane 1	640	0.9	849	0.754	100	11.7	LOS B	7.2	180.5	Full	1600	0.0	0.0
Lane 2 ^d	640	0.9	848	0.754	100	11.2	LOS B	7.2	180.5	Full	1600	0.0	0.0
Approach	1279	0.9		0.754		11.5	LOS B	7.2	180.5				
West: Mannix Road													
Lane 1 ^d	61	0.0	316	0.192	100	11.1	LOS B	0.8	20.4	Full	1600	0.0	0.0
Approach	61	0.0		0.192		11.1	LOS B	0.8	20.4				
Intersection	2998	2.0		0.754		9.4	LOS A	7.2	180.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Route 151 - 2020 Build w/ Tempel Farms PM]

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	358	0.4	486	0.737	100	21.9	LOS C	6.1	151.8	Full	1600	0.0	0.0
Lane 2 ^d	418	0.5	567	0.737	100	17.1	LOS B	6.5	163.5	Full	1600	0.0	0.0
Approach	776	0.5		0.737		19.3	LOS B	6.5	163.5				
East: Route 151													
Lane 1	203	4.3	521	0.390	100	14.0	LOS B	2.1	54.7	Full	1600	0.0	0.0
Lane 2 ^d	232	3.0	613	0.378	100	10.6	LOS B	2.1	54.4	Full	1600	0.0	0.0
Approach	435	3.6		0.390		12.2	LOS B	2.1	54.7				
North: US Route 4													
Lane 1	856	0.2	943	0.907	100	26.8	LOS C	20.4	510.5	Full	1600	0.0	0.0
Lane 2 ^d	950	0.8	1047	0.907	100	19.5	LOS B	21.1	530.4	Full	1600	0.0	0.0
Approach	1805	0.5		0.907		22.9	LOS C	21.1	530.4				
West: Route 151													
Lane 1	428	1.0	299	1.433	100	222.4	LOS F	49.9	1257.0	Full	1600	0.0	0.0
Lane 2 ^d	537	1.9	375	1.433	100	214.8	LOS F	61.2	1552.5	Full	1600	0.0	4.1
Approach	965	1.5		1.433		218.2	LOS F	61.2	1552.5				
Intersection	3982	1.1		1.433		68.4	LOS E	61.2	1552.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

Site: 1 [Tempel Lane & Tempel Farm - Build PM]

Tempel Lane & Tempel Farm Roundabout
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tempel Lane													
Lane 1 ^d	312	2.0	744	0.420	100	10.1	LOS B	2.7	69.3	Full	1600	0.0	0.0
Approach	312	2.0		0.420		10.1	LOS B	2.7	69.3				
East: Tempel Farm													
Lane 1 ^d	364	2.0	831	0.438	100	8.1	LOS A	3.0	76.3	Full	1600	0.0	0.0
Approach	364	2.0		0.438		8.1	LOS A	3.0	76.3				
North: Tempel Lane													
Lane 1 ^d	534	2.0	749	0.713	100	15.0	LOS B	8.2	208.4	Full	1600	0.0	0.0
Approach	534	2.0		0.713		15.0	LOS B	8.2	208.4				
West: Tempel Farm													
Lane 1 ^d	325	2.0	601	0.541	100	12.9	LOS B	4.4	112.6	Full	1600	0.0	0.0
Approach	325	2.0		0.541		12.9	LOS B	4.4	112.6				
Intersection	1535	2.0		0.713		11.9	LOS B	8.2	208.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗	↗
Traffic Vol, veh/h	0	124	0	1137	767	315
Future Vol, veh/h	0	124	0	1137	767	315
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	135	0	1236	834	342
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	417	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	585	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	585	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 585		-	-		
HCM Lane V/C Ratio	- 0.23		-	-		
HCM Control Delay (s)	- 13		-	-		
HCM Lane LOS	- B		-	-		
HCM 95th %tile Q(veh)	- 0.9		-	-		

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	395	629	73	1064	453	114		
Future Volume (veh/h)	395	629	73	1064	453	114		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1881	1792	1696	1827	1792	1681		
Adj Flow Rate, veh/h	444	501	82	1196	509	63		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	1	6	12	4	6	13		
Cap, veh/h	645	623	358	1676	1210	1022		
Arrive On Green	0.36	0.36	0.05	0.48	0.36	0.36		
Sat Flow, veh/h	1792	1524	1616	3563	3495	1429		
Grp Volume(v), veh/h	444	501	82	1196	509	63		
Grp Sat Flow(s),veh/h/ln	1792	1524	1616	1736	1703	1429		
Q Serve(g_s), s	16.1	22.1	2.3	20.7	8.6	1.0		
Cycle Q Clear(g_c), s	16.1	22.1	2.3	20.7	8.6	1.0		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	645	623	358	1676	1210	1022		
V/C Ratio(X)	0.69	0.80	0.23	0.71	0.42	0.06		
Avail Cap(c_a), veh/h	822	774	1020	2049	2010	1358		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.8	19.9	13.9	15.6	18.6	3.2		
Incr Delay (d2), s/veh	1.9	5.4	0.3	1.5	0.5	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	8.2	10.1	1.0	10.1	4.1	0.9		
LnGrp Delay(d),s/veh	22.7	25.2	14.2	17.0	19.1	3.3		
LnGrp LOS	C	C	B	B	B	A		
Approach Vol, veh/h	945			1278	572			
Approach Delay, s/veh	24.0			16.8	17.4			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	9.7	33.1				42.8		33.4
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	4.3	10.6				22.7		24.1
Green Ext Time (p_c), s	0.2	7.2				14.1		3.4
Intersection Summary								
HCM 2010 Ctrl Delay			19.4					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/26/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	109	311	765	694	239	457		
Future Volume (veh/h)	109	311	765	694	239	457		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1845	1863	1881	1545	1776		
Adj Flow Rate, veh/h	130	297	911	455	285	544		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84		
Percent Heavy Veh, %	0	3	2	1	23	7		
Cap, veh/h	355	558	1235	872	417	2047		
Arrive On Green	0.20	0.20	0.35	0.35	0.16	0.61		
Sat Flow, veh/h	1810	1568	3632	1599	1471	3463		
Grp Volume(v), veh/h	130	297	911	455	285	544		
Grp Sat Flow(s),veh/h/ln	1810	1568	1770	1599	1471	1687		
Q Serve(g_s), s	3.2	7.6	11.5	9.2	5.5	3.8		
Cycle Q Clear(g_c), s	3.2	7.6	11.5	9.2	5.5	3.8		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	355	558	1235	872	417	2047		
V/C Ratio(X)	0.37	0.53	0.74	0.52	0.68	0.27		
Avail Cap(c_a), veh/h	392	589	1463	975	848	3255		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	17.7	13.0	14.5	7.3	9.8	4.7		
Incr Delay (d2), s/veh	0.6	0.8	1.7	0.5	2.0	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.6	3.4	5.9	5.8	2.4	1.8		
LnGrp Delay(d),s/veh	18.3	13.8	16.1	7.8	11.8	4.8		
LnGrp LOS	B	B	B	A	B	A		
Approach Vol, veh/h	427		1366			829		
Approach Delay, s/veh	15.2		13.4			7.2		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	13.1	22.7				35.8		15.0
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.0	21.0				49.0		11.0
Max Q Clear Time (g_c+I), s	17.5	13.5				5.8		9.6
Green Ext Time (p_c), s	0.7	4.3				3.7		0.2
Intersection Summary								
HCM 2010 Ctrl Delay			11.7					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

10: Red Mill Rd & Tempel Ln

07/26/2018

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	63	245	412	235	157	27		
Future Volume (veh/h)	63	245	412	235	157	27		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1792	1827	1900	1900	1900		
Adj Flow Rate, veh/h	73	285	479	220	183	12		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	0	6	4	0	0	0		
Cap, veh/h	407	988	637	860	333	412		
Arrive On Green	0.07	0.55	0.35	0.35	0.18	0.18		
Sat Flow, veh/h	1810	1792	1827	1615	1810	1615		
Grp Volume(v), veh/h	73	285	479	220	183	12		
Grp Sat Flow(s),veh/h/ln	1810	1792	1827	1615	1810	1615		
Q Serve(g_s), s	0.8	3.2	8.8	2.8	3.5	0.2		
Cycle Q Clear(g_c), s	0.8	3.2	8.8	2.8	3.5	0.2		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	407	988	637	860	333	412		
V/C Ratio(X)	0.18	0.29	0.75	0.26	0.55	0.03		
Avail Cap(c_a), veh/h	518	1421	966	1151	957	968		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.2	4.5	10.9	4.8	14.0	10.6		
Incr Delay (d2), s/veh	0.2	0.2	1.8	0.2	1.4	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.4	1.6	4.7	1.7	1.9	0.2		
LnGrp Delay(d),s/veh	7.4	4.7	12.7	4.9	15.4	10.6		
LnGrp LOS	A	A	B	A	B	B		
Approach Vol, veh/h		358	699		195			
Approach Delay, s/veh		5.2	10.3		15.1			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				25.9		12.0	7.7	18.2
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.2		5.5	2.8	10.8
Green Ext Time (p_c), s				1.5		0.4	0.0	2.4
Intersection Summary								
HCM 2010 Ctrl Delay			9.6					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/26/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	342	31	213	449	146	83		
Future Volume (veh/h)	342	31	213	449	146	83		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1849	1900	1900	1875	1900	1810		
Adj Flow Rate, veh/h	398	28	248	522	170	48		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	3	3	1	1	0	5		
Cap, veh/h	1721	121	511	1032	416	354		
Arrive On Green	0.52	0.52	0.52	0.52	0.23	0.23		
Sat Flow, veh/h	3424	233	689	2082	1810	1538		
Grp Volume(v), veh/h	209	217	355	415	170	48		
Grp Sat Flow(s),veh/h/ln	1757	1808	1064	1621	1810	1538		
Q Serve(g_s), s	2.6	2.6	7.9	6.6	3.2	1.0		
Cycle Q Clear(g_c), s	2.6	2.6	10.5	6.6	3.2	1.0		
Prop In Lane		0.13	0.70		1.00	1.00		
Lane Grp Cap(c), veh/h	908	934	705	838	416	354		
V/C Ratio(X)	0.23	0.23	0.50	0.50	0.41	0.14		
Avail Cap(c_a), veh/h	1335	1373	979	1232	1375	1169		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	5.2	5.2	7.4	6.2	12.9	12.1		
Incr Delay (d2), s/veh	0.3	0.3	1.2	1.0	1.4	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.3	1.3	3.1	3.1	1.7	0.4		
LnGrp Delay(d),s/veh	5.5	5.5	8.6	7.2	14.3	12.5		
LnGrp LOS	A	A	A	A	B	B		
Approach Vol, veh/h	426			770	218			
Approach Delay, s/veh	5.5			7.8	13.9			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2					6	8	
Phs Duration (G+Y+Rc), s	25.4					25.4	14.1	
Change Period (Y+Rc), s	5.0					5.0	5.0	
Max Green Setting (Gmax), s	30.0					30.0	30.0	
Max Q Clear Time (g_c+I1), s	4.6					12.5	5.2	
Green Ext Time (p_c), s	4.5					8.0	1.5	
Intersection Summary								
HCM 2010 Ctrl Delay			8.1					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	306	101	103	471	548	664		
Future Volume (veh/h)	306	101	103	471	548	664		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1749	1782	1712	1776	1863	1900		
Adj Flow Rate, veh/h	356	97	120	548	637	602		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86		
Percent Heavy Veh, %	7	5	11	7	2	2		
Cap, veh/h	400	442	255	1120	910	815		
Arrive On Green	0.24	0.24	0.05	0.63	0.51	0.51		
Sat Flow, veh/h	1666	1515	1630	1776	1863	1583		
Grp Volume(v), veh/h	356	97	120	548	637	602		
Grp Sat Flow(s),veh/h/ln	1666	1515	1630	1776	1770	1583		
Q Serve(g_s), s	16.0	0.0	0.0	12.8	21.2	23.1		
Cycle Q Clear(g_c), s	16.0	0.0	0.0	12.8	21.2	23.1		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	400	442	255	1120	910	815		
V/C Ratio(X)	0.89	0.22	0.47	0.49	0.70	0.74		
Avail Cap(c_a), veh/h	1032	1016	466	1489	1096	981		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	28.4	20.8	30.0	7.7	14.3	14.7		
Incr Delay (d2), s/veh	2.7	0.1	0.5	0.7	2.5	3.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.6	2.1	2.5	6.5	10.9	10.8		
LnGrp Delay(d),s/veh	31.2	20.8	30.5	8.4	16.8	18.3		
LnGrp LOS	C	C	C	A	B	B		
Approach Vol, veh/h	453			668	1239			
Approach Delay, s/veh	29.0			12.3	17.5			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	44.9		23.6		53.9		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	47.0	48.0		48.0		65.0		
Max Q Clear Time (g_c+I2), s	12.0	25.1		18.0		14.8		
Green Ext Time (p_c), s	0.1	14.8		0.6		7.9		
Intersection Summary								
HCM 2010 Ctrl Delay			18.2					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	2	29	108	8	147	45	681	114	256	1026	95
Future Volume (veh/h)	54	2	29	108	8	147	45	681	114	256	1026	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1864	1776	1900	1819	1900	1900	1727	1900	1845	1845	1863
Adj Flow Rate, veh/h	56	2	30	112	8	113	47	709	115	267	1069	43
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	7	0	0	0	0	11	11	3	3	2
Cap, veh/h	278	9	323	169	24	129	347	768	124	303	2102	949
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.53	0.53	0.10	0.60	0.60
Sat Flow, veh/h	954	41	1509	532	110	604	1810	1451	235	1757	3505	1583
Grp Volume(v), veh/h	58	0	30	233	0	0	47	0	824	267	1069	43
Grp Sat Flow(s),veh/h/ln	995	0	1509	1246	0	0	1810	0	1686	1757	1752	1583
Q Serve(g_s), s	0.0	0.0	1.5	13.0	0.0	0.0	1.1	0.0	43.1	7.3	16.8	1.1
Cycle Q Clear(g_c), s	4.8	0.0	1.5	17.8	0.0	0.0	1.1	0.0	43.1	7.3	16.8	1.1
Prop In Lane	0.97		1.00	0.48		0.48	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	287	0	323	322	0	0	347	0	892	303	2102	949
V/C Ratio(X)	0.20	0.00	0.09	0.72	0.00	0.00	0.14	0.00	0.92	0.88	0.51	0.05
Avail Cap(c_a), veh/h	414	0	473	466	0	0	577	0	951	604	2379	1075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	30.2	37.6	0.0	0.0	10.1	0.0	20.8	23.7	11.0	7.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.2	0.0	0.0	0.1	0.0	14.7	3.3	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.6	6.1	0.0	0.0	0.6	0.0	23.5	7.2	8.1	0.5
LnGrp Delay(d),s/veh	31.6	0.0	30.2	38.8	0.0	0.0	10.2	0.0	35.4	27.0	11.5	7.9
LnGrp LOS	C		C	D			B		D	C	B	A
Approach Vol, veh/h	88			233			871			1379		
Approach Delay, s/veh	31.1			38.8			34.1			14.4		
Approach LOS	C			D			C			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.6	55.7		25.5	7.9	62.4		25.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	54.0		30.0	15.0	65.0		30.0				
Max Q Clear Time (g_c+I), s	19.3	45.1		6.8	3.1	18.8		19.8				
Green Ext Time (p_c), s	0.3	5.5		0.2	0.0	19.0		0.6				
Intersection Summary												
HCM 2010 Ctrl Delay	23.8											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary
28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	273	151	163	530	3	123	0	68	5	0	9
Future Volume (veh/h)	2	273	151	163	530	3	123	0	68	5	0	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	2	297	164	177	576	3	134	0	74	5	0	10
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	529	420	232	530	1097	6	472	0	413	188	45	171
Arrive On Green	0.37	0.37	0.37	0.10	0.59	0.59	0.16	0.00	0.16	0.16	0.00	0.16
Sat Flow, veh/h	831	1129	624	1774	1851	10	1548	0	1583	249	276	1050
Grp Volume(v), veh/h	2	0	461	177	0	579	134	0	74	15	0	0
Grp Sat Flow(s),veh/h/ln	831	0	1753	1774	0	1861	1548	0	1583	1575	0	0
Q Serve(g_s), s	0.0	0.0	7.3	1.7	0.0	6.0	0.2	0.0	1.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	7.3	1.7	0.0	6.0	2.3	0.0	1.2	0.2	0.0	0.0
Prop In Lane	1.00		0.36	1.00		0.01	1.00		1.00	0.33		0.67
Lane Grp Cap(c), veh/h	529	0	652	530	0	1102	472	0	413	403	0	0
V/C Ratio(X)	0.00	0.00	0.71	0.33	0.00	0.53	0.28	0.00	0.18	0.04	0.00	0.00
Avail Cap(c_a), veh/h	882	0	1396	845	0	2223	1016	0	1028	980	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.5	0.0	8.7	5.6	0.0	3.9	12.4	0.0	9.4	11.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.4	0.4	0.0	0.4	0.3	0.0	0.2	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.7	0.8	0.0	3.2	1.1	0.0	0.5	0.1	0.0	0.0
LnGrp Delay(d),s/veh	6.5	0.0	10.2	6.0	0.0	4.3	12.7	0.0	9.6	11.6	0.0	0.0
LnGrp LOS	A		B	A		A	B		A	B		
Approach Vol, veh/h	463			756			208			15		
Approach Delay, s/veh	10.1			4.7			11.6			11.6		
Approach LOS	B			A			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		9.2	7.2	16.1		9.2		23.3				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0		4.0				
Max Green Setting (Gmax), s		18.0	9.0	26.0		18.0		39.0				
Max Q Clear Time (g_c+l1), s		4.3	3.7	9.3		2.2		8.0				
Green Ext Time (p_c), s		0.8	0.2	2.8		0.0		4.3				
Intersection Summary												
HCM 2010 Ctrl Delay	7.5											
HCM 2010 LOS	A											

Intersection						
Int Delay, s/veh	5.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	63	52	139	317	261	53
Future Vol, veh/h	63	52	139	317	261	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	57	151	345	284	58
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	950	324	0	0	496	0
Stage 1	324	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	289	717	-	-	1068	-
Stage 1	733	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	212	717	-	-	1068	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	538	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	21.1	0	8			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 212 717 1068	-	-		
HCM Lane V/C Ratio	-	- 0.323 0.079 0.266	-	-		
HCM Control Delay (s)	-	- 29.9 10.5 9.6	-	-		
HCM Lane LOS	-	- D B A	-	-		
HCM 95th %tile Q(veh)	-	- 1.3 0.3 1.1	-	-		

LANE SUMMARY

 **Site: 1 [Mannix - 2020 Build w/ Tempel Farms AM]**

With MIT

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	603	2.9	1135	0.531	100	6.5	LOS A	4.4	111.7	Full	1600	0.0	0.0
Lane 2 ^d	635	1.2	1197	0.531	100	6.1	LOS A	4.4	111.1	Full	1600	0.0	0.0
Approach	1238	2.1		0.531		6.3	LOS A	4.4	111.7				
East: Mannix Road													
Lane 1	68	4.9	689	0.099	100	10.3	LOS B	0.4	11.5	Full	1600	0.0	0.0
Lane 2 ^d	73	1.9	738	0.099	100	7.0	LOS A	0.4	11.4	Full	1600	0.0	0.0
Approach	141	3.4		0.099		8.6	LOS A	0.4	11.5				
North: US Route 4													
Lane 1 ^d	429	14.3	981	0.438	100	8.1	LOS A	2.7	75.7	Full	1600	0.0	0.0
Lane 2	406	20.2	928	0.438	100	6.3	LOS A	2.7	78.3	Full	1600	0.0	0.0
Approach	836	17.1		0.438		7.2	LOS A	2.7	78.3				
West: Mannix Road													
Lane 1 ^d	24	5.7	478	0.051	100	8.3	LOS A	0.2	4.8	Full	1600	0.0	0.0
Approach	24	5.7		0.051		8.3	LOS A	0.2	4.8				
Intersection	2239	7.8		0.531		6.8	LOS A	4.4	111.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

 **Site: 1 [Route 151 - 2020 Build w/ Tempel Farms AM]** With MIT

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	432	10.7	685	0.630	100	14.0	LOS B	4.3	118.0	Full	1600	0.0	0.0
Lane 2 ^d	508	5.8	806	0.630	100	10.2	LOS B	4.5	118.4	Full	1600	0.0	0.0
Approach	940	8.0		0.630		12.0	LOS B	4.5	118.4				
East: Route 151													
Lane 1	281	9.2	418	0.674	100	19.4	LOS B	4.4	118.9	Full	1600	0.0	0.0
Lane 2 ^d	464	6.0	564	0.822	100	20.7	LOS C	8.0	209.3	Full	1600	0.0	0.0
Approach	745	7.2		0.822		20.2	LOS C	8.0	209.3				
North: US Route 4													
Lane 1	412	4.2	780	0.528	100	15.1	LOS B	4.4	113.4	Full	1600	0.0	0.0
Lane 2 ^d	481	3.0	911	0.528	100	9.5	LOS A	4.5	116.2	Full	1600	0.0	0.0
Approach	893	3.6		0.528		12.1	LOS B	4.5	116.2				
West: Route 151													
Lane 1 ^d	285	0.0	802	0.356	100	13.6	LOS B	1.9	46.5	Full	1600	0.0	0.0
Lane 2	232	7.2	653	0.356	100	9.8	LOS A	1.8	47.3	Full	1600	0.0	0.0
Approach	517	3.2		0.356		11.9	LOS B	1.9	47.3				
Intersection	3095	5.7		0.822		14.0	LOS B	8.0	209.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

 **Site: 1 [Tempel Lane & Tempel Farm - Build AM]** With MIT

Tempel Lane & Tempel Farm Roundabout
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tempel Lane													
Lane 1 ^d	285	2.0	950	0.300	100	6.9	LOS A	1.8	45.6	Full	1600	0.0	0.0
Approach	285	2.0		0.300		6.9	LOS A	1.8	45.6				
East: Tempel Farm													
Lane 1 ^d	321	2.0	815	0.394	100	7.5	LOS A	2.5	63.7	Full	1600	0.0	0.0
Approach	321	2.0		0.394		7.5	LOS A	2.5	63.7				
North: Tempel Lane													
Lane 1 ^d	195	2.0	951	0.205	100	7.4	LOS A	1.1	29.2	Full	1600	0.0	0.0
Approach	195	2.0		0.205		7.4	LOS A	1.1	29.2				
West: Tempel Farm													
Lane 1 ^d	149	2.0	909	0.164	100	7.0	LOS A	0.9	22.3	Full	1600	0.0	0.0
Approach	149	2.0		0.164		7.0	LOS A	0.9	22.3				
Intersection	949	2.0		0.394		7.2	LOS A	2.5	63.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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HCM 2010 TWSC
1: US Route 4 & Hotel Access

07/26/2018

Intersection						
Int Delay, s/veh	17.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↗	↗
Traffic Vol, veh/h	0	369	0	1483	1528	374
Future Vol, veh/h	0	369	0	1483	1528	374
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	401	0	1612	1661	407
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	831	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0 ~ 314	0	-	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	- ~ 314	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	181.3	0		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 314		-	-		
HCM Lane V/C Ratio	- 1.277		-	-		
HCM Control Delay (s)	- 181.3		-	-		
HCM Lane LOS	- F		-	-		
HCM 95th %tile Q(veh)	- 18.9		-	-		
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 2010 Signalized Intersection Summary

3: US Route 4 & I-90 EB Off-Ramp

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	198	1071	198	1285	831	291		
Future Volume (veh/h)	198	1071	198	1285	831	291		
Number	3	18	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1881	1881	1881	1881	1881		
Adj Flow Rate, veh/h	208	800	208	1353	875	168		
Adj No. of Lanes	1	1	1	2	2	1		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	8	1	1	1	1	1		
Cap, veh/h	611	736	324	1825	1258	1146		
Arrive On Green	0.36	0.36	0.10	0.51	0.35	0.35		
Sat Flow, veh/h	1675	1599	1792	3668	3668	1599		
Grp Volume(v), veh/h	208	800	208	1353	875	168		
Grp Sat Flow(s),veh/h/ln	1675	1599	1792	1787	1787	1599		
Q Serve(g_s), s	8.6	35.0	6.7	28.6	20.2	3.2		
Cycle Q Clear(g_c), s	8.6	35.0	6.7	28.6	20.2	3.2		
Prop In Lane	1.00	1.00	1.00			1.00		
Lane Grp Cap(c), veh/h	611	736	324	1825	1258	1146		
V/C Ratio(X)	0.34	1.09	0.64	0.74	0.70	0.15		
Avail Cap(c_a), veh/h	611	736	805	1825	1675	1332		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	22.1	25.9	19.5	18.5	26.7	4.3		
Incr Delay (d2), s/veh	0.4	59.2	2.1	2.0	1.6	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.1	31.5	3.5	14.6	10.2	3.3		
LnGrp Delay(d),s/veh	22.5	85.1	21.6	20.5	28.3	4.4		
LnGrp LOS	C	F	C	C	C	A		
Approach Vol, veh/h	1008			1561	1043			
Approach Delay, s/veh	72.2			20.7	24.4			
Approach LOS	E			C	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.2	39.8				55.0		41.0
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0
Max Green Setting (Gmax), s	35.0	45.0				45.0		35.0
Max Q Clear Time (g_c+I1), s	8.7	22.2				30.6		37.0
Green Ext Time (p_c), s	0.5	11.6				11.1		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			36.1					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

5: US Route 4 & I-90 WB Off-Ramp

07/26/2018

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations			 			 		
Traffic Volume (veh/h)	87	238	759	723	518	1035		
Future Volume (veh/h)	87	238	759	723	518	1035		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1827	1845	1845	1881	1881	1900		
Adj Flow Rate, veh/h	94	227	816	443	557	1113		
Adj No. of Lanes	1	1	2	1	1	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh, %	4	3	3	1	1	0		
Cap, veh/h	301	673	1084	771	629	2356		
Arrive On Green	0.17	0.17	0.31	0.31	0.26	0.65		
Sat Flow, veh/h	1740	1568	3597	1599	1792	3705		
Grp Volume(v), veh/h	94	227	816	443	557	1113		
Grp Sat Flow(s),veh/h/ln	1740	1568	1752	1599	1792	1805		
Q Serve(g_s), s	2.7	5.5	12.0	11.4	11.4	8.9		
Cycle Q Clear(g_c), s	2.7	5.5	12.0	11.4	11.4	8.9		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	301	673	1084	771	629	2356		
V/C Ratio(X)	0.31	0.34	0.75	0.57	0.89	0.47		
Avail Cap(c_a), veh/h	333	702	1282	862	887	3082		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.7	10.9	17.9	10.6	11.2	5.0		
Incr Delay (d2), s/veh	0.6	0.3	2.1	0.7	8.0	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.4	2.4	6.1	6.8	9.6	4.4		
LnGrp Delay(d),s/veh	21.3	11.2	20.0	11.4	19.2	5.2		
LnGrp LOS	C	B	B	B	B	A		
Approach Vol, veh/h	321		1259			1670		
Approach Delay, s/veh	14.2		17.0			9.8		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	19.7	22.7				42.5		14.9
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	23.0	21.0				49.0		11.0
Max Q Clear Time (g_c+1.5), s	13.4	14.0				10.9		7.5
Green Ext Time (p_c), s	1.3	3.7				9.1		0.4
Intersection Summary								
HCM 2010 Ctrl Delay			13.0					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

10: Red Mill Rd & Tempel Ln

07/26/2018

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	53	460	350	244	453	76		
Future Volume (veh/h)	53	460	350	244	453	76		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1827	1900		
Adj Flow Rate, veh/h	58	500	380	204	492	43		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	1	0	0	4	0		
Cap, veh/h	343	832	517	975	577	629		
Arrive On Green	0.06	0.44	0.27	0.27	0.33	0.33		
Sat Flow, veh/h	1810	1881	1900	1615	1740	1615		
Grp Volume(v), veh/h	58	500	380	204	492	43		
Grp Sat Flow(s),veh/h/ln	1810	1881	1900	1615	1740	1615		
Q Serve(g_s), s	0.9	8.9	8.1	2.5	11.7	0.7		
Cycle Q Clear(g_c), s	0.9	8.9	8.1	2.5	11.7	0.7		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	343	832	517	975	577	629		
V/C Ratio(X)	0.17	0.60	0.73	0.21	0.85	0.07		
Avail Cap(c_a), veh/h	443	1273	857	1265	785	822		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	10.2	9.4	14.7	4.0	13.8	8.5		
Incr Delay (d2), s/veh	0.2	0.7	2.0	0.1	6.8	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.5	4.7	4.5	2.1	6.7	0.9		
LnGrp Delay(d),s/veh	10.4	10.1	16.7	4.1	20.6	8.5		
LnGrp LOS	B	B	B	A	C	A		
Approach Vol, veh/h		558	584		535			
Approach Delay, s/veh		10.1	12.3		19.6			
Approach LOS		B	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				24.6		19.7	7.6	17.1
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		20.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				10.9		13.7	2.9	10.1
Green Ext Time (p_c), s				2.7		1.1	0.0	2.0
Intersection Summary								
HCM 2010 Ctrl Delay			13.9					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

17: Barracks Rd & 3rd Avenue Ext

07/26/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑			↑↑	↑	↑		
Traffic Volume (veh/h)	378	79	147	400	85	194		
Future Volume (veh/h)	378	79	147	400	85	194		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1886	1900	1900		
Adj Flow Rate, veh/h	411	62	160	435	92	123		
Adj No. of Lanes	2	0	0	2	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	1	1	0	0		
Cap, veh/h	1405	211	408	1009	465	415		
Arrive On Green	0.45	0.45	0.45	0.45	0.26	0.26		
Sat Flow, veh/h	3245	472	542	2348	1810	1615		
Grp Volume(v), veh/h	234	239	288	307	92	123		
Grp Sat Flow(s),veh/h/ln	1805	1817	1173	1631	1810	1615		
Q Serve(g_s), s	2.8	2.8	3.5	4.3	1.3	2.1		
Cycle Q Clear(g_c), s	2.8	2.8	6.3	4.3	1.3	2.1		
Prop In Lane		0.26	0.56		1.00	1.00		
Lane Grp Cap(c), veh/h	805	810	690	727	465	415		
V/C Ratio(X)	0.29	0.29	0.42	0.42	0.20	0.30		
Avail Cap(c_a), veh/h	1607	1618	1222	1452	1611	1438		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	5.9	6.0	6.8	6.4	9.8	10.1		
Incr Delay (d2), s/veh	0.4	0.4	0.9	0.8	0.4	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.5	1.5	2.1	2.0	0.7	1.0		
LnGrp Delay(d),s/veh	6.4	6.4	7.7	7.2	10.2	10.9		
LnGrp LOS	A	A	A	A	B	B		
Approach Vol, veh/h	473			595	215			
Approach Delay, s/veh	6.4			7.4	10.6			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		20.0				20.0		13.7
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		30.0				30.0		30.0
Max Q Clear Time (g_c+I1), s		4.8				8.3		4.1
Green Ext Time (p_c), s		5.1				6.7		1.5
Intersection Summary								
HCM 2010 Ctrl Delay			7.6					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

21: US Route 4 & 3rd Avenue Ext

07/26/2018

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations					 			
Traffic Volume (veh/h)	583	252	114	694	716	386		
Future Volume (veh/h)	583	252	114	694	716	386		
Number	7	14	1	6	2	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1817	1835	1792	1881	1862	1900		
Adj Flow Rate, veh/h	601	215	118	715	738	340		
Adj No. of Lanes	1	1	1	1	2	0		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	3	2	6	1	1	1		
Cap, veh/h	642	649	221	972	979	451		
Arrive On Green	0.37	0.37	0.04	0.52	0.42	0.42		
Sat Flow, veh/h	1730	1560	1707	1881	2448	1084		
Grp Volume(v), veh/h	601	215	118	715	554	524		
Grp Sat Flow(s),veh/h/ln	1730	1560	1707	1881	1769	1671		
Q Serve(g_s), s	29.8	4.3	0.0	26.4	23.7	23.8		
Cycle Q Clear(g_c), s	29.8	4.3	0.0	26.4	23.7	23.8		
Prop In Lane	1.00	1.00	1.00			0.65		
Lane Grp Cap(c), veh/h	642	649	221	972	735	695		
V/C Ratio(X)	0.94	0.33	0.53	0.74	0.75	0.75		
Avail Cap(c_a), veh/h	1068	1033	336	1267	893	844		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	27.0	17.6	37.6	16.8	22.1	22.2		
Incr Delay (d2), s/veh	6.6	0.1	0.7	2.7	4.3	4.5		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	15.4	6.9	2.8	14.2	12.4	11.8		
LnGrp Delay(d),s/veh	33.6	17.7	38.4	19.5	26.4	26.7		
LnGrp LOS	C	B	D	B	C	C		
Approach Vol, veh/h	816			833	1078			
Approach Delay, s/veh	29.4			22.1	26.5			
Approach LOS	C			C	C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.0	42.1		38.1		51.1		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	10.0	45.0		55.0		60.0		
Max Q Clear Time (g_c+I2), s	12.0	25.8		31.8		28.4		
Green Ext Time (p_c), s	0.1	11.3		1.2		10.3		
Intersection Summary								
HCM 2010 Ctrl Delay			26.0					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

23: US Route 4 & Greenbush Commons/Grandview Drive

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	5	124	32	11	45	98	1138	36	45	992	306
Future Volume (veh/h)	285	5	124	32	11	45	98	1138	36	45	992	306
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1863	1900	1900	1900	1900	1882	1900	1900	1827	1881
Adj Flow Rate, veh/h	300	5	111	34	12	18	103	1198	37	47	1044	166
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	2	0	0	0	0	1	1	0	4	1
Cap, veh/h	326	4	420	49	20	8	312	1044	32	113	1948	897
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.04	0.57	0.57	0.03	0.56	0.56
Sat Flow, veh/h	993	17	1583	0	77	30	1810	1816	56	1810	3471	1599
Grp Volume(v), veh/h	305	0	111	64	0	0	103	0	1235	47	1044	166
Grp Sat Flow(s),veh/h/ln	1009	0	1583	106	0	0	1810	0	1872	1810	1736	1599
Q Serve(g_s), s	0.0	0.0	6.3	0.0	0.0	0.0	2.7	0.0	65.0	1.2	21.3	5.7
Cycle Q Clear(g_c), s	30.0	0.0	6.3	30.0	0.0	0.0	2.7	0.0	65.0	1.2	21.3	5.7
Prop In Lane	0.98		1.00	0.53		0.28	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	420	77	0	0	312	0	1076	113	1948	897
V/C Ratio(X)	0.92	0.00	0.26	0.83	0.00	0.00	0.33	0.00	1.15	0.42	0.54	0.18
Avail Cap(c_a), veh/h	331	0	420	77	0	0	558	0	1076	304	1948	897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	32.8	43.7	0.0	0.0	12.1	0.0	24.0	27.6	15.6	12.1
Incr Delay (d2), s/veh	29.8	0.0	0.1	48.5	0.0	0.0	0.2	0.0	77.7	0.9	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	0.0	2.8	3.0	0.0	0.0	1.4	0.0	56.4	0.9	10.3	2.6
LnGrp Delay(d),s/veh	73.1	0.0	32.9	92.2	0.0	0.0	12.3	0.0	101.7	28.5	16.1	12.4
LnGrp LOS	E		C	F			B		F	C	B	B
Approach Vol, veh/h	416			64			1338			1257		
Approach Delay, s/veh	62.4			92.2			94.8			16.1		
Approach LOS	E			F			F			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	70.0			35.0	9.6	68.5		35.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (G_max), s	15.0	65.0		30.0	20.0	60.0		30.0				
Max Q Clear Time (g_c+I), s	13.2	67.0		32.0	4.7	23.3		32.0				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.1	18.1		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	58.2											
HCM 2010 LOS	E											

HCM 2010 Signalized Intersection Summary

28: Tempel Ln/Cedar Crest Dr & 3rd Ave Ext

07/26/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	420	144	88	349	6	193	0	185	4	0	5
Future Volume (veh/h)	8	420	144	88	349	6	193	0	185	4	0	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	9	457	157	96	379	7	210	0	201	4	0	5
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	589	568	195	378	1061	20	466	0	473	165	41	110
Arrive On Green	0.43	0.43	0.43	0.06	0.58	0.58	0.24	0.00	0.24	0.24	0.00	0.24
Sat Flow, veh/h	993	1327	456	1774	1823	34	1279	0	1583	200	173	466
Grp Volume(v), veh/h	9	0	614	96	0	386	210	0	201	9	0	0
Grp Sat Flow(s),veh/h/ln	993	0	1782	1774	0	1857	1279	0	1583	839	0	0
Q Serve(g_s), s	0.2	0.0	13.2	1.2	0.0	4.8	0.0	0.0	4.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	13.2	1.2	0.0	4.8	7.0	0.0	4.5	7.0	0.0	0.0
Prop In Lane	1.00		0.26	1.00		0.02	1.00		1.00	0.44		0.56
Lane Grp Cap(c), veh/h	589	0	764	378	0	1081	466	0	473	316	0	0
V/C Ratio(X)	0.02	0.00	0.80	0.25	0.00	0.36	0.45	0.00	0.42	0.03	0.00	0.00
Avail Cap(c_a), veh/h	818	0	1175	428	0	1561	773	0	819	616	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.3	0.0	11.0	8.0	0.0	4.9	15.5	0.0	12.4	13.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.4	0.3	0.0	0.2	0.7	0.0	0.6	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	6.8	0.6	0.0	2.4	2.4	0.0	2.0	0.1	0.0	0.0
LnGrp Delay(d),s/veh	7.3	0.0	13.3	8.3	0.0	5.1	16.2	0.0	13.0	13.2	0.0	0.0
LnGrp LOS	A		B	A		A	B		B	B		
Approach Vol, veh/h	623			482			411			9		
Approach Delay, s/veh	13.2			5.7			14.6			13.2		
Approach LOS	B			A			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		14.4	6.8	22.9		14.4		29.6				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0		4.0				
Max Green Setting (Gmax), s		20.0	4.0	29.0		20.0		37.0				
Max Q Clear Time (g_c+l1), s		9.0	3.2	15.2		9.0		6.8				
Green Ext Time (p_c), s		1.4	0.0	3.7		0.0		2.5				
Intersection Summary												
HCM 2010 Ctrl Delay	11.2											
HCM 2010 LOS	B											

Intersection						
Int Delay, s/veh	10.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	315	258	120	62	52	180
Future Vol, veh/h	315	258	120	62	52	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	342	280	130	67	57	196
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	474	164	0	0	197	0
Stage 1	164	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	549	881	-	-	1376	-
Stage 1	865	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	526	881	-	-	1376	-
Mov Cap-2 Maneuver	526	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	18	0	1.7			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 526 881 1376				-
HCM Lane V/C Ratio	-	- 0.651 0.318 0.041				-
HCM Control Delay (s)	-	- 23.7 11 7.7				-
HCM Lane LOS	-	- C B A				-
HCM 95th %tile Q(veh)	-	- 4.7 1.4 0.1				-

LANE SUMMARY

 **Site: 1 [Mannix - 2020 Build w/ Tempel Farms PM]** With MIT

US Route 4 & Mannix Road
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	540	3.4	1228	0.439	100	6.6	LOS A	3.6	92.8	Full	1600	0.0	0.0
Lane 2 ^d	548	3.7	1248	0.439	100	5.5	LOS A	3.6	93.2	Full	1600	0.0	0.0
Approach	1088	3.5		0.439		6.0	LOS A	3.6	93.2				
East: Mannix Road													
Lane 1	273	2.0	627	0.434	100	12.4	LOS B	2.2	55.2	Full	1600	0.0	0.0
Lane 2 ^d	297	1.0	684	0.434	100	9.6	LOS A	2.2	55.9	Full	1600	0.0	0.0
Approach	570	1.5		0.434		10.9	LOS B	2.2	55.9				
North: US Route 4													
Lane 1	640	0.9	849	0.754	100	11.7	LOS B	7.2	180.5	Full	1600	0.0	0.0
Lane 2 ^d	640	0.9	848	0.754	100	11.2	LOS B	7.2	180.5	Full	1600	0.0	0.0
Approach	1279	0.9		0.754		11.5	LOS B	7.2	180.5				
West: Mannix Road													
Lane 1 ^d	61	0.0	316	0.192	100	11.1	LOS B	0.8	20.4	Full	1600	0.0	0.0
Approach	61	0.0		0.192		11.1	LOS B	0.8	20.4				
Intersection	2998	2.0		0.754		9.4	LOS A	7.2	180.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

 **Site: 1 [Route 151 - 2020 Build w/ Tempel Farms PM]** With MIT

US Route 4 & NYS Route 151
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: US Route 4													
Lane 1	358	0.4	486	0.737	100	21.9	LOS C	6.1	151.8	Full	1600	0.0	0.0
Lane 2 ^d	418	0.5	567	0.737	100	17.1	LOS B	6.5	163.5	Full	1600	0.0	0.0
Approach	776	0.5		0.737		19.3	LOS B	6.5	163.5				
East: Route 151													
Lane 1	203	4.3	521	0.390	100	14.0	LOS B	2.1	54.7	Full	1600	0.0	0.0
Lane 2 ^d	232	3.0	613	0.378	100	10.6	LOS B	2.1	54.4	Full	1600	0.0	0.0
Approach	435	3.6		0.390		12.2	LOS B	2.1	54.7				
North: US Route 4													
Lane 1	856	0.2	943	0.907	100	26.8	LOS C	20.4	510.5	Full	1600	0.0	0.0
Lane 2 ^d	950	0.8	1047	0.907	100	19.5	LOS B	21.1	530.4	Full	1600	0.0	0.0
Approach	1805	0.5		0.907		22.9	LOS C	21.1	530.4				
West: Route 151													
Lane 1	428	1.0	299	1.433	100	222.4	LOS F	49.9	1257.0	Full	1600	0.0	0.0
Lane 2 ^d	537	1.9	375	1.433	100	214.8	LOS F	61.2	1552.5	Full	1600	0.0	4.1
Approach	965	1.5		1.433		218.2	LOS F	61.2	1552.5				
Intersection	3982	1.1		1.433		68.4	LOS E	61.2	1552.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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LANE SUMMARY

 **Site: 1 [Tempel Lane & Tempel Farm - Build PM]** With MIT

Tempel Lane & Tempel Farm Roundabout
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Tempel Lane													
Lane 1 ^d	312	2.0	744	0.420	100	10.1	LOS B	2.7	69.3	Full	1600	0.0	0.0
Approach	312	2.0		0.420		10.1	LOS B	2.7	69.3				
East: Tempel Farm													
Lane 1 ^d	364	2.0	831	0.438	100	8.1	LOS A	3.0	76.3	Full	1600	0.0	0.0
Approach	364	2.0		0.438		8.1	LOS A	3.0	76.3				
North: Tempel Lane													
Lane 1 ^d	534	2.0	749	0.713	100	15.0	LOS B	8.2	208.4	Full	1600	0.0	0.0
Approach	534	2.0		0.713		15.0	LOS B	8.2	208.4				
West: Tempel Farm													
Lane 1 ^d	325	2.0	601	0.541	100	12.9	LOS B	4.4	112.6	Full	1600	0.0	0.0
Approach	325	2.0		0.541		12.9	LOS B	4.4	112.6				
Intersection	1535	2.0		0.713		11.9	LOS B	8.2	208.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^d Dominant lane on roundabout approach

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