

Exhibit "16"

Chick-fil-A I-5 & Hwy 20 Burlington, WA

Traffic Impact Analysis
September 4, 2024

Prepared for:

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FINDINGS/CONCLUSIONS

This Traffic Impact Analysis (TIA) has been prepared for the proposed *Chick-fil-A I-5 & Hwy 20* project located on the east side of Nevitt Road south of SR 20 in Burlington, WA.

Project Proposal. The project would include the development of a 5,967 square foot (SF) Chick-fil-A restaurant with indoor seating and a drive-through window. The existing site is occupied by a 10-room motel that will be removed with the project. Vehicular access to the site is proposed at two (2) locations; one (1) full access driveway on Nevitt Road and one (1) right-in, right out driveway on SR 20. Full project buildout is expected by 2026.

Trip Generation. The proposed project is estimated to generate 1,304 net new weekday daily trips with 129 net new trips occurring during the weekday AM peak hour (67 in, 62 out) and 85 net new trips during the weekday PM peak hour (44 in, 41 out). The proposed project is estimated to generate 148 net new trips during the Saturday midday peak hour (75 in, 73 out).

Intersection Level of Service (LOS). Weekday AM, weekday PM, and Saturday midday peak hour LOS analysis was conducted at three (3) off-site study intersections. Based on the results of the analysis, each of the study intersections are anticipated to meet City of Burlington and WSDOT LOS standards during the weekday AM, weekday PM, and Saturday midday peak hours with the proposed project.

Additionally, a queuing analysis for the northbound approach of the Nevitt Road/SR 20 signalized intersection was conducted during the weekday AM, weekday PM, and Saturday midday peak hours for future year 2026 conditions. Based on this analysis, the peak hour queueing from the traffic signal (northbound approach) is expected to be accommodated within the proposed turn pockets and is not anticipated to impact the operations of the proposed Chick-fil-A driveway.

Site Access Evaluation. Based on the results of the analysis, the individual movements entering and exiting the site at each of the proposed stop-controlled site access locations on Nevitt Road and SR 20 are expected to operate at LOS C or better with minimal queuing during the weekday AM, weekday PM, and Saturday midday peak hours.

Drive-Through Queuing. A drive-through queuing analysis was conducted for the proposed project including an estimate of 95th-percentile queues. The current site plan includes queue storage for approximately 37 vehicles in two (2) lanes, which is anticipated to accommodate the estimated 95th-percentile queues.

Mitigation.

Nevitt Road Channelization Modification. The project is proposing a modification to the channelization on Nevitt Road including converting the existing northbound channelization at the Nevitt Road/SR 20 signalized intersection from a single northbound left-turn lane and dual northbound right-turn lanes to dual northbound left-turn lanes and a single northbound right-turn lane. This change effectively reduces the length of the northbound left-turn queue and allows room for a new southbound left-turn pocket on Nevitt Road serving the proposed Chick-fil-A site. The project would also complete necessary modifications to the traffic signal at Nevitt Road/SR 20 to accommodate the revised northbound lane configuration.

Transportation Impact Fees. Per Burlington Municipal Code 15.12, transportation mitigation required by the City of Burlington is payment of a transportation impact fee based on the project's proposed land use. As of the date of this study, the adopted impact fee schedule identifies a fee of \$2,665 per new PM peak hour trip, for a total fee of \$226,525 (\$2,665 X 85 PM Trips). The impact fee rates are subject to change, and the final impact fee calculation will be based on the rates in effect at the time of issuance of a building permit.

INTRODUCTION

This Traffic Impact Analysis (TIA) has been prepared for the proposed *Chick-fil-A I-5 & Hwy 20* project located on the east side of Nevitt Road south of SR 20 in Burlington, WA as shown in **Figure 1**.

Project Description

Buildout of the proposed project is anticipated to include the development of a 5,967 square foot (SF) Chick-fil-A restaurant with indoor seating and a drive-through window. The existing site is occupied by a 10-room motel that will be removed with the project.

Vehicular access to the site is proposed at two (2) locations; one (1) full access driveway on Nevitt Road and one (1) right-in, right out driveway on SR 20. Full project buildout is expected by 2026. A preliminary site plan is included in **Appendix A**.

Project Approach

To analyze the traffic impacts from the proposed *Chick-fil-A I-5 & Hwy 20* project, the following tasks were undertaken based on coordination with City of Burlington staff during the traffic scoping process.

- Assessed existing conditions through field reconnaissance and reviewed existing planning documents.
- Described and assessed existing transportation conditions in the area.
- Documented existing (2024) traffic volumes and intersection levels of service (LOS) at three (3) off-site study intersections during the weekday AM, weekday PM, and Saturday midday peak hours.
- Documented future planned transportation improvements in the project vicinity.
- Developed trip generation estimates for weekday daily, weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour conditions based on the proposed land uses.
- Documented trip distribution and assignment of weekday AM and PM peak hour and Saturday midday peak hour project-generated traffic.
- Documented traffic forecasts and assumptions for year 2026 conditions at the three (3) off-site study intersections without and with the proposed project.
- Analyzed weekday AM, weekday PM, and Saturday midday peak hour LOS for future year 2026 conditions without and with the proposed project at three (3) off-site study intersections.
- Evaluated weekday AM, weekday PM, and Saturday midday peak hour operations of the two (2) proposed site access locations.
- Documented proposed traffic mitigation.

Primary Data and Information Sources

- Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 11th Edition, 2021.
- 2024 weekday AM, weekday PM, and Saturday midday peak hour traffic counts, All Traffic Data.
- *Highway Capacity Manual (HCM 7th Edition)*, 2022.
- City of Burlington Comprehensive Plan (Section 8 – Transportation), 2023.
- WSDOT 2024-2027 *Statewide Transportation Improvement Program* (STIP).

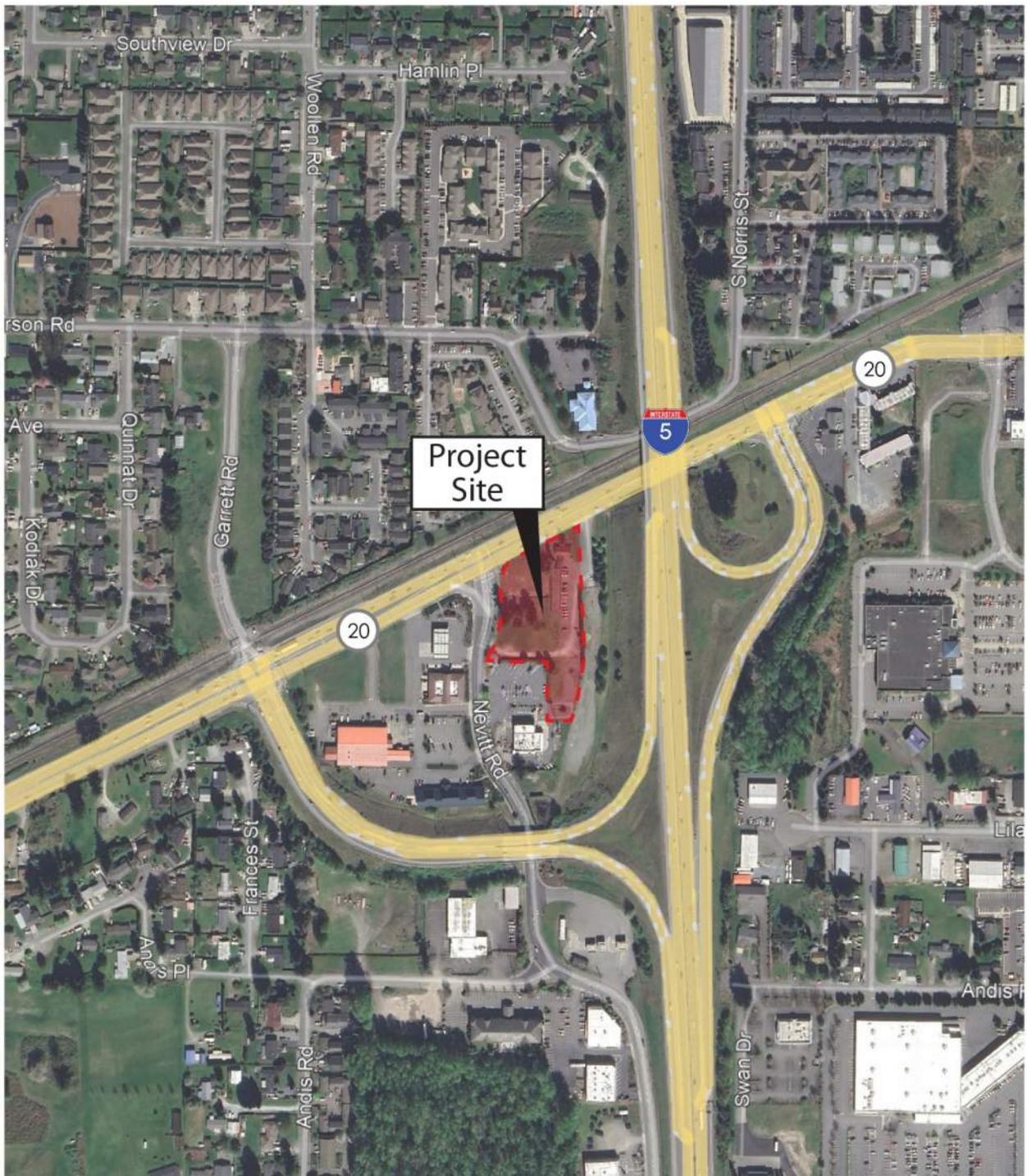


Figure 1: Project Site Vicinity



EXISTING CONDITIONS

Study Area

The existing transportation study area and roadway network providing access to the *Chick-fil-A I-5 & Hwy 20* project is shown on **Figure 1**. The study intersections evaluated in this traffic analysis were identified and agreed upon by the City of Burlington and WSDOT staff during the traffic scoping process. The three (3) study intersections are as follows:

1. I-5 SB Ramps/SR 20
2. Nevitt Road/SR 20
3. I-5 NB Ramps/SR 20

Roadway Network

Table 1 describes the existing characteristics of the streets that would be used as primary routes to and from the site. Roadway characteristics are described in terms of orientation, arterial classification, posted speed limits, number of lanes, parking, and sidewalks. The relationship of these roadways to the project site is shown in **Figure 1**.

Table 1
Existing Roadway Network Summary – Project Site Vicinity

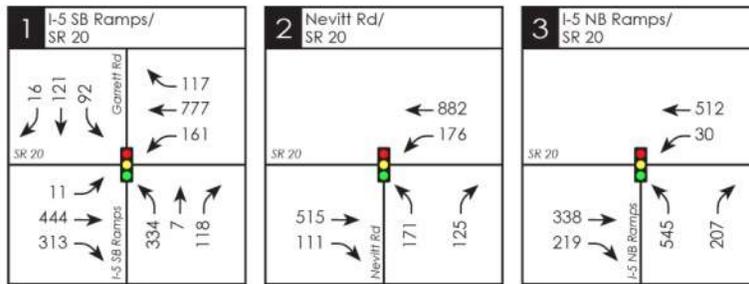
Roadway	Orientation	Classification	Speed Limit	Number of Lanes	Street Parking	Sidewalks
SR 20	East/West	Principal Arterial	35	4-6	None	South Side
Nevitt Road	North/South	Local	25	3	None	Both Sides

Traffic Volumes

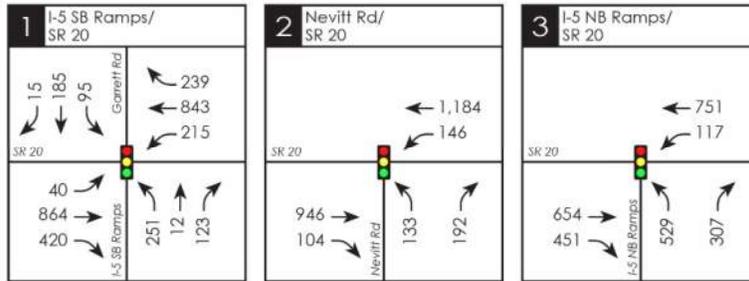
Existing weekday AM, weekday PM, and Saturday midday peak hour traffic volumes at the study intersections were based on counts collected by All Traffic Data in May and July 2024. The weekday AM peak hour represents the highest hour of traffic between 7:00 and 9:00 a.m. The weekday PM peak hour represents the highest hour of traffic between 4:00 and 6:00 p.m. The Saturday midday peak hour represents the highest hour of traffic between 11:00 a.m. and 1:00 p.m. The 2024 existing peak hour traffic volumes at the study intersections are shown in **Figure 2**. The existing traffic count sheets are included in **Appendix B**.



Weekday AM Peak Hour



Weekday PM Peak Hour



Saturday Midday Peak Hour

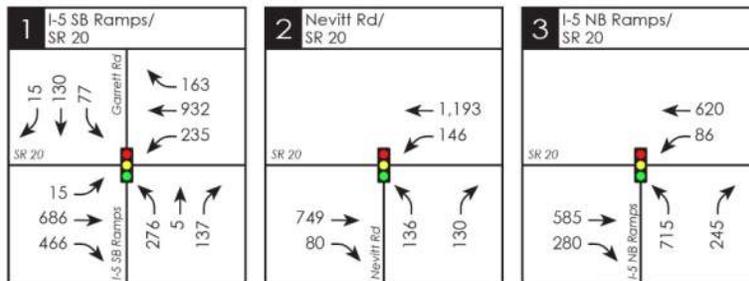


Figure 2: 2024 Existing Peak Hour Traffic Volumes

Intersection Levels of Service

Existing weekday AM, weekday PM, and Saturday midday peak hour level of service (LOS) analyses were conducted at the three (3) off site study intersections based upon existing channelization.

Intersection LOS was calculated using the methodology and procedures outlined in the *Highway Capacity Manual* (HCM 7th Edition) using the *Synchro 12* software program and consistent with the WSDOT Synchro Protocol (August 2018). The 2024 existing weekday AM, weekday PM, and Saturday midday peak hour LOS analysis results for the study intersections are summarized in **Table 2**. The LOS methodology and 2024 Existing LOS calculations are included in **Appendix C**.

Per the City of Burlington Comprehensive Plan, the LOS standard for City streets is LOS D. State Highways are managed by WSDOT and the current LOS standard is also LOS D.

Table 2
Existing 2024 Peak Hour LOS Summary

Study Intersection	<u>Weekday AM</u> <u>Peak Hour</u>		<u>Weekday PM</u> <u>Peak Hour</u>		<u>Saturday</u> <u>Midday Peak</u> <u>Hour</u>	
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
<u>Signalized:</u>						
1. I-5 SB Ramp / SR 20	C	22.4	C	25.9	C	23.7
2. Nevitt Road / SR 20	B	11.3	B	10.9	A	10.0
3. I-5 NB Ramp / SR 20	B	12.0	B	16.2	B	15.1

As shown in **Table 2**, each of the study intersections currently meet City of Burlington and WSDOT standards during the weekday AM, weekday PM, and Saturday midday peak hour.

Were City of Burlington planning documents reviewed? Suggest reviewing their latest comp plan.

Does Chick-fil-A have any historical data for trip generation for their developments? This particular fast food restaurant seems to have a history of very high volumes compared to other fast-food restaurants.

FUTURE CONDITIONS

Planned Transportation Improvements

Based on a review of the current WSDOT 2024-2027 *Statewide Transportation Improvement Program* (STIP), there are no planned transportation improvements in the study area.

Project Trip Generation

The net new weekday daily, AM, PM, and Saturday midday peak hour trip generation estimates for the proposed *Chick-fil-A I-5 & Hwy 20* project were based on methodology documented in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition for Land Use Code (LUC) 934 (Fast Food Restaurant with Drive-Thru) and LUC 320 (Motel) for the existing use.

Adjustments to the trip generation estimates were made to account for pass-by trips, which are trips that are made by vehicles that are already on the adjacent streets and make intermediate stops at a commercial use on route to a primary destination (i.e. on the way from work to home). The pass-by reduction is based on studies documented in the appendices of the ITE *Trip Generation Manual*, 11th Edition.

The resulting net new weekday daily, AM, PM, and Saturday midday peak hour trip generation estimates for the proposed project are summarized below in **Table 3**. Detailed trip generation calculations are included in **Appendix D**.

Table 3
Trip Generation Summary

Time Period	Net New Trips Generated		
	In	Out	Total
Weekday Daily	652	652	1,304
Weekday AM Peak Hour	67	62	129
Weekday PM Peak Hour	44	41	85
Saturday Midday Peak Hour	75	73	148

Project Trip Distribution

The distribution of vehicle trips generated by the proposed *Chick-fil-A I-5 & Hwy 20* project to the surrounding roadway network was based on existing and anticipated travel patterns in the area and turning movement count data collected at the study intersections. The distribution and assignment of the net new weekday AM, weekday PM, and Saturday midday peak hour project-generated trips are shown in **Figure 3**.

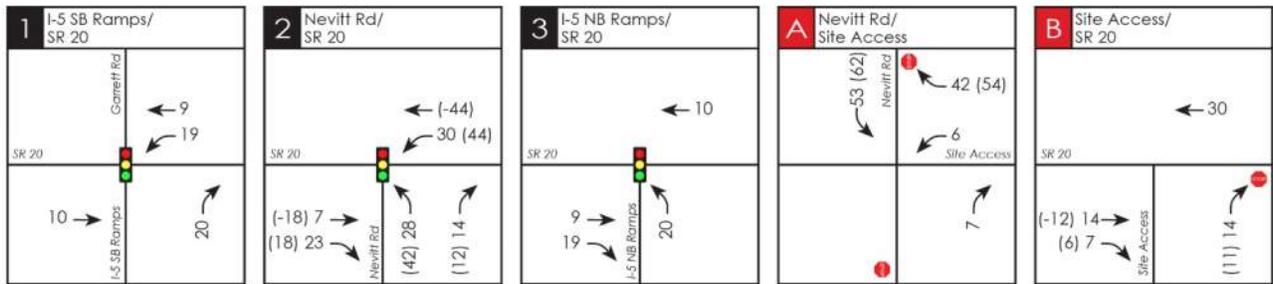
Traffic Volumes

To estimate the future 2026 No Action (Without Project) weekday AM, weekday PM, and Saturday midday peak hour traffic volumes, a 3% annual background growth rate was applied to the existing volumes as confirmed by City and WSDOT staff during the traffic scoping process.

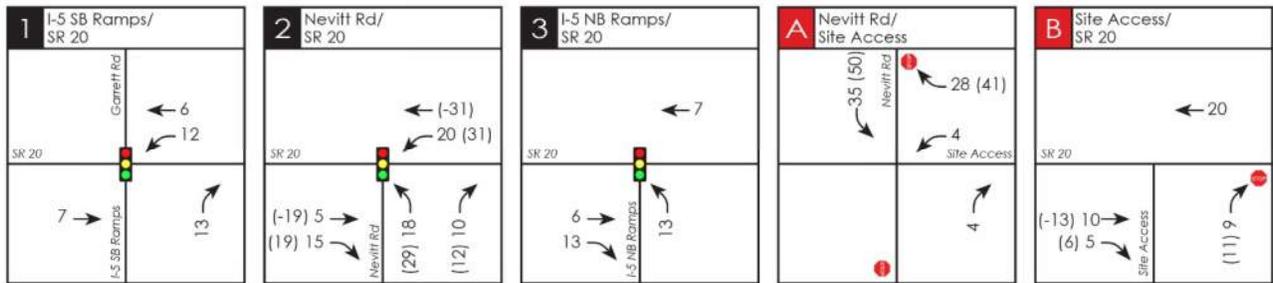
The resulting future 2026 No Action weekday AM, weekday PM, and Saturday midday peak hour traffic volumes at the study intersections are shown in **Figure 4**. The 2026 With Project traffic volumes were determined by adding the trip assignment from the proposed project (shown in **Figure 3**) to the future 2026 No Action traffic volumes (shown in **Figure 4**). The 2026 With Project weekday AM, weekday PM, and Saturday midday peak hour traffic volumes are shown in **Figure 5**.



Weekday AM Peak Hour



Weekday PM Peak Hour



Saturday Midday Peak Hour

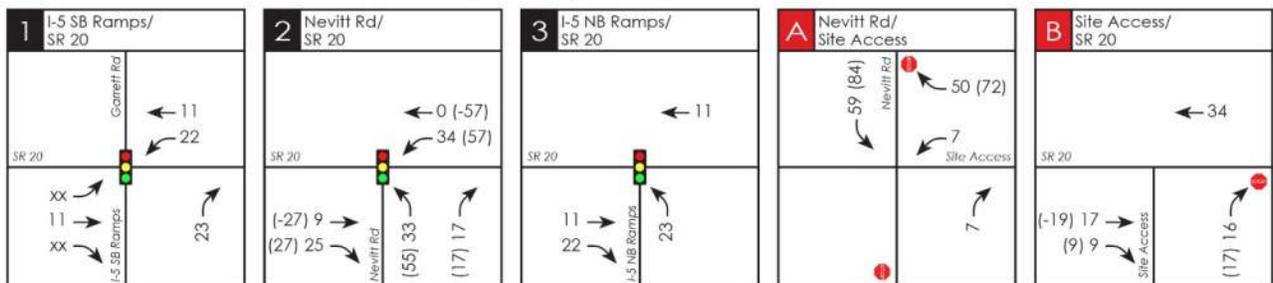
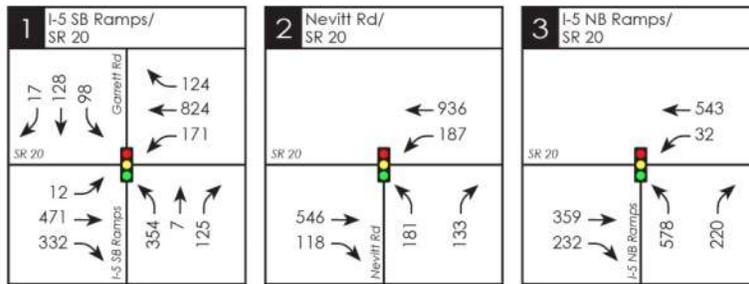


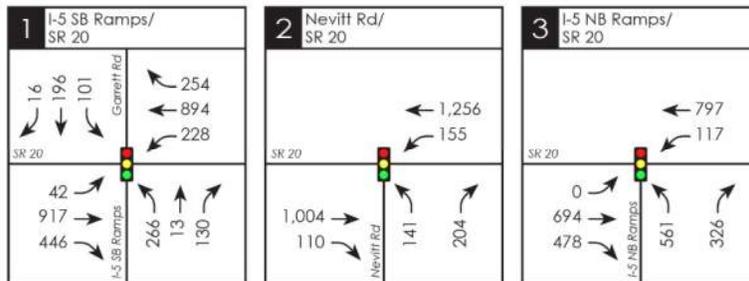
Figure 3: Peak Hour Project Trip Distribution and Net Trip Assignment



Weekday AM Peak Hour



Weekday PM Peak Hour



Saturday Midday Peak Hour

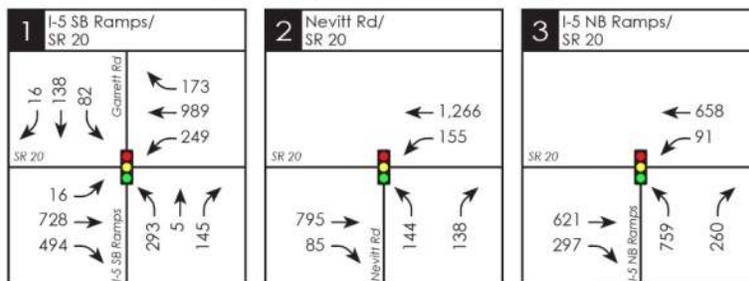
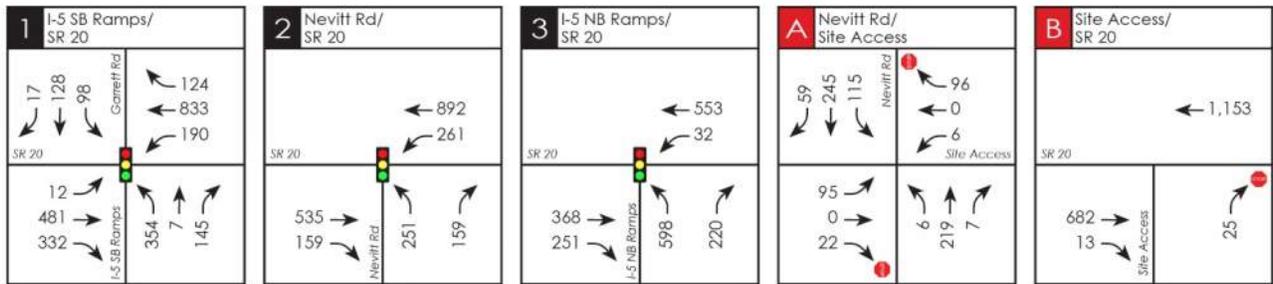


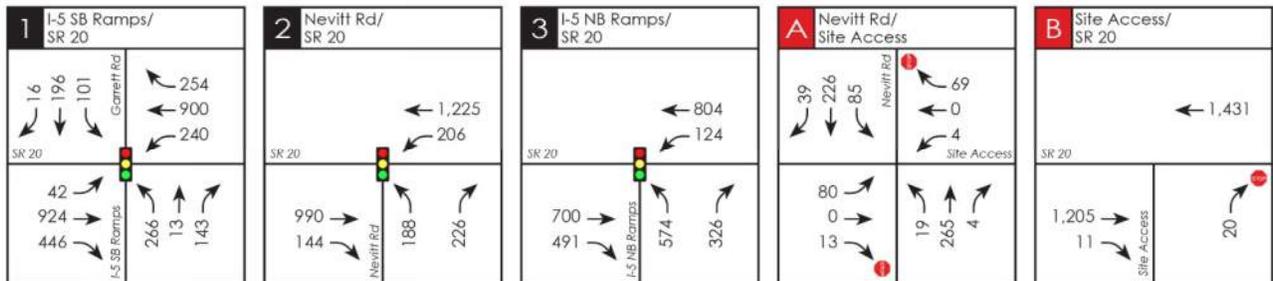
Figure 4: 2026 No Action Peak Hour Traffic Volumes



Weekday AM Peak Hour



Weekday PM Peak Hour



Saturday Midday Peak Hour

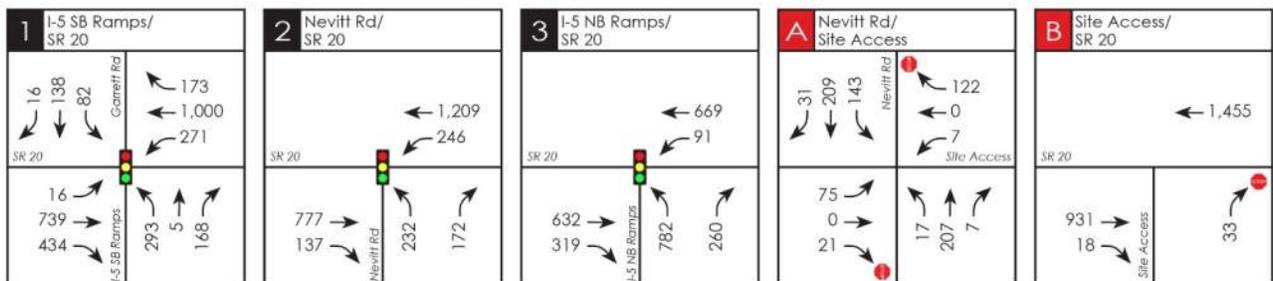


Figure 5: 2026 With Project Peak Hour Traffic Volumes

Intersection Levels of Service & Queue Analysis

Future year (2026) weekday AM, weekday PM, and Saturday midday peak hour LOS analysis was conducted at the three (3) study intersections for future No Action (without project) and With Project conditions.

In order to better facilitate access to the site for customers coming from the east on SR 20, the project is proposing a modification to the channelization on Nevitt Road that would convert the existing northbound channelization at the Nevitt Road/SR 20 signalized intersection from a single northbound left-turn lane and dual northbound right-turn lanes to dual northbound left-turn lanes and a single northbound right-turn lane. This change effectively reduces the length of the northbound left-turn queue on Nevitt Road and allows room for a new southbound left-turn pocket on Nevitt Road serving the proposed Chick-fil-A site. A preliminary concept of this proposed modification is included in **Appendix E**. The LOS analysis conducted for future With Project conditions at Nevitt Road/SR 20 reflect this proposed modification.

The LOS results at the study intersections without and with the proposed project are summarized in **Table 4**. The peak hour queuing results at the Nevitt Road/SR 20 intersection with the proposed modifications is shown in **Table 5**. The detailed LOS worksheets are included in **Appendix C**.

Table 4
Future 2026 Peak Hour LOS Summary at Study Intersections

Study Intersection	No Action		With Project	
	LOS	Delay (sec)	LOS	Delay (sec)
<u>Weekday AM Peak Hour</u>				
1. I-5 SB Ramps / SR 20	C	23.8	C	24.1
2. Nevitt Road / SR 20 ¹	B	11.8	B	12.5
3. I-5 NB Ramps / SR 20	B	12.4	B	12.6
<u>Weekday PM Peak Hour</u>				
1. I-5 SB Ramps / SR 20	C	27.8	C	28.3
2. Nevitt Road / SR 20 ¹	B	11.5	B	14.2
3. I-5 NB Ramps / SR 20	B	17.3	B	17.6
<u>Saturday Midday Peak Hour</u>				
1. I-5 SB Ramps / SR 20	C	25.3	C	25.9
2. Nevitt Road / SR 20 ¹	B	10.4	B	12.4
3. I-5 NB Ramps / SR 20	B	15.9	B	16.2

Notes:

1. With Project results include proposed modification to Nevitt Road.

Per the City of Burlington Comprehensive Plan, the LOS standard for City streets is LOS D. State Highways are managed by WSDOT and the current LOS standard is also LOS D.

As shown in **Table 4**, each of the study intersections are anticipated to meet City of Burlington and WSDOT LOS standards during the weekday AM, weekday PM, and Saturday midday peak hours.

Additionally, the peak hour queuing at the Nevitt Road/SR 20 signalized intersection (northbound approach) with the proposed project and channelization modification is accommodated within the proposed turn pocket lengths as shown in **Table 5**.

**Table 5
Future 2026 With-Project Peak Hour Queues at Nevitt Road/SR 20**

Study Intersection/Lane	Storage (ft)	50 th % Queue (ft)	95 th % Queue (ft)
<u>Weekday AM Peak Hour</u>			
2. Nevitt Road / SR 20			
Northbound Left-Turn	75'	50'	75'
Northbound Left-Turn	200'	50'	125'
Northbound Right-Turn	200'	0'	25'
<u>Weekday PM Peak Hour</u>			
2. Nevitt Road / SR 20			
Northbound Left-Turn	75'	50'	75'
Northbound Left-Turn	200'	50'	125'
Northbound Right-Turn	200'	50'	150'
<u>Saturday Midday Peak Hour</u>			
2. Nevitt Road / SR 20			
Northbound Left-Turn	75'	50'	75'
Northbound Left-Turn	200'	50'	125'
Northbound Right-Turn	200'	25'	50'

Site Access Evaluation

Vehicular access to the site is proposed at two (2) locations; one (1) right-in, right out driveway on SR 20.

To assess operations at the proposed site access locations, LOS was modeled for weekday AM, weekday PM, and Saturday midday peak hour conditions. The reported queues for the individual movements are 95th-percentile queues, which are only exceeded five (5) percent of the time during weekday AM, weekday PM, and Saturday midday peak hour traffic volumes shown previously in Figures 7-9.

The weekday AM, weekday PM, and Saturday midday peak hour LOS (year of opening) is summarized below in Table 6. The LOS was

Please provide estimated queues based on SimTraffic modeling. The changes to the channelization at the NB approach will significantly change operations on this approach. SimTraffic will provide a more accurate estimate than Synchro queues. This information can be used to:

- 1) Validate the storage length needed for the left turn lane(s)
- 2) Analyze whether existing queueing occurs and if these queues affect the proposed trips to the development
- 3) Analyze whether a one right turn lane is sufficient

We'd also like to see the Synchro models used for this analysis.

**Table 6
Future 2026 Site Access LOS and Queue Summary**

Site Access / Movement	<u>Weekday AM Peak Hour</u>			<u>Weekday PM Peak Hour</u>			<u>Saturday Midday Peak Hour</u>		
	LOS	Delay (sec)	95 th % Queue (ft)	LOS	Delay (sec)	95 th % Queue (ft)	LOS	Delay (sec)	95 th % Queue (ft)
A. Nevitt Rd/Site Access									
Westbound Approach	B	10.9	25'	B	10.7	< 25'	B	11.1	25'
Southbound Left-Turn	A	8.2	< 25'	A	8.1	< 25'	A	8.1	< 25'
B. SR 20/Site Access									
Northbound Right-Turn	B	11.0	< 25'	B	14.3	< 25'	B	12.6	< 25'

As shown in Table 6, the individual movements entering and exiting the site at the proposed stop-controlled site access locations are expected to operate at LOS C or better during the weekday AM, weekday PM, and

Saturday midday peak hours in 2026 (year of opening). Additionally, the estimated 95th-percentile queues at each of the site access locations are anticipated to be no more than 25 feet (1 vehicle) during the weekday AM, weekday PM, and Saturday midday peak hours.

Drive-Through Queuing

A drive-through queuing analysis was conducted for the proposed drive-through lanes including a summary of the proposed drive-through lane storage capacity and an estimate of 95th-percentile queues based on service time information provided by Chick-fil-A.

Drive-Through Operations and Storage

Based on the current site plan, the proposed *Chick-fil-A I-5 & Hwy 20* project includes two (2) drive-through lanes with approximately 925 total feet of total queuing storage (approximately 37 vehicles) from the pick-up window to the entrance of the drive-through lanes. Storage for approximately 20 vehicles would be provided from the order point to the drive-through entrance.

Drive-Through Queue Analysis

A drive-through queuing analysis was conducted to estimate future queuing in the drive-through lanes with the proposed *Chick-fil-A I-5 & Hwy 20* project. The queue analysis was based on standard queue theory equations that relate the rate of vehicle arrivals to the rate of vehicle departures (service time), which are both based on a Poisson distribution (M/M/s queue regime).

Queue analysis is based on the fact that a queue will form when vehicles arrive at a faster rate than they can be served. The key inputs in the model are (1) the arrival rate of vehicles during the peak hour, and (2) the service rate of the drive-through. The use of the Poisson distribution assumes arrival times are independent of each other and that the arrival time of one vehicle has no impact on the arrival time of the next vehicle, which is a reasonable assumption at a fast-food drive-through window where vehicle arrival rates fluctuate throughout the peak hour. The model also assumes that departure rates can vary (some customers take

To estimate future queues in the proposed drive-through lanes, the queuing formula based on the M/M/s queuing regime was used. The M/M/s queuing regime assumes random (exponentially distributed) arrivals and departures and uses average arrival and departure rates.

40% seems low, especially for peak hour conditions. Is the data from Chick-fil-a to support this available? This should ideally be included in the report appendices.

Arrival Rate

The arrival rate at the drive-through was based on the forecasted future project trip generation and information provided by Chick-fil-A related to drive-through usage. Because the Saturday midday peak hour is estimated to generate the most entering trips, the drive-through queuing analysis is based on the Saturday midday peak hour. Based on data provided by Chick-fil-A, approximately 40 percent of arriving customers are estimated to utilize the drive-through. During the Saturday midday peak hour, 168 vehicles (gross project trip generation) are estimated to enter the *Chick-fil-A I-5 & Hwy 20* site. Assuming 40 percent of the vehicles would use the drive-through, this would result in 67 vehicles in the drive-through lanes.

Departure Rate

The average service (departure) rate was based on information provided by Chick-fil-A. Per Chick-fil-A, on average, it takes approximately 60 seconds per vehicle at the order window and 30 seconds per vehicle at the pay/pick-up window. It should be noted that the average service time does not include queue "move-up" time, or the time it takes for the next vehicle in line to move forward. With the assumption of 5 seconds for "move-up" time, the average service rate would be conservatively estimated at 65 seconds (60 seconds per

vehicle for ordering + 5 seconds move-up time) at the order point and 35 seconds (30 seconds per vehicle at each of the pay/pick-up window + 5 seconds move-up time) at the pay/pick-up window. Based on this information, the order point is the critical component of the drive-through operations and the cause for potential queuing. Therefore, the queuing analysis described next is for the queuing at the order point.

Drive-Through Queue Estimate

Queues were calculated at the order point based on the estimated drive-through volumes during the Saturday midday peak hour and the average service (departure) rate as provided by Chick-fil-A. Based on 67 entering vehicles utilizing the drive-through during the Saturday midday peak hour, a service rate of 65 seconds per vehicle, and two (2) order points, a 95th-percentile queue of 5 vehicles during the Saturday midday peak hour is estimated at the order point. The 95th-percentile queues during the Saturday midday peak hour would be accommodated within the drive-through lane storage provided (approximately 20 vehicles measured from the order point to the drive-through entrance). The detailed queue calculations are shown in **Appendix F**.

MITIGATION

Nevitt Road Channelization Modification

The project is proposing a modification to the channelization on Nevitt Road including converting the existing northbound channelization at the Nevitt Road/SR 20 signalized intersection from a single northbound left-turn lane and dual northbound right-turn lanes to dual northbound left-turn lanes and a single northbound right-turn lane. This change effectively reduces the length of the northbound left-turn queue and allows room for a new southbound left-turn pocket on Nevitt Road serving the proposed Chick-fil-A site. The project would also complete necessary modifications to the traffic signal at Nevitt Road/SR 20 to accommodate the revised northbound lane configuration.

Transportation Impact Fees

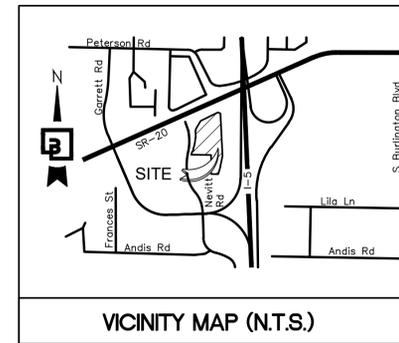
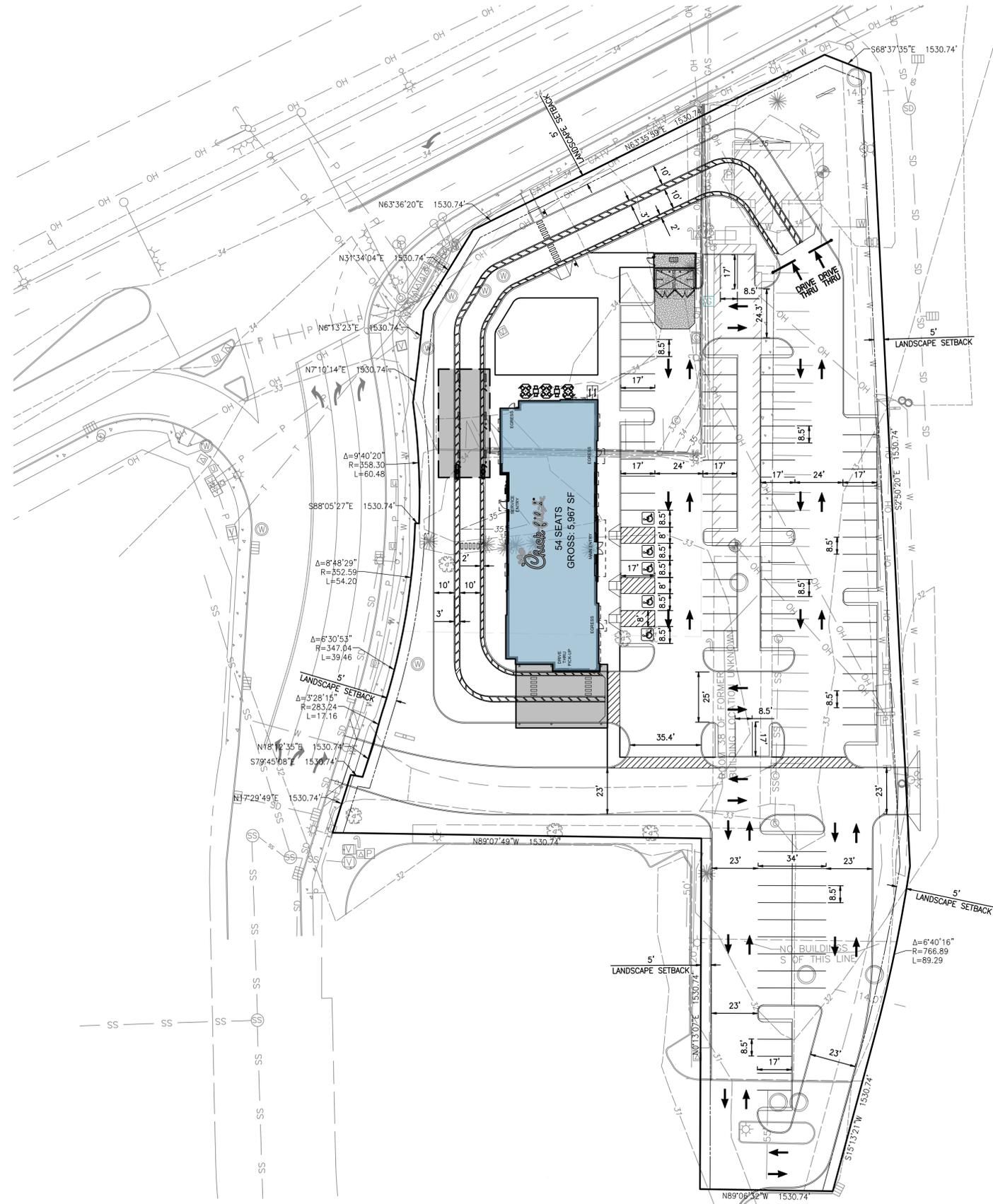
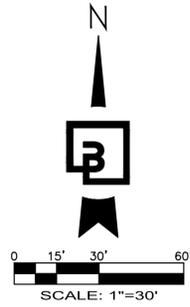
Per Burlington Municipal Code 15.12, transportation mitigation required by the City of Burlington is payment of a transportation impact fee based on the project's proposed land use. As of the date of this study, the adopted impact fee schedule identifies a fee of \$2,665 per new PM peak hour trip, for a total fee of \$226,525 ($\$2,665 \times 85$ PM Trips). The impact fee rates are subject to change, and the final impact fee calculation will be based on the rates in effect at the time of issuance of a building permit.

Appendix A

Preliminary Site Plan

CONCEPTUAL SITE PLAN FOR BURLINGTON QUICK SERVE RESTAURANT

SECTION 06, TWP. 34 N, RGE 4 E
BURLINGTON, SKAGIT COUNTY, WASHINGTON



SITE INFORMATION	
PARCEL NUMBER(S):	P23672 & P23664
EXISTING ZONING:	C-1
COMPREHENSIVE PLAN:	CITY

PARKING CALCULATIONS	
STANDARD SPACES	1 PER 200 SF
REQUIRED	30
TOTAL PROVIDED	5 ADA (1 VAN) 92 STANDARD
BIKE SPACES REQUIRED	4
BIKE RACKS PROVIDED	4

WETLANDS:
THERE ARE NO KNOWN WETLANDS LOCATED ON THE PROJECT SITE. THERE ARE MARSHES LOCATED NEAR TO THE SITE AND THE SKAGIT RIVER IS LOCATED NEAR THE SITE, HOWEVER IT IS DOUBTFUL THAT IT WILL HAVE ANY IMPACT ON THE PROPOSED PROJECT.

FLOOD AREAS:
BY GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES ENTIRELY WITHIN ZONE A7, (AREAS OF 100-YEAR FLOOD; BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS DETERMINED TO BE ROUGHLY 26.5 FEET "INTERPOLATED" ON NGVD 1929, OR ROUGHLY 30 FEET "COMPUTED" ON NAVD 1988) AS SHOWN ON THE FLOOD INSURANCE RATE MAP, COMMUNITY PANNEL NO. 5301510250C, BEARING AN EFFECTIVE DATE OF JANUARY 3, 1985, AND IS IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE.

PANEL NO. 5301510250C OMTS A PORTION OF SAID SITE (STATES CITY OF BURLINGTON AREA NOT INCLUDED) AND THE ADJUTING PANEL NO. 5301530001B APPEARS TO NOT PROPERTY DEPICT THE MISSING PORTION; HOWEVER, THE CIRCULAR "ZONE A7" AREA DEPICTED ON SAID PANEL NO. 5301510250C LIKELY COVERS THE ENTIRE SITE.

No.	Date	By	Chk.	Appr.	Revision

Title:

CONCEPTUAL SITE PLAN

For:
680 HIGHWAY 20
BURLINGTON, WA 98233



Scale:	
Horizontal	1"=30'
Vertical	N/A

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com



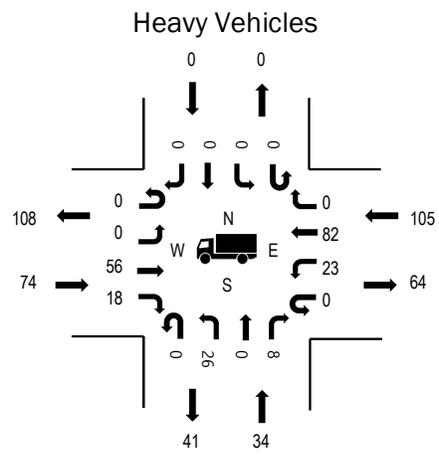
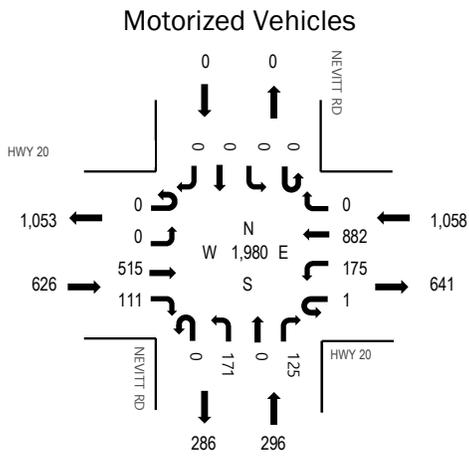
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Sheet
01 of **01**

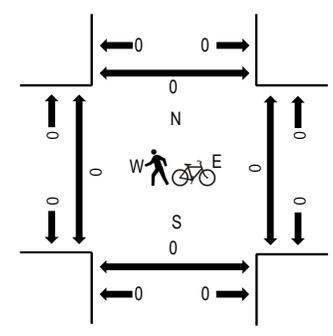
Appendix B

Existing Traffic Count Sheets

Peak Hour



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	11.8%	0.84
WB	9.9%	0.94
NB	11.5%	0.83
SB	0.0%	0.00
All	10.8%	0.93

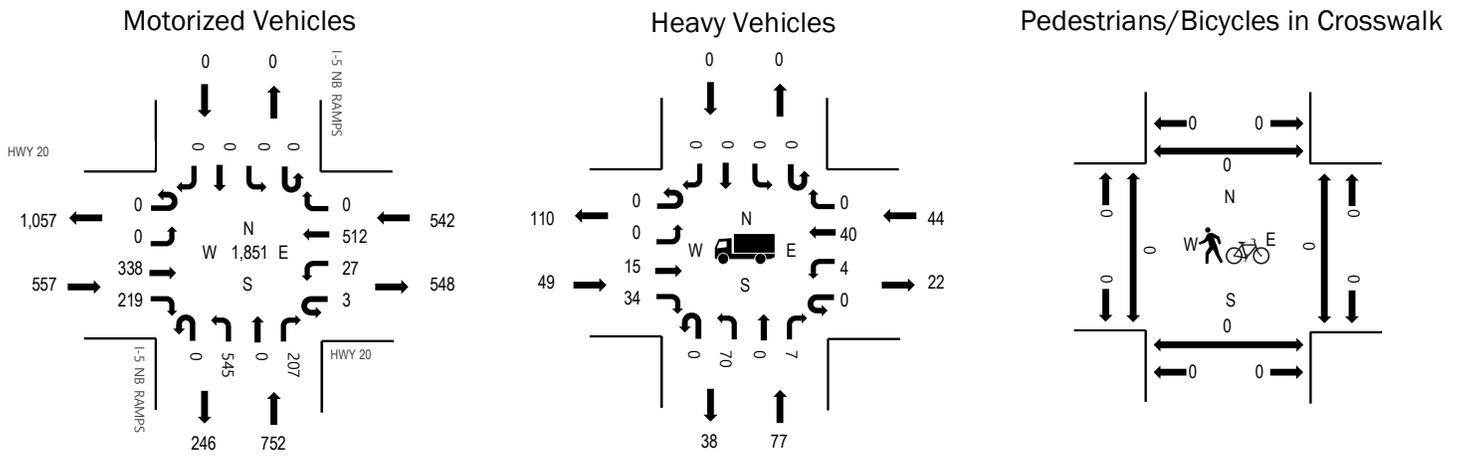
Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				NEVITT RD Northbound			NEVITT RD Southbound				Total	Rolling Hour	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru			Right
7:00 AM	0	0	107	8	0	37	195	0	0	35	0	21	0	0	0	0	403	1,871
7:15 AM	0	0	102	14	0	34	216	0	0	34	0	36	0	0	0	0	436	1,952
7:30 AM	0	0	118	23	0	46	221	0	0	47	0	42	0	0	0	0	497	1,980
7:45 AM	0	0	155	31	0	48	233	0	0	45	0	23	0	0	0	0	535	1,939
8:00 AM	0	0	112	30	1	44	225	0	0	37	0	35	0	0	0	0	484	1,833
8:15 AM	0	0	130	27	0	37	203	0	0	42	0	25	0	0	0	0	464	
8:30 AM	0	0	118	20	0	30	223	0	0	37	0	28	0	0	0	0	456	
8:45 AM	0	0	131	22	0	22	200	0	0	36	0	18	0	0	0	0	429	
Count Total	0	0	973	175	1	298	1,716	0	0	313	0	228	0	0	0	0	3,704	
Peak Hour	0	0	515	111	1	175	882	0	0	171	0	125	0	0	0	0	1,980	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	8	6	19	0	33	7:00 AM	0	0	0	0	0
7:15 AM	10	13	23	0	46	7:15 AM	0	0	0	0	0
7:30 AM	19	10	22	0	51	7:30 AM	0	0	0	0	0
7:45 AM	18	9	32	0	59	7:45 AM	0	0	0	0	0
8:00 AM	21	7	24	0	52	8:00 AM	0	0	0	0	0
8:15 AM	16	8	27	0	51	8:15 AM	0	0	0	0	0
8:30 AM	16	10	30	0	56	8:30 AM	0	0	0	0	0
8:45 AM	20	6	23	0	49	8:45 AM	0	0	0	0	0
Count Total	128	69	200	0	397	Count Total	0	0	0	0	0
Peak Hour	74	34	105	0	213	Peak Hour	0	0	0	0	0

Peak Hour



	HV%	PHF
EB	8.8%	0.92
WB	8.1%	0.89
NB	10.2%	0.87
SB	0.0%	0.00
All	9.2%	0.89

Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				I-5 NB RAMPS Northbound				I-5 NB RAMPS Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	70	69	1	10	141	0	0	131	0	41	0	0	0	0	463	1,851
7:15 AM	0	0	103	48	1	8	144	0	0	162	0	54	0	0	0	0	520	1,826
7:30 AM	0	0	97	55	0	4	119	0	0	144	0	61	0	0	0	0	480	1,777
7:45 AM	0	0	68	47	1	5	108	0	0	108	0	51	0	0	0	0	388	1,762
8:00 AM	0	0	79	56	0	4	128	0	0	122	0	49	0	0	0	0	438	1,830
8:15 AM	0	0	102	58	0	6	112	0	0	131	0	62	0	0	0	0	471	
8:30 AM	0	0	108	51	4	8	112	0	0	125	0	57	0	0	0	0	465	
8:45 AM	0	0	103	51	1	7	121	0	0	127	0	46	0	0	0	0	456	
Count Total	0	0	730	435	8	52	985	0	0	1,050	0	421	0	0	0	0	3,681	
Peak Hour	0	0	338	219	3	27	512	0	0	545	0	207	0	0	0	0	1,851	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	11	16	15	0	42	7:00 AM	0	0	0	0	0
7:15 AM	15	24	8	0	47	7:15 AM	0	0	0	0	0
7:30 AM	15	24	10	0	49	7:30 AM	0	0	0	0	0
7:45 AM	8	13	11	0	32	7:45 AM	0	0	0	0	0
8:00 AM	20	13	6	0	39	8:00 AM	0	2	0	0	2
8:15 AM	14	18	10	0	42	8:15 AM	0	0	0	0	0
8:30 AM	8	19	14	0	41	8:30 AM	0	0	0	0	0
8:45 AM	13	18	21	0	52	8:45 AM	0	2	0	0	2
Count Total	104	145	95	0	344	Count Total	0	4	0	0	4
Peak Hour	49	77	44	0	170	Peak Hour	0	0	0	0	0



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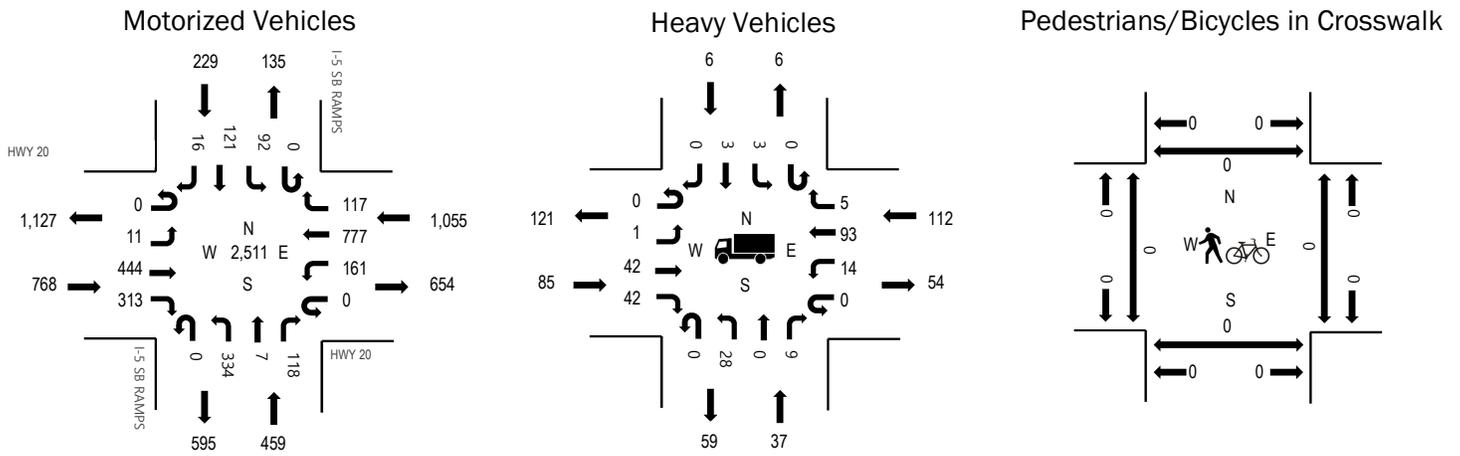
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Location: 4 I-5 SB RAMPS & HWY 20 AM

Date: Thursday, July 11, 2024

Peak Hour: 07:15 AM - 08:15 AM

Peak Hour



	HV%	PHF
EB	11.1%	0.93
WB	10.6%	0.97
NB	8.1%	0.97
SB	2.6%	0.87
All	9.6%	0.97

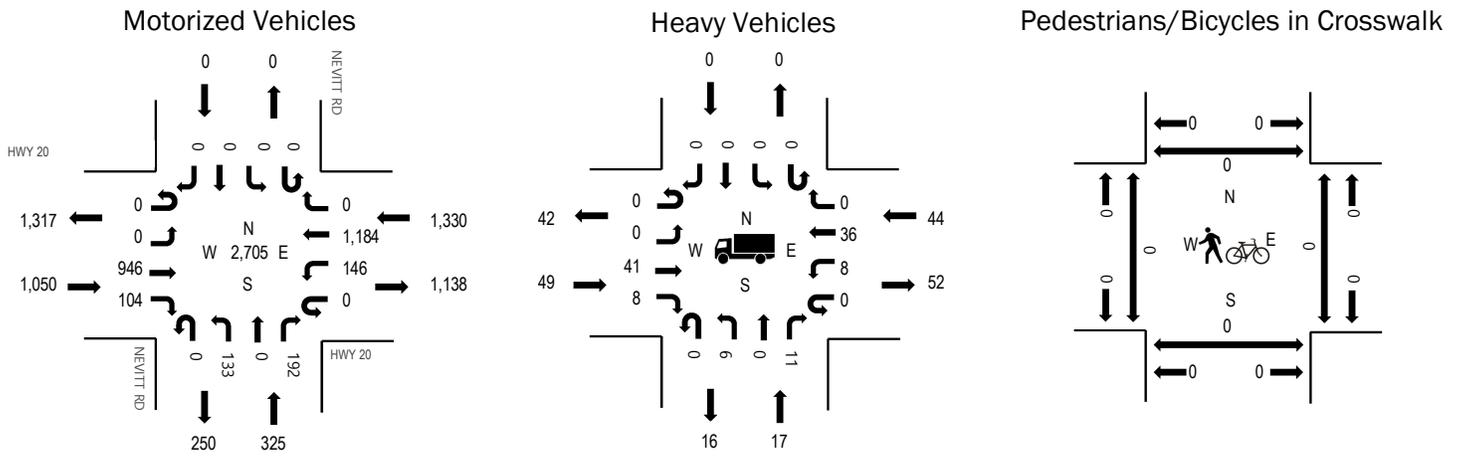
Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				I-5 SB RAMPS Northbound				I-5 SB RAMPS Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	2	77	67	0	26	168	24	0	71	2	26	0	12	32	9	516	2,416
7:15 AM	0	3	110	79	0	40	206	26	0	86	0	28	0	27	35	4	644	2,511
7:30 AM	0	2	116	74	0	34	201	28	0	85	2	22	0	29	30	5	628	2,415
7:45 AM	0	0	99	78	0	29	198	46	0	87	1	30	0	22	37	1	628	2,380
8:00 AM	0	6	119	82	0	58	172	17	0	76	4	38	0	14	19	6	611	2,383
8:15 AM	0	5	107	80	0	46	159	18	0	65	1	25	0	17	23	2	548	
8:30 AM	0	3	84	74	1	35	186	34	0	79	4	33	0	23	30	7	593	
8:45 AM	0	2	139	98	0	33	157	44	0	61	5	40	0	15	35	2	631	
Count Total	0	23	851	632	1	301	1,447	237	0	610	19	242	0	159	241	36	4,799	
Peak Hour	0	11	444	313	0	161	777	117	0	334	7	118	0	92	121	16	2,511	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	22	9	22	1	54	7:00 AM	0	0	0	0	0
7:15 AM	23	3	26	2	54	7:15 AM	0	0	0	0	0
7:30 AM	14	13	27	3	57	7:30 AM	0	0	0	0	0
7:45 AM	25	12	33	1	71	7:45 AM	0	0	0	0	0
8:00 AM	23	9	26	0	58	8:00 AM	0	0	0	0	0
8:15 AM	29	9	14	1	53	8:15 AM	0	0	1	0	1
8:30 AM	19	18	23	3	63	8:30 AM	0	0	0	0	0
8:45 AM	23	7	28	5	63	8:45 AM	0	0	0	0	0
Count Total	178	80	199	16	473	Count Total	0	0	1	0	1
Peak Hour	85	37	112	6	240	Peak Hour	0	0	0	0	0

Peak Hour



	HV%	PHF
EB	4.7%	0.96
WB	3.3%	0.95
NB	5.2%	0.94
SB	0.0%	0.00
All	4.1%	0.97

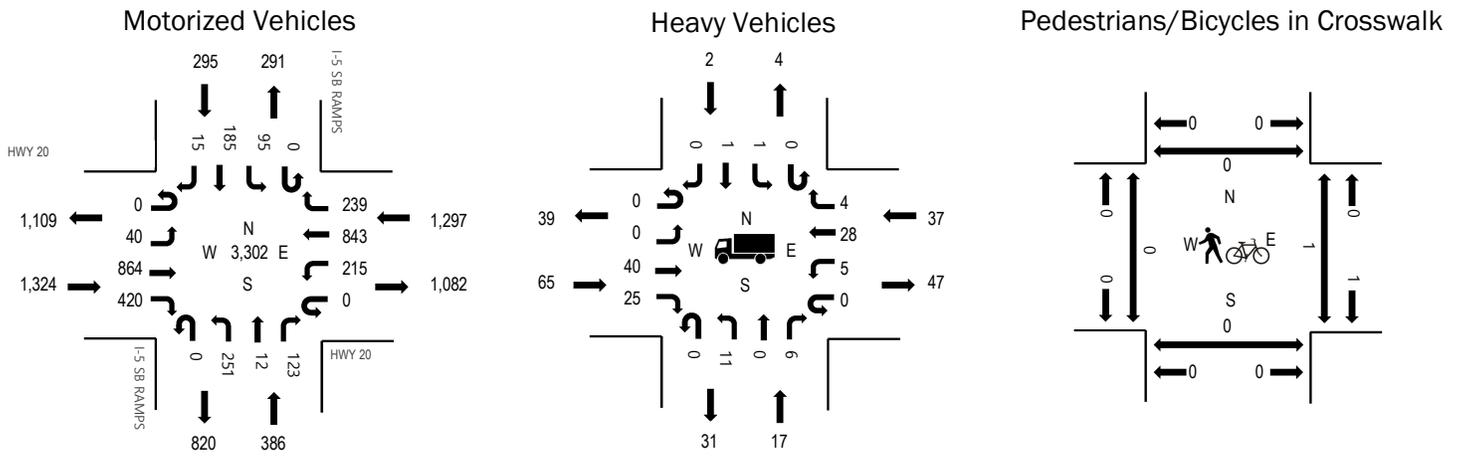
Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				NEVITT RD Northbound			NEVITT RD Southbound				Total	Rolling Hour	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru			Right
4:00 PM	0	0	242	31	0	23	327	0	0	32	0	45	0	0	0	0	700	2,705
4:15 PM	0	0	242	28	0	35	301	0	0	35	0	49	0	0	0	0	690	2,634
4:30 PM	0	0	219	23	0	47	294	0	0	29	0	49	0	0	0	0	661	2,647
4:45 PM	0	0	243	22	0	41	262	0	0	37	0	49	0	0	0	0	654	2,637
5:00 PM	0	0	201	17	0	40	298	0	0	33	0	40	0	0	0	0	629	2,553
5:15 PM	0	0	276	24	0	25	290	0	0	48	0	40	0	0	0	0	703	
5:30 PM	0	0	244	21	0	32	288	0	0	31	0	35	0	0	0	0	651	
5:45 PM	0	0	237	22	0	25	226	0	0	27	0	33	0	0	0	0	570	
Count Total	0	0	1,904	188	0	268	2,286	0	0	272	0	340	0	0	0	0	5,258	
Peak Hour	0	0	946	104	0	146	1,184	0	0	133	0	192	0	0	0	0	2,705	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Total	Interval Start Time	Pedestrians/Bicycles on Crosswalk					Total
	EB	NB	WB	SB				EB	NB	WB	SB		
4:00 PM	13	5	11	0		29	4:00 PM	0	0	0	0	0	0
4:15 PM	9	4	12	0		25	4:15 PM	0	0	0	0	0	0
4:30 PM	8	3	11	0		22	4:30 PM	0	0	0	0	0	0
4:45 PM	19	5	10	0		34	4:45 PM	0	0	0	0	0	0
5:00 PM	10	2	11	0		23	5:00 PM	0	0	0	0	0	0
5:15 PM	13	0	5	0		18	5:15 PM	0	0	0	0	0	0
5:30 PM	9	3	6	0		18	5:30 PM	0	1	0	0	1	1
5:45 PM	8	6	7	0		21	5:45 PM	0	0	0	0	0	0
Count Total	89	28	73	0		190	Count Total	0	1	0	0	1	1
Peak Hour	49	17	44	0		110	Peak Hour	0	0	0	0	0	0

Peak Hour



	HV%	PHF
EB	4.9%	0.98
WB	2.9%	0.93
NB	4.4%	0.83
SB	0.7%	0.84
All	3.7%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				I-5 SB RAMPS Northbound				I-5 SB RAMPS Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	13	202	140	0	48	211	52	0	51	5	28	0	25	37	3	815	3,263
4:15 PM	0	11	215	100	0	50	216	47	0	78	4	34	0	24	45	2	826	3,302
4:30 PM	0	10	210	118	0	47	204	52	0	60	2	26	0	28	56	4	817	3,262
4:45 PM	0	10	214	111	0	54	212	65	0	46	3	29	0	17	40	4	805	3,234
5:00 PM	0	9	225	91	0	64	211	75	0	67	3	34	0	26	44	5	854	3,183
5:15 PM	1	10	261	75	0	51	192	47	0	70	6	19	0	23	29	2	786	
5:30 PM	0	8	218	103	0	61	171	59	0	70	4	26	0	29	37	3	789	
5:45 PM	0	17	258	96	0	60	160	31	0	44	2	36	0	20	24	6	754	
Count Total	1	88	1,803	834	0	435	1,577	428	0	486	29	232	0	192	312	29	6,446	
Peak Hour	0	40	864	420	0	215	843	239	0	251	12	123	0	95	185	15	3,302	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	17	2	11	0	30	4:00 PM	0	0	0	0	0
4:15 PM	24	5	10	0	39	4:15 PM	0	0	0	0	0
4:30 PM	17	6	10	2	35	4:30 PM	0	0	0	0	0
4:45 PM	11	2	12	0	25	4:45 PM	0	0	0	0	0
5:00 PM	13	4	5	0	22	5:00 PM	0	0	1	0	1
5:15 PM	17	4	4	0	25	5:15 PM	0	0	0	0	0
5:30 PM	18	5	6	1	30	5:30 PM	0	0	0	0	0
5:45 PM	13	6	9	0	28	5:45 PM	0	0	1	0	1
Count Total	130	34	67	3	234	Count Total	0	0	2	0	2
Peak Hour	65	17	37	2	121	Peak Hour	0	0	1	0	1



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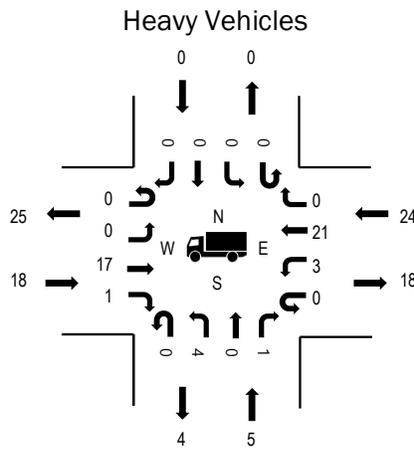
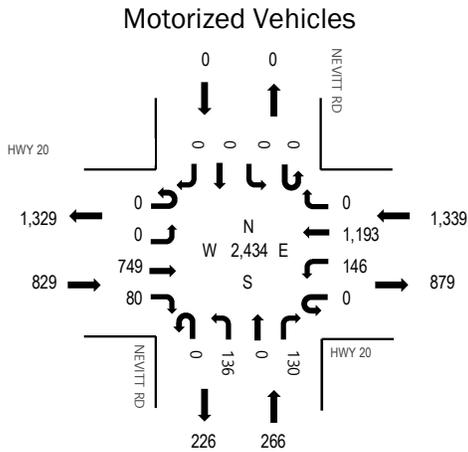
www.alltrafficdata.net

Location: 1 NEVITT RD & HWY 20 Noon

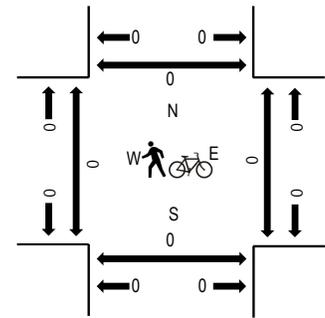
Date: Saturday, July 13, 2024

Peak Hour: 11:00 AM - 12:00 PM

Peak Hour



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	2.2%	0.87
WB	1.8%	0.89
NB	1.9%	0.89
SB	0.0%	0.00
All	1.9%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				NEVITT RD Northbound				NEVITT RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
11:00 AM	0	0	153	19	0	35	341	0	0	23	0	25	0	0	0	0	596	2,434
11:15 AM	0	0	218	19	0	33	287	0	0	45	0	30	0	0	0	0	632	2,430
11:30 AM	0	0	164	21	0	39	286	0	0	33	0	38	0	0	0	0	581	2,377
11:45 AM	0	0	214	21	0	39	279	0	0	35	0	37	0	0	0	0	625	2,388
12:00 PM	0	0	172	14	0	38	305	0	0	32	0	31	0	0	0	0	592	2,402
12:15 PM	0	0	180	21	0	23	285	0	0	40	0	30	0	0	0	0	579	
12:30 PM	0	0	159	19	0	48	296	0	0	38	0	32	0	0	0	0	592	
12:45 PM	0	0	217	30	0	32	284	0	1	42	0	33	0	0	0	0	639	
Count Total	0	0	1,477	164	0	287	2,363	0	1	288	0	256	0	0	0	0	4,836	
Peak Hour	0	0	749	80	0	146	1,193	0	0	136	0	130	0	0	0	0	2,434	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
11:00 AM	2	1	6	0	9	11:00 AM	0	0	0	0	0
11:15 AM	5	2	6	0	13	11:15 AM	0	0	0	0	0
11:30 AM	6	1	10	0	17	11:30 AM	0	0	0	0	0
11:45 AM	5	1	2	0	8	11:45 AM	0	0	0	0	0
12:00 PM	6	2	5	0	13	12:00 PM	0	0	0	0	0
12:15 PM	6	3	4	0	13	12:15 PM	0	0	0	0	0
12:30 PM	4	1	4	0	9	12:30 PM	1	0	0	0	1
12:45 PM	10	0	5	0	15	12:45 PM	0	0	0	0	0
Count Total	44	11	42	0	97	Count Total	1	0	0	0	1
Peak Hour	18	5	24	0	47	Peak Hour	0	0	0	0	0



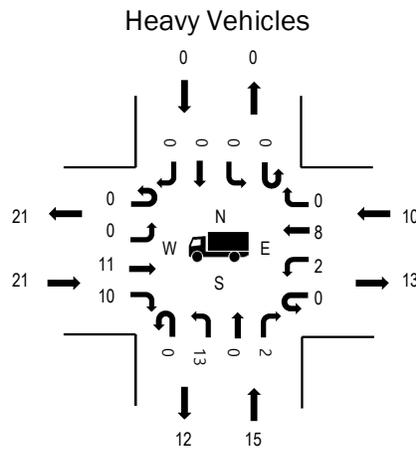
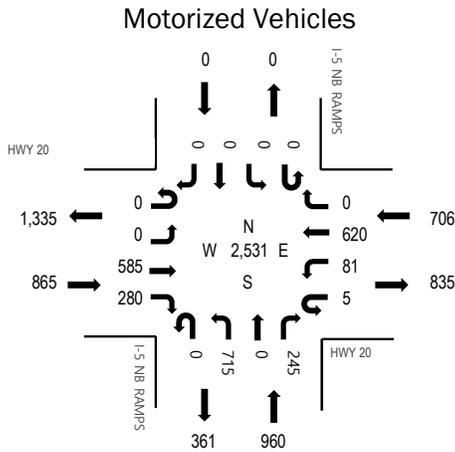
(303) 216-2439
www.alltrafficdata.net

Location: 3 I-5 NB RAMPS & HWY 20 Noon

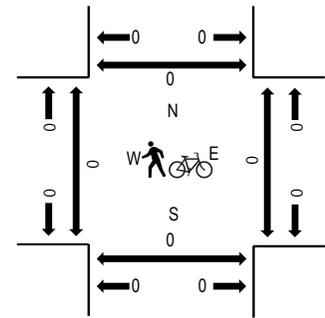
Date: Saturday, July 13, 2024

Peak Hour: 12:00 PM - 01:00 PM

Peak Hour



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	2.4%	0.92
WB	1.4%	0.92
NB	1.6%	0.92
SB	0.0%	0.00
All	1.8%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 20 Eastbound				HWY 20 Westbound				I-5 NB RAMPS Northbound				I-5 NB RAMPS Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
11:00 AM	0	0	185	70	1	21	136	0	0	175	0	58	0	0	0	0	646	2,529
11:15 AM	0	0	149	77	1	18	151	0	0	163	0	76	0	0	0	0	635	2,496
11:30 AM	0	0	152	40	0	17	161	0	0	176	0	77	0	0	0	0	623	2,512
11:45 AM	0	0	152	59	1	14	147	0	0	172	0	80	0	0	0	0	625	2,525
12:00 PM	0	0	132	81	1	12	145	0	0	184	0	58	0	0	0	0	613	2,531
12:15 PM	0	0	160	75	0	24	167	0	0	160	0	65	0	0	0	0	651	
12:30 PM	0	0	160	63	3	25	153	0	0	166	0	66	0	0	0	0	636	
12:45 PM	0	0	133	61	1	20	155	0	0	205	0	56	0	0	0	0	631	
Count Total	0	0	1,223	526	8	151	1,215	0	0	1,401	0	536	0	0	0	0	5,060	
Peak Hour	0	0	585	280	5	81	620	0	0	715	0	245	0	0	0	0	2,531	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
11:00 AM	7	12	2	0	21	11:00 AM	0	0	0	0	0
11:15 AM	7	4	2	0	13	11:15 AM	0	0	0	0	0
11:30 AM	4	1	1	0	6	11:30 AM	0	0	0	0	0
11:45 AM	8	2	5	0	15	11:45 AM	0	0	0	0	0
12:00 PM	6	3	2	0	11	12:00 PM	0	0	0	0	0
12:15 PM	6	0	3	0	9	12:15 PM	0	0	0	0	0
12:30 PM	7	5	3	0	15	12:30 PM	0	0	0	0	0
12:45 PM	2	7	2	0	11	12:45 PM	0	0	0	0	0
Count Total	47	34	20	0	101	Count Total	0	0	0	0	0
Peak Hour	21	15	10	0	46	Peak Hour	0	0	0	0	0

Appendix C

Level of Service (LOS) Methodology and Calculations

Level of Service Methodology

Level of Service (LOS) generally refers to the degree of congestion at an intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes intersection LOS.

Signalized Intersection LOS represents the average control delay (sec/veh) and can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only). The table below outlines the HCM (7th Edition) LOS criteria for signalized intersections.

LOS Criteria for Signalized Intersections ¹

Control Delay (sec/veh)	Level of Service ²	General Description ³
≤ 10	A	Exceptionally Favorable Progression (or very short cycle lengths) – Most vehicles arrive during the green indication and travel through the intersection without stopping.
> 10 to ≤ 20	B	Highly Favorable Progression (or short cycle lengths) – While more vehicles than LOS A stop, most vehicles still pass through the intersection without stopping.
> 20 to ≤ 35	C	Favorable Progression (or moderate cycle lengths) – Individual cycle failures begin to appear, but many vehicles still pass through the intersection without stopping.
> 35 to ≤ 55	D	Ineffective Progression (or long cycle lengths) – Many vehicles stop and individual cycle failures are noticeable.
> 55 to ≤ 80	E	Unfavorable Progression (and long cycle lengths) – Individual cycle failures are frequent.
> 80	F	Very Poor Progression (and long cycle lengths) – Most cycles fail to clear the queue at this level.

¹ Source: Highway Capacity Manual 7th Edition, Transportation Research Board, 2022.

² If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0, LOS F is assigned to the individual lane group. For approach-based and intersection-wide assessments at signals, LOS is defined solely by control delay.

³ Individual cycle failures: one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle.

Synchro 12 and/or HCM 2000 LOS methodology may be used when HCM 7th Edition methodology is not supported at an intersection (i.e., intersection geometry and/or custom phasing) or jurisdictional standards require use of an alternative methodology.

Unsignalized Intersection LOS (two-way stop control, all-way stop control, and roundabouts) is based on the average control delay. For two-way stop-controlled intersections, the LOS criteria apply to each controlled minor-street approach, controlled minor-street lane group, and controlled major-street movement (additional v/c ratio criteria apply to lane group LOS only). LOS is not calculated for major-street approaches or for the intersection as a whole at two-way stop-controlled intersections. For all-way stop-controlled intersections and roundabouts, LOS can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only). The table below outlines the HCM (7th Edition) LOS criteria for unsignalized intersections based on these methodologies.

LOS Criteria for Unsignalized Intersections¹

Control Delay (sec/veh)	Level of Service ²
≤ 10	A
> 10 to ≤ 15	B
> 15 to ≤ 25	C
> 25 to ≤ 35	D
> 35 to ≤ 50	E
> 50	F

¹ Source: Highway Capacity Manual 7th Edition, Transportation Research Board, 2022.

² If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0, LOS F is assigned to the individual lane group. For approach-based and intersection-wide assessments at unsignalized intersections, LOS is defined solely by control delay.

2024 Existing

Lanes, Volumes, Timings
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

Ideal Saturation Flow Rate should be 1750 for urban areas per WSDOT Synchro protocol

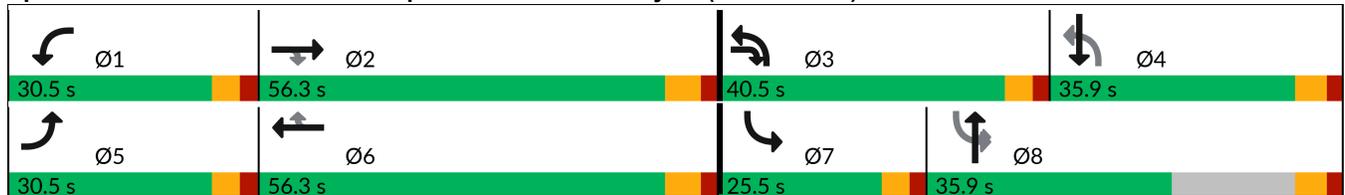
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations	↖	↖↖	↖	↖↖	↖↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	11	444	313	161	777	117	334	7	118	92	121	16
Future Volume (vph)	11	444	313	161	777	117	334	7	118	92	121	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		430			754			691				551
Travel Time (s)		6.5			14.7			18.8				15.0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	11%	11%	11%	11%	11%	8%	8%	8%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	NA
Protected Phases	5	2	3	1	6		3	8		7		4
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7		4
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0		5.0
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5		48.9
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5		35.9
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%		22.0%
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5		3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5		5.9
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag
Lead-Lag Optimize?	Yes		Yes									
Recall Mode	None	Min	None	None	Min	Min	None	Min	Min	None		None

Intersection Summary

Area Type:	Other
Cycle Length:	163.2
Actuated Cycle Length:	90.2
Natural Cycle:	120
Control Type:	Actuated-Uncoordinated

Lead-lag optimize is not allowed per WSDOT Synchro protocol

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	444	313	161	777	117	334	7	118	92	121	16
Future Volume (veh/h)	11	444	313	161	777	117	334	7	118	92	121	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737	1781	1781	1781	1856	1856	1856
Adj Flow Rate, veh/h	11	458	323	166	801	121	344	7	122	95	125	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	11	11	11	11	8	8	8	3	3	3
Cap, veh/h	14	960	736	254	1194	533	495	468	397	523	179	23
Arrive On Green	0.01	0.29	0.29	0.08	0.36	0.36	0.21	0.26	0.26	0.06	0.11	0.11
Sat Flow, veh/h	1654	3300	1472	3209	3300	1472	1697	1781	1510	1767	1612	206
Grp Volume(v), veh/h	11	458	323	166	801	121	344	7	122	95	0	141
Grp Sat Flow(s),veh/h/ln	1654	1650	1472	1605	1650	1472	1697	1781	1510	1767	0	1818
Q Serve(g_s), s	0.5	8.6	10.5	3.8	15.3	4.3	13.0	0.2	4.9	2.9	0.0	5.6
Cycle Q Clear(g_c), s	0.5	8.6	10.5	3.8	15.3	4.3	13.0	0.2	4.9	2.9	0.0	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	14	960	736	254	1194	533	495	468	397	523	0	202
V/C Ratio(X)	0.81	0.48	0.44	0.65	0.67	0.23	0.70	0.01	0.31	0.18	0.00	0.70
Avail Cap(c_a), veh/h	551	2200	1289	1069	2200	981	931	712	604	892	0	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.1	21.9	12.0	33.5	20.2	16.6	22.0	20.5	22.2	18.3	0.0	32.1
Incr Delay (d2), s/veh	55.5	0.5	0.6	2.1	0.9	0.3	1.3	0.0	0.4	0.1	0.0	4.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.0	3.3	1.5	5.5	1.4	5.1	0.1	1.7	1.2	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	92.6	22.4	12.6	35.6	21.1	16.9	23.3	20.5	22.6	18.4	0.0	36.4
LnGrp LOS	F	C	B	D	C	B	C	C	C	B		D
Approach Vol, veh/h	792			1088			473			236		
Approach Delay, s/veh	19.4			22.9			23.1			29.2		
Approach LOS	B			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.4	28.1	21.2	14.2	6.1	33.4	9.8	25.6				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	5.8	12.5	15.0	7.6	2.5	17.3	4.9	6.9				
Green Ext Time (p_c), s	0.4	6.6	0.8	0.7	0.0	9.8	0.1	0.4				

Intersection Summary

HCM 7th Control Delay, s/veh	22.4
HCM 7th LOS	C

Notes

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

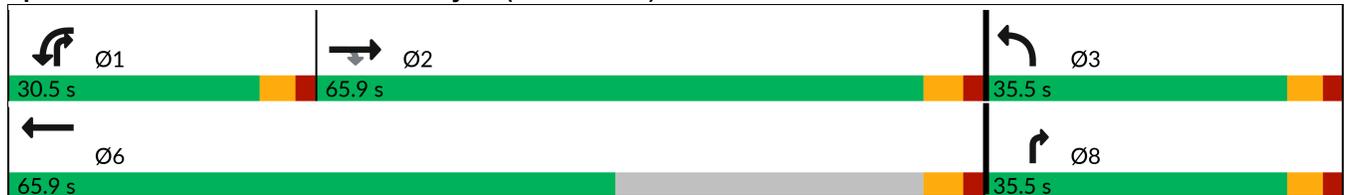
09/04/2024

	→	↘	↙	←	↖	↗	Ø8
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑	
Traffic Volume (vph)	515	111	176	882	171	125	
Future Volume (vph)	515	111	176	882	171	125	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	754			985	262		
Travel Time (s)	14.7			19.2	7.1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	12%	12%	10%	10%	12%	12%	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 66.4
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

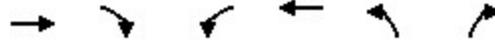
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑↑
Traffic Volume (veh/h)	515	111	176	882	171	125
Future Volume (veh/h)	515	111	176	882	171	125
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1722	1722	1752	1752	1722	1722
Adj Flow Rate, veh/h	554	0	189	948	184	134
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	10	10	12	12
Cap, veh/h	1036		243	1938	277	809
Arrive On Green	0.32	0.00	0.15	0.58	0.17	0.17
Sat Flow, veh/h	3358	1459	1668	3416	1640	2569
Grp Volume(v), veh/h	554	0	189	948	184	134
Grp Sat Flow(s),veh/h/ln	1636	1459	1668	1664	1640	1284
Q Serve(g_s), s	6.4	0.0	5.0	7.6	4.8	1.7
Cycle Q Clear(g_c), s	6.4	0.0	5.0	7.6	4.8	1.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1036		243	1938	277	809
V/C Ratio(X)	0.53		0.78	0.49	0.66	0.17
Avail Cap(c_a), veh/h	4282		910	4356	1073	2055
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	18.9	5.6	17.8	11.4
Incr Delay (d2), s/veh	0.6	0.0	4.0	0.3	2.7	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	1.9	1.5	1.8	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	13.5	0.0	22.8	5.9	20.5	11.4
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	554			1137	318	
Approach Delay, s/veh	13.5			8.7	16.7	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.2	20.4			32.6	13.3
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	7.0	8.4			9.6	6.8
Green Ext Time (p_c), s	0.3	6.1			12.4	1.1

Intersection Summary						
HCM 7th Control Delay, s/veh			11.3			
HCM 7th LOS			B			

Notes
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

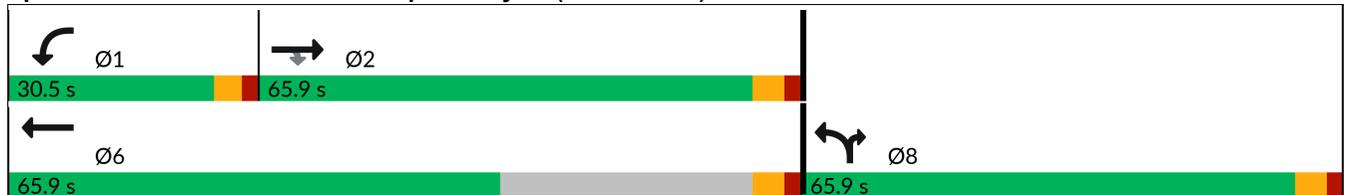


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑↑	↑
Traffic Volume (vph)	338	219	30	512	545	207
Future Volume (vph)	338	219	30	512	545	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	985			373	648	
Travel Time (s)	19.2			7.3	17.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	9%	8%	8%	10%	2%
Shared Lane Traffic (%)						10%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 54.1
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑	↖↖	↗
Traffic Volume (veh/h)	338	219	30	512	545	207
Future Volume (veh/h)	338	219	30	512	545	207
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1767	1767	1781	1781	1752	1870
Adj Flow Rate, veh/h	380	0	34	575	612	233
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	9	9	8	8	10	2
Cap, veh/h	814		67	1410	980	466
Arrive On Green	0.24	0.00	0.04	0.42	0.29	0.29
Sat Flow, veh/h	3445	1497	1697	3474	3337	1585
Grp Volume(v), veh/h	380	0	34	575	612	233
Grp Sat Flow(s),veh/h/ln	1678	1497	1697	1692	1668	1585
Q Serve(g_s), s	3.9	0.0	0.8	4.9	6.5	5.0
Cycle Q Clear(g_c), s	3.9	0.0	0.8	4.9	6.5	5.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	814		67	1410	980	466
V/C Ratio(X)	0.47		0.51	0.41	0.62	0.50
Avail Cap(c_a), veh/h	4942		1041	4984	4913	2334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	19.2	8.4	12.4	11.9
Incr Delay (d2), s/veh	0.6	0.0	4.4	0.3	0.7	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.4	1.3	2.1	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	13.8	0.0	23.6	8.6	13.1	12.7
LnGrp LOS	B		C	A	B	B
Approach Vol, veh/h	380			609	845	
Approach Delay, s/veh	13.8			9.5	13.0	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.1	15.8			22.9	17.9
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	2.8	5.9			6.9	8.5
Green Ext Time (p_c), s	0.0	3.9			6.4	3.5

Intersection Summary

HCM 7th Control Delay, s/veh	12.0
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

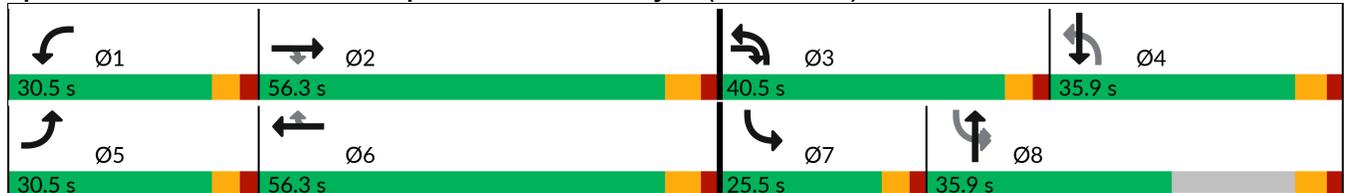
09/04/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	864	420	215	843	239	251	12	123	95	185	15
Future Volume (vph)	40	864	420	215	843	239	251	12	123	95	185	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		576			738			872				571
Travel Time (s)		8.7			14.4			23.8				15.6
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	4%	4%	4%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None	None	

Intersection Summary

Area Type: Other
 Cycle Length: 163.2
 Actuated Cycle Length: 112.8
 Natural Cycle: 120
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 							
Traffic Volume (veh/h)	40	864	420	215	843	239	251	12	123	95	185	15
Future Volume (veh/h)	40	864	420	215	843	239	251	12	123	95	185	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1841	1841	1841	1885	1885	1885
Adj Flow Rate, veh/h	41	891	433	222	869	246	259	12	127	98	191	15
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	3	3	3	4	4	4	1	1	1
Cap, veh/h	52	1282	803	306	1513	675	382	433	366	472	249	20
Arrive On Green	0.03	0.37	0.37	0.09	0.43	0.43	0.15	0.24	0.24	0.06	0.14	0.14
Sat Flow, veh/h	1739	3469	1547	3428	3526	1572	1753	1841	1558	1795	1725	135
Grp Volume(v), veh/h	41	891	433	222	869	246	259	12	127	98	0	206
Grp Sat Flow(s),veh/h/ln	1739	1735	1547	1714	1763	1572	1753	1841	1558	1795	0	1860
Q Serve(g_s), s	2.2	20.4	17.5	5.9	17.5	9.9	11.5	0.5	6.4	3.8	0.0	10.0
Cycle Q Clear(g_c), s	2.2	20.4	17.5	5.9	17.5	9.9	11.5	0.5	6.4	3.8	0.0	10.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	52	1282	803	306	1513	675	382	433	366	472	0	268
V/C Ratio(X)	0.79	0.70	0.54	0.72	0.57	0.36	0.68	0.03	0.35	0.21	0.00	0.77
Avail Cap(c_a), veh/h	464	1851	1057	915	1882	839	775	589	499	750	0	596
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.2	25.1	15.1	41.5	20.3	18.1	28.1	27.6	29.8	24.7	0.0	38.6
Incr Delay (d2), s/veh	18.1	1.0	0.8	2.4	0.5	0.5	1.6	0.0	0.6	0.2	0.0	4.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	7.9	6.1	2.5	6.9	3.6	4.9	0.2	2.4	1.6	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.2	26.0	15.9	44.0	20.8	18.6	29.7	27.6	30.4	24.9	0.0	43.2
LnGrp LOS	E	C	B	D	C	B	C	C	C	C		D
Approach Vol, veh/h	1365			1337			398			304		
Approach Delay, s/veh	23.9			24.2			29.9			37.3		
Approach LOS	C			C			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.9	40.9	19.5	19.4	8.3	46.5	11.0	27.9				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	7.9	22.4	13.5	12.0	4.2	19.5	5.8	8.4				
Green Ext Time (p_c), s	0.5	12.2	0.5	1.1	0.0	11.4	0.1	0.4				

Intersection Summary

HCM 7th Control Delay, s/veh	25.9
HCM 7th LOS	C

Notes

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

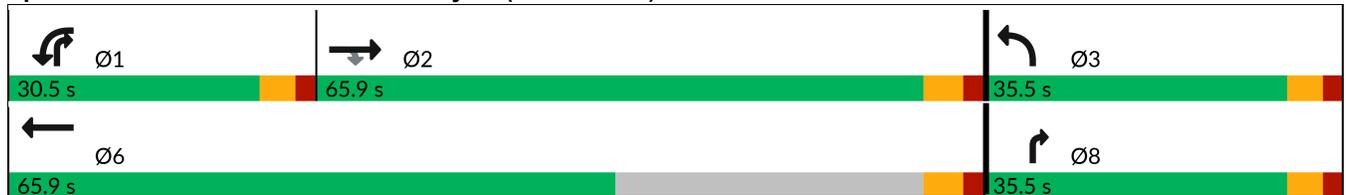
09/04/2024

	→	↘	↙	←	↖	↗	Ø8
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑↑	
Traffic Volume (vph)	946	104	146	1184	133	192	
Future Volume (vph)	946	104	146	1184	133	192	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	738			984	262		
Travel Time (s)	14.4			19.2	7.1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	
Heavy Vehicles (%)	5%	5%	3%	3%	5%	5%	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 77.2
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↗	↑↙	↑↑	↑↖	↑↗
Traffic Volume (veh/h)	946	104	146	1184	133	192
Future Volume (veh/h)	946	104	146	1184	133	192
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1826	1826
Adj Flow Rate, veh/h	975	0	151	1221	137	198
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	5	5
Cap, veh/h	1611		197	2368	225	656
Arrive On Green	0.46	0.00	0.11	0.67	0.13	0.13
Sat Flow, veh/h	3561	1547	1767	3618	1739	2723
Grp Volume(v), veh/h	975	0	151	1221	137	198
Grp Sat Flow(s),veh/h/ln	1735	1547	1767	1763	1739	1362
Q Serve(g_s), s	12.0	0.0	4.8	10.0	4.3	3.4
Cycle Q Clear(g_c), s	12.0	0.0	4.8	10.0	4.3	3.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1611		197	2368	225	656
V/C Ratio(X)	0.61		0.77	0.52	0.61	0.30
Avail Cap(c_a), veh/h	3631		771	3690	910	1728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.4	0.0	24.8	4.7	23.6	17.8
Incr Delay (d2), s/veh	0.5	0.0	4.6	0.2	2.7	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	2.1	2.1	1.8	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.0	0.0	29.4	5.0	26.2	18.1
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	975			1372	335	
Approach Delay, s/veh	12.0			7.7	21.4	
Approach LOS	B			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.9	32.5			44.4	12.9
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	6.8	14.0			12.0	6.3
Green Ext Time (p_c), s	0.3	12.6			17.8	1.2

Intersection Summary

HCM 7th Control Delay, s/veh	10.9
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

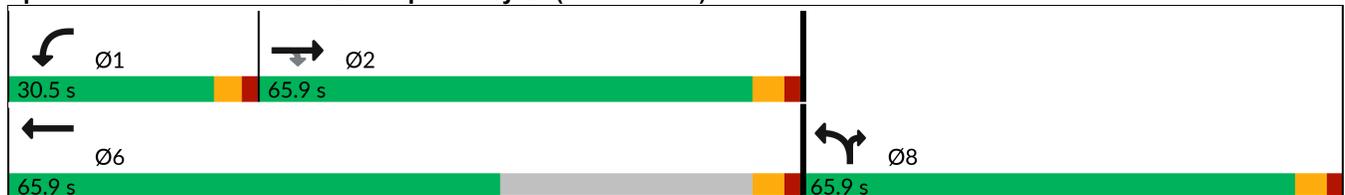
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (vph)	654	451	117	751	529	307
Future Volume (vph)	654	451	117	751	529	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	984			319	654	
Travel Time (s)	19.2			6.2	17.8	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	2%	2%	4%	4%
Shared Lane Traffic (%)						15%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 89.4
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (veh/h)	654	451	117	751	529	307
Future Volume (veh/h)	654	451	117	751	529	307
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1870	1870	1841	1841
Adj Flow Rate, veh/h	711	0	127	816	604	303
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	2	2	4	4
Cap, veh/h	1198		167	1879	955	425
Arrive On Green	0.34	0.00	0.09	0.53	0.27	0.27
Sat Flow, veh/h	3589	1560	1781	3647	3506	1560
Grp Volume(v), veh/h	711	0	127	816	604	303
Grp Sat Flow(s),veh/h/ln	1749	1560	1781	1777	1753	1560
Q Serve(g_s), s	10.0	0.0	4.1	8.3	9.0	10.4
Cycle Q Clear(g_c), s	10.0	0.0	4.1	8.3	9.0	10.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1198		167	1879	955	425
V/C Ratio(X)	0.59		0.76	0.43	0.63	0.71
Avail Cap(c_a), veh/h	3533		750	3590	3542	1576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	26.3	8.6	19.0	19.5
Incr Delay (d2), s/veh	0.7	0.0	5.3	0.2	0.7	2.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	1.9	2.5	3.5	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.8	0.0	31.5	8.8	19.7	21.7
LnGrp LOS	B		C	A	B	C
Approach Vol, veh/h	711			943	907	
Approach Delay, s/veh	16.8			11.9	20.4	
Approach LOS	B			B	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.1	26.3			37.3	22.1
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	6.1	12.0			10.3	12.4
Green Ext Time (p_c), s	0.2	8.2			9.9	3.8

Intersection Summary

HCM 7th Control Delay, s/veh	16.2
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings

1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	686	466	235	932	163	276	5	137	77	130	15
Future Volume (vph)	15	686	466	235	932	163	276	5	137	77	130	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25			25	
Link Distance (ft)		576			738			872			571	
Travel Time (s)		8.7			14.4			23.8			15.6	
Confl. Peds. (#/hr)									3			3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 163.2

Actuated Cycle Length: 99.1

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	686	466	235	932	163	276	5	137	77	130	15
Future Volume (veh/h)	15	686	466	235	932	163	276	5	137	77	130	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	15	700	476	240	951	166	282	5	140	79	133	15
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	1	1	1
Cap, veh/h	19	1245	816	332	1549	691	432	446	377	467	207	23
Arrive On Green	0.01	0.35	0.35	0.10	0.44	0.44	0.16	0.24	0.24	0.05	0.12	0.12
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1767	1856	1567	1795	1662	187
Grp Volume(v), veh/h	15	700	476	240	951	166	282	5	140	79	0	148
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1767	1856	1567	1795	0	1850
Q Serve(g_s), s	0.7	14.0	18.3	5.9	18.1	5.8	11.8	0.2	6.5	2.9	0.0	6.7
Cycle Q Clear(g_c), s	0.7	14.0	18.3	5.9	18.1	5.8	11.8	0.2	6.5	2.9	0.0	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	19	1245	816	332	1549	691	432	446	377	467	0	230
V/C Ratio(X)	0.80	0.56	0.58	0.72	0.61	0.24	0.65	0.01	0.37	0.17	0.00	0.64
Avail Cap(c_a), veh/h	508	2026	1164	985	2026	904	847	635	536	789	0	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.3	23.0	14.8	38.5	19.0	15.6	26.7	25.4	27.8	23.2	0.0	36.5
Incr Delay (d2), s/veh	42.8	0.6	0.9	2.2	0.6	0.3	1.2	0.0	0.6	0.1	0.0	3.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.4	6.4	2.5	7.0	2.1	5.0	0.1	2.5	1.2	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	86.1	23.6	15.7	40.7	19.6	15.8	28.0	25.4	28.4	23.3	0.0	39.5
LnGrp LOS	F	C	B	D	B	B	C	C	C	C		D
Approach Vol, veh/h	1191			1357			427			227		
Approach Delay, s/veh	21.2			22.9			28.1			33.9		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.9	37.0	19.9	16.8	6.4	44.5	9.7	27.0				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	7.9	20.3	13.8	8.7	2.7	20.1	4.9	8.5				
Green Ext Time (p_c), s	0.5	10.5	0.6	0.8	0.0	11.8	0.1	0.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			23.7									
HCM 7th LOS			C									

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

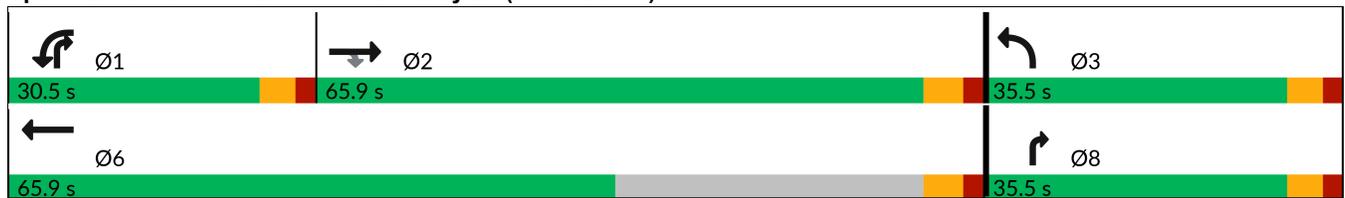
09/04/2024

	→	↘	↙	←	↖	↗	Ø8
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗↗	
Traffic Volume (vph)	749	80	146	1193	136	130	
Future Volume (vph)	749	80	146	1193	136	130	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	738			984	262		
Travel Time (s)	14.4			19.2	7.1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 66.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	749	80	146	1193	136	130
Future Volume (veh/h)	749	80	146	1193	136	130
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	780	0	152	1243	142	135
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1434		201	2240	236	685
Arrive On Green	0.40	0.00	0.11	0.63	0.13	0.13
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	780	0	152	1243	142	135
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	8.1	0.0	4.0	9.6	3.6	1.8
Cycle Q Clear(g_c), s	8.1	0.0	4.0	9.6	3.6	1.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1434		201	2240	236	685
V/C Ratio(X)	0.54		0.76	0.55	0.60	0.20
Avail Cap(c_a), veh/h	4431		925	4431	1110	2054
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.0	0.0	20.7	5.1	19.7	14.4
Incr Delay (d2), s/veh	0.5	0.0	4.3	0.3	2.4	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	1.7	1.8	1.5	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.4	0.0	25.0	5.4	22.1	14.5
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	780			1395	277	
Approach Delay, s/veh	11.4			7.5	18.4	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.9	25.3			36.2	11.9
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	6.0	10.1			11.6	5.6
Green Ext Time (p_c), s	0.3	9.3			18.3	0.9

Intersection Summary

HCM 7th Control Delay, s/veh	10.0
HCM 7th LOS	A

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

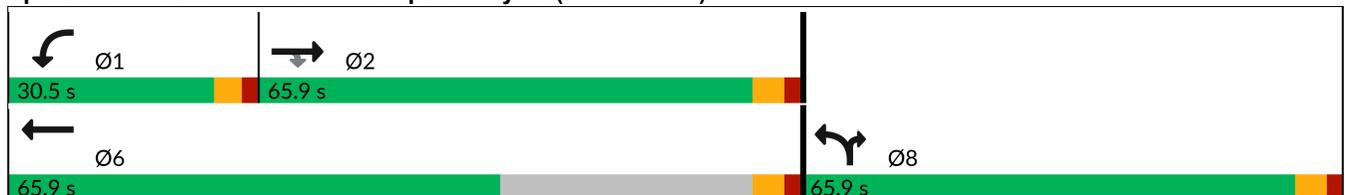
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑	↖↖	↗
Traffic Volume (vph)	585	280	86	620	715	245
Future Volume (vph)	585	280	86	620	715	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	984			319	654	
Travel Time (s)	19.2			6.2	17.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Shared Lane Traffic (%)						10%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 77.5
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (veh/h)	585	280	86	620	715	245
Future Volume (veh/h)	585	280	86	620	715	245
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	603	0	89	639	737	253
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	1086		124	1712	1068	475
Arrive On Green	0.31	0.00	0.07	0.48	0.30	0.30
Sat Flow, veh/h	3647	1585	1795	3676	3563	1585
Grp Volume(v), veh/h	603	0	89	639	737	253
Grp Sat Flow(s),veh/h/ln	1777	1585	1795	1791	1781	1585
Q Serve(g_s), s	7.5	0.0	2.6	6.0	9.7	7.1
Cycle Q Clear(g_c), s	7.5	0.0	2.6	6.0	9.7	7.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1086		124	1712	1068	475
V/C Ratio(X)	0.56		0.72	0.37	0.69	0.53
Avail Cap(c_a), veh/h	4014		845	4046	4024	1791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	24.2	8.8	16.4	15.5
Incr Delay (d2), s/veh	0.6	0.0	5.8	0.2	0.8	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	1.2	1.8	3.7	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.1	0.0	30.0	9.0	17.2	16.4
LnGrp LOS	B		C	A	B	B
Approach Vol, veh/h	603			728	990	
Approach Delay, s/veh	16.1			11.6	17.0	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.2	22.1			31.3	21.8
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	4.6	9.5			8.0	11.7
Green Ext Time (p_c), s	0.1	6.7			7.2	4.2

Intersection Summary

HCM 7th Control Delay, s/veh	15.1
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

2026 No Action

Lanes, Volumes, Timings

1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	471	332	171	824	124	354	7	125	98	128	17
Future Volume (vph)	12	471	332	171	824	124	354	7	125	98	128	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		430			754			691				551
Travel Time (s)		6.5			14.7			18.8				15.0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	11%	11%	11%	11%	11%	8%	8%	8%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	Min	Min	None	None	

Intersection Summary

Area Type: Other

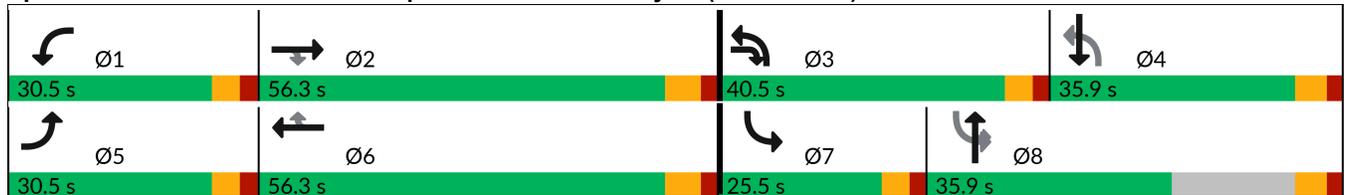
Cycle Length: 163.2

Actuated Cycle Length: 97.5

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 							
Traffic Volume (veh/h)	12	471	332	171	824	124	354	7	125	98	128	17
Future Volume (veh/h)	12	471	332	171	824	124	354	7	125	98	128	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737	1781	1781	1781	1856	1856	1856
Adj Flow Rate, veh/h	12	486	342	176	849	128	365	7	129	101	132	18
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	11	11	11	11	8	8	8	3	3	3
Cap, veh/h	15	984	760	261	1224	546	500	485	411	530	183	25
Arrive On Green	0.01	0.30	0.30	0.08	0.37	0.37	0.22	0.27	0.27	0.06	0.11	0.11
Sat Flow, veh/h	1654	3300	1472	3209	3300	1472	1697	1781	1510	1767	1598	218
Grp Volume(v), veh/h	12	486	342	176	849	128	365	7	129	101	0	150
Grp Sat Flow(s),veh/h/ln	1654	1650	1472	1605	1650	1472	1697	1781	1510	1767	0	1816
Q Serve(g_s), s	0.6	9.8	11.8	4.3	17.5	4.8	14.7	0.2	5.5	3.3	0.0	6.4
Cycle Q Clear(g_c), s	0.6	9.8	11.8	4.3	17.5	4.8	14.7	0.2	5.5	3.3	0.0	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	15	984	760	261	1224	546	500	485	411	530	0	208
V/C Ratio(X)	0.83	0.49	0.45	0.67	0.69	0.23	0.73	0.01	0.31	0.19	0.00	0.72
Avail Cap(c_a), veh/h	514	2050	1235	997	2050	914	868	664	563	863	0	677
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	23.2	12.3	35.9	21.5	17.5	23.2	21.4	23.3	19.0	0.0	34.4
Incr Delay (d2), s/veh	55.5	0.5	0.6	2.3	1.0	0.3	1.5	0.0	0.4	0.1	0.0	4.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.5	3.8	1.7	6.4	1.6	5.9	0.1	2.0	1.3	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	95.3	23.8	12.9	38.2	22.5	17.8	24.8	21.4	23.7	19.2	0.0	39.1
LnGrp LOS	F	C	B	D	C	B	C	C	C	B		D
Approach Vol, veh/h	840			1153			501			251		
Approach Delay, s/veh	20.4			24.3			24.5			31.1		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	30.3	23.0	15.1	6.2	36.1	10.3	27.8				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	6.3	13.8	16.7	8.4	2.6	19.5	5.3	7.5				
Green Ext Time (p_c), s	0.4	7.1	0.8	0.8	0.0	10.3	0.1	0.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			23.8									
HCM 7th LOS			C									

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

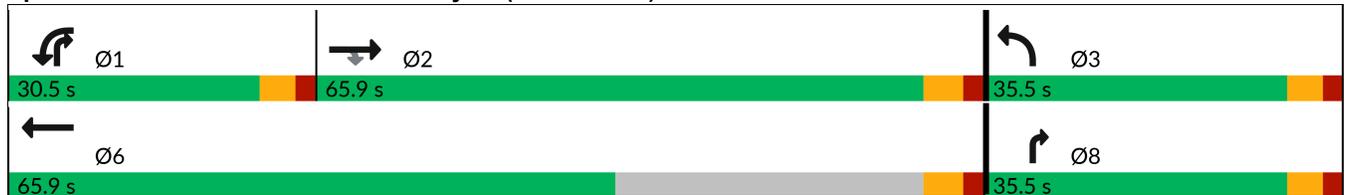
09/04/2024

	→	↘	↙	←	↖	↗	Ø8
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑	
Traffic Volume (vph)	546	118	187	936	181	133	
Future Volume (vph)	546	118	187	936	181	133	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	754			985	262		
Travel Time (s)	14.7			19.2	7.1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	12%	12%	10%	10%	12%	12%	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 70.1
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↗	↑↙	↑↑	↑↖	↑↗
Traffic Volume (veh/h)	546	118	187	936	181	133
Future Volume (veh/h)	546	118	187	936	181	133
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1722	1722	1752	1752	1722	1722
Adj Flow Rate, veh/h	587	0	201	1006	195	143
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	10	10	12	12
Cap, veh/h	1060		256	1967	286	843
Arrive On Green	0.32	0.00	0.15	0.59	0.17	0.17
Sat Flow, veh/h	3358	1459	1668	3416	1640	2569
Grp Volume(v), veh/h	587	0	201	1006	195	143
Grp Sat Flow(s),veh/h/ln	1636	1459	1668	1664	1640	1284
Q Serve(g_s), s	7.2	0.0	5.6	8.6	5.4	1.9
Cycle Q Clear(g_c), s	7.2	0.0	5.6	8.6	5.4	1.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1060		256	1967	286	843
V/C Ratio(X)	0.55		0.78	0.51	0.68	0.17
Avail Cap(c_a), veh/h	4041		859	4111	1013	1981
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	19.8	5.8	18.8	11.6
Incr Delay (d2), s/veh	0.6	0.0	3.9	0.3	2.9	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	2.2	1.8	2.1	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.2	0.0	23.7	6.1	21.6	11.7
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	587			1207	338	
Approach Delay, s/veh	14.2			9.0	17.4	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.0	21.6			34.6	14.0
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	7.6	9.2			10.6	7.4
Green Ext Time (p_c), s	0.4	6.6			13.5	1.1

Intersection Summary

HCM 7th Control Delay, s/veh	11.8
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

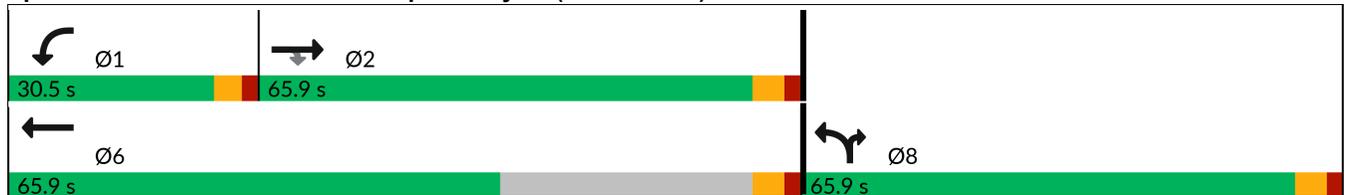
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (vph)	359	232	32	543	578	220
Future Volume (vph)	359	232	32	543	578	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	985			373	648	
Travel Time (s)	19.2			7.3	17.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	9%	8%	8%	10%	2%
Shared Lane Traffic (%)						10%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 58.9
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑	↖↖	↗
Traffic Volume (veh/h)	359	232	32	543	578	220
Future Volume (veh/h)	359	232	32	543	578	220
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1767	1767	1781	1781	1752	1870
Adj Flow Rate, veh/h	403	0	36	610	649	247
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	9	9	8	8	10	2
Cap, veh/h	834		69	1417	1014	482
Arrive On Green	0.25	0.00	0.04	0.42	0.30	0.30
Sat Flow, veh/h	3445	1497	1697	3474	3337	1585
Grp Volume(v), veh/h	403	0	36	610	649	247
Grp Sat Flow(s),veh/h/ln	1678	1497	1697	1692	1668	1585
Q Serve(g_s), s	4.4	0.0	0.9	5.4	7.1	5.5
Cycle Q Clear(g_c), s	4.4	0.0	0.9	5.4	7.1	5.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	834		69	1417	1014	482
V/C Ratio(X)	0.48		0.52	0.43	0.64	0.51
Avail Cap(c_a), veh/h	4737		998	4776	4709	2237
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.6	0.0	20.0	8.8	12.8	12.2
Incr Delay (d2), s/veh	0.6	0.0	4.4	0.3	0.7	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.4	1.5	2.3	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.3	0.0	24.4	9.1	13.5	13.1
LnGrp LOS	B		C	A	B	B
Approach Vol, veh/h	403			646	896	
Approach Delay, s/veh	14.3			9.9	13.4	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.2	16.5			23.7	18.8
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	2.9	6.4			7.4	9.1
Green Ext Time (p_c), s	0.0	4.2			6.9	3.8

Intersection Summary

HCM 7th Control Delay, s/veh	12.4
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	917	446	228	894	254	266	13	130	101	196	16
Future Volume (vph)	42	917	446	228	894	254	266	13	130	101	196	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		576			738			872				571
Travel Time (s)		8.7			14.4			23.8				15.6
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	4%	4%	4%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None	None	

Intersection Summary

Area Type: Other

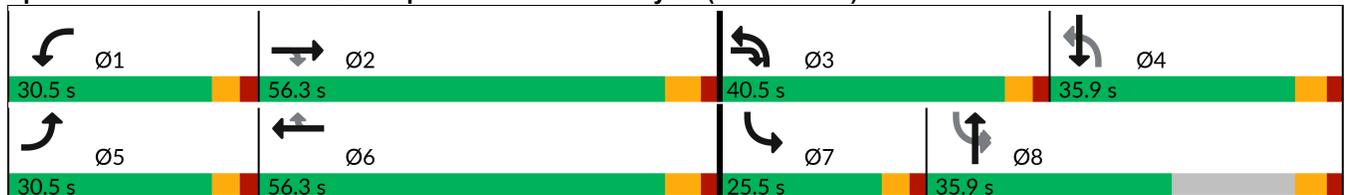
Cycle Length: 163.2

Actuated Cycle Length: 120

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	917	446	228	894	254	266	13	130	101	196	16
Future Volume (veh/h)	42	917	446	228	894	254	266	13	130	101	196	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1841	1841	1841	1885	1885	1885
Adj Flow Rate, veh/h	43	945	460	235	922	262	274	13	134	104	202	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	3	3	3	4	4	4	1	1	1
Cap, veh/h	55	1303	820	314	1536	685	383	446	377	476	256	20
Arrive On Green	0.03	0.38	0.38	0.09	0.44	0.44	0.15	0.24	0.24	0.06	0.15	0.15
Sat Flow, veh/h	1739	3469	1547	3428	3526	1572	1753	1841	1558	1795	1724	137
Grp Volume(v), veh/h	43	945	460	235	922	262	274	13	134	104	0	218
Grp Sat Flow(s),veh/h/ln	1739	1735	1547	1714	1763	1572	1753	1841	1558	1795	0	1860
Q Serve(g_s), s	2.5	23.6	20.1	6.7	20.2	11.4	13.0	0.5	7.2	4.3	0.0	11.4
Cycle Q Clear(g_c), s	2.5	23.6	20.1	6.7	20.2	11.4	13.0	0.5	7.2	4.3	0.0	11.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	55	1303	820	314	1536	685	383	446	377	476	0	276
V/C Ratio(X)	0.79	0.73	0.56	0.75	0.60	0.38	0.72	0.03	0.36	0.22	0.00	0.79
Avail Cap(c_a), veh/h	431	1719	1006	849	1747	779	720	547	463	723	0	553
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.5	27.0	15.8	44.7	21.7	19.3	29.9	29.2	31.7	26.0	0.0	41.5
Incr Delay (d2), s/veh	16.7	1.4	0.9	2.7	0.6	0.5	1.9	0.0	0.6	0.2	0.0	5.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	9.3	7.1	2.9	8.1	4.2	5.7	0.2	2.8	1.9	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.2	28.4	16.7	47.3	22.4	19.8	31.8	29.2	32.3	26.2	0.0	46.5
LnGrp LOS	E	C	B	D	C	B	C	C	C	C		D
Approach Vol, veh/h	1448			1419			421			322		
Approach Delay, s/veh	25.8			26.0			31.9			39.9		
Approach LOS	C			C			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.7	44.2	21.1	20.9	8.7	50.3	11.6	30.3				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	8.7	25.6	15.0	13.4	4.5	22.2	6.3	9.2				
Green Ext Time (p_c), s	0.5	12.3	0.6	1.1	0.0	11.8	0.1	0.5				

Intersection Summary												
HCM 7th Control Delay, s/veh	27.8											
HCM 7th LOS	C											

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

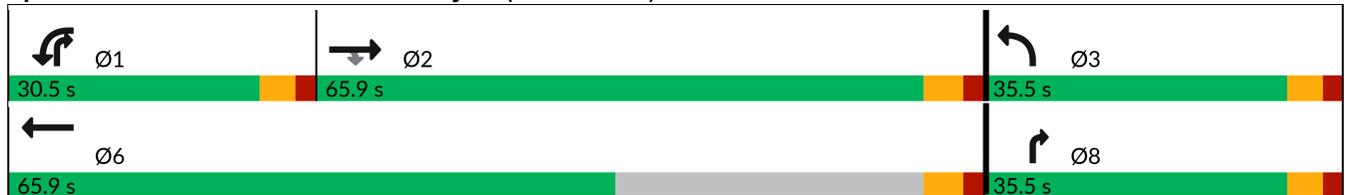
09/04/2024

	→	↘	↙	←	↖	↗	Ø8
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗↗	
Traffic Volume (vph)	1004	110	155	1256	141	204	
Future Volume (vph)	1004	110	155	1256	141	204	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	738			984	262		
Travel Time (s)	14.4			19.2	7.1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	
Heavy Vehicles (%)	5%	5%	3%	3%	5%	5%	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 82
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑
Traffic Volume (veh/h)	1004	110	155	1256	141	204
Future Volume (veh/h)	1004	110	155	1256	141	204
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1826	1826
Adj Flow Rate, veh/h	1035	0	160	1295	145	210
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	5	5
Cap, veh/h	1654		206	2408	229	676
Arrive On Green	0.48	0.00	0.12	0.68	0.13	0.13
Sat Flow, veh/h	3561	1547	1767	3618	1739	2723
Grp Volume(v), veh/h	1035	0	160	1295	145	210
Grp Sat Flow(s),veh/h/ln	1735	1547	1767	1763	1739	1362
Q Serve(g_s), s	13.7	0.0	5.4	11.3	4.9	3.9
Cycle Q Clear(g_c), s	13.7	0.0	5.4	11.3	4.9	3.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1654		206	2408	229	676
V/C Ratio(X)	0.63		0.78	0.54	0.63	0.31
Avail Cap(c_a), veh/h	3385		718	3440	848	1647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.0	0.0	26.4	4.9	25.3	18.8
Incr Delay (d2), s/veh	0.6	0.0	4.6	0.3	2.9	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	2.4	2.4	2.1	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.6	0.0	31.0	5.2	28.2	19.1
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	1035			1455	355	
Approach Delay, s/veh	12.6			8.0	22.8	
Approach LOS	B			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.7	35.2			47.9	13.6
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	7.4	15.7			13.3	6.9
Green Ext Time (p_c), s	0.3	13.6			19.3	1.3

Intersection Summary

HCM 7th Control Delay, s/veh	11.5
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

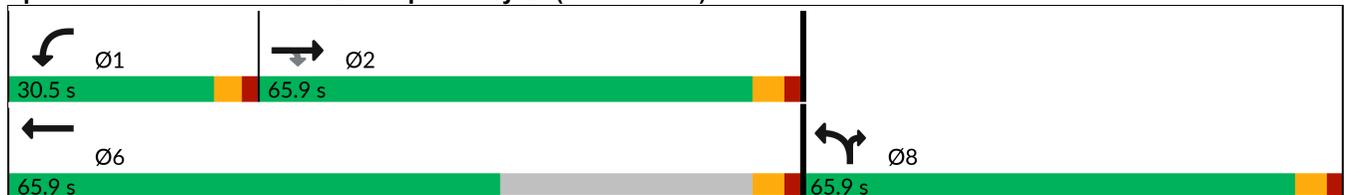
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (vph)	694	478	124	797	561	326
Future Volume (vph)	694	478	124	797	561	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	984			319	654	
Travel Time (s)	19.2			6.2	17.8	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	2%	2%	4%	4%
Shared Lane Traffic (%)						15%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 96.8
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (veh/h)	694	478	124	797	561	326
Future Volume (veh/h)	694	478	124	797	561	326
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1870	1870	1841	1841
Adj Flow Rate, veh/h	754	0	135	866	640	321
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	2	2	4	4
Cap, veh/h	1225		176	1901	985	438
Arrive On Green	0.35	0.00	0.10	0.53	0.28	0.28
Sat Flow, veh/h	3589	1560	1781	3647	3506	1560
Grp Volume(v), veh/h	754	0	135	866	640	321
Grp Sat Flow(s),veh/h/ln	1749	1560	1781	1777	1753	1560
Q Serve(g_s), s	11.4	0.0	4.7	9.6	10.3	11.9
Cycle Q Clear(g_c), s	11.4	0.0	4.7	9.6	10.3	11.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1225		176	1901	985	438
V/C Ratio(X)	0.62		0.77	0.46	0.65	0.73
Avail Cap(c_a), veh/h	3276		695	3329	3284	1461
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	0.0	28.1	9.2	20.3	20.9
Incr Delay (d2), s/veh	0.7	0.0	5.2	0.2	0.7	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	2.1	3.0	4.1	4.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.0	0.0	33.3	9.4	21.0	23.2
LnGrp LOS	B		C	A	C	C
Approach Vol, veh/h	754			1001	961	
Approach Delay, s/veh	18.0			12.6	21.7	
Approach LOS	B			B	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.8	28.3			40.2	23.9
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	6.7	13.4			11.6	13.9
Green Ext Time (p_c), s	0.2	8.9			10.7	4.1

Intersection Summary

HCM 7th Control Delay, s/veh	17.3
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings

1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	728	494	249	989	173	293	5	145	82	138	16
Future Volume (vph)	16	728	494	249	989	173	293	5	145	82	138	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25			25	
Link Distance (ft)		576			738			872			571	
Travel Time (s)		8.7			14.4			23.8			15.6	
Confl. Peds. (#/hr)									3			3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 163.2

Actuated Cycle Length: 104.2

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

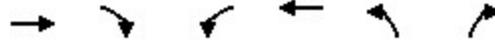
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	728	494	249	989	173	293	5	145	82	138	16
Future Volume (veh/h)	16	728	494	249	989	173	293	5	145	82	138	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	16	743	504	254	1009	177	299	5	148	84	141	16
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	1	1	1
Cap, veh/h	19	1269	837	341	1581	705	434	459	387	471	211	24
Arrive On Green	0.01	0.36	0.36	0.10	0.44	0.44	0.17	0.25	0.25	0.05	0.13	0.13
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1767	1856	1567	1795	1661	189
Grp Volume(v), veh/h	16	743	504	254	1009	177	299	5	148	84	0	157
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1767	1856	1567	1795	0	1850
Q Serve(g_s), s	0.8	16.0	20.7	6.7	20.7	6.6	13.5	0.2	7.4	3.2	0.0	7.6
Cycle Q Clear(g_c), s	0.8	16.0	20.7	6.7	20.7	6.6	13.5	0.2	7.4	3.2	0.0	7.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	19	1269	837	341	1581	705	434	459	387	471	0	235
V/C Ratio(X)	0.82	0.59	0.60	0.75	0.64	0.25	0.69	0.01	0.38	0.18	0.00	0.67
Avail Cap(c_a), veh/h	473	1887	1113	918	1887	842	789	591	499	762	0	589
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.5	24.6	15.4	41.3	20.3	16.3	28.3	26.7	29.5	24.4	0.0	39.2
Incr Delay (d2), s/veh	44.6	0.6	1.0	2.4	0.7	0.3	1.5	0.0	0.6	0.1	0.0	3.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.3	7.4	2.9	8.2	2.4	5.8	0.1	2.8	1.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	91.1	25.2	16.4	43.7	21.0	16.6	29.8	26.8	30.1	24.5	0.0	42.5
LnGrp LOS	F	C	B	D	C	B	C	C	C	C		D
Approach Vol, veh/h	1263			1440			452			241		
Approach Delay, s/veh	22.5			24.4			29.9			36.2		
Approach LOS	C			C			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.8	39.9	21.6	17.8	6.5	48.2	10.3	29.2				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	8.7	22.7	15.5	9.6	2.8	22.7	5.2	9.4				
Green Ext Time (p_c), s	0.6	10.9	0.6	0.8	0.0	12.2	0.1	0.5				

Intersection Summary												
HCM 7th Control Delay, s/veh			25.3									
HCM 7th LOS			C									

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

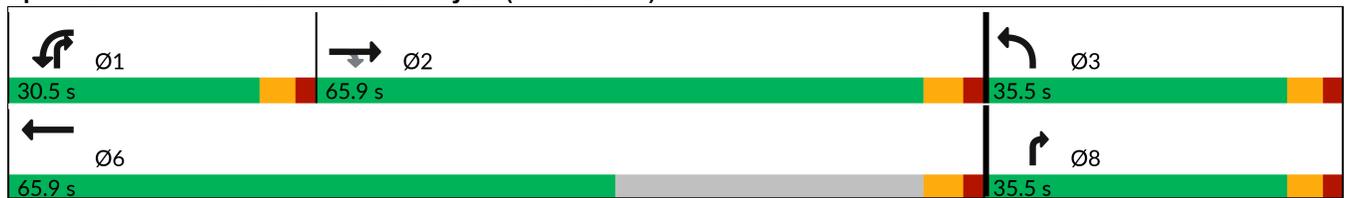


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑↑	
Traffic Volume (vph)	795	85	155	1266	144	138	
Future Volume (vph)	795	85	155	1266	144	138	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	738			984	262		
Travel Time (s)	14.4			19.2	7.1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 70.1
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↗	↑↙	↑↑	↑↖	↑↗
Traffic Volume (veh/h)	795	85	155	1266	144	138
Future Volume (veh/h)	795	85	155	1266	144	138
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	828	0	161	1319	150	144
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1474		211	2278	242	710
Arrive On Green	0.41	0.00	0.12	0.64	0.14	0.14
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	828	0	161	1319	150	144
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	9.1	0.0	4.5	10.8	4.1	2.1
Cycle Q Clear(g_c), s	9.1	0.0	4.5	10.8	4.1	2.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1474		211	2278	242	710
V/C Ratio(X)	0.56		0.76	0.58	0.62	0.20
Avail Cap(c_a), veh/h	4173		872	4173	1046	1969
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.4	0.0	21.8	5.2	20.8	15.0
Incr Delay (d2), s/veh	0.5	0.0	4.2	0.3	2.6	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	1.9	2.2	1.7	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.9	0.0	26.0	5.6	23.4	15.1
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	828			1480	294	
Approach Delay, s/veh	11.9			7.8	19.3	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.6	27.1			38.7	12.4
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	6.5	11.1			12.8	6.1
Green Ext Time (p_c), s	0.3	10.1			19.9	1.0

Intersection Summary

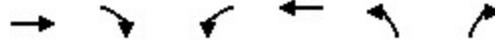
HCM 7th Control Delay, s/veh	10.4
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

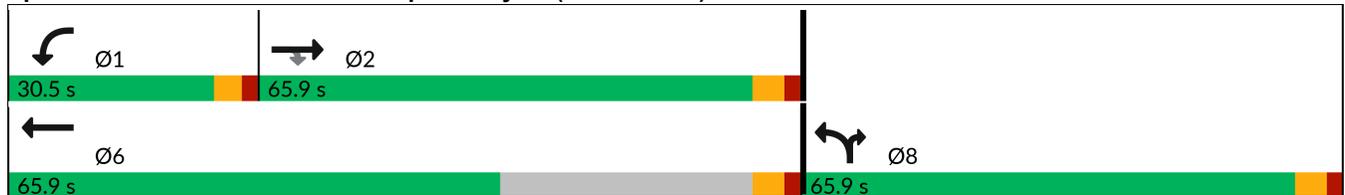


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑↑	↑
Traffic Volume (vph)	621	297	91	658	759	260
Future Volume (vph)	621	297	91	658	759	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	984			319	654	
Travel Time (s)	19.2			6.2	17.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Shared Lane Traffic (%)						10%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 85.2
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↘	↑↑	↖↖	↗
Traffic Volume (veh/h)	621	297	91	658	759	260
Future Volume (veh/h)	621	297	91	658	759	260
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	640	0	94	678	782	268
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	1116		124	1721	1105	492
Arrive On Green	0.31	0.00	0.07	0.48	0.31	0.31
Sat Flow, veh/h	3647	1585	1795	3676	3563	1585
Grp Volume(v), veh/h	640	0	94	678	782	268
Grp Sat Flow(s),veh/h/ln	1777	1585	1795	1791	1781	1585
Q Serve(g_s), s	8.5	0.0	2.9	6.8	10.9	7.9
Cycle Q Clear(g_c), s	8.5	0.0	2.9	6.8	10.9	7.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1116		124	1721	1105	492
V/C Ratio(X)	0.57		0.76	0.39	0.71	0.54
Avail Cap(c_a), veh/h	3782		796	3812	3791	1687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	25.8	9.4	17.2	16.1
Incr Delay (d2), s/veh	0.7	0.0	6.9	0.2	0.8	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	1.4	2.1	4.2	2.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.8	0.0	32.7	9.6	18.0	17.1
LnGrp LOS	B		C	A	B	B
Approach Vol, veh/h	640			772	1050	
Approach Delay, s/veh	16.8			12.4	17.8	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.4	23.6			33.0	23.4
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	4.9	10.5			8.8	12.9
Green Ext Time (p_c), s	0.1	7.2			7.8	4.6

Intersection Summary

HCM 7th Control Delay, s/veh	15.9
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

2026 With Project

Lanes, Volumes, Timings

1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	481	332	190	833	124	354	7	145	98	128	17
Future Volume (vph)	12	481	332	190	833	124	354	7	145	98	128	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		430			754			691				551
Travel Time (s)		6.5			14.7			18.8				15.0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	11%	11%	11%	11%	11%	11%	8%	8%	8%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	Min	Min	None	None	

Intersection Summary

Area Type: Other

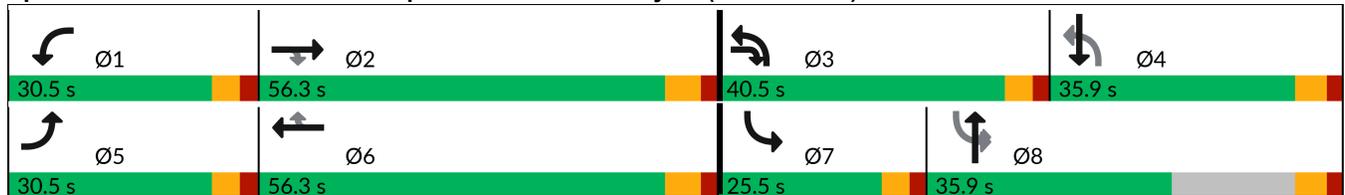
Cycle Length: 163.2

Actuated Cycle Length: 98.4

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	481	332	190	833	124	354	7	145	98	128	17
Future Volume (veh/h)	12	481	332	190	833	124	354	7	145	98	128	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737	1781	1781	1781	1856	1856	1856
Adj Flow Rate, veh/h	12	496	342	196	859	128	365	7	149	101	132	18
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	11	11	11	11	11	11	8	8	8	3	3	3
Cap, veh/h	14	970	753	283	1232	550	499	484	410	523	182	25
Arrive On Green	0.01	0.29	0.29	0.09	0.37	0.37	0.22	0.27	0.27	0.06	0.11	0.11
Sat Flow, veh/h	1654	3300	1472	3209	3300	1472	1697	1781	1510	1767	1598	218
Grp Volume(v), veh/h	12	496	342	196	859	128	365	7	149	101	0	150
Grp Sat Flow(s),veh/h/ln	1654	1650	1472	1605	1650	1472	1697	1781	1510	1767	0	1816
Q Serve(g_s), s	0.6	10.1	12.0	4.8	17.9	4.8	14.9	0.2	6.5	3.3	0.0	6.5
Cycle Q Clear(g_c), s	0.6	10.1	12.0	4.8	17.9	4.8	14.9	0.2	6.5	3.3	0.0	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	14	970	753	283	1232	550	499	484	410	523	0	207
V/C Ratio(X)	0.83	0.51	0.45	0.69	0.70	0.23	0.73	0.01	0.36	0.19	0.00	0.72
Avail Cap(c_a), veh/h	510	2035	1228	989	2035	908	862	659	558	853	0	672
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	23.8	12.6	35.9	21.5	17.4	23.4	21.6	23.9	19.2	0.0	34.7
Incr Delay (d2), s/veh	55.7	0.6	0.6	2.2	1.0	0.3	1.6	0.0	0.5	0.1	0.0	4.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.7	3.8	1.9	6.6	1.7	6.0	0.1	2.3	1.3	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	95.8	24.4	13.2	38.1	22.6	17.7	25.0	21.6	24.4	19.3	0.0	39.4
LnGrp LOS	F	C	B	D	C	B	C	C	C	B		D
Approach Vol, veh/h	850			1183			521			251		
Approach Delay, s/veh	20.9			24.6			24.8			31.3		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.7	30.1	23.2	15.2	6.2	36.6	10.4	27.9				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	6.8	14.0	16.9	8.5	2.6	19.9	5.3	8.5				
Green Ext Time (p_c), s	0.4	7.2	0.8	0.8	0.0	10.4	0.1	0.5				

Intersection Summary

HCM 7th Control Delay, s/veh	24.1
HCM 7th LOS	C

Notes

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

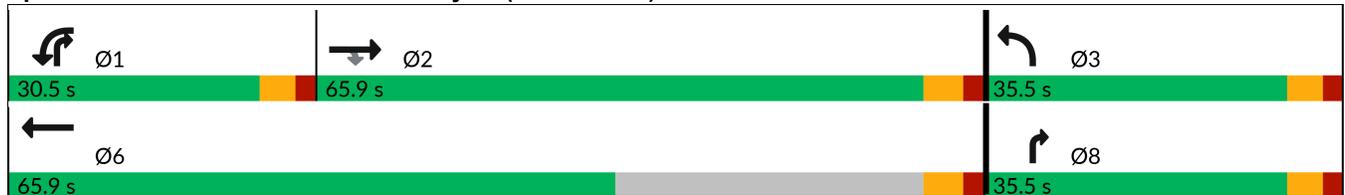
09/04/2024

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↗	↘	↑↑	↖↖	↗	
Traffic Volume (vph)	535	159	261	892	251	159	
Future Volume (vph)	535	159	261	892	251	159	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	754			349	262		
Travel Time (s)	14.7			6.8	7.1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	12%	12%	10%	10%	12%	12%	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 71.9
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



Queues

2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	575	171	281	959	270	171
v/c Ratio	0.57	0.30	0.62	0.44	0.51	0.20
Control Delay (s/veh)	23.8	5.1	31.1	6.3	32.7	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.8	5.1	31.1	6.3	32.7	2.5
Queue Length 50th (ft)	111	0	107	86	57	0
Queue Length 95th (ft)	184	41	223	142	109	29
Internal Link Dist (ft)	674			269	182	
Turn Bay Length (ft)		485	515		75	205
Base Capacity (vph)	2700	1236	587	3282	1344	941
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.14	0.48	0.29	0.20	0.18

Intersection Summary

HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↗	↑↙	↑↑	↑↗	↑↙
Traffic Volume (veh/h)	535	159	261	892	251	159
Future Volume (veh/h)	535	159	261	892	251	159
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1722	1722	1752	1752	1722	1722
Adj Flow Rate, veh/h	575	0	281	959	270	171
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	10	10	12	12
Cap, veh/h	1016		344	2075	492	526
Arrive On Green	0.31	0.00	0.21	0.62	0.15	0.15
Sat Flow, veh/h	3358	1459	1668	3416	3182	1459
Grp Volume(v), veh/h	575	0	281	959	270	171
Grp Sat Flow(s),veh/h/ln	1636	1459	1668	1664	1591	1459
Q Serve(g_s), s	7.6	0.0	8.3	7.8	4.0	4.4
Cycle Q Clear(g_c), s	7.6	0.0	8.3	7.8	4.0	4.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1016		344	2075	492	526
V/C Ratio(X)	0.57		0.82	0.46	0.55	0.32
Avail Cap(c_a), veh/h	3822		812	3887	1858	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	19.5	5.1	20.1	11.9
Incr Delay (d2), s/veh	0.7	0.0	3.6	0.2	1.0	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	3.1	1.6	1.5	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.5	0.0	23.1	5.3	21.0	12.3
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	575			1240	441	
Approach Delay, s/veh	15.5			9.4	17.6	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.1	21.8			37.9	13.4
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	10.3	9.6			9.8	6.4
Green Ext Time (p_c), s	0.5	6.4			12.6	1.6

Intersection Summary

HCM 7th Control Delay, s/veh	12.5
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

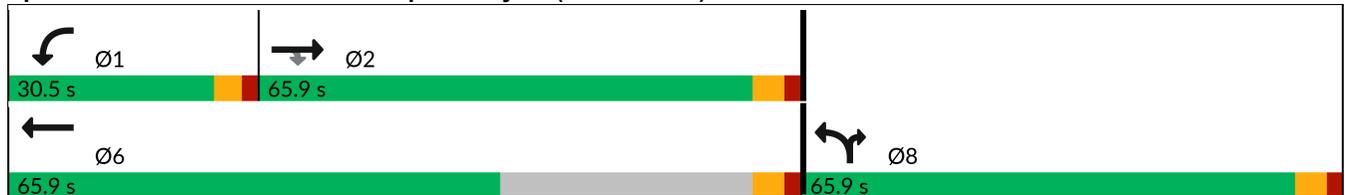
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (vph)	368	251	32	553	598	220
Future Volume (vph)	368	251	32	553	598	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	636			373	648	
Travel Time (s)	12.4			7.3	17.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	9%	8%	8%	10%	2%
Shared Lane Traffic (%)						10%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 60.7
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (veh/h)	368	251	32	553	598	220
Future Volume (veh/h)	368	251	32	553	598	220
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1767	1767	1781	1781	1752	1870
Adj Flow Rate, veh/h	413	0	36	621	672	247
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	9	9	8	8	10	2
Cap, veh/h	842		69	1416	1034	491
Arrive On Green	0.25	0.00	0.04	0.42	0.31	0.31
Sat Flow, veh/h	3445	1497	1697	3474	3337	1585
Grp Volume(v), veh/h	413	0	36	621	672	247
Grp Sat Flow(s),veh/h/ln	1678	1497	1697	1692	1668	1585
Q Serve(g_s), s	4.6	0.0	0.9	5.7	7.6	5.5
Cycle Q Clear(g_c), s	4.6	0.0	0.9	5.7	7.6	5.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	842		69	1416	1034	491
V/C Ratio(X)	0.49		0.52	0.44	0.65	0.50
Avail Cap(c_a), veh/h	4641		977	4680	4613	2192
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	20.4	9.0	12.9	12.2
Incr Delay (d2), s/veh	0.6	0.0	4.5	0.3	0.7	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.4	1.5	2.5	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.5	0.0	24.9	9.3	13.6	13.0
LnGrp LOS	B		C	A	B	B
Approach Vol, veh/h	413			657	919	
Approach Delay, s/veh	14.5			10.2	13.5	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.3	16.8			24.0	19.3
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	2.9	6.6			7.7	9.6
Green Ext Time (p_c), s	0.0	4.3			7.0	3.9

Intersection Summary

HCM 7th Control Delay, s/veh	12.6
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 4: Nevitt Rd & Dvwy/Site Access

09/04/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	95	0	22	6	0	96	6	219	7	115	245	59
Future Volume (vph)	95	0	22	6	0	96	6	219	7	115	245	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			251			251			262	
Travel Time (s)		4.3			6.8			6.8			7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	12%	12%	0%	0%	0%	11%	11%	11%	14%	14%	14%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	95	0	22	6	0	96	6	219	7	115	245	59
Future Vol, veh/h	95	0	22	6	0	96	6	219	7	115	245	59
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									
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	12	12	12	0	0	0	11	11	11	14	14	14
Mvmt Flow	103	0	24	7	0	104	7	238	8	125	266	64

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	799	807	298	771	835	242	330	0	0	246	0	0
Stage 1	548	548	-	255	255	-	-	-	-	-	-	-
Stage 2	251	259	-	516	580	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.1	6.5	6.2	4.21	-	-	4.24	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.5	4	3.3	2.299	-	-	2.326	-	-
Pot Cap-1 Maneuver	292	304	718	319	306	802	1180	-	-	1253	-	-
Stage 1	503	501	-	754	700	-	-	-	-	-	-	-
Stage 2	731	676	-	545	503	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	227	272	718	276	274	802	1180	-	-	1253	-	-
Mov Cap-2 Maneuver	227	272	-	276	274	-	-	-	-	-	-	-
Stage 1	453	451	-	750	696	-	-	-	-	-	-	-
Stage 2	633	672	-	475	453	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/veh	4.27		10.9		0.21		2.25	
HCM LOS	D		B					

Minor Lane/Major Mvmt	NBL	NBT	NBREBLn	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1180	-	-	261	721	1253	-
HCM Lane V/C Ratio	0.006	-	-	0.488	0.154	0.1	-
HCM Control Delay (s/veh)	8.1	-	-	31.3	10.9	8.2	-
HCM Lane LOS	A	-	-	D	B	A	-
HCM 95th %tile Q(veh)	0	-	-	2.5	0.5	0.3	-

Lanes, Volumes, Timings
 5: Site Access & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Volume (vph)	682	13	0	1153	0	25
Future Volume (vph)	682	13	0	1153	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35			35	25	
Link Distance (ft)	349			636	197	
Travel Time (s)	6.8			12.4	5.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	10%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	682	13	0	1153	0	25
Future Vol, veh/h	682	13	0	1153	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #0	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	741	14	0	1253	0	27

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	-	-	378
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	626
Stage 1	-	-	0	-	0
Stage 2	-	-	0	-	0
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	626
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	11.01
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	626	-	-	-
HCM Lane V/C Ratio	0.043	-	-	-
HCM Control Delay (s/veh)	11	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Lanes, Volumes, Timings
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	924	446	240	900	254	266	13	143	101	196	16
Future Volume (vph)	42	924	446	240	900	254	266	13	143	101	196	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		576			738			872				571
Travel Time (s)		8.7			14.4			23.8				15.6
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	4%	4%	4%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 163.2

Actuated Cycle Length: 121.1

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	924	446	240	900	254	266	13	143	101	196	16
Future Volume (veh/h)	42	924	446	240	900	254	266	13	143	101	196	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1841	1841	1841	1885	1885	1885
Adj Flow Rate, veh/h	43	953	460	247	928	262	274	13	147	104	202	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	3	3	3	4	4	4	1	1	1
Cap, veh/h	55	1303	820	326	1549	691	381	445	377	471	255	20
Arrive On Green	0.03	0.38	0.38	0.10	0.44	0.44	0.15	0.24	0.24	0.06	0.15	0.15
Sat Flow, veh/h	1739	3469	1547	3428	3526	1572	1753	1841	1558	1795	1724	137
Grp Volume(v), veh/h	43	953	460	247	928	262	274	13	147	104	0	218
Grp Sat Flow(s),veh/h/ln	1739	1735	1547	1714	1763	1572	1753	1841	1558	1795	0	1860
Q Serve(g_s), s	2.5	24.2	20.3	7.2	20.5	11.5	13.2	0.6	8.1	4.4	0.0	11.6
Cycle Q Clear(g_c), s	2.5	24.2	20.3	7.2	20.5	11.5	13.2	0.6	8.1	4.4	0.0	11.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	55	1303	820	326	1549	691	381	445	377	471	0	275
V/C Ratio(X)	0.79	0.73	0.56	0.76	0.60	0.38	0.72	0.03	0.39	0.22	0.00	0.79
Avail Cap(c_a), veh/h	425	1697	996	839	1725	769	711	540	457	714	0	546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.2	27.5	16.1	45.1	21.8	19.3	30.3	29.6	32.4	26.4	0.0	42.0
Incr Delay (d2), s/veh	16.6	1.5	0.9	2.7	0.6	0.5	1.9	0.0	0.7	0.2	0.0	5.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	9.6	7.2	3.1	8.2	4.3	5.8	0.2	3.1	1.9	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.7	28.9	16.9	47.8	22.4	19.8	32.3	29.6	33.1	26.6	0.0	47.2
LnGrp LOS	E	C	B	D	C	B	C	C	C	C		D
Approach Vol, veh/h	1456			1437			434			322		
Approach Delay, s/veh	26.2			26.3			32.5			40.5		
Approach LOS	C			C			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	44.7	21.3	21.0	8.7	51.2	11.7	30.6				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	9.2	26.2	15.2	13.6	4.5	22.5	6.4	10.1				
Green Ext Time (p_c), s	0.5	12.2	0.6	1.1	0.0	11.9	0.1	0.5				

Intersection Summary

HCM 7th Control Delay, s/veh	28.3
HCM 7th LOS	C

Notes

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

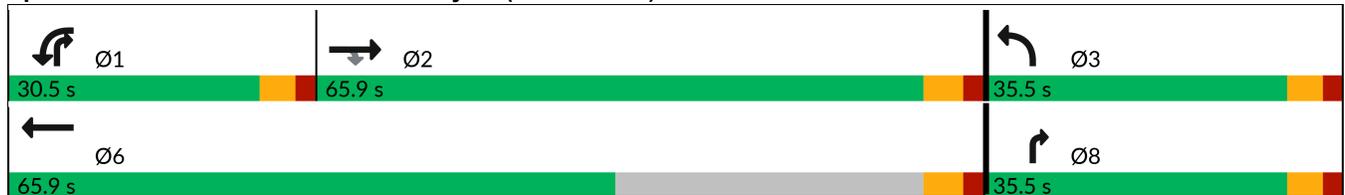
09/04/2024

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↗	↙	↑↑	↖↗	↗	
Traffic Volume (vph)	990	144	206	1225	188	226	
Future Volume (vph)	990	144	206	1225	188	226	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	738			349	262		
Travel Time (s)	14.4			6.8	7.1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	
Heavy Vehicles (%)	5%	5%	3%	3%	5%	5%	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 85.9
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

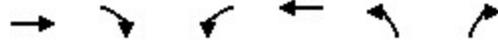
Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



Queues

2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1021	148	212	1263	194	233
v/c Ratio	0.66	0.19	0.64	0.51	0.39	0.35
Control Delay (s/veh)	21.4	3.5	45.2	6.6	38.5	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	21.4	3.5	45.2	6.6	38.5	16.3
Queue Length 50th (ft)	206	0	102	126	47	61
Queue Length 95th (ft)	376	35	237	238	105	155
Internal Link Dist (ft)	658			269	182	
Turn Bay Length (ft)		485	515		75	205
Base Capacity (vph)	2534	1172	547	3270	1249	843
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.13	0.39	0.39	0.16	0.28

Intersection Summary

HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↗	↑↘	↑↑	↑↖	↑↗
Traffic Volume (veh/h)	990	144	206	1225	188	226
Future Volume (veh/h)	990	144	206	1225	188	226
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1826	1826
Adj Flow Rate, veh/h	1021	0	212	1263	194	233
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	5	5
Cap, veh/h	1543		260	2361	573	490
Arrive On Green	0.44	0.00	0.15	0.67	0.17	0.17
Sat Flow, veh/h	3561	1547	1767	3618	3374	1547
Grp Volume(v), veh/h	1021	0	212	1263	194	233
Grp Sat Flow(s),veh/h/ln	1735	1547	1767	1763	1687	1547
Q Serve(g_s), s	16.4	0.0	8.2	13.1	3.6	8.6
Cycle Q Clear(g_c), s	16.4	0.0	8.2	13.1	3.6	8.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1543		260	2361	573	490
V/C Ratio(X)	0.66		0.81	0.54	0.34	0.48
Avail Cap(c_a), veh/h	2934		623	2981	1426	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.5	0.0	29.3	6.0	25.9	19.5
Incr Delay (d2), s/veh	0.7	0.0	4.6	0.3	0.3	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	3.6	3.4	1.4	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	16.2	0.0	33.9	6.3	26.3	20.2
LnGrp LOS	B		C	A	C	C
Approach Vol, veh/h	1021			1475	427	
Approach Delay, s/veh	16.2			10.3	23.0	
Approach LOS	B			B	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.9	37.5			53.4	17.5
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	10.2	18.4			15.1	10.6
Green Ext Time (p_c), s	0.4	13.1			18.3	1.5

Intersection Summary

HCM 7th Control Delay, s/veh	14.2
HCM 7th LOS	B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

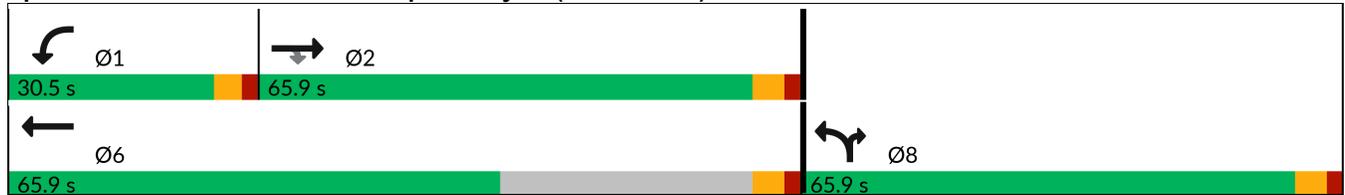
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (vph)	700	491	124	804	574	326
Future Volume (vph)	700	491	124	804	574	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	635			319	654	
Travel Time (s)	12.4			6.2	17.8	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	2%	2%	4%	4%
Shared Lane Traffic (%)						14%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 98.6
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑↑↑	↑
Traffic Volume (veh/h)	700	491	124	804	574	326
Future Volume (veh/h)	700	491	124	804	574	326
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1841	1841	1870	1870	1841	1841
Adj Flow Rate, veh/h	761	0	135	874	650	326
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	2	2	4	4
Cap, veh/h	1229		176	1900	995	443
Arrive On Green	0.35	0.00	0.10	0.53	0.28	0.28
Sat Flow, veh/h	3589	1560	1781	3647	3506	1560
Grp Volume(v), veh/h	761	0	135	874	650	326
Grp Sat Flow(s),veh/h/ln	1749	1560	1781	1777	1753	1560
Q Serve(g_s), s	11.7	0.0	4.8	9.9	10.6	12.3
Cycle Q Clear(g_c), s	11.7	0.0	4.8	9.9	10.6	12.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1229		176	1900	995	443
V/C Ratio(X)	0.62		0.77	0.46	0.65	0.74
Avail Cap(c_a), veh/h	3231		686	3283	3239	1441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.5	0.0	28.5	9.3	20.5	21.1
Incr Delay (d2), s/veh	0.7	0.0	5.2	0.2	0.7	2.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	2.2	3.1	4.2	4.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	18.2	0.0	33.7	9.6	21.2	23.5
LnGrp LOS	B		C	A	C	C
Approach Vol, veh/h	761			1009	976	
Approach Delay, s/veh	18.2			12.8	22.0	
Approach LOS	B			B	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.9	28.7			40.6	24.3
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	6.8	13.7			11.9	14.3
Green Ext Time (p_c), s	0.2	9.0			10.9	4.1

Intersection Summary

HCM 7th Control Delay, s/veh	17.6
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 4: Nevitt Rd & Dvwy/Site Access

09/04/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	0	13	4	0	69	19	265	4	85	226	39
Future Volume (vph)	80	0	13	4	0	69	19	265	4	85	226	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			251			251			262	
Travel Time (s)		4.3			6.8			6.8			7.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	80	0	13	4	0	69	19	265	4	85	226	39
Future Vol, veh/h	80	0	13	4	0	69	19	265	4	85	226	39
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									
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	4	4	4	0	0	0	5	5	5	6	6	6
Mvmt Flow	84	0	14	4	0	73	20	279	4	89	238	41

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	756	761	258	738	779	281	279	0	0	283	0	0
Stage 1	437	437	-	321	321	-	-	-	-	-	-	-
Stage 2	319	323	-	417	458	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.1	6.5	6.2	4.15	-	-	4.16	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.5	4	3.3	2.245	-	-	2.254	-	-
Pot Cap-1 Maneuver	322	333	775	336	330	763	1267	-	-	1257	-	-
Stage 1	594	576	-	695	655	-	-	-	-	-	-	-
Stage 2	688	647	-	617	570	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	266	304	775	302	301	763	1267	-	-	1257	-	-
Mov Cap-2 Maneuver	266	304	-	302	301	-	-	-	-	-	-	-
Stage 1	552	535	-	684	645	-	-	-	-	-	-	-
Stage 2	613	636	-	563	530	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s/veh	29.32		10.74		0.52		1.96			
HCM LOS	C		B							

Minor Lane/Major Mvmt	NBL	NBT	NBREBLn	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1267	-	-	293	704	1257	-
HCM Lane V/C Ratio	0.016	-	-	0.334	0.109	0.071	-
HCM Control Delay (s/veh)	7.9	-	-	23.3	10.7	8.1	-
HCM Lane LOS	A	-	-	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	1.4	0.4	0.2	-

Lanes, Volumes, Timings
 5: Site Access & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Volume (vph)	1205	11	0	1431	0	20
Future Volume (vph)	1205	11	0	1431	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35			35	25	
Link Distance (ft)	349			635	192	
Travel Time (s)	6.8			12.4	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1205	11	0	1431	0	20
Future Vol, veh/h	1205	11	0	1431	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #0	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	3	3	0	0
Mvmt Flow	1310	12	0	1555	0	22

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	- - - 661
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - - 6.9
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - - 3.3
Pot Cap-1 Maneuver	-	-	0 - 0 410
Stage 1	-	-	0 - 0 -
Stage 2	-	-	0 - 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - - 410
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	14.28
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	410	-	-	-
HCM Lane V/C Ratio	0.053	-	-	-
HCM Control Delay (s/veh)	14.3	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Lanes, Volumes, Timings

1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	739	494	271	1000	173	293	5	168	82	138	16
Future Volume (vph)	16	739	494	271	1000	173	293	5	168	82	138	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		500	385		365	725		240	365		0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			35			25				25
Link Distance (ft)		576			738			872				571
Travel Time (s)		8.7			14.4			23.8				15.6
Confl. Peds. (#/hr)									3			3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	D.P+P	NA	Perm	D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			6	4		8	8		
Detector Phase	5	2	3	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0	3.0	3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	8.5	50.3	8.5	8.5	45.3	45.3	8.5	47.9	47.9	8.5	48.9	
Total Split (s)	30.5	56.3	40.5	30.5	56.3	56.3	40.5	35.9	35.9	25.5	35.9	
Total Split (%)	18.7%	34.5%	24.8%	18.7%	34.5%	34.5%	24.8%	22.0%	22.0%	15.6%	22.0%	
Yellow Time (s)	3.5	4.3	3.5	3.5	4.3	4.3	3.5	3.9	3.9	3.5	3.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	6.3	5.5	5.5	6.3	6.3	5.5	5.9	5.9	5.5	5.9	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes											
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 163.2

Actuated Cycle Length: 106.3

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 1: I-5 SB Ramps/Garrett Road & Hwy 20 (Avon Cutoff)

09/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	739	494	271	1000	173	293	5	168	82	138	16
Future Volume (veh/h)	16	739	494	271	1000	173	293	5	168	82	138	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	16	754	504	277	1020	177	299	5	171	84	141	16
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	1	1	1
Cap, veh/h	19	1265	835	364	1600	714	431	457	386	462	210	24
Arrive On Green	0.01	0.36	0.36	0.11	0.45	0.45	0.17	0.25	0.25	0.05	0.13	0.13
Sat Flow, veh/h	1781	3554	1585	3456	3554	1585	1767	1856	1567	1795	1661	188
Grp Volume(v), veh/h	16	754	504	277	1020	177	299	5	171	84	0	157
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1728	1777	1585	1767	1856	1567	1795	0	1850
Q Serve(g_s), s	0.9	16.6	21.2	7.5	21.2	6.6	13.7	0.2	8.9	3.3	0.0	7.8
Cycle Q Clear(g_c), s	0.9	16.6	21.2	7.5	21.2	6.6	13.7	0.2	8.9	3.3	0.0	7.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	19	1265	835	364	1600	714	431	457	386	462	0	233
V/C Ratio(X)	0.83	0.60	0.60	0.76	0.64	0.25	0.69	0.01	0.44	0.18	0.00	0.67
Avail Cap(c_a), veh/h	465	1853	1097	901	1853	827	775	581	490	746	0	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.3	25.2	15.8	41.7	20.3	16.3	28.9	27.3	30.6	24.9	0.0	40.0
Incr Delay (d2), s/veh	45.2	0.6	1.0	2.5	0.7	0.3	1.5	0.0	0.8	0.1	0.0	3.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	6.6	7.6	3.2	8.4	2.4	5.9	0.1	3.4	1.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	92.5	25.9	16.8	44.2	21.1	16.6	30.4	27.3	31.4	25.0	0.0	43.3
LnGrp LOS	F	C	B	D	C	B	C	C	C	C		D
Approach Vol, veh/h	1274			1474			475			241		
Approach Delay, s/veh	23.1			24.9			30.7			36.9		
Approach LOS	C			C			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.6	40.4	21.9	18.0	6.5	49.5	10.3	29.5				
Change Period (Y+Rc), s	5.5	6.3	5.5	5.9	5.5	6.3	5.5	5.9				
Max Green Setting (Gmax), s	25.0	50.0	35.0	30.0	25.0	50.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	9.5	23.2	15.7	9.8	2.9	23.2	5.3	10.9				
Green Ext Time (p_c), s	0.6	11.0	0.6	0.8	0.0	12.3	0.1	0.5				

Intersection Summary

HCM 7th Control Delay, s/veh	25.9
HCM 7th LOS	C

Notes

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

Lanes, Volumes, Timings
2: Nevitt Rd & Hwy 20 (Avon Cutoff)

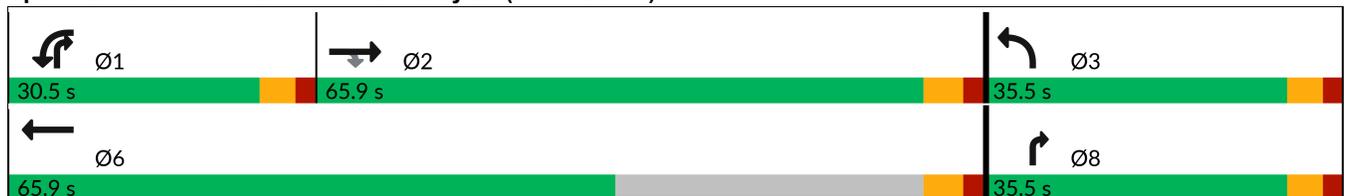
09/04/2024

	→	↘	↙	←	↖	↗	Ø8
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations	↑↑	↗	↘	↑↑	↖↗	↗	
Traffic Volume (vph)	777	137	246	1209	232	172	
Future Volume (vph)	777	137	246	1209	232	172	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		485	515		75	205	
Storage Lanes		1	1		1	0	
Taper Length (ft)			25		25		
Right Turn on Red		Yes				Yes	
Link Speed (mph)	35			35	25		
Link Distance (ft)	738			402	262		
Travel Time (s)	14.4			7.8	7.1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Shared Lane Traffic (%)							
Turn Type	NA	Perm	Prot	NA	Prot	pt+ov	
Protected Phases	2		1	6	3	8 1	8
Permitted Phases		2					
Detector Phase	2	2	1	6	3	8 1	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0		5.0
Minimum Split (s)	33.9	33.9	10.5	12.9	10.5		10.5
Total Split (s)	65.9	65.9	30.5	65.9	35.5		35.5
Total Split (%)	50.0%	50.0%	23.1%	50.0%	26.9%		27%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.5		3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Min	Min	None	Min	None		None

Intersection Summary

Area Type: Other
 Cycle Length: 131.9
 Actuated Cycle Length: 74.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Nevitt Rd & Hwy 20 (Avon Cutoff)



Queues

2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	809	143	256	1259	242	179
v/c Ratio	0.60	0.21	0.64	0.52	0.46	0.23
Control Delay (s/veh)	21.0	4.1	35.6	6.4	34.4	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	21.0	4.1	35.6	6.4	34.4	7.2
Queue Length 50th (ft)	150	0	105	119	52	19
Queue Length 95th (ft)	255	35	221	188	109	64
Internal Link Dist (ft)	658			322	182	
Turn Bay Length (ft)		485	515		75	205
Base Capacity (vph)	2888	1318	621	3484	1445	963
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.11	0.41	0.36	0.17	0.19

Intersection Summary

HCM 7th Signalized Intersection Summary
 2: Nevitt Rd & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↗	↑↘	↑↑	↑↖	↑↗
Traffic Volume (veh/h)	777	137	246	1209	232	172
Future Volume (veh/h)	777	137	246	1209	232	172
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	809	0	256	1259	242	179
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1366		316	2335	505	513
Arrive On Green	0.38	0.00	0.18	0.66	0.15	0.15
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	809	0	256	1259	242	179
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	10.5	0.0	8.0	10.9	3.7	5.0
Cycle Q Clear(g_c), s	10.5	0.0	8.0	10.9	3.7	5.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1366		316	2335	505	513
V/C Ratio(X)	0.59		0.81	0.54	0.48	0.35
Avail Cap(c_a), veh/h	3685		770	3685	1792	1103
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	0.0	22.9	5.3	22.7	14.9
Incr Delay (d2), s/veh	0.6	0.0	3.7	0.3	0.7	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	3.3	2.4	1.5	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	14.8	0.0	26.6	5.5	23.4	15.3
LnGrp LOS	B		C	A	C	B
Approach Vol, veh/h	809			1515	421	
Approach Delay, s/veh	14.8			9.1	20.0	
Approach LOS	B			A	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.8	28.1			43.9	13.9
Change Period (Y+Rc), s	5.5	5.9			5.9	5.5
Max Green Setting (Gmax), s	25.0	60.0			60.0	30.0
Max Q Clear Time (g_c+I1), s	10.0	12.5			12.9	7.0
Green Ext Time (p_c), s	0.5	9.7			18.5	1.5

Intersection Summary						
HCM 7th Control Delay, s/veh			12.4			
HCM 7th LOS			B			

Notes
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

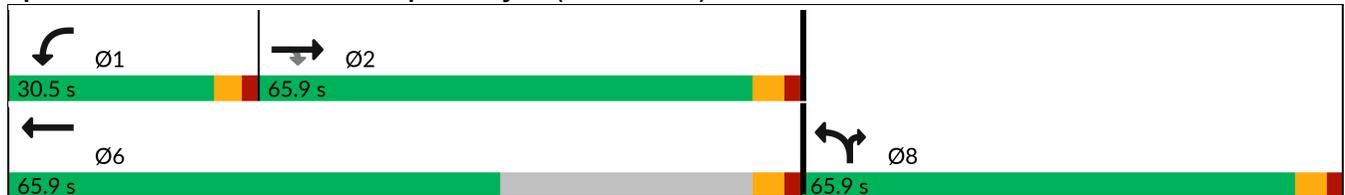
09/04/2024

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (vph)	632	319	91	669	782	260
Future Volume (vph)	632	319	91	669	782	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200	300		0	485
Storage Lanes		1	1		2	1
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	35			35	25	
Link Distance (ft)	581			319	654	
Travel Time (s)	11.3			6.2	17.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Shared Lane Traffic (%)						10%
Turn Type	NA	Perm	Prot	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases		2				
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	7.0	7.0	5.0	7.0	5.0	5.0
Minimum Split (s)	43.9	43.9	10.5	12.9	10.9	10.9
Total Split (s)	65.9	65.9	30.5	65.9	65.9	65.9
Total Split (%)	40.6%	40.6%	18.8%	40.6%	40.6%	40.6%
Yellow Time (s)	3.9	3.9	3.5	3.9	3.9	3.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.5	5.9	5.9	5.9
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Min	Min	None	Min	None	None

Intersection Summary

Area Type: Other
 Cycle Length: 162.3
 Actuated Cycle Length: 87.9
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)



HCM 7th Signalized Intersection Summary
 3: I-5 NB Ramps & Hwy 20 (Avon Cutoff)

09/04/2024

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖↖	↗
Traffic Volume (veh/h)	632	319	91	669	782	260
Future Volume (veh/h)	632	319	91	669	782	260
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1885	1885	1870	1870
Adj Flow Rate, veh/h	652	0	94	690	806	268
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	1	1	2	2
Cap, veh/h	1122		124	1719	1125	501
Arrive On Green	0.32	0.00	0.07	0.48	0.32	0.32
Sat Flow, veh/h	3647	1585	1795	3676	3563	1585
Grp Volume(v), veh/h	652	0	94	690	806	268
Grp Sat Flow(s),veh/h/ln	1777	1585	1795	1791	1781	1585
Q Serve(g_s), s	8.9	0.0	3.0	7.2	11.6	8.0
Cycle Q Clear(g_c), s	8.9	0.0	3.0	7.2	11.6	8.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1122		124	1719	1125	501
V/C Ratio(X)	0.58		0.76	0.40	0.72	0.54
Avail Cap(c_a), veh/h	3689		777	3718	3698	1645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	26.4	9.7	17.5	16.3
Incr Delay (d2), s/veh	0.7	0.0	6.9	0.2	0.9	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	1.4	2.3	4.5	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	17.2	0.0	33.4	9.9	18.3	17.2
LnGrp LOS	B		C	A	B	B
Approach Vol, veh/h	652			784	1074	
Approach Delay, s/veh	17.2			12.7	18.1	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.5	24.2			33.6	24.2
Change Period (Y+Rc), s	5.5	5.9			5.9	5.9
Max Green Setting (Gmax), s	25.0	60.0			60.0	60.0
Max Q Clear Time (g_c+I1), s	5.0	10.9			9.2	13.6
Green Ext Time (p_c), s	0.1	7.4			7.9	4.7

Intersection Summary

HCM 7th Control Delay, s/veh	16.2
HCM 7th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
 4: Nevitt Rd & Dvwy/Site Access

09/04/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	0	21	7	0	122	17	207	7	143	209	31
Future Volume (vph)	75	0	21	7	0	122	17	207	7	143	209	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			251			251			262	
Travel Time (s)		4.3			6.8			6.8			7.1	
Confl. Peds. (#/hr)	1		3	3		1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	75	0	21	7	0	122	17	207	7	143	209	31
Future Vol, veh/h	75	0	21	7	0	122	17	207	7	143	209	31
Conflicting Peds, #/hr	1	0	3	3	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	2	2	2
Mvmt Flow	82	0	23	8	0	133	18	225	8	155	227	34

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	818	824	247	807	837	230	261	0	0	233	0	0
Stage 1	555	555	-	266	266	-	-	-	-	-	-	-
Stage 2	263	270	-	541	572	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	297	310	797	302	305	814	1304	-	-	1335	-	-
Stage 1	520	517	-	744	693	-	-	-	-	-	-	-
Stage 2	747	690	-	529	508	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	216	270	794	255	266	814	1304	-	-	1335	-	-
Mov Cap-2 Maneuver	216	270	-	255	266	-	-	-	-	-	-	-
Stage 1	459	456	-	733	683	-	-	-	-	-	-	-
Stage 2	615	680	-	453	449	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s/veh	8.2		11.13		0.57		3.01			
HCM LOS	D		B							

Minor Lane/Major Mvmt	NBL	NBT	NBREBLn	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1304	-	-	257	727	1335	-
HCM Lane V/C Ratio	0.014	-	-	0.405	0.193	0.116	-
HCM Control Delay (s/veh)	7.8	-	-	28.2	11.1	8.1	-
HCM Lane LOS	A	-	-	D	B	A	-
HCM 95th %tile Q(veh)	0	-	-	1.9	0.7	0.4	-

Lanes, Volumes, Timings
 5: Site Access & Hwy 20 (Avon Cutoff)

09/04/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Volume (vph)	931	18	0	1455	0	33
Future Volume (vph)	931	18	0	1455	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	35			35	25	
Link Distance (ft)	402			581	206	
Travel Time (s)	7.8			11.3	5.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	931	18	0	1455	0	33
Future Vol, veh/h	931	18	0	1455	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #0	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	1012	20	0	1582	0	36

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	-	-	516
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	509
Stage 1	-	-	0	-	0
Stage 2	-	-	0	-	0
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	509
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	509	-	-	-
HCM Lane V/C Ratio	0.07	-	-	-
HCM Control Delay (s/veh)	12.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Appendix D

Trip Generation Calculations

**Chick-fil-A I-5 & Hwy 20 (Burlington)
Trip Generation Summary**

Land Use	Units ¹	ITE LUC ²	Trip Rate ²	Directional Distribution		Trips Generated		
				In	Out	In	Out	Total
DAILY								
Proposed Use:								
Fast-Food Restaurant with Drive-Through Window	5,967 GFA	934	467.48	50%	50%	1,394	1,395	2,789
<i>Pass-by Trips</i> ^{3,4}	53%					-739	-739	-1,478
						655	656	1,311
Existing Use:								
Motel	10 Rooms	320	T=3.62(X)-29.43	50%	50%	-3	-4	-7
New Weekday Daily Trips =						652	652	1,304
WEEKDAY AM PEAK HOUR								
Proposed Use:								
Fast-Food Restaurant with Drive-Through Window	5,967 GFA	934	44.61	51%	49%	136	130	266
<i>Pass-by Trips</i> ³	50%					-68	-65	-133
						68	65	133
Existing Use:								
Motel	10 Rooms	320	0.35	37%	63%	-1	-3	-4
New Weekday AM Peak Hour Trips =						67	62	129
WEEKDAY PM PEAK HOUR								
Proposed Use:								
Fast-Food Restaurant with Drive-Through Window	5,967 GFA	934	33.03	52%	48%	102	95	197
<i>Pass-by Trips</i> ³	55%					-56	-52	-108
						46	43	89
Existing Use:								
Motel	10 Rooms	320	0.36	54%	46%	-2	-2	-4
New Weekday PM Peak Hour Trips =						44	41	85
SATURDAY MIDDAY PEAK HOUR								
Proposed Use:								
Fast-Food Restaurant with Drive-Through Window	5,967 GFA	934	55.25	51%	49%	168	162	330
<i>Pass-by Trips</i> ⁵	55%					-93	-89	-182
						75	73	148
New Saturday Midday Peak Hour Trips =						75	73	148

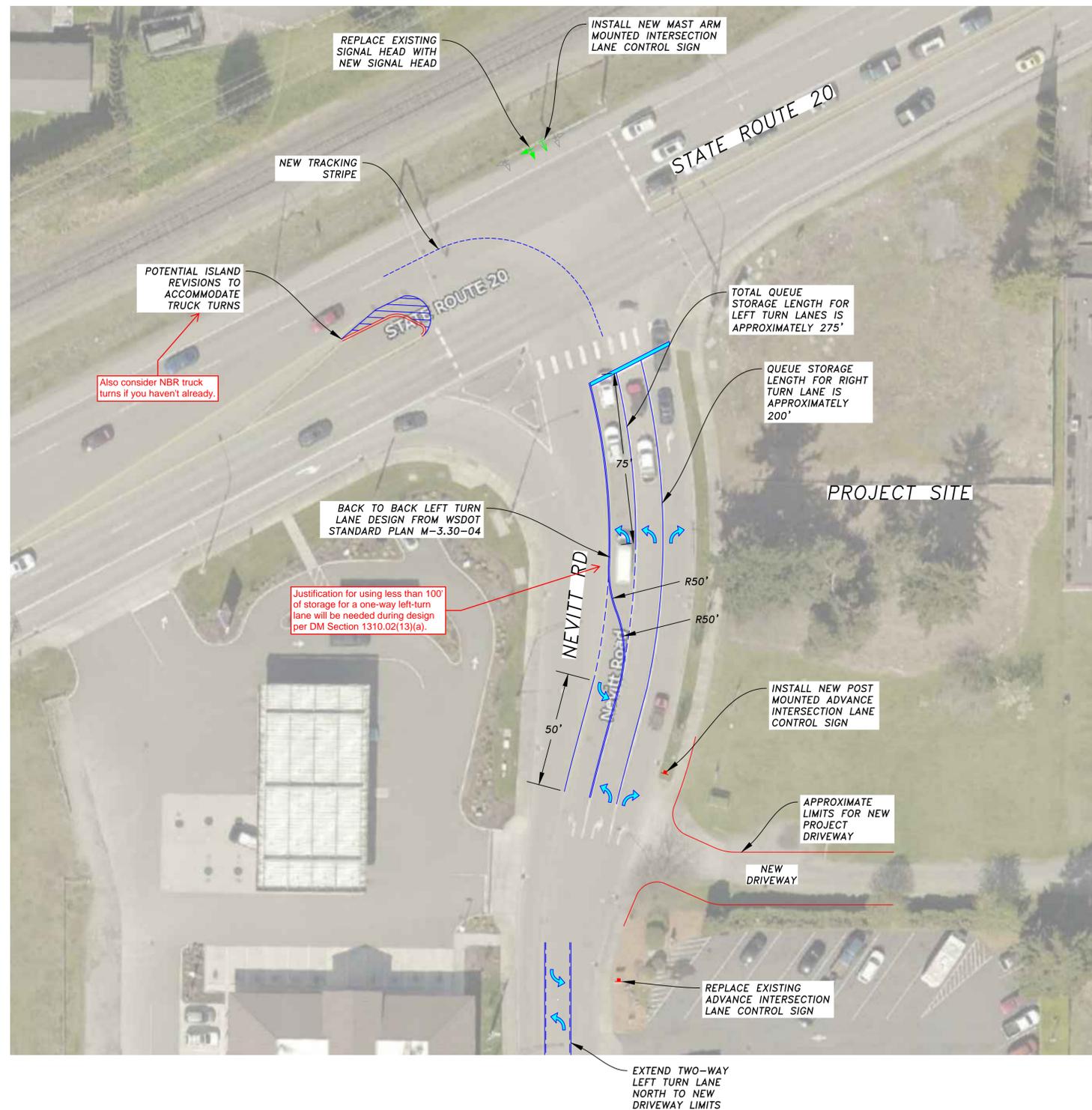
Notes:

- ¹ GFA = Gross Floor Area
- ² Based on Institute of Transportation Engineers (ITE) *Trip Generation* Manual, 11th Edition, 2021.
- ³ Pass-by trips determined based on appendices included in the ITE *Trip Generation* Manual, 11th Edition.
- ⁴ Pass-by percentage for daily based on the average of the AM and PM peak hours.
- ⁵ Pass-by percentage for Saturday Midday peak hour based on the PM peak hour.

Appendix E

Proposed Nevitt Road Channelization Modification

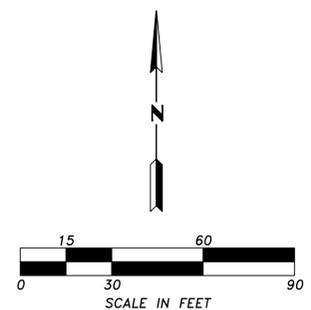
This project will require a channelization plan submittal approved by WSDOT



PRELIMINARY - FOR DISCUSSION ONLY

- LIST OF IMPROVEMENTS:**
- TWO NEWLY STRIPED NORTHBOUND LEFT TURN LANES
 - ONE NEW TRACKING STRIPE THROUGH INTERSECTION
 - ONE NEWLY STRIPED NORTHBOUND RIGHT TURN LANE
 - ONE NEWLY STRIPED SOUTHBOUND LEFT TURN LANE FOR NEW DRIVEWAY
 - EXTEND STRIPING FOR TWO-WAY LEFT TURN LANE
 - REPLACE ONE EXISTING POST MOUNTED SIGN
 - INSTALL ONE NEW POST MOUNTED SIGN
 - INSTALL ONE NEW SIGN ON EXISTING SIGNAL POLE MAST ARM
 - REPLACE ONE EXISTING VEHICLE SIGNAL HEAD WITH NEW VEHICLE SIGNAL HEAD ON EXISTING SIGNAL POLE MAST ARM
 - POTENTIAL ISLAND REVISIONS TO ACCOMMODATE TRUCK TURNS

LEGEND		DESCRIPTION
EXISTING	NEW	VEHICLE SIGNAL HEAD
		MAST ARM MOUNTED SIGN
		POLE MOUNTED SIGN
		CURB
		CHANNELIZATION



REVISION	DATE	BY

DESIGNED BY: KEW
DRAWN BY: KEW
APPROVED BY: CTB

ISSUE DATE: 07-18-2024
JOB NO.: TENW 2024-146
DRAWING FILE NO.:

TENW
 Transportation Engineering NorthWest
 Transportation Planning | Design | Traffic Impact & Operations
 11400 SE 8th St, Suite 200, Bellevue, WA 98004 | Office (425) 889-6747
 Project Contact: Chris Bicket, P.E.
 Phone: 206-817-9400

CHICK-FIL-A, INC.
 105 PROGRESS
 IRVINE, CA 92618
 (303) 519-7206
 STEVE.SCHWARTZ@CFACORP.COM
 STEVE SCHWARTZ

CHICK-FIL-A
 I-5 & HIGHWAY 20
 BURLINGTON, WA

NEVITT RD CHANNELIZATION & SIGNAL
 CONCEPT

DRAWING NO.:	PM-01
SHEET NO.:	1 OF 1 SHEETS

Appendix F

Drive-Through Queue Calculations

Order Point

Arrival Rate (λ)
67 veh/hr
 0.0186 veh/sec

Departure Rate (μ)
65.0 sec
 0.0154 veh/sec

Inputs:
 $\lambda = 0.0186$
 $\mu = 0.0154$
 $s = 2$

Outputs:
 $\rho = 0.60486$

L = 1.9 veh
 $L_q = 0.7$ veh

$W = 102.50053$
 $W_q = 37.50053$

Probability Calcs:		Prob <= n Vehicles	Vehicles (n)
n	P _n		
0	0.24621376	24.6%	0
1	0.29785026	54.4%	1
2	0.18015804	72.4%	2
3	0.10897059	83.3%	3
4	0.06591207	89.9%	4
5	0.03986765	93.9%	5
6	0.02411439	96.3%	6
7	0.01458586	97.8%	7
8	0.00882242	98.6%	8
9	0.00533634	99.2%	9
10	0.00322774	99.5%	10
11	0.00195234	99.7%	11
12	0.00118089	99.8%	12
13	0.00071428	99.9%	13
14	0.00043204	99.9%	14
15	0.00026132	100.0%	15
16	0.00015806	100.0%	16
17	0.00009561	100.0%	17
18	0.00005783	100.0%	18
19	0.00003498	100.0%	19
20	0.00002116	100.0%	20

Legend:
 λ = mean arrival rate
 μ = mean service rate
 s = # of servers
 ρ = traffic intensity
L = **expected number of customers in system**
 L_q = expected number of customers in the queue
 W = expected waiting time of customer in system
 W_q = expected waiting time of customer in queue
 P_0 = probability of 0 cars in the system
 P_n = probability of n cars in the system

