



Grant Creek Village Residential Development Traffic Impact Study 2022 UPDATE

Missoula, Montana



Prepared For:

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Grant Creek Village Traffic Impact Study 2022 Update Missoula, Montana

A. EXECUTIVE SUMMARY

The Grant Creek Village development is a 44-acre residential project located north of Interstate-90 and west of Grant Creek Road in Missoula, Montana. The development would be constructed in several phases over the next 5-10 years. At full build-out, the development would include approximately 700 multi-family residential units. The Grant Creek Village would access Grant Creek Road and North Reserve Street using Expo Parkway and Stonebridge Road. As proposed, the Grant Creek Village would not create any new roadway capacity problems in this area. The New southbound through-lane installed by MDT in 2020 have increased intersection capacity and provided additional capacity for future growth in this area. At full build-out, the Grant Creek Village will account for a 60% increase in traffic volumes on Grant Creek Road and a 20% increase in traffic volumes along North Reserve Street. The developers should work with the City of Missoula to implement multi-modal improvements in the area to encourage pedestrian and bicycle access to the site.

B. PROJECT DESCRIPTION

This document reports the study of the possible effects on the surrounding road system from a proposed residential apartment complex located west of Grant Creek Road within the City of Missoula. The document provides information regarding possible traffic impacts in the area and identifies traffic mitigation efforts that the development may require. The development could ultimately include up to 700 residential apartment units constructed in phases over the next 5-10 years.

C. EXISTING CONDITIONS

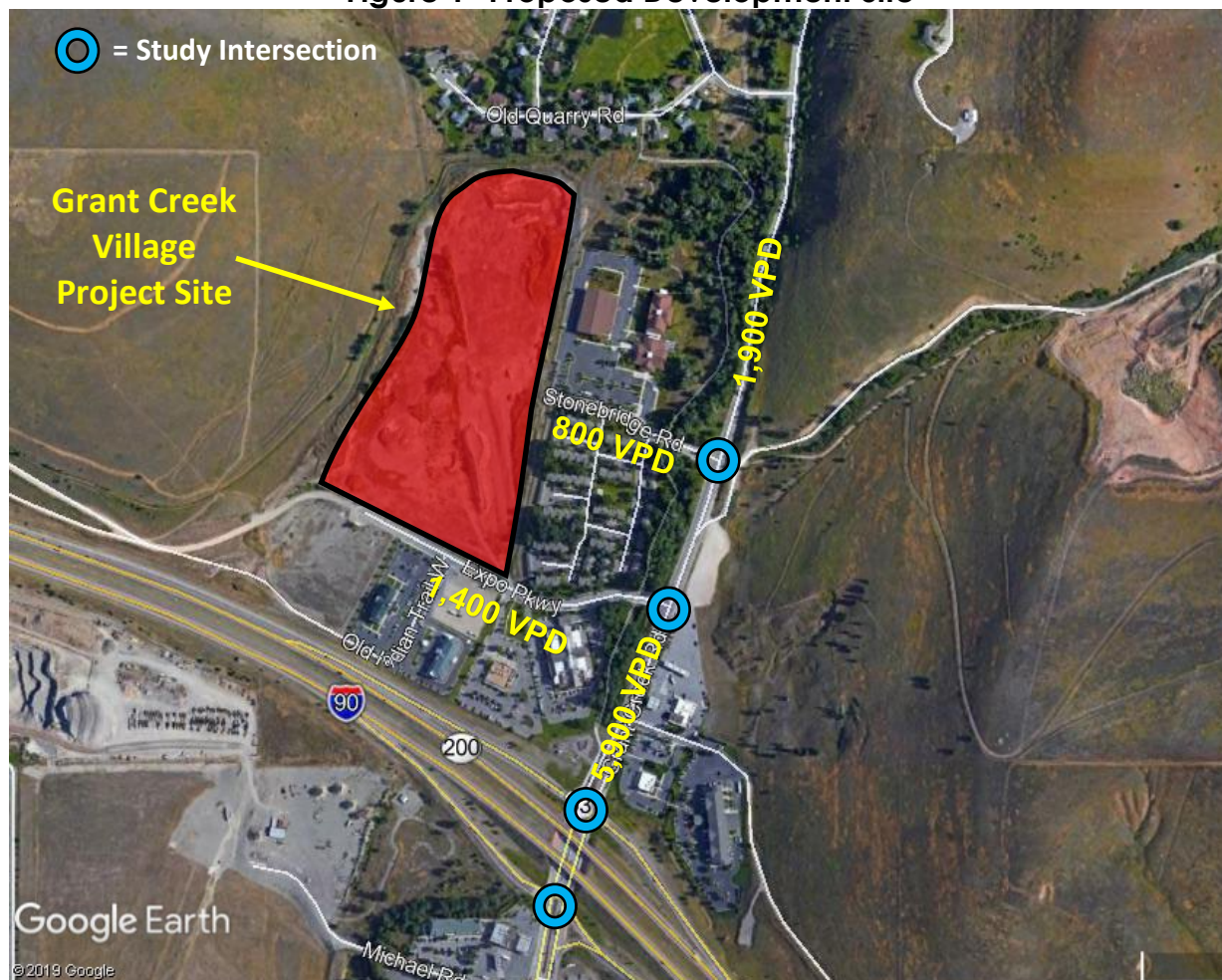
The proposed development property currently consists of a 44-acre gravel and rock quarry located north of Expo Parkway at the north end of Reserve Street (Grant Creek Road). The surrounding area is comprised of a mix of residential and commercial areas north of Interstate-90. See **Figure 1** for a location map of the proposed development.

Adjacent Roadways

North Reserve Street (Grant Creek Road) is a north/south principal arterial route that extends through the western side of Missoula. South of the Interstate-90 interchange the roadway has a five-lane urban cross-section and a speed limit of 45 MPH. Both interchange ramps with I-90 are currently signalized. North of the interchange the road narrows to a

three-lane cross-section and becomes Grant Creek Road. The road has a paved width of 58-feet south of Expo Parkway and narrows to 50 feet at Stonebridge Road. The posted speed limit on Grant Creek Road is 45 MPH. The Grant Creek Trail is located along the western side of the road. The route is characterized by commercial properties adjacent to the roadway which transition to residential land uses north of Expo Parkway. Traffic data available from MDT indicates that the road currently carries over 20,000 VPD south of the I-90 interchange and 1,900 VPD north of Expo Parkway.

Figure 1 - Proposed Development Site



Expo Parkway is a two-lane east/west local roadway which extends west from Grant Creek Road and provides access to the commercial and residential properties in this area including hotels, restaurants, and the Cottonwoods Apartments. Expo Parkway has a paved width of 42 feet with on-street parking and sidewalks. Traffic data collected by Abelin Traffic Services (ATS) indicates that the roadway currently carries 1,400 VPD.

Stonebridge Road is a two-lane east/west local route which extends west from Grant Creek Road 600 feet north of Expo Parkway. The road has a paved width of 40 feet with on-street parking and sidewalks along the north side of the road. The road provides access to The Cottonwoods Apartments and the Rocky Mountain Elk Foundation. Traffic data collected by ATS indicates that the Stonebridge Road currently carries 800 VPD.

Traffic Data

In October 2019 and March 2021 ATS collected traffic data at area intersections to evaluate current operation characteristics. This data includes peak-hour turning movement counts at the intersections of Grant Creek Road with Expo Parkways and Stonebridge Road. Peak-hour traffic data for the I-90 interchange ramps was obtained from traffic counts conducted in April 2018 by MDT. ATS also performed 24-hour hose counts on Expo Parkway and Stonebridge Road in 2019 and a weekday/weekend traffic count along Grant Creek Road in March 2021 to identify skier traffic along the road. The raw traffic data is included in **Appendix A** of this report.

The raw 2018 and 2019 data collected for this project may be adjusted for seasonal variations using data collected from MDT's automatic count stations located on Orange Street Bridge in Missoula (Site #A-037) and on Van Buren Street north of I-90 (Site #A-067). This data indicates traffic counts collected in October are 102% to 104% of the AADT (Average Annual Daily Traffic) volume in this area and traffic data from April is 104% to 106% of the AADT. In this case the raw data could be factored down by 2% to 6% to match the AADT values for this area. However, these factors were not applied to the raw traffic data to provide a slightly more conservative result from the traffic analysis.

The 2021 traffic data must also be reviewed for pandemic related variation. ATS obtained traffic data from MDT's automatic continuous count site located at the Orange Street Bridge in Missoula (Site #A-037) and on Van Buren Street north of I-90 (Site #A-067) for the March 2021 traffic counts days. The continuous count data indicates the traffic counts collected on March 24th and March 30th are 98-99% of the AADT (Average Annual Daily Traffic) in this area compared to the 2019 traffic averages. Therefore, the March 2021 traffic count data was factored up by 2% to match historical averages.

Directly comparing the traffic count data from 2019 to 2021 indicates that the traffic data used for 2021 was approximately 15% higher than the data used in 2019.

ATS also performed a directional radar volume and speed count along Grant Creek Road north of Expo Parkway. The traffic count data recorded daily traffic volumes of 4,000 VPD along this section of road with higher daily traffic volumes on the weekend compared to weekdays. The data also clearly showed the peak hour flow going towards Snowbowl ski area in the weekend mornings and away from the ski area in the afternoon. However, the peak hourly

traffic flows recorded during the weekend were lower than the typical AM and PM peak-hour directional flow volumes observed during weekdays corresponding to commuter traffic.

Historic Traffic Data

Abelin Traffic Services obtained historic traffic data for the surrounding road network from the Montana DOT. This data is presented in **Table 1**. The traffic data history shows that in general traffic volumes on this section of North Reserve Street and the I-90 interchange have not increased significantly in the last ten years. There was a significant reported traffic volume increase along Grant Creek Road from 2018 to 2019 but it is unclear why this increase occurred as no other roadways which lead into this area reported similar traffic volume increases. The reported 2019 to 2021 traffic data on Grant Creek Road is similar in magnitude to the reported volumes from 2010 to 2015. It is likely the lower traffic volumes reported on Grant Creek Road from 2016-2018 were an anomaly that may have resulted from the exact placement of the MDT traffic counters. If the traffic data anomalies on Grant Creek Road are discounted, then the overall traffic volume growth rate for the roads entering this area is near zero. Therefore, no background traffic volume growth rates were used for the short-term traffic projections for this analysis. Traffic counts throughout the Missoula area were universally down in 2020 due to the Covid-19 pandemic, except for the I-90 corridor which reported higher-than-average traffic volumes.

Table 1 – Historic Traffic Data

Location	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Grant Cr. N of Stone-bridge #32-3A-137	1,240	1,170	1,190	1,220	1,240	1,230	1,248	1,931	1,796	19,40
Grant Cr. N of I-90 Intch. #32-3A-136	5,530	5,020	5,110	5,240	2,762	2,740	2,781	5,909	5,495	5,935
Reserve S of I-90 Intch. #32-3A-006	19,820	20,990	19,590	20,330	21,146	20,808	20,532	20,429	18,631	20,364
I-90 WB Off-ramp at Reserve #32-3-074	--	4,720	5,150	5,150	5,538	5,449	5,525	5,497	4,772	5,216
I-90 WB On-ramp at Reserve #32-3-075	--	--	--	--	4,677	4,602	5,141	5,115	4,665	5,099
I-90 EB Off-ramp at Reserve #32-3-072	--	--	--	--	3,721	3,661	3,618	3,600	3,283	3,588
I-90 EB On-ramp at Reserve #32-3-073	--	--	--	--	5,721	5,629	5,708	5,679	5,135	5,613

Roadway Improvements

The Montana Department of Transportation completed construction of roadway improvements at the intersection of Grant Creek Road and the Interstate 90 interchange in 2020. This project included roadway widening on Grant Creek Road to the north of the interchange and the

development of an additional southbound through lane and a dedicated southbound right-turn lane. The improvements also included updates to the traffic signal controllers.

Level of Service

Using the data collected for this project, ATS conducted a Level of Service (LOS) analysis at the study intersections. This evaluation was conducted in accordance with the procedures outlined in the Transportation Research Board's *Highway Capacity Manual (HCM) - Special Report 209* and the Synchro 11 traffic simulation software. The base file used for the Synchro 10 model was produced by MDT for the entire Reserve Street Corridor from Interstate 90 to Brooks Street and the new traffic data collected by ATS in 2021. ATS modified this model to include the study intersections on Grant Creek Road. Intersections are graded from A to F representing the average delay that a vehicle entering an intersection can expect. Typically, a LOS of C or better is considered acceptable for peak-hour conditions.

Table 2 – Existing 2021 Level of Service Summary

Grant Creek Road (Reserve Street) Intersection	AM Peak Hour		PM Peak Hour	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Stonebridge Road*	10.4	B	9.7	A
Expo Parkway*	10.5/13.9	B/B	10.6/14.5	B/B
I-90 Westbound Ramps	30.4	C	23.2	C
I-90 Eastbound Ramps	13.8	B	18.7	B

*Eastbound/Westbound LOS & Delay.

Table 2 shows the existing 2021 LOS at the study intersections. The analysis shows that with the MDT improvements at the Grant Creek Road and I-90 interchange, all intersections in this area function at LOS C or better under existing 2021 traffic volume conditions. The LOS calculations are included in **Appendix C**.

Area Crash Data

ATS obtained crash data from the MDT vehicle crash database for the section of Grant Creek Road between the I-90 interchange and Stonebridge Road. The data included all reported crashes which occur on this segment of road over the past ten years. The MDT database indicates that 28 vehicle crashes occurred along this section. Most of these crashes were rear-end (6) and sideswipe collisions (7). A total of 24 of the crashes were multi-vehicle collisions and most occurred on dry roadways and in daylight conditions. Seven injury collisions were reported. These types and numbers of crashes are typical for urban roadway segments. No specific crash trends or crash locations were identified.

D. PROPOSED DEVELOPMENT

The development to be constructed on this site includes 44 acres of land located north of Expo Parkway which would be developed into a residential apartment complex. The total developable area of the property is 28.5 acres. Access to the Grant Creek Apartments would be provided through new connections onto Expo Parkway and Stonebridge Road. The project would be constructed in several phases over the next 5-10 years. At full buildout the property could include up to 700 residential dwelling units. Apartment buildings would have up to four floors and would be classified as mid-rise apartments. The Grant Creek Village development plan is shown in **Figure 2**.

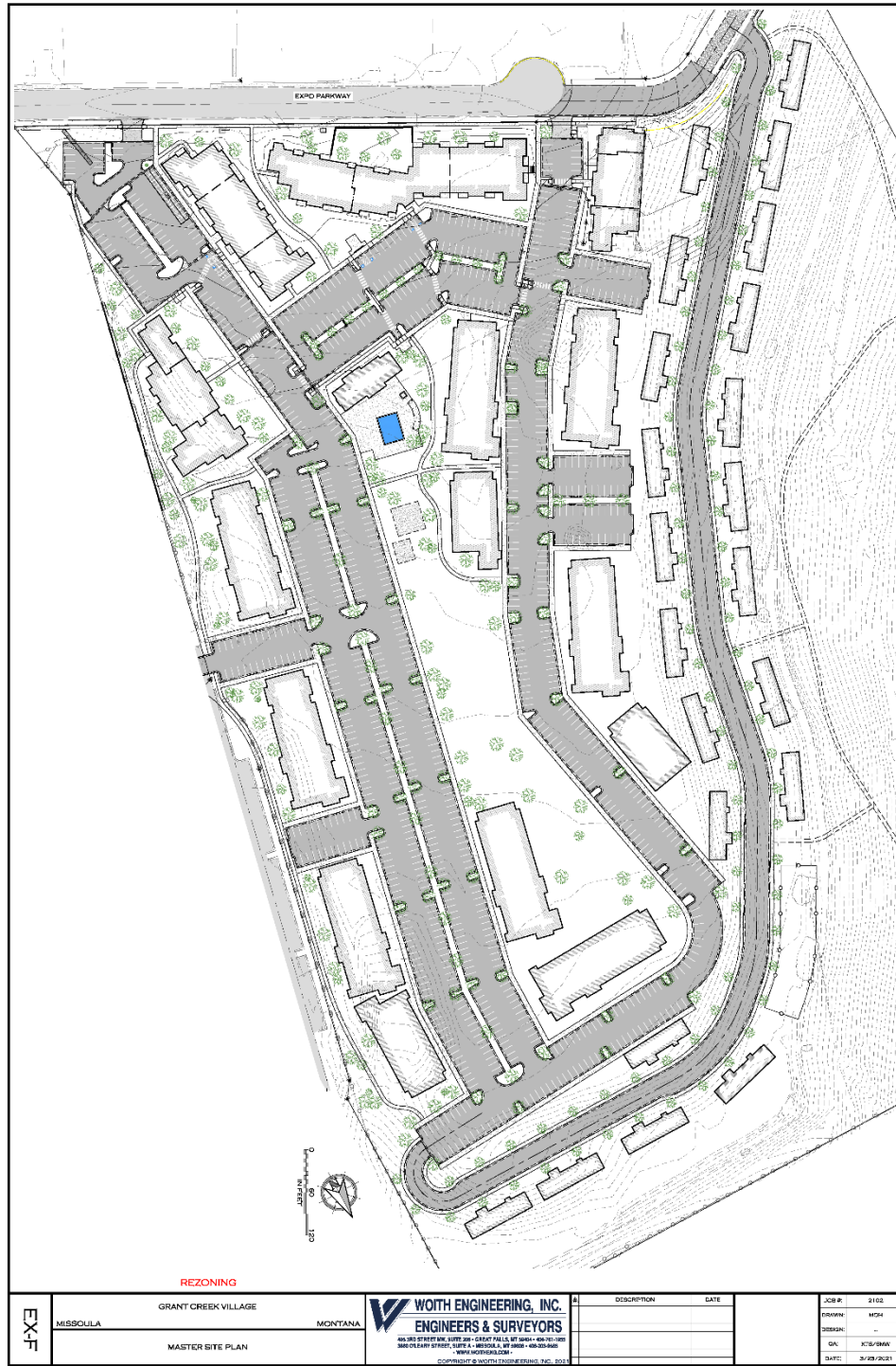
E. TRIP GENERATION AND ASSIGNMENT

ATS performed a trip generation analysis to determine the anticipated future traffic volumes from the proposed development phases using the trip generation rates contained in *Trip Generation* (Institute of Transportation Engineers, Tenth Edition). These rates are the national standard and are based on the most current information available to planners. A vehicle “trip” is defined as any trip that either begins or ends at the development site. ATS determined that the critical traffic impacts on the intersections and roadways would occur during the weekday morning and evening peak hours. At full build-out, the maximum potential development could produce 252 AM peak hour trips, 308 PM peak hour trips, and 3,808 daily trips. See **Table 3** for detailed trip generation information. The projected traffic generation for the project is down from the 5,168 estimated daily vehicle trips from the previous traffic study (a 26% decrease).

Table 3 - Trip Generation Rates

Land Use ITE #221	Dwelling Units	AM Peak Hour Trip Ends per Unit	Total AM Peak Hour Trip Ends	PM Peak Hour Trip Ends per Unit	Total PM Peak Hour Trip Ends	Weekday Trip Ends per Unit	Total Weekday Trip Ends
Apartments	700	0.36	252 66in/186out	0.44	308 188in/120out	5.44	3,808

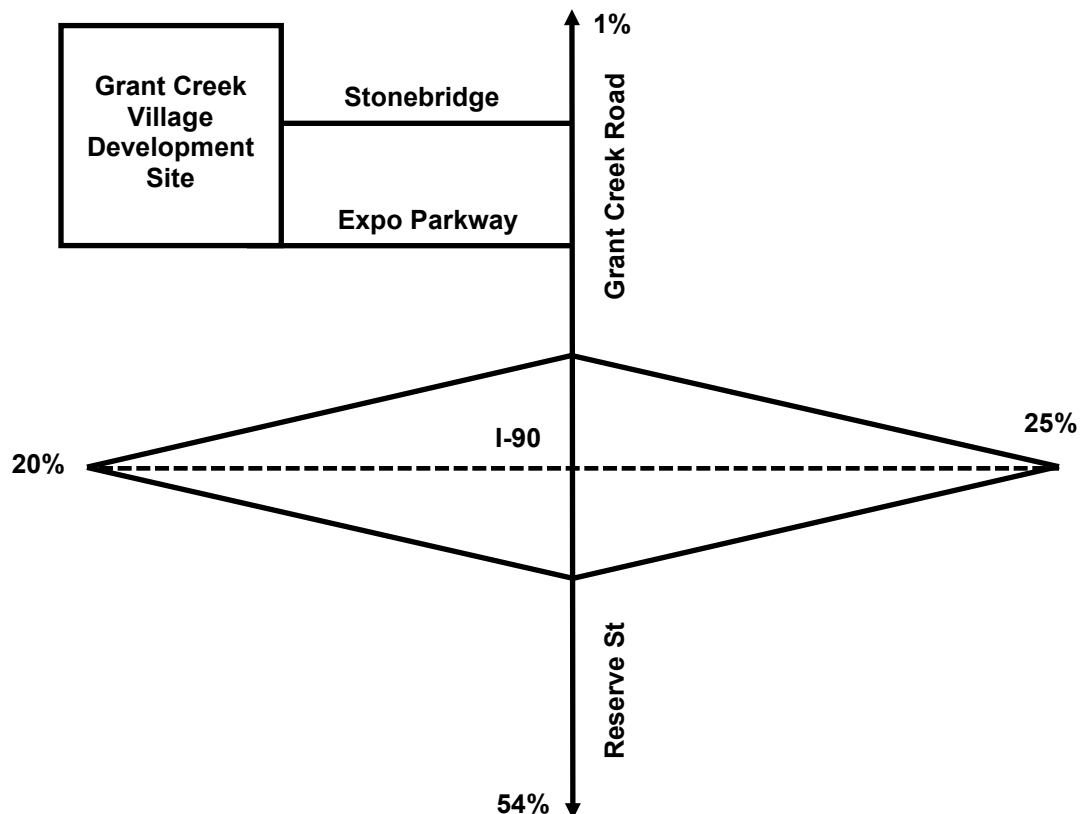
Figure 2 – Proposed Grant Creek Village Development



F. TRIP DISTRIBUTION

The traffic distribution and assignment for the proposed subdivision was based upon the existing ADT volumes and peak-hour traffic volumes along the adjacent roadways. Drivers are expected to distribute onto the surrounding road network as shown on **Figure 3**. It is likely that 1-5% of the traffic from the Grant Creek Village will distribute to the north on Grant Creek Road. A distribution of 5% of traffic to the north on Grant Creek Road closely matches the existing traffic volume distributions at Expo Parkway and Stonebridge. While it is true that only a small portion of the residents may have business to the north on Grant Creek Road, the overall trip generation numbers from a development also include delivery vehicles, mail carriers, and service vehicles which may use the Grant Creek Village as one stop along Grant Creek Road. Based on comments from the City of Missoula a 1% distribution to the north was used in the LOS calculations to provide a more conservative estimate of traffic impacts to the south of the project.

Figure 3 – Peak-Hour Trip Distribution



G. TRAFFIC IMPACTS OUTSIDE OF THE DEVELOPMENT

Using the trip generation and trip distribution rates, ATS determined the future Level of Service for the area intersections for full potential buildout of the development. The anticipated intersection LOS with the proposed development is shown in **Tables 4 and 5**. The LOS calculations are included in **Appendix C** of this report. The tables indicate that at full build-out of the project the average vehicle delay at this intersection will increase by 2-6 seconds from the current traffic conditions. The average vehicle delay and overall LOS at this intersection is heavily influenced by the existing required cycle length at the traffic signals. 130-second cycles provide high intersection capacity at the interchange and is necessary due to the signal phasing plan and roadway geometries. Generally, the delay and LOS at a traffic signal can be improved with lower cycle lengths, but this would be difficult to implement with the geometry and traffic patterns at this location. However, this traffic signal timing can handle a wide range of traffic volumes without significantly changing the overall intersection delay.

The Grant Creek Village will likely account for the majority of development in this area over the next ten years. The Grant Creek Village project would increase traffic volumes on Grant Creek Road by 3,600 (60%) and by 1,900 VPD (10%) on North Reserve Street at full potential build-out of the project.

Table 4 – Level of Service Summary 2021 vs. Full-Build

Grant Creek Road (Reserve Street) Intersection	Existing AM		Existing PM		Full-Build AM		Full-Build PM	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Stonebridge Road*	10.4	B	9.7	A	11.0	B	10.0	B
Expo Parkway*	10.5/13.9	B/B	10.6/14.5	B/B	12.4/21.1	B/C	11.7/23.9	B/C
I-90 WB Ramps	30.4	C	23.2	C	32.9	C	26.2	C
WB Approach	45.2	D	40.3	D	50.0	D	44.4	D
NB Approach	1.0	A	2.8	A	1.3	A	2.7	A
SB Approach	38.3	D	44.2	D	41.6	D	54.5	D
I-90 EB Ramps	13.8	B	18.7	B	16.5	B	24.6	C
EB Approach	10.8	B	16.0	B	15.9	B	26.6	C
NB Approach	36.4	D	28.1	C	43.4	D	35.7	D
SB Approach	0.8	A	1.3	A	0.9	A	1.8	A

*Eastbound/Westbound LOS & Delay for Unsignalized Intersections.

ATS reviewed the turn lane needs for the planned development at the approaches onto Grant Creek Road. Currently Grant Creek Road has a continuous center left-turn lane from Expo Parkway to Stonebridge Road which is built to MDT design standards and provides for left-turning needs into these roads from Grant Creek Road. Current and projected peak-hour left-turning traffic volumes from Expo Parkway and Stonebridge Road are low (1-5 vehicles per hour, less than one left-turning vehicle every ten minutes). This is well below the thresholds for warranting left-turn pockets from these streets onto Grant Creek Road. Adding left-turn pockets on Expo Parkway and Stonebridge Road would not have any impact on the projected operations and LOS at these intersections and would increase the total crossing distances for pedestrians at these locations. Therefore, no additional left-turn pockets are recommended with the proposed Grant Creek Village development.

ATS used the Synchro traffic data simulation software to identify the average and maximum vehicle queuing lengths that can be expected at the study intersections with the development of Grant Creek Village. The results of this analysis are shown in **Tables 5 & 6**. Under the existing roadway configuration, vehicles on Grant Creek Road regularly queue back from the I-90 interchange signal 200 to 250 with the new southbound lanes at this intersection. The table shows that the current and future queue lengths at this location will be less than 300 feet and will not affect the operations at adjacent intersections.

Table 5 – Vehicle Queuing Analysis: Existing 2021

Grant Creek Road (Reserve Street) Intersection	AM Peak Hour		PM Peak Hour	
	Average Queue (ft)	95% Queue (ft)	Average Queue (ft)	95% Queue (ft)
I-90 Westbound Ramps NB	10	33	23	55
I-90 Westbound Ramps WB	131	196	94	151
I-90 Westbound Ramps SB	141	212	91	143
I-90 Eastbound Ramps NB	49	118	90	156
I-90 Eastbound Ramps EB	107	153	92	145
I-90 Eastbound Ramps SB	16	44	18	51

Table 6 – Vehicle Queuing Analysis: Full-Buildout

Grant Creek Road (Reserve Street) Intersection	AM Peak Hour		PM Peak Hour	
	Average Queue (ft)	95% Queue (ft)	Average Queue (ft)	95% Queue (ft)
I-90 Westbound Ramps NB	13	44	29	57
I-90 Westbound Ramps WB	141	205	123	191
I-90 Westbound Ramps SB	186	264	151	228
I-90 Eastbound Ramps NB	62	124	117	217
I-90 Eastbound Ramps EB	113	187	93	154
I-90 Eastbound Ramps SB	16	42	24	55

Multi-Modal Considerations and Recommendations

To decrease the overall traffic impacts from the Grant Creek Village development, additional modes of transportation should be encouraged by developing pedestrian/bicycle access to the site as well as transit service if possible. The Missoula Mountain Line Bus does not currently provide any routes along the north end of Reserve Street/Grant Creek Road. The nearest bus routes are one mile to the south along Express Way. As residential and commercial properties in this portion of Missoula continue to develop, it is encouraged that bus routes to serve the Grant Creek area be created. Providing space for a future bus pull-out along Expo Parkway or Grant Creek Road should be a part of future development plans in this area.

The *North Reserve Scott Street Master Plan* provides recommendations for improvements to the trail systems in this portion of Missoula. The plan recommends the development of a multi-use path connection under I-90 at Grant Creek that would be separated from vehicle traffic. This bike/pedestrian route would provide improved connectivity between the residential and commercial areas in this portion of Missoula. The project would require coordination with MDT & FHWA and is currently considered a low priority. The estimated cost of this pedestrian underpass is \$2 million. The existing underpass at Reserve Street currently has pedestrian facilities and sidewalks on both sides of the road.

Additional planned and recommended improvements to the pedestrian/bike facilities in this area include upgrading the Grant Creek Trail between Expo Parkway and Stonebridge Road. Expo Parkway has a missing sidewalk link along the north side of the roadway near the Grant Creek Village development adjacent to the Cottonwood Apartments. This section of sidewalk should be connected with the Grant Creek Village development to provide a continuous pedestrian link to Grant Creek Road.

Fire Mitigation & Emergency Access

The developers requested a review of the Grant Creek Village project from Firelogistics Inc. to evaluate the current conditions in Grant Creek and the impacts from the proposed project. The Missoula County Emergency Management and the County Sheriff's Office have general emergency plans for this area. In case of an emergency evacuation of Grant Creek it is anticipated that both lanes of Grant Creek Road may be used for exiting vehicles. Prospect Drive, Stonebridge Road, and Expo Parkway would be controlled to prevent traffic entering the exit path. Traffic from Grant Creek would be directed onto I-90 and the exits from I-90 at the Reserve Street (Grant Creek) interchange would be restricted. This would effectively allow two lanes of unopposed traffic to exit Grant Creek continuously at a rate of approximately 3,600 vehicles per hour. Under this scenario, the entirety of the 700 units at the Grant Creek Village could be evacuated in 10-15 minutes and the entire Grant Creek area could be evacuated in approximately one hour. For more information about the fire mitigation plan for see the *Grant Creek Village Risk Analysis and Fire Protection & Emergency Plan*.

H. IMPACT SUMMARY & RECOMMENDATIONS

As proposed, the Grant Creek Village would not create any new roadway capacity problems in this area. The new southbound through-lane installed by MDT in 2020 have increased intersection capacity and provided additional capacity for future growth in this area. At full build-out, the Grant Creek Village will account for a 60% increase in traffic volumes on Grant Creek Road and a 20% increase in traffic volumes along North Reserve Street. The developers should work with the City of Missoula to implement multi-modal improvements in the area to encourage pedestrian and bicycle access to the site.

APPENDIX A

Traffic Data

130 S. Howie Street
Helena, MT 59601

File Name : RerserveNInterchangeTMCAM

Site Code : 00000000

Start Date : 3/24/2021

Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

[illegible]

Turning Movement Count

All Vehicles

Location Missoula I-90 EB and Reserve

Date 3/30/2021

	Northbound				Southbound				Eastbound				Westbound				TOTAL
	Left	Thr	Right	Peds	Left	Thr	Right	Peds	Left	Thr	Right	Peds	Left	Thr	Right	Peds	
7:00 - 7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 - 7:30	0	64	32	1	13	89	0	1	7	0	36	0	0	0	0	0	243
7:30 - 7:45	0	83	37	0	29	118	0	1	8	0	51	0	0	0	0	0	327
7:45 - 8:00	0	75	35	0	39	137	0	0	7	0	63	0	0	0	0	0	356
8:00 - 8:15	0	93	37	0	22	85	0	0	11	0	31	0	0	0	0	0	279
8:15 - 8:30	0	85	40	1	33	76	0	1	9	0	54	0	0	0	0	0	299
8:30 - 8:45	0	73	47	0	17	90	0	0	9	0	44	0	0	0	0	0	280
8:45 - 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 - 1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 - 1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 - 1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 - 2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 - 2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 - 2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 - 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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3:00 - 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 - 3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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3:45 - 4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 - 4:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 - 4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 4:45	0	142	93	1	18	98	0	0	5	0	31	0	0	0	0	0	388
4:45 - 5:00	0	141	98	0	10	128	0	2	9	0	46	0	0	0	0	0	434
5:00 - 5:15	0	144	112	2	33	96	0	0	14	0	57	0	0	0	0	0	458
5:15 - 5:30	0	108	67	0	16	78	0	0	5	0	29	0	0	0	0	0	303
5:30 - 5:45	0	118	64	0	15	71	0	1	9	0	31	0	0	0	0	0	309
5:45 - 6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 - 6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 - 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 - 6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 - 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	1126	662	5	245	1066	0	6	93	0	473	0	0	0	0	0	3676

Abelin Traffic Services

130 S. Howie Street
Helena, MT 59601

File Name : StoneBridge
Site Code : 00000000
Start Date : 10/23/2019
Page No : 1

Groups Printed- Class 1

	Grant Creek Southbound					Stonebridge Westbound					Grant Creek Northbound					Stonebridge Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	0	91	0	0	91	0	0	0	0	0	0	20	5	0	25	6	0	0	0	6	122
07:45 AM	0	71	0	0	71	0	0	0	0	0	0	45	22	0	67	11	0	0	0	11	149
Total	0	162	0	0	162	0	0	0	0	0	0	65	27	0	92	17	0	0	0	17	271
08:00 AM	0	77	0	0	77	0	0	0	0	0	0	25	12	0	37	10	0	0	0	10	124
*** BREAK ***																					
Total	0	77	0	0	77	0	0	0	0	0	0	25	12	0	37	10	0	0	0	10	124
*** BREAK ***																					
04:30 PM	0	43	0	0	43	0	0	0	0	0	0	55	2	0	57	7	0	1	0	8	108
04:45 PM	0	66	0	0	66	0	0	0	0	0	0	39	5	0	44	33	0	0	0	33	143
Total	0	109	0	0	109	0	0	0	0	0	0	94	7	0	101	40	0	1	0	41	251
05:00 PM	0	46	0	0	46	0	0	0	0	0	0	70	3	0	73	10	0	1	0	11	130
05:15 PM	0	45	0	0	45	0	0	0	0	0	0	80	7	0	87	12	0	0	0	12	144
Grand Total	0	439	0	0	439	0	0	0	0	0	0	334	56	0	390	89	0	2	0	91	920
Apprch %	0	100	0	0		0	0	0	0		0	85.6	14.4	0		97.8	0	2.2	0		
Total %	0	47.7	0	0	47.7	0	0	0	0	0	0	36.3	6.1	0	42.4	9.7	0	0.2	0	9.9	

Abelin Traffic Services

130 S. Howie Street
Helena, MT 59601

File Name : Not Named 1

Site Code : 00000000

Start Date : 10/23/2019

Page No : 1

Groups Printed- Class 1 - New Group

	Grant Creek Southbound					Expo Westbound					Grant Creek Northbound					Expo Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	0	89	2	0	91	3	0	7	0	10	1	17	7	0	25	16	0	0	0	16	142
07:45 AM	0	69	2	0	71	2	0	7	0	9	0	43	7	0	50	15	0	0	0	15	145
Total	0	158	4	0	162	5	0	14	0	19	1	60	14	0	75	31	0	0	0	31	287
08:00 AM	0	75	2	0	77	0	0	5	0	5	0	25	5	0	30	5	0	0	0	5	117
*** BREAK ***																					
Total	0	75	2	0	77	0	0	5	0	5	0	25	5	0	30	5	0	0	0	5	117
*** BREAK ***																					
04:30 PM	0	41	2	0	43	4	1	1	0	6	0	51	11	0	62	10	0	0	0	10	121
04:45 PM	0	62	4	0	66	6	0	9	0	15	1	33	18	0	52	5	0	0	1	6	139
Total	0	103	6	0	109	10	1	10	0	21	1	84	29	0	114	15	0	0	1	16	260
05:00 PM	0	44	2	0	46	2	0	10	0	12	0	68	14	0	82	9	4	0	1	14	154
05:15 PM	0	43	2	0	45	3	0	2	0	5	0	77	19	0	96	12	0	0	0	12	158
Grand Total	0	423	16	0	439	20	1	41	0	62	2	314	81	0	397	72	4	0	2	78	976
Apprch %	0	96.4	3.6	0		32.3	1.6	66.1	0		0.5	79.1	20.4	0		92.3	5.1	0	2.6		
Total %	0	43.3	1.6	0	45	2	0.1	4.2	0	6.4	0.2	32.2	8.3	0	40.7	7.4	0.4	0	0.2	8	
Class 1	0	419	16	0	435	18	1	41	0	60	1	313	80	0	394	71	4	0	2	77	966
% Class 1	0	99.1	100	0	99.1	90	100	100	0	96.8	50	99.7	98.8	0	99.2	98.6	100	0	100	98.7	99
New Group																					
% New Group	0	0.9	0	0	0.9	10	0	0	0	3.2	50	0.3	1.2	0	0.8	1.4	0	0	0	1.3	1

Outgoing Monthly Counts Southbound
GrantCreekMissoula

from Wed-Mar-24-2021-09-00-AM to Tue-Mar-30-2021-06-59-PM

	Mar 2021									
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Week	Weekend	Week Day 85%
Hour								Day Avg	Avg	Avg Speed
0 - 1	2	4	*	3	1	5	5	2.5	5	33.75
1 - 2	1	2	*	3	3	0	3	2.25	1.5	38.75
2 - 3	0	1	*	1	4	5	5	1.5	5	39.33
3 - 4	2	1	*	3	3	3	5	2.25	4	39
4 - 5	7	7	*	7	8	5	5	7.25	5	41.75
5 - 6	31	23	*	18	30	10	11	25.5	10.5	41.12
6 - 7	57	69	*	70	57	22	14	63.25	18	41.2
7 - 8	205	201	*	204	193	52	30	200.75	41	41.3
8 - 9	192	197	*	200	176	87	62	191.25	74.5	42.1
9 - 10	160	142	109	148	153	114	110	142.4	112	42.44
10 - 11	103	122	129	105	134	150	134	118.6	142	42.12
11 - 12	105	101	119	121	131	153	124	115.4	138.5	42.82
12 - 13	118	126	142	156	150	150	138	138.4	144	41.28
13 - 14	108	117	141	117	158	142	141	128.2	141.5	42.22
14 - 15	121	125	141	158	175	152	123	144	137.5	42.4
15 - 16	109	120	144	176	184	171	192	146.6	181.5	42.2
16 - 17	128	116	163	169	163	174	148	147.8	161	41.84
17 - 18	127	135	181	162	223	175	171	165.6	173	41.8
18 - 19	75	21	104	116	129	122	133	89	127.5	42.8
19 - 20	48	*	57	78	69	86	79	63	82.5	42
20 - 21	42	*	45	35	53	49	71	43.75	60	39.5
21 - 22	15	*	18	30	39	29	18	25.5	23.5	38.58
22 - 23	6	*	8	5	17	26	10	9	18	40.1
23 - 24	3	*	7	6	10	12	6	6.5	9	38.5
Totals	1765	1630	1508	2091	2263	1894	1738			
% of Total	13.69%	12.65%	11.7%	16.22%	17.56%	14.69%	13.48%			

	Mar 2021									
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Week	Weekend	Week Day 85%
Hour								Day Avg	Avg	Avg Speed
0 - 1	8	6	*	7	6	9	17	6.75	13	38
1 - 2	2	7	*	5	4	6	8	4.5	7	39.75
2 - 3	0	2	*	0	9	5	6	2.75	5.5	43
3 - 4	1	1	*	1	5	2	6	2	4	36.5
4 - 5	2	0	*	4	2	5	4	2	4.5	37.67
5 - 6	10	4	*	6	6	3	3	6.5	3	38.25
6 - 7	14	14	*	23	22	11	4	18.25	7.5	46.08
7 - 8	60	60	*	49	60	30	35	57.25	32.5	44.2
8 - 9	92	86	*	108	103	74	50	97.25	62	43.35
9 - 10	96	80	79	151	142	121	87	109.6	104	43.66
10 - 11	103	97	128	147	147	139	146	124.4	142.5	43.9
11 - 12	87	122	139	148	141	193	208	127.4	200.5	44.88
12 - 13	124	119	173	144	209	184	237	153.8	210.5	44.64
13 - 14	125	121	154	139	184	159	156	144.6	157.5	44.54
14 - 15	114	122	117	132	133	149	145	123.6	147	44.92
15 - 16	180	173	150	171	175	129	128	169.8	128.5	45.26
16 - 17	166	181	176	196	177	154	114	179.2	134	44.36
17 - 18	251	252	270	238	248	147	136	251.8	141.5	44.56
18 - 19	147	41	181	174	162	110	110	141	110	45.1
19 - 20	91	*	121	128	116	106	98	114	102	45.18
20 - 21	58	*	87	76	75	77	71	74	74	43.05
21 - 22	59	*	56	59	62	57	40	59	48.5	45.05
22 - 23	14	*	23	26	41	48	13	26	30.5	43.2
23 - 24	11	*	6	14	23	23	6	13.5	14.5	44.62
Totals	1815	1488	1860	2146	2252	1941	1828			
% of Total	13.62%	11.16%	13.95%	16.1%	16.89%	14.56%	13.71%			

Basic Volume Report: EXPO

Station ID : EXPO

Info Line 1 : ATS
Info Line 2 : Unicorn #3

GPS Lat/Lon :
DB File : EXPO.DB

Last Connected Device Type : Unic-L

Version Number : 1.41

Serial Number :

Number of Lanes : 1

Posted Speed Limit : 0.0 mph

Lane #3 Configuration

#	Dir.	Information	Volume Mode	Volume Sensors	Divide By 2	Comment
3.	E/W		Normal	Axle	Yes	

Lane #3 Basic Volume Data From: 15:00 - 10/23/2019 To: 14:59 - 10/24/2019

Date	DW	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total
102319	W																65	106	99	105	71	60	35	21	7	569
102419	T	4	3	3	3	9	13	53	75	106	69	77	117	105	133	85										855
Month Total :		4	3	3	3	9	13	53	75	106	69	77	117	105	133	85	65	106	99	105	71	60	35	21	7	1424
Percent :		0%	0%	0%	0%	1%	1%	4%	5%	7%	5%	5%	8%	7%	9%	6%	5%	7%	7%	7%	5%	4%	2%	1%	0%	
ADT :		4	3	3	3	9	13	53	75	106	69	77	117	105	133	85	65	106	99	105	71	60	35	21	7	1424

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total	Percent
DW Totals :	0	0	0	569	855	0	0	Weekday (Mon-Fri) :	1424 100%
# Days :	0.0	0.0	0.0	0.4	0.6	0.0	0.0	ADT :	1424
ADT :	0	0	0	1517	1368	0	0	Weekend (Sat-Sun) :	0 0%
Percent :	0%	0%	0%	40%	60%	0%	0%	ADT :	0

Basic Volume Report: STONEB

Station ID : STONEB

Info Line 1 : ATS

Info Line 2 : Unicorn # 2

GPS Lat/Lon :

DB File : STONEB.DB

Last Connected Device Type : Unic-L

Version Number : 1.41

Serial Number : 91434

Number of Lanes : 1

Posted Speed Limit : 0.0 mph

Lane #3 Configuration

#	Dir.	Information	Volume Mode	Volume Sensors	Divide By 2	Comment
3.	WB		Normal	Axle	Yes	

Lane #3 Basic Volume Data From: 15:00 - 10/23/2019 To: 14:59 - 10/24/2019

Date	DW	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total
102319	W																65	56	84	45	24	22	11	7	8	322
102419	T	7	1	2	4	1	0	11	66	68	40	36	61	62	58	53										470
Month Total :		7	1	2	4	1	0	11	66	68	40	36	61	62	58	53	65	56	84	45	24	22	11	7	8	792
Percent :		1%	0%	0%	1%	0%	0%	1%	8%	9%	5%	5%	8%	8%	7%	7%	8%	7%	11%	6%	3%	3%	1%	1%	1%	
ADT :		7	1	2	4	1	0	11	66	68	40	36	61	62	58	53	65	56	84	45	24	22	11	7	8	792

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total	Percent
DW Totals :	0	0	0	322	470	0	0	792	100%
# Days :	0.0	0.0	0.0	0.4	0.6	0.0	0.0	792	
ADT :	0	0	0	859	752	0	0	0	0%
Percent :	0%	0%	0%	41%	59%	0%	0%	0	

APPENDIX B

Traffic Model

Grant Creek Village

Traffic Model

2021

AM Peak

Hour (15 Min X 4)

		Grant Creek Road	
Stonebridge	4	↩	10.4 B
	290	↓	
	4	↩	↩ 90
	45	↩	↑ 184
	0	↩	10.5/13.9 B/B
	282	↩	↩ 8
Expo Pkwy	8	↩	↩ 0
			↩ 29
Seasonal Factor	4	↩	↩ 29
	0	↩	↑ 175
Seasonal Factors	61	↩	↩ 4
			30.4 C
October	86	↩	↩ 86
	384	↓	↑ 0
			↩ 326 I-90 WB
			↩ 175
			↑ 159
	559	↓	13.8 B
	159	↩	
	29	↩	
	0	↩	↑ 306
	257	↩	↩ 143
	1473		1195 2668

PM Peak

Hour (15 Min X 4)

		Grant Creek Road	
Stonebridge	4	↩	9.7 A
	184	↓	
	4	↩	↩ 29
	49	↩	↑ 326
	0	↩	10.6/14.5 B/B
	184	↩	↩ 8
Expo Pkwy	8	↩	↩ 0
			↩ 12
	0	↩	↩ 78
	8	↩	↑ 314
	49	↩	↩ 4
			23.2 C
	53	↩	↩ 171
	261	↓	↑ 16
			↩ 245 I-90 WB
			↩ 298
			↑ 388
I-90 EB	392	↓	18.7 B
	135	↩	
	57	↩	
	0	↩	↑ 588
	233	↩	↩ 457
	1130		2162 3293

Grant Creek Village

Traffic Model

Full Build

AM Peak

Site Generated Traffic

				1	↶		
Stonebridge		26		2	↓		
40%		74		1	↶	↶	25
				74	↷	↑	1
IN	66					↶	
OUT	186			2	↶	↶	
				74	↓	↑	
Expo Pkwy		40			↷	↶	
60%		112		1	↶	↶	38
					↶	↑	25
				110	↷	↶	
						↶	16
				37	↶	↶	
				147	↓	↑	
						↶	
						↑	
							I-90 WB
						↶	78
						↑	
				102	↓		
I-90 EB				46	↷		
				21	↶		
					↶	↑	57
					↶	↶	

Grant Creek Road

Full Build

PM Peak

Site Generated Traffic

				4	↶		
Stonebridge		75		6	↓		
40%		48		0	↶	↶	71
				48	↷	↑	1
IN	188					↶	
OUT	120			6	↶	↶	
				48	↓	↑	
Expo Pkwy		113			↷	↶	
60%		72		1	↶	↶	107
					↶	↑	71
				71	↷	↶	
						↶	45
				24	↶	↶	
				95	↓	↑	
						↶	
						↑	
							I-90 WB
						↶	223
						↑	
				66	↓		
I-90 EB				29	↷		
				60	↶		
					↶	↑	163
					↶	↶	

Grant Creek Road

Grant Creek Village

Traffic Model

Full Buildout

AM Peak

Total Projected Traffic

		Grant Creek Road	
		5	11.0 B
Stonebridge	292		
	5		
	119		115
			185
			12.4/21.1 B/C
	2		8
	355		0
Expo Pkwy	8		29
	5		66
	0		201
	172		4
			32.9 C
	123		101
	531		0
			326 I-90 WB
			175
			237
			16.5 B
I-90 EB	661		
	205		
	50		
	0		363
	257		143

Full Buildout

PM Peak

Total Projected Traffic

		Grant Creek Road	
		8	10.0 B
Stonebridge	189		
	5		
	96		100
			327
			11.7/23.9 B/C
	6		8
	231		0
Expo Pkwy	8		12
	1		185
	8		386
	120		4
			26.2 C
	77		216
	356		16
			245 I-90 WB
			298
			611
			24.6 C
I-90 EB	457		
	164		
	117		
	0		750
	233		457

APPENDIX C

LOS Calculations

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	326	1	86	175	159	0	0	384	86
Future Volume (vph)	0	0	0	326	1	86	175	159	0	0	384	86
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-2%	
Storage Length (ft)	0		0	330		330	0		0	0		250
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			200			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.953		0.950	0.985				
Satd. Flow (prot)	0	0	0	1564	1569	1473	1476	3060	0	0	3292	1473
Flt Permitted				0.950	0.953		0.950	0.985				
Satd. Flow (perm)	0	0	0	1564	1569	1473	1476	3060	0	0	3292	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						118						154
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		967			1298			399			506	
Travel Time (s)		22.0			29.5			6.0			7.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	326	1	86	175	159	0	0	384	86
Shared Lane Traffic (%)				50%			38%					
Lane Group Flow (vph)	0	0	0	163	164	86	108	226	0	0	384	86
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	1	1	1	1			1	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				50	50	50	50	50			50	50
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				50	50	50	50	50			50	50
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Turn Type				Split	NA	custom	Split	NA			NA	Perm
Protected Phases				5	5	8	6 7 11	6 7 11			8	
Permitted Phases						5						8
Detector Phase				5	5	8	6 7 11	6 7 11			8	8
Switch Phase												
Minimum Initial (s)				6.0	6.0	20.0					20.0	20.0
Minimum Split (s)				39.3	39.3	33.0					33.0	33.0

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

06/03/2021

Lane Group	Ø6	Ø7	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	6	7	11	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	20.0	6.0	4.0	3.7
Minimum Split (s)	34.0	46.0	10.0	9.7

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)				45.0	45.0	45.0					45.0	45.0
Total Split (%)				23.2%	23.2%	23.2%					23.2%	23.2%
Maximum Green (s)				38.7	38.7	39.0					39.0	39.0
Yellow Time (s)				4.3	4.3	4.0					4.0	4.0
All-Red Time (s)				2.0	2.0	2.0					2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0					0.0	0.0
Total Lost Time (s)				6.3	6.3	6.0					6.0	6.0
Lead/Lag				Lag	Lag	Lead					Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0	4.5					4.5	4.5
Recall Mode				None	None	None					None	None
Walk Time (s)				7.0	7.0	7.0					7.0	7.0
Flash Dont Walk (s)				18.0	18.0	20.0					20.0	20.0
Pedestrian Calls (#/hr)				0	0	0					0	0
Act Effect Green (s)				24.4	24.4	61.2	46.7	46.7			30.4	30.4
Actuated g/C Ratio				0.19	0.19	0.47	0.36	0.36			0.23	0.23
v/c Ratio				0.56	0.56	0.11	0.20	0.21			0.50	0.19
Control Delay				56.7	56.7	1.4	1.5	0.8			46.6	0.9
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				56.7	56.7	1.4	1.5	0.8			46.6	0.9
LOS				E	E	A	A	A			D	A
Approach Delay					45.2			1.0			38.3	
Approach LOS					D			A			D	

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 130.1

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 30.4

Intersection LOS: C

Intersection Capacity Utilization 46.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Reserve Street & WB On Ramp/WB Off Ramp

				
38.3 s	46 s	10 s	45 s	45 s

Lane Group	Ø6	Ø7	Ø11	Ø13
Total Split (s)	38.3	46.0	10.0	9.7
Total Split (%)	20%	24%	5%	5%
Maximum Green (s)	32.3	40.0	4.0	3.7
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.5	3.5	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	7.0	7.0		
Flash Dont Walk (s)	21.0	25.0		
Pedestrian Calls (#/hr)	0	0		
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summary				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			  					  			  	
Traffic Volume (vph)	29	0	257	0	0	0	0	306	143	159	559	0
Future Volume (vph)	29	0	257	0	0	0	0	306	143	159	559	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-1%	
Storage Length (ft)	165		165	0		0	150		240	190		0
Storage Lanes	1		1	0		0	1		1	1		0
Taper Length (ft)	200			25			30			50		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1646	0	2592	0	0	0	0	4660	1451	1638	3276	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1646	0	2592	0	0	0	0	4660	1451	1638	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257						187			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		1164			1456			816			399	
Travel Time (s)		26.5			33.1			12.4			6.0	
Confl. Peds. (#/hr)												6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	0	257	0	0	0	0	306	143	159	559	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	0	257	0	0	0	0	306	143	159	559	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1	1	1	1	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	50		50					50	50	50	50	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	50		50					50	50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Turn Type	Prot		custom					NA	Free	Split	NA	
Protected Phases	7		6 7 11					6		5 8 13	5 8 13	
Permitted Phases									Free			
Detector Phase	7		6 7 11					6		5 8 13	5 8 13	
Switch Phase												

Lane Group	Ø5	Ø8	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	5	8	11	13
Permitted Phases				
Detector Phase				
Switch Phase				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0							20.0				
Minimum Split (s)	46.0							34.0				
Total Split (s)	46.0							38.3				
Total Split (%)	23.7%							19.7%				
Maximum Green (s)	40.0							32.3				
Yellow Time (s)	4.0							4.0				
All-Red Time (s)	2.0							2.0				
Lost Time Adjust (s)	0.0							0.0				
Total Lost Time (s)	6.0							6.0				
Lead/Lag	Lag							Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5							3.5				
Recall Mode	None							None				
Walk Time (s)	7.0							7.0				
Flash Dont Walk (s)	25.0							21.0				
Pedestrian Calls (#/hr)	0							0				
Act Effect Green (s)	9.3		46.7					21.1	130.1	70.8	70.8	
Actuated g/C Ratio	0.07		0.36					0.16	1.00	0.54	0.54	
v/c Ratio	0.25		0.23					0.40	0.10	0.18	0.31	
Control Delay	67.8		4.4					53.4	0.1	0.6	0.6	
Queue Delay	0.0		0.0					0.0	0.0	0.3	0.2	
Total Delay	67.8		4.4					53.4	0.1	0.9	0.8	
LOS	E		A					D	A	A	A	
Approach Delay		10.8						36.4			0.8	
Approach LOS		B						D			A	

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 130.1

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 13.8

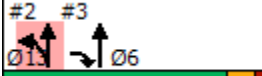
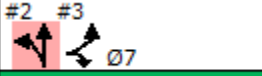
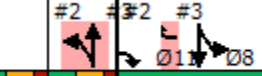
Intersection LOS: B

Intersection Capacity Utilization 46.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Reserve Street & EB Off Ramp/EB On Ramp

				
38.3 s	46 s	10 s 45 s	45 s	9.7 s

Lane Group	Ø5	Ø8	Ø11	Ø13
Minimum Initial (s)	6.0	20.0	4.0	3.7
Minimum Split (s)	39.3	33.0	10.0	9.7
Total Split (s)	45.0	45.0	10.0	9.7
Total Split (%)	23%	23%	5%	5%
Maximum Green (s)	38.7	39.0	4.0	3.7
Yellow Time (s)	4.3	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	4.0	4.5	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	7.0	7.0		
Flash Dont Walk (s)	18.0	20.0		
Pedestrian Calls (#/hr)	0	0		
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summary				

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↱	↰			↕	
Traffic Vol, veh/h	4	1	61	29	1	8	29	175	4	8	282	1
Future Vol, veh/h	4	1	61	29	1	8	29	175	4	8	282	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	1	61	29	1	8	29	175	4	8	282	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	539	536	283	565	534	177	283	0	0	179	0	0
Stage 1	299	299	-	235	235	-	-	-	-	-	-	-
Stage 2	240	237	-	330	299	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	453	451	756	436	452	866	1279	-	-	1397	-	-
Stage 1	710	666	-	768	710	-	-	-	-	-	-	-
Stage 2	763	709	-	683	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	438	437	756	391	438	866	1279	-	-	1397	-	-
Mov Cap-2 Maneuver	438	437	-	391	438	-	-	-	-	-	-	-
Stage 1	694	661	-	750	694	-	-	-	-	-	-	-
Stage 2	738	693	-	623	661	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.5		13.9		1.1		0.2					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1279	-	-	717	443	1397	-	-				
HCM Lane V/C Ratio	0.023	-	-	0.092	0.086	0.006	-	-				
HCM Control Delay (s)	7.9	-	-	10.5	13.9	7.6	0	-				
HCM Lane LOS	A	-	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	0	-	-				

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	45	90	184	290	4
Future Vol, veh/h	4	45	90	184	290	4
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	45	90	184	290	4
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	656	292	294	0	-	0
Stage 1	292	-	-	-	-	-
Stage 2	364	-	-	-	-	-
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	430	747	1268	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	396	747	1268	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.4	2.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1268	-	718	-	-	
HCM Lane V/C Ratio	0.071	-	0.068	-	-	
HCM Control Delay (s)	8.1	0	10.4	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-	

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	245	16	171	298	388	0	0	261	53
Future Volume (vph)	0	0	0	245	16	171	298	388	0	0	261	53
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-2%	
Storage Length (ft)	0		0	330		330	0		0	0		250
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			200			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.958		0.950	0.992				
Satd. Flow (prot)	0	0	0	1564	1577	1473	1476	3082	0	0	3292	1473
Flt Permitted				0.950	0.958		0.950	0.992				
Satd. Flow (perm)	0	0	0	1564	1577	1473	1476	3082	0	0	3292	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						171						154
Link Speed (mph)		75			30			45			45	
Link Distance (ft)		967			1298			399			506	
Travel Time (s)		8.8			29.5			6.0			7.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	245	16	171	298	388	0	0	261	53
Shared Lane Traffic (%)				47%			25%					
Lane Group Flow (vph)	0	0	0	130	131	171	223	463	0	0	261	53
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	1	1	1	1			1	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				50	50	50	50	50			50	50
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				50	50	50	50	50			50	50
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Turn Type				Split	NA	custom	Split	NA			NA	Perm
Protected Phases				5	5	8	6 7 11	6 7 11			8	
Permitted Phases						5						8
Detector Phase				5	5	8	6 7 11	6 7 11			8	8
Switch Phase												
Minimum Initial (s)				6.0	6.0	20.0					20.0	20.0
Minimum Split (s)				39.3	39.3	33.0					33.0	33.0

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

06/03/2021

Lane Group	Ø6	Ø7	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	6	7	11	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	20.0	6.0	4.0	3.7
Minimum Split (s)	34.0	46.0	10.0	9.7

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)				46.0	46.0	38.0					38.0	38.0
Total Split (%)				23.7%	23.7%	19.6%					19.6%	19.6%
Maximum Green (s)				39.7	39.7	32.0					32.0	32.0
Yellow Time (s)				4.3	4.3	4.0					4.0	4.0
All-Red Time (s)				2.0	2.0	2.0					2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0					0.0	0.0
Total Lost Time (s)				6.3	6.3	6.0					6.0	6.0
Lead/Lag				Lag	Lag	Lead					Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0	4.5					4.5	4.5
Recall Mode				None	None	None					None	None
Walk Time (s)				7.0	7.0	7.0					7.0	7.0
Flash Dont Walk (s)				18.0	18.0	20.0					20.0	20.0
Pedestrian Calls (#/hr)				0	0	0					0	0
Act Effect Green (s)				20.1	20.1	50.7	59.5	59.5			24.1	24.1
Actuated g/C Ratio				0.15	0.15	0.38	0.45	0.45			0.18	0.18
v/c Ratio				0.55	0.55	0.26	0.34	0.33			0.44	0.13
Control Delay				63.6	63.5	4.9	3.4	2.3			53.0	0.7
Queue Delay				0.0	0.0	0.0	0.2	0.1			0.0	0.0
Total Delay				63.6	63.5	4.9	3.6	2.4			53.0	0.7
LOS				E	E	A	A	A			D	A
Approach Delay					40.3			2.8			44.2	
Approach LOS					D			A			D	

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 132.5

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 23.2

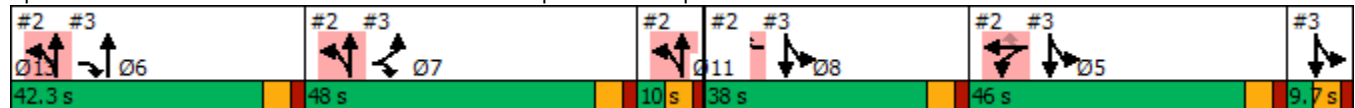
Intersection LOS: C

Intersection Capacity Utilization 45.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Reserve Street & WB On Ramp/WB Off Ramp



Lane Group	Ø6	Ø7	Ø11	Ø13
Total Split (s)	42.3	48.0	10.0	9.7
Total Split (%)	22%	25%	5%	5%
Maximum Green (s)	36.3	42.0	4.0	3.7
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.5	3.5	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	7.0	7.0		
Flash Dont Walk (s)	21.0	25.0		
Pedestrian Calls (#/hr)	0	0		
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summary				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			  					  			  	
Traffic Volume (vph)	57	0	233	0	0	0	0	588	457	135	392	0
Future Volume (vph)	57	0	233	0	0	0	0	588	457	135	392	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-1%	
Storage Length (ft)	165		165	0		0	150		240	190		0
Storage Lanes	1		1	0		0	1		1	1		0
Taper Length (ft)	200			25			30			50		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor										1.00		
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1646	0	2592	0	0	0	0	4660	1451	1638	3276	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1646	0	2592	0	0	0	0	4660	1451	1637	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			233						418			
Link Speed (mph)		30			75			45			45	
Link Distance (ft)		1164			1456			816			399	
Travel Time (s)		26.5			13.2			12.4			6.0	
Confl. Peds. (#/hr)										1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	0	233	0	0	0	0	588	457	135	392	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	0	233	0	0	0	0	588	457	135	392	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1	1	1	1	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	50		50					50	50	50	50	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	50		50					50	50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Turn Type	Prot		custom					NA	Free	Split	NA	
Protected Phases	7		6 7					6		5 8 13	5 8 13	
Permitted Phases									Free			
Detector Phase	7		6 7					6		5 8 13	5 8 13	
Switch Phase												

Lane Group	Ø5	Ø8	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	5	8	11	13
Permitted Phases				
Detector Phase				
Switch Phase				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

06/03/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0							20.0				
Minimum Split (s)	46.0							34.0				
Total Split (s)	48.0							42.3				
Total Split (%)	24.7%							21.8%				
Maximum Green (s)	42.0							36.3				
Yellow Time (s)	4.0							4.0				
All-Red Time (s)	2.0							2.0				
Lost Time Adjust (s)	0.0							0.0				
Total Lost Time (s)	6.0							6.0				
Lead/Lag	Lag							Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5							3.5				
Recall Mode	None							None				
Walk Time (s)	7.0							7.0				
Flash Dont Walk (s)	25.0							21.0				
Pedestrian Calls (#/hr)	0							0				
Act Effect Green (s)	13.8		49.3					29.3	132.5	60.3	60.3	
Actuated g/C Ratio	0.10		0.37					0.22	1.00	0.46	0.46	
v/c Ratio	0.33		0.21					0.57	0.31	0.18	0.26	
Control Delay	65.1		4.0					49.5	0.6	1.3	1.2	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.1	
Total Delay	65.1		4.0					49.5	0.6	1.3	1.3	
LOS	E		A					D	A	A	A	
Approach Delay		16.0						28.1			1.3	
Approach LOS		B						C			A	

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 132.5

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 18.7

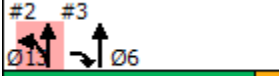
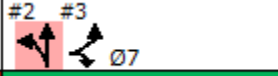
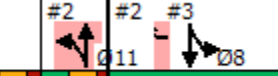
Intersection LOS: B

Intersection Capacity Utilization 45.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Reserve Street & EB Off Ramp/EB On Ramp

				
42.3 s	48 s	10 s 38 s	46 s	9.7 s

Lane Group	Ø5	Ø8	Ø11	Ø13
Minimum Initial (s)	6.0	20.0	4.0	3.7
Minimum Split (s)	39.3	33.0	10.0	9.7
Total Split (s)	46.0	38.0	10.0	9.7
Total Split (%)	24%	20%	5%	5%
Maximum Green (s)	39.7	32.0	4.0	3.7
Yellow Time (s)	4.3	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?				
Vehicle Extension (s)	4.0	4.5	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	7.0	7.0		
Flash Dont Walk (s)	18.0	20.0		
Pedestrian Calls (#/hr)	0	0		
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summary				

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	8	49	12	1	8	78	314	4	8	184	1
Future Vol, veh/h	1	8	49	12	1	8	78	314	4	8	184	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	49	12	1	8	78	314	4	8	184	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	678	675	185	701	673	316	185	0	0	318	0	0
Stage 1	201	201	-	472	472	-	-	-	-	-	-	-
Stage 2	477	474	-	229	201	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	366	376	857	353	377	724	1390	-	-	1242	-	-
Stage 1	801	735	-	573	559	-	-	-	-	-	-	-
Stage 2	569	558	-	774	735	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	344	352	857	311	353	724	1390	-	-	1242	-	-
Mov Cap-2 Maneuver	344	352	-	311	353	-	-	-	-	-	-	-
Stage 1	756	730	-	541	528	-	-	-	-	-	-	-
Stage 2	530	527	-	717	730	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.6		14.5		1.5		0.3					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1390	-	-	700	400	1242	-	-				
HCM Lane V/C Ratio	0.056	-	-	0.083	0.053	0.006	-	-				
HCM Control Delay (s)	7.7	-	-	10.6	14.5	7.9	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.2	0	-	-				

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	49	29	326	184	4
Future Vol, veh/h	4	49	29	326	184	4
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	49	29	326	184	4

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	570	186	188
Stage 1	186	-	-
Stage 2	384	-	-
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	483	856	1386
Stage 1	846	-	-
Stage 2	688	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	470	856	1386
Mov Cap-2 Maneuver	552	-	-
Stage 1	824	-	-
Stage 2	688	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1386	-	822	-	-
HCM Lane V/C Ratio	0.021	-	0.064	-	-
HCM Control Delay (s)	7.7	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	326	1	101	175	237	0	0	531	123
Future Volume (vph)	0	0	0	326	1	101	175	237	0	0	531	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-2%	
Storage Length (ft)	0		0	330		330	0		0	0		250
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			200			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.953		0.950	0.993				
Satd. Flow (prot)	0	0	0	1564	1569	1473	1476	3085	0	0	3292	1473
Flt Permitted				0.950	0.953		0.950	0.993				
Satd. Flow (perm)	0	0	0	1564	1569	1473	1476	3085	0	0	3292	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						118						154
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		967			1298			399			506	
Travel Time (s)		22.0			29.5			6.0			7.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	326	1	101	175	237	0	0	531	123
Shared Lane Traffic (%)				50%			24%					
Lane Group Flow (vph)	0	0	0	163	164	101	133	279	0	0	531	123
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	1	1	1	1			1	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				50	50	50	50	50			50	50
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				50	50	50	50	50			50	50
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Turn Type				Split	NA	custom	Split	NA			NA	Perm
Protected Phases				5	5	8	6 7 11	6 7 11			8	
Permitted Phases						5						8
Detector Phase				5	5	8	6 7 11	6 7 11			8	8
Switch Phase												
Minimum Initial (s)				6.0	6.0	20.0					20.0	20.0
Minimum Split (s)				39.3	39.3	33.0					33.0	33.0

Lane Group	Ø6	Ø7	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	6	7	11	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	20.0	6.0	4.0	3.7
Minimum Split (s)	34.0	46.0	10.0	9.7

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)				41.0	41.0	50.0					50.0	50.0
Total Split (%)				21.1%	21.1%	25.8%					25.8%	25.8%
Maximum Green (s)				34.7	34.7	44.0					44.0	44.0
Yellow Time (s)				4.3	4.3	4.0					4.0	4.0
All-Red Time (s)				2.0	2.0	2.0					2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0					0.0	0.0
Total Lost Time (s)				6.3	6.3	6.0					6.0	6.0
Lead/Lag				Lag	Lag	Lead					Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0	4.5					4.5	4.5
Recall Mode				None	None	None					None	None
Walk Time (s)				7.0	7.0	7.0					7.0	7.0
Flash Dont Walk (s)				18.0	18.0	20.0					20.0	20.0
Pedestrian Calls (#/hr)				0	0	0					0	0
Act Effect Green (s)				26.3	26.3	72.4	51.0	51.0			39.6	39.6
Actuated g/C Ratio				0.18	0.18	0.50	0.35	0.35			0.27	0.27
v/c Ratio				0.58	0.58	0.13	0.26	0.26			0.59	0.24
Control Delay				64.7	64.7	2.5	1.9	1.1			50.3	3.8
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				64.7	64.7	2.5	1.9	1.1			50.3	3.8
LOS				E	E	A	A	A			D	A
Approach Delay					50.0			1.3			41.6	
Approach LOS					D			A			D	

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 145.4

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 32.9

Intersection LOS: C

Intersection Capacity Utilization 49.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Reserve Street & WB On Ramp/WB Off Ramp

				
37.3 s	46 s	10 s 50 s	41 s	9.7 s

Lane Group	Ø6	Ø7	Ø11	Ø13
Total Split (s)	37.3	46.0	10.0	9.7
Total Split (%)	19%	24%	5%	5%
Maximum Green (s)	31.3	40.0	4.0	3.7
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.5	3.5	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	7.0	7.0		
Flash Dont Walk (s)	21.0	25.0		
Pedestrian Calls (#/hr)	0	0		
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summary				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			  					  			  	
Traffic Volume (vph)	50	0	257	0	0	0	0	363	143	205	661	0
Future Volume (vph)	50	0	257	0	0	0	0	363	143	205	661	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-1%	
Storage Length (ft)	165		165	0		0	150		240	190		0
Storage Lanes	1		1	0		0	1		1	1		0
Taper Length (ft)	200			25			30			50		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1646	0	2592	0	0	0	0	4660	1451	1638	3276	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1646	0	2592	0	0	0	0	4660	1451	1638	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257						187			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		1164			1456			816			399	
Travel Time (s)		26.5			33.1			12.4			6.0	
Confl. Peds. (#/hr)												6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	0	257	0	0	0	0	363	143	205	661	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	0	257	0	0	0	0	363	143	205	661	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1	1	1	1	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	50		50					50	50	50	50	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	50		50					50	50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Turn Type	Prot		custom					NA	Free	Split	NA	
Protected Phases	7		6 7 11					6		5 8 13	5 8 13	
Permitted Phases									Free			
Detector Phase	7		6 7 11					6		5 8 13	5 8 13	
Switch Phase												

Lane Group	Ø5	Ø8	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	5	8	11	13
Permitted Phases				
Detector Phase				
Switch Phase				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0							20.0				
Minimum Split (s)	46.0							34.0				
Total Split (s)	46.0							37.3				
Total Split (%)	23.7%							19.2%				
Maximum Green (s)	40.0							31.3				
Yellow Time (s)	4.0							4.0				
All-Red Time (s)	2.0							2.0				
Lost Time Adjust (s)	0.0							0.0				
Total Lost Time (s)	6.0							6.0				
Lead/Lag	Lag							Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5							3.5				
Recall Mode	None							None				
Walk Time (s)	7.0							7.0				
Flash Dont Walk (s)	25.0							21.0				
Pedestrian Calls (#/hr)	0							0				
Act Effect Green (s)	11.8		51.0					22.8	145.4	81.9	81.9	
Actuated g/C Ratio	0.08		0.35					0.16	1.00	0.56	0.56	
v/c Ratio	0.38		0.24					0.50	0.10	0.22	0.36	
Control Delay	75.7		4.3					60.4	0.1	0.6	0.7	
Queue Delay	0.0		0.0					0.0	0.0	0.5	0.2	
Total Delay	75.7		4.3					60.4	0.1	1.1	0.9	
LOS	E		A					E	A	A	A	
Approach Delay		15.9						43.4				0.9
Approach LOS		B						D				A

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 145.4

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 16.5

Intersection LOS: B

Intersection Capacity Utilization 49.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Reserve Street & EB Off Ramp/EB On Ramp

				
37.3 s	46 s	10 s 50 s	41 s	9.7 s

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↱	↰			↕	
Traffic Vol, veh/h	5	1	172	29	1	8	66	201	4	8	355	2
Future Vol, veh/h	5	1	172	29	1	8	66	201	4	8	355	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	172	29	1	8	66	201	4	8	355	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	712	709	356	794	708	203	357	0	0	205	0	0
Stage 1	372	372	-	335	335	-	-	-	-	-	-	-
Stage 2	340	337	-	459	373	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	347	359	688	306	360	838	1202	-	-	1366	-	-
Stage 1	648	619	-	679	643	-	-	-	-	-	-	-
Stage 2	675	641	-	582	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	327	337	688	218	338	838	1202	-	-	1366	-	-
Mov Cap-2 Maneuver	327	337	-	218	338	-	-	-	-	-	-	-
Stage 1	612	615	-	642	608	-	-	-	-	-	-	-
Stage 2	631	606	-	433	614	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12.4		21.1		2		0.2					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1202	-	-	664	261	1366	-	-				
HCM Lane V/C Ratio	0.055	-	-	0.268	0.146	0.006	-	-				
HCM Control Delay (s)	8.2	-	-	12.4	21.1	7.7	0	-				
HCM Lane LOS	A	-	-	B	C	A	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	1.1	0.5	0	-	-				

Intersection

Int Delay, s/veh 3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	119	115	189	292	5
Future Vol, veh/h	5	119	115	189	292	5
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	119	115	189	292	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	714	295	297	0	-	0
Stage 1	295	-	-	-	-	-
Stage 2	419	-	-	-	-	-
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	398	744	1264	-	-	-
Stage 1	755	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	357	744	1264	-	-	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	664	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	3.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1264	-	727	-	-
HCM Lane V/C Ratio	0.091	-	0.171	-	-
HCM Control Delay (s)	8.1	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	245	16	216	298	611	0	0	356	77
Future Volume (vph)	0	0	0	245	16	216	298	611	0	0	356	77
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-2%	
Storage Length (ft)	0		0	330		330	0		0	0		250
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	25			200			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950	0.958		0.950	0.998				
Satd. Flow (prot)	0	0	0	1564	1577	1473	1476	3101	0	0	3292	1473
Flt Permitted				0.950	0.958		0.950	0.998				
Satd. Flow (perm)	0	0	0	1564	1577	1473	1476	3101	0	0	3292	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						216						154
Link Speed (mph)		75			30			45			45	
Link Distance (ft)		967			1298			399			506	
Travel Time (s)		8.8			29.5			6.0			7.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	245	16	216	298	611	0	0	356	77
Shared Lane Traffic (%)				47%			10%					
Lane Group Flow (vph)	0	0	0	130	131	216	268	641	0	0	356	77
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	1	1	1	1			1	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				50	50	50	50	50			50	50
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				50	50	50	50	50			50	50
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Turn Type				Split	NA	custom	Split	NA			NA	Perm
Protected Phases				5	5	8	6 7 11	6 7 11			8	
Permitted Phases						5						8
Detector Phase				5	5	8	6 7 11	6 7 11			8	8
Switch Phase												
Minimum Initial (s)				6.0	6.0	20.0					20.0	20.0
Minimum Split (s)				39.3	39.3	33.0					33.0	33.0

Lane Group	Ø6	Ø7	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	6	7	11	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	20.0	6.0	4.0	3.7
Minimum Split (s)	34.0	46.0	10.0	9.7

Lanes, Volumes, Timings

2: Reserve Street & WB On Ramp/WB Off Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)				41.0	41.0	37.0					37.0	37.0
Total Split (%)				21.1%	21.1%	19.1%					19.1%	19.1%
Maximum Green (s)				34.7	34.7	31.0					31.0	31.0
Yellow Time (s)				4.3	4.3	4.0					4.0	4.0
All-Red Time (s)				2.0	2.0	2.0					2.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0					0.0	0.0
Total Lost Time (s)				6.3	6.3	6.0					6.0	6.0
Lead/Lag				Lag	Lag	Lead					Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0	4.5					4.5	4.5
Recall Mode				None	None	None					None	None
Walk Time (s)				7.0	7.0	7.0					7.0	7.0
Flash Dont Walk (s)				18.0	18.0	20.0					20.0	20.0
Pedestrian Calls (#/hr)				0	0	0					0	0
Act Effect Green (s)				22.5	22.5	57.0	78.5	78.5			28.1	28.1
Actuated g/C Ratio				0.14	0.14	0.36	0.50	0.50			0.18	0.18
v/c Ratio				0.59	0.58	0.32	0.37	0.42			0.61	0.20
Control Delay				76.8	76.6	5.5	2.4	2.4			67.3	1.1
Queue Delay				0.0	0.0	0.0	0.5	0.3			0.0	0.0
Total Delay				76.8	76.6	5.5	2.9	2.7			67.3	1.1
LOS				E	E	A	A	A			E	A
Approach Delay					44.4			2.7			55.5	
Approach LOS					D			A			E	

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 157.8

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 26.2

Intersection LOS: C

Intersection Capacity Utilization 48.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Reserve Street & WB On Ramp/WB Off Ramp

  	  	 	  	  	
#2 #3	#2 #3	#2	#2 #3	#2 #3	#3
Ø11	Ø7	Ø11	Ø8	Ø5	
50.3 s	46 s	10 s	37 s	41 s	9.7 s

Lane Group	Ø6	Ø7	Ø11	Ø13
Total Split (s)	50.3	46.0	10.0	9.7
Total Split (%)	26%	24%	5%	5%
Maximum Green (s)	44.3	40.0	4.0	3.7
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?				
Vehicle Extension (s)	3.5	3.5	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	7.0	7.0		
Flash Dont Walk (s)	21.0	25.0		
Pedestrian Calls (#/hr)	0	0		
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Intersection Summary				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			  					  			  	
Traffic Volume (vph)	117	0	233	0	0	0	0	750	457	164	457	0
Future Volume (vph)	117	0	233	0	0	0	0	750	457	164	457	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		-2%			-2%			1%			-1%	
Storage Length (ft)	165		165	0		0	150		240	190		0
Storage Lanes	1		1	0		0	1		1	1		0
Taper Length (ft)	200			25			30			50		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor										1.00		
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1646	0	2592	0	0	0	0	4660	1451	1638	3276	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1646	0	2592	0	0	0	0	4660	1451	1637	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			233						327			
Link Speed (mph)		30			75			45			45	
Link Distance (ft)		1164			1456			816			399	
Travel Time (s)		26.5			13.2			12.4			6.0	
Confl. Peds. (#/hr)										1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	117	0	233	0	0	0	0	750	457	164	457	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	0	233	0	0	0	0	750	457	164	457	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Right	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.10	1.10	1.10	1.10	1.12	1.12	1.12	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1	1	1	1	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	50		50					50	50	50	50	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	50		50					50	50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Turn Type	Prot		custom					NA	Free	Split	NA	
Protected Phases	7		6 7					6		5 8 13	5 8 13	
Permitted Phases									Free			
Detector Phase	7		6 7					6		5 8 13	5 8 13	
Switch Phase												

Lane Group	Ø5	Ø8	Ø11	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Grade (%)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Number of Detectors				
Detector Template				
Leading Detector (ft)				
Trailing Detector (ft)				
Detector 1 Position(ft)				
Detector 1 Size(ft)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Turn Type				
Protected Phases	5	8	11	13
Permitted Phases				
Detector Phase				
Switch Phase				

Lanes, Volumes, Timings

3: Reserve Street & EB Off Ramp/EB On Ramp

04/07/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0							20.0				
Minimum Split (s)	46.0							34.0				
Total Split (s)	46.0							50.3				
Total Split (%)	23.7%							25.9%				
Maximum Green (s)	40.0							44.3				
Yellow Time (s)	4.0							4.0				
All-Red Time (s)	2.0							2.0				
Lost Time Adjust (s)	0.0							0.0				
Total Lost Time (s)	6.0							6.0				
Lead/Lag	Lag							Lead				
Lead-Lag Optimize?												
Vehicle Extension (s)	3.5							3.5				
Recall Mode	None							None				
Walk Time (s)	7.0							7.0				
Flash Dont Walk (s)	25.0							21.0				
Pedestrian Calls (#/hr)	0							0				
Act Effect Green (s)	22.3		68.2					39.7	157.8	66.7	66.7	
Actuated g/C Ratio	0.14		0.43					0.25	1.00	0.42	0.42	
v/c Ratio	0.50		0.19					0.64	0.31	0.24	0.33	
Control Delay	72.9		3.4					57.1	0.6	1.6	1.5	
Queue Delay	0.0		0.0					0.0	0.0	0.5	0.3	
Total Delay	72.9		3.4					57.1	0.6	2.0	1.7	
LOS	E		A					E	A	A	A	
Approach Delay		26.6						35.7				1.8
Approach LOS		C						D				A

Intersection Summary

Area Type: Other

Cycle Length: 194

Actuated Cycle Length: 157.8

Natural Cycle: 175

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 24.6

Intersection LOS: C

Intersection Capacity Utilization 48.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Reserve Street & EB Off Ramp/EB On Ramp

#2 #3	#2 #3	#2 #3	#2 #3	#3
  	  	  	  	
50.3 s	46 s	10 s 37 s	41 s	9.7 s

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↵	↵			↵	
Traffic Vol, veh/h	1	8	120	12	1	8	185	386	4	8	231	6
Future Vol, veh/h	1	8	120	12	1	8	185	386	4	8	231	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	120	12	1	8	185	386	4	8	231	6
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1013	1010	234	1072	1011	388	237	0	0	390	0	0
Stage 1	250	250	-	758	758	-	-	-	-	-	-	-
Stage 2	763	760	-	314	253	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	217	240	805	198	240	660	1330	-	-	1169	-	-
Stage 1	754	700	-	399	415	-	-	-	-	-	-	-
Stage 2	397	414	-	697	698	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	190	205	805	145	205	660	1330	-	-	1169	-	-
Mov Cap-2 Maneuver	190	205	-	145	205	-	-	-	-	-	-	-
Stage 1	649	694	-	344	357	-	-	-	-	-	-	-
Stage 2	337	356	-	582	692	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	11.7		23.9		2.6		0.3					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1330	-	-	667	211	1169	-	-				
HCM Lane V/C Ratio	0.139	-	-	0.193	0.1	0.007	-	-				
HCM Control Delay (s)	8.1	-	-	11.7	23.9	8.1	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0.5	-	-	0.7	0.3	0	-	-				

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	96	100	327	189	8
Future Vol, veh/h	5	96	100	327	189	8
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	96	100	327	189	8
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	720	193	197	0	-	0
Stage 1	193	-	-	-	-	-
Stage 2	527	-	-	-	-	-
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	395	849	1376	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	360	849	1376	-	-	-
Mov Cap-2 Maneuver	463	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10	1.8		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1376	-	815	-	-	
HCM Lane V/C Ratio	0.073	-	0.124	-	-	
HCM Control Delay (s)	7.8	0	10	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-	

Intersection: 2: Reserve Street & WB On Ramp/WB Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	L	LT	T	T	T	R
Maximum Queue (ft)	180	184	50	15	13	34	235	211	58
Average Queue (ft)	124	141	23	5	4	13	186	153	39
95th Queue (ft)	202	205	55	17	20	44	264	237	60
Link Distance (ft)		1241		333	333	333	417	417	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330		330						250
Storage Blk Time (%)								0	
Queuing Penalty (veh)								0	

Intersection: 3: Reserve Street & EB Off Ramp/EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	R	T	T	T	L	T	T
Maximum Queue (ft)	86	158	121	57	110	112	23	22	37
Average Queue (ft)	52	113	68	21	62	59	8	7	16
95th Queue (ft)	102	187	147	73	124	121	25	32	42
Link Distance (ft)		1116			721	721		333	333
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	165		165	150			190		
Storage Blk Time (%)		3	0		1				
Queuing Penalty (veh)		4	0		1				

Intersection: 52: Expo Pkwy

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	LTR
Maximum Queue (ft)	65	42	33	5
Average Queue (ft)	45	25	13	1
95th Queue (ft)	75	52	42	9
Link Distance (ft)	533	256	287	537
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Reserve Street & WB On Ramp/WB Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	LT	R	L	LT	T	T	T	R
Maximum Queue (ft)	165	175	78	21	30	34	204	171	50
Average Queue (ft)	105	123	44	8	14	15	151	120	34
95th Queue (ft)	184	191	88	28	41	44	228	195	60
Link Distance (ft)		1241		333	333	333	417	417	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330		330						250
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Reserve Street & EB Off Ramp/EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	R	T	T	T	L	T	T
Maximum Queue (ft)	144	130	85	118	188	187	16	33	32
Average Queue (ft)	88	93	37	52	117	115	4	9	12
95th Queue (ft)	148	154	98	131	217	202	20	36	41
Link Distance (ft)		1116			721	721		333	333
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	165		165	150			190		
Storage Blk Time (%)	1	0			4	0			
Queuing Penalty (veh)	3	0			11	1			

Intersection: 28: Expo

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	LTR
Maximum Queue (ft)	52	34	49	8
Average Queue (ft)	37	14	22	2
95th Queue (ft)	59	40	57	16
Link Distance (ft)	283	144	379	642
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 57: Stonebridge

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	48	42
Average Queue (ft)	30	17
95th Queue (ft)	53	53
Link Distance (ft)	328	642
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 15

Intersection: 57: Stonebridge

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	49	49
Average Queue (ft)	36	21
95th Queue (ft)	59	56
Link Distance (ft)	783	537
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 6
