

INTERCHANGE MODIFICATION REPORT



**I-26 AT S-48 (COLUMBIA AVENUE)
INTERCHANGE IMPROVEMENTS
LEXINGTON COUNTY, SOUTH CAROLINA
PROJECT No. R4035500-121734.01
PROJECT ID P042383**

DECEMBER 2016

**PREPARED FOR:
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
&
LEXINGTON COUNTY**



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12-16-16

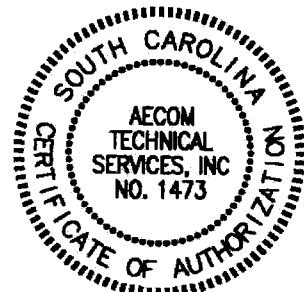


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1.0 EXECUTIVE SUMMARY

To obtain approval from the Federal Highway Administration (FHWA), the following Interstate 26 at S-48 (Columbia Avenue) Interchange Modification Report (IMR) was developed for the South Carolina Department of Transportation (SCDOT). The I-26 at S-48 (Columbia Avenue) diamond interchange is located at Exit 91 in Lexington County, South Carolina. The S-48 (Columbia Avenue) portion of the interchange is just within the Town of Chapin limits, which is located approximately 20 miles northwest of Columbia, SC.

The purpose of the project is to improve operational efficiency and safety of the existing interchange and to accommodate future volumes. The current interchange design is approaching capacity as a two-lane bridge along with no turn lanes to / from S-48 and is functionally obsolete. Operation is expected to worsen with more daily traffic volumes based on past census data indicating the population has been increasing by approximately twenty (20) percent per decade since 1990. With this anticipated growth along with the recently approved Chapin Technology Park and a planned commercial development north of the interchange, modifications to the existing diamond interchange are needed.

The traffic analysis included the evaluation of Existing year 2014, Future year 2020, and Future year 2040 traffic volumes during the AM and PM peak hours. The future year analyses included a No-Build Alternative with the existing interchange / intersection layout and three Build Alternatives:

1. Diverging Diamond Interchange
2. Partial Clover Leaf
3. Dual Roundabout

Geometric design improvements to the adjacent intersections to the interchange are also addressed in this Interchange Modification Report (IMR). Plans to realign Crooked Creek Road (S-232), currently intersecting with the I-26 Eastbound On Ramp, and Ellett Road (less than 50 feet from the I-26 Westbound Ramps) are expected to be realigned directly with S-48 approximately 1000 feet to the south under signal control. This report focuses on the interchange; however, plans are being conducted along S-48 (Columbia Avenue) to widen the existing two-lane highway to five-lanes. Traffic volumes used in this IMR were referenced from the S-48 (Columbia Avenue) Corridor Improvement Project Traffic Study dated October 17, 2016.

Adjacent interchanges Exit 85 (SC 202) and Exit 97 (US 176) were also studied even though both interchanges are more than 5 miles from the study interchange. As expected, Exit 97 (14 miles from Columbia and more developed) carries more traffic than the Exit 85, which is rural and 12 additional miles further away from Columbia. It should be noted, that there an I-26 widening project underway that extends from Exit 85 to Exit 101 which also includes some interchange improvements.

Analysis using Synchro 9.1 indicated that interchange alternatives 1 and 2 operated at an acceptable level-of-service (LOS) C; however, the diverging diamond interchange was selected based its minimal right-of-way acquisition and impact to future development as opposed to other study alternatives. The preferred alternative was also modeled using the microsimulation software VISSIM 7.0. Alternative 3 (dual roundabouts) did not provide an acceptable level-of-service (see **Appendix N**); therefore, it should be not be considered as a viable alternative.

Operation at Exit 97 (US 176 east of the study interchange) is expected to fail by 2040 with no improvements to the interchange. Consideration for widening of I-26 and a review of the interchange is recommended to accommodate projected traffic volumes. Operation at Exit 85 (SC 202 west of the study interchange) is expected to operate an acceptable level-of-service during the year 2040 with its existing design. **Figure 15** summarizes the Level-of-Service and delay for the projected 2040 preferred alternative.

This study recommends the best alternative to meet current and future surrounding area needs for Lexington County, South Carolina. SCDOT will submit this report for a validation of engineering and operational feasibility. Final approval of the IMR will be requested once all National Environmental Policy Act (NEPA) requirements have been met.

2.0 INTRODUCTION

2.1 BACKGROUND

Interstate 26 is a rolling four-lane East-West highway that is divided by a grassy median. The study area for the proposed project begins at Exit 85 (SC 202) and ends at Exit 97 (US 176). The interchange of emphasis in this report is Exit 91, which provides access to S-48 (Columbia Avenue) in Chapin, South Carolina. S-48 is a two lane minor arterial with future widening plans to accommodate future growth as part of this project. The approved Chapin Technology Park (a phased 2019 and 2024 Build-out) is approximately 1 mile south of the interchange and the planned commercial development just north of the interchange (northwest quadrant) was included in the traffic projections. The existing interchange at S-48 currently has minor queuing issues at the signalized I-26 westbound ramp and is expected to be over capacity based on the projected annual growth in the area and the added traffic volumes from the two large developments. The preferred alternative is to replace the existing diamond interchange design with a diverging diamond interchange (DDI) and to realign Crooked Creek Road and Ellett Road 1000 feet south of interchange under signal control improving the access management of S-48.

2.2 SCOPE

This report focuses on traffic analysis of existing and future conditions and provides recommendations for mitigating Level-of Service (LOS) and queuing. AECOM was tasked with studying traffic conditions in the vicinity of the proposed project during the weekday AM and PM peak hours for three scenarios:

- 2014 Existing: An analysis of existing conditions in the year 2014.
- 2020/2040 No-Build: An analysis of conditions in the years 2020 and 2040 with no changes to the interchange.
- 2020/2040 Project Build-Out: An analysis of conditions in the years 2020 and 2040 if a an interchange is modified, S-48 is widened to 5 lanes to the south, and Crooked Creek Road and Ellett Road are realigned 1000 feet to the south.

This study includes an analysis of the existing adjacent interchanges to the east and west of the proposed interchange modification of Exit 91. To the east is Exit 97 and to the west is Exit 85.

The scope of this interchange modification study included the following tasks:

1. Field visits to the study area were performed to collect data on the existing conditions such as lane configurations/geometry and current traffic control measures. Traffic counts and signal timing information at the interchanges were obtained from SCDOT.
2. Existing conditions of the interchanges were studied by utilizing the existing traffic volumes. Levels of service of the intersections at each interchange were determined using Synchro 9.1. I-26 freeway and interchange on / off ramps (segments, merges, and diverges, and off-ramps) were analyzed High Capacity Software 2010. VISSIM 7.0 was also used to model the entire network.

3. Two future design years were examined in this report. Build and No-Build scenarios were analyzed for the years 2020 and 2040. The No-Build scenario analyzed the conditions in both design years in which no modifications were made to the interchange or adjacent freeway and interchanges. The Build scenario analyzed the future conditions in both build years if the interchange modification and widening of S-48 (Columbia Avenue) were constructed. Adjacent merge and diverge areas (freeway segments, on-ramps, and off-ramps) were analyzed under the future design year (2020/2040) conditions of the study area.
4. The future design year conditions were analyzed for three (3) different interchange alternative scenarios. Adjacent merge and diverge areas (freeway segments, on-ramps, and off-ramps) were analyzed under the future design year (2020/2040) conditions of the study area. Only the preferred alternative was also modeled using VISSIM 7.0.

2.3 STUDY AREA

The study area is located in Lexington County, South Carolina. Specifically, the S-48 (Columbia Avenue) Widening project is located in the Town of Chapin, South Carolina. The study area of the IMR begins to the west of S-48 at Exit 85 of I-26 and ends to the east at Exit 97. The interchange of I-26 at S-48 is Exit 91. I-26 is an east-west four (4) lane freeway with two (2) travel lanes in each direction. The location of the project is shown in **Figure 1A** and **Figure 1B**.

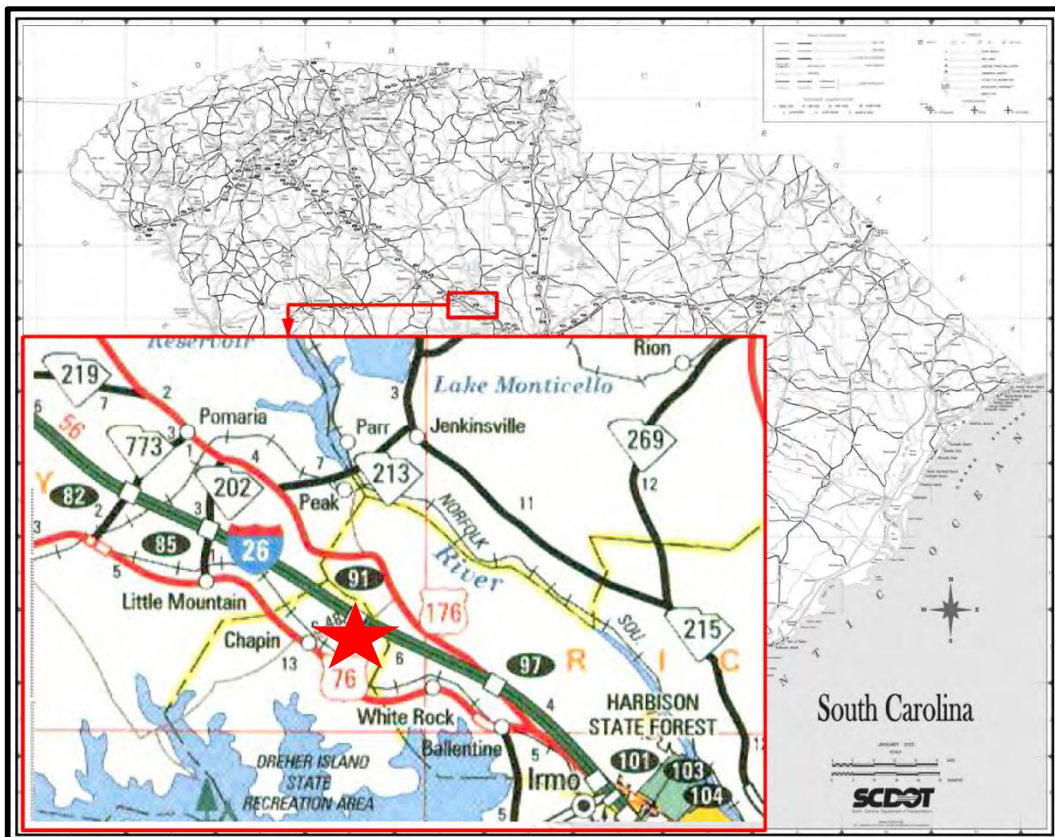


Figure 1A – Project Location

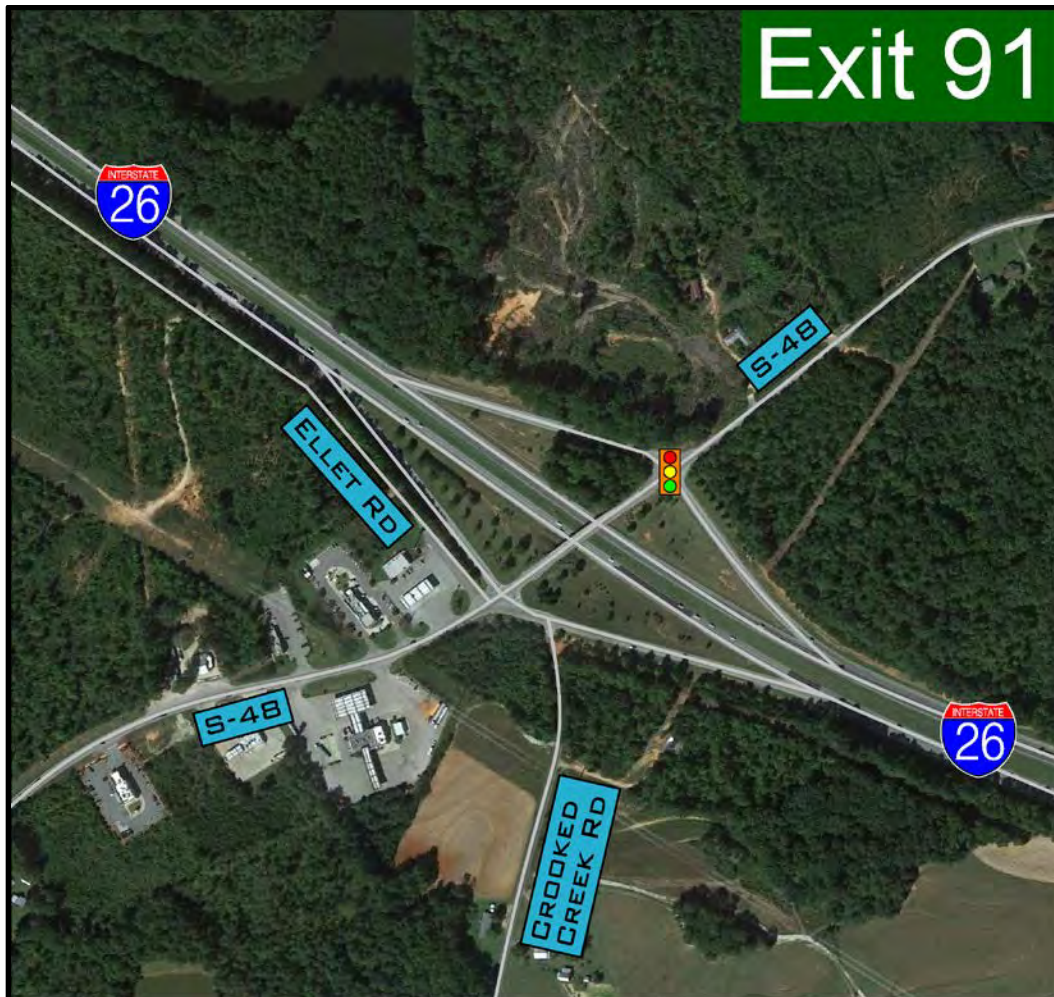


Figure 1B – Interchange Study Area

2.4 PURPOSE AND NEED STATEMENT

The purpose of this IMR is to study the impact of the modification of the interchange at Exit 91 on I-26 near Chapin, South Carolina. Chapin is located in Lexington County, northwest of Columbia. The population of Lexington County has been steadily increasing. In the 1990 Census, the population of Lexington County was 167,611. This grew to 216,014 (28.9% increase) in the 2000 Census and then reached 262,391 (21.5% increase) in 2010. Due to continual and anticipated growth in the area, improvements to the existing roadway network should be reviewed. This report is aimed at the potential improvements to the interchange from I-26 to Columbia Avenue in Chapin. The existing interchange is currently over capacity and the Frontage Road connection with S-48 and Crooked Creek Road connection with the I-26 EB On Ramp should be realigned for safety to meet SCDOT's latest criteria for access management. With new developments and construction in Chapin, such as the S-48 (Columbia Avenue) widening, there is a need for to modify the interchange to be able to accommodate this growth in terms of both capacity and safety.

2.5 EXISTING CONDITIONS FOR STUDY AREA

Currently S-48 is a 2-lane undivided minor arterial roadway with a 35 mile per hour (mph) posted speed limit that runs from US 76 at its intersection with S-51 (Amick Ferry Road) to the I-26 interchange. In the study area, I-26 is a 4-lane divided freeway with a 70 mph posted speed limit running in the east-west direction.

The AM peak hour studied was from 7:30-8:30 AM and the PM peak hour was from 4:45 – 5:45 PM based on the peak hour turning movement traffic counts. Heavy truck percentage for the peak hours varied; however, 4% was used for I-26 and 2% was used on the other studied roadways. It should be noted that SCDOT records indicate the daily heavy truck percentage on S-48 is 7% while I-26 is approximately 15%. Descriptions of the interchanges and a complete list of the study area are described below and shown in **Figure 2**:

1. I-26 Eastbound Ramps at S-48
2. I-26 Westbound Ramps at S-48
3. I-26 Eastbound Ramps at SC 202
4. I-26 Westbound Ramps at SC 202
5. I-26 Eastbound Ramps/ Exxon Driveway at US 176
6. I-26 Westbound Ramps at US 176

Exit 85

Approximately 6 miles to the west of Exit 91 on I-26 is Exit 85, a folded diamond/partial cloverleaf interchange. This interchange provides access to SC 202, a north-south 2-lane undivided roadway with a bridge over I-26. The eastbound off-ramp from I-26 is a stop controlled intersection where vehicles have the ability to turn left or right on to SC 202. The westbound off-ramp also has a stop controlled left turn onto SC 202 while the right turn from the ramp is yield controlled. A frontage road (Meadow Brook Road), less than 100 feet north of the I-26 westbound ramps, runs parallel to I-26 westbound, which is accessible from SC 202.

Exit 91

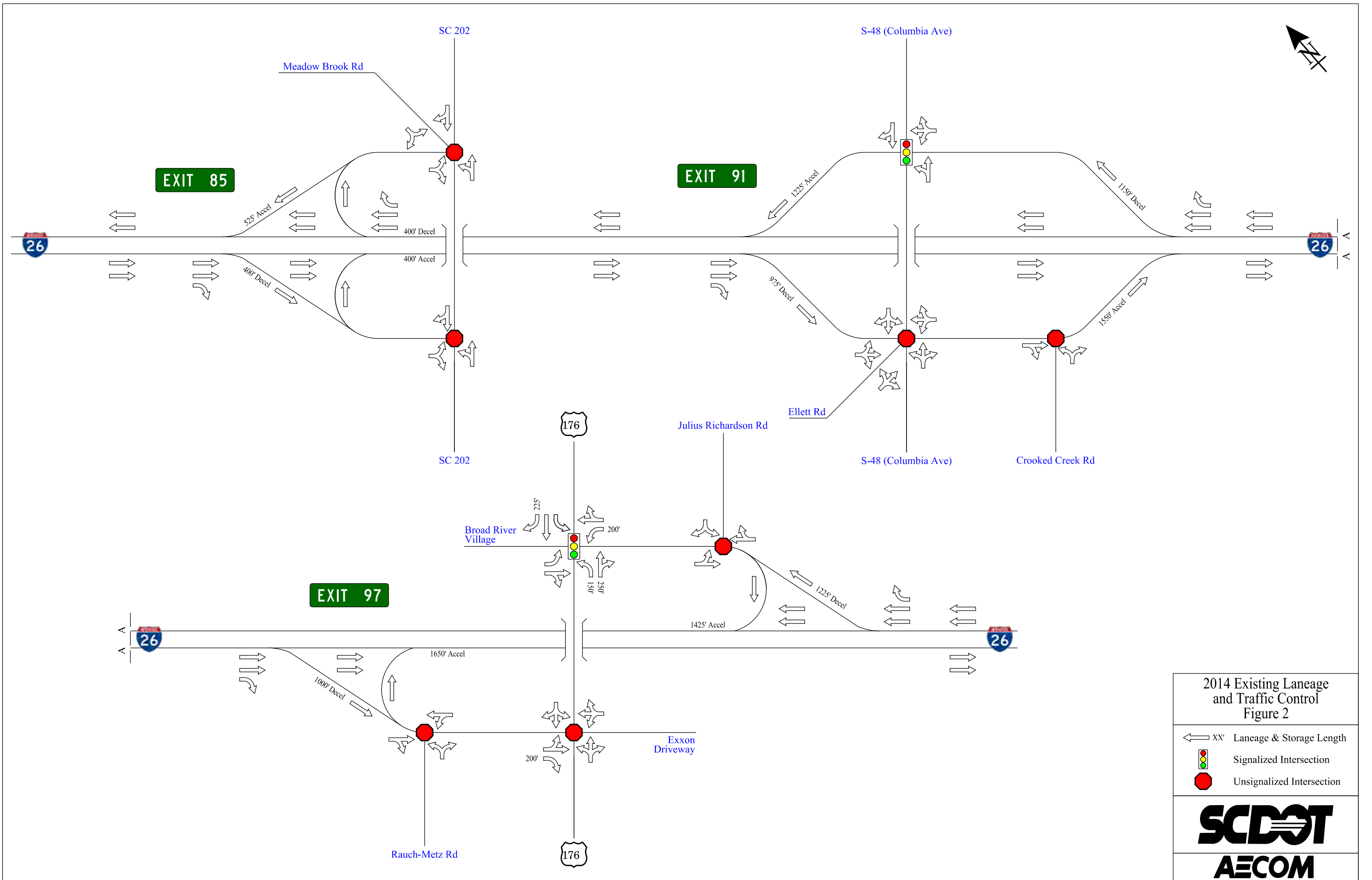
The interchange that intersects with S-48 is Exit 91 as a diamond interchange. This interchange provides access to S-48, which leads directly into Chapin. The eastbound off-ramp provides stop controlled access to S-48. The westbound off-ramp is signalized at the intersection with S-48. A frontage road (Ellett Road) intersects with S-48 approximately 50 feet to the southwest of the eastbound off-ramp. This road runs parallel to I-26 eastbound to the west of S-48. The eastbound on-ramp has access to Crooked Creek Road located on the ramp. There are multiple fast food restaurants and gas stations located west of the interchange on S-48.

Exit 97

Approximately 6 miles to the east of Exit 91 on I-26 is Exit 97. This interchange is a partial cloverleaf design for I-26 westbound and eastbound on ramp movements. The interchange

provides access to US 176, which has access to many residential developments near the interstate. The eastbound off-ramp leads to an intersection with US 176 that is stop controlled coming off the ramp. In addition to the intersection with US 176, the ramp intersects with Rauch Metz Road about half the distance between I-26 and US 176. Traffic traveling from Rauch Metz Road has the option to turn left to access the on-ramp to I-26 eastbound or turn right and head toward the intersection with US 176. The I-26 eastbound loop on-ramp also provides for vehicles to turn left onto Rauch Metz Road.

The I-26 westbound off-ramp intersects with US 176 at a signalized intersection. Through and left turn lane traffic approach the signal while the right turning traffic approaches a yield before continuing onto US 176. There is a driveway leading to a shopping center (Broad River Village) across from the off/on ramps at the signalized intersection.



2014 Existing Laneage and Traffic Control
Figure 2

- ← XX' Laneage & Storage Length
- 🚦 Signalized Intersection
- 🛑 Unsignalized Intersection



3.0 OPERATIONAL ANALYSIS

3.1 ANALYSIS METHODOLOGY

The highway capacity analyses performed are based on methodologies from the Highway Capacity Manual (HCM 2010). Traffic modeling software used in the capacity analyses were Synchro 9.1 and SimTraffic 9.0, (Build 908, Rev 56), and VISSIM 7.0 for intersection analyses.

The traffic carrying ability of a roadway is described by levels of service (LOS) that range from LOS A to LOS F. LOS A represents unrestricted maneuverability and operating speeds. LOS B represents reduced maneuverability and operating speeds. LOS C represents restricted maneuverability and operating speeds closer to the speed limit. LOS D represents severely restricted maneuverability and unstable, low operating speeds. LOS E represents operating conditions at or near the capacity level. LOS F represents breakdown conditions characterized by stop and go travel. A visual representation of each LOS is shown below.



The Highway Capacity Manual (HCM) 2010 defines LOS at an unsignalized intersection by average control delay per vehicle, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the controlled delay for unsignalized intersections, such as availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue. The Highway Capacity Manual explains that drivers perceive that a signalized intersection is designed to carry higher traffic volumes and therefore expect to experience greater delays at signalized intersections. Unsignalized intersections are assigned a LOS for each minor movement. Typically, LOS C is

considered the minimum acceptable level of service at an intersection for a suburban area. **Table 1** presents LOS thresholds for unsignalized intersections.

Table 1: LOS Thresholds for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

LOS for a signalized intersection is defined in terms of average control delay per vehicle, which is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. A single LOS describes a signalized intersection. **Table 2** presents LOS thresholds for signalized intersections.

Table 2: LOS Thresholds Signalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

A basic freeway segment can be characterized by three performance measures: density in terms of passenger cars per mile per lane, speed in terms of mean passenger-car speed, and volume to capacity (v/c) ratio. Each of these measures is an indication of how well traffic flow is being accommodated by the freeway. The measure used to provide an estimate of level of service is density. **Table 3** defines the traffic density conditions at each level of service.

Traffic flow within a basic freeway segment can vary greatly depending on the conditions constricting flow at upstream and downstream bottleneck locations. Bottlenecks can be created by ramp merges or weaving segments, lane drops, maintenance and construction activities, accidents, and objects in the roadway.

Table 3: LOS Thresholds for Freeway Segments

Level of Service	Density Range (pc/mi/ln)
A	≤ 11.0
B	> 11.0 and ≤ 18.0
C	> 18.0 and ≤ 26.0
D	> 26.0 and ≤ 35.0
E	> 35.0 and ≤ 45.0
F	> 45.0

A ramp is a length of roadway providing an exclusive connection between two highway facilities. On freeways, all entering and exiting maneuvers take place on ramps that are designed to facilitate smooth merging of on-ramp vehicles into the freeway traffic stream and smooth diverging of off-ramp vehicles from the freeway traffic stream onto the ramp.

A ramp consists of three geometric elements of interest: the ramp-freeway junction, the ramp roadway, and the ramp street junction. The ramp freeway junction is typically designed to permit high-speed merging and diverging with varying acceleration and deceleration lanes. Ramp roadways can vary between locations in terms of number of lanes, design speeds, grades, and horizontal curvature. The design of ramp roadways is seldom a source of operational difficulty unless a traffic incident causes disruption along the length of the ramp. Ramp-street terminal problems can cause queuing along the length of ramp, but this is generally not related to the design of the ramp roadway. **Table 4** defines the traffic density conditions at each level of service.

Table 4: LOS Thresholds for Merge / Diverge Areas

Level of Service	Density Range (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	Demand Exceeds Capacity

3.2 TRAFFIC VOLUMES

Traffic volumes were for this IMR were referenced from the S-48 (Columbia Avenue) Corridor Improvement Project Traffic Study dated 10-17-16. In summary, the 2014 existing traffic volumes were grown at a linear rate of 1.25% to obtain the base Opening Year (2020) and Design Year (2040) traffic projections. After these projections were complete, a traffic study for the Chapin Technology Park and Chapin Commerce Village Development became available. These two developments are significant in size and impact the S-48 corridor and interchange. At the direction of Lexington County and SCDOT, additional traffic volumes were added to the base volumes to be conservative and to better estimate the turning movement volumes to / from S-48. Additional volumes were generated using:

- Chapin Technology Park (120 acre industrial park, 450 single family houses, and 350,000 SF of commercial). Based on the final traffic study submitted and approved by SCDOT on October 13, 2015 for the Chapin Technology Park, the opening year is 2019. These new trips were added to the Opening Year (2020). The Chapin Technology Park is not expected to be complete until 2024 as these trips at full build-out were added to the Design Year (2040). The Technology Park is located north of Columbia Avenue near Woodthrush Road.
- Chapin Commerce Village (132,000 SF Specialty Retail, 8,350 SF Quality Restaurant, 8,350 SF General Office, 4,500 SF Fast Food Restaurant with Drive-Through, 8,350 High Turn-Over (Sit-Down) Restaurant, 4,050 SF Fast Food Restaurant with Drive-Through, 4,950 SF Convenience Market with Gasoline Pumps, 8,350 SF Quality Restaurant, 120 Room Hotel, 8,350 Quality Restaurant, and 4,050 SF General Office Building). This development has not had a traffic study and is only in the early planning stages. It is located just east of I-26 along S-48 (Columbia Avenue).

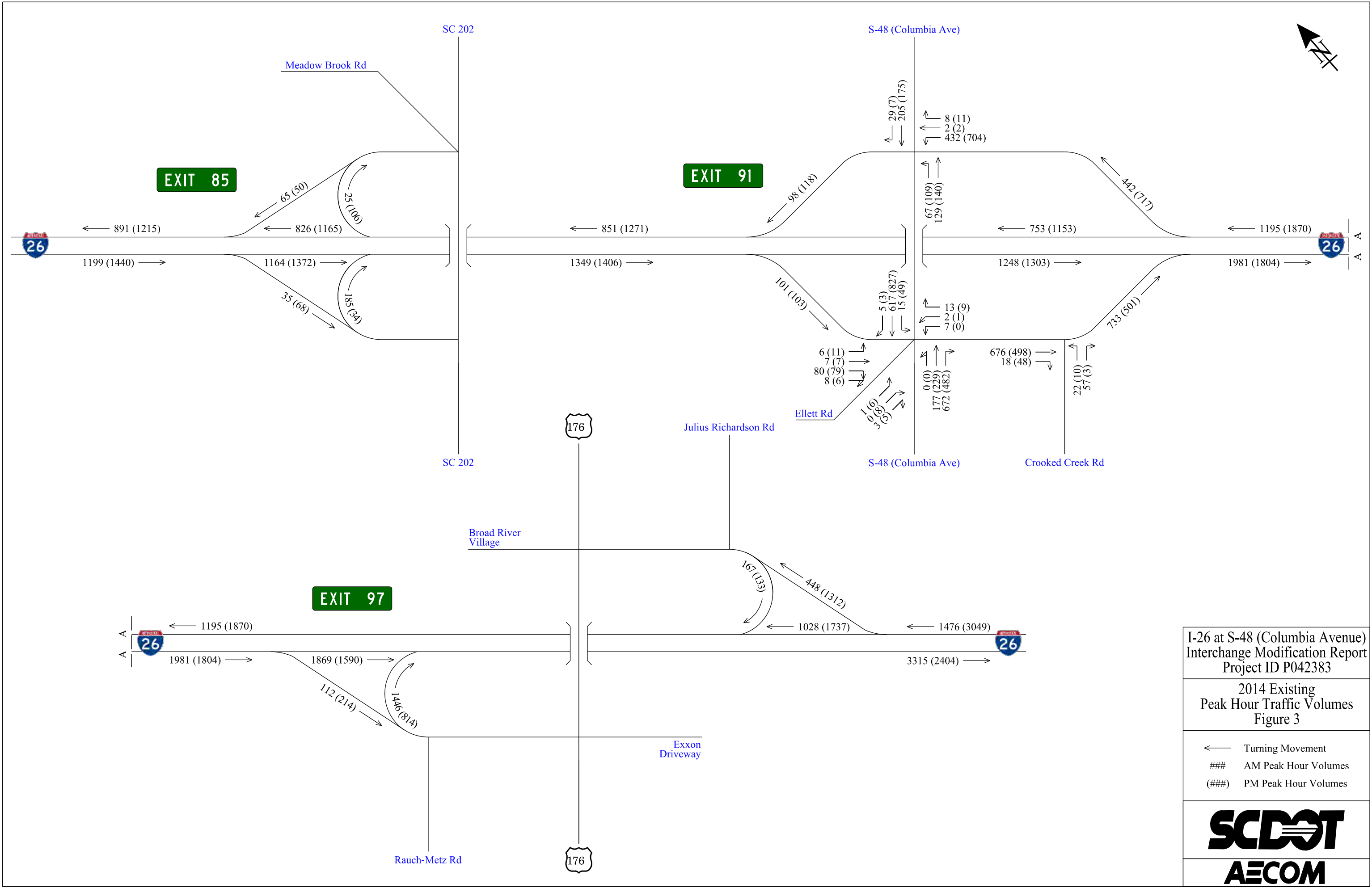
A complete memo describing the methodology with traffic figures can be referenced in **Appendix A**.

The memo does not provide volumes along I-26, therefore, AECOM used an I-26 traffic count located just east Exit 91 and determined other sections along I-26 in the study area by balancing with the known ramp volumes at Exit 85 and Exit 97. The raw traffic counts are located in **Appendix B**. Finalized traffic volumes (balanced) for all study scenarios are displayed in **Figures 3-9**.

3.3 CRASH ANALYSIS

Crash data collected over the last 3.4 years show low crash rates along I-26 within the Exit 91 interchange area. There was a total 40 crashes with 75 percent of the crashes consisting of either running off the road or rear end. Of the 40 crashes, 8 people were injured with 1 fatality. The one fatality appears to be pedestrian related occurring during the dusk hours. The crash data also indicates that there were 8 rear-end collisions between the on / off ramps (stack 6) over the 3.4 year period which may be attributed to queuing from the westbound off-ramp extending onto the interstate. Crash summaries can be found in **Appendix C**.

The preferred Alternative Diverging Diamond Interchange design is not expected change the existing diamond interchange as the ramp design and number of lanes on the freeway are expected to remain the same. A modification to the S-48 interchange is not expected to have a significant adverse effect on safety on I-26 but is expected to improve the safety on S-48 at the ramps with the fewer conflict points.

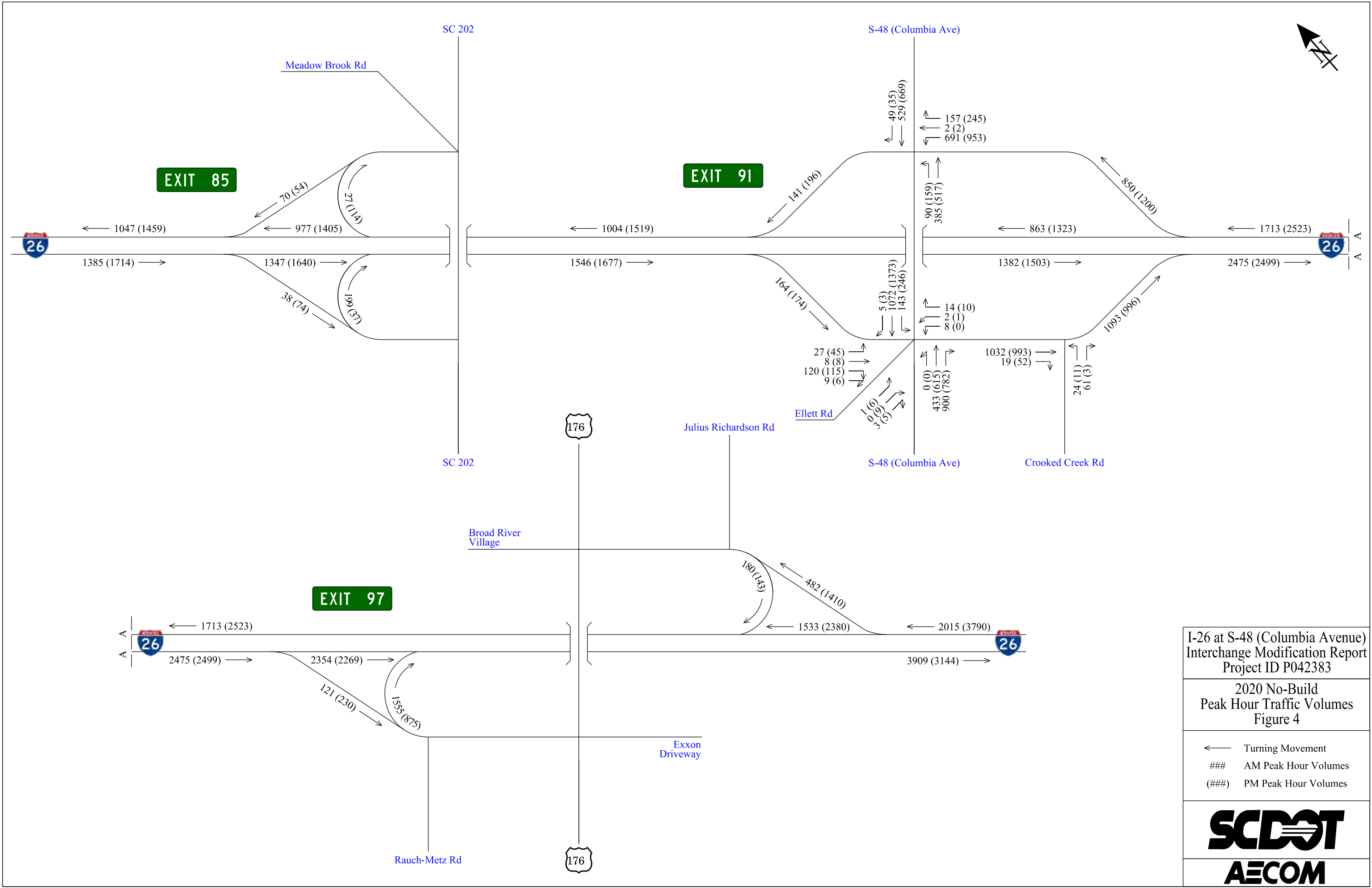


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2014 Existing
Peak Hour Traffic Volumes
Figure 3

← Turning Movement
AM Peak Hour Volumes
(###) PM Peak Hour Volumes



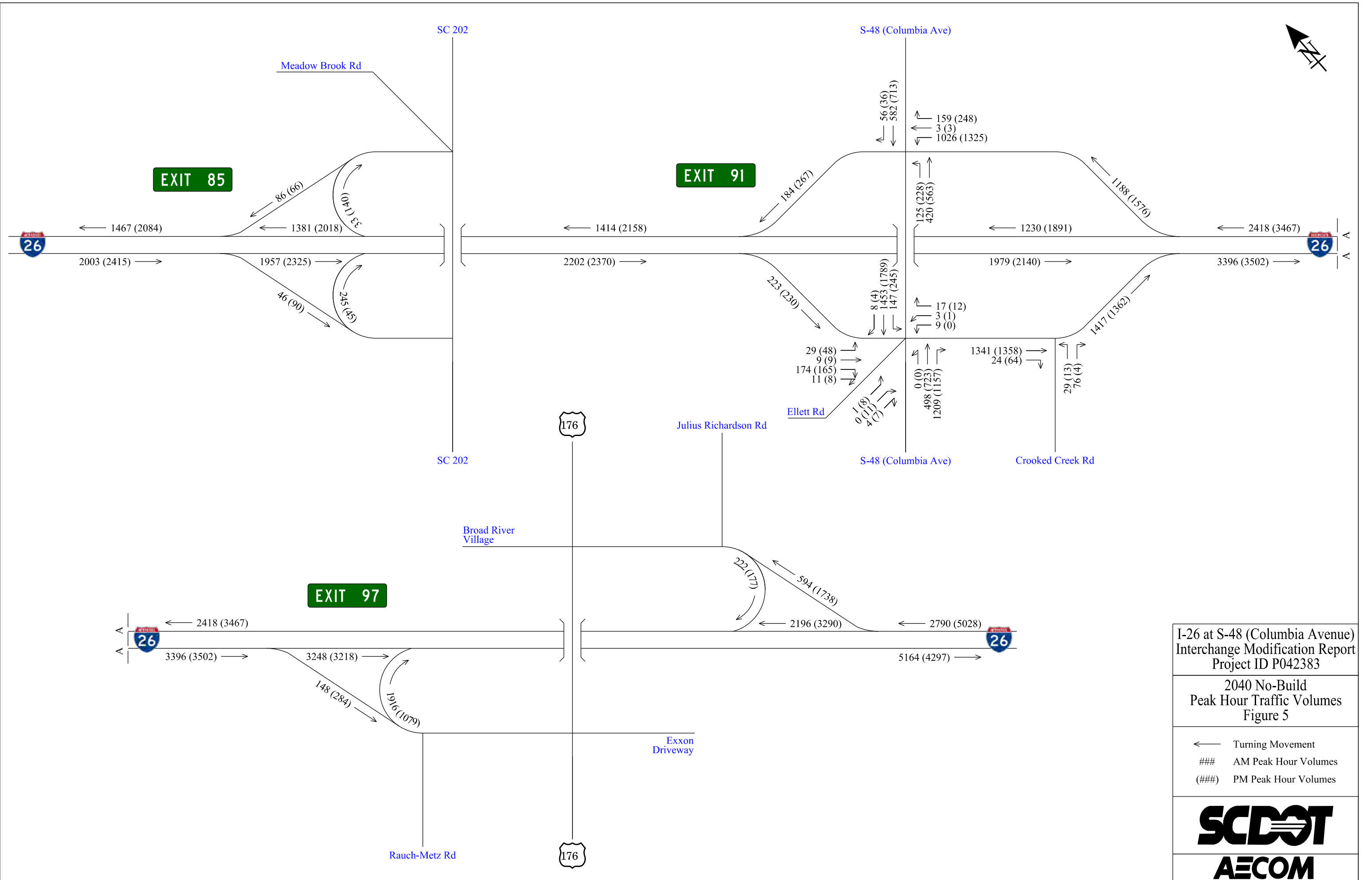


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2020 No-Build
Peak Hour Traffic Volumes
Figure 4

← Turning Movement
AM Peak Hour Volumes
(###) PM Peak Hour Volumes



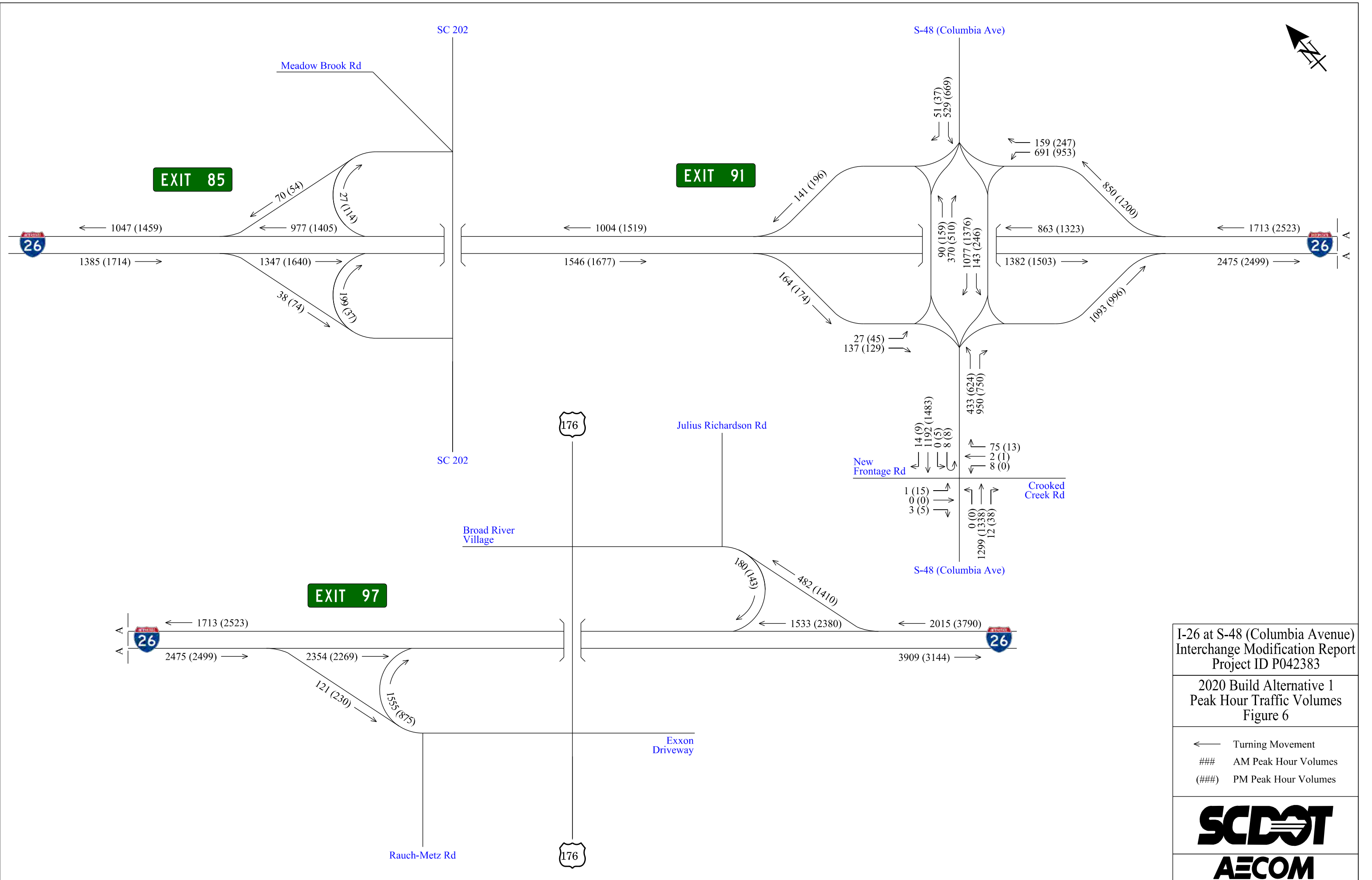


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2040 No-Build
Peak Hour Traffic Volumes
Figure 5

- ← Turning Movement
- ### AM Peak Hour Volumes
- (###) PM Peak Hour Volumes



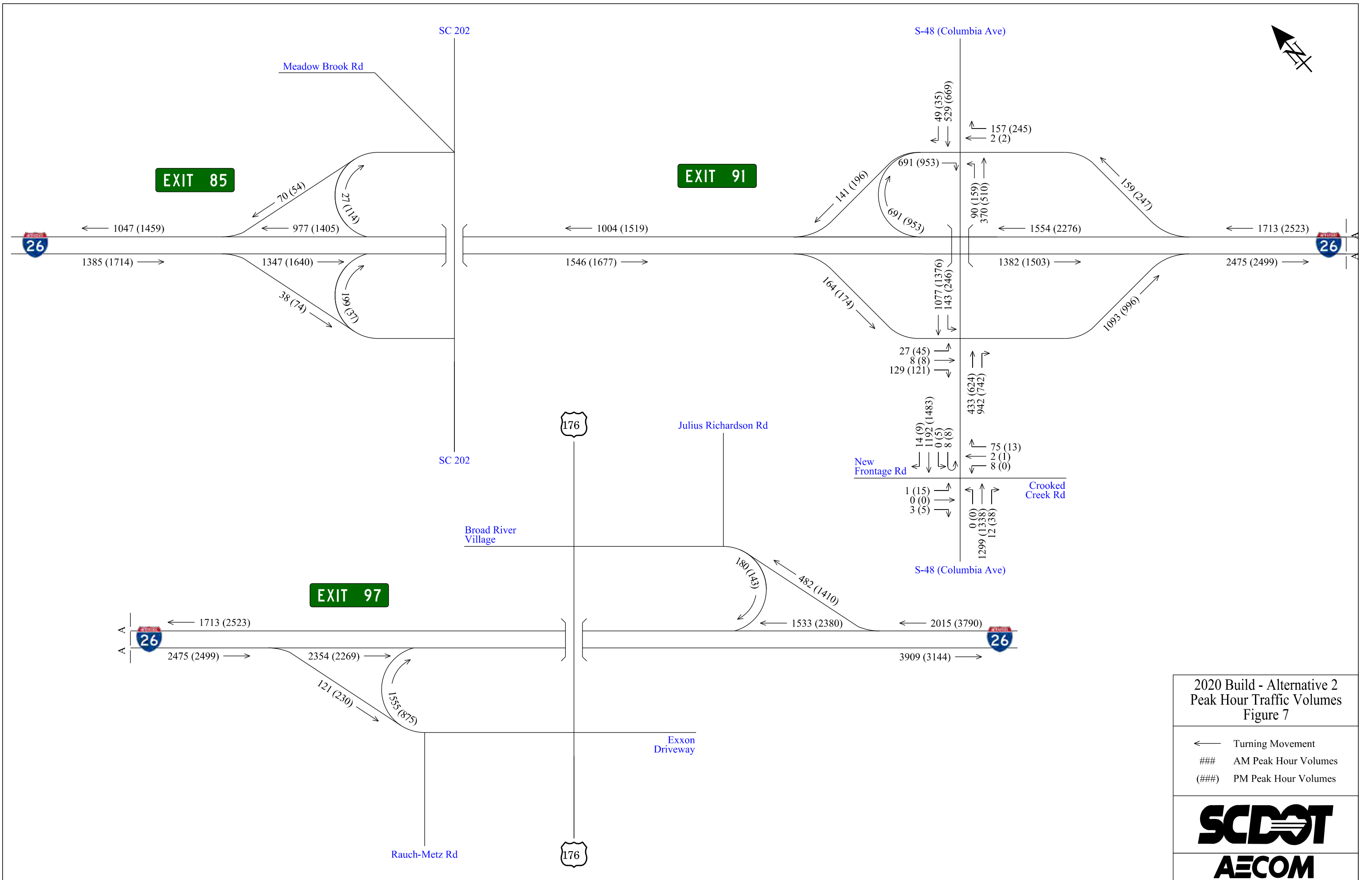


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2020 Build Alternative 1
Peak Hour Traffic Volumes
Figure 6

← Turning Movement
 ### AM Peak Hour Volumes
 (###) PM Peak Hour Volumes





EXIT 85

EXIT 91

EXIT 97

SC 202

S-48 (Columbia Ave)

SC 202

Julius Richardson Rd

Broad River Village

New Frontage Rd

Crooked Creek Rd

S-48 (Columbia Ave)

Exxon Driveway

Rauch-Metz Rd

176

176

26

26

26

26

← 1047 (1459)

→ 1385 (1714)

← 977 (1405)

→ 1347 (1640)

← 1004 (1519)

→ 1546 (1677)

← 141 (196)

→ 164 (174)

← 1554 (2276)

→ 1382 (1503)

← 1713 (2523)

→ 2475 (2499)

← 1713 (2523)

→ 2475 (2499)

→ 2354 (2269)

→ 121 (230)

← 1533 (2380)

→ 3909 (3144)

← 2015 (3790)

→ 3909 (3144)

70 (54)

27 (114)

38 (74)

199 (37)

691 (953)

691 (953)

49 (35)

529 (669)

157 (245)

2 (2)

1077 (1376)

143 (246)

27 (45)

8 (8)

129 (121)

14 (9)

1192 (1483)

0 (5)

8 (8)

1 (15)

0 (0)

3 (5)

433 (624)

942 (742)

75 (13)

2 (1)

8 (0)

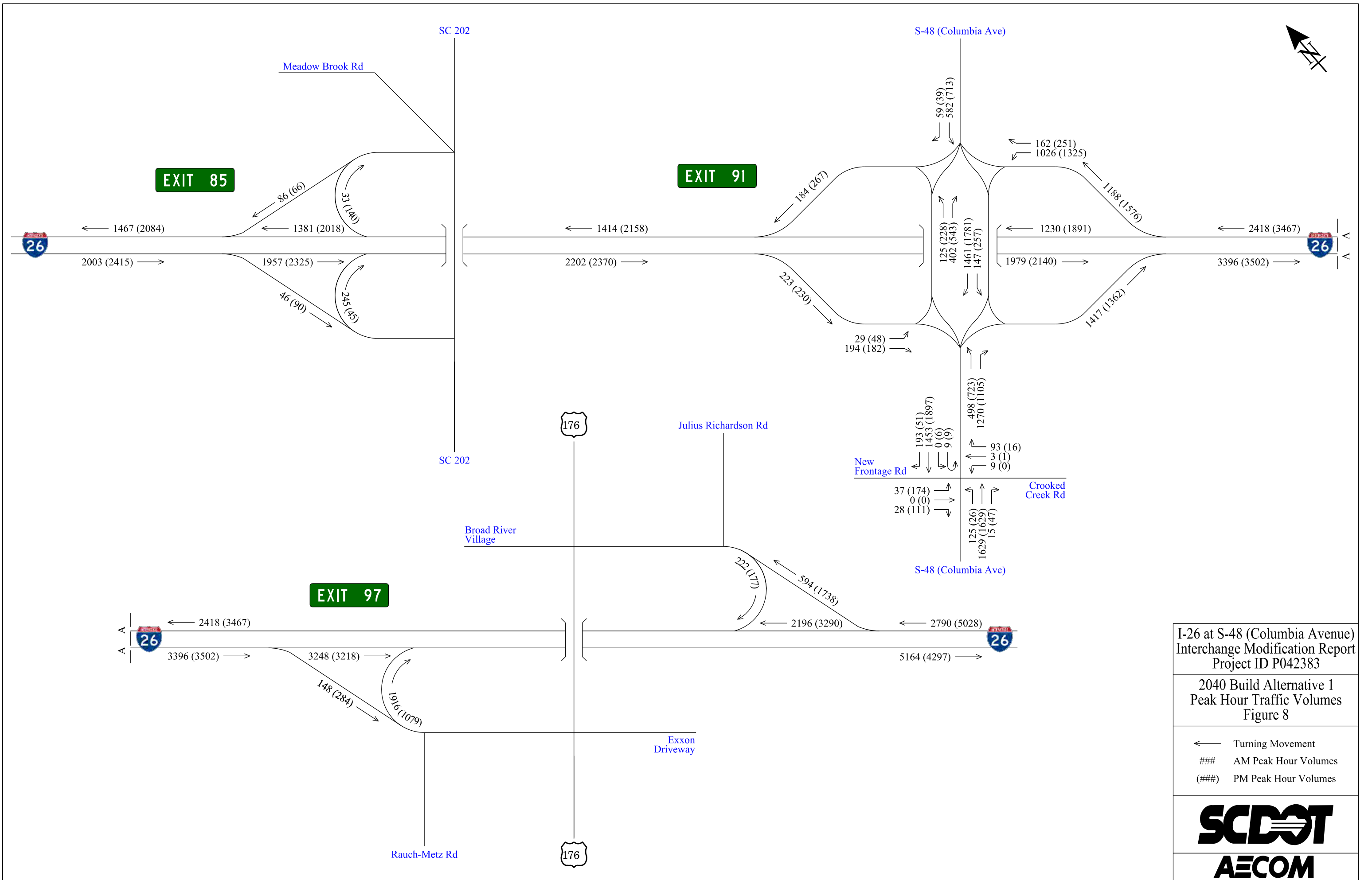
0 (0)

1299 (1338)

12 (38)

180 (143)

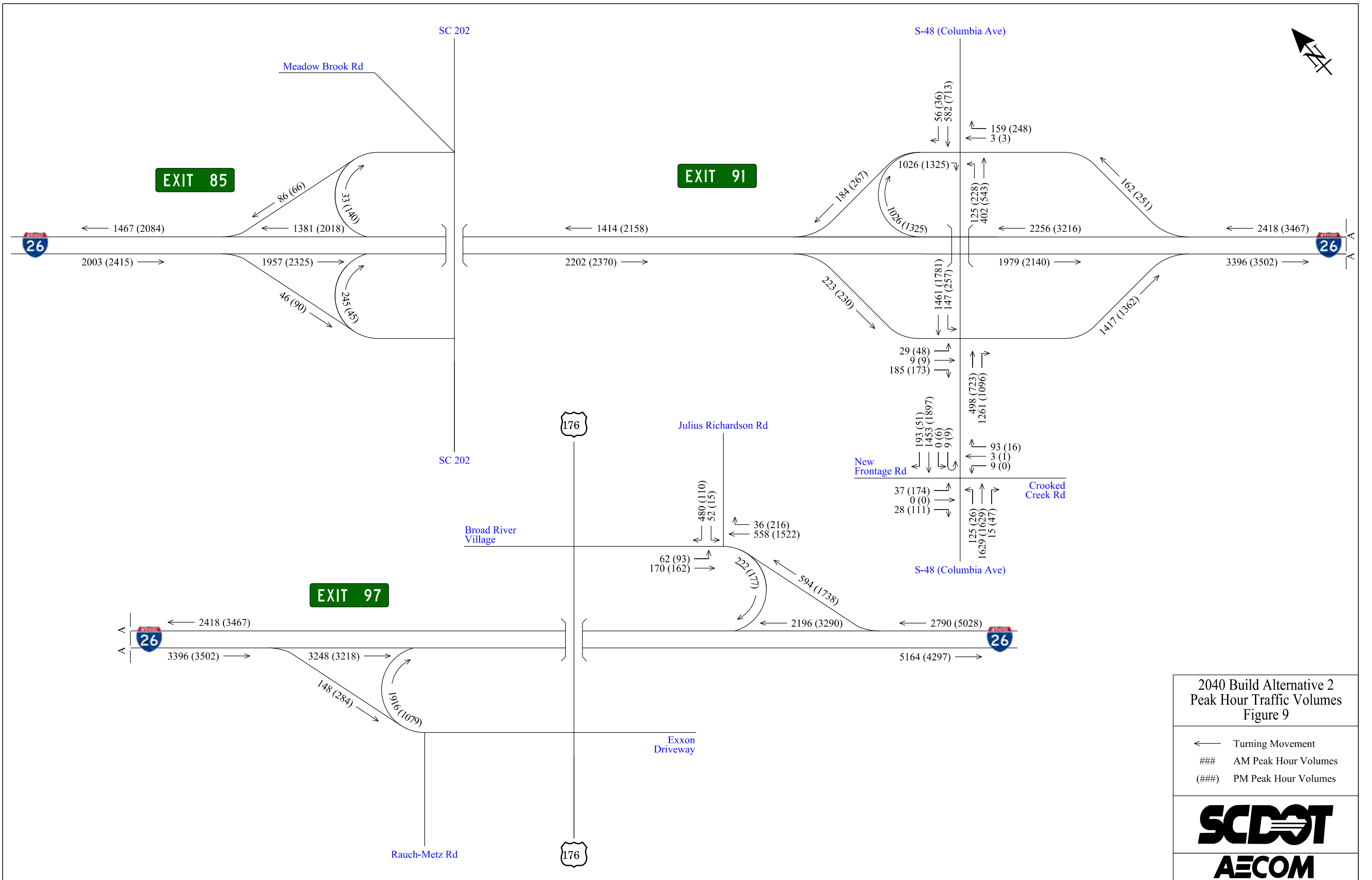
482 (1410)



I-26 at S-48 (Columbia Avenue)
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2040 Build Alternative 1
Peak Hour Traffic Volumes
Figure 8





3.4 EXISTING 2014 TRAFFIC ANALYSIS

The results of the Existing 2014 intersection analysis using Synchro 9.1 indicate that S-48 at I-26 eastbound ramp is currently operating LOS D in the AM Peak hour and LOS E during PM for the minor street approaches. The westbound off ramp under signal control is operating at LOS B; however, queues from the signal may extend onto I-26.

Table 5 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix D**.

Table 5: Existing 2014 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48)							
1	I-26 Eastbound Off Ramp / Crook Creek Road at S-48	Unsignalized	WB (AM)* EB (PM)*	D	E	28.4	42.7
2	I-26 Westbound Ramps at S-48	Signalized	-	B	B	11.7	19.1

*Since vehicles from Crooked Creek Road can access the I-26 eastbound on ramp to S-48 (Columbia Avenue), the worst of the two minor approaches was reported.

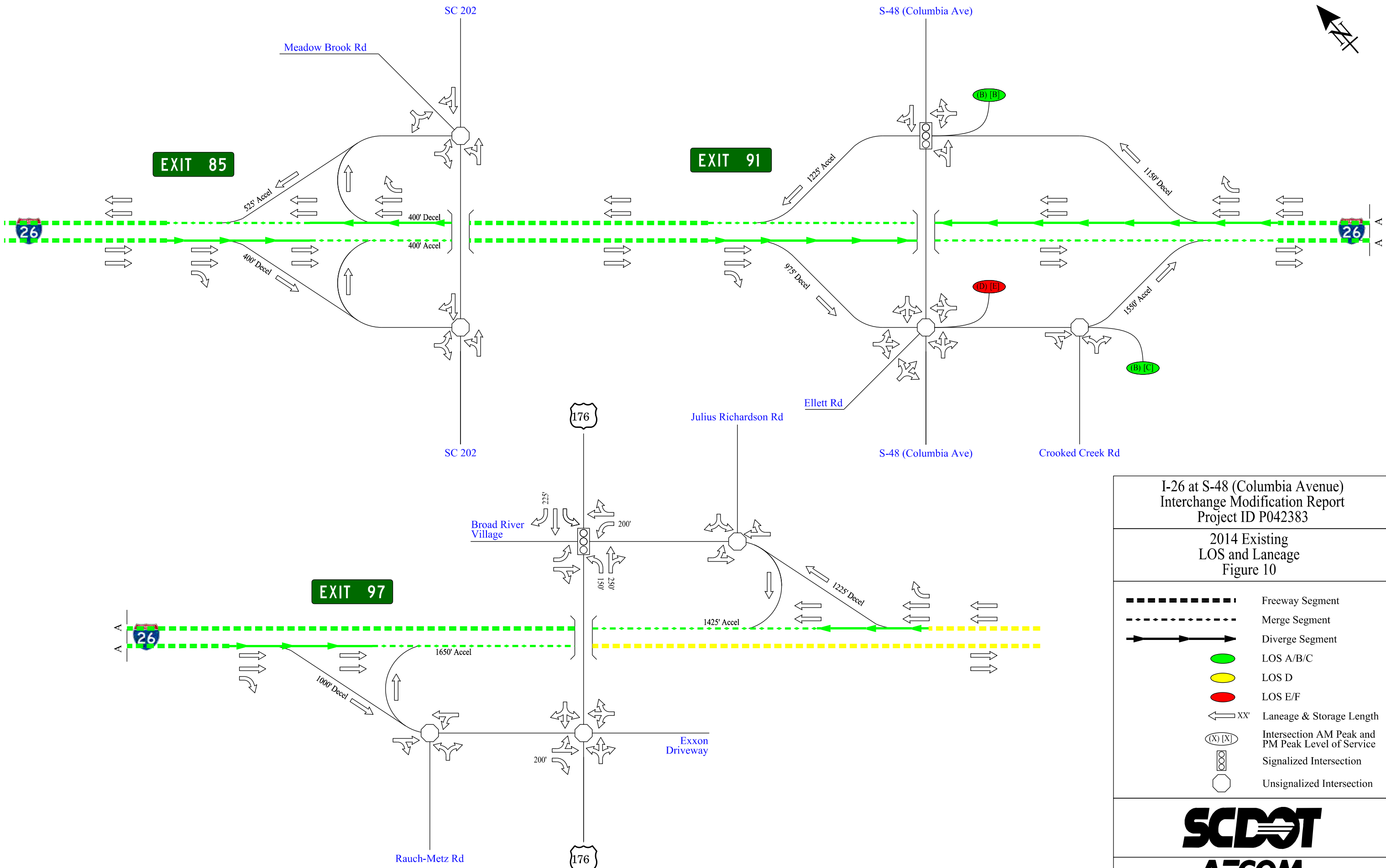
The results of the Existing 2014 Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is operating at LOS D in the AM peak hour (eastbound) and during the PM peak hour (westbound). All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 6 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix E**.

Table 6: Existing 2014 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	A	B	9.4	11.3
	Between Exit 85 and Exit 91	A	B	10.6	11.0
	Between Exit 91 and Exit 97	B	B	15.6	14.2
	East of Exit 97	D	C	30.0	19.4
Westbound	East of Exit 97	B	D	11.6	26.4
	Between Exit 91 and Exit 97	A	B	9.4	14.7
	Between Exit 85 and Exit 91	A	A	6.7	10.0
	West of Exit 85	A	A	7.0	9.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	B	B	15.2	15.9
	EB Exit 91 On-Ramp	B	B	13.7	12.2
	EB Exit 97 On-Ramp	C	B	25.4	17.5
Westbound	WB Exit 97 On-Ramp	A	B	7.4	13.6
	WB Exit 91 On-Ramp	A	A	5.5	9.4
	WB Exit 85 On-Ramp	B	B	10.3	13.3
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	B	B	12.8	15.2
	EB Exit 91 Off-Ramp	A	A	9.1	9.7
	EB Exit 97 Off-Ramp	B	B	15.3	13.5
Westbound	WB Exit 97 Off-Ramp	A	C	8.2	24.1
	WB Exit 91 Off-Ramp	A	B	5.3	12.2
	WB Exit 85 Off-Ramp	A	B	9.3	13.5

Figure 10 shows the LOS for the Existing 2014 conditions.



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2014 Existing
LOS and Laneage
Figure 10

	Freeway Segment
	Merge Segment
	Diverge Segment
	LOS A/B/C
	LOS D
	LOS E/F
	Laneage & Storage Length
	Intersection AM Peak and PM Peak Level of Service
	Signalized Intersection
	Unsignalized Intersection

SCDOT
AECOM

3.5 NO-BUILD 2020 TRAFFIC ANALYSIS

The 2020 No-Build scenario analyzes the conditions if there were no improvements made to the interchange. The results of the No-Build 2020 intersection analysis using Synchro 9.1 indicate that S-48 at I-26 is expected to operate at LOS F in the AM and PM peak hours.

Table 7 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix F**.

Table 7: No-Build 2020 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48)							
1	I-26 Eastbound Off Ramp / Crook Creek Road at S-48	Unsignalized	WB (AM)* EB (PM)*	F	F	900+	900+
2	I-26 Westbound Ramps at S-48	Signalized	-	F	F	126.0	433.7

*Since vehicles from Crooked Creek Road can access the I-26 eastbound on ramp to S-48 (Columbia Avenue), the worst of the two minor approaches was reported.

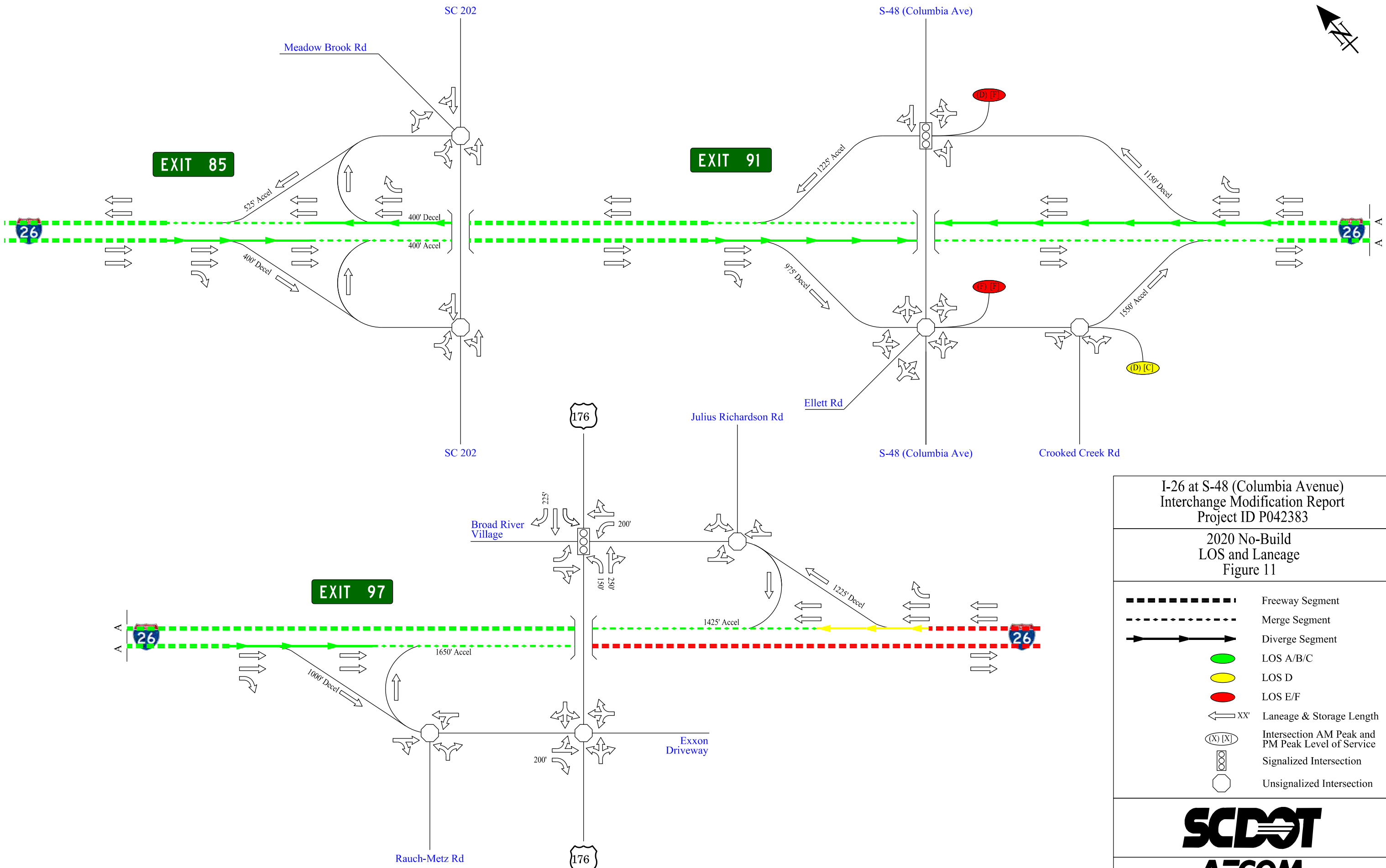
The results of the 2020 No-Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS E in the AM peak hour (eastbound) and during the PM peak hour (westbound). In addition the I-26 eastbound merge area from Exit 97 is expected to operate at LOS D along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 8 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix G**.

Table 8: No-Build 2020 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	A	B	10.9	13.5
	Between Exit 85 and Exit 91	B	B	12.1	13.2
	Between Exit 91 and Exit 97	C	C	20.1	20.3
	East of Exit 97	E	D	40.9	27.6
Westbound	East of Exit 97	B	E	15.9	38.4
	Between Exit 91 and Exit 97	B	C	13.5	20.5
	Between Exit 85 and Exit 91	A	B	7.9	11.9
	West of Exit 85	A	B	8.2	11.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	B	B	17.0	18.3
	EB Exit 91 On-Ramp	B	B	18.0	18.2
	EB Exit 97 On-Ramp	D	C	30.8	24.3
Westbound	WB Exit 97 On-Ramp	B	B	12.1	19.6
	WB Exit 91 On-Ramp	A	B	6.9	11.6
	WB Exit 85 On-Ramp	B	B	11.7	15.5
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	B	B	14.7	18.0
	EB Exit 91 Off-Ramp	B	B	11.1	12.5
	EB Exit 97 Off-Ramp	C	C	20.3	20.6
Westbound	WB Exit 97 Off-Ramp	B	D	13.6	31.6
	WB Exit 91 Off-Ramp	B	B	10.6	18.8
	WB Exit 85 Off-Ramp	B	B	10.8	16.0

Figure 11 shows the LOS for the No-Build 2020 conditions.



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2020 No-Build
LOS and Laneage
Figure 11

	Freeway Segment
	Merge Segment
	Diverge Segment
	LOS A/B/C
	LOS D
	LOS E/F
	Laneage & Storage Length
	Intersection AM Peak and PM Peak Level of Service
	Signalized Intersection
	Unsignalized Intersection

SCDOT
AECOM

3.6 NO-BUILD 2040 TRAFFIC ANALYSIS

The 2040 No-Build scenario analyzes the conditions if there were no improvements made to the interchange. The results of the No-Build 2040 intersection analysis using Synchro 9.1 indicate that S-48 at I-26 is expected to continue to operate at LOS F in the AM and PM peak hours.

Table 9 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix H**.

Table 9: No-Build 2040 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48)							
1	I-26 Eastbound Off Ramp / Crook Creek Road at S-48	Unsignalized	WB (AM)* EB (PM)*	F	F	900+	900+
2	I-26 Westbound Ramps at S-48	Signalized	-	F	F	247.4	900+

*Since vehicles from Crooked Creek Road can access the I-26 eastbound on ramp to S-48 (Columbia Avenue), the worst of the two minor approaches was reported.

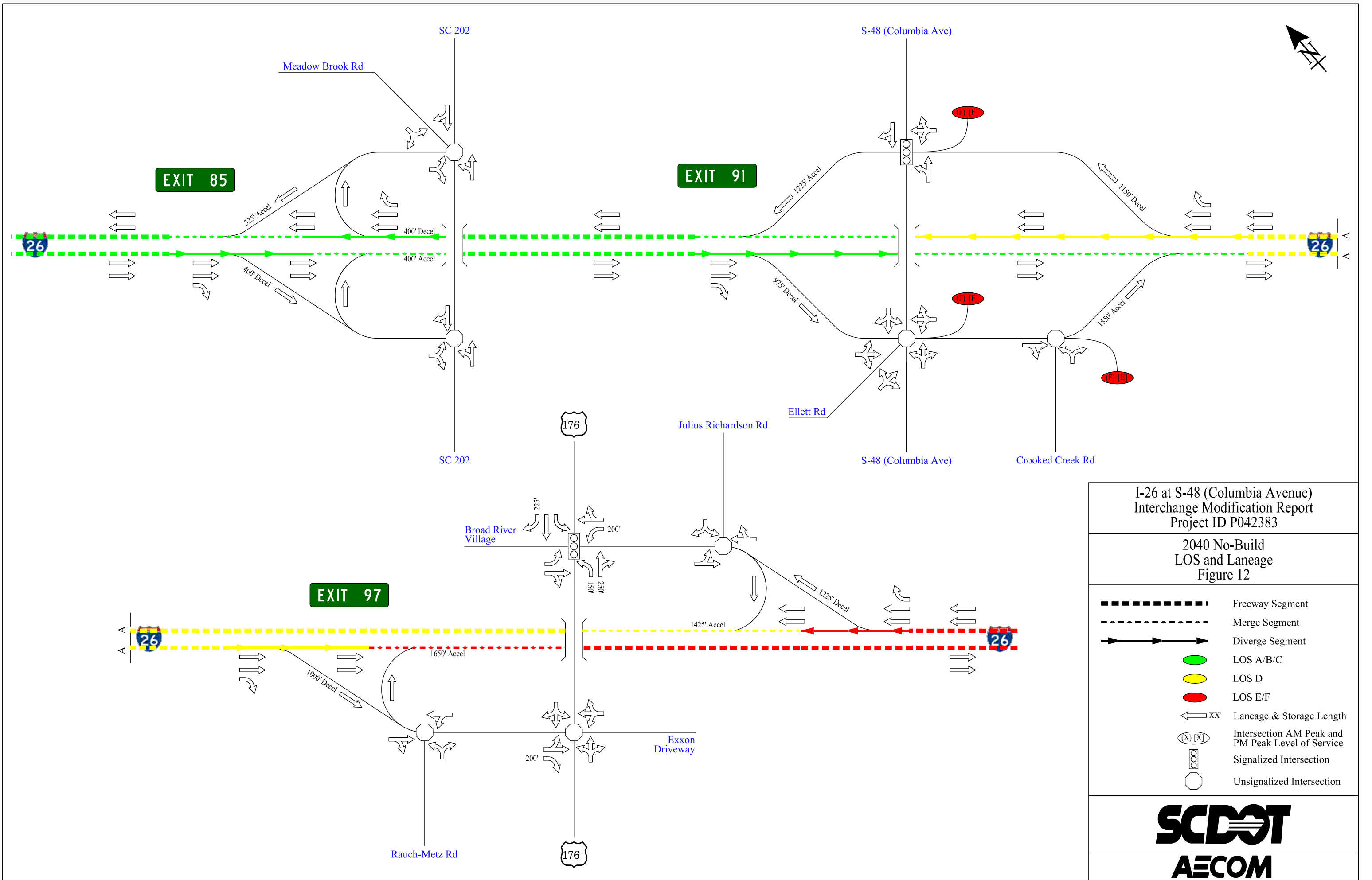
The results of the 2040 No-Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS F in the AM and PM peak hours. Between Exit 91 and Exit 97, the freeway is expected to operate at LOS D in the AM peak hour (eastbound) and PM peak hour (westbound). The PM hour diverge at Exit 91 is also LOS D. In addition the I-26 eastbound merge area from Exit 97 is expected to operate at LOS F along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 10 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix I**.

Table 10: No-Build 2040 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	B	C	15.8	19.5
	Between Exit 85 and Exit 91	B	C	17.5	19.1
	Between Exit 91 and Exit 97	D	D	31.3	33.0
	East of Exit 97	F	F	105.3	50.3
Westbound	East of Exit 97	C	F	23.3	91.3
	Between Exit 91 and Exit 97	C	D	19.5	32.4
	Between Exit 85 and Exit 91	B	B	11.1	17.1
	West of Exit 85	B	B	11.5	16.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	C	C	23.0	24.7
	EB Exit 91 On-Ramp	C	C	26.2	27.2
	EB Exit 97 On-Ramp	F	F	42.0	34.7
Westbound	WB Exit 97 On-Ramp	B	D	18.6	28.3
	WB Exit 91 On-Ramp	B	B	10.6	17.4
	WB Exit 85 On-Ramp	B	C	15.6	21.3
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	C	C	20.9	25.1
	EB Exit 91 Off-Ramp	B	B	17.8	19.5
	EB Exit 97 Off-Ramp	D	D	29.7	30.7
Westbound	WB Exit 97 Off-Ramp	C	F	21.5	44.2
	WB Exit 91 Off-Ramp	B	D	17.7	28.3
	WB Exit 85 Off-Ramp	B	C	15.0	22.5

Figure 12 shows the LOS for the 2040 No-Build Conditions



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**2040 No-Build
LOS and Laneage
Figure 12**

	Freeway Segment
	Merge Segment
	Diverge Segment
	LOS A/B/C
	LOS D
	LOS E/F
	Laneage & Storage Length
	Intersection AM Peak and PM Peak Level of Service
	Signalized Intersection
	Unsignalized Intersection

SCDOT
AECOM

3.7 BUILD 2020 TRAFFIC ANALYSIS

The 2020 Build scenario analyzes the conditions for three-interchange alternatives at Exit 91. For all three Alternatives, the following changes were included in the 2020 Build scenario:

- A New Frontage Road approximately 1000 feet to the south of the I-26 eastbound ramps was included to carry the traffic of the proposed Chapin Technology Park. The new Frontage Road was assumed to be a signalized intersection.
- Ellet Road (old frontage road) was removed in the Build scenario. In the Build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with S-48. In the Build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

The results of the Build 2020 analysis using Synchro 9.1 indicate that two of three alternatives are expected to operate at LOS C or better. Alternative 1 (DDI) is expected to have signals at both ramps; therefore, the LOS is balanced at both intersections to obtain proper signals timing. Alternative 2 (Partial Cloverleaf) has an expected LOS A at the I-26 eastbound ramps because no signal is recommended at the I-26 westbound ramps and signal can operate independently. Alternative 3 (Dual Roundabouts) is expected to operate at LOS F for the westbound ramps during the PM peak hour; therefore, it should not be considered as a viable alternative.

Table 11 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix J and K**. Detailed Sidra output reports are found in **Appendix N**.

Table 11: Build 2020 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48) – Diverging Diamond Interchange – Alt 1							
1	I-26 Eastbound Ramps at S-48	Signalized	-	C	C	20.9	22.3
21	I-26 WB Ramps at S-48	Signalized	-	B	C	17.2	23.6
22	S-48 at I-26 WB Off Ramp	Signalized	-	C	B	20.5	16.9
Exit 91 (I-26 at S-48) – Partial Cloverleaf – Alt 2							
1	I-26 Eastbound Ramps at S-48	Signalized	-	A	A	4.1	4.7
2	S-48 at I-26 WB Off Ramp	Unsignalized	WB	B	C	12.7	19.8

The results of the 2020 Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS E in the AM peak hour (eastbound) and during the PM peak hour (westbound). In addition

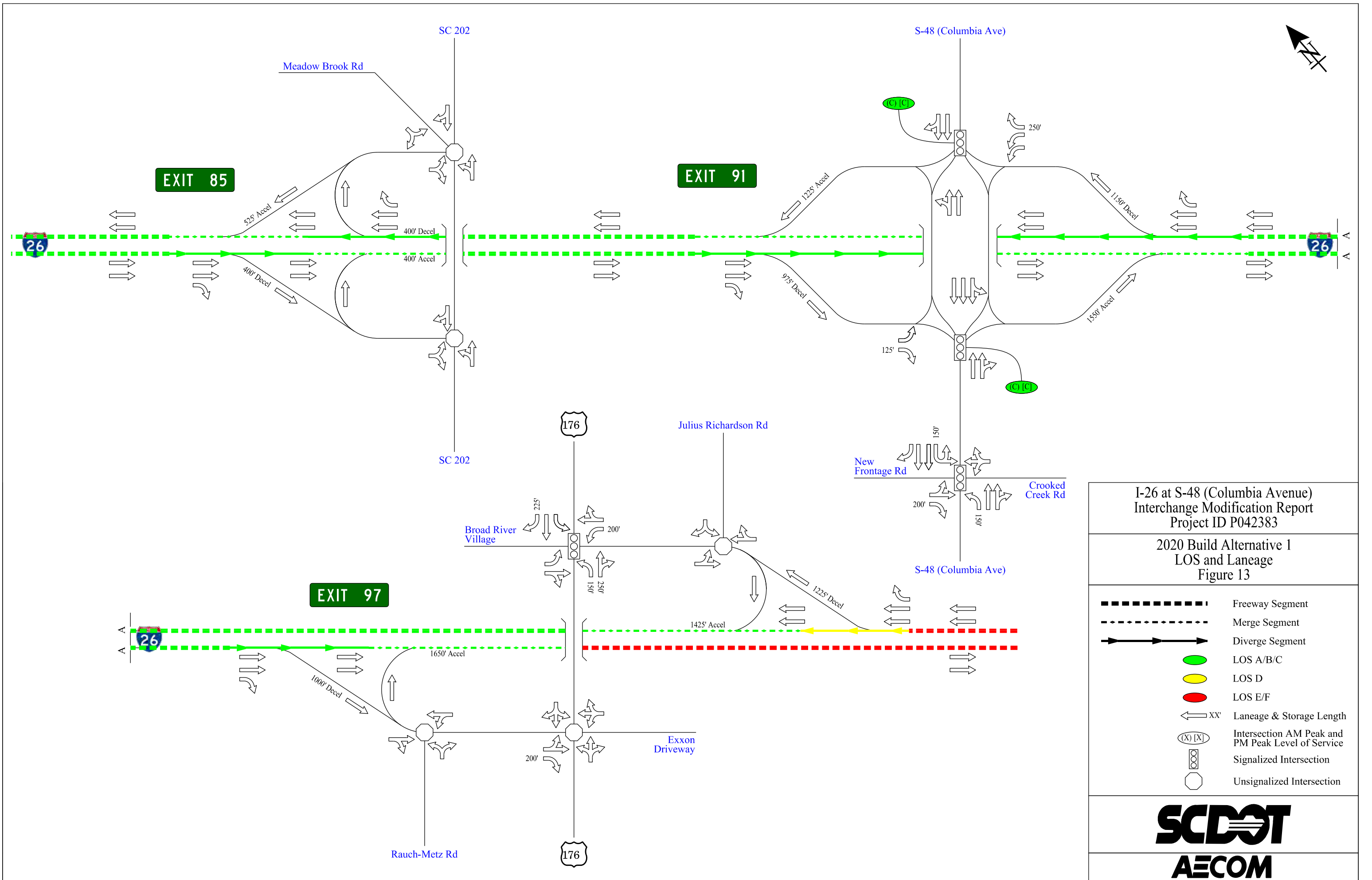
the I-26 eastbound merge area from Exit 97 is expected to operate at LOS D along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 12 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix G**.

Table 12: Build 2020 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	A	B	10.9	13.5
	Between Exit 85 and Exit 91	B	B	12.1	13.2
	Between Exit 91 and Exit 97	C	C	20.1	20.3
	East of Exit 97	E	D	40.9	27.6
Westbound	East of Exit 97	B	E	15.9	38.4
	Between Exit 91 and Exit 97	B	C	13.5	20.5
	Between Exit 85 and Exit 91	A	B	7.9	11.9
	West of Exit 85	A	B	8.2	11.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	B	B	17.0	18.3
	EB Exit 91 On-Ramp	B	B	18.0	18.2
	EB Exit 97 On-Ramp	D	C	30.8	24.3
Westbound	WB Exit 97 On-Ramp	B	B	12.1	19.6
	WB Exit 91 On-Ramp	A	B	6.9	11.6
	WB Exit 85 On-Ramp	B	B	11.7	15.5
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	B	B	14.7	18.0
	EB Exit 91 Off-Ramp	B	B	11.1	12.5
	EB Exit 97 Off-Ramp	C	C	20.3	20.6
Westbound	WB Exit 97 Off-Ramp	B	D	13.6	31.6
	WB Exit 91 Off-Ramp – Alt 1	B	B	10.6	18.8
	WB Exit 91 Off- Ramp – Alt 2	B	B	10.6	16.3
	WB Exit 91 Off Loop Ramp – Alt 2	A	B	9.0	18.8
	WB Exit 85 Off-Ramp	B	B	10.8	16.0

Figure 13 and 14 shows the LOS for the 2020 Build Conditions for Alternative 1 and 2.

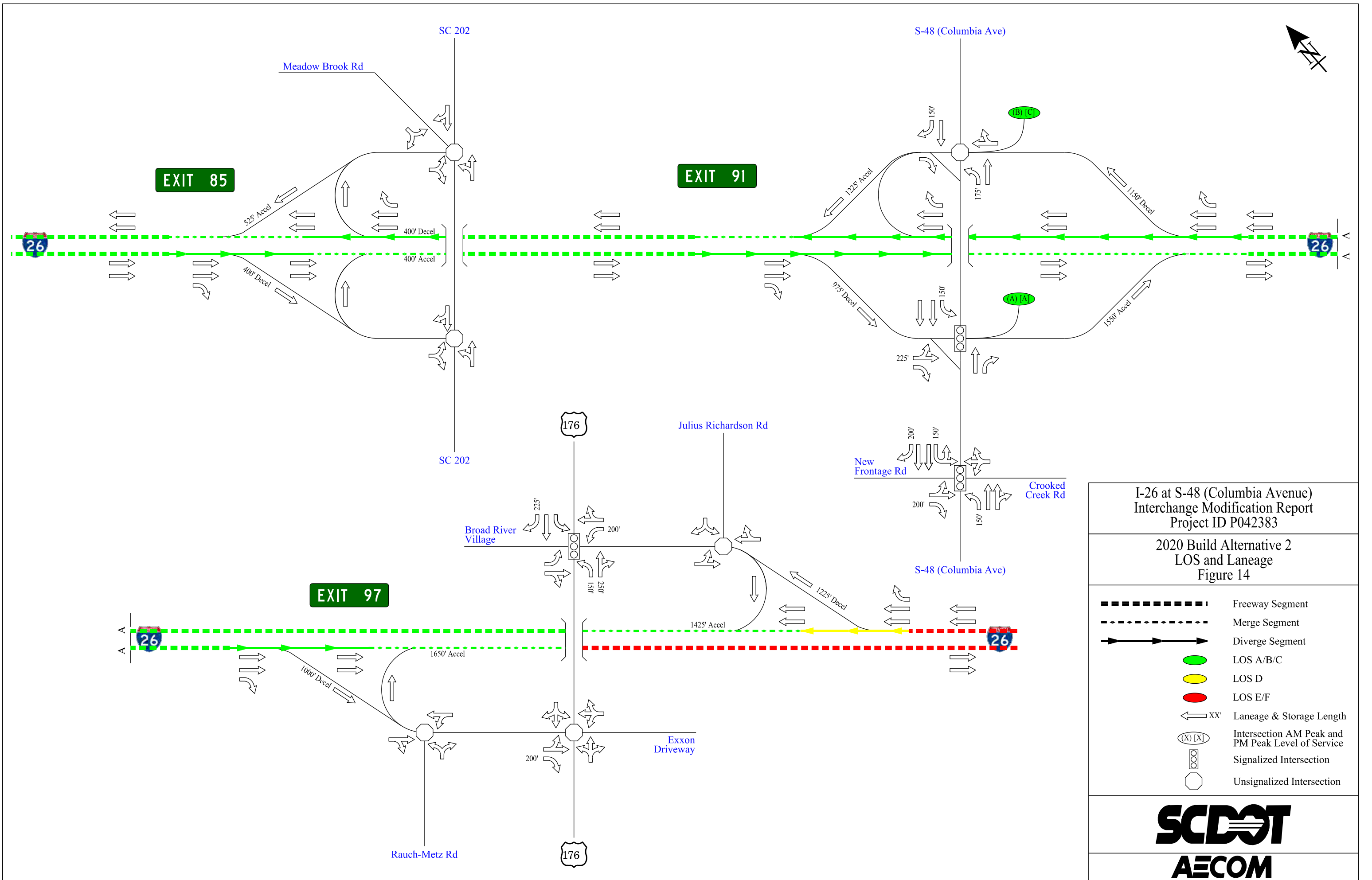


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2020 Build Alternative 1
LOS and Laneage
Figure 13

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- ⏸ Signalized Intersection
- ⬡ Unsignalized Intersection





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2020 Build Alternative 2
LOS and Laneage
Figure 14

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection



3.8 BUILD 2040 TRAFFIC ANALYSIS

The 2040 Build scenario analyzes the conditions for three-interchange alternatives at Exit 91. For three Alternatives, the following changes were included in the 2040 Build scenario:

- A New Frontage Road approximately 1000 feet to the south of the I-26 eastbound ramps was included to carry the traffic of the proposed Chapin Technology Park. The new Frontage Road was assumed to be a signalized intersection.
- Ellet Road (old frontage road) was removed in the Build scenario. In the Build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with S-48. In the Build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

The results of the Build 2040 analysis using Synchro 9.1 indicate that two of three alternatives are expected to operate at LOS C or better. Alternative 1 (DDI) is expected to have signals at both ramps; therefore, the LOS is balanced at both intersections to obtain proper signals timing. Alternative 2 (Partial Cloverleaf) has an expected LOS A at the I-26 eastbound ramps because no signal is recommended at the I-26 westbound ramps and signal can operate independently. Alternative 3 (Dual Roundabouts) is expected to operate at LOS F for the westbound ramps during the PM peak hour; therefore, it should not be considered as a viable alternative.

Table 13 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix L and M**. Detailed Sidra output reports are found in **Appendix N**.

Table 13: Build 2040 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48) – Diverging Diamond Interchange – Alt 1							
1	I-26 Eastbound Ramps at S-48	Signalized	-	C	C	24.3	25.1
21	I-26 WB Ramps at S-48	Signalized	-	C	C	26.6	29.2
22	S-48 at I-26 WB Off Ramp	Signalized	-	B	B	19.4	16.9
Exit 91 (I-26 at S-48) – Partial Cloverleaf – Alt 2							
1	I-26 Eastbound Ramps at S-48	Signalized	-	A	A	4.2	5.0
2	S-48 at I-26 WB Off Ramp	Unsignalized	WB	B	C	13.3	21.0

The results of the 2040 Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS F in the AM and PM peak hours. Between Exit 91 and Exit 97, the freeway is expected to

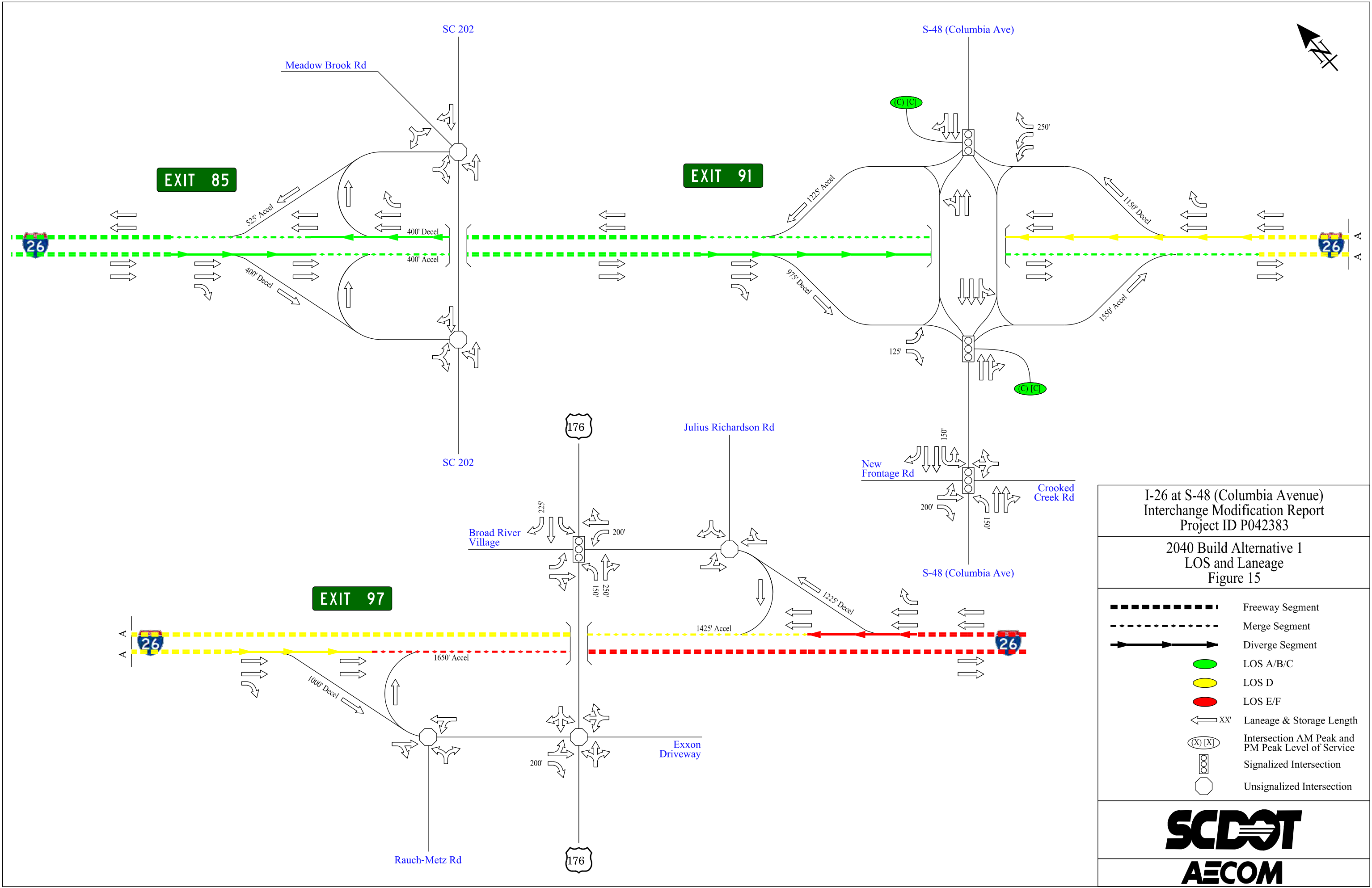
operate at LOS D in the AM peak hour (eastbound) and PM peak hour (westbound). The PM hour diverge at Exit 91 is also LOS D. In addition the I-26 eastbound merge area from Exit 97 is expected to operate at LOS F along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 14 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix I**.

Table 14: Build 2040 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	B	C	15.8	19.5
	Between Exit 85 and Exit 91	B	C	17.5	19.1
	Between Exit 91 and Exit 97	D	D	31.3	33.0
	East of Exit 97	F	F	105.3	50.3
Westbound	East of Exit 97	C	F	23.3	91.3
	Between Exit 91 and Exit 97	C	D	19.5	32.4
	Between Exit 85 and Exit 91	B	B	11.1	17.1
	West of Exit 85	B	B	11.5	16.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	C	C	23.0	24.7
	EB Exit 91 On-Ramp	C	C	26.2	27.2
	EB Exit 97 On-Ramp	F	F	42.0	34.7
Westbound	WB Exit 97 On-Ramp	B	D	18.6	28.3
	WB Exit 91 On-Ramp	B	B	10.6	17.4
	WB Exit 85 On-Ramp	B	C	15.6	21.3
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	C	C	20.9	25.1
	EB Exit 91 Off-Ramp	B	B	17.8	19.5
	EB Exit 97 Off-Ramp	D	D	29.7	30.7
Westbound	WB Exit 97 Off-Ramp	C	F	21.5	44.2
	WB Exit 91 Off-Ramp – Alt 1	B	D	17.7	28.3
	WB Exit 91 Off- Ramp – Alt 2	B	A	10.6	6.7
	WB Exit 91 Off Loop Ramp – Alt 2	B	C	16.1	25.8
	WB Exit 85 Off-Ramp	B	C	15.0	22.5

Figure 15 and 16 shows the LOS for the 2040 Build Conditions for Alternative 1 and 2.

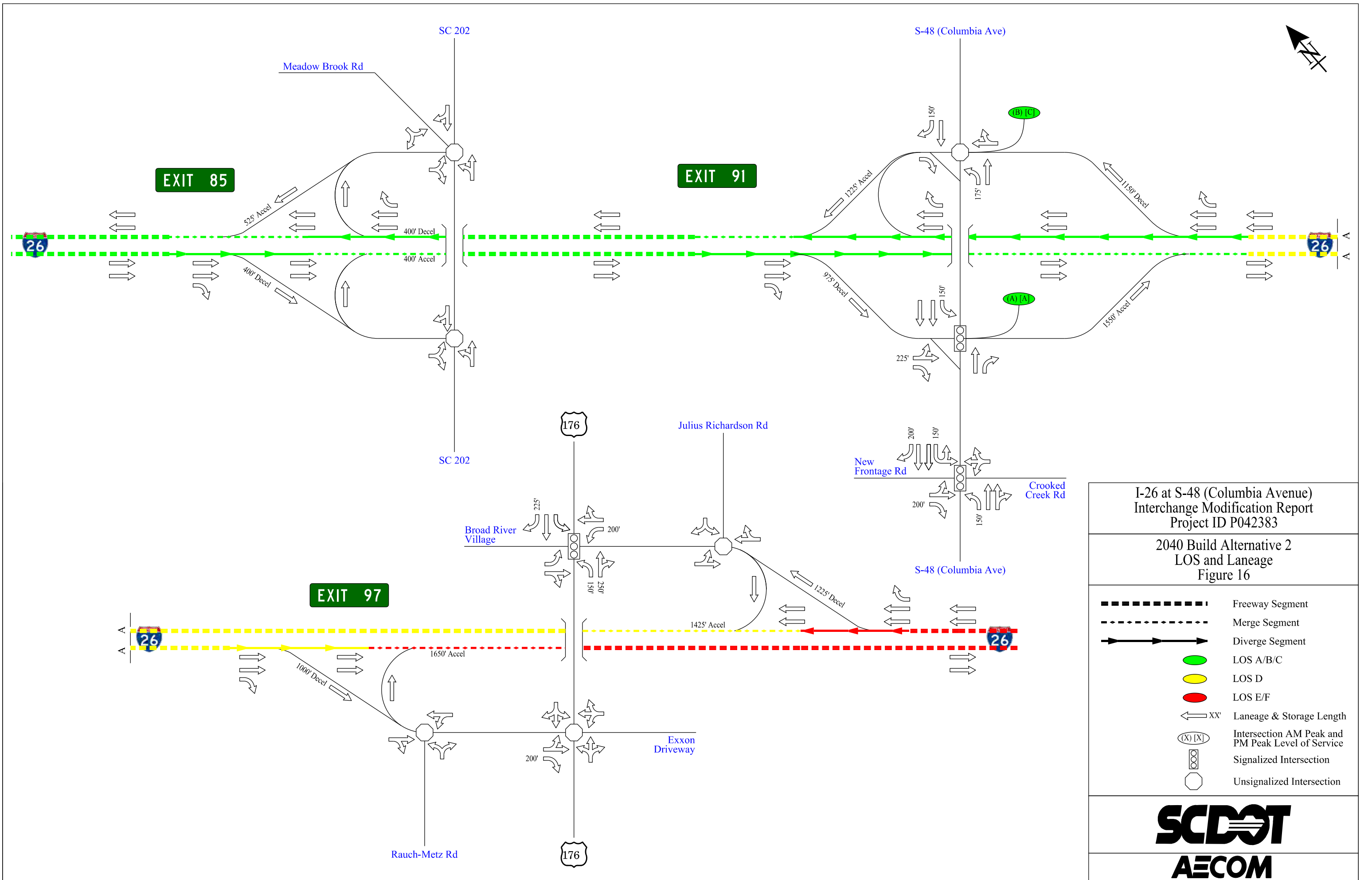


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2040 Build Alternative 1
LOS and Laneage
Figure 15

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- Laneage & Storage Length
- Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection





I-26 at S-48 (Columbia Avenue)
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2040 Build Alternative 2
LOS and Laneage
Figure 16

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection



4.0 VISSIM ANALYSIS

Simulation modeling is a very useful tool for designing improvements to the roadway system. It enables engineers and planners to predict and compare the outcomes of both No-Build and Build alternatives. For this project VISSIM 7.0 software was selected for the traffic operational analysis due to its powerful multi-model modeling capabilities. VISSIM is stochastic traffic simulation software that uses the psycho-physical driver behavior model developed by R. Wiedemann. It combines a perceptual model of the driver with a vehicle model. Every driver with his or her specific behavior characteristics is assigned to a specific vehicle. As a result, the driver behavior corresponds to the technical capabilities of his vehicle. In addition, the optional 3D visualization capability makes it easier to visualize the traffic flow patterns in the corridor. As a result the analyst can see the issues in the model and propose the appropriate solution

4.1 MODEL DEVELOPMENT

The following subsections summarize the data collection, field observations, traffic assignment, and other relevant inputs that were required for the development of the VISSIM models. First, the existing condition models were developed and calibrated, which then served as the base for the development of the future year No-Build and Build model networks.

4.1.1 Geometric Data

To assist in coding of the model network, aerial photography was obtained using VISSIM 7's built-in Bing Maps aerial feature. In addition, Google Maps was also used to for the geometrical information of the study corridor. Lane configurations were initially taken from the aerial pictures and confirmed with the field observations.

Grades (gradient) are an important element of the microsimulation models as they directly impact the vehicle acceleration and deceleration parameters. It is particularly very important for a heavy truck's acceleration and deceleration travelling at the higher speed. The field observations data suggested that grades are very slight in the study area. The study team utilized United States Geological Survey (USGS)¹ data to obtain grades for the model segments.

4.1.2 Traffic Control Data

4.1.2.1 Signal Controllers

VISSIM can model signalized intersections using either the built-in fixed-time control or various other external signal control logic formats. Among the available external logic formats is the Ring Barrier Controller (RBC), which was used in this model at the signalized intersection. The settings on this controller type are saved to an external data file with the extension *.rbc.

¹ <http://viewer.nationalmap.gov/basic/>

It should be noted that in the 2014, 2020 No-Build and 2040 No-Build scenarios the signals were coded as RBC – Actuated Uncoordinated.

For the 2020 and 2040 Build AM and PM scenarios, the signals on S-48 (Columbia Avenue) interchange (DDI) were coded as RBC- Actuated Coordinated. In addition, the signal at I-26 WB On & Off Ramps and US-176 are coded as Actuated Uncoordinated.

4.1.2.2 Signal Timings

Traffic signal timing plans for the two signalized intersections; I-26 westbound On-Off Ramps & Columbia Avenue intersection and I-26 WB On-Off Ramps & Columbia Avenue intersection were obtained from the South Carolina Department of Transportation. However, the plans only had minimum, maximum, yellow, red times and phase information. Based on this, 2014 AM and PM peak hour Synchro models were developed and optimized to calculate the splits and cycle lengths. Split and cycle length information was entered into the VISSIM models.

Similarly, 2020 and 2040 AM and PM peak hour No-Build and Build synchro models were developed to obtain the signal timing information, which was then used in the VISSIM models.

4.1.2.3 Stop Signs

Stop controlled intersections are modeled in VISSIM using a combination of stop signs and priority rules. The stop sign and stop line of the priority rule define the location at which vehicles must stop. The amount of time a vehicle is stopped is determined by the time distribution assigned to the respective vehicle class. In the absence of time distributions, a vehicle will stop for one time step. Priority rules are implemented to establish the minimum gap time and headway at which the stopped vehicle may proceed into the receiving traffic stream. Stop and yield signs were coded based on the aerial data.

4.1.3 Speed Data

The posted speed limits data on the roadways were collected from Google Maps' street view function. For the existing year model calibration, the average speed data for section along the interstate corridor was collected from INRIX. This data was used to develop the desired speed distribution for the I-26 segments. The desired speed distribution for the turning vehicles at an intersection was assumed to be 17 MPH and 14 MPH for cars and heavy vehicles respectively with a 1.5 MPH of standard deviation.

Table 15: Speed Distribution

SD No	Speed Limit (MPH)	Min	Max	15%	85%
3	15	10	20		
5	25	20	30		
7	35	30	40		
8	40	35	45		
9	45	40	50		
10	50	45	55		
15	65	40	75	60	70
18	65	60	85	70	78.8

Desired Speed Decision points are used for permanent speed changes within the network and are coded at locations where the speed change would typically occur (location of speed signs).

A new series of desired speed distributions are assigned to each vehicle class at the Desired Speed Decision point. Therefore, as a vehicle passes over a decision point, its speed is adjusted according to the new distribution.

Reduced Speed Areas were used to model short sections with reduced speeds (curves or turns). Similar to the Desired Speed Decision points, a new set of desired speed distributions (in this case 'reduced' speeds) are assigned to each vehicle class to account for slower speeds within the reduced speed area. However, unlike the Desired Speed Decision Point, when encountering a Reduced Speed Area, each vehicle begins to decelerate in advance to reach the lower desired speed as it enters the defined area. After leaving the reduced speed area, the vehicle returns to its actual desired speed.

The Reduced Speed Areas coded in the model correspond to turns (left and right) and locations that because of their geometry will impose a mandatory reduction on the speed of vehicles, independently of their originally desired speed.

4.1.4 Traffic Input

VISSIM supports two different forms of vehicle assignments; Dynamic and Static. In dynamic assignment, the vehicle travels from its origin to designation based on the best available route. Parking lots are used as the origin and destination points and generally there are multiple routes between each origin and destination.

Static assignment assumes that the vehicle will follow an assigned path or route from its origin to destination irrespective of the friction or cost. Route is a sequence of links and connectors from a routing decision point to the destination(s).

The study corridor does not have multiple routes option i.e. for a vehicle there is only one route available to travel between any origin and destination. Hence, it was determined that the static assignment would be the most suitable to replicate the existing conditions. Each vehicle input source on I-26 and cross-streets had its routing decision point. Route stretched to each on and off-ramp followed by another routing decision (origin) to eventually take the vehicles through interchange to reach its destination. No vehicles are taken out or added to the network automatically; therefore, it is important that balanced volume flows are entered.

4.1.4.1 Traffic Composition

The default vehicle types available in VISSIM are Car, HGV (truck), Bus, Tram (transit), Bike, and Pedestrian. These can be used to define traffic composition for a microsimulation model. For the purpose of this study, only two default vehicle types; Car and HGV (truck) were utilized. Traffic compositions are the proportions of each vehicle type present in each of the vehicle input sources. Vehicle Inputs are time variable traffic volumes entered at the source node. For the modeling purpose, I-26 (East and West ends of the model) and the cross-streets were defined as source nodes.

4.1.4.2 Exiting Condition Volumes

The 2014 Existing Condition AM and PM peak hour turning movement volumes were developed from the (2014) collected counts. Most of the collected approach and receiving volumes were balanced. However, at some locations where the approach and receiving volumes were off, minor adjustments were done to get the balanced volumes. No vehicles were taken out or added to the network automatically; therefore, it was important that balanced volume flows were entered.

4.1.4.3 2020 and 2040 No-Build and Build Volumes

It was assumed that in 2020 or 2040 the traffic pattern i.e. origin and destination would remain unchanged between the No-Build and Build scenarios. Hence, the No-Build and Build condition traffic volumes were kept consistent.

4.1.5 Driving behavior Parameters

During the simulation, the driver behavior parameters are used to guide the vehicles through the model network. VISSIM uses five driving behavior models, out of which only two; Urban (Motorized) and Freeway (Free Lane Selection) were used for the development of the base year model network. The Urban (Motorized) parameter was used to model surface streets within the network. The Freeway (Free Lane Selection) parameter was used to model the freeway facilities within the project network.

4.1.5.1 Data Limitations

There were a few limitations associated with the collected data. Limitations and relevant logical solution are listed below:

- Traffic Signal Data:
 - Signal plans were obtained from the SCDOT, however, the signal timing, splits and offsets were not available.
 - VISSIM (RBC controller) requires various signal parameter inputs. Using the information provided in the signal plan, Synchro models were developed to develop and optimized to generate the splits and timings.
 - Using the base year Synchro model, 2020 and 2040 No-Build Synchro models and signal timing data were developed.

- Grade/Elevation Data:
 - Grade or Elevation is an important component of microsimulation as it can have a significant impact on the acceleration and deceleration parameter of a vehicle, especially on the heavy trucks. As mentioned in the **Section 4.2** elevation data was obtained from the United States Geological Survey (USGS) and grades were calculated using the best engineering judgement. Grades were then applied to the model segments.

- Traffic Volumes:
 - At some locations, including on I-26 mainline, traffic counts were not available such as west of Exit 91. The only 24-hour traffic count on I-26 that was conducted just east of Exit 91.
 - Using the engineering judgement, logical existing and future traffic volumes were back calculated and balanced.

4.2 BASE YEAR MODEL CALIBRATION AND VISUAL VALIDATION

In order to achieve logical microsimulation results, it is imperative to calibrate and validate the model using observed field data. It should be noted that there are no universally accepted or definitive methods for performing model calibration and validation. The responsibility lies with the modeler to adopt and implement a suitable procedure depending upon the scope and budget of the project that will provide an acceptable level of confidence in the model results. Once the calibration targets are achieved, the same parameters can then be applied to the future year models.

4.2.1 Calibration Criteria

To ensure satisfactory calibration of the model, standards were used to establish targets regarding traffic flows and travel times. The targets of this calibration effort were set at the values included in Traffic Analysis Toolbox Volume III –Guidelines for Applying Traffic Microsimulation Modeling Software² published by the Federal Highway Administration (FHWA) shown below:

Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed	
Individual Link Flows	
Within 15%, for 700 veh/h < Flow < 2700 veh/h	> 85% of cases
Within 100 veh/h, for Flow < 700 veh/h	> 85% of cases
Within 400 veh/h, for Flow > 2700 veh/h	> 85% of cases
Sum of All Link Flows	Within 5% of sum of all link counts
GEH Statistic < 5 for Individual Link Flows*	> 85% of cases
GEH Statistic for Sum of All Link Flows	GEH < 4 for sum of all link counts
Travel Times, Model Versus Observed	
Journey Times, Network	
Within 15% (or 1 min, if higher)	> 85% of cases
Visual Audits	
Individual Link Speeds	
Visually Acceptable Speed-Flow Relationship	To analyst's satisfaction
Bottlenecks	
Visually Acceptable Queuing	To analyst's satisfaction

GEH measure is a formula used in traffic modeling to compare two sets of traffic volumes (Observed and Modeled). Its mathematical formulation is similar to the Chi-Squared test, but it is not a true statistical test but rather an empirical formula. The formulation for the GEH Statistic is as follows:

$$GEH = \sqrt{\frac{2 * (M - O)^2}{(M + O)}}$$

Where M represents model estimate volume and O represents field counts.

² http://ops.fhwa.dot.gov/trafficanalysisitools/tat_vol3/vol3_guidelines.pdf, page64

This statistic is typically used to offset the discrepancies that occur when using only simple percentages, as traffic volumes vary over a wide range. In other words, if using only percentages, small absolute discrepancies have no impact on large volumes but a large percent impact in smaller numbers, and vice versa. It has been shown that for traffic volumes smaller than 10,000 a five percent variation yields smaller numbers than a GEH of five. Beyond 10,000, five percent differences keep growing linearly whereas GEH=5 follows a decaying curve.

Based on the scope and purpose of this study it was determined that base year model calibration will be based on the link flows, travel time and speed criteria. For the link volume calibration, 2014 traffic counts and turning movements were used to compare with the model link volumes.

For the link speed comparison, it was recommended to use the INRIX speed data against the model link speeds. In the study area, INRIX only provided speeds on the I-26 links, therefore only I-26 model link speeds were used for the calibration and validation purposes. Data collection points were placed on I-26 corridor in areas upstream and downstream of merge and diverge at the locations of the INRIX speed data collection.

4.2.2 Simulation Setting and Random Seed Variation

The AM peak hour model was set run from 7:00-8:30 AM with 30 minutes of seeding time. Hence, the actual analysis period was 7:30-8:30AM. Similarly, the PM peak hour model was set to run from 4:15 – 5:45PM with 30 minutes of seeding time. The actual PM analysis period was from 4:45 – 5:45PM. The model was ran ten times starting with a random seed at five with five seed increments. Simulation parameter settings are pictorially shown on the following page.

4.2.3 Visual Validation

Visual validation of the models is an imperative step in the development and calibration of the model. It is essential for the modeler to perform a thorough visual validation to eliminate any coding errors and achieving logical results.

After coding, the models were ran and visually inspected multiple times. The errors pertaining to the lane change decision, yield, conflict area, etc. were then addressed to achieve realistic vehicle movements. The validation process was performed for all the existing, no-build and build models.

Simulation Settings - AM

Simulation Parameters

Comment:

Period: Simulation seconds

Start Time: [hh:mm:ss]

Start Date: [DD.MM.YYYY]

Simulation resolution: Time step(s) / Sim. sec.

Random Seed:

Number of runs:

Random seed increment:

Dynamic assignment volume increment: %

Simulation speed: 1000.0 Sim. sec. / s
 maximum
 Retrospective synchronization

Break at: Simulation seconds

Number of cores:

OK Cancel

Simulation Settings - PM

Simulation Parameters

Comment:

Period: Simulation seconds

Start Time: [hh:mm:ss]

Start Date: [DD.MM.YYYY]

Simulation resolution: Time step(s) / Sim. sec.

Random Seed:

Number of runs:

Random seed increment:

Dynamic assignment volume increment: %

Simulation speed: 1000.0 Sim. sec. / s
 maximum
 Retrospective synchronization

Break at: Simulation seconds

Number of cores:

OK Cancel

4.2.4 Calibration Results

2014 Existing Condition AM and PM peak hour models were run with the VISSIM's default simulation parameters settings. It was observed that with the default simulation parameters the models' link volumes were within the desired ranges for the calibration. However, the model link speeds were less than the observed INRIX speeds on the I-26 links. Hence, some minor adjustments to the desired speed distribution and speed curve were performed to account for the higher speeds observed in the INRIX data.

4.2.4.1 Link Volumes and Speed

A model is assumed to be reasonably calibrated, if:

- Link flows satisfy modeled versus observed flow thresholds for 85% of the individual links.
- Sum of all link flows is within 5% of sum of all link counts.
- 85% of the network link flows have a GEH less than 5.
- Model link speeds fall within ± 2.5 MPH of INRIX Speeds.

Table 16 and 17 shows overall calibration results under AM and PM peak hours.

Table 16: 2014 AM Peak Hour Calibration Results

Calibration Summary			
Speed Data			
MOE Criteria	Target	Actual	Calibrated
Within Acceptable Range (± 5 MPH of INRIX Speed)	90%	100.0%	Calibrated
Within Desirable Range (± 2.5 MPH of INRIX Speed)	75%	100.0%	Calibrated
Flow (Count) Data			
MOE Criteria	Target	Actual	Calibrated
Individual Link Flow	85%	99.1%	Calibrated
Sum of All Link Flows	5%	1.4%	Calibrated
GEH Individual Link	85%	98.0%	Calibrated
GEH - All Links	5.00	2.40	Calibrated

Table 17: 2014 PM Peak Hour Calibration Results

Calibration Summary			
Speed Data			
MOE Criteria	Target	Actual	Calibrated
Within Acceptable Range (± 5 MPH of INRIX Speed)	90%	100.0%	Calibrated
Within Desirable Range (± 2.5 MPH of INRIX Speed)	75%	100.0%	Calibrated
Flow (Count) Data			
MOE Criteria	Target	Actual	Calibrated
Individual Link Flow	85%	100.0%	Calibrated
Sum of All Link Flows	5%	1.2%	Calibrated
GEH Individual Link	85%	100.0%	Calibrated
GEH - All Links	5.00	2.26	Calibrated

4.2.4.2 Travel Time

A model is reasonably calibrated when the modeled travel times are within 15% (or one minute if higher) of the average field collected travel time for 85% of the cases. **Table 18** shows the AM and PM peak hour travel time calibration results.

Table 18: Travel Time Calibration Results

Time	Percentage	Calibrated
7:30 AM - 8:30 AM	100%	Calibrated
4:45 PM - 5:45 PM	100%	Calibrated

Percentage of Travel Times within 15% (or one minute)

4.3 MEASURES OF EFFECTIVENESS

4.3.1 95th Percentile (Worst Case) Methodology

For the AM and PM peak hourly analysis, *95 percent Worst Case Result method*³ as described in the FHWA Tool Box was utilized for the worst case (density) determination. The equation below shows the 95th percentile density equation:

$$95 \text{ percent Worst Result} = M + 1.64 * S$$

Where,

M = Mean observed result (weighted density) in the model runs;

S = Standard deviation of the result (weighted density) in the model runs

Weighted delay results from the 10 batch runs were compiled by each intersection. Further, average and standard deviation in the model runs were calculated. The resultant weighted delay was calculated utilizing the 95 percent worst case result method. Error! Reference source not found. **Table 19** below shows the 95th percentile delay calculation method.

Table 19: 95th Percentile Calculation Method

Time	Calibrated
Model Runs	Intersection Average Delay
Run 1	D1
Run 2	D2
Run 3	D3
...	...
Run 10	D16
Average Wt. Delay (D_a)	$D_a = (D1+D2+D3+.....+D10) / 10$
St. Deviation (S_d)	$S_d = \text{Stand. Dev } (D1, D2, D3, \dots, D10)$

³ http://ops.fhwa.dot.gov/trafficanalysisstools/tat_vol3/Vol3_Guidelines.pdf page 77

4.3.2 Delay Reporting for Stop and Signal Controlled Intersections

Stop Controlled Intersection

Most of the stop controlled intersections in the study corridor are “1-Way Stop”. Because the main approach is generally a free-flow with heavy traffic movement, the stop controlled movement is weighted out. As a result, even though the stop controlled approach operated at LOS E or F but overall the intersection reported as operating at LOS D or better. It was determined that for stop controlled intersections, worst approach delay should be reported.

Signalized (or Signal Controlled Intersection)

For the signal controlled intersections, the 95th percentile of the overall (weighted) delays were calculated.

MOEs for the all the No-Build and Build models are compiled in the following subsections.

4.3.3 2014 Existing Condition AM and PM Peak Hour MOEs

After the existing conditions VISSIM model was calibrated, the measures of effectiveness (MOEs) for existing conditions were obtained for the AM and PM peak hours.

Table 20 shows the intersection delay and Level of Service for the both the peak periods.

Table 20: 2014 Existing AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2014 Existing Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	14.1	B	19.5	B
S-48 and I-26 EB Ramps		Stop	14.5	B	19.7	C

*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.

4.3.4 2020 No-Build AM and PM Peak Hour MOEs

Table 21 shows the intersection delay and level of service for the AM and PM peak hours under 2020 No-Build scenario.

Table 21: 2020 No-Build AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2020 No-Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	51.6	D	81.0	F
S-48 and I-26 EB Ramps		Stop	>300.0	F	>300.0	F
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

4.3.5 2020 Build (DDI) AM and PM Peak Hour MOEs

In addition to the DDI project, the following changes were included in the 2020 Build scenario:

- A New Frontage was included to carry the traffic of the proposed future developments. It was connected to the Columbia Avenue around Shell Gas Station, south of the I-26 EB Ramps intersection. It coded and analyzed as a signalized intersection.
- Ellet Road was removed in the built scenario. In the build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with Columbia Avenue. In the build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

Table 22 shows the intersection delay and level of service for the AM and PM peak hours under 2020 Build scenario. The build scenario would be a Diverging Diamond Interchange (DDI) at I-26 and Columbia Avenue interchange.

Table 22: 2020 Build (DDI) AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2020 Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	15.5	B	16.3	B
S-48 and I-26 EB Ramps		Signalized	12.0	B	12.6	B
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

4.3.6 2040 No-Build AM and PM Peak Hour MOEs

Table 23 shows the intersection delay and level of service for the 2040 No-Build AM and PM peak hour scenario.

Table 23: 2040 No-Build AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2040 No-Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	74.2	E	90.9	F
S-48 and I-26 EB Ramps		Stop	>300.0	F	>300.0	F
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

4.3.7 2040 Build (DDI) AM and PM Peak Hour MOEs

In 2040 Build scenario, in addition to the DDI project, the following changes were included in the 2040 Build scenario:

- A New Frontage was included to carry the traffic of the proposed future developments. It was connected to the Columbia Avenue around Shell Gas Station, south of the I-26 EB Ramps intersection. It coded and analyzed as a signalized intersection.
- Ellet Road was removed in the built scenario. In the build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with Columbia Avenue. In the build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

Table 24 shows the intersection delay and level of service for the 2040 Build AM and PM peak hour scenario.

Table 24: 2040 Build (DDI) AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2040 Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	17.8	B	15.7	B
S-48 and I-26 EB Ramps		Signalized	24.5	C	27.5	C
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

5.0 SUMMARY OF FINDINGS

The following is a summary of the results for the analysis of the project to provide interchange improvements at Exit 91 – S-48 (Columbia Avenue). As shown in this analysis, under the No-Build conditions, by 2020 the level of service begins to fail (LOS E/F) at the I-26 ramps. In the 2040 No-Build scenario, all intersections of concern at Exit 91 are at failing level of service conditions.

1. I-26 Eastbound Ramps at S-48
2. I-26 Westbound Ramps at S-48

The scenario in which the diverging diamond interchange alternative is constructed, the 2020 and 2040 Build conditions show an acceptable level of service (C or higher) at all intersections.

The HCS analysis of the freeway, merge, and diverge segments reach similar conclusions regarding acceptable levels of service. The freeway segments directly adjacent to Exit 91 in the Existing, No-Build, and Build scenarios operate at level of service D or better. Merge and diverge analysis at Exit 91 also indicates a level of service of D or better in the existing and 2020/2040 No-Build and Build years.

It should be noted that at Exit 97, to the East of Exit 91, intersections reach a failing level of service by 2020. Freeway segments reach failing conditions in 2040.

5.1 FINDINGS

2014 Existing Condition

The 2014 analysis results show that most of the intersections in the study area operate at LOS C or better.

2020 No-Build Condition

In the 2020 No-Build AM and PM scenarios, only a few stop controlled approaches operate at LOS D or better. The signalized intersections and stop controlled approaches listed below operate at a LOS E or worse.

- I-26 EB Ramps & S-48 Intersection ; Stop Controlled Approach
- I-26 WB Ramps & S-48 Intersection; Signalized Intersection

2020 Build (DDI) Condition

In the 2020 Build (DDI) AM and PM scenarios, both the intersections on S-48 (Columbia Avenue) operate well at LOS B. The signalized intersections listed below operate at a LOS E or worse:

- I-26 WB Off-Ramp & US-176; Signalized Intersection

2040 No-Build Condition

Under the 2040 No-Build condition the signalized intersections and stop controlled approaches listed below operate at a LOS E or worse:

- I-26 EB Ramps & S-48 Intersection ; Stop Controlled Approach
- I-26 WB Ramps & S-48 Intersection; Signalized Intersection

2040 Build (DDI) Condition

All the signalized intersections on S-48 (Columbia Avenue) operate at LOS C or better.

5.2 CONCLUSION AND RECOMMENDATION

The traffic analysis presented in this report suggests that the proposed diverging diamond alternative at S-48 (Columbia Avenue) interchange will operate acceptably in both the 2020 and 2040 build scenarios and does not adversely impact the adjacent interchanges.

6.0 FEDERAL HIGHWAY ADMINISTRATION (FHWA) POLICY

It is in the national interest to maintain the Interstate System to provide the highest level of service on terms of safety and mobility. Adequate control of access is critical to providing such service. Therefore FHWA has developed policy points that must be addressed prior to granting a new or modified access point to the interstate system. The policy points were originally detailed in the Federal Register on October 22, 1990 (95 FR 42670), and updated in the Federal Register: February 11, 1998 (Volume 63, Number 28). On August 27, 2009 FHWA published a new policy in the Federal Register (Volume 74, Number 165). The following section details how the proposed action meets the requirements for the new or revised access points to the existing Interstate System.

It should be noted that this Interchange Modification Report for Exit 91 does not include a Signing Plan. A Signing Plan for Exit 91 can be referenced in the Exit 85 and Exit 97 Interchange Modification Reports.

Policy Point #1: *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).*

Interstate 26 is an east / west main route of the interstate highway system in the southeastern United States. It spans from US 17 in Charleston, South Carolina to US 23 in Kingsport, Tennessee. I-26 is a 4-lane divided highway with a posted speed limit of 70 mile per hour. S-48 (Columbia Avenue) is a two lane minor arterial that connects downtown Chapin with I-26 at Exit 91. The existing Exit 91 interchange is a diamond interchange approximately 20 miles from Columbia, South Carolina. The eastbound off ramp is under stop control while westbound off ramp is signalized. No turn lanes are present to / from I-26. Access management concerns include Ellett Road which is less than 100 feet south of the I-26 eastbound off ramp and Crooked Creek Road which intersects with I-26 eastbound on ramp.

Access management along S-48 is also expected to improve with the proposed DDI. There are plans to consolidate closely spaced driveways adjacent to the interchange termini ramps to one frontage road intersecting S-48 over 1000 feet south of the interchange under signal control.

The purpose of the interchange modification is to improve the operational efficiency and safety of the existing interchange configuration and to accommodate projected traffic volumes. Based on 2020 and 2040 projection traffic volumes, both interstate off-ramps are expected to operate at LOS F with the current interchange configuration. Safety concerns include I-26 westbound off ramp queuing onto I-26 and unsignalized traffic control for the I-26 eastbound off ramp.

Policy Point #2: *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).*

The diverging diamond interchange and partial cloverleaf alternatives were analyzed as part of this report. Results from the analysis indicates both alternatives are expected to provide a LOS

C or better for the 2040 projected design volumes. The preferred alternative was the diverging diamond interchange due its right-of-way costs and location of the planned development north of the interchange. Ramp metering, mass transit, and HOV facilities are not warranted based on existing or design year volumes and are not expected to improve operations for this suburban interchange.

Policy Point #3: *An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)).*

Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

An operational analysis was performed for Existing 2014, Opening 2020, and Design 2040 years along I-26 between Exit 85 (SC 202) and Exit 97 (US 176). All mainline segments, merge and diverge ramp junctions as well as surface street intersection were studied. Synchro 9.1 was used for the intersections, HCS 2010 for the mainline segments and merge / diverge areas, and VISSIM 7.0 to model everything together.

The Existing 2014 traffic analysis indicates as shown in Figure 10 that majority of the study is operating at LOS C or better with following exceptions:

- US 176 at I-26 westbound off ramp (Exit 97)
- I-26 freeway segment east of Exit 97

The No-Build 2020 and 2040 traffic analysis indicates, as shown in Figure 11 and 12, that basically everything east of Exit 91 (S-48) is not operating at an acceptable LOS C. Please note the intersections on Exit 91 (S-48) are expected to operate at LOS F while the I-26 westbound segment prior to Exit 91 and off-ramp are projected to operate at LOS D.

The Build 2020 and 2040 traffic analysis indicates, as shown in Figure 13 and 15, that overall operations at the interchange of I-26 at S-48 (Columbia Avenue) would be improved when comparing to the No-Build scenario. East of Exit 91 (S-48) would continue to operate at LOS D until Exit 97 where the LOS worsens to F due to capacity on the mainline. Operation at the intersections on the surface streets at Exit 97 would not be impacted with the proposed interchange modification due to the 6-mile distance to the study interchange and would continue to operate the same as in the No-Build scenario.

Policy Point #4: *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

The proposed interchange modification for this project would provide all relevant traffic movements at the I-26 and S-48 interchange. The proposed interchange design concept will meet or exceed all applicable SCDOT, AASHTO, and FHWA design standards.

It should be noted that the proposed design plans to remove the existing Crooked Creek Road access with the I-26 eastbound on ramp and realign it with S-48 (Columbia Avenue) to the south. In addition, the closely spaced Ellett Road just south of the I-26 eastbound off ramp is expected to be realigned with this new Crooked Creek Road.

Policy Point #5: *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

The proposed project is consistent with the COATS 2035 Long Range Transportation Plan, and lists the S-48 (Columbia Avenue) project as a Prioritized Road Widening Project. The project is also included as a system upgrade in SCDOT's Statewide Transportation Improvement Program (STIP) for Lexington County. The STIP covers all federally funded transportation improvements for which funding has been approved and that are expected to be undertaken in the six-year period the STIP covers. The fiscally-constrained STIP includes approximately \$13,000,000 for preliminary design services, right-of-way acquisition, and project construction through 2019. Full funding is reasonably anticipated to be available for its completion.

Policy Point #6: *In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).*

There are currently no planned or programmed additional interchanges within the study area for the project or the expanded study area for analysis of the adjacent interchanges in the SCDOT STIP or the Central Midland Council of Governments (CMCOG) Long Range Plan.

In the event that a project to construct an interchange is initiated in the future it will also be subject to the FHWA policy for additional access to the Interstate System, and an Interchange Justification Report will be required.

Policy Point #7: *When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate*

appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

The current report incorporates planned traffic volumes from two major developments in the area. The Chapin Technology Park (approved) and Chapin Commerce Village (planned). Chapin Technology Park is located south of the interchange along S-48 (Columbia Avenue) and Chapin Commerce Village (planned), located north of the interchange. Both development are planned generate a significant number of vehicles and were accounted for with the proposed design of diverging diamond interchange alternative. There have been a series of public meetings that have taken place.

Policy Point #8: *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

The proposed alternative is expected to have minimal impact on natural environment such was water quality, floodplains, farmland, and cultural resources as a result retrofitting the existing diamond to a diverging diamond interchange.

A draft Environmental Assessment (EA) is currently being prepared for SCDOT and submitted to FHWA. Effects on human and natural environment was assessed.

Approval of this IMR can only be given by FHWA with the completion of a successful NEPA document.

APPENDIX A

S-48 TRAFFIC PROJECTIONS MEMO

AECOM

10 Patewood Drive, Building VI, Suite 500
Greenville, SC 29615
T 864-234-3000; www.aecom.com

Memorandum

To: Mrs. Gaye Sprague, PE
Sprague & Sprague Consulting Engineers

From: Ryan Eckenrode, P.E., PTOE, Traffic Engineer, AECOM

Date: June 14, 2016

Reference: S-48 (Columbia Avenue) Corridor Improvement Project – Traffic Projections

As directed by Mead & Hunt / Lexington County and SCDOT, AECOM developed a traffic forecast for Opening Year (2020) and Design Year (2040) for the S-48 (Columbia Avenue) Corridor Improvement Project. AECOM originally recommended a 1.64% linear growth rate; however, SCDOT approved a 1.25% linear growth rate at the following intersections on July 24, 2014:

1. Columbia Avenue and I-26 Eastbound Ramps
2. Columbia Avenue and I-26 Westbound Ramps
3. I-26 Eastbound ramp and Crooked Creek Road
4. Ellet Road and Columbia Avenue
5. Columbia Avenue and Eagle Chase Court
6. Columbia Avenue and Woodthrush Road
7. Columbia Avenue and Ellet Road/Chapin High School (1)
8. Columbia Avenue and Chapin High School (2)
9. Columbia Avenue and Ellet Road/Chapin High School (3)
10. Columbia Avenue and East Boundary Street
11. Columbia Avenue and Clark Street/Peak Street
12. Lexington Street and Columbia Avenue
13. Lexington Street and Beaufort Street
14. Lexington Street and Chapin Road
15. Lexington Street and Water Street
16. Lexington Street and Clark Street
17. Amicks Ferry Road and Columbia Avenue
18. Amicks Ferry Road and Chapin Road
19. Amicks Ferry Road and Zion Church Road
20. Amicks Ferry Road and Broomstraw Road
21. Amicks Ferry Road and Virginia Street

AECOM used the 2014 existing traffic volumes and grew them at a linear rate of 1.25% to obtain the base Opening Year (2020) and Design Year (2040) traffic projections. After these projections were complete, a traffic study for the Chapin Technology Park and Chapin Commerce Village Development became available. These two developments are significant in size and impact the S-48 corridor. At the direction of Prime Consultant Mead & Hunt, Lexington County and SCDOT, AECOM added additional traffic volumes to the base

volumes previously presented to be conservative and to better estimate the turning movement volumes to / from Columbia Avenue. The following describes the methods AECOM used to add the additional volumes:

- Chapin Technology Park (120 acre industrial park, 450 single family houses, and 350,000 SF of commercial). Based on the final traffic study submitted and approved by SCDOT on October 13, 2015 for the Chapin Technology Park, the opening year is 2019. AECOM added these new trips to the Opening Year (2020). The Chapin Technology Park is not expected to be complete until 2024 as these trips at full build-out were added to the Design Year (2040). The Technology Park is located north of Columbia Avenue near Woodthrush Road.
- Chapin Commerce Village (132,000 SF Specialty Retail, 8,350 SF Quality Restaurant, 8,350 SF General Office, 4,500 SF Fast Food Restaurant with Drive-Through, 8,350 High Turn-Over (Sit-Down) Restaurant, 4,050 SF Fast Food Restaurant with Drive-Through, 4,950 SF Convenience Market with Gasoline Pumps, 8,350 SF Quality Restaurant, 120 Room Hotel, 8,350 Quality Restaurant, and 4,050 SF General Office Building). This development has not had a traffic study and is only in the early planning stages. It is located just east of I-26 along S-48/Columbia Avenue.

Traffic volume figures showing how both of these developments were distributed within the study area are attached to this document. Once the 2020 and 2040 No-Build traffic volumes projections were developed, AECOM rerouted traffic for Alternative 9A. AECOM looked at the existing traffic patterns and the path of the new road to determine the percentage of traffic that would use the new facility. Based on these two criteria, the following engineering assumptions were made:

- 25% of Westbound Left-turns from Columbia Avenue onto Lexington Avenue are expected to use New Road as shown in alternative 9A.
- 25% of Westbound Left-turns from Columbia Avenue onto Amicks Ferry Road is expected to use New Road as shown in Alternative 9A.
- 25% of Northbound Right-turns from Lexington Avenue on Columbia Avenue is expected to use New Road as shown in Alternative 9A.
- 25% of Northbound Right-turns from Amicks Ferry Road on Columbia Avenue is expected to use New Road as shown in Alternative 9A.
- 50% of Westbound Left-turns from Chapin Road onto Amicks Ferry Road is expected to use New Road as shown in Alternative 9A.
- 50% of Westbound Left-turns from Chapin Road onto Lexington Avenue is expected to use New Road as shown in Alternative 9A.
- 50% of Northbound Right-turns from Amicks Ferry Road onto Chapin Road is expected to use New Road as shown in Alternative 9A.
- 50% of Northbound Right-turns from Lexington Road onto Chapin Road is expected to use New Road as shown in Alternative 9A.
- E. Boundary Street at Columbia Avenue becomes a Right-in Right-out, so 75% Eastbound Right-turns move to New Road / Clark Street. Also 75% of the Northbound Right turns move to New Road / Clark Street.

Each one of these engineering assumptions is documented in the attached figures with its own color to carefully track the new traffic patterns. It is to be noted that the traffic volume assumptions are likely to change if Columbia Avenue (between Boundary Street and Amicks Ferry Road) becomes over capacity. The New Road is not expected to be at capacity using these assumptions and therefore can handle additional traffic if necessary.

Volume Development Figures

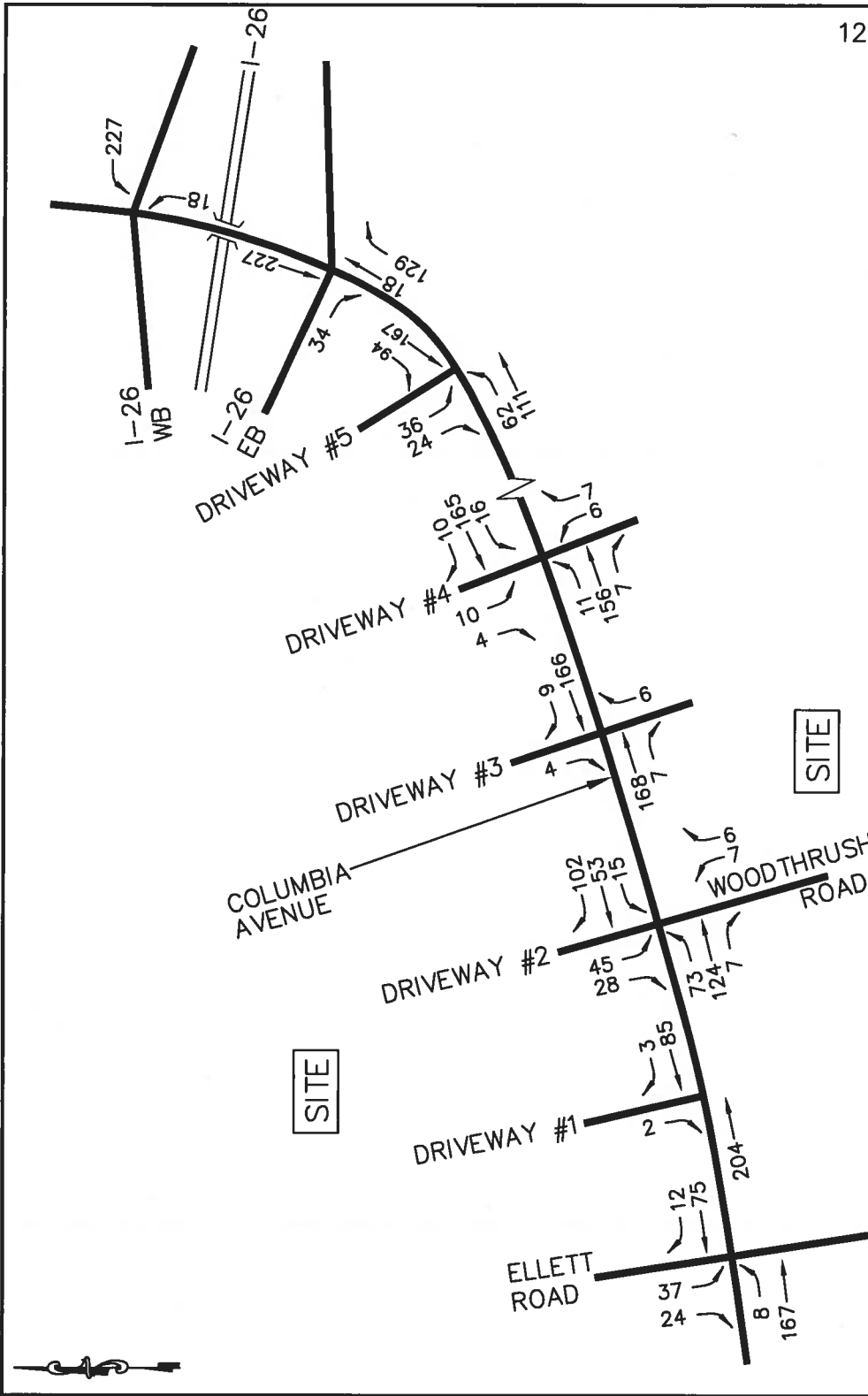


Figure 8

10/16/14



2019 MORNING PEAK HOUR PRIMARY SITE TRIP TOTALS

CHAPIN TECHNOLOGY PARK TRAFFIC IMPACT STUDY
CHAPIN, SOUTH CAROLINA

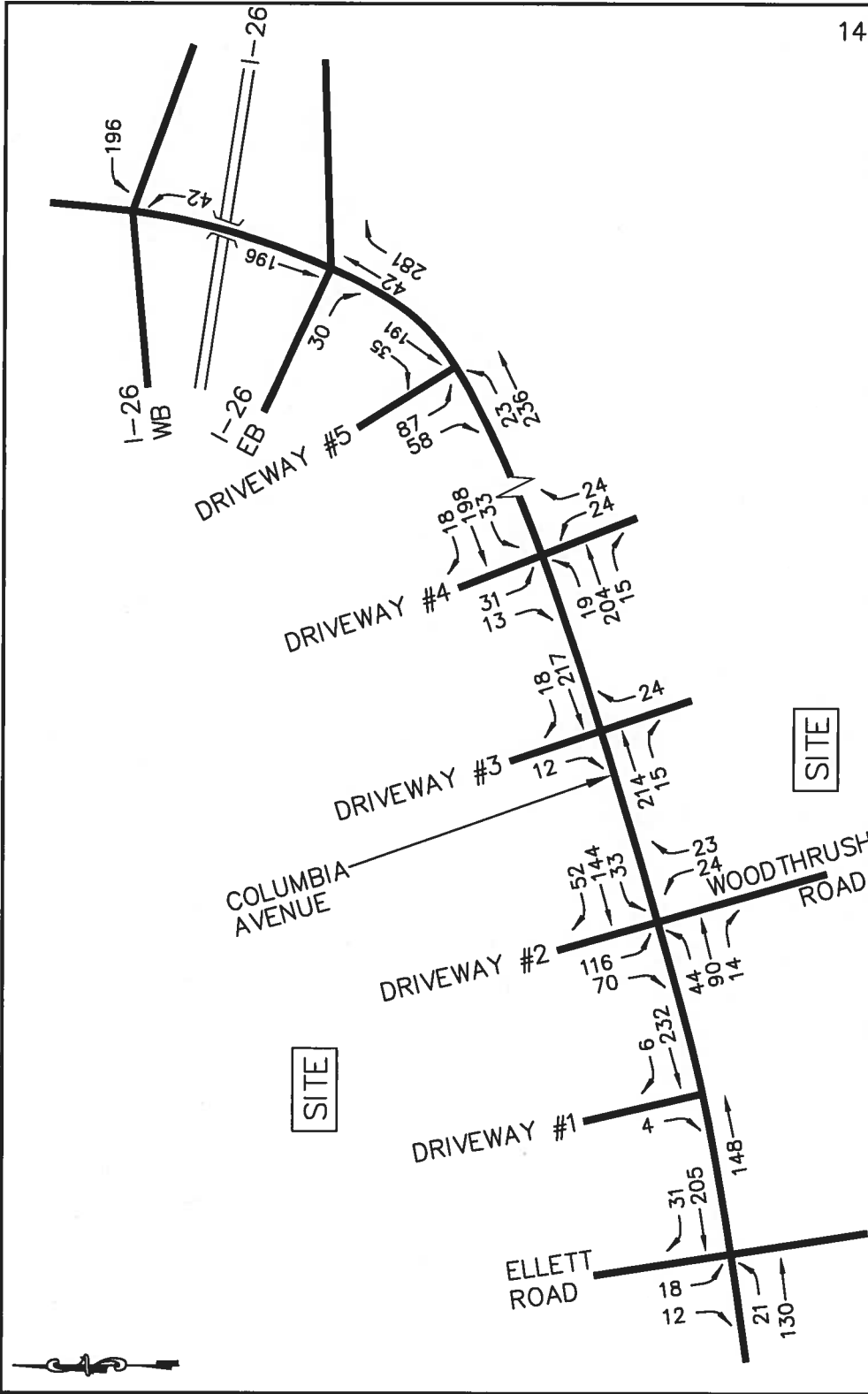


Figure 10

2019 AFTERNOON PEAK HOUR PRIMARY SITE TRIP TOTALS

CHAPIN TECHNOLOGY PARK TRAFFIC IMPACT STUDY
CHAPIN, SOUTH CAROLINA

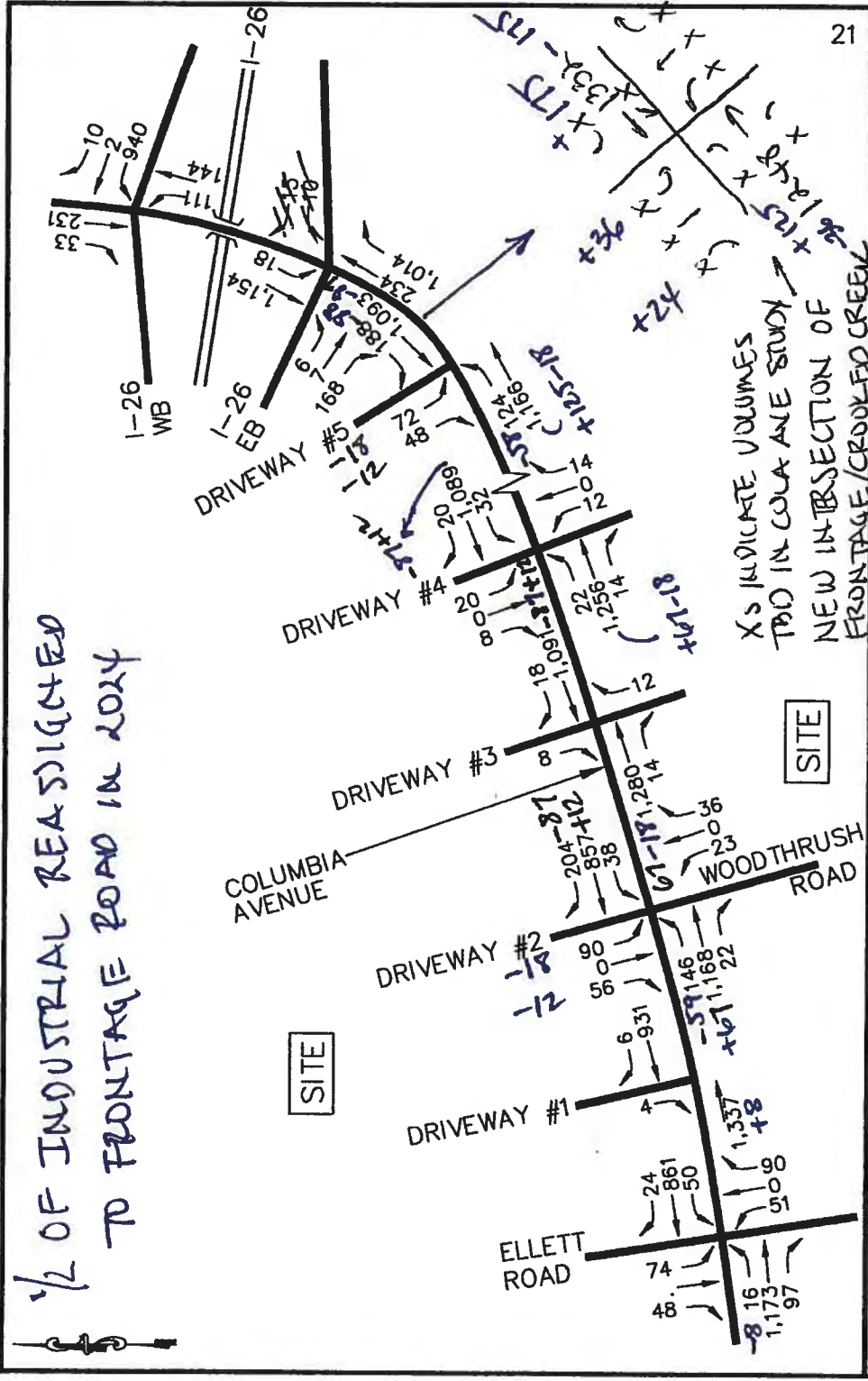
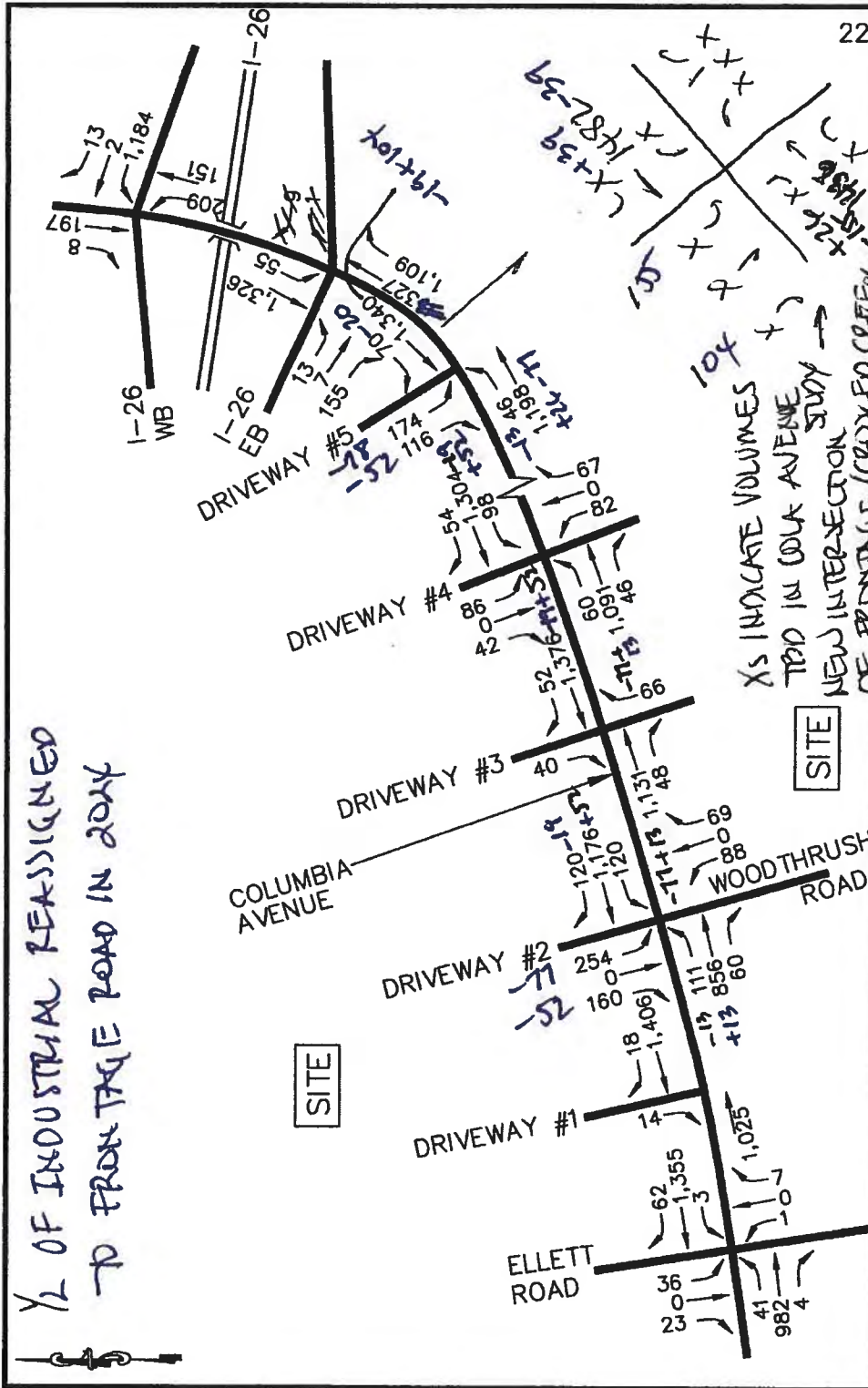


Figure 17 A-1

2024 MORNING PEAK HOUR BUILD VOLUMES

CHAPIN TECHNOLOGY PARK TRAFFIC IMPACT STUDY
 CHAPIN, SOUTH CAROLINA





14-0205T-66S.DWG

Figure 18

10/16/14

2024 AFTERNOON PEAK HOUR BUILD VOLUMES

**CHAPIN TECHNOLOGY PARK TRAFFIC IMPACT STUDY
 CHAPIN, SOUTH CAROLINA**



A-3

Project: Chapin Commerce Village

Date: 10/22/2014

Location	Description of Use	Units		Trips/Unit	PM Peak Hours Trips
North Parcel A	Specialty Retail Center	132000	SF	0.00271	358
North Parcel B	Quality Restaurant	8350	SF	0.00749	63
North Parcel C	General Office Building	8350	SF	0.00149	12
North Parcel D	Fast Food Restaurant with Drive-Through	4500	SF	0.03384	152
Total PM Peak Hour Trips					585

Location	Description of Use	Units		Trips/Unit	PM Peak Hours Trips
South Parcel E	High-Turnover (Sit-Down) Restaurant	8350	SF	0.01115	93
South Parcel F	Fast Food Restaurant with Drive-Through	4050	SF	0.03384	137
South Parcel G	Convenience Market with Gasoline Pumps	4950	SF	0.05092	252
South Parcel H	Quality Restaurant	8350	SF	0.00749	63
South Parcel I	Hotel	120	Rooms	0.6	72
South Parcel J	Quality Restaurant	8350	SF	0.00749	63
South Parcel K	General Office Building	4050	SF	0.00149	6
Total PM Peak Hour Trips					685

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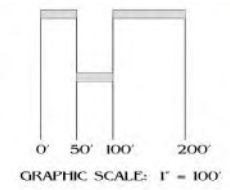


SITE ELEMENTS

- TOTAL AREA - 25 ACRES (NORTH PARCELS)
TOTAL AREA - 20.9 ACRES (SOUTH PARCELS)
- PARCEL A - 17 ACRES
(13,500 SF BUILDING & 476 PARKING SPACES SHOWN)
- PARCEL B - 2.1 ACRES
- PARCEL C - .57 ACRES
- PARCEL D - 2.2 ACRES
- PARCEL E - 2.0 ACRES
(7,500 SF BUILDING & 121 PARKING SPACES SHOWN)
- PARCEL F - 1.2 ACRES
(4,000 SF BUILDING & 55 PARKING SPACES SHOWN)
- PARCEL G - 2.0 ACRES
(2,500 SF BUILDING & 60 PARKING SPACES SHOWN)
- PARCEL H - 2.2 ACRES
(7,500 SF BUILDING & 125 PARKING SPACES SHOWN)
- PARCEL I - 2.8 ACRES
(FOUR STORY HOTEL & 135 PARKING SPACES SHOWN)
- PARCEL J - 2.0 ACRES
- PARCEL K - 11 ACRES

DEVELOPER

M & R ASSOCIATES, LLC.
 DEVELOPERS AND CONSULTANTS
 P.O. BOX 1035
 CHAPIN, SOUTH CAROLINA 29036
 CONTACTS: MARK BOLDING 803-429-1023
 RUSSELL COOK 803-750-7201



CHAPIN COMMERCE VILLAGE

January 2014

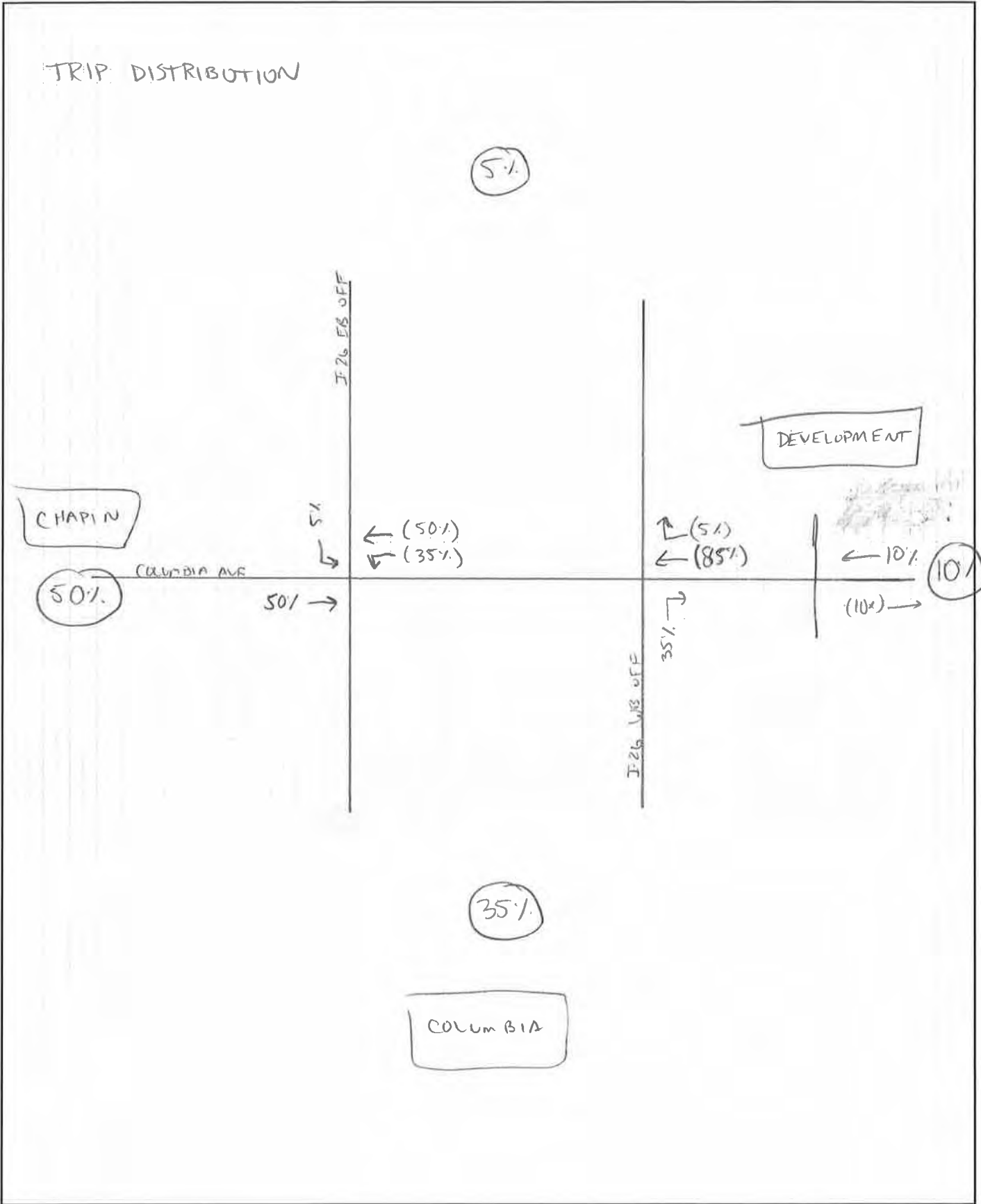
Chapin Commerce Village

Table 1 - Trip Generation

Land Use	Intensity	Daily						AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out
310 Hotel	120 rooms	702	351	351	64	38	26	72	37	35			
710 General Office Building*	8,350 s.f.	92	46	46	13	11	2	12	2	10			
710 General Office Building*	4,050 s.f.	46	23	23	6	5	1	6	1	5			
826 Speciality Retail	132,000 s.f.	5,686	2,843	2,843	-	-	-	338	149	189			
853 Convenience Market with Gasoline Pumps	4,950 s.f.	4,186	2,093	2,093	203	102	101	252	126	126			
931 Quality Restaurant	8,350 s.f.	752	376	376	7	6	1	63	52	11			
931 Quality Restaurant	8,350 s.f.	752	376	376	7	6	1	63	52	11			
931 Quality Restaurant	8,350 s.f.	752	376	376	7	6	1	63	52	11			
932 High-Turnover (Sit Down) Restaurant	8,350 s.f.	1,062	531	531	90	50	40	82	49	33			
934 Fast Food Restaurant with Drive-Through	4,500 s.f.	2,234	1,117	1,117	204	104	100	147	76	71			
934 Fast Food Restaurant with Drive-Through	4,050 s.f.	2,010	1,005	1,005	184	94	90	132	69	63			
Subtotal		18,274	9,137	9,137	785	422	363	1,230	665	565			

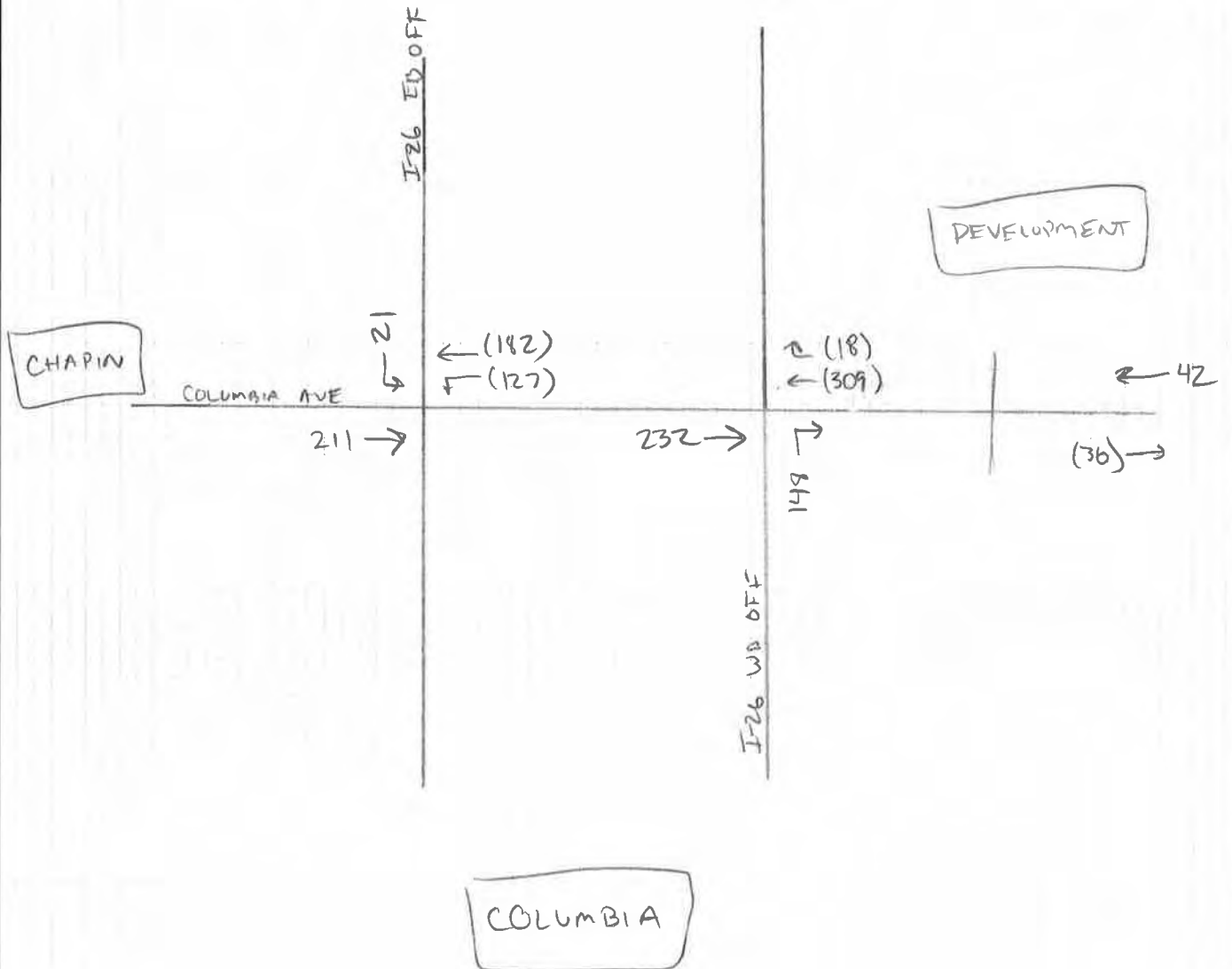
*Rate was used due to the small square footage

TRIP DISTRIBUTION



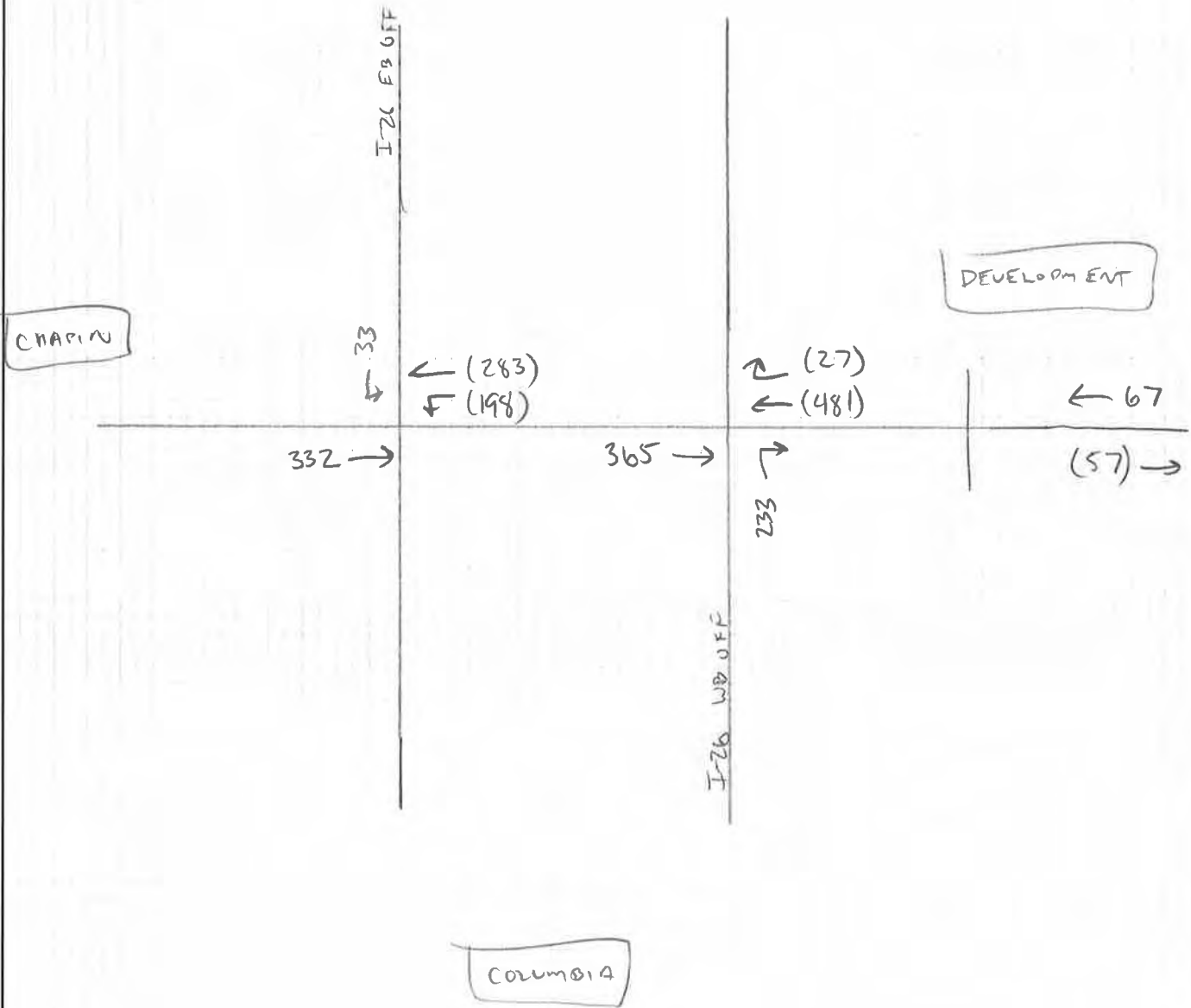
AM PEAK

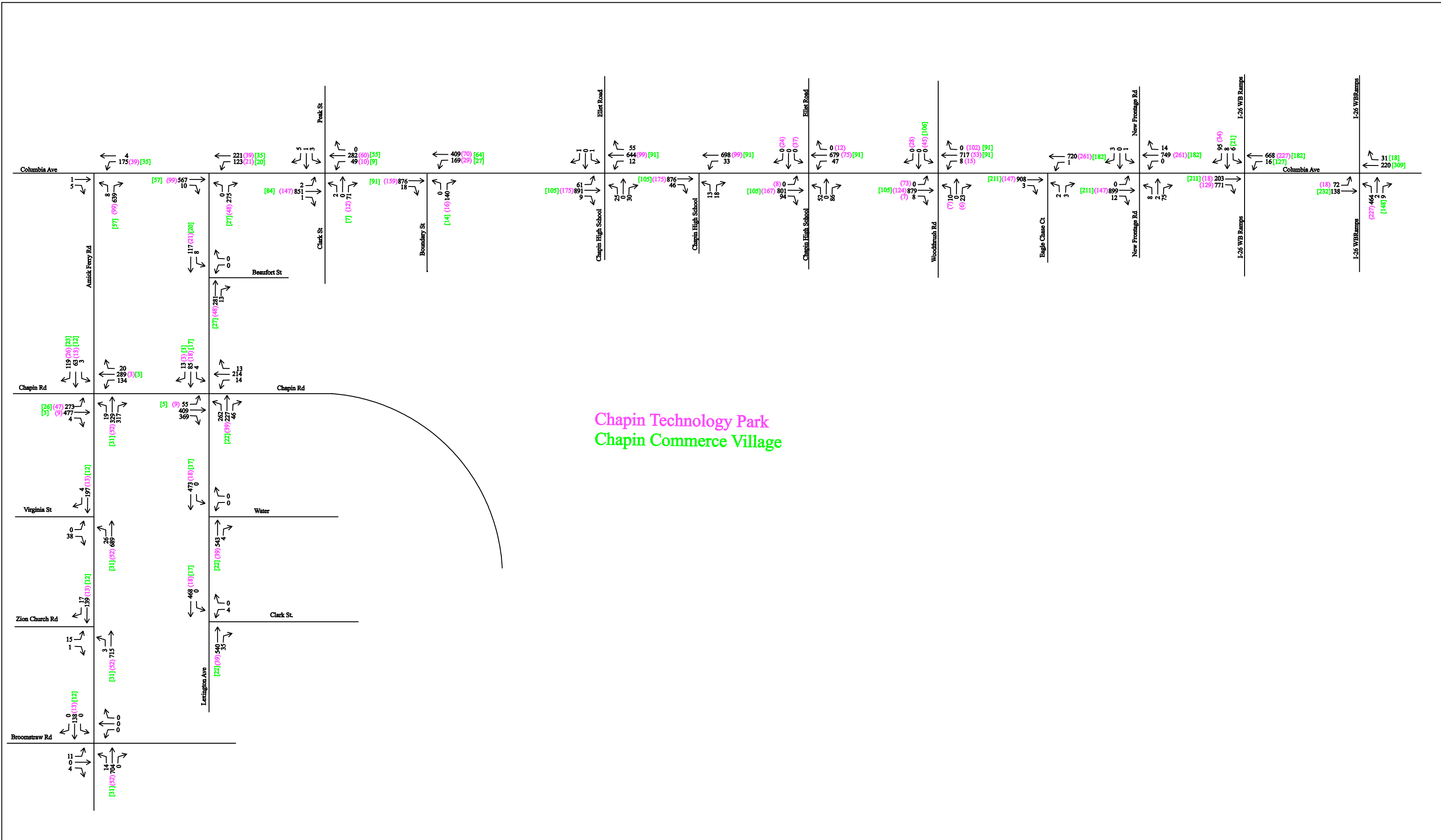
TOTAL TRIP = 785
 ENTER = 422
 EXIT = 363



PM PEAK

TOTAL TRIPS = 1,230
 ENTERED = 665
 EXIT = 565



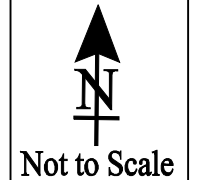


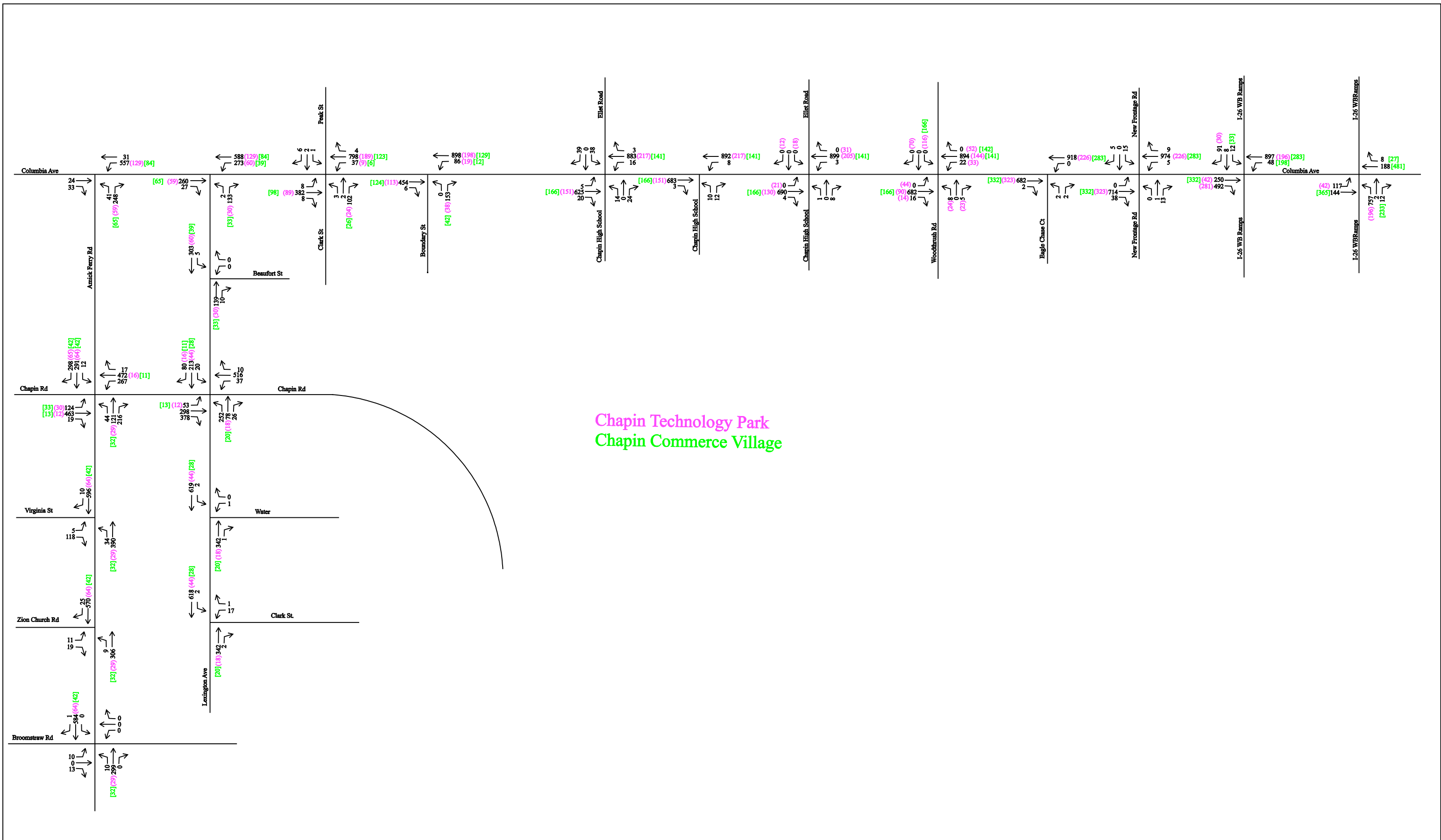
Chapin Technology Park
Chapin Commerce Village



2020 No-Build AM Peak Traffic Forecast Development

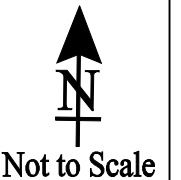
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S-48 (Columbia Avenue)
Corridor Improvement Project

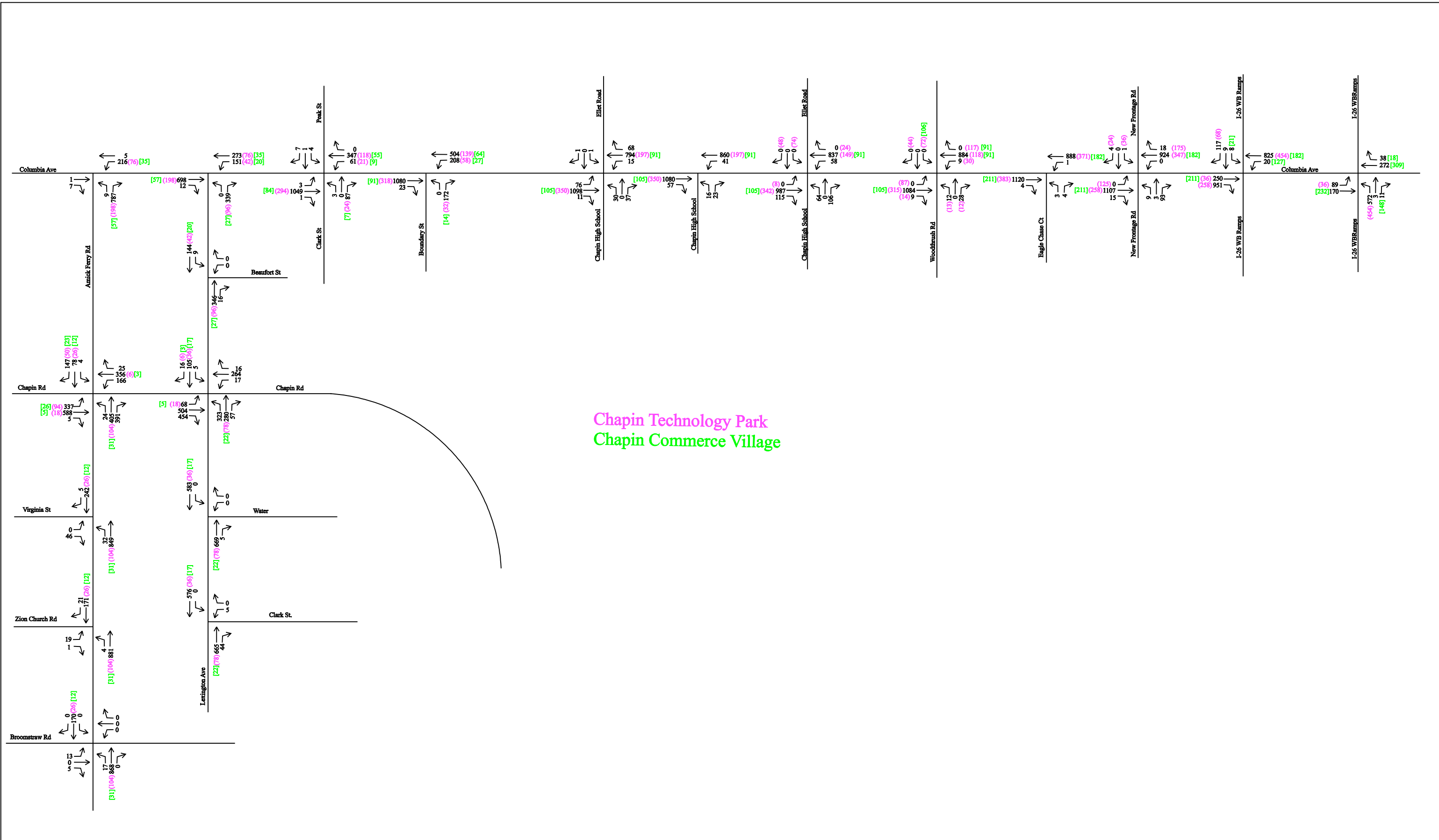




2020 No-Build PM Peak Traffic Forecast Development

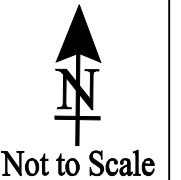
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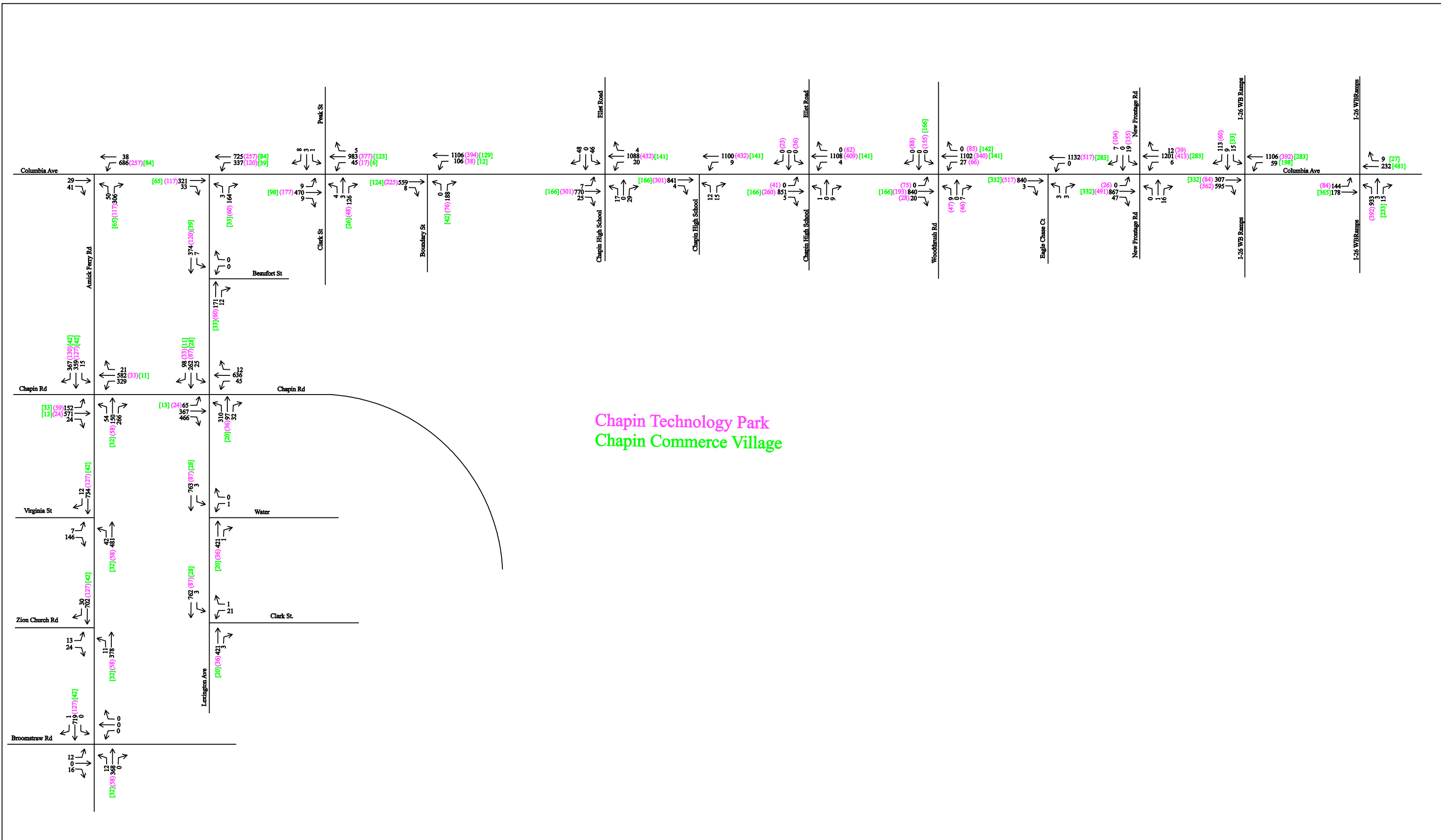




2040 No-Build AM Peak Traffic Forecast Development

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S-48 (Columbia Avenue)
Corridor Improvement Project



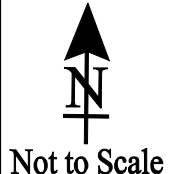


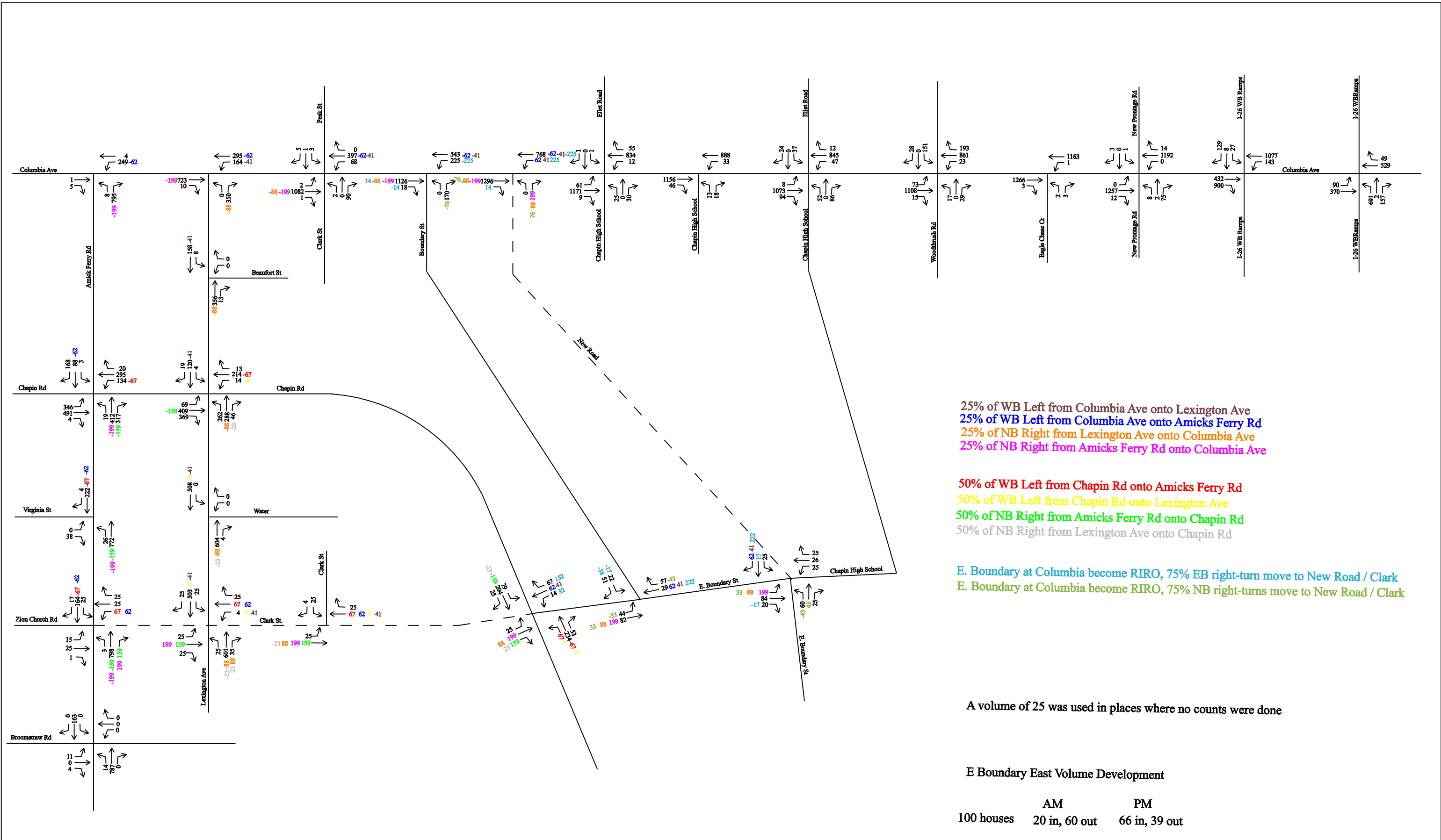
Chapin Technology Park
Chapin Commerce Village



2040 No-Build PM Peak Traffic Forecast Development

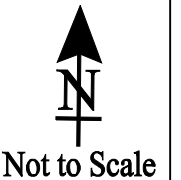
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S-48 (Columbia Avenue)
Corridor Improvement Project

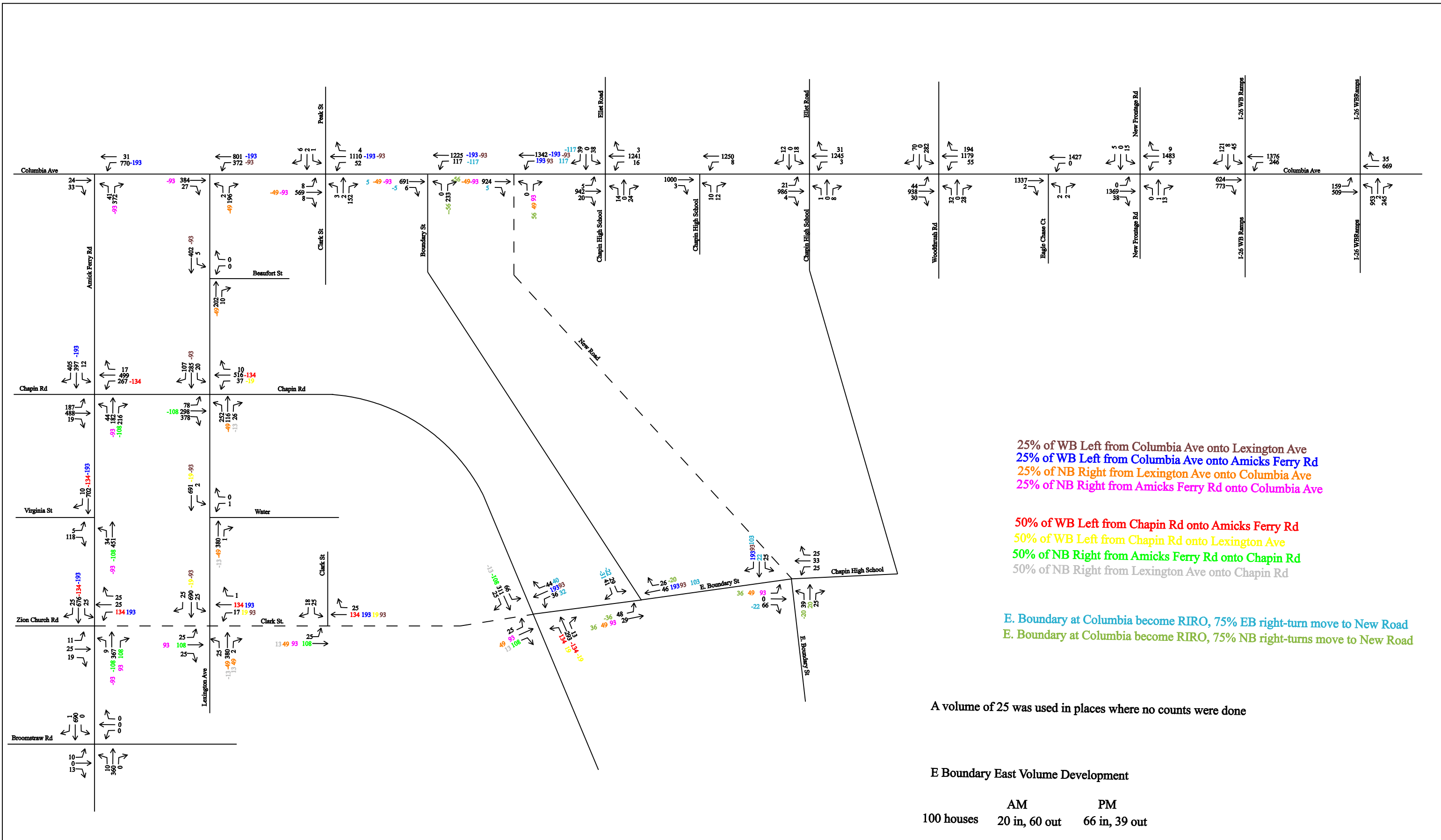




2020 Alternative 9A AM Peak Traffic Forecast Development

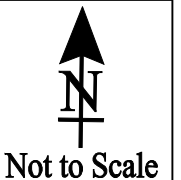
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 S-48 (Columbia Avenue)
 Corridor Improvement Project

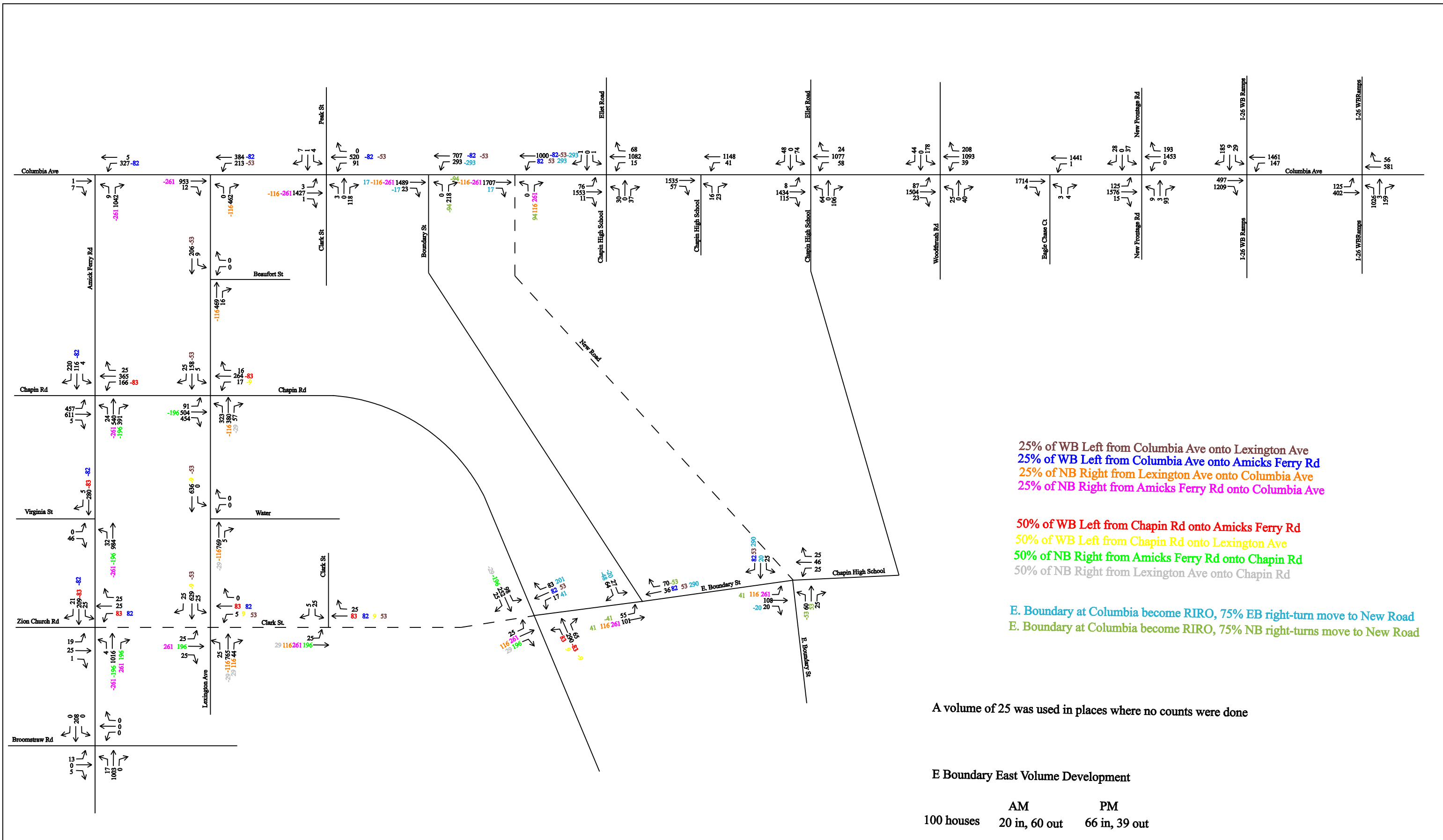




2020 Alternative 9A PM Peak Traffic Forecast Development

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S-48 (Columbia Avenue)
Corridor Improvement Project

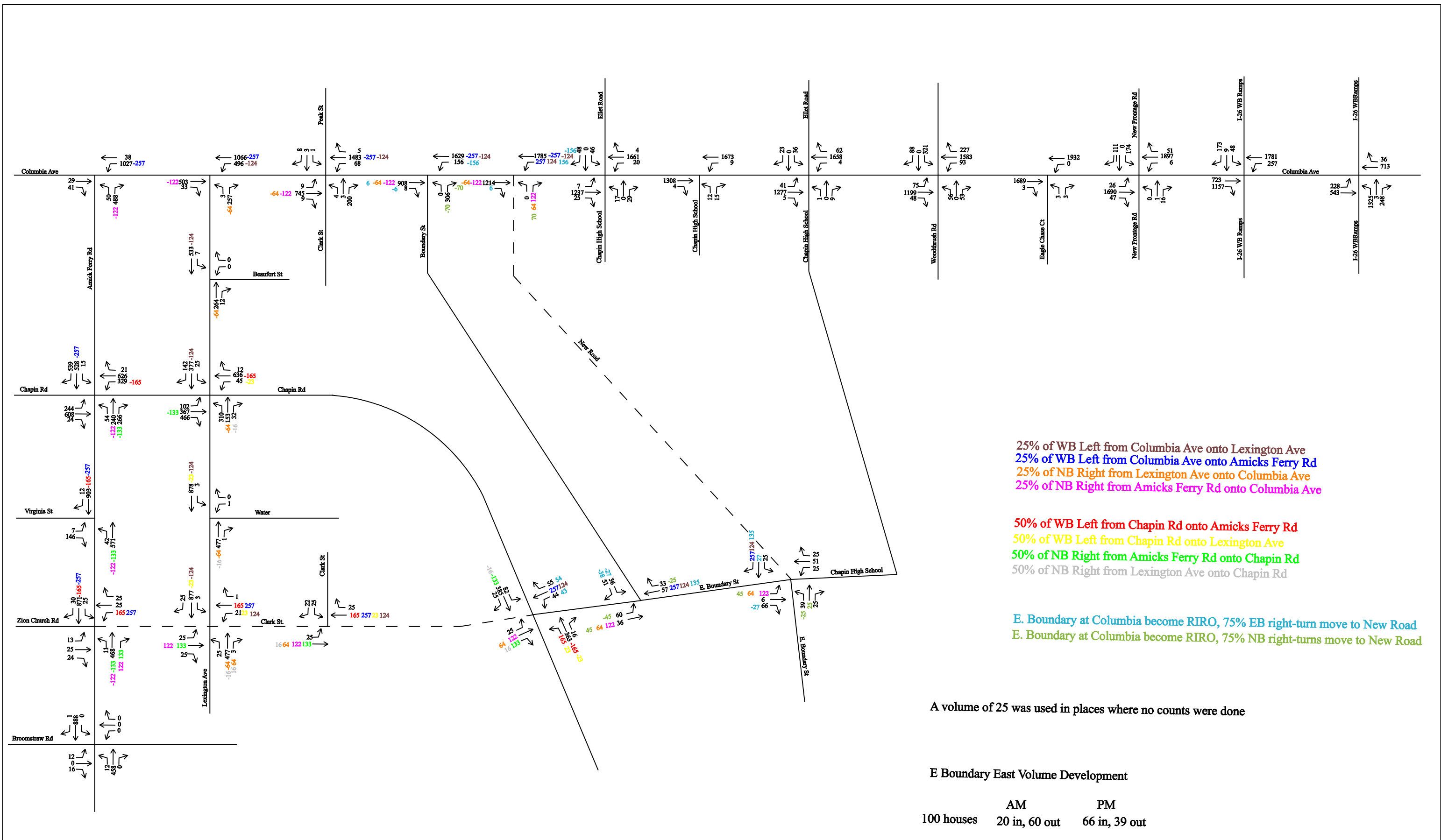




2040 Alternative 9A AM Peak Traffic Forecast Development

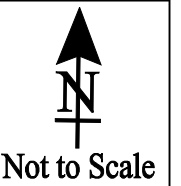
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 S-48 (Columbia Avenue)
 Corridor Improvement Project



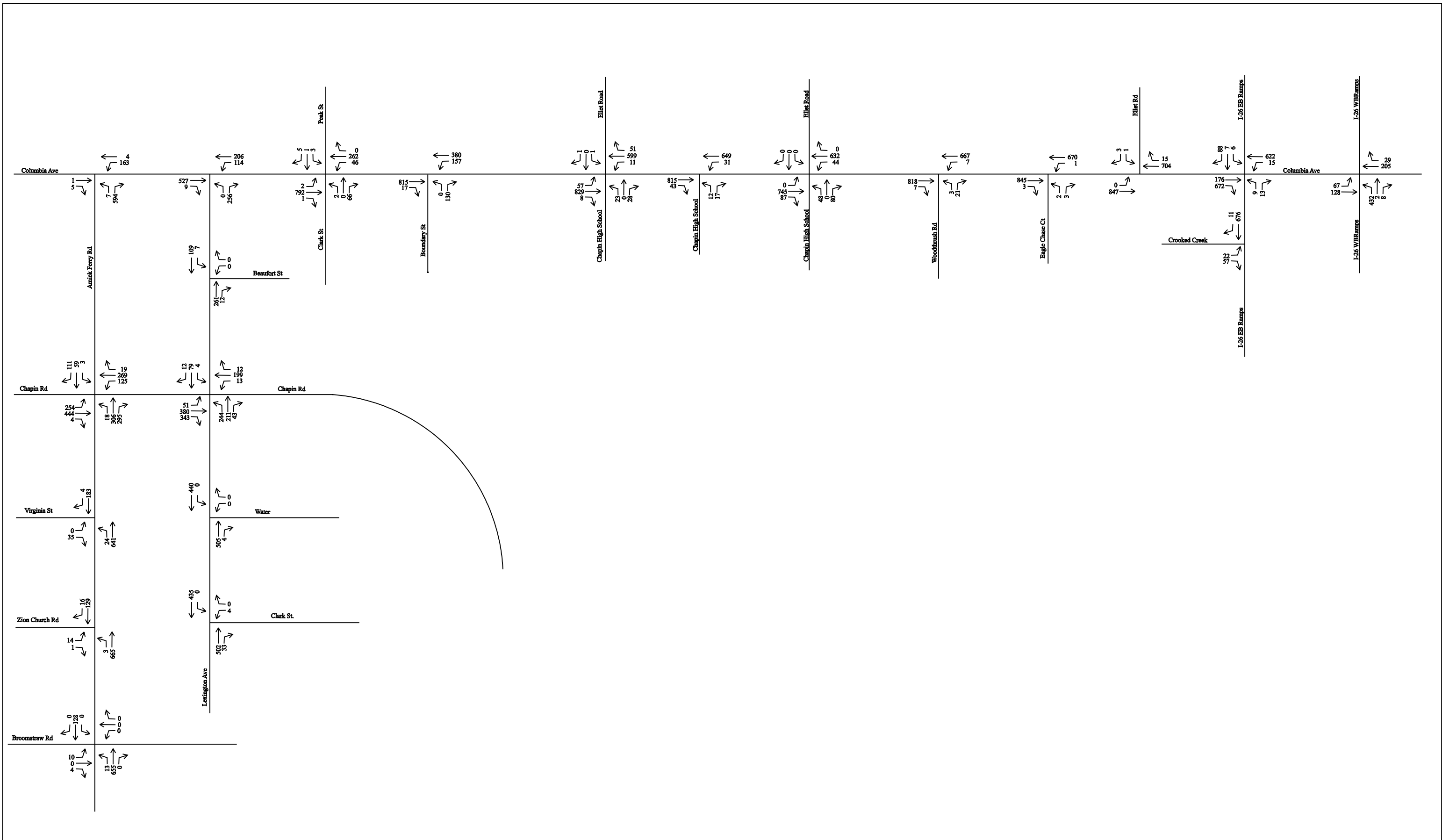


2040 Alternative 9A PM Peak Traffic Forecast Development

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S-48 (Columbia Avenue)
Corridor Improvement Project

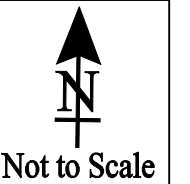


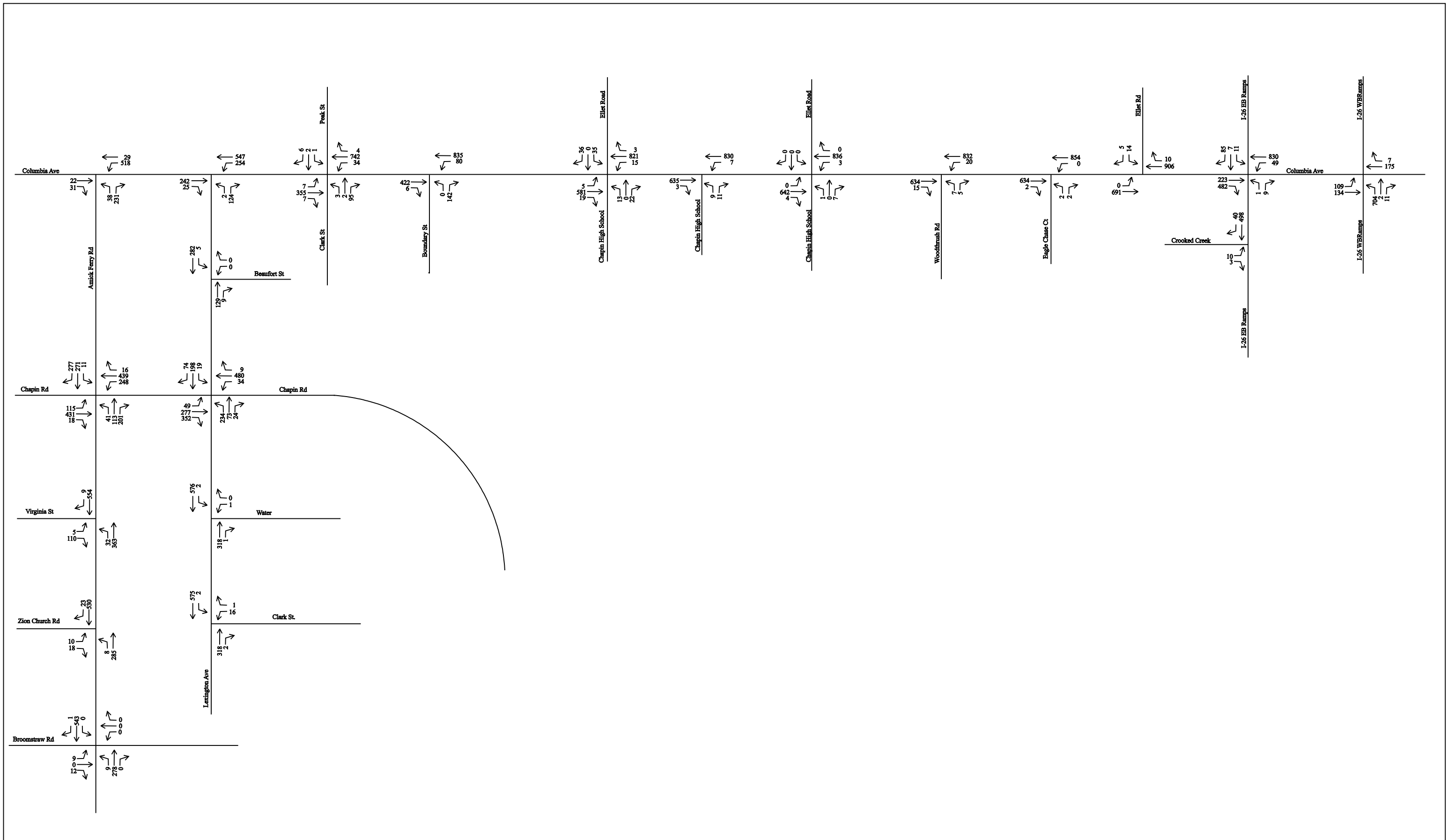
Final Traffic Projection Figures



2014 Existing AM Peak Traffic Volumes

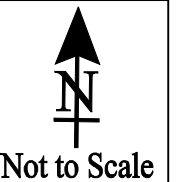
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S-48 (Columbia Avenue)
Corridor Improvement Project

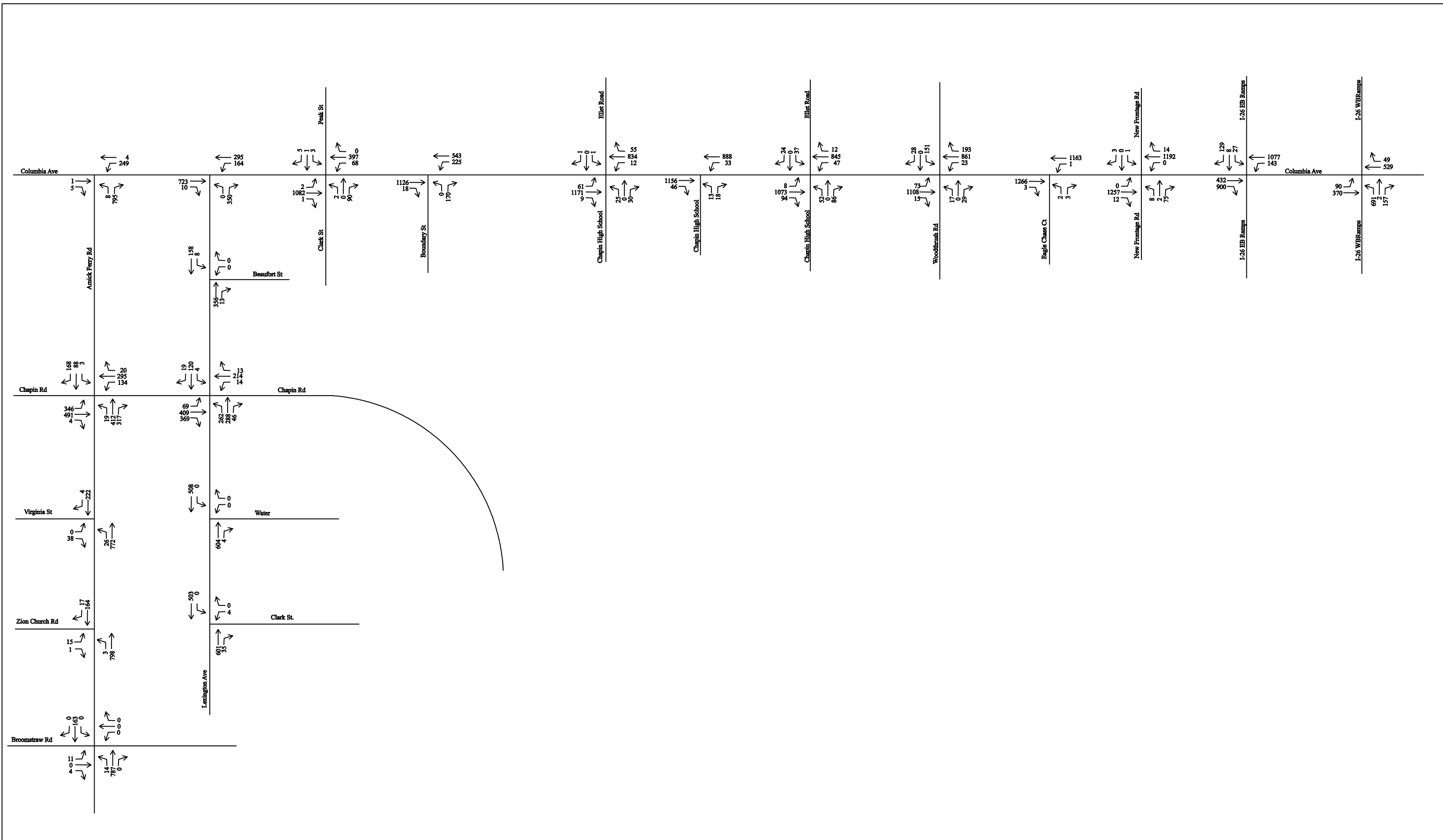




2014 Existing PM Peak Traffic Volumes

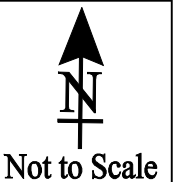
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 S-48 (Columbia Avenue)
 Corridor Improvement Project

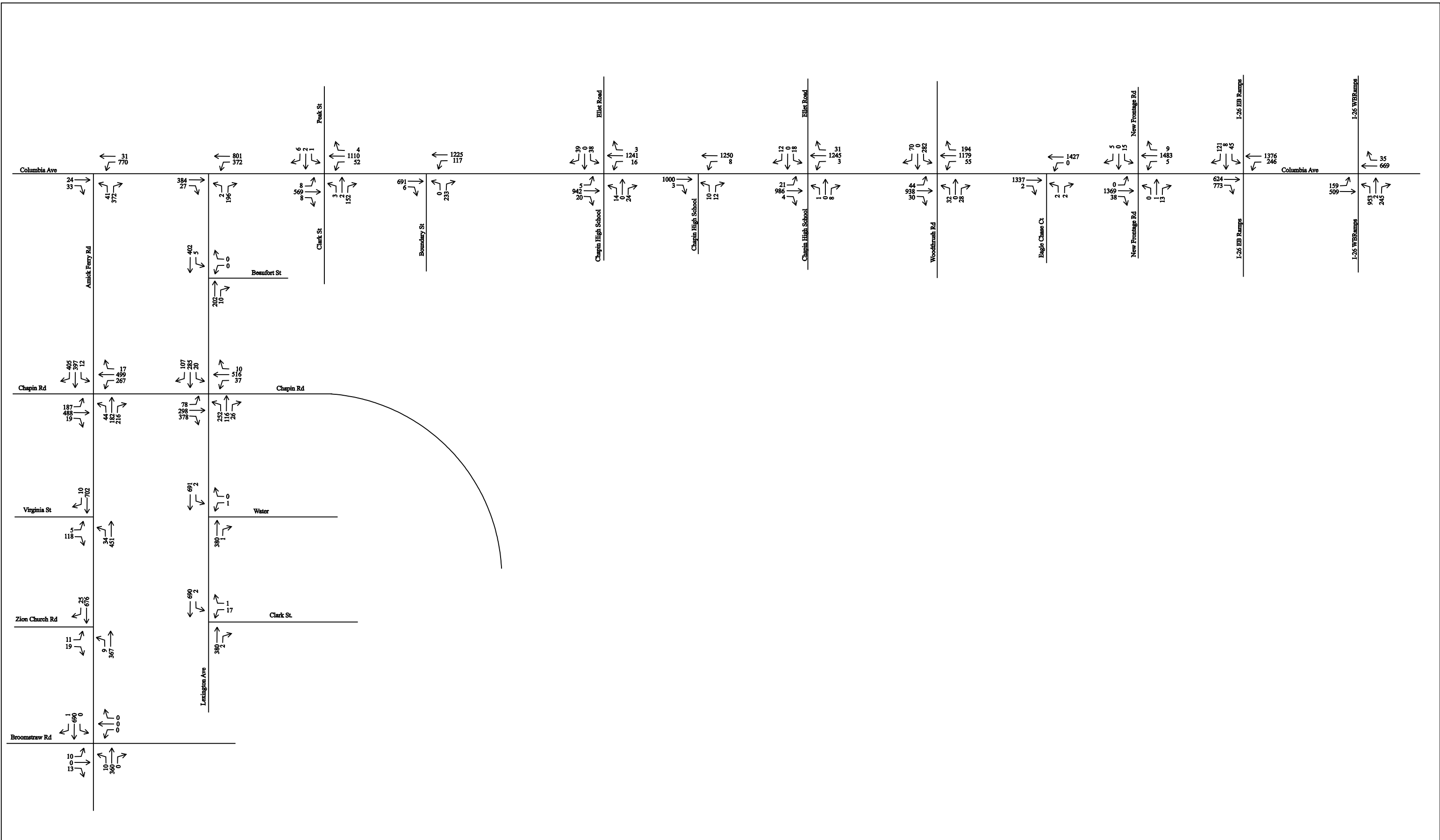




2020 No-Build AM Peak Traffic Forecast

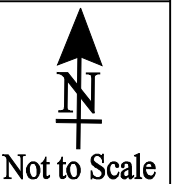
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S-48 (Columbia Avenue)
Corridor Improvement Project

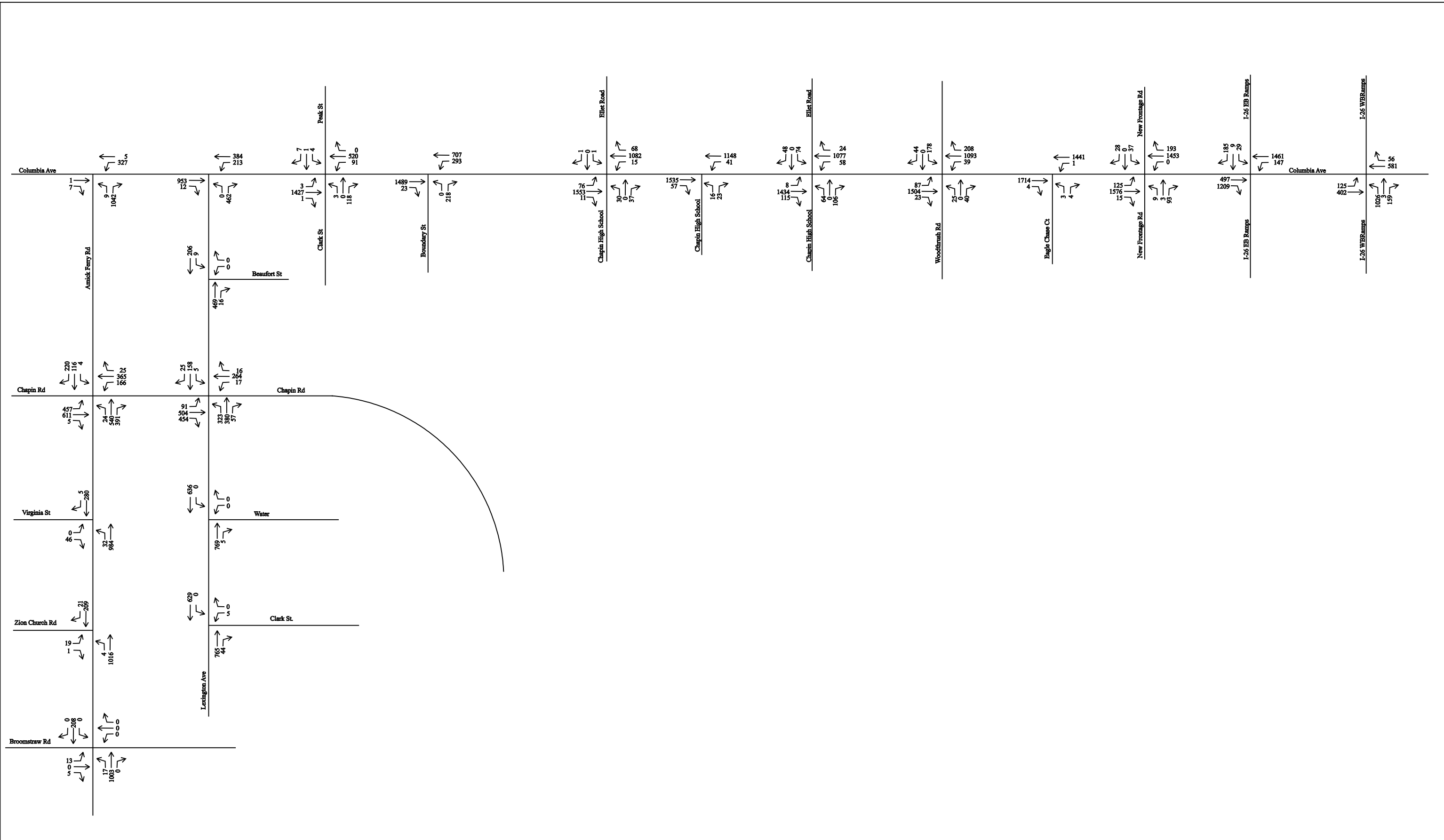




2020 No-Build PM Peak Traffic Forecast

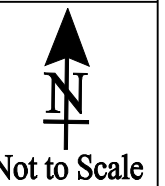
SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

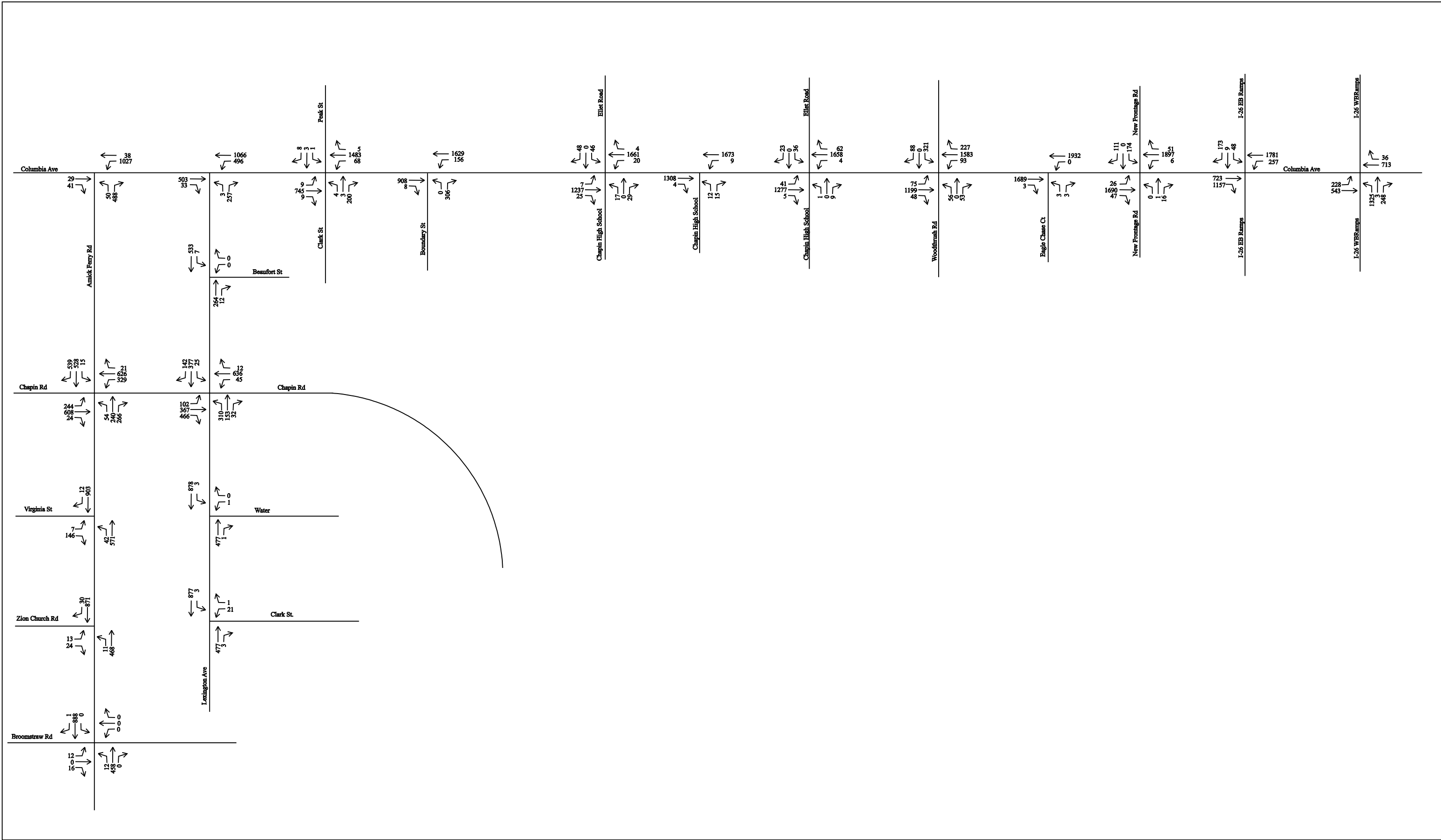




2040 No-Build AM Peak Traffic Forecast

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

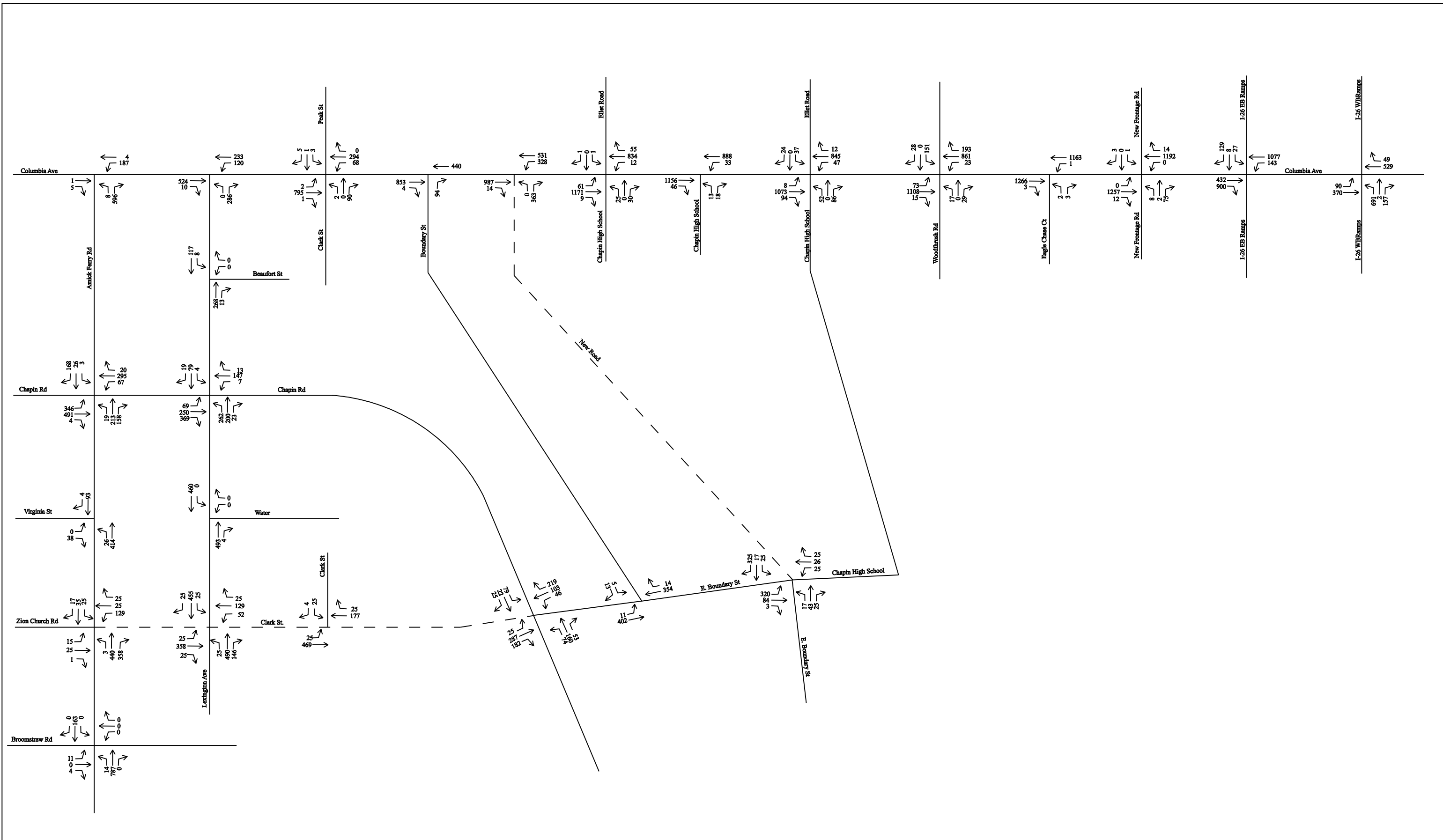




2040 No-Build PM Peak Traffic Forecast

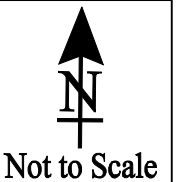
SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

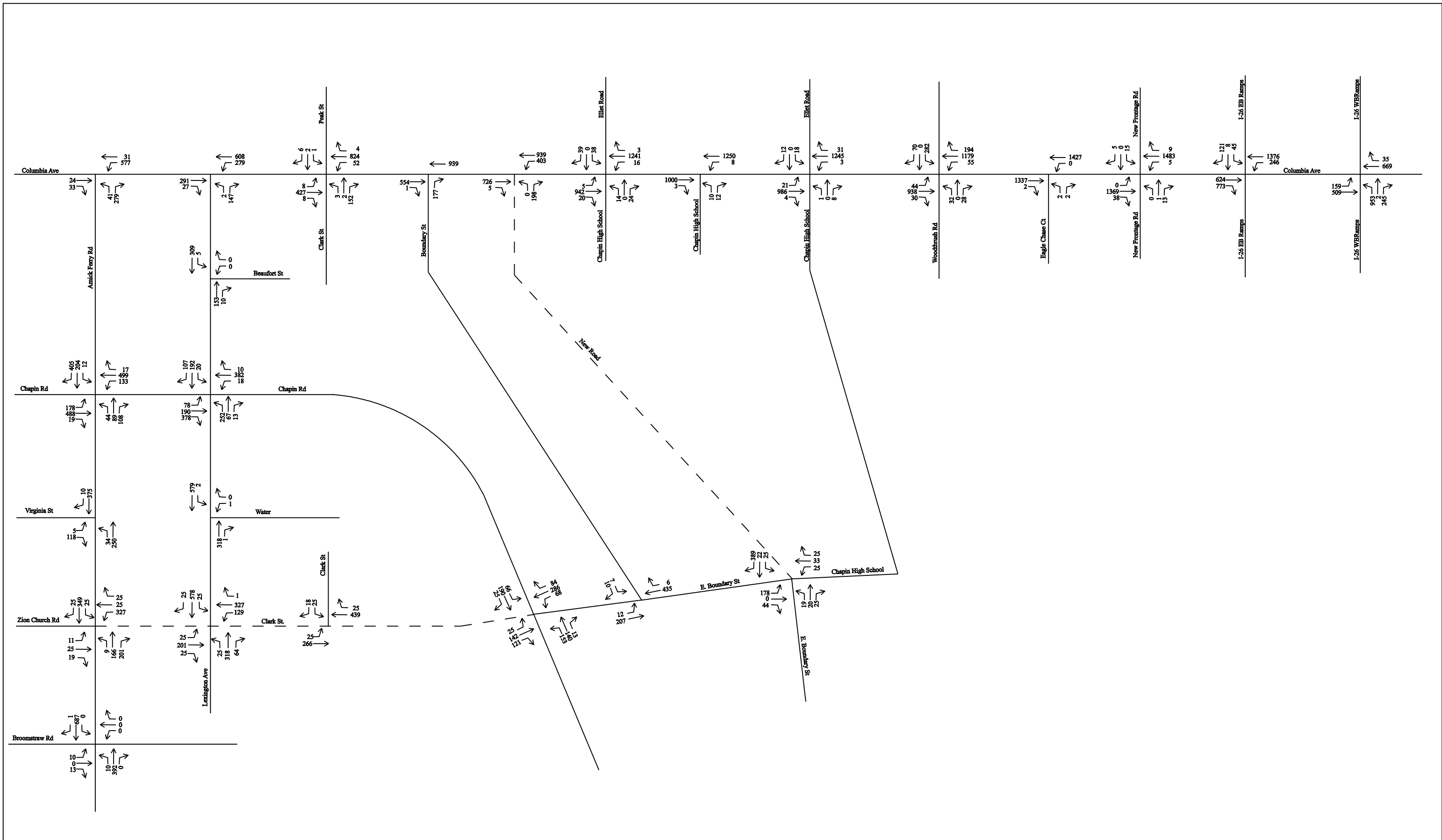




2020 Alternative 9A AM Peak Traffic Forecast

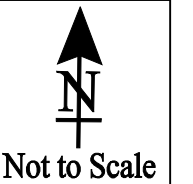
SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

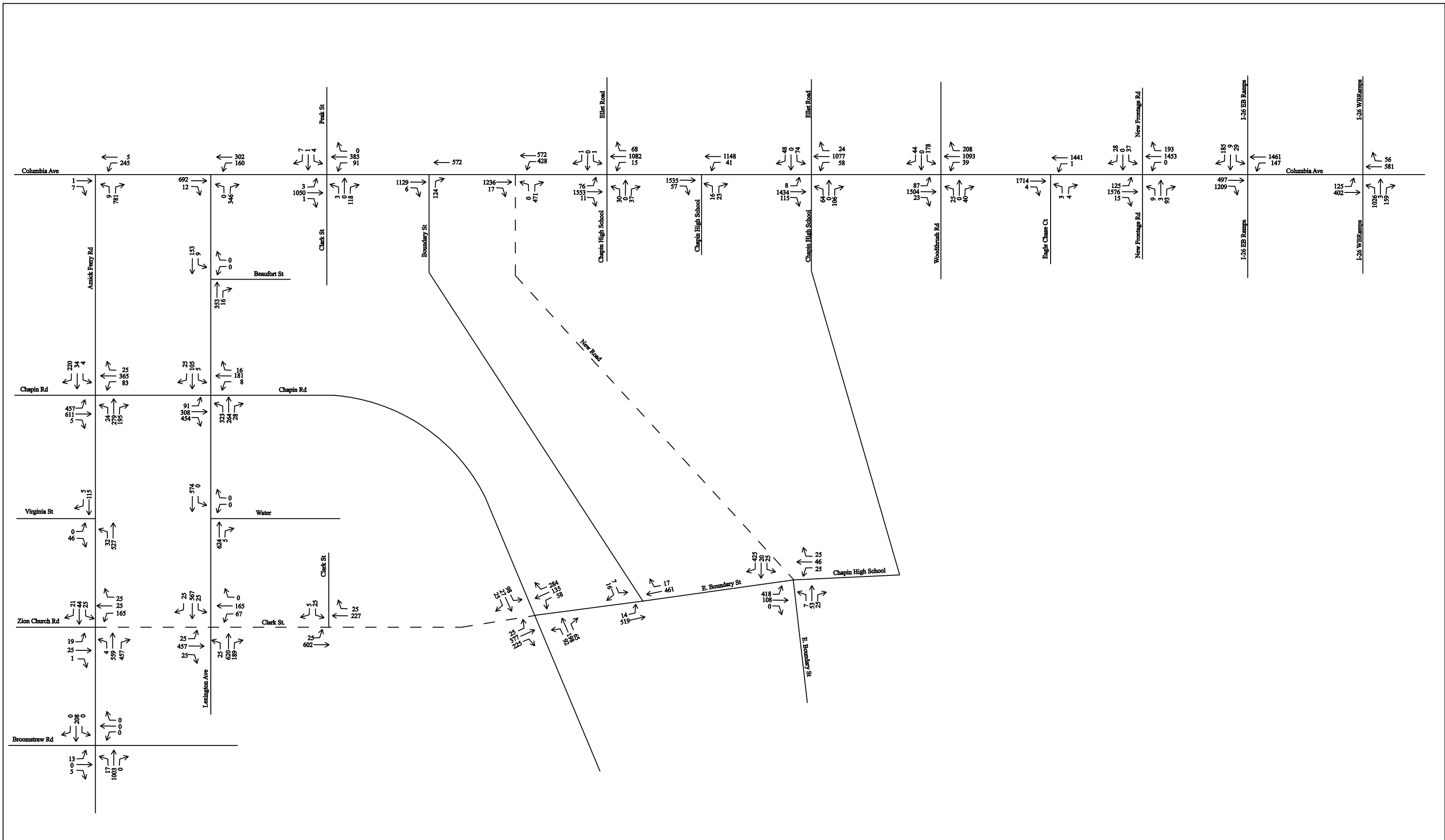




2020 Alternative 9A PM Peak Traffic Forecast

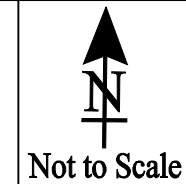
SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

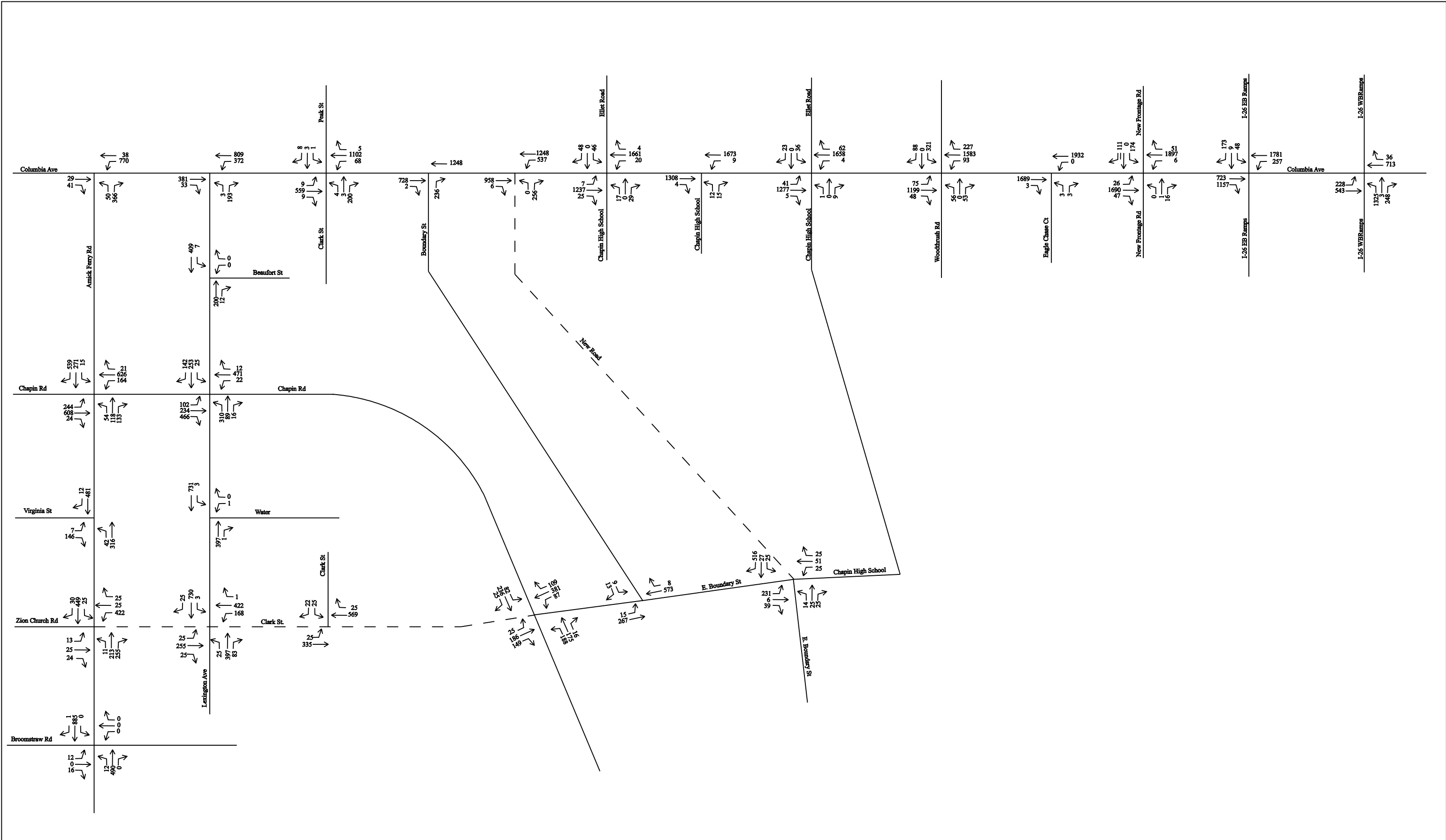




2040 Alternative 9A AM Peak Traffic Forecast

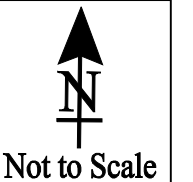
SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project





2040 Alternative 9A PM Peak Traffic Forecast

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

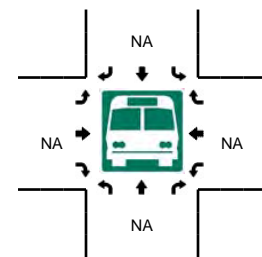
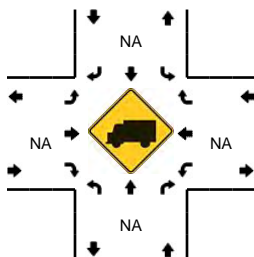
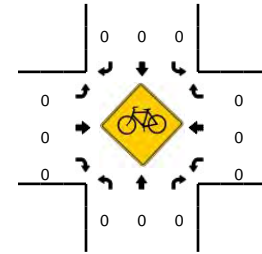
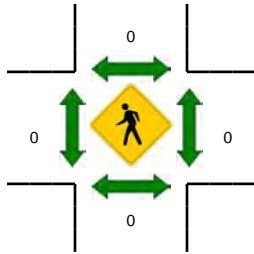
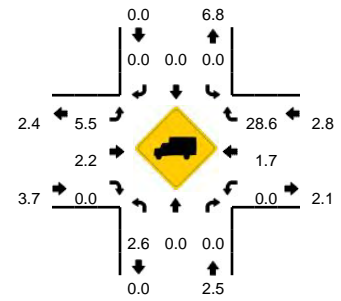
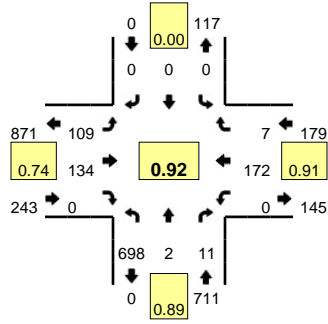


APPENDIX B
TRAFFIC COUNTS

LOCATION: I-26 WB Ramps -- Columbia Ave
CITY/STATE: Chapin, SC

QC JOB #: 12491433
DATE: Tue, May 13 2014

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



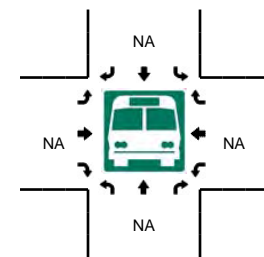
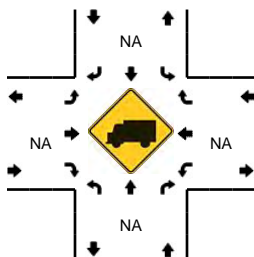
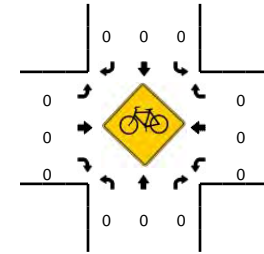
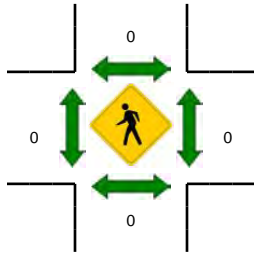
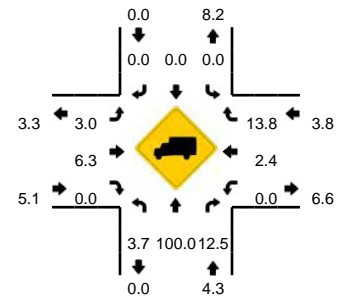
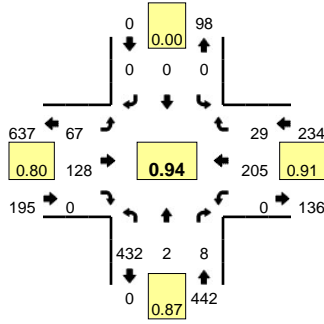
15-Min Count Period Beginning At	I-26 WB Ramps (Northbound)				I-26 WB Ramps (Southbound)				Columbia Ave (Eastbound)				Columbia Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:30 PM	75	0	1	0	0	0	0	0	17	13	0	0	0	16	0	0	122	525
12:45 PM	68	0	3	0	0	0	0	0	17	15	0	0	0	16	4	0	123	509
1:00 PM	83	1	2	0	0	0	0	0	10	21	0	0	0	17	0	0	134	498
1:15 PM	71	0	2	0	0	0	0	0	17	14	0	0	0	15	1	0	120	499
1:30 PM	82	0	3	0	0	0	0	0	18	9	0	0	0	26	0	0	138	515
1:45 PM	74	0	3	0	0	0	0	0	15	23	0	0	0	22	4	0	141	533
2:00 PM	74	2	3	0	0	0	0	0	23	24	0	0	0	14	3	0	143	542
2:15 PM	94	1	4	0	0	0	0	0	21	19	0	0	0	18	2	0	159	581
2:30 PM	89	0	1	0	0	0	0	0	18	14	0	0	0	19	1	0	142	585
2:45 PM	97	0	0	0	0	0	0	0	19	18	0	0	0	22	1	0	157	601
3:00 PM	97	0	1	0	0	0	0	0	14	23	0	0	0	23	2	0	160	618
3:15 PM	105	0	2	0	0	0	0	0	18	19	0	0	0	24	4	0	172	631
3:30 PM	90	1	2	0	0	0	0	0	16	24	0	0	0	59	4	0	196	685
3:45 PM	101	0	2	0	0	0	0	0	25	68	0	0	0	40	2	0	238	766
4:00 PM	120	0	2	0	0	0	0	0	23	60	0	0	0	22	5	0	232	838
4:15 PM	150	0	2	0	0	0	0	0	16	30	0	0	0	32	2	0	232	898
4:30 PM	155	0	2	0	0	0	0	0	22	31	0	0	0	38	5	0	253	955
4:45 PM	166	1	2	0	0	0	0	0	27	37	0	0	0	39	1	0	273	990
5:00 PM	177	1	4	0	0	0	0	0	29	31	0	0	0	41	1	0	284	1042
5:15 PM	200	0	3	0	0	0	0	0	24	35	0	0	0	44	1	0	307	1117
5:30 PM	155	0	2	0	0	0	0	0	28	31	0	1	0	48	4	0	269	1133
5:45 PM	172	3	2	0	0	0	0	0	22	32	0	0	0	39	1	0	271	1131
6:00 PM	142	0	2	0	0	0	0	0	16	23	0	0	0	33	1	0	217	1064
6:15 PM	147	0	4	0	0	0	0	0	16	17	0	0	0	24	0	0	208	965
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	800	0	12	0	0	0	0	0	96	140	0	0	0	176	4	0	1228	
Heavy Trucks	8	0	0		0	0	0		4	0	0		0	8	0		20	
Pedestrians		0				0				0				0			0	
Bicycles		0	0			0	0			0	0			0	0		0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: I-26 WB Ramps -- Columbia Ave
CITY/STATE: Chapin, SC

QC JOB #: 12491434
DATE: Tue, May 13 2014

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

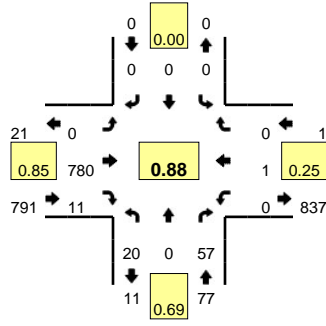


15-Min Count Period Beginning At	I-26 WB Ramps (Northbound)				I-26 WB Ramps (Southbound)				Columbia Ave (Eastbound)				Columbia Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	56	1	2	0	0	0	0	0	16	15	0	0	0	18	3	0	111	
6:45 AM	76	1	1	0	0	0	0	0	6	19	0	0	0	34	6	0	143	
7:00 AM	48	0	0	0	0	0	0	0	18	16	0	0	0	23	8	0	113	
7:15 AM	85	2	1	0	0	0	0	0	12	14	0	0	0	40	9	0	163	530
7:30 AM	103	0	1	0	0	0	0	0	25	22	0	0	0	52	14	0	217	636
7:45 AM	125	1	1	0	0	0	0	0	18	25	0	0	0	53	8	0	231	724
8:00 AM	106	1	4	0	0	0	0	0	16	28	0	0	0	61	4	0	220	831
8:15 AM	98	0	2	0	0	0	0	0	8	53	0	0	0	39	3	0	203	871
8:30 AM	90	0	3	0	0	0	0	0	19	24	0	0	0	28	3	0	167	821
8:45 AM	84	0	0	0	0	0	0	0	22	11	0	0	0	25	5	0	147	737
9:00 AM	77	1	1	0	0	0	0	0	17	15	0	0	0	13	5	0	129	646
9:15 AM	70	1	1	0	0	0	0	0	18	9	0	0	0	13	2	0	114	557
9:30 AM	71	0	0	0	0	0	0	0	20	7	0	0	0	17	4	0	119	509
9:45 AM	91	0	0	0	0	0	0	0	20	11	0	0	0	27	3	0	152	514
10:00 AM	53	0	0	0	0	0	0	0	16	15	0	0	0	11	0	0	95	480
10:15 AM	45	0	0	0	0	0	0	0	16	16	0	0	0	12	0	1	90	456
10:30 AM	63	0	1	0	0	0	0	0	13	8	0	0	0	20	4	0	109	446
10:45 AM	55	0	2	0	0	0	0	0	15	22	0	0	0	20	11	0	125	419
11:00 AM	60	1	2	0	0	0	0	0	10	10	0	0	0	15	3	0	101	425
11:15 AM	68	0	0	0	0	0	0	0	19	18	0	0	0	45	0	0	150	485
11:30 AM	50	0	1	0	0	0	0	0	11	27	0	0	0	24	2	0	115	491
11:45 AM	66	4	1	0	0	0	0	0	16	27	0	0	0	23	2	0	139	505
12:00 PM	79	0	0	0	0	0	0	0	26	24	0	0	0	15	1	0	145	549
12:15 PM	59	0	3	0	0	0	0	0	19	27	0	0	0	11	0	0	119	518
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	500	4	4	0	0	0	0	0	72	100	0	0	0	212	32	0	924	
Heavy Trucks	28	4	0		0	0	0		4	0	0		0	4	4		44	
Pedestrians		0			0				0	0			0	0			0	
Bicycles		0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

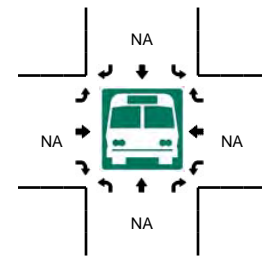
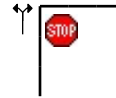
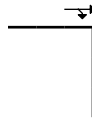
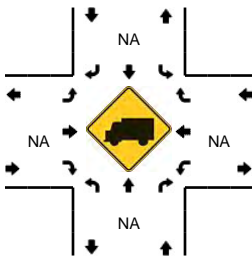
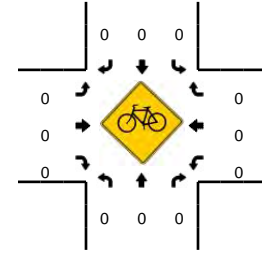
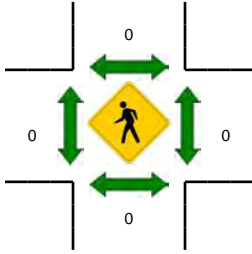
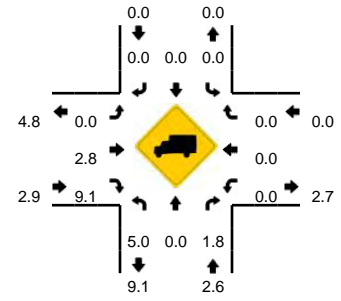
Comments:

LOCATION: Crooked Creek Rd -- I-26 EB Ramps
CITY/STATE: Chapin, SC

QC JOB #: 12491448
DATE: Tue, May 13 2014



Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM



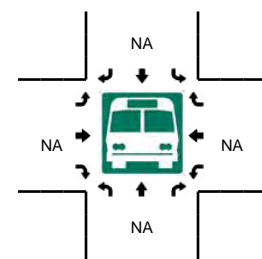
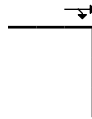
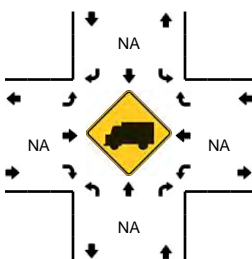
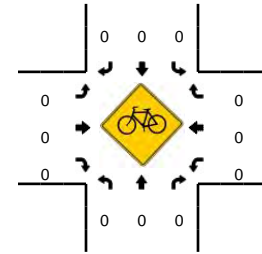
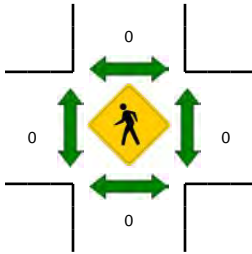
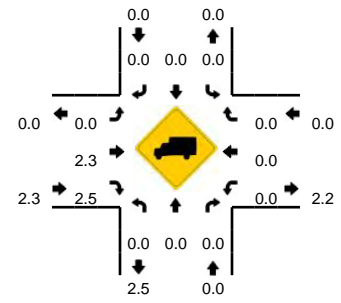
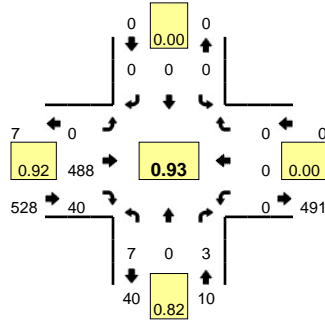
15-Min Count Period Beginning At	Crooked Creek Rd (Northbound)				Crooked Creek Rd (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
6:30 AM	3	0	0	0	0	0	0	0	0	134	0	0	0	0	0	0	0	137	
6:45 AM	3	0	3	0	0	0	0	0	0	152	4	0	0	0	0	0	0	162	
7:00 AM	2	0	10	0	0	0	0	0	0	233	1	0	0	1	0	0	0	247	
7:15 AM	4	0	9	0	0	0	0	0	0	182	1	0	0	0	0	0	0	196	742
7:30 AM	7	0	14	0	0	0	0	0	0	200	7	0	0	0	0	0	0	228	833
7:45 AM	7	0	24	0	0	0	0	0	0	165	2	0	0	0	0	0	0	198	869
8:00 AM	6	0	14	0	0	0	0	0	0	152	6	0	0	0	0	0	0	178	800
8:15 AM	3	0	2	0	0	0	0	0	0	147	4	0	0	0	0	0	0	156	760
8:30 AM	3	0	1	0	0	0	0	0	0	116	5	0	0	0	0	0	0	125	657
8:45 AM	1	0	0	0	0	0	0	0	0	104	8	0	0	0	0	0	0	113	572
9:00 AM	1	0	4	0	0	0	0	0	0	97	3	0	0	0	0	0	0	105	499
9:15 AM	2	0	1	0	0	0	0	0	0	107	1	0	0	0	0	0	0	111	454
9:30 AM	2	0	2	0	0	0	0	0	0	102	2	0	0	0	0	0	0	108	437
9:45 AM	2	0	1	0	0	0	0	0	0	95	2	0	0	0	0	0	0	100	424
10:00 AM	4	0	2	0	0	0	0	0	0	88	2	0	0	0	0	0	0	96	415
10:15 AM	1	0	3	0	0	0	0	0	0	71	2	0	0	0	0	0	0	77	381
10:30 AM	1	0	4	0	0	0	0	0	0	59	2	0	0	0	0	0	0	66	339
10:45 AM	4	0	0	0	0	0	0	0	0	69	3	0	0	0	0	0	0	76	315
11:00 AM	2	0	0	0	0	0	0	0	0	88	4	0	0	0	0	0	0	94	313
11:15 AM	3	0	1	0	0	0	0	0	0	84	2	0	0	0	0	0	0	90	326
11:30 AM	1	0	0	0	0	0	0	0	0	71	4	0	0	0	0	0	0	76	336
11:45 AM	1	0	1	0	0	0	0	0	0	77	4	0	0	0	0	0	0	83	343
12:00 PM	4	0	1	0	0	0	0	0	0	70	5	0	0	0	0	0	0	80	329
12:15 PM	3	0	2	0	0	0	0	0	0	85	2	0	0	0	0	0	0	92	331
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	8	0	40	0	0	0	0	0	0	932	4	0	0	4	0	0	0	988	
Heavy Trucks	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	20	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Comments:

LOCATION: Crooked Creek Rd -- I-26 EB Ramp
CITY/STATE: Chapin, SC

QC JOB #: 12491449
DATE: Tue, May 13 2014

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

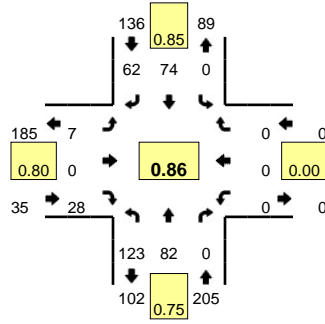


15-Min Count Period Beginning At	Crooked Creek Rd (Northbound)				Crooked Creek Rd (Southbound)				I-26 EB Ramp (Eastbound)				I-26 EB Ramp (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:30 PM	1	0	0	0	0	0	0	0	0	77	2	0	0	0	0	0	80	
12:45 PM	2	0	0	0	0	0	0	0	0	72	4	0	0	0	0	0	78	
1:00 PM	3	0	1	0	0	0	0	0	0	74	5	0	0	0	0	0	83	
1:15 PM	0	0	2	0	0	0	0	0	0	74	2	0	0	0	0	0	78	319
1:30 PM	0	0	1	0	0	0	0	0	0	75	4	0	0	0	0	0	80	319
1:45 PM	0	0	1	0	0	0	0	0	0	63	5	0	0	0	0	0	69	310
2:00 PM	1	0	1	0	0	0	0	0	0	71	5	0	0	0	0	0	78	305
2:15 PM	2	0	0	0	0	0	0	0	0	72	6	0	0	0	0	0	80	307
2:30 PM	3	0	0	0	0	0	0	0	0	64	5	0	0	0	0	0	72	299
2:45 PM	3	0	1	0	0	0	0	0	0	66	4	0	0	0	0	0	74	304
3:00 PM	0	0	2	0	0	0	0	0	0	80	6	0	0	0	0	0	88	314
3:15 PM	0	0	0	0	0	0	0	0	0	69	3	0	0	0	0	0	72	306
3:30 PM	0	0	1	0	0	0	0	0	0	72	4	0	0	0	0	0	77	311
3:45 PM	3	0	3	0	0	0	0	0	0	111	14	0	0	0	0	0	131	368
4:00 PM	6	0	0	0	0	0	0	0	0	119	7	0	0	0	0	0	132	412
4:15 PM	6	0	1	0	0	0	0	0	0	68	8	0	0	0	0	0	83	423
4:30 PM	4	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	106	452
4:45 PM	2	0	1	0	0	0	0	0	0	88	7	0	0	0	0	0	98	419
5:00 PM	1	0	0	0	0	0	0	0	0	139	4	0	0	0	0	0	144	431
5:15 PM	3	0	0	0	0	0	0	0	0	121	9	0	0	0	0	0	133	481
5:30 PM	0	0	3	0	0	0	0	0	0	115	9	0	0	0	0	0	127	502
5:45 PM	3	0	0	0	0	0	0	0	0	113	18	0	0	0	0	0	134	538
6:00 PM	3	0	5	0	0	0	0	0	0	96	7	0	0	0	0	0	111	505
6:15 PM	1	0	1	0	0	0	0	0	0	79	6	0	0	0	0	0	87	459
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	4	0	0	0	0	0	0	0	0	556	16	0	0	0	0	0	576	
Heavy Trucks	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	20	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

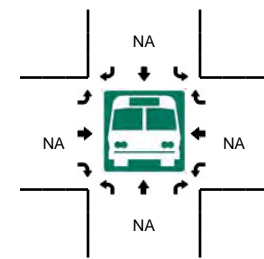
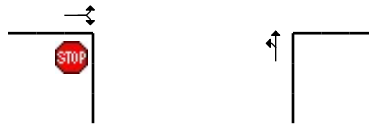
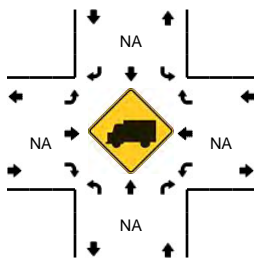
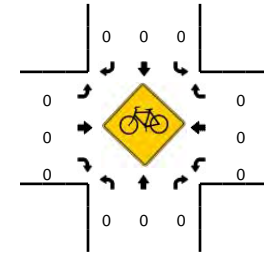
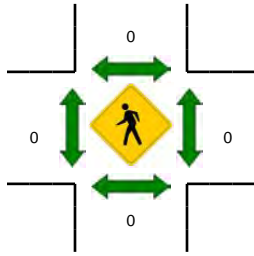
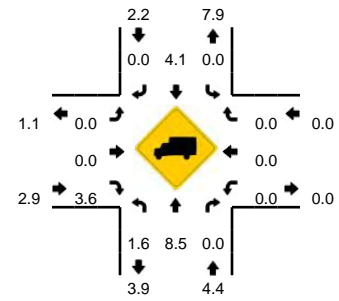
Comments:

LOCATION: SC Hwy 202 -- I-26 EB Ramps
CITY/STATE: Little Mountain, SC

QC JOB #: 12491432
DATE: Tue, May 13 2014



Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

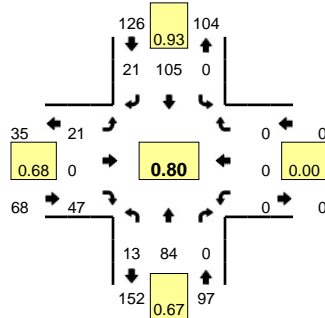


15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	33	9	0	0	0	14	14	0	2	0	9	0	0	0	0	0	81	
7:15 AM	30	18	0	0	0	24	16	0	1	0	5	0	0	0	0	0	94	
7:30 AM	39	29	0	0	0	17	17	0	0	0	7	0	0	0	0	0	109	
7:45 AM	21	26	0	0	0	19	15	0	4	0	7	0	0	0	0	0	92	376
8:00 AM	23	19	0	0	0	13	13	0	2	0	1	1	0	0	0	0	72	367
8:15 AM	16	10	0	0	0	9	5	0	2	0	3	0	0	0	0	0	45	318
8:30 AM	10	13	0	0	0	11	9	0	4	0	4	0	0	0	0	0	51	260
8:45 AM	7	3	0	0	0	4	6	0	0	0	4	0	0	0	0	0	24	192
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	156	116	0	0	0	68	68	0	0	0	28	0	0	0	0	0	436	
Heavy Trucks	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

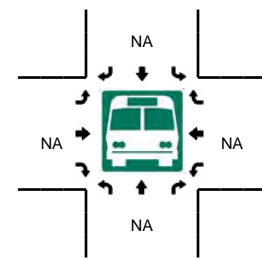
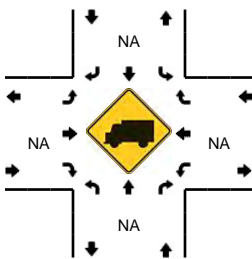
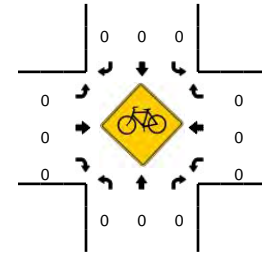
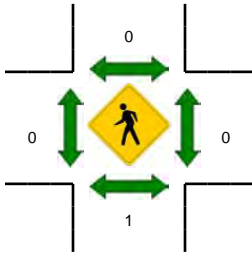
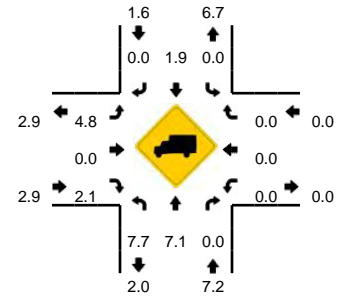
Comments:

LOCATION: SC Hwy 202 -- I-26 EB Ramps
CITY/STATE: Little Mountain, SC

QC JOB #: 12491442
DATE: Tue, May 13 2014



Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

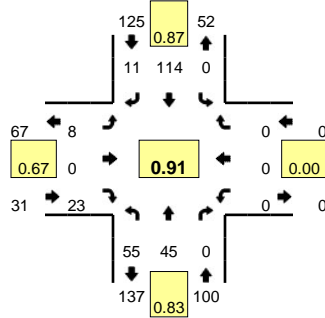


15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	12	0	0	0	16	5	0	2	0	10	0	0	0	0	0	49	
4:15 PM	8	19	0	0	0	25	3	0	6	0	13	0	0	0	0	0	74	
4:30 PM	5	14	0	0	0	27	6	0	1	0	13	0	0	0	0	0	66	
4:45 PM	5	13	0	0	0	33	2	0	1	0	8	0	0	0	0	0	62	251
5:00 PM	7	16	0	0	0	27	3	0	1	0	9	0	0	0	0	0	63	265
5:15 PM	3	33	0	0	0	26	4	0	6	0	18	1	0	0	0	0	91	282
5:30 PM	2	14	0	0	0	25	10	0	4	0	8	0	0	0	0	0	63	279
5:45 PM	1	21	0	0	0	27	4	0	9	0	12	0	0	0	0	0	74	291
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	12	132	0	0	0	104	16	0	24	0	72	4	0	0	0	0	364	
Heavy Trucks	0	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

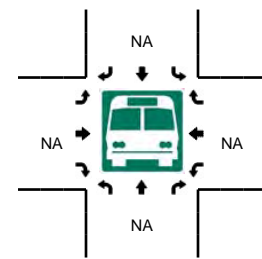
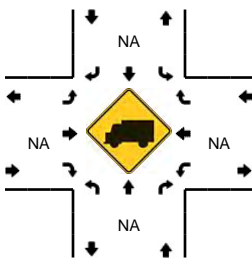
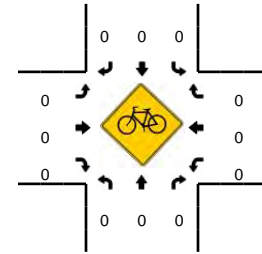
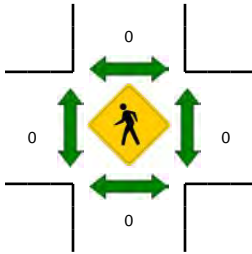
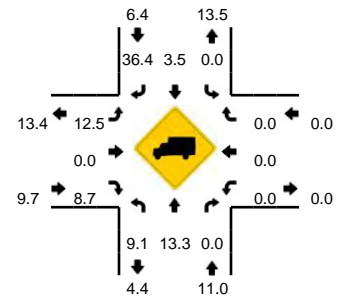
Comments:

LOCATION: SC Hwy 202 -- I-26 WB Ramps/Meadow Brook Rd
CITY/STATE: Pomaria, SC

QC JOB #: 12491446
DATE: Tue, May 13 2014



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM



15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 WB Ramps/Meadow Brook Rd (Eastbound)				I-26 WB Ramps/Meadow Brook Rd (Westbound)				Rd Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	7	3	0	0	0	23	1	0	2	0	5	0	0	0	0	0	41	
7:15 AM	10	10	0	0	0	30	6	0	2	0	10	0	0	0	0	0	68	
7:30 AM	20	10	0	0	0	30	2	0	1	0	7	0	0	0	0	0	70	
7:45 AM	16	13	0	0	0	31	2	0	2	0	3	0	0	0	0	0	67	246
8:00 AM	9	12	0	0	0	23	1	0	2	0	3	1	0	0	0	0	51	256
8:15 AM	7	5	0	0	0	10	2	0	2	0	4	0	0	0	0	0	30	218
8:30 AM	7	11	0	0	0	20	1	0	3	0	0	1	0	0	0	0	43	191
8:45 AM	1	1	0	0	0	10	0	0	0	0	1	0	0	0	0	0	13	137
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	80	40	0	0	0	120	8	0	4	0	28	0	0	0	0	0	280	
Heavy Trucks	8	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	16	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491446

Start Date : 5/13/2014

Page No : 1

Groups Printed- Cars - Heavy Vehicles - Turns

Start Time	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						Int. Total
	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		
07:00 AM	0	23	1	0	0	24	0	0	0	0	0	0	7	0	3	0	0	10	0	2	0	2	0	4	0	0	3	0	0	3	41
07:15 AM	0	30	6	0	0	36	0	0	0	0	0	0	10	0	10	0	0	20	0	2	0	7	0	9	0	0	3	0	0	3	68
07:30 AM	0	30	2	0	0	32	0	0	0	0	0	0	19	1	10	0	0	30	0	1	0	6	0	7	0	0	1	0	0	1	70
07:45 AM	0	31	2	0	0	33	0	0	0	0	0	0	16	0	13	0	0	29	0	2	0	2	0	4	0	0	1	0	0	1	67
Total	0	114	11	0	0	125	0	0	0	0	0	0	52	1	36	0	0	89	0	7	0	17	0	24	0	0	8	0	0	8	246
08:00 AM	0	23	1	0	0	24	0	0	0	0	0	0	8	1	12	0	0	21	0	2	0	3	1	6	0	0	0	1	0	1	52
08:15 AM	0	10	2	0	0	12	0	0	0	0	0	0	7	0	5	0	0	12	0	2	0	4	0	6	1	0	0	0	0	1	31
08:30 AM	0	20	1	0	0	21	0	0	0	0	0	0	7	0	11	0	0	18	0	3	0	0	1	4	0	0	0	0	0	0	43
08:45 AM	0	10	0	0	0	10	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	13
Total	0	63	4	0	0	67	0	0	0	0	0	0	22	2	29	0	0	53	0	7	0	7	2	16	1	0	1	1	0	3	139
Grand Total	0	177	15	0	0	192	0	0	0	0	0	0	74	3	65	0	0	142	0	14	0	24	2	40	1	0	9	1	0	11	385
Apprch %	0	92.2	7.8	0	0		0	0	0	0	0	0	52.1	2.1	45.8	0	0		0	35	0	60	5		9.1	0	81.8	9.1	0		
Total %	0	46	3.9	0	0	49.9	0	0	0	0	0	0	19.2	0.8	16.9	0	0	36.9	0	3.6	0	6.2	0.5	10.4	0.3	0	2.3	0.3	0	2.9	
Cars	0	169	9	0	0	178	0	0	0	0	0	0	64	3	57	0	0	124	0	11	0	22	0	33	1	0	9	1	0	11	346
% Cars	0	95.5	60	0	0	92.7	0	0	0	0	0	0	86.5	100	87.7	0	0	87.3	0	78.6	0	91.7	0	82.5	100	0	100	100	0	100	89.9
Heavy Vehicles	0	4.5	40	0	0	7.3	0	0	0	0	0	0	13.5	0	12.3	0	0	12.7	0	21.4	0	8.3	0	12.5	0	0	0	0	0	0	9.6
% Heavy Vehicles	0	4.5	40	0	0	7.3	0	0	0	0	0	0	13.5	0	12.3	0	0	12.7	0	21.4	0	8.3	0	12.5	0	0	0	0	0	0	9.6
Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0.5
% Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0.5

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 3

Start Time	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						Int. Total	
	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																																
Peak Hour for Entire Intersection Begins at 07:15 AM																																
07:15 AM	0	30	6	0	0	36	0	0	0	0	0	0	10	0	10	0	0	20	0	2	0	7	0	9	0	0	3	0	0	3	68	
07:30 AM	0	30	2	0	0	32	0	0	0	0	0	0	19	1	10	0	0	30	0	1	0	6	0	7	0	0	1	0	0	1	70	
07:45 AM	0	31	2	0	0	33	0	0	0	0	0	0	16	0	13	0	0	29	0	2	0	2	0	4	0	0	1	0	0	1	67	
08:00 AM	0	23	1	0	0	24	0	0	0	0	0	0	8	1	12	0	0	21	0	2	0	3	1	6	0	0	0	1	0	1	52	
Total Volume	0	114	11	0	0	125	0	0	0	0	0	0	53	2	45	0	0	100	0	7	0	18	1	26	0	0	5	1	0	6	257	
% App. Total	0	91.2	8.8	0	0		0	0	0	0	0		53	2	45	0	0		0	26.9	0	69.2	3.8		0	0	83.3	16.7	0			
PHF	.000	.919	.458	.000	.000	.868	.000	.000	.000	.000	.000	.000	.697	.500	.865	.000	.000	.833	.000	.875	.000	.643	.250	.722	.000	.000	.417	.250	.000	.500	.918	

Quality Counts, LLC

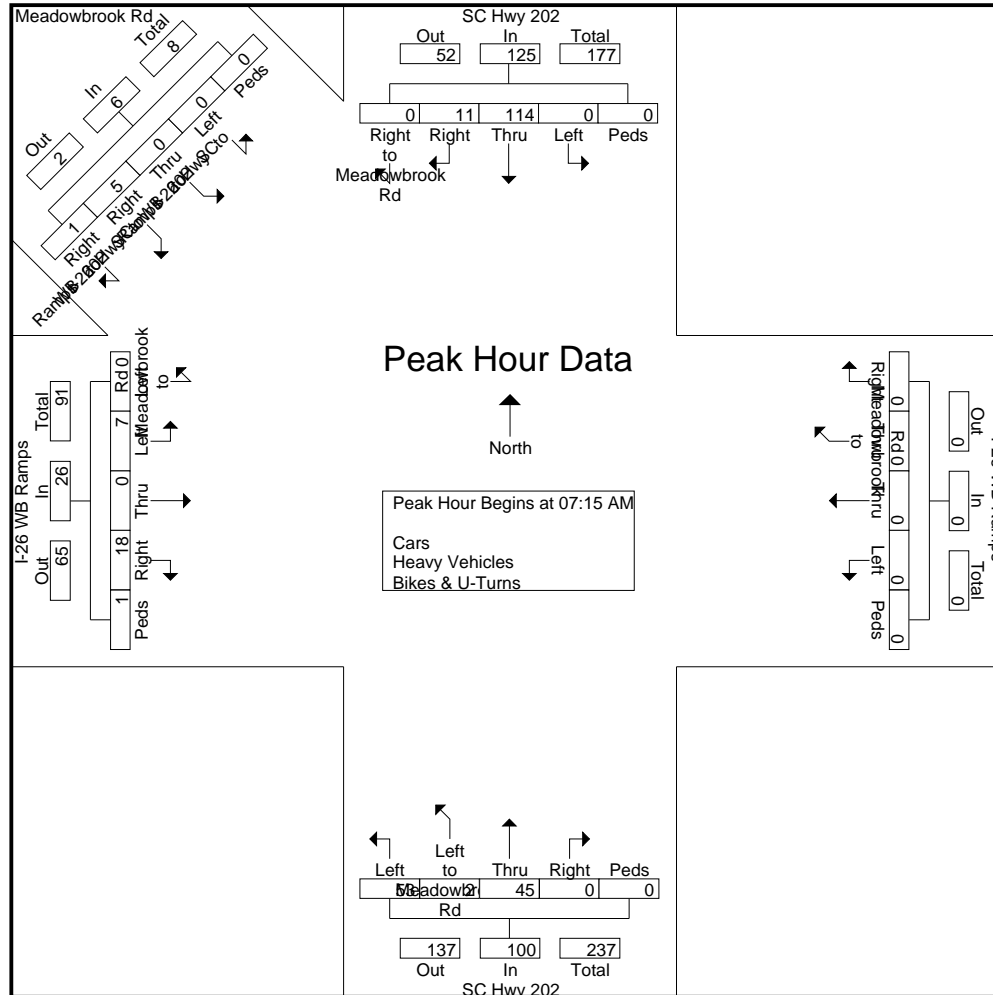
920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491446

Start Date : 5/13/2014

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Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 5

Start Time	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						Int. Total
	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM						07:00 AM						07:15 AM						07:00 AM											
+0 mins.	0	23	1	0	0	24	0	0	0	0	0	0	10	0	10	0	0	20	0	2	0	7	0	9	0	0	3	0	0	3
+15 mins.	0	30	6	0	0	36	0	0	0	0	0	0	19	1	10	0	0	30	0	1	0	6	0	7	0	0	3	0	0	3
+30 mins.	0	30	2	0	0	32	0	0	0	0	0	0	16	0	13	0	0	29	0	2	0	2	0	4	0	0	1	0	0	1
+45 mins.	0	31	2	0	0	33	0	0	0	0	0	0	8	1	12	0	0	21	0	2	0	3	1	6	0	0	1	0	0	1
Total Volume	0	114	11	0	0	125	0	0	0	0	0	0	53	2	45	0	0	100	0	7	0	18	1	26	0	0	8	0	0	8
% App. Total	0	91.2	8.8	0	0		0	0	0	0	0	0	53	2	45	0	0		0	26.9	0	69.2	3.8		0	0	100	0	0	
PHF	.000	.919	.458	.000	.000	.868	.000	.000	.000	.000	.000	.000	.697	.500	.865	.000	.000	.833	.000	.875	.000	.643	.250	.722	.000	.000	.667	.000	.000	.667

Quality Counts, LLC

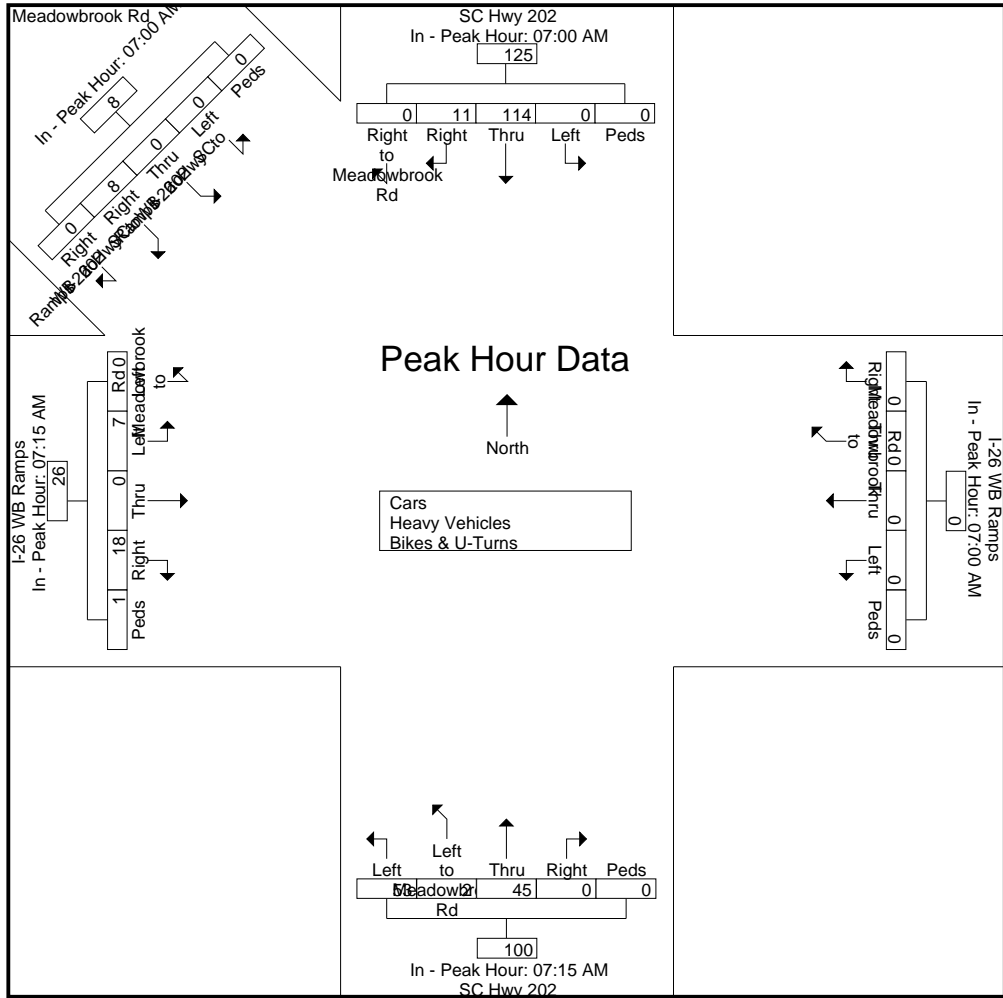
920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491446

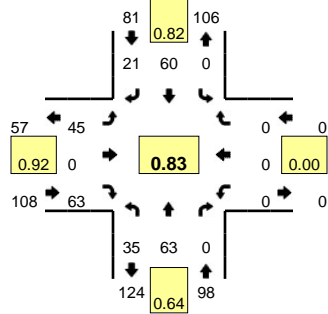
Start Date : 5/13/2014

Page No : 6

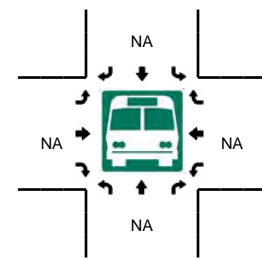
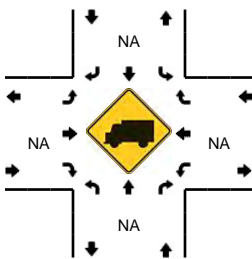
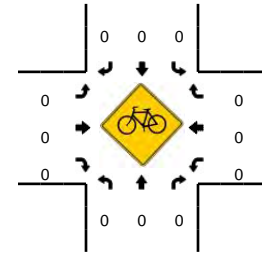
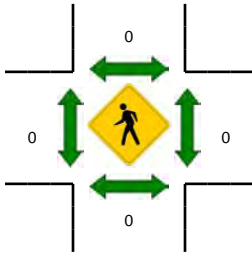
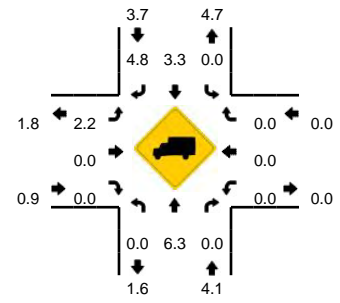


LOCATION: SC Hwy 202 -- I-26 WB Ramps/Meadow Brook Rd
CITY/STATE: Pomaria, SC

QC JOB #: 12491447
DATE: Tue, May 13 2014



Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 WB Ramps/Meadow Brook Rd (Eastbound)				I-26 WB Ramps/Meadow Brook Rd (Westbound)				Rd Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	9	0	0	0	12	2	0	4	0	9	1	0	0	0	0	42	
4:15 PM	3	21	0	0	0	13	3	0	9	0	15	1	0	0	0	0	65	
4:30 PM	7	8	0	0	0	14	5	0	10	0	19	0	0	0	0	0	63	
4:45 PM	5	9	0	0	0	12	9	0	6	0	24	0	0	0	0	0	65	235
5:00 PM	5	10	0	0	0	16	7	0	7	0	13	1	0	0	0	0	59	252
5:15 PM	13	25	0	0	0	13	5	0	13	0	17	0	0	0	0	0	86	273
5:30 PM	9	9	0	0	0	22	5	0	17	0	12	0	0	0	0	0	74	284
5:45 PM	7	19	0	1	0	9	4	0	6	0	21	1	0	0	0	0	68	287

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	100	0	0	0	52	20	0	52	0	68	0	0	0	0	0	344
Heavy Trucks	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad																	
Stopped Buses																	

Comments:

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491447

Start Date : 5/13/2014

Page No : 1

Groups Printed- Cars - Heavy Vehicles - Turns

Start Time	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						Int. Total
	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		
04:00 PM	0	12	2	0	0	14	0	0	0	0	0	0	5	0	9	0	0	14	1	3	0	9	1	14	0	0	0	0	0	0	42
04:15 PM	0	13	3	0	0	16	0	0	0	0	0	0	3	0	21	0	0	24	0	9	0	15	1	25	1	0	0	0	0	1	66
04:30 PM	0	14	5	0	0	19	0	0	0	0	0	0	6	1	8	0	0	15	0	10	0	19	0	29	1	0	0	1	0	2	65
04:45 PM	0	12	9	0	0	21	0	0	0	0	0	0	5	0	9	0	0	14	0	6	0	24	0	30	0	0	0	0	0	0	65
Total	0	51	19	0	0	70	0	0	0	0	0	0	19	1	47	0	0	67	1	28	0	67	2	98	2	0	0	1	0	3	238
05:00 PM	0	16	7	0	0	23	0	0	0	0	0	0	5	0	10	0	0	15	0	7	0	13	1	21	0	0	0	0	0	0	59
05:15 PM	0	13	5	0	0	18	0	0	0	0	0	0	12	1	25	0	0	38	0	13	0	17	0	30	0	0	1	0	0	1	87
05:30 PM	0	22	5	0	0	27	0	0	0	0	0	0	5	4	9	0	0	18	0	17	0	12	0	29	0	0	1	0	0	1	75
05:45 PM	0	9	4	0	0	13	0	0	0	0	0	0	7	0	19	0	1	27	2	4	0	21	1	28	0	0	0	0	0	0	68
Total	0	60	21	0	0	81	0	0	0	0	0	0	29	5	63	0	1	98	2	41	0	63	2	108	0	0	2	0	0	2	289
Grand Total	0	111	40	0	0	151	0	0	0	0	0	0	48	6	110	0	1	165	3	69	0	130	4	206	2	0	2	1	0	5	527
Apprch %	0	73.5	26.5	0	0		0	0	0	0	0		29.1	3.6	66.7	0	0.6		1.5	33.5	0	63.1	1.9		40	0	40	20	0		
Total %	0	21.1	7.6	0	0	28.7	0	0	0	0	0		9.1	1.1	20.9	0	0.2	31.3	0.6	13.1	0	24.7	0.8	39.1	0.4	0	0.4	0.2	0	0.9	
Cars	0	104	39	0	0	143	0	0	0	0	0		47	6	105	0	0	158	3	68	0	125	0	196	0	0	2	1	0	3	500
% Cars	0	93.7	97.5	0	0	94.7	0	0	0	0	0		97.9	100	95.5	0	0	95.8	100	98.6	0	96.2	0	95.1	0	0	100	100	0	60	94.9
Heavy Vehicles	0	6.3	2.5	0	0	5.3	0	0	0	0	0		2.1	0	4.5	0	0	3.6	0	1.4	0	3.8	0	2.9	100	0	0	0	0	40	4.2
Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	1	1	0	0	0	0	4	4	0	0	0	0	0	0	5
% Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	100	0.6	0	0	0	0	100	1.9	0	0	0	0	0	0	0.9

Quality Counts, LLC

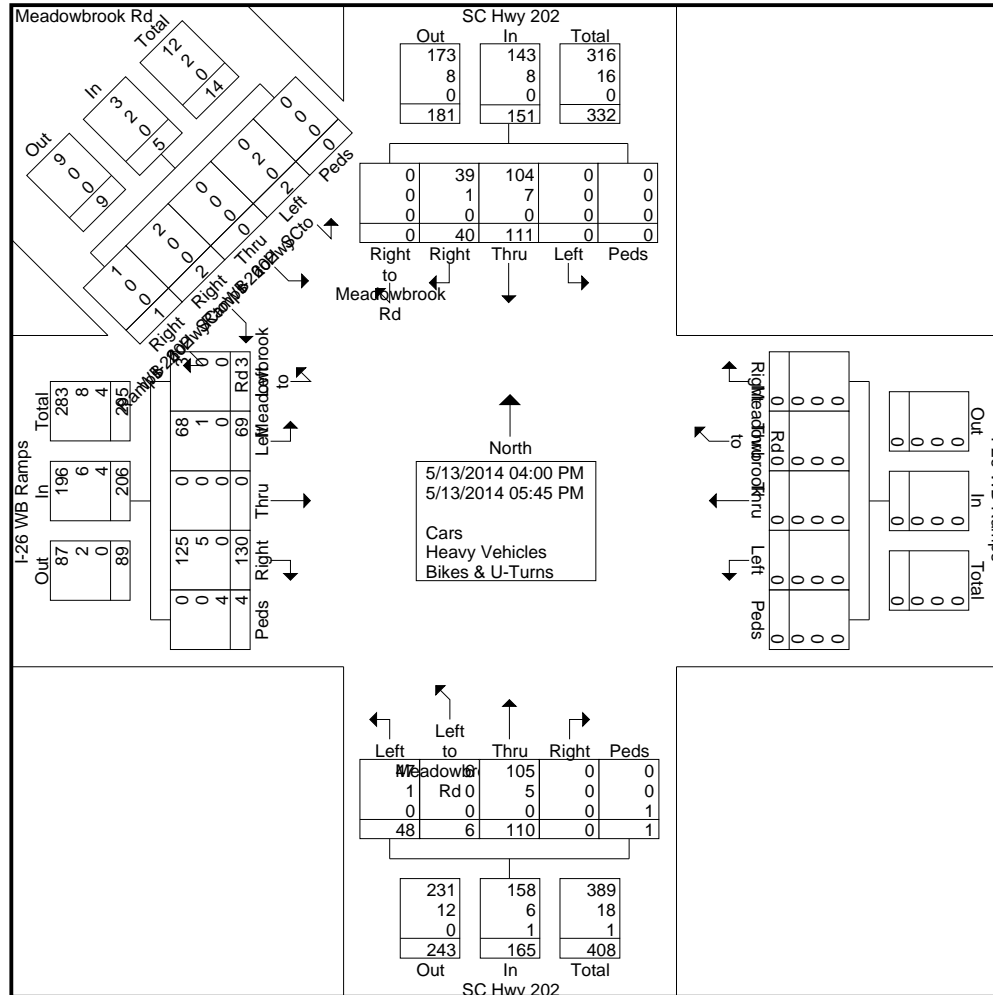
920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491447

Start Date : 5/13/2014

Page No : 2



Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 3

Start Time	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						Int. Total	
	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																																
Peak Hour for Entire Intersection Begins at 05:00 PM																																
05:00 PM	0	16	7	0	0	23	0	0	0	0	0	0	5	0	10	0	0	15	0	7	0	13	1	21	0	0	0	0	0	0	0	59
05:15 PM	0	13	5	0	0	18	0	0	0	0	0	0	12	1	25	0	0	38	0	13	0	17	0	30	0	0	1	0	0	1	87	
05:30 PM	0	22	5	0	0	27	0	0	0	0	0	0	5	4	9	0	0	18	0	17	0	12	0	29	0	0	1	0	0	1	75	
05:45 PM	0	9	4	0	0	13	0	0	0	0	0	0	7	0	19	0	1	27	2	4	0	21	1	28	0	0	0	0	0	0	68	
Total Volume	0	60	21	0	0	81	0	0	0	0	0	0	29	5	63	0	1	98	2	41	0	63	2	108	0	0	2	0	0	2	289	
% App. Total	0	74.1	25.9	0	0		0	0	0	0	0		29.6	5.1	64.3	0	1		1.9	38	0	58.3	1.9		0	0	100	0	0			
PHF	.000	.682	.750	.000	.000	.750	.000	.000	.000	.000	.000	.000	.604	.313	.630	.000	.250	.645	.250	.603	.000	.750	.500	.900	.000	.000	.500	.000	.500	.830		

Quality Counts, LLC

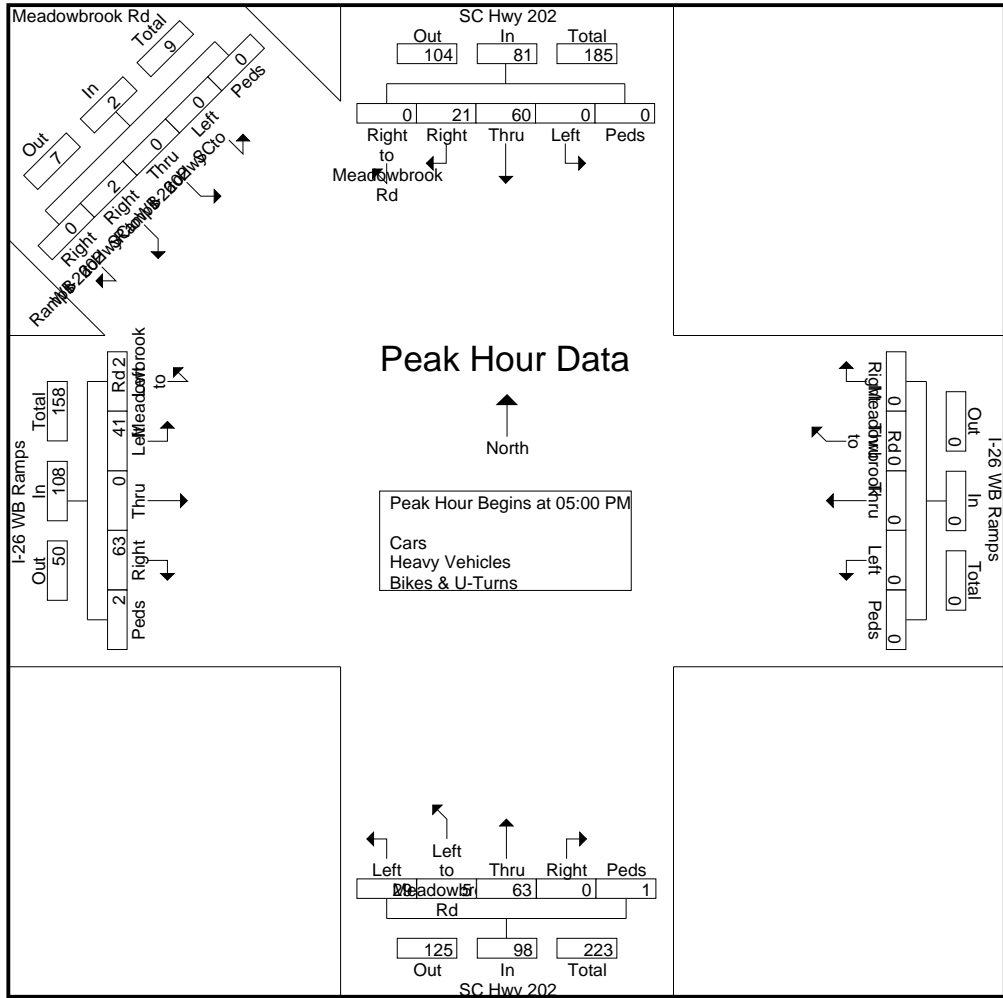
920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491447

Start Date : 5/13/2014

Page No : 4



Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 5

Start Time	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						Int. Total
	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM						04:00 PM						05:00 PM						04:30 PM						04:00 PM					
+0 mins.	0	12	9	0	0	21	0	0	0	0	0	0	5	0	10	0	0	15	0	10	0	19	0	29	0	0	0	0	0	0
+15 mins.	0	16	7	0	0	23	0	0	0	0	0	0	12	1	25	0	0	38	0	6	0	24	0	30	1	0	0	0	0	1
+30 mins.	0	13	5	0	0	18	0	0	0	0	0	0	5	4	9	0	0	18	0	7	0	13	1	21	1	0	0	1	0	2
+45 mins.	0	22	5	0	0	27	0	0	0	0	0	0	7	0	19	0	1	27	0	13	0	17	0	30	0	0	0	0	0	0
Total Volume	0	63	26	0	0	89	0	0	0	0	0	0	29	5	63	0	1	98	0	36	0	73	1	110	2	0	0	1	0	3
% App. Total	0	70.8	29.2	0	0		0	0	0	0	0	0	29.6	5.1	64.3	0	1		0	32.7	0	66.4	0.9		66.7	0	0	33.3	0	
PHF	.000	.716	.722	.000	.000	.824	.000	.000	.000	.000	.000	.000	.604	.313	.630	.000	.250	.645	.000	.692	.000	.760	.250	.917	.500	.000	.000	.250	.000	.375

Quality Counts, LLC

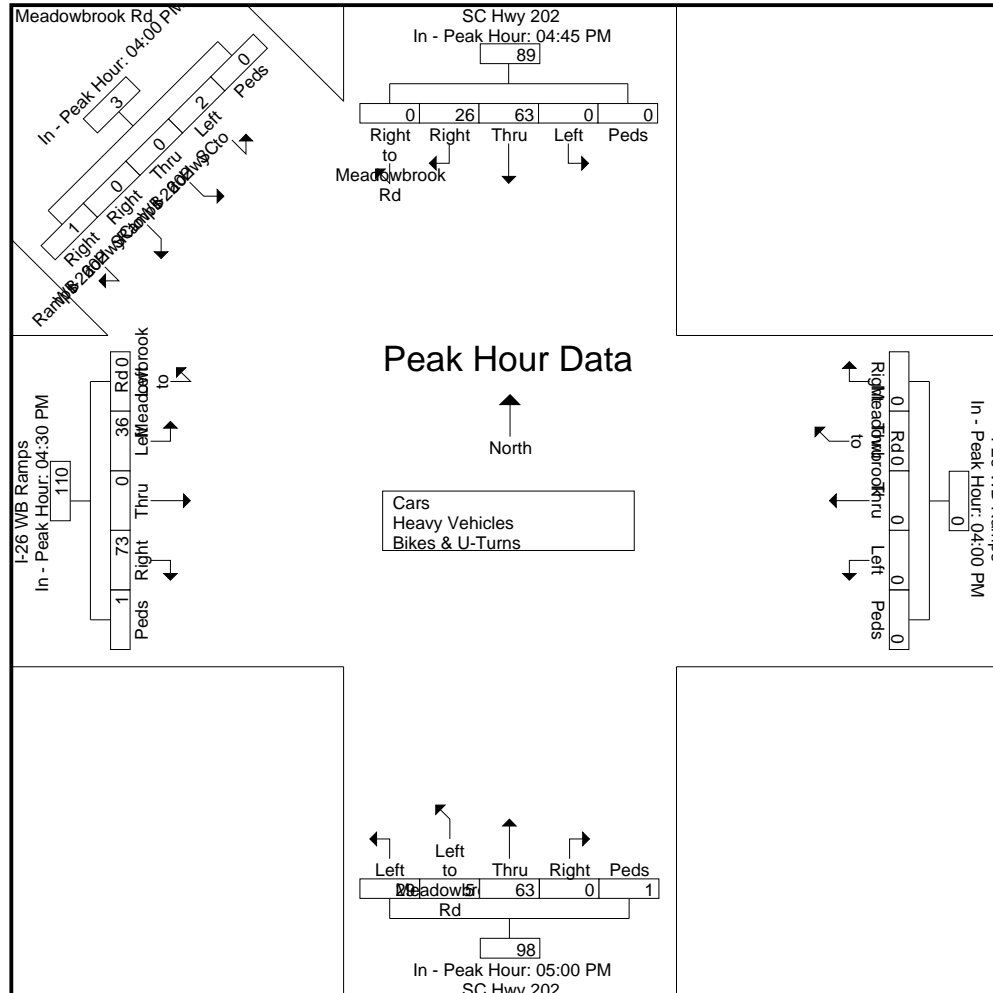
920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd

Site Code : 12491447

Start Date : 5/13/2014

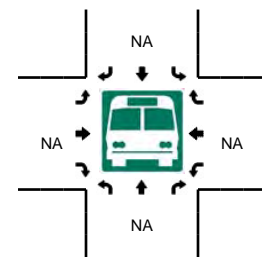
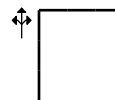
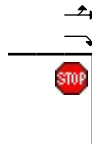
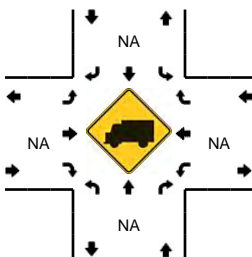
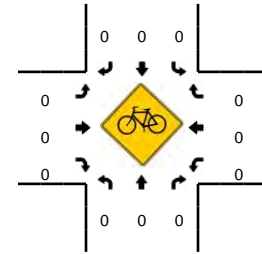
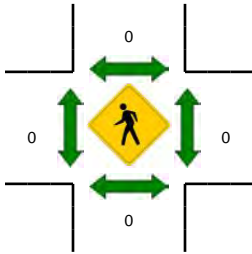
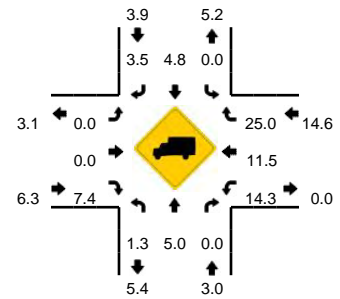
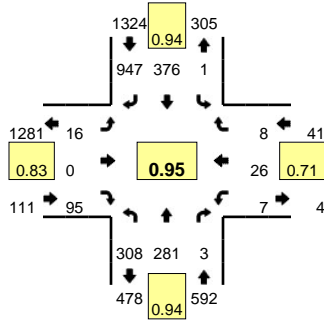
Page No : 6



LOCATION: US 176/Broad River Rd -- I-26 EB Ramps
CITY/STATE: Irmo, SC

QC JOB #: 12491427
DATE: Tue, May 13 2014

Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

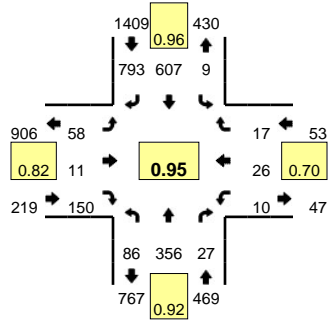


15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	84	47	0	0	1	81	261	0	4	0	16	0	0	11	1	0	506	
7:15 AM	92	66	0	0	0	88	264	0	1	0	25	0	3	3	3	0	545	
7:30 AM	70	79	0	0	0	138	216	0	4	0	28	0	2	3	2	0	542	
7:45 AM	62	89	3	0	0	69	206	0	7	0	26	0	2	9	2	0	475	2068
8:00 AM	51	65	11	0	0	58	161	0	10	0	15	0	0	9	8	0	388	1950
8:15 AM	38	82	5	0	0	51	152	0	7	0	32	0	1	1	3	0	372	1777
8:30 AM	33	45	5	0	0	71	150	0	7	1	15	0	4	7	2	0	340	1575
8:45 AM	27	37	5	0	0	67	124	0	9	2	13	1	2	5	5	0	297	1397
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	368	264	0	0	0	352	1056	0	4	0	100	0	12	12	12	0	2180	
Heavy Trucks	4	12	0	0	0	4	28	0	0	0	8	0	4	0	4	0	64	
Pedestrians		0				0					0			0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																	0	
Stopped Buses																	0	

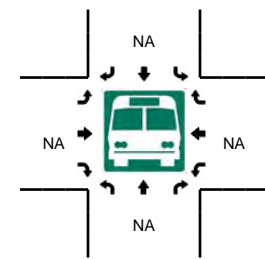
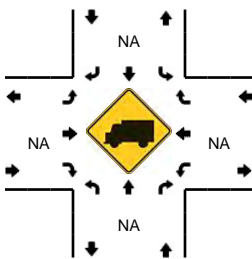
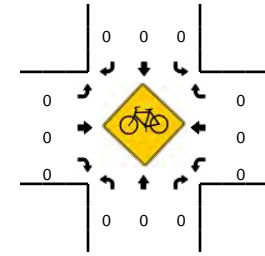
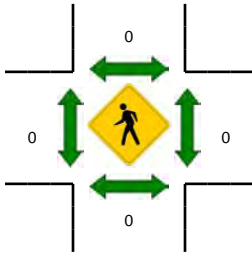
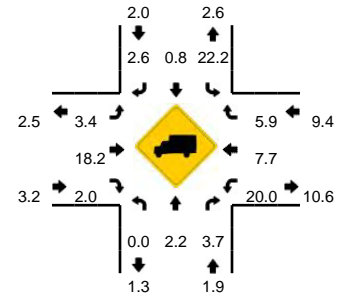
Comments:

LOCATION: US 176/Broad River Rd -- I-26 EB Ramps
CITY/STATE: Irmo, SC

QC JOB #: 12491428
DATE: Tue, May 13 2014



Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



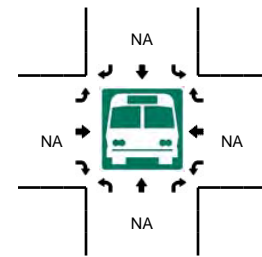
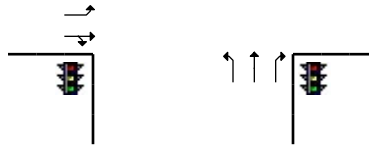
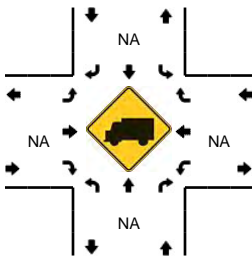
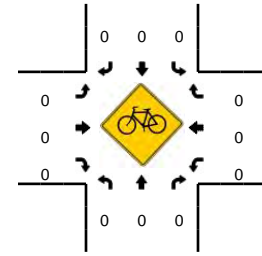
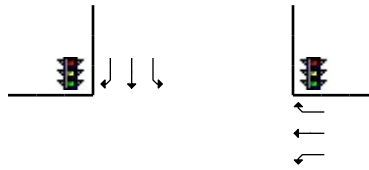
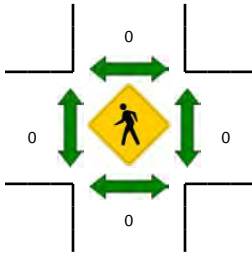
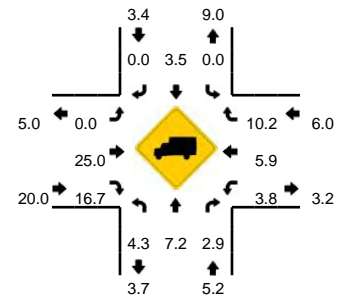
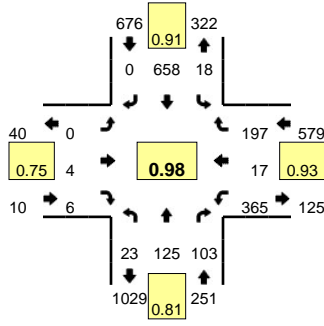
15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	23	74	5	0	1	116	99	0	17	2	35	0	1	6	4	0	383	
4:15 PM	19	83	9	0	1	119	113	0	11	3	32	0	3	0	8	0	401	
4:30 PM	20	89	4	0	2	134	131	0	8	3	26	0	3	5	0	0	425	
4:45 PM	20	109	7	0	0	150	156	0	12	3	26	0	2	11	1	0	497	1706
5:00 PM	19	95	3	0	2	158	179	0	11	4	33	0	3	9	3	0	519	1842
5:15 PM	30	97	10	0	3	165	188	0	16	4	47	0	0	5	3	0	568	2009
5:30 PM	18	78	8	0	1	143	224	0	18	0	39	1	4	4	3	0	541	2125
5:45 PM	19	86	6	0	3	141	202	0	12	3	31	0	3	8	8	0	522	2150
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	120	388	40	0	12	660	752	0	64	16	188	0	0	20	12	0	2272	
Heavy Trucks	0	4	0	0	4	8	12	0	0	4	0	0	0	0	0	0	32	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Comments:

LOCATION: US 176/Broad River Rd -- I-26 WB Ramps
CITY/STATE: Irmo, SC

QC JOB #: 12491430
DATE: Thu, Jun 26 2014

Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM



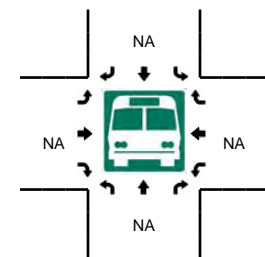
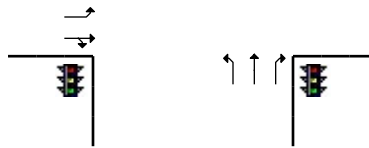
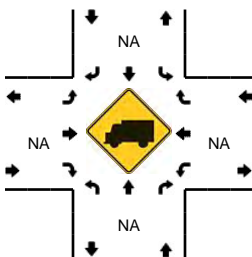
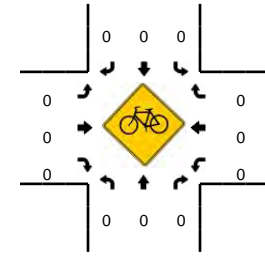
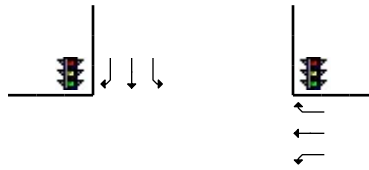
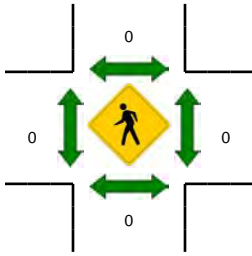
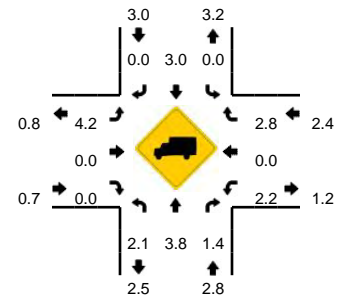
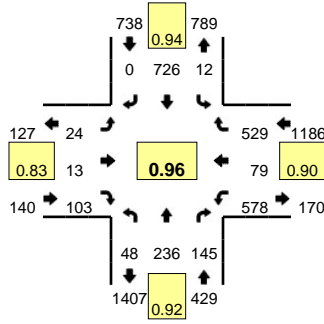
15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 WB Ramps (Eastbound)				I-26 WB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	26	17	0	7	179	0	0	0	1	1	0	87	2	43	0	368	
7:15 AM	4	16	31	0	5	168	0	0	0	0	3	0	93	6	57	0	383	
7:30 AM	9	38	36	0	4	151	0	0	0	1	0	0	98	3	47	0	387	
7:45 AM	5	45	19	0	2	160	0	0	0	2	2	0	87	6	50	0	378	1516
8:00 AM	3	32	25	0	6	131	0	0	1	1	5	0	88	5	33	1	331	1479
8:15 AM	4	30	22	0	4	131	0	0	0	0	3	0	104	3	21	0	322	1418
8:30 AM	7	29	22	0	3	125	0	0	0	1	6	0	91	4	27	0	315	1346
8:45 AM	7	34	31	0	3	120	0	0	0	0	4	0	86	2	44	1	332	1300
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	36	152	144	0	16	604	0	0	0	4	0	0	392	12	188	0	1548	
Heavy Trucks	0	8	4		0	16	0		0	4	0		44	4	8		88	
Pedestrians		0				0				0				0				0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		0
Stopped Buses																		0

Comments:

LOCATION: US 176/Broad River Rd -- I-26 WB Ramps
CITY/STATE: Irmo, SC

QC JOB #: 12491431
DATE: Wed, Jun 25 2014

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 WB Ramps (Eastbound)				I-26 WB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	41	27	0	2	95	0	0	2	2	6	0	100	12	74	0	372	
4:15 PM	16	30	33	0	9	105	0	0	4	2	10	0	116	13	99	0	437	
4:30 PM	5	40	23	0	5	122	0	0	0	1	7	0	118	15	112	0	448	
4:45 PM	13	53	30	0	3	194	0	0	2	3	10	0	128	14	97	1	548	1805
5:00 PM	10	55	37	0	4	185	0	0	1	5	26	0	110	18	116	0	567	2000
5:15 PM	9	55	29	0	3	181	0	0	7	4	31	0	151	25	155	0	650	2213
5:30 PM	16	62	39	0	1	172	0	0	10	2	26	0	160	17	133	0	638	2403
5:45 PM	13	64	40	0	4	188	0	0	6	2	20	0	157	19	125	0	638	2493

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	220	116	0	12	724	0	0	28	16	124	0	604	100	620	0	2600
Heavy Trucks	4	4	0	0	0	28	0	0	0	0	0	0	16	0	20	0	72
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments:

APPENDIX C

CRASH DATA

Crash Summary

I- 26 (26 E) from MPT 90.557 to MPT 91.670

LEXINGTON County

01/01/2012 - 05/31/2015 (3.4 years)

Length = 1.113 miles

AADT = 43,975

Functional Class = Rural -- Principal Arterial - Interstate

Crashes by Injury Class

Fatality Crashes	1
Injury Crashes	8
PDO Crashes	31
Total Crashes	40

Crashes by Manner Of Collision

Rear End	14
Angle	2
Sideswipe	4
Head On	0
Run Off Road	15
Other	5
Total Crashes	40

Special Contributing Factors

Animal	2
Bicycle	0
Pedestrian	1

I- 26 (26 E) from MPT 90.557 to MPT 91.670

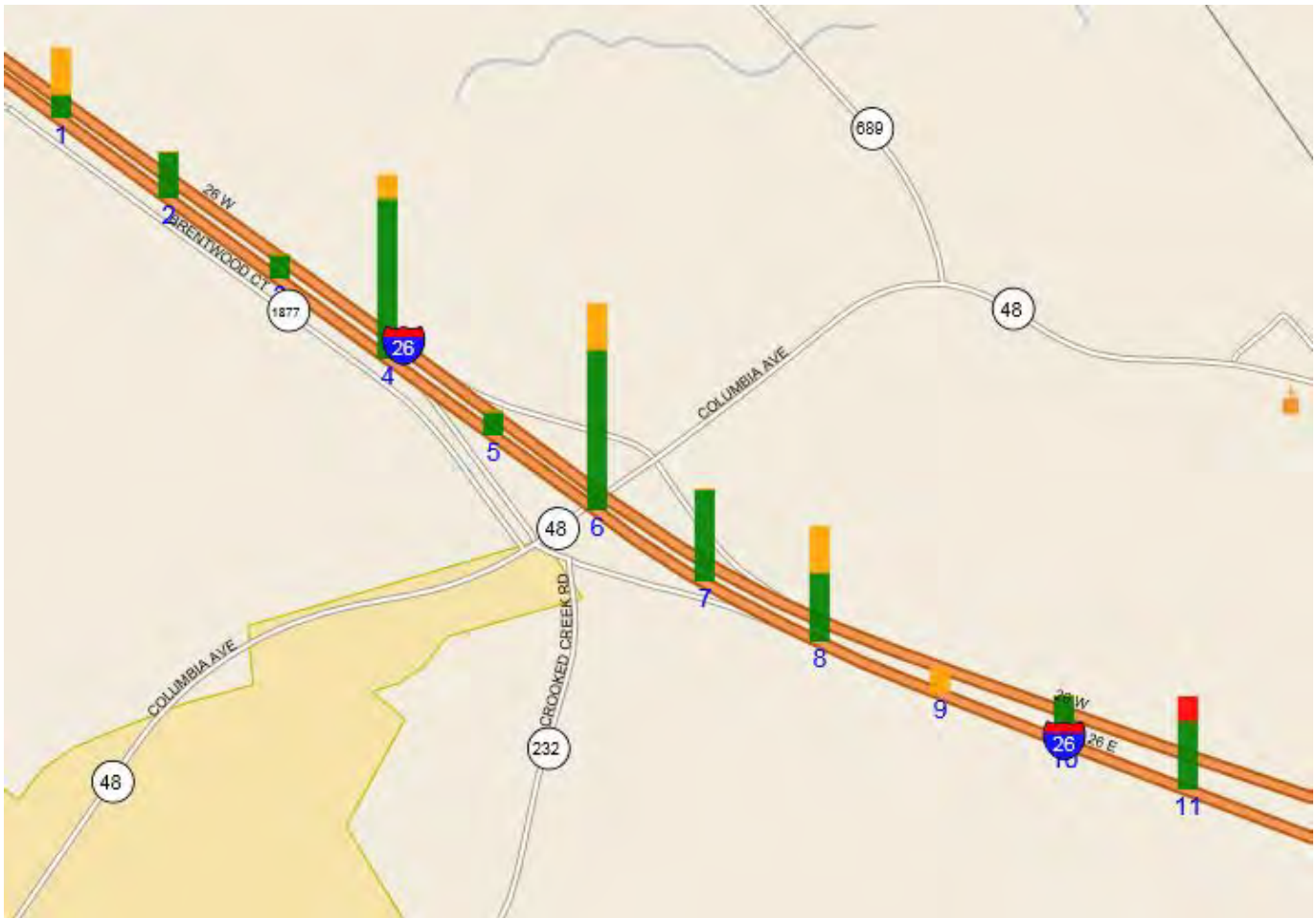
LEXINGTON County

01/01/2012 - 05/31/2015 (3.4 years)

Length = 1.113 miles AADT = 43,975

Functional Class = Rural -- Principal Arterial - Interstate

■ fatality
■ injury
■ pdo



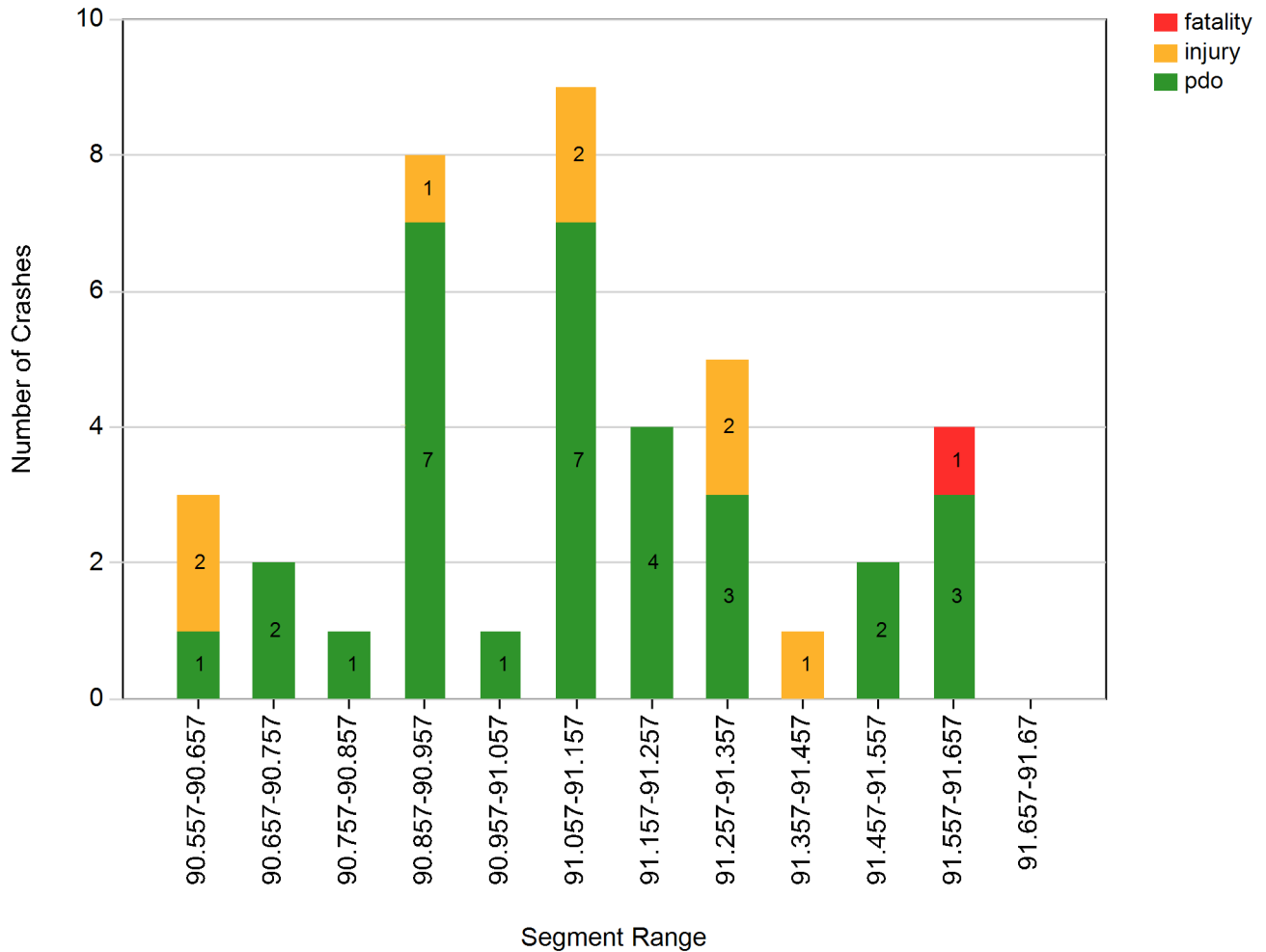
I- 26 (26 E) from MPT 90.557 to MPT 91.670

LEXINGTON County

01/01/2012 - 05/31/2015 (3.4 years)

Length = 1.113 miles AADT = 43,975

Functional Class = Rural -- Principal Arterial - Interstate



Section Crashes

MPT 90.557 to 90.657 (Stack #1)

Total Crashes: 3 Light: 3 Dark: 0 Dry: 1 Wet: 2 Fatalities: 0 Injuries: 2 PDO: 1

1	13535244	90.573	INJ1	DAY		WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	12573088	90.583	INJ0	DAY		DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
3	13532800	90.642	INJ1	DAY		WET	MOTOR VEHICLE (STOPPED)	REAR END

MPT 90.657 to 90.757 (Stack #2)

Total Crashes: 2 Light: 1 Dark: 1 Dry: 1 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 2

1	14623574	90.712	INJ0	DAY		WET	MEDIAN BARRIER	NO COLLISION W/MV
2	14606230	90.726	INJ0	DARK		DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV

MPT 90.757 to 90.857 (Stack #3)

Total Crashes: 1 Light: 0 Dark: 1 Dry: 0 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 1

1	14508930	90.773	INJ0	DARK		WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
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MPT 90.857 to 90.957 (Stack #4)

Total Crashes: 8 Light: 6 Dark: 2 Dry: 7 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 7

1	14506828	90.876	INJ0	DARK		SNOW	TREE	NO COLLISION W/MV
2	14592718	90.877	INJ0	DAY		DRY	MEDIAN BARRIER	NO COLLISION W/MV
3	13554860	90.901	INJ0	DAY		DRY	DITCH	NO COLLISION W/MV
4	14592689	90.917	INJ0	DAY		DRY	EMBANKMENT	NO COLLISION W/MV
5	12549186	90.918	INJ2	DAY		DRY	SPILL (TWO-WHEELED VEH)	NO COLLISION W/MV
6	12568711	90.920	INJ0	DAY		DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
7	12506514	90.921	INJ0	DARK		DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV
8	14505005	90.923	INJ0	DAY		DRY	OTHER MOVABLE OBJECT	NO COLLISION W/MV

MPT 90.957 to 91.057 (Stack #5)

Total Crashes: 1 Light: 1 Dark: 0 Dry: 0 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 1

1	15527428	90.994	INJ0	DAY		WET	TREE	NO COLLISION W/MV
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MPT 91.057 to 91.157 (Stack #6)

Total Crashes: 9 Light: 6 Dark: 3 Dry: 7 Wet: 2 Fatalities: 0 Injuries: 2 PDO: 7

1	14580416	91.107	INJ0	DAY		DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	12576226	91.122	INJ0	DARK		DRY	MOTOR VEHICLE (STOPPED)	NO COLLISION W/MV
3	13509164	91.123	INJ0	DAY		WET	MOTOR VEHICLE (STOPPED)	REAR END
4	14620354	91.126	INJ0	DARK		DRY	MOTOR VEHICLE (STOPPED)	REAR END

Section Crashes

5	14560207	91.134	INJ1	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	15545968	91.138	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
7	13621256	91.141	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
8	12522173	91.151	INJ2	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
9	13028770	91.151	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 91.157 to 91.257 (Stack #7)

Total Crashes: 4 Light: 2 Dark: 2 Dry: 3 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 4

1	14512428	91.169	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
2	13607832	91.170	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
3	14576684	91.196	INJ0	DAY	WET	OVERHEAD SIGN SUPPORT	NO COLLISION W/MV
4	14004663	91.220	INJ0	DARK	SNOW	MEDIAN BARRIER	NO COLLISION W/MV

MPT 91.257 to 91.357 (Stack #8)

Total Crashes: 5 Light: 4 Dark: 1 Dry: 4 Wet: 1 Fatalities: 0 Injuries: 2 PDO: 3

1	13615213	91.291	INJ2	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
2	13541303	91.301	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
3	13536711	91.310	INJ2	DAWN	WET	TREE	NO COLLISION W/MV
4	15560792	91.320	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
5	12565324	91.334	INJ0	DARK	DRY	OTHER NONCOLLISION	NO COLLISION W/MV

MPT 91.357 to 91.457 (Stack #9)

Total Crashes: 1 Light: 1 Dark: 0 Dry: 1 Wet: 0 Fatalities: 0 Injuries: 1 PDO: 0

1	14519195	91.381	INJ1	DAWN	DRY	OVERTURN/ROLLOVER	NO COLLISION W/MV
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MPT 91.457 to 91.557 (Stack #10)

Total Crashes: 2 Light: 2 Dark: 0 Dry: 2 Wet: 0 Fatalities: 0 Injuries: 0 PDO: 2

1	12589179	91.496	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	13523409	91.525	INJ0	DUSK	DRY	JACKKNIFE	NO COLLISION W/MV

MPT 91.557 to 91.657 (Stack #11)

Total Crashes: 4 Light: 3 Dark: 1 Dry: 3 Wet: 1 Fatalities: 1 Injuries: 0 PDO: 3

1	14605635	91.577	INJ4	DARK	DRY	PEDESTRIAN	NO COLLISION W/MV
2	15536619	91.577	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
3	13551630	91.581	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	14541624	91.645	INJ0	DAY	DRY	EMBANKMENT	NO COLLISION W/MV
















APPENDIX D

EXISTING 2014 SYNCHRO AND SIM TRAFFIC REPORTS

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	7	88	9	0	13	0	177	672	15	622	0
Future Vol, veh/h	6	7	88	9	0	13	0	177	672	15	622	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	8	98	10	0	14	0	197	747	17	691	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1301	1667	691	1347	1294	570	-	0	0	943	0	0
Stage 1	724	724	-	570	570	-	-	-	-	-	-	-
Stage 2	577	943	-	777	724	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	138	96	445	128	163	521	0	-	-	727	-	0
Stage 1	417	430	-	506	505	-	0	-	-	-	-	0
Stage 2	502	341	-	390	430	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	130	92	445	91	157	521	-	-	-	727	-	-
Mov Cap-2 Maneuver	130	92	-	91	157	-	-	-	-	-	-	-
Stage 1	417	414	-	506	505	-	-	-	-	-	-	-
Stage 2	488	341	-	287	414	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	22.5			28.4			0			0.2		
HCM LOS	C			D								
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT						
Capacity (veh/h)	-	-	316	178	727	-						
HCM Lane V/C Ratio	-	-	0.355	0.137	0.023	-						
HCM Control Delay (s)	-	-	22.5	28.4	10.1	0						
HCM Lane LOS	-	-	C	D	B	A						
HCM 95th %tile Q(veh)	-	-	1.6	0.5	0.1	-						

Lanes, Volumes, Timings
2: Columbia Ave & I-26 WB Ramps

Existing 2014 AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	432	2	8	67	129	0	0	205	29
Future Volume (vph)	0	0	0	432	2	8	67	129	0	0	205	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1772	0	0	1831	0	0	1831	0
Flt Permitted					0.953			0.784				
Satd. Flow (perm)	0	0	0	0	1772	0	0	1460	0	0	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2							9
Link Speed (mph)		45			45			35				35
Link Distance (ft)		883			668			593				885
Travel Time (s)		13.4			10.1			11.6				17.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	491	0	0	217	0	0	260	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6				2
Permitted Phases				4			6					
Detector Phase				4	4		6	6				2
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0				10.0
Minimum Split (s)				22.0	22.0		22.0	22.0				22.0
Total Split (s)				52.0	52.0		38.0	38.0				38.0
Total Split (%)				57.8%	57.8%		42.2%	42.2%				42.2%
Maximum Green (s)				46.0	46.0		31.7	31.7				31.7
Yellow Time (s)				4.0	4.0		4.3	4.3				4.3
All-Red Time (s)				2.0	2.0		2.0	2.0				2.0
Lost Time Adjust (s)					0.0			0.0				0.0
Total Lost Time (s)					6.0			6.3				6.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0				3.0
Recall Mode				None	None		Min	Min				Min
Act Effct Green (s)					19.7			13.6				13.6
Actuated g/C Ratio					0.43			0.29				0.29
v/c Ratio					0.65			0.51				0.48
Control Delay					15.3			19.8				17.6
Queue Delay					0.0			0.0				0.0
Total Delay					15.3			19.8				17.6
LOS					B			B				B
Approach Delay					15.3			19.8				17.6

Lanes, Volumes, Timings
 2: Columbia Ave & I-26 WB Ramps

Existing 2014 AM



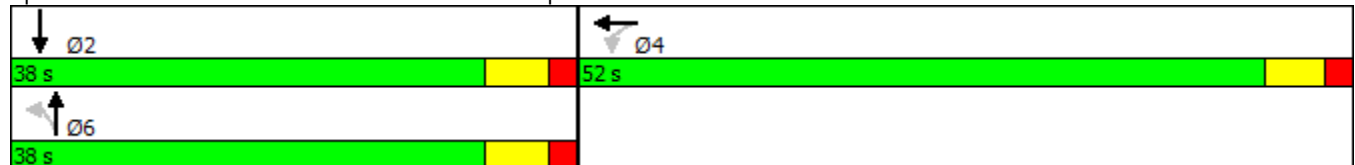
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B			B				B
Queue Length 50th (ft)					88			45				52
Queue Length 95th (ft)					211			125				137
Internal Link Dist (ft)		803			588			513				805
Turn Bay Length (ft)												
Base Capacity (vph)					1634			1053				1323
Starvation Cap Reductn					0			0				0
Spillback Cap Reductn					0			0				0
Storage Cap Reductn					0			0				0
Reduced v/c Ratio					0.30			0.21				0.20

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 46.3
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 16.9
 Intersection Capacity Utilization 63.1%
 Analysis Period (min) 15
















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
2: Columbia Ave & I-26 WB Ramps

Existing 2014 AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	432	2	8	67	129	0	0	205	29
Future Volume (veh/h)	0	0	0	432	2	8	67	129	0	0	205	29
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				480	2	9	74	143	0	0	228	32
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				697	3	13	206	303	0	0	441	62
Arrive On Green				0.40	0.40	0.40	0.28	0.28	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1731	7	32	291	1098	0	0	1599	224
Grp Volume(v), veh/h				491	0	0	217	0	0	0	0	260
Grp Sat Flow(s),veh/h/ln				1770	0	0	1389	0	0	0	0	1823
Q Serve(g_s), s				8.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	4.6
Cycle Q Clear(g_c), s				8.8	0.0	0.0	5.7	0.0	0.0	0.0	0.0	4.6
Prop In Lane				0.98		0.02	0.34		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				713	0	0	509	0	0	0	0	503
V/C Ratio(X)				0.69	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.52
Avail Cap(c_a), veh/h				2129	0	0	1348	0	0	0	0	1511
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				9.4	0.0	0.0	11.6	0.0	0.0	0.0	0.0	11.7
Incr Delay (d2), s/veh				1.7	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.6	0.0	0.0	2.1	0.0	0.0	0.0	0.0	2.4
LnGrp Delay(d),s/veh				11.1	0.0	0.0	12.2	0.0	0.0	0.0	0.0	12.5
LnGrp LOS				B			B					B
Approach Vol, veh/h					491			217			260	
Approach Delay, s/veh					11.1			12.2			12.5	
Approach LOS					B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		16.8		21.4		16.8						
Change Period (Y+Rc), s		6.3		6.0		6.3						
Max Green Setting (Gmax), s		31.7		46.0		31.7						
Max Q Clear Time (g_c+l1), s		6.6		10.8		7.7						
Green Ext Time (p_c), s		2.9		4.7		2.9						
Intersection Summary												
HCM 2010 Ctrl Delay				11.7								
HCM 2010 LOS				B								

SimTraffic Simulation Summary
Existing 2014 AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3756	3731	3647	3712
Vehs Exited	3764	3730	3631	3708
Starting Vehs	102	105	86	96
Ending Vehs	94	106	102	100
Travel Distance (mi)	4252	4192	4111	4185
Travel Time (hr)	94.5	100.1	87.0	93.9
Total Delay (hr)	16.8	23.7	12.6	17.7
Total Stops	935	948	837	907
Fuel Used (gal)	160.6	160.5	153.3	158.2

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	3756	3731	3647	3712
Vehs Exited	3764	3730	3631	3708
Starting Vehs	102	105	86	96
Ending Vehs	94	106	102	100
Travel Distance (mi)	4252	4192	4111	4185
Travel Time (hr)	94.5	100.1	87.0	93.9
Total Delay (hr)	16.8	23.7	12.6	17.7
Total Stops	935	948	837	907
Fuel Used (gal)	160.6	160.5	153.3	158.2

Queuing and Blocking Report
Existing 2014 AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	284	47	51	438
Average Queue (ft)	97	16	12	86
95th Queue (ft)	265	40	37	321
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)		2	1	2
Queuing Penalty (veh)		0	6	12
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				
















Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	343	193	204
Average Queue (ft)	119	78	81
95th Queue (ft)	279	157	153
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	5		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	11	7	85	1	0	9	0	229	490	49	830	0
Future Vol, veh/h	11	7	85	1	0	9	0	229	490	49	830	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	8	94	1	0	10	0	254	544	54	922	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1563	1830	922	1609	1558	527	-	0	0	799	0	0
Stage 1	1031	1031	-	527	527	-	-	-	-	-	-	-
Stage 2	532	799	-	1082	1031	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	91	76	327	84	112	551	0	-	-	824	-	0
Stage 1	281	310	-	535	528	-	0	-	-	-	-	0
Stage 2	531	398	-	263	310	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	80	66	327	49	97	551	-	-	-	824	-	-
Mov Cap-2 Maneuver	80	66	-	49	97	-	-	-	-	-	-	-
Stage 1	281	268	-	535	528	-	-	-	-	-	-	-
Stage 2	521	398	-	157	268	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	42.7			18.8			0			0.5		
HCM LOS	E			C								
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT						
Capacity (veh/h)	-	-	205	272	824	-						
HCM Lane V/C Ratio	-	-	0.558	0.041	0.066	-						
HCM Control Delay (s)	-	-	42.7	18.8	9.7	0						
HCM Lane LOS	-	-	E	C	A	A						
HCM 95th %tile Q(veh)	-	-	3	0.1	0.2	-						

Lanes, Volumes, Timings
2: Columbia Ave & I-26 WB Ramps

Existing 2014 PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	704	2	11	109	140	0	0	175	7
Future Volume (vph)	0	0	0	704	2	11	109	140	0	0	175	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1772	0	0	1824	0	0	1853	0
Flt Permitted					0.953			0.763				
Satd. Flow (perm)	0	0	0	0	1772	0	0	1421	0	0	1853	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1							2
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	796	0	0	277	0	0	202	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6				2
Permitted Phases				4			6					
Detector Phase				4	4		6	6				2
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0				10.0
Minimum Split (s)				22.0	22.0		22.0	22.0				22.0
Total Split (s)				56.0	56.0		34.0	34.0				34.0
Total Split (%)				62.2%	62.2%		37.8%	37.8%				37.8%
Maximum Green (s)				50.0	50.0		27.7	27.7				27.7
Yellow Time (s)				4.0	4.0		4.3	4.3				4.3
All-Red Time (s)				2.0	2.0		2.0	2.0				2.0
Lost Time Adjust (s)					0.0			0.0				0.0
Total Lost Time (s)					6.0			6.3				6.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0				3.0
Recall Mode				None	None		Min	Min				Min
Act Effct Green (s)					38.1			19.9				19.9
Actuated g/C Ratio					0.54			0.28				0.28
v/c Ratio					0.84			0.70				0.39
Control Delay					24.2			35.3				24.9
Queue Delay					0.0			0.0				0.0
Total Delay					24.2			35.3				24.9
LOS					C			D				C
Approach Delay					24.2			35.3				24.9

Lanes, Volumes, Timings
 2: Columbia Ave & I-26 WB Ramps

Existing 2014 PM

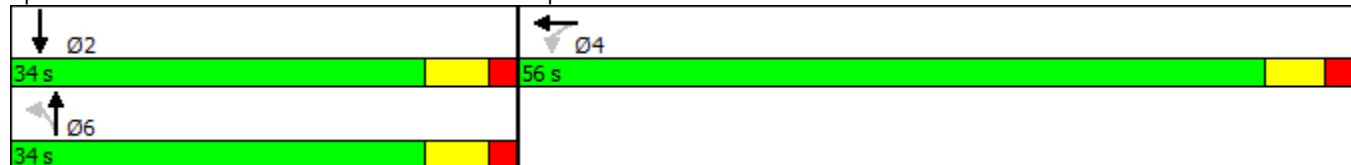


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					C			D			C	
Queue Length 50th (ft)					274			111			73	
Queue Length 95th (ft)					519			217			147	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					1290			594			776	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.62			0.47			0.26	

Intersection Summary
















Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	71.2
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	26.7
Intersection LOS:	C
Intersection Capacity Utilization:	78.3%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
2: Columbia Ave & I-26 WB Ramps

Existing 2014 PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	704	2	11	109	140	0	0	175	7
Future Volume (veh/h)	0	0	0	704	2	11	109	140	0	0	175	7
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				782	2	12	121	156	0	0	194	8
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				929	2	14	202	229	0	0	497	20
Arrive On Green				0.53	0.53	0.53	0.28	0.28	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1740	4	27	443	821	0	0	1777	73
Grp Volume(v), veh/h				796	0	0	277	0	0	0	0	202
Grp Sat Flow(s),veh/h/ln				1771	0	0	1264	0	0	0	0	1850
Q Serve(g_s), s				25.1	0.0	0.0	8.4	0.0	0.0	0.0	0.0	5.8
Cycle Q Clear(g_c), s				25.1	0.0	0.0	14.3	0.0	0.0	0.0	0.0	5.8
Prop In Lane				0.98		0.02	0.44		0.00	0.00		0.04
Lane Grp Cap(c), veh/h				945	0	0	432	0	0	0	0	517
V/C Ratio(X)				0.84	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.39
Avail Cap(c_a), veh/h				1343	0	0	640	0	0	0	0	777
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				13.0	0.0	0.0	22.8	0.0	0.0	0.0	0.0	19.2
Incr Delay (d2), s/veh				4.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.3	0.0	0.0	4.9	0.0	0.0	0.0	0.0	3.0
LnGrp Delay(d),s/veh				17.2	0.0	0.0	24.4	0.0	0.0	0.0	0.0	19.7
LnGrp LOS				B			C					B
Approach Vol, veh/h					796			277			202	
Approach Delay, s/veh					17.2			24.4			19.7	
Approach LOS					B			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		24.7		41.2		24.7						
Change Period (Y+Rc), s		6.3		6.0		6.3						
Max Green Setting (Gmax), s		27.7		50.0		27.7						
Max Q Clear Time (g_c+l1), s		7.8		27.1		16.3						
Green Ext Time (p_c), s		2.8		8.1		2.2						
Intersection Summary												
HCM 2010 Ctrl Delay				19.1								
HCM 2010 LOS				B								

SimTraffic Simulation Summary
Existing 2014 PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4185	4108	4180	4157
Vehs Exited	4182	4112	4211	4168
Starting Vehs	110	111	108	113
Ending Vehs	113	107	77	96
Travel Distance (mi)	4855	4746	4877	4826
Travel Time (hr)	112.3	114.1	111.0	112.5
Total Delay (hr)	24.8	27.4	22.9	25.0
Total Stops	1154	1303	1116	1191
Fuel Used (gal)	180.7	179.3	182.6	180.9

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	4185	4108	4180	4157
Vehs Exited	4182	4112	4211	4168
Starting Vehs	110	111	108	113
Ending Vehs	113	107	77	96
Travel Distance (mi)	4855	4746	4877	4826
Travel Time (hr)	112.3	114.1	111.0	112.5
Total Delay (hr)	24.8	27.4	22.9	25.0
Total Stops	1154	1303	1116	1191
Fuel Used (gal)	180.7	179.3	182.6	180.9

Queuing and Blocking Report
Existing 2014 PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	293	32	57	519
Average Queue (ft)	87	5	10	197
95th Queue (ft)	223	23	35	522
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)		0	1	4
Queuing Penalty (veh)		0	4	33
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	696	252	222
Average Queue (ft)	256	110	91
95th Queue (ft)	529	198	175
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	5		
Queuing Penalty (veh)	33		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

APPENDIX E

EXISTING 2014 HCS REPORTS

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1199	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	333	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	706	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	706	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	9.4	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1349	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	375	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	794	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	794	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	10.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1981	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	550	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1167	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1167	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	2	
Density, D	15.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: East of US176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3315	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	921	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1952	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1952	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	30.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: East of US 176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1476	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	410	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	869	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	869	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1195	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	332	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	704	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	704	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	9.4	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	851	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	236	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	501	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	501	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	6.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	891	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	248	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	525	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	525	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	7.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1440	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	400	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	848	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	848	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1406	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	391	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	828	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	828	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.0+	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1804	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	501	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1062	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1062	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2404	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	668	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1416	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	2	
Density, D	19.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: East of US 176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3049	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	847	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1796	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1796	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	2	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1870	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	519	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1101	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1101	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	2	
Density, D	14.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1271	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	353	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	748	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	748	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	10.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1215	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	338	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	716	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	716	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	9.5	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1164	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	185	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	35	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1164	185	35	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	323	51	10	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1371	212	40	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1371 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1583	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1371		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1583	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 15.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.320	
Space mean speed in ramp influence area,	S = 64.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1248	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	733	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	101	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1248	733	101	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	347	204	28	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1470	839	116	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_{F} (P_{FM}) = 1470 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2309	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1470		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2309	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 13.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.225	
Space mean speed in ramp influence area,	S _R = 67.6	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 67.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1869	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1446	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	112	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1869	1446	112	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	519	402	31	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

Heavy vehicle adjustment, fHV	0.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2201	1655	126	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2201 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	3856	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2201		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	3856	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 25.4 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.430	
Space mean speed in ramp influence area,	S _R = 60.8	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 60.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1028	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	167	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	448	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1028	167	448	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	286	46	124	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1211	191	513	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1211 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1402	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1211		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1402	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 7.4 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	M = 0.266	
Space mean speed in ramp influence area,	S _R = 66.2	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 66.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	753	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	98	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	442	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	753	98	442	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	209	27	123	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	887	112	506	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 887 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	999	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 887		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	999	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 5.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	M = 0.221	
Space mean speed in ramp influence area,	S _R = 67.7	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 67.7	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	826	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	65	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	25	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	826	65	25	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	229	18	7	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	973	74	29	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 973 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1047	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 973		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1047	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 10.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.285	
Space mean speed in ramp influence area,	S = 65.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 65.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1372	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	34	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	68	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1372	34	68	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	381	9	19	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1616	39	78	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1616 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1655	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1616		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1655	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 15.9 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.321	
Space mean speed in ramp influence area,	S = 64.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
 E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: S-48 EB On-Ramp
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1303	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	501	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	103	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1303	501	103	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	362	139	29	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1535	573	118	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1535 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2108	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1535		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2108	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 12.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.218	
Space mean speed in ramp influence area,	S _R = 67.8	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 67.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1590	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	814	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	214	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1590	814	214	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	442	226	59	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

Heavy vehicle adjustment, fHV	0.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1873	932	240	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1873 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2805	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1873		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2805	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 17.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.310	
Space mean speed in ramp influence area,	S = 64.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1737	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	133	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1312	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1737	133	1312	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	483	37	364	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2046	152	1502	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2046 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2198	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2046		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2198	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 13.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.285	
Space mean speed in ramp influence area,	S _R = 65.6	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 65.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1153	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	118	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	717	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1153	118	717	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	320	33	199	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1358	135	821	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1358 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1493	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1358		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1493	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 9.4 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	M = 0.228	
Space mean speed in ramp influence area,	S = 67.5	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 67.5	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1165	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	50	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	106	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1165	50	106	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	324	14	29	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1372	57	121	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1372 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1429	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1372		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1429	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 13.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.290	
Space mean speed in ramp influence area,	S _R = 65.4	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 65.4	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1199	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	35	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	185	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1199	35	185	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	333	10	51	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1412	40	212	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1412 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1412	4800	No
$v_{FO} = v_F - v_R$	1372	4800	No
v_R	40	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1412$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1412	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 12.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.302	
Space mean speed in ramp influence area,	S = 65.0	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 65.0	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1349	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	101	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	733	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1349	101	733	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	375	28	204	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1589	116	839	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1589 \text{ pc/h}$
12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1589	4800	No
$v_{FO} = v_F - v_R$	1473	4800	No
v_R	116	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1589$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1589	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 9.1 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.308	
Space mean speed in ramp influence area,	S = 64.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1981	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	112	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1446	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1981	112	1446	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	550	31	402	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2333	128	1655	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2333 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2333	4800	No
$v_{FO} = v_F - v_R$	2205	4800	No
v_R	128	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2333$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2333	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 15.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.310	
Space mean speed in ramp influence area,	S = 64.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: US 176 WB Off-Ramp
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1476	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	448	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	167	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1476	448	167	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	410	124	46	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1738	513	191	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1738 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1738	4800	No
$v_{FO} = v_F - v_R$	1225	4800	No
v_R	513	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1738$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1738	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 8.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.344	
Space mean speed in ramp influence area,	S = 63.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 63.6	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1195	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	442	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	98	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1195	442	98	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	332	123	27	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1407	506	112	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1407 \text{ pc/h}$
12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1407	4800	No
$v_{FO} = v_F - v_R$	901	4800	No
v_R	506	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1407$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1407	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 5.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.344	
Space mean speed in ramp influence area,	S = 63.7	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 63.7	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	851	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	25	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	65	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	851	25	65	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	236	7	18	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1002	29	74	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1002 \text{ pc/h}$
FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1002	4800	No
$v_{FO} = v_F - v_R$	973	4800	No
v_R	29	1900	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1002$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1002	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 9.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.561	
Space mean speed in ramp influence area,	S = 56.5	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 56.5	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: SC 202 EB Off-Ramp
 Jurisdiction:
 Analysis Year: 2014
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1440	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	68	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	34	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1440	68	34	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	400	19	9	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1696	78	39	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1696 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1696	4800	No
$v_{FO} = v_F - v_R$	1618	4800	No
v_R	78	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1696$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1696	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 15.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.305	
Space mean speed in ramp influence area,	S = 64.9	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.9	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1406	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	103	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	501	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1406	103	501	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	391	29	139	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1656	118	573	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1656 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1656	4800	No
$v_{FO} = v_F - v_R$	1538	4800	No
v_R	118	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1656$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1656	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 9.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.309	
Space mean speed in ramp influence area,	S = 64.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1804	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	214	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	814	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1804	214	814	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	501	59	226	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2125	245	932	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2125 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2125	4800	No
$v_{FO} = v_F - v_R$	1880	4800	No
v_R	245	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2125$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2125	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 13.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.320	
Space mean speed in ramp influence area,	S = 64.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3049	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1312	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	133	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3049	1312	133	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	847	364	37	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3591	1502	152	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 3591 \text{ pc/h}$
12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3591	4800	No
$v_{FO} = v_F - v_R$	2089	4800	No
v_R	1502	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3591$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3591	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 24.1 \text{ pc/mi/ln}$
R 12 D
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.433	
Space mean speed in ramp influence area,	S = 60.7	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 60.7	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1870	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	717	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	118	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1870	717	118	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	519	199	33	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2202	821	135	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2202 \text{ pc/h}$
FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2202	4800	No
$v_{FO} = v_F - v_R$	1381	4800	No
v_R	821	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2202$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2202	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 12.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.372	
Space mean speed in ramp influence area,	S = 62.7	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 62.7	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2014
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1271	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	106	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	50	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1271	106	50	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	353	29	14	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1497	121	57	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1497 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1497	4800	No
$v_{FO} = v_F - v_R$	1376	4800	No
v_R	121	1900	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1497$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1497	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 13.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.569	
Space mean speed in ramp influence area,	S = 56.2	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 56.2	mph

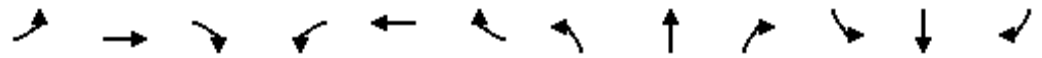
APPENDIX F

NO-BUILD 2020 SYNCHRO AND SIM TRAFFIC REPORTS

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	8	129	10	0	14	0	434	900	143	1077	0
Future Vol, veh/h	27	8	129	10	0	14	0	434	900	143	1077	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	9	143	11	0	16	0	482	1000	159	1197	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2504	2996	1197	2573	2496	982	-	0	0	1482	0	0
Stage 1	1514	1514	-	982	982	-	-	-	-	-	-	-
Stage 2	990	1482	-	1591	1514	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 19	14	226	17	29	302	0	-	-	454	-	0
Stage 1	149	182	-	300	327	-	0	-	-	-	-	0
Stage 2	297	189	-	135	182	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	-	0	226	-	0	302	-	-	-	454	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	149	0	-	300	327	-	-	-	-	-	-	-
Stage 2	282	189	-	-	0	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s							0			2		
HCM LOS												
Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	-	-	454							
HCM Lane V/C Ratio	-	-	-	-	0.35							
HCM Control Delay (s)	-	-	-	-	17.1	0						
HCM Lane LOS	-	-	-	-	C	A						
HCM 95th %tile Q(veh)	-	-	-	-	1.6							
Notes												
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Lanes, Volumes, Timings
2: Columbia Ave & I-26 WB Ramps

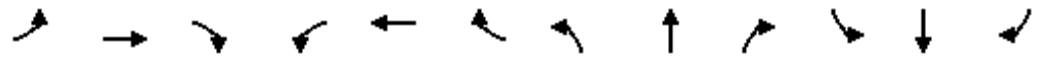
No-Build 2020 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	691	2	157	90	385	0	0	529	49
Future Volume (vph)	0	0	0	691	2	157	90	385	0	0	529	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1745	0	0	1846	0	0	1842	0
Flt Permitted					0.961			0.458				
Satd. Flow (perm)	0	0	0	0	1745	0	0	853	0	0	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					11						5	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	944	0	0	528	0	0	642	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				59.0	59.0		71.0	71.0			71.0	
Total Split (%)				45.4%	45.4%		54.6%	54.6%			54.6%	
Maximum Green (s)				53.0	53.0		64.7	64.7			64.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					53.0			64.7			64.7	
Actuated g/C Ratio					0.41			0.50			0.50	
v/c Ratio					1.32			1.25			0.70	
Control Delay					185.0			159.4			30.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					185.0			159.4			30.0	
LOS					F			F			C	
Approach Delay					185.0			159.4			30.0	

Lanes, Volumes, Timings
 2: Columbia Ave & I-26 WB Ramps

No-Build 2020 AM

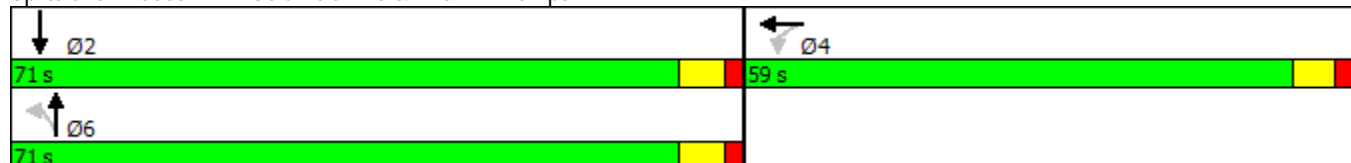


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			C	
Queue Length 50th (ft)					~1025			~555			402	
Queue Length 95th (ft)					#1282			#780			548	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					717			424			919	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.32			1.25			0.70	

Intersection Summary
















Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Natural Cycle: 130
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 131.5
 Intersection LOS: F
 Intersection Capacity Utilization 119.5%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
2: Columbia Ave & I-26 WB Ramps

No-Build 2020 AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	691	2	157	90	385	0	0	529	49
Future Volume (veh/h)	0	0	0	691	2	157	90	385	0	0	529	49
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				768	2	174	100	428	0	0	588	54
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				576	1	130	97	379	0	0	837	77
Arrive On Green				0.41	0.41	0.41	0.50	0.50	0.00	0.00	0.50	0.50
Sat Flow, veh/h				1412	4	320	128	761	0	0	1681	154
Grp Volume(v), veh/h				944	0	0	528	0	0	0	0	642
Grp Sat Flow(s),veh/h/ln				1736	0	0	889	0	0	0	0	1836
Q Serve(g_s), s				53.0	0.0	0.0	29.6	0.0	0.0	0.0	0.0	35.1
Cycle Q Clear(g_c), s				53.0	0.0	0.0	64.7	0.0	0.0	0.0	0.0	35.1
Prop In Lane				0.81		0.18	0.19		0.00	0.00		0.08
Lane Grp Cap(c), veh/h				708	0	0	475	0	0	0	0	914
V/C Ratio(X)				1.33	0.00	0.00	1.11	0.00	0.00	0.00	0.00	0.70
Avail Cap(c_a), veh/h				708	0	0	475	0	0	0	0	914
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				38.5	0.0	0.0	40.9	0.0	0.0	0.0	0.0	25.2
Incr Delay (d2), s/veh				159.9	0.0	0.0	75.2	0.0	0.0	0.0	0.0	2.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				56.8	0.0	0.0	27.0	0.0	0.0	0.0	0.0	18.3
LnGrp Delay(d),s/veh				198.4	0.0	0.0	116.1	0.0	0.0	0.0	0.0	27.7
LnGrp LOS				F			F					C
Approach Vol, veh/h					944			528				642
Approach Delay, s/veh					198.4			116.1				27.7
Approach LOS					F			F				C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		71.0		59.0		71.0						
Change Period (Y+Rc), s		6.3		6.0		6.3						
Max Green Setting (Gmax), s		64.7		53.0		64.7						
Max Q Clear Time (g_c+I1), s		37.1		55.0		66.7						
Green Ext Time (p_c), s		9.5		0.0		0.0						
Intersection Summary												
HCM 2010 Ctrl Delay				126.0								
HCM 2010 LOS				F								

SimTraffic Simulation Summary
 No-Build 2020 AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2991	2611	2674	2759
Vehs Exited	2717	2371	2487	2526
Starting Vehs	249	303	325	292
Ending Vehs	523	543	512	525
Travel Distance (mi)	3020	2530	2666	2738
Travel Time (hr)	1418.0	1635.4	1594.7	1549.4
Total Delay (hr)	1363.2	1587.9	1545.1	1498.7
Total Stops	2362	2280	2178	2272
Fuel Used (gal)	432.8	466.4	461.1	453.4

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2991	2611	2674	2759
Vehs Exited	2717	2371	2487	2526
Starting Vehs	249	303	325	292
Ending Vehs	523	543	512	525
Travel Distance (mi)	3020	2530	2666	2738
Travel Time (hr)	1418.0	1635.4	1594.7	1549.4
Total Delay (hr)	1363.2	1587.9	1545.1	1498.7
Total Stops	2362	2280	2178	2272
Fuel Used (gal)	432.8	466.4	461.1	453.4

Queuing and Blocking Report
No-Build 2020 AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	870	48	65	526
Average Queue (ft)	798	35	31	510
95th Queue (ft)	1055	51	59	517
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	82	69	3	96
Queuing Penalty (veh)	134	16	36	1172
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

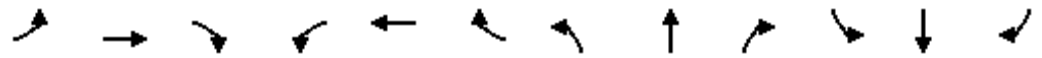
Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	680	320	873
Average Queue (ft)	666	179	861
95th Queue (ft)	679	281	870
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	100		100
Queuing Penalty (veh)	848		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	8	121	1	0	10	0	621	791	246	1376	0
Future Vol, veh/h	45	8	121	1	0	10	0	621	791	246	1376	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	9	134	1	0	11	0	690	879	273	1529	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3211	3645	1529	3276	3205	1129	-	0	0	1569	0	0
Stage 1	2076	2076	-	1129	1129	-	-	-	-	-	-	-
Stage 2	1135	1569	-	2147	2076	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 6	~ 5	144	5	10	248	0	-	-	420	-	0
Stage 1	70	95	-	248	279	-	0	-	-	-	-	0
Stage 2	246	171	-	64	95	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	-	0	144	-	0	248	-	-	-	420	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	70	0	-	248	279	-	-	-	-	-	-	-
Stage 2	235	171	-	-	0	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s							0			4.3		
HCM LOS												
Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	-	-	420							
HCM Lane V/C Ratio	-	-	-	-	0.651							
HCM Control Delay (s)	-	-	-	-	28.2	0						
HCM Lane LOS	-	-	-	-	D	A						
HCM 95th %tile Q(veh)	-	-	-	-	4.5							
Notes												
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Lanes, Volumes, Timings
2: Columbia Ave & I-26 WB Ramps

No-Build 2020 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	953	2	245	159	517	0	0	669	35
Future Volume (vph)	0	0	0	953	2	245	159	517	0	0	669	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1742	0	0	1840	0	0	1850	0
Flt Permitted					0.962			0.272				
Satd. Flow (perm)	0	0	0	0	1742	0	0	507	0	0	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10							3
Link Speed (mph)		45			45			35				35
Link Distance (ft)		883			668			593				885
Travel Time (s)		13.4			10.1			11.6				17.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1333	0	0	751	0	0	782	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA				NA
Protected Phases					4			6				2
Permitted Phases				4			6					
Detector Phase				4	4		6	6				2
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0				10.0
Minimum Split (s)				22.0	22.0		22.0	22.0				22.0
Total Split (s)				64.0	64.0		86.0	86.0				86.0
Total Split (%)				42.7%	42.7%		57.3%	57.3%				57.3%
Maximum Green (s)				58.0	58.0		79.7	79.7				79.7
Yellow Time (s)				4.0	4.0		4.3	4.3				4.3
All-Red Time (s)				2.0	2.0		2.0	2.0				2.0
Lost Time Adjust (s)					0.0			0.0				0.0
Total Lost Time (s)					6.0			6.3				6.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0				3.0
Recall Mode				None	None		Min	Min				Min
Act Effct Green (s)					58.0			79.7				79.7
Actuated g/C Ratio					0.39			0.53				0.53
v/c Ratio					1.96			2.79				0.79
Control Delay					465.5			834.9				35.8
Queue Delay					0.0			0.0				0.0
Total Delay					465.5			834.9				35.8
LOS					F			F				D
Approach Delay					465.5			834.9				35.8

Lanes, Volumes, Timings
 2: Columbia Ave & I-26 WB Ramps

No-Build 2020 PM

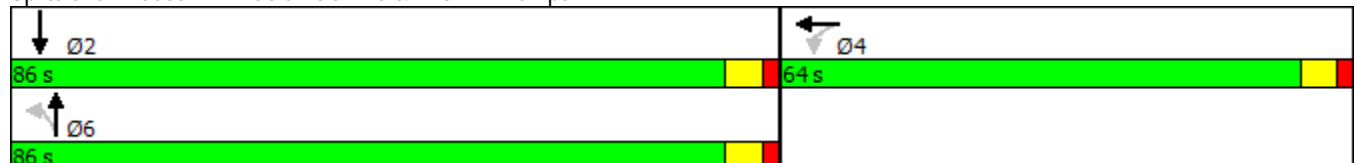


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			D	
Queue Length 50th (ft)					~2026			~997			603	
Queue Length 95th (ft)					#2295			#1252			790	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					679			269			984	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.96			2.79			0.79	

Intersection Summary
















Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 2.79
 Intersection Signal Delay: 445.1
 Intersection LOS: F
 Intersection Capacity Utilization 156.7%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
 2: Columbia Ave & I-26 WB Ramps

No-Build 2020 PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	953	2	245	159	517	0	0	669	35
Future Volume (veh/h)	0	0	0	953	2	245	159	517	0	0	669	35
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				1059	2	272	177	574	0	0	743	39
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				532	1	137	88	213	0	0	932	49
Arrive On Green				0.39	0.39	0.39	0.53	0.53	0.00	0.00	0.53	0.53
Sat Flow, veh/h				1376	3	353	110	401	0	0	1754	92
Grp Volume(v), veh/h				1333	0	0	751	0	0	0	0	782
Grp Sat Flow(s),veh/h/ln				1732	0	0	512	0	0	0	0	1846
Q Serve(g_s), s				58.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0	51.6
Cycle Q Clear(g_c), s				58.0	0.0	0.0	79.7	0.0	0.0	0.0	0.0	51.6
Prop In Lane				0.79		0.20	0.24		0.00	0.00		0.05
Lane Grp Cap(c), veh/h				670	0	0	302	0	0	0	0	981
V/C Ratio(X)				1.99	0.00	0.00	2.49	0.00	0.00	0.00	0.00	0.80
Avail Cap(c_a), veh/h				670	0	0	302	0	0	0	0	981
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				46.0	0.0	0.0	57.3	0.0	0.0	0.0	0.0	28.6
Incr Delay (d2), s/veh				451.2	0.0	0.0	680.7	0.0	0.0	0.0	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
%ile BackOfQ(50%),veh/ln				111.6	0.0	0.0	69.5	0.0	0.0	0.0	0.0	27.6
LnGrp Delay(d),s/veh				497.2	0.0	0.0	738.0	0.0	0.0	0.0	0.0	33.2
LnGrp LOS				F			F					C
Approach Vol, veh/h					1333			751				782
Approach Delay, s/veh					497.2			738.0				33.2
Approach LOS					F			F				C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		86.0		64.0		86.0						
Change Period (Y+Rc), s		6.3		6.0		6.3						
Max Green Setting (Gmax), s		79.7		58.0		79.7						
Max Q Clear Time (g_c+I1), s		53.6		60.0		81.7						
Green Ext Time (p_c), s		14.0		0.0		0.0						
Intersection Summary												
HCM 2010 Ctrl Delay				433.7								
HCM 2010 LOS				F								

SimTraffic Simulation Summary

No-Build 2020 PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2216	2731	2347	2431
Vehs Exited	2050	2642	2252	2314
Starting Vehs	393	402	412	403
Ending Vehs	559	491	507	519
Travel Distance (mi)	2049	2828	2315	2397
Travel Time (hr)	2471.4	2238.0	2322.1	2343.8
Total Delay (hr)	2430.7	2186.0	2277.5	2298.1
Total Stops	1925	2105	2187	2071
Fuel Used (gal)	637.5	614.3	615.2	622.3

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2216	2731	2347	2431
Vehs Exited	2050	2642	2252	2314
Starting Vehs	393	402	412	403
Ending Vehs	559	491	507	519
Travel Distance (mi)	2049	2828	2315	2397
Travel Time (hr)	2471.4	2238.0	2322.1	2343.8
Total Delay (hr)	2430.7	2186.0	2277.5	2298.1
Total Stops	1925	2105	2187	2071
Fuel Used (gal)	637.5	614.3	615.2	622.3

Queuing and Blocking Report
No-Build 2020 PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	876	33	61	524
Average Queue (ft)	852	8	19	509
95th Queue (ft)	942	27	50	516
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	94	0	1	96
Queuing Penalty (veh)	164	0	20	1565
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	680	488	874
Average Queue (ft)	666	281	860
95th Queue (ft)	681	440	872
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	100	0	100
Queuing Penalty (veh)	1198	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

APPENDIX G

NO-BUILD 2020 HCS REPORTS

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1385	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	385	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	816	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	816	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1546	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	429	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	910	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	910	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	12.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2475	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	688	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1458	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1458	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	2	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: East of US176
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3909	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1086	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2302	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2302	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	56.2	mi/h
Number of lanes, N	2	
Density, D	40.9	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2015	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	560	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1187	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1187	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	2	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1713	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	476	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1009	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1009	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	13.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1004	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	279	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	591	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	591	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	7.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1047	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	291	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	617	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	617	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1714	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	476	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1009	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1009	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	13.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1677	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	466	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	988	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	988	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2499	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	694	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1472	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1472	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	2	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: East of US176
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3144	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	873	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1851	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1851	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	67.0	mi/h
Number of lanes, N	2	
Density, D	27.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: East of US 176
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3790	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1053	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2232	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2232	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	58.2	mi/h
Number of lanes, N	2	
Density, D	38.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2523	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	701	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1486	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1486	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	2	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and SC 202
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1519	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	422	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	895	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	895	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: West of SC 202
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1459	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	405	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	859	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	859	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1347	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	199	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	38	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1347	199	38	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	374	55	11	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1586	228	43	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1586 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1814	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1586		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1814	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 17.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.325	
Space mean speed in ramp influence area,	S _R = 64.3	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 64.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: S-48 EB On-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1382	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1093	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	164	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1382	1093	164	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	384	304	46	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1628	1251	188	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1628 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2879	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1628		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2879	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.255	
Space mean speed in ramp influence area,	S = 66.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 66.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: US176 EB On-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2354	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1555	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	121	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2354	1555	121	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	654	432	34	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

Heavy vehicle adjustment, fHV	0.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2772	1780	136	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2772 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	4552	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2772		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	4552	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 30.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable, M = 0.616
S
Space mean speed in ramp influence area, S = 54.7 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 54.7 mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1533	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	180	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	482	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1533	180	482	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	426	50	134	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1806	206	552	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1806 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2012	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1806		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2012	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 12.1 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.279	
Space mean speed in ramp influence area,	S _R = 65.8	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 65.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: S-48 WB On-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	863	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	141	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	850	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	863	141	850	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	240	39	236	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1016	161	973	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_{F} (P_{FM}) = 1016 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1177	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1016		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1177	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 6.9 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	M = 0.223	
Space mean speed in ramp influence area,	S _R = 67.6	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 67.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	977	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	70	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	27	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	977	70	27	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	271	19	8	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1151	80	31	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1151 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1231	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1151		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1231	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 11.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.287	
Space mean speed in ramp influence area,	S = 65.5	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 65.5	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: SC-202 EB On-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1640	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	37	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	74	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1640	37	74	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	456	10	21	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1932	42	85	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1932 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1974	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1932		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1974	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.329	
Space mean speed in ramp influence area,	S = 64.1	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.1	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1503	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	996	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	174	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1503	996	174	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	418	277	48	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1770	1140	199	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1770 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2910	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1770		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2910	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.258	
Space mean speed in ramp influence area,	S _R = 66.5	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 66.5	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2269	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	875	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	230	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2269	875	230	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	630	243	64	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

Heavy vehicle adjustment, fHV	0.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2672	1001	258	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2672 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	3673	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2672		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	3673	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 24.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.400	
Space mean speed in ramp influence area,	S = 61.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.8	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2380	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	143	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1410	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2380	143	1410	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	661	40	392	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2803	164	1614	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2803 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2967	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2803		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2967	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 19.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.326	
Space mean speed in ramp influence area,	S = 64.3	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: S-48 WB On-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1323	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	196	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1200	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1323	196	1200	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	368	54	333	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1558	224	1373	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_{F} (P_{FM}) = 1558 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1782	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1558		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1782	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 11.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.234	
Space mean speed in ramp influence area,	S _R = 67.3	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 67.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1405	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	54	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	114	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1405	54	114	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	390	15	32	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1655	62	130	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1655 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1717	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1655		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1717	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 15.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable, M = 0.295
S
Space mean speed in ramp influence area, S = 65.2 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 65.2 mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1385	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	38	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	199	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1385	38	199	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	385	11	55	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1631	43	228	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1631 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1631	4800	No
$v_{FO} = v_F - v_R$	1588	4800	No
v_R	43	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1631$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1631	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 14.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.302	
Space mean speed in ramp influence area,	S = 65.0	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 65.0	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1546	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	164	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1093	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1546	164	1093	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	429	46	304	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1821	188	1251	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1821 \text{ pc/h}$
12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1821	4800	No
$v_{FO} = v_F - v_R$	1633	4800	No
v_R	188	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1821$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1821	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 11.1 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.315	
Space mean speed in ramp influence area,	S = 64.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2475	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	121	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1555	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2475	121	1555	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	688	34	432	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2915	138	1780	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2915 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2915	4800	No
$v_{FO} = v_F - v_R$	2777	4800	No
v_R	138	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2915$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2915	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 20.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.310	
Space mean speed in ramp influence area,	S = 64.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: US 176 WB Off-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2015	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	482	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	180	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2015	482	180	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	560	134	50	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2373	552	206	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2373 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2373	4800	No
$v_{FO} = v_F - v_R$	1821	4800	No
v_R	552	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2373$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2373	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 13.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.348	
Space mean speed in ramp influence area,	S = 63.5	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 63.5	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1713	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	850	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	141	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1713	850	141	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	236	39	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2018	973	161	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2018 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2018	4800	No
$v_{FO} = v_F - v_R$	1045	4800	No
v_R	973	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2018$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2018	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 10.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.386	
Space mean speed in ramp influence area,	S = 62.3	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 62.3	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: SC 202 WB Off-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1004	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	27	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	70	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1004	27	70	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	279	8	19	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1182	31	80	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1182 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1182	4800	No
$v_{FO} = v_F - v_R$	1151	4800	No
v_R	31	1900	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1182$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1182	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 10.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.561	
Space mean speed in ramp influence area,	S = 56.5	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 56.5	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: SC 202 EB Off-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1714	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	74	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	37	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1714	74	37	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	21	10	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2019	85	42	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2019 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2019	4800	No
$v_{FO} = v_F - v_R$	1934	4800	No
v_R	85	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2019$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2019	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 18.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.306	
Space mean speed in ramp influence area,	S = 64.9	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.9	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1677	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	174	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	996	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1677	174	996	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	466	48	277	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1975	199	1140	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1975 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1975	4800	No
$v_{FO} = v_F - v_R$	1776	4800	No
v_R	199	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1975$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1975	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 12.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.316	
Space mean speed in ramp influence area,	S = 64.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: US 176 EB Off-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2499	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	875	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2499	230	875	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	694	64	243	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2943	263	1001	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2943 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2943	4800	No
$v_{FO} = v_F - v_R$	2680	4800	No
v_R	263	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2943$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2943	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 20.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.322	
Space mean speed in ramp influence area,	S = 64.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: US 176 WB Off-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3790	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1410	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	143	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3790	1410	143	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1053	392	40	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4464	1614	164	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 4464 \text{ pc/h}$
12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4464	4800	No
$v_{FO} = v_F - v_R$	2850	4800	No
v_R	1614	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4464$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4464	4400	Yes

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 31.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.443	
Space mean speed in ramp influence area,	S = 60.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 60.4	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2020 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2523	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1200	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	196	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2523	1200	196	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	701	333	54	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2972	1373	224	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2972 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2972	4800	No
$v_{FO} = v_F - v_R$	1599	4800	No
v_R	1373	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2972$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 18.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.422	
Space mean speed in ramp influence area,	S = 61.1	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.1	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: SC 202 WB Off-Ramp
 Jurisdiction:
 Analysis Year: 2020 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1519	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	114	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	54	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1519	114	54	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	422	32	15	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1789	130	62	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1789 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1789	4800	No
$v_{FO} = v_F - v_R$	1659	4800	No
v_R	130	1900	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1789$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1789	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 16.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.570	
Space mean speed in ramp influence area,	S = 56.2	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 56.2	mph

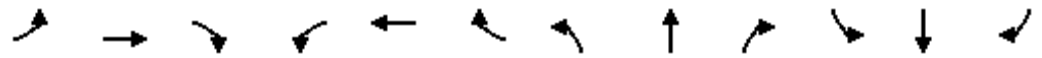
APPENDIX H

NO-BUILD 2040 SYNCHRO AND SIM TRAFFIC REPORTS

Intersection													
Int Delay, s/veh	0.8												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Traffic Vol, veh/h	29	9	185	12	0	17	0	208	1209	147	1461	0	
Future Vol, veh/h	29	9	185	12	0	17	0	208	1209	147	1461	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	32	10	206	13	0	19	0	231	1343	163	1623	0	
Major/Minor	Minor2			Minor1			Major1			Major2			
Conflicting Flow All	2862	3524	1623	2961	2853	903	-	0	0	1574	0	0	
Stage 1	1950	1950	-	903	903	-	-	-	-	-	-	-	
Stage 2	912	1574	-	2058	1950	-	-	-	-	-	-	-	
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-	
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-	
Pot Cap-1 Maneuver	~ 11	~ 6	~ 127	~ 9	17	336	0	-	-	419	-	0	
Stage 1	83	111	-	332	356	-	0	-	-	-	-	0	
Stage 2	328	170	-	72	111	-	0	-	-	-	-	0	
Platoon blocked, %													
Mov Cap-1 Maneuver	-	0	~ 127	-	0	336	-	-	-	419	-	-	
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-	
Stage 1	83	0	-	332	356	-	-	-	-	-	-	-	
Stage 2	310	170	-	-	0	-	-	-	-	-	-	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s							0			1.7			
HCM LOS	-			-									
Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT								
Capacity (veh/h)	-	-	-	-	419	-							
HCM Lane V/C Ratio	-	-	-	-	0.39	-							
HCM Control Delay (s)	-	-	-	-	19	0							
HCM Lane LOS	-	-	-	-	C	A							
HCM 95th %tile Q(veh)	-	-	-	-	1.8	-							
Notes													
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon													

Lanes, Volumes, Timings
2: Columbia Ave & I-26 WB Ramps

No-Build 2040 AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	1026	3	159	125	129	0	0	582	56
Future Volume (vph)	0	0	0	1026	3	159	125	129	0	0	582	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1754	0	0	1818	0	0	1840	0
Flt Permitted					0.959			0.190				
Satd. Flow (perm)	0	0	0	0	1754	0	0	354	0	0	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7							4
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1320	0	0	282	0	0	709	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6				2
Permitted Phases				4			6					
Detector Phase				4	4		6	6				2
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0				10.0
Minimum Split (s)				22.0	22.0		22.0	22.0				22.0
Total Split (s)				73.0	73.0		77.0	77.0				77.0
Total Split (%)				48.7%	48.7%		51.3%	51.3%				51.3%
Maximum Green (s)				67.0	67.0		70.7	70.7				70.7
Yellow Time (s)				4.0	4.0		4.3	4.3				4.3
All-Red Time (s)				2.0	2.0		2.0	2.0				2.0
Lost Time Adjust (s)					0.0			0.0				0.0
Total Lost Time (s)					6.0			6.3				6.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0				3.0
Recall Mode				None	None		Min	Min				Min
Act Effct Green (s)					67.0			70.7				70.7
Actuated g/C Ratio					0.45			0.47				0.47
v/c Ratio					1.68			1.70				0.82
Control Delay					339.4			367.1				43.0
Queue Delay					0.0			0.0				0.0
Total Delay					339.4			367.1				43.0
LOS					F			F				D
Approach Delay					339.4			367.1				43.0

Lanes, Volumes, Timings
 2: Columbia Ave & I-26 WB Ramps

No-Build 2040 AM

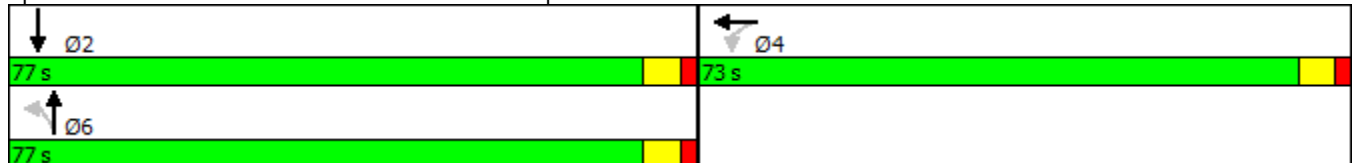


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			D	
Queue Length 50th (ft)					~1890			~399			584	
Queue Length 95th (ft)					#2161			#421			769	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					787			166			869	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.68			1.70			0.82	

Intersection Summary
















Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.70
 Intersection Signal Delay: 251.8
 Intersection LOS: F
 Intersection Capacity Utilization 129.9%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
2: Columbia Ave & I-26 WB Ramps

No-Build 2040 AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1026	3	159	125	129	0	0	582	56
Future Volume (veh/h)	0	0	0	1026	3	159	125	129	0	0	582	56
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				1140	3	177	139	143	0	0	647	62
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				674	2	105	108	100	0	0	789	76
Arrive On Green				0.45	0.45	0.45	0.47	0.47	0.00	0.00	0.47	0.47
Sat Flow, veh/h				1508	4	234	154	212	0	0	1674	160
Grp Volume(v), veh/h				1320	0	0	282	0	0	0	0	709
Grp Sat Flow(s),veh/h/ln				1746	0	0	366	0	0	0	0	1834
Q Serve(g_s), s				67.0	0.0	0.0	20.7	0.0	0.0	0.0	0.0	50.0
Cycle Q Clear(g_c), s				67.0	0.0	0.0	70.7	0.0	0.0	0.0	0.0	50.0
Prop In Lane				0.86		0.13	0.49		0.00	0.00		0.09
Lane Grp Cap(c), veh/h				780	0	0	208	0	0	0	0	865
V/C Ratio(X)				1.69	0.00	0.00	1.35	0.00	0.00	0.00	0.00	0.82
Avail Cap(c_a), veh/h				780	0	0	208	0	0	0	0	865
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				41.5	0.0	0.0	59.1	0.0	0.0	0.0	0.0	34.2
Incr Delay (d2), s/veh				317.2	0.0	0.0	187.3	0.0	0.0	0.0	0.0	6.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				101.0	0.0	0.0	19.5	0.0	0.0	0.0	0.0	26.7
LnGrp Delay(d),s/veh				358.7	0.0	0.0	246.4	0.0	0.0	0.0	0.0	40.5
LnGrp LOS				F			F					D
Approach Vol, veh/h					1320			282				709
Approach Delay, s/veh					358.7			246.4				40.5
Approach LOS					F			F				D
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		77.0		73.0		77.0						
Change Period (Y+Rc), s		6.3		6.0		6.3						
Max Green Setting (Gmax), s		70.7		67.0		70.7						
Max Q Clear Time (g_c+I1), s		52.0		69.0		72.7						
Green Ext Time (p_c), s		7.1		0.0		0.0						
Intersection Summary												
HCM 2010 Ctrl Delay				247.4								
HCM 2010 LOS				F								

SimTraffic Simulation Summary
 No-Build 2040 AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2588	2719	2674	2659
Vehs Exited	2569	2612	2593	2591
Starting Vehs	459	438	425	437
Ending Vehs	478	545	506	510
Travel Distance (mi)	2864	2890	2921	2891
Travel Time (hr)	2438.5	2434.2	2281.7	2384.8
Total Delay (hr)	2386.1	2381.0	2227.9	2331.7
Total Stops	2344	2247	2116	2236
Fuel Used (gal)	659.2	659.7	627.3	648.7

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2588	2719	2674	2659
Vehs Exited	2569	2612	2593	2591
Starting Vehs	459	438	425	437
Ending Vehs	478	545	506	510
Travel Distance (mi)	2864	2890	2921	2891
Travel Time (hr)	2438.5	2434.2	2281.7	2384.8
Total Delay (hr)	2386.1	2381.0	2227.9	2331.7
Total Stops	2344	2247	2116	2236
Fuel Used (gal)	659.2	659.7	627.3	648.7

Queuing and Blocking Report
No-Build 2040 AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	870	48	70	524
Average Queue (ft)	837	34	40	511
95th Queue (ft)	985	50	64	522
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	91	62	5	87
Queuing Penalty (veh)	204	18	76	1406
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

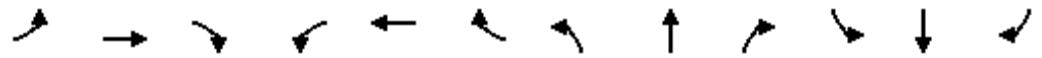
Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	704	193	889
Average Queue (ft)	675	81	861
95th Queue (ft)	691	161	883
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	98		87
Queuing Penalty (veh)	1166		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection												
Int Delay, s/veh	6.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↑			↕	
Traffic Vol, veh/h	48	9	173	1	0	12	0	711	1168	245	1793	0
Future Vol, veh/h	48	9	173	1	0	12	0	711	1168	245	1793	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	10	192	1	0	13	0	790	1298	272	1992	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3983	4625	1992	4077	3976	1439	-	0	0	2088	0	0
Stage 1	2537	2537	-	1439	1439	-	-	-	-	-	-	-
Stage 2	1446	2088	-	2638	2537	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 2	~ 1	~ 76	~ 1	3	163	0	-	-	~ 264	-	0
Stage 1	~ 37	55	-	165	198	-	0	-	-	-	-	0
Stage 2	164	94	-	32	55	-	0	-	-	-	-	0
Platoon blocked, %												
Mov Cap-1 Maneuver	-	0	~ 76	-	0	163	-	-	-	~ 264	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 37	0	-	165	198	-	-	-	-	-	-	-
Stage 2	151	94	-	-	0	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s							0			12.7		
HCM LOS												
Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	-	-	~ 264							
HCM Lane V/C Ratio	-	-	-	-	1.031							
HCM Control Delay (s)	-	-	-	-	105.5	0						
HCM Lane LOS	-	-	-	-	F	A						
HCM 95th %tile Q(veh)	-	-	-	-	10.6							
Notes												
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Lanes, Volumes, Timings
2: Columbia Ave & I-26 WB Ramps

No-Build 2040 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	1325	3	248	228	543	0	0	713	36
Future Volume (vph)	0	0	0	1325	3	248	228	543	0	0	713	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1751	0	0	1835	0	0	1852	0
Flt Permitted					0.960			0.091				
Satd. Flow (perm)	0	0	0	0	1751	0	0	170	0	0	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8							2
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1751	0	0	856	0	0	832	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6				2
Permitted Phases				4			6					
Detector Phase				4	4		6	6				2
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0				10.0
Minimum Split (s)				22.0	22.0		22.0	22.0				22.0
Total Split (s)				72.0	72.0		78.0	78.0				78.0
Total Split (%)				48.0%	48.0%		52.0%	52.0%				52.0%
Maximum Green (s)				66.0	66.0		71.7	71.7				71.7
Yellow Time (s)				4.0	4.0		4.3	4.3				4.3
All-Red Time (s)				2.0	2.0		2.0	2.0				2.0
Lost Time Adjust (s)					0.0			0.0				0.0
Total Lost Time (s)					6.0			6.3				6.3
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0				3.0
Recall Mode				None	None		Min	Min				Min
Act Effct Green (s)					66.0			71.7				71.7
Actuated g/C Ratio					0.44			0.48				0.48
v/c Ratio					2.26			10.57				0.94
Control Delay					595.1			4335.5				56.0
Queue Delay					0.0			0.0				0.0
Total Delay					595.1			4335.5				56.0
LOS					F			F				E
Approach Delay					595.1			4335.5				56.0

Lanes, Volumes, Timings
 2: Columbia Ave & I-26 WB Ramps

No-Build 2040 PM

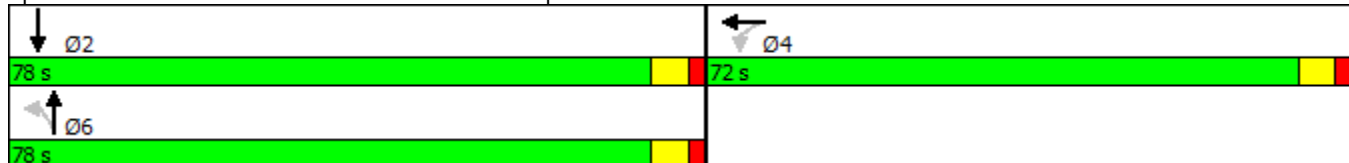


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			E	
Queue Length 50th (ft)					~2788			~1597			757	
Queue Length 95th (ft)					#3051			#1865			#1045	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					774			81			886	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					2.26			10.57			0.94	

Intersection Summary
















Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 10.57
 Intersection Signal Delay: 1395.7
 Intersection LOS: F
 Intersection Capacity Utilization 185.1%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
 2: Columbia Ave & I-26 WB Ramps

No-Build 2040 PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1325	3	248	228	543	0	0	713	36
Future Volume (veh/h)	0	0	0	1325	3	248	228	543	0	0	713	36
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				1472	3	276	253	603	0	0	792	40
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				644	1	121	49	43	0	0	840	42
Arrive On Green				0.44	0.44	0.44	0.48	0.48	0.00	0.00	0.48	0.48
Sat Flow, veh/h				1464	3	274	37	89	0	0	1758	89
Grp Volume(v), veh/h				1751	0	0	856	0	0	0	0	832
Grp Sat Flow(s),veh/h/ln				1741	0	0	127	0	0	0	0	1847
Q Serve(g_s), s				66.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	64.2
Cycle Q Clear(g_c), s				66.0	0.0	0.0	71.7	0.0	0.0	0.0	0.0	64.2
Prop In Lane				0.84		0.16	0.30		0.00	0.00		0.05
Lane Grp Cap(c), veh/h				766	0	0	92	0	0	0	0	883
V/C Ratio(X)				2.29	0.00	0.00	9.34	0.00	0.00	0.00	0.00	0.94
Avail Cap(c_a), veh/h				766	0	0	92	0	0	0	0	883
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				42.0	0.0	0.0	72.5	0.0	0.0	0.0	0.0	37.2
Incr Delay (d2), s/veh				582.7	0.0	0.0	3774.8	0.0	0.0	0.0	0.0	17.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				155.7	0.0	0.0	99.9	0.0	0.0	0.0	0.0	37.0
LnGrp Delay(d),s/veh				624.7	0.0	0.0	3847.3	0.0	0.0	0.0	0.0	55.1
LnGrp LOS				F			F					E
Approach Vol, veh/h					1751			856			832	
Approach Delay, s/veh					624.7			3847.3			55.1	
Approach LOS					F			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		78.0		72.0		78.0						
Change Period (Y+Rc), s		6.3		6.0		6.3						
Max Green Setting (Gmax), s		71.7		66.0		71.7						
Max Q Clear Time (g_c+I1), s		66.2		68.0		73.7						
Green Ext Time (p_c), s		4.6		0.0		0.0						
Intersection Summary												
HCM 2010 Ctrl Delay					1289.0							
HCM 2010 LOS					F							

SimTraffic Simulation Summary
 No-Build 2040 PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2911	2325	2458	2563
Vehs Exited	2864	2264	2432	2520
Starting Vehs	445	470	463	460
Ending Vehs	492	531	489	504
Travel Distance (mi)	3117	2359	2559	2678
Travel Time (hr)	3248.8	3755.9	3657.5	3554.1
Total Delay (hr)	3192.0	3710.8	3609.3	3504.0
Total Stops	2591	2078	2604	2426
Fuel Used (gal)	857.4	946.0	931.4	911.6

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	2911	2325	2458	2563
Vehs Exited	2864	2264	2432	2520
Starting Vehs	445	470	463	460
Ending Vehs	492	531	489	504
Travel Distance (mi)	3117	2359	2559	2678
Travel Time (hr)	3248.8	3755.9	3657.5	3554.1
Total Delay (hr)	3192.0	3710.8	3609.3	3504.0
Total Stops	2591	2078	2604	2426
Fuel Used (gal)	857.4	946.0	931.4	911.6

Queuing and Blocking Report
No-Build 2040 PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	882	47	55	525
Average Queue (ft)	863	10	28	510
95th Queue (ft)	942	32	56	516
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	97	1	2	95
Queuing Penalty (veh)	224	0	41	1934
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	692	420	873
Average Queue (ft)	667	249	859
95th Queue (ft)	683	391	874
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	100		100
Queuing Penalty (veh)	1573		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

APPENDIX I

NO-BUILD 2040 HCS REPORTS

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2003	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	556	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1180	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1180	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	2	
Density, D	15.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2202	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	612	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1297	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1297	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	2	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 EB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3396	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	943	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2000	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2000	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	63.9	mi/h
Number of lanes, N	2	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 EB
 From/To: East of US176
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	5164	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1434	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	3041	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	3041	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	28.9	mi/h
Number of lanes, N	2	
Density, D	105.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: AM Peak
Freeway/Direction: I-26 WB
From/To: East of US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2790	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	775	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1643	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1643	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	70.4	mi/h
Number of lanes, N	2	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2418	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	672	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1424	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1424	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	2	
Density, D	19.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1414	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	393	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	833	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	833	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: AM Peak
 Freeway/Direction: I-26 WB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	1467	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	408	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	864	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	864	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2415	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	671	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1422	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1422	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	2	
Density, D	19.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2370	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	658	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1396	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1396	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	2	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 EB
 From/To: Between S-48 and US 176
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3502	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	973	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2062	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2062	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	62.5	mi/h
Number of lanes, N	2	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 EB
From/To: East of US176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	4257	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1183	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2507	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2507	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	49.9	mi/h
Number of lanes, N	2	
Density, D	50.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: East of US 176
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	5028	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1397	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2961	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2961	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	32.4	mi/h
Number of lanes, N	2	
Density, D	91.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Operational Analysis-----

Analyst: AECOM
Agency or Company: AECOM
Date Performed: 6/30/2016
Analysis Time Period: PM Peak
Freeway/Direction: I-26 WB
From/To: Between S-48 and US 176
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	3467	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	963	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2042	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	2042	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	63.0	mi/h
Number of lanes, N	2	
Density, D	32.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: Between S-48 and SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2158	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	599	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1271	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1271	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	2	
Density, D	17.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

-----Operational Analysis-----

Analyst: AECOM
 Agency or Company: AECOM
 Date Performed: 6/30/2016
 Analysis Time Period: PM Peak
 Freeway/Direction: I-26 WB
 From/To: West of SC 202
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Flow Inputs and Adjustments-----

Volume, V	2084	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	579	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1227	pc/h/ln

-----Speed Inputs and Adjustments-----

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

-----LOS and Performance Measures-----

Flow rate, vp	1227	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	2	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1957	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	46	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1957	245	46	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	544	68	13	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2305	280	53	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2305 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2585	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2305		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2585	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 23.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.353	
Space mean speed in ramp influence area,	S _R = 63.4	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 63.4	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1979	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1417	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	223	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1979	1417	223	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	550	394	62	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2331	1622	255	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2331 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	3953	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2331		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	3953	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 26.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.389	
Space mean speed in ramp influence area,	S _R = 62.2	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 62.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3248	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1916	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	148	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3248	1916	148	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	902	532	41	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

Heavy vehicle adjustment, fHV	0.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3825	2193	166	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 3825 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	6018	4800	Yes
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 3825		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	6018	4600	Yes

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 42.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence F

----- Speed Estimation -----

Intermediate speed variable,	M = 1.848	
Space mean speed in ramp influence area,	S = 14.0	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 14.0	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2196	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	222	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	594	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2196	222	594	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	610	62	165	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2586	254	680	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_{F} (P_{FM}) = 2586 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2840	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2586		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2840	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 18.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.317	
Space mean speed in ramp influence area,	S = 64.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: S-48 WB On-Ramp
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1230	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	184	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1188	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1230	184	1188	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	342	51	330	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1449	211	1360	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1449 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1660	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1449		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1660	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 10.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.231	
Space mean speed in ramp influence area,	S = 67.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 67.4	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1381	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	86	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	33	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1381	86	33	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	384	24	9	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1627	98	38	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 1627 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	1725	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 1627		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	1725	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 15.6 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.296	
Space mean speed in ramp influence area,	S = 65.2	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 65.2	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC-202 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2325	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	45	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	90	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2325	45	90	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	646	13	25	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2738	52	103	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2738 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2790	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2738		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2790	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 24.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.364	
Space mean speed in ramp influence area,	S = 63.0	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 63.0	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: S-48 EB On-Ramp
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2140	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1362	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	230	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2140	1362	230	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	594	378	64	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2520	1559	263	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2520 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	4079	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2520		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	4079	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 27.2 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.416	
Space mean speed in ramp influence area,	S = 61.3	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US176 EB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3218	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1079	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	284	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3218	1079	284	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	894	300	79	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

Heavy vehicle adjustment, fHV	0.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3790	1235	319	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 3790 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	5025	4800	Yes
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 3790		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	5025	4600	Yes

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 34.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence F

----- Speed Estimation -----

Intermediate speed variable,	M = 0.839	
Space mean speed in ramp influence area,	S _R = 47.3	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S ₀ = 47.3	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 6/30/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: US 176 WB On-Ramp
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3290	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	177	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1738	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3290	177	1738	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	914	49	483	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3875	203	1989	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 3875 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	4078	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 3875		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	4078	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 28.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable, M = 0.480
S
Space mean speed in ramp influence area, S = 59.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.2 mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1891	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	267	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1576	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1891	267	1576	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	525	74	438	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2227	306	1804	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2227 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2533	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2227		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2533	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 17.4 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	M = 0.260	
Space mean speed in ramp influence area,	S _R = 66.4	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 66.4	mph

Phone: Fax:
E-mail:

-----Merge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 6/30/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC-202 WB On-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2018	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	66	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	140	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2018	66	140	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	561	18	39	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2377	76	160	pcph

----- Estimation of V12 Merge Areas -----

L = (Equation 13-6 or 13-7)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2377 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
v _{FO}	2453	4800	No
v ₃ or v _{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v ₃ or v _{av34} > 2700 pc/h?		No	
Is v ₃ or v _{av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} = 2377		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Merge Influence Area -----

	Actual	Max Desirable	Violation?
v _{R12}	2453	4600	No

----- Level of Service Determination (if not F) -----

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 21.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	M = 0.319	
Space mean speed in ramp influence area,	S _R = 64.5	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 64.5	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: SC 202 EB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2003	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	46	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	245	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2003	46	245	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	556	13	68	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2359	53	280	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2359 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2359	4800	No
$v_{FO} = v_F - v_R$	2306	4800	No
v_R	53	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2359$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2359	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 20.9 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.303	
Space mean speed in ramp influence area,	S = 65.0	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 65.0	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2202	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	223	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1417	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2202	223	1417	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	612	62	394	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2593	255	1622	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2593 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2593	4800	No
$v_{FO} = v_F - v_R$	2338	4800	No
v_R	255	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2593$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2593	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 17.8 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.321	
Space mean speed in ramp influence area,	S = 64.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: US 176 EB Off-Ramp
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3396	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	148	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1916	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3396	148	1916	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	943	41	532	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4000	169	2193	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 4000 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4000	4800	No
$v_{FO} = v_F - v_R$	3831	4800	No
v_R	169	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4000$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4000	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.313	
Space mean speed in ramp influence area,	S = 64.7	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.7	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: AM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: US 176 WB Off-Ramp
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2790	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	594	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	222	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2790	594	222	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	775	165	62	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3286	680	254	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 3286 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3286	4800	No
$v_{FO} = v_F - v_R$	2606	4800	No
v_R	680	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3286$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3286	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 21.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.359	
Space mean speed in ramp influence area,	S = 63.1	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 63.1	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2418	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1188	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	184	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2418	1188	184	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	672	330	51	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2848	1360	211	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2848 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2848	4800	No
$v_{FO} = v_F - v_R$	1488	4800	No
v_R	1360	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2848$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2848	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 17.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.420	
Space mean speed in ramp influence area,	S = 61.1	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.1	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1414	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	33	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	86	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1414	33	86	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	393	9	24	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1665	38	98	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 1665 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1665	4800	No
$v_{FO} = v_F - v_R$	1627	4800	No
v_R	38	1900	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1665$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1665	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 15.0 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.561	
Space mean speed in ramp influence area,	S = 56.5	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 56.5	mph

Phone: Fax:
 E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 EB
 Junction: SC 202 EB Off-Ramp
 Jurisdiction:
 Analysis Year: 2040 No-Build
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2415	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	90	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	45	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2415	90	45	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	671	25	13	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2844	103	52	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2844 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2844	4800	No
$v_{FO} = v_F - v_R$	2741	4800	No
v_R	103	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2844$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2844	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 25.1 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.307	
Space mean speed in ramp influence area,	S = 64.9	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.9	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: S-48 EB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2370	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1362	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2370	230	1362	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	658	64	378	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2791	263	1559	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2791 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2791	4800	No
$v_{FO} = v_F - v_R$	2528	4800	No
v_R	263	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2791$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2791	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 19.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.322	
Space mean speed in ramp influence area,	S = 64.4	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 EB
Junction: US 176 EB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3502	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	284	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1079	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3502	284	1079	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	973	79	300	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4125	325	1235	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 4125 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4125	4800	No
$v_{FO} = v_F - v_R$	3800	4800	No
v_R	325	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4125$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4125	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.7 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.327	
Space mean speed in ramp influence area,	S = 64.2	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.2	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: US 176 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	5028	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1738	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	177	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5028	1738	177	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1397	483	49	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5922	1989	203	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 5922 \text{ pc/h}$
12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5922	4800	Yes
$v_{FO} = v_F - v_R$	3933	4800	No
v_R	1989	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 5922$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	5922	4400	Yes

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 44.2 \text{ pc/mi/ln}$
R 12 D
Level of service for ramp-freeway junction areas of influence F

----- Speed Estimation -----

Intermediate speed variable,	D = 0.477	
Space mean speed in ramp influence area,	S = 59.3	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 59.3	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3467	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1576	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	267	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3467	1576	267	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	963	438	74	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4083	1804	306	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 4083 \text{ pc/h}$
FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4083	4800	No
$v_{FO} = v_F - v_R$	2279	4800	No
v_R	1804	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 4083$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	4083	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 28.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence D

----- Speed Estimation -----

Intermediate speed variable,	D = 0.460	
Space mean speed in ramp influence area,	S = 59.8	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 59.8	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: SC 202 WB Off-Ramp
Jurisdiction:
Analysis Year: 2040 No-Build
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2158	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	140	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	66	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2158	140	66	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	599	39	18	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2542	160	76	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 2542 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2542	4800	No
$v_{FO} = v_F - v_R$	2382	4800	No
v_R	160	1900	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2542$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2542	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.5 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

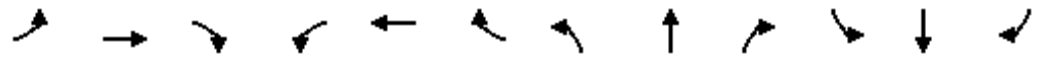
Intermediate speed variable,	D = 0.572	
Space mean speed in ramp influence area,	S = 56.1	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 56.1	mph

APPENDIX J

BUILD ALT 1 2020 SYNCHRO AND SIM TRAFFIC REPORTS

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2020 Build AM DDI



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	0	433	0	0	0	0	0	1077	0
Future Volume (vph)	0	0	0	0	433	0	0	0	0	0	1077	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		153			109			130			161	
Travel Time (s)		3.0			2.1			2.5			3.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	481	0	0	0	0	0	1197	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					26.0						34.0	
Total Split (%)					43.3%						56.7%	
Maximum Green (s)					20.0						28.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					13.9						34.1	
Actuated g/C Ratio					0.23						0.57	
v/c Ratio					0.59						0.41	
Control Delay					18.1						6.1	
Queue Delay					0.0						0.0	
Total Delay					18.1						6.1	
LOS					B						A	
Approach Delay					18.1						6.1	

Lanes, Volumes, Timings
 1: Columbia Ave & I-26 EB Ramps

2020 Build AM DDI



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B							A
Queue Length 50th (ft)					60							42
Queue Length 95th (ft)					59							114
Internal Link Dist (ft)		73			29			50				81
Turn Bay Length (ft)												
Base Capacity (vph)					1179							2893
Starvation Cap Reductn					0							0
Spillback Cap Reductn					0							0
Storage Cap Reductn					0							0
Reduced v/c Ratio					0.41							0.41

Intersection Summary













Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	48 (80%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	9.6
Intersection LOS:	A
Intersection Capacity Utilization	46.0%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps



HCM 2010 Signalized Intersection Summary
 1: Columbia Ave & I-26 EB Ramps

2020 Build AM DDI

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (veh/h)	0	0	0	0	433	0	0	0	0	0	1077	0
Future Volume (veh/h)	0	0	0	0	433	0	0	0	0	0	1077	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	481	0				0	1197	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	696	0				0	2373	0
Arrive On Green				0.00	0.20	0.00				0.00	0.15	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	481	0				0	1197	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	7.6	0.0				0.0	13.0	0.0
Cycle Q Clear(g_c), s				0.0	7.6	0.0				0.0	13.0	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	696	0				0	2373	0
V/C Ratio(X)				0.00	0.69	0.00				0.00	0.50	0.00
Avail Cap(c_a), veh/h				0	1180	0				0	2373	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	22.4	0.0				0.0	19.0	0.0
Incr Delay (d2), s/veh				0.0	1.2	0.0				0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	3.8	0.0				0.0	6.2	0.0
LnGrp Delay(d),s/veh				0.0	23.7	0.0				0.0	19.8	0.0
LnGrp LOS					C						B	
Approach Vol, veh/h					481						1197	
Approach Delay, s/veh					23.7						19.8	
Approach LOS					C						B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				17.8		34.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				20.0		28.0						
Max Q Clear Time (g_c+I1), s				9.6		15.0						
Green Ext Time (p_c), s				2.2		6.6						
Intersection Summary												
HCM 2010 Ctrl Delay				20.9								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
 21: Columbia Ave & I-26 WB Ramps

2020 Build AM DDI



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	370	0	0	0	0	0	0	0	0	529	0
Future Volume (vph)	0	370	0	0	0	0	0	0	0	0	529	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		147			115			170			129	
Travel Time (s)		2.9			2.2			3.3			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	411	0	0	0	0	0	0	0	0	588	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		28.0									32.0	
Total Split (%)		46.7%									53.3%	
Maximum Green (s)		22.0									26.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		12.6									35.4	
Actuated g/C Ratio		0.21									0.59	
v/c Ratio		0.55									0.28	
Control Delay		5.2									6.9	
Queue Delay		0.0									0.0	
Total Delay		5.2									6.9	
LOS		A									A	
Approach Delay		5.2									6.9	

Lanes, Volumes, Timings
 21: Columbia Ave & I-26 WB Ramps

2020 Build AM DDI

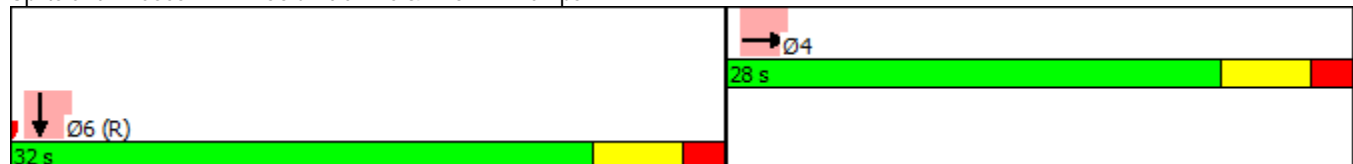


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A										
Queue Length 50th (ft)		4										
Queue Length 95th (ft)		10										
Internal Link Dist (ft)		67			35			90				49
Turn Bay Length (ft)												
Base Capacity (vph)		1297										2088
Starvation Cap Reductn		0										0
Spillback Cap Reductn		0										7
Storage Cap Reductn		0										0
Reduced v/c Ratio		0.32										0.28

Intersection Summary













Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	3 (5%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	6.2
Intersection Capacity Utilization	34.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 21: Columbia Ave & I-26 WB Ramps









HCM 2010 Signalized Intersection Summary
 21: Columbia Ave & I-26 WB Ramps

2020 Build AM DDI

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (veh/h)	0	370	0	0	0	0	0	0	0	0	529	0
Future Volume (veh/h)	0	370	0	0	0	0	0	0	0	0	529	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	411	0							0	588	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	625	0							0	1534	0
Arrive On Green	0.00	0.18	0.00							0.00	0.43	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	411	0							0	588	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	6.5	0.0							0.0	6.8	0.0
Cycle Q Clear(g_c), s	0.0	6.5	0.0							0.0	6.8	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	625	0							0	1534	0
V/C Ratio(X)	0.00	0.66	0.00							0.00	0.38	0.00
Avail Cap(c_a), veh/h	0	1298	0							0	1534	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	23.0	0.0							0.0	11.6	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0							0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.2	0.0							0.0	3.4	0.0
LnGrp Delay(d),s/veh	0.0	24.2	0.0							0.0	12.3	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		411									588	
Approach Delay, s/veh		24.2									12.3	
Approach LOS		C									B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				16.6		32.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				22.0		26.0						
Max Q Clear Time (g_c+l1), s				8.5		8.8						
Green Ext Time (p_c), s				2.1		3.6						
Intersection Summary												
HCM 2010 Ctrl Delay				17.2								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
 22: Columbia Ave & I-26 WB Off Ramp

2020 Build AM DDI

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙					↕↕
Traffic Volume (vph)	691	0	0	0	0	529
Future Volume (vph)	691	0	0	0	0	529
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	306					
Link Speed (mph)	30		35			35
Link Distance (ft)	161		300			170
Travel Time (s)	3.7		5.8			3.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	768	0	0	0	0	588
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	15.0					22.0
Total Split (s)	30.0					30.0
Total Split (%)	50.0%					50.0%
Maximum Green (s)	24.0					24.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	14.8					33.2
Actuated g/C Ratio	0.25					0.55
v/c Ratio	0.71					0.30
Control Delay	15.6					2.7
Queue Delay	0.0					0.2
Total Delay	15.6					2.9
LOS	B					A
Approach Delay	15.6					2.9

Lanes, Volumes, Timings
 22: Columbia Ave & I-26 WB Off Ramp

2020 Build AM DDI

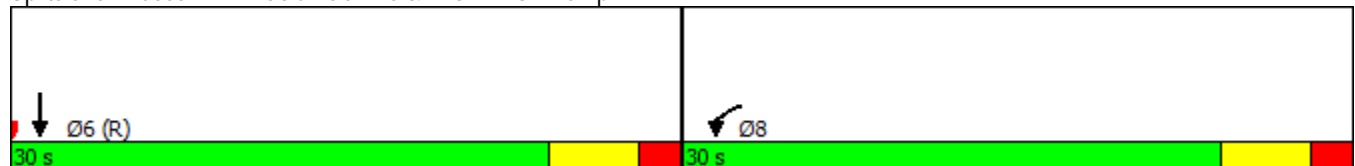












Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B					A
Queue Length 50th (ft)	74					11
Queue Length 95th (ft)	108					15
Internal Link Dist (ft)	81		220		90	
Turn Bay Length (ft)						
Base Capacity (vph)	1556			1960		
Starvation Cap Reductn	0					621
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.49			0.44		

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	3 (5%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	40
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	10.1
Intersection LOS:	B
Intersection Capacity Utilization	44.3%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 22: Columbia Ave & I-26 WB Off Ramp



								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 					 		
Traffic Volume (veh/h)	691	0	0	0	0	529		
Future Volume (veh/h)	691	0	0	0	0	529		
Number	3	18			1	6		
Initial Q (Qb), veh	0	0			0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00			
Parking Bus, Adj	1.00	1.00			1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	0			0	1863		
Adj Flow Rate, veh/h	768	0			0	588		
Adj No. of Lanes	2	0			0	2		
Peak Hour Factor	0.90	0.90			0.90	0.90		
Percent Heavy Veh, %	2	0			0	2		
Cap, veh/h	0	0			0	1416		
Arrive On Green	0.00	0.00			0.00	0.13		
Sat Flow, veh/h	0				0	3725		
Grp Volume(v), veh/h	0.0				0	588		
Grp Sat Flow(s),veh/h/ln					0	1770		
Q Serve(g_s), s					0.0	9.2		
Cycle Q Clear(g_c), s					0.0	9.2		
Prop In Lane					0.00			
Lane Grp Cap(c), veh/h					0	1416		
V/C Ratio(X)					0.00	0.42		
Avail Cap(c_a), veh/h					0	1416		
HCM Platoon Ratio					1.00	0.33		
Upstream Filter(I)					0.00	0.97		
Uniform Delay (d), s/veh					0.0	19.6		
Incr Delay (d2), s/veh					0.0	0.9		
Initial Q Delay(d3),s/veh					0.0	0.0		
%ile BackOfQ(50%),veh/ln					0.0	4.7		
LnGrp Delay(d),s/veh					0.0	20.5		
LnGrp LOS						C		
Approach Vol, veh/h						588		
Approach Delay, s/veh						20.5		
Approach LOS						C		
Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						30.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						24.0		
Max Q Clear Time (g_c+I1), s						11.2		
Green Ext Time (p_c), s						3.1		
Intersection Summary								
HCM 2010 Ctrl Delay			20.5					
HCM 2010 LOS			C					

SimTraffic Simulation Summary 2020 Build AM DDI

Summary of All Intervals

Start Time	7:20
End Time	8:30
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	5184
Vehs Exited	5189
Starting Vehs	139
Ending Vehs	134
Travel Distance (mi)	5590
Travel Time (hr)	141.0
Total Delay (hr)	37.8
Total Stops	2324
Fuel Used (gal)	222.9

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	5184
Vehs Exited	5189
Starting Vehs	139
Ending Vehs	134
Travel Distance (mi)	5590
Travel Time (hr)	141.0
Total Delay (hr)	37.8
Total Stops	2324
Fuel Used (gal)	222.9

Queuing and Blocking Report
2020 Build AM DDI

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	WB	WB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	144	113	98	120	55
Average Queue (ft)	102	54	54	95	16
95th Queue (ft)	144	99	100	110	46
Link Distance (ft)	57	57	13	13	13
Upstream Blk Time (%)	32	7	16	33	5
Queuing Penalty (veh)	69	14	56	120	19
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 21: Columbia Ave & I-26 WB Ramps

Movement	EB	EB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	93	92	75	153
Average Queue (ft)	48	62	24	117
95th Queue (ft)	90	108	61	170
Link Distance (ft)	13	13	16	16
Upstream Blk Time (%)	39	43	6	31
Queuing Penalty (veh)	72	79	17	81
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 22: Columbia Ave & I-26 WB Off Ramp

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	165	160	51	73
Average Queue (ft)	113	111	12	37
95th Queue (ft)	156	153	40	60
Link Distance (ft)	103	103	30	30
Upstream Blk Time (%)	8	9	5	23
Queuing Penalty (veh)	26	30	14	60
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Lanes, Volumes, Timings
1: I-26 EB Ramps & Columbia Ave

2020 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	0	624	0	0	0	0	0	1376	0
Future Volume (vph)	0	0	0	0	624	0	0	0	0	0	1376	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		135			109			140			150	
Travel Time (s)		2.6			2.1			2.7			2.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	693	0	0	0	0	0	1529	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					26.0						34.0	
Total Split (%)					43.3%						56.7%	
Maximum Green (s)					20.0						28.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					17.3						30.7	
Actuated g/C Ratio					0.29						0.51	
v/c Ratio					0.68						0.59	
Control Delay					19.2						10.2	
Queue Delay					0.0						0.0	
Total Delay					19.2						10.2	
LOS					B						B	
Approach Delay					19.2						10.2	

Lanes, Volumes, Timings
 1: I-26 EB Ramps & Columbia Ave

2020 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B							B
Queue Length 50th (ft)					113							125
Queue Length 95th (ft)					84							221
Internal Link Dist (ft)		55			29			60				70
Turn Bay Length (ft)												
Base Capacity (vph)					1179							2598
Starvation Cap Reductn					0							0
Spillback Cap Reductn					0							0
Storage Cap Reductn					0							0
Reduced v/c Ratio					0.59							0.59

Intersection Summary













Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	48 (80%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	13.0
Intersection LOS:	B
Intersection Capacity Utilization	53.8%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 1: I-26 EB Ramps & Columbia Ave













HCM 2010 Signalized Intersection Summary
 1: I-26 EB Ramps & Columbia Ave

2020 Build DDI PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (veh/h)	0	0	0	0	624	0	0	0	0	0	1376	0
Future Volume (veh/h)	0	0	0	0	624	0	0	0	0	0	1376	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	693	0				0	1529	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	911	0				0	2373	0
Arrive On Green				0.00	0.26	0.00				0.00	0.15	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	693	0				0	1529	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	10.8	0.0				0.0	16.9	0.0
Cycle Q Clear(g_c), s				0.0	10.8	0.0				0.0	16.9	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	911	0				0	2373	0
V/C Ratio(X)				0.00	0.76	0.00				0.00	0.64	0.00
Avail Cap(c_a), veh/h				0	1180	0				0	2373	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	20.6	0.0				0.0	20.7	0.0
Incr Delay (d2), s/veh				0.0	2.2	0.0				0.0	1.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	5.6	0.0				0.0	8.2	0.0
LnGrp Delay(d),s/veh				0.0	22.8	0.0				0.0	22.1	0.0
LnGrp LOS					C						C	
Approach Vol, veh/h					693						1529	
Approach Delay, s/veh					22.8						22.1	
Approach LOS					C						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				21.4		34.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				20.0		28.0						
Max Q Clear Time (g_c+I1), s				12.8		18.9						
Green Ext Time (p_c), s				2.6		6.3						
Intersection Summary												
HCM 2010 Ctrl Delay				22.3								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
 21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp

2020 Build DDI PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 					 
Traffic Volume (vph)	953	0	0	0	0	669
Future Volume (vph)	953	0	0	0	0	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	142					
Link Speed (mph)	30		35			35
Link Distance (ft)	149		327			152
Travel Time (s)	3.4		6.4			3.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1059	0	0	0	0	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	22.0					22.0
Total Split (s)	32.0					28.0
Total Split (%)	53.3%					46.7%
Maximum Green (s)	26.0					22.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	22.4					25.6
Actuated g/C Ratio	0.37					0.43
v/c Ratio	0.77					0.49
Control Delay	18.2					6.1
Queue Delay	0.0					0.2
Total Delay	18.2					6.3
LOS	B					A
Approach Delay	18.2					6.3

21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp

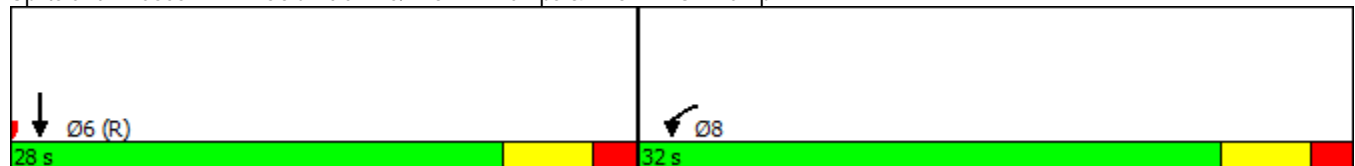


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B					A
Queue Length 50th (ft)	141					24
Queue Length 95th (ft)	189					32
Internal Link Dist (ft)	69		247			72
Turn Bay Length (ft)						
Base Capacity (vph)	1568					1510
Starvation Cap Reductn	0					215
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.68					0.57

Intersection Summary











Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	0 (0%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	13.3
Intersection LOS:	B
Intersection Capacity Utilization	55.7%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp



HCM 2010 Signalized Intersection Summary
 21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp

2020 Build DDI PM

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 					 		
Traffic Volume (veh/h)	953	0	0	0	0	669		
Future Volume (veh/h)	953	0	0	0	0	669		
Number	3	18			1	6		
Initial Q (Qb), veh	0	0			0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00			
Parking Bus, Adj	1.00	1.00			1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	0			0	1863		
Adj Flow Rate, veh/h	1059	0			0	743		
Adj No. of Lanes	2	0			0	2		
Peak Hour Factor	0.90	0.90			0.90	0.90		
Percent Heavy Veh, %	2	0			0	2		
Cap, veh/h	0	0			0	1298		
Arrive On Green	0.00	0.00			0.00	0.12		
Sat Flow, veh/h	0				0	3725		
Grp Volume(v), veh/h	0.0				0	743		
Grp Sat Flow(s),veh/h/ln					0	1770		
Q Serve(g_s), s					0.0	11.9		
Cycle Q Clear(g_c), s					0.0	11.9		
Prop In Lane					0.00			
Lane Grp Cap(c), veh/h					0	1298		
V/C Ratio(X)					0.00	0.57		
Avail Cap(c_a), veh/h					0	1298		
HCM Platoon Ratio					1.00	0.33		
Upstream Filter(I)					0.00	0.93		
Uniform Delay (d), s/veh					0.0	21.9		
Incr Delay (d2), s/veh					0.0	1.7		
Initial Q Delay(d3),s/veh					0.0	0.0		
%ile BackOfQ(50%),veh/ln					0.0	6.1		
LnGrp Delay(d),s/veh					0.0	23.6		
LnGrp LOS						C		
Approach Vol, veh/h						743		
Approach Delay, s/veh						23.6		
Approach LOS						C		
Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						28.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						22.0		
Max Q Clear Time (g_c+I1), s						13.9		
Green Ext Time (p_c), s						3.0		
Intersection Summary								
HCM 2010 Ctrl Delay			23.6					
HCM 2010 LOS			C					

Lanes, Volumes, Timings
22: I-26 WB Ramps & Columbia Ave

2020 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	510	0	0	0	0	0	0	0	0	669	0
Future Volume (vph)	0	510	0	0	0	0	0	0	0	0	669	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		159			115			152			129	
Travel Time (s)		3.1			2.2			3.0			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	567	0	0	0	0	0	0	0	0	743	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		27.0									33.0	
Total Split (%)		45.0%									55.0%	
Maximum Green (s)		21.0									27.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		15.4									32.6	
Actuated g/C Ratio		0.26									0.54	
v/c Ratio		0.63									0.39	
Control Delay		5.5									9.3	
Queue Delay		0.0									0.0	
Total Delay		5.5									9.3	
LOS		A									A	
Approach Delay		5.5									9.3	

Lanes, Volumes, Timings
 22: I-26 WB Ramps & Columbia Ave

2020 Build DDI PM

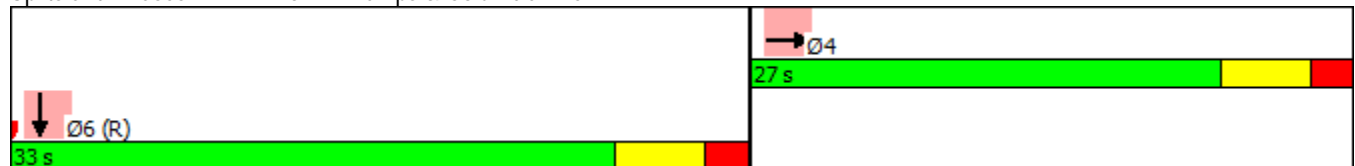


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A									A	
Queue Length 50th (ft)		11									74	
Queue Length 95th (ft)		9									128	
Internal Link Dist (ft)		79			35			72			49	
Turn Bay Length (ft)												
Base Capacity (vph)		1238									1924	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		0									19	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.46									0.39	

Intersection Summary













Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	1 (2%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	7.7
Intersection LOS:	A
Intersection Capacity Utilization	42.6%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 22: I-26 WB Ramps & Columbia Ave



HCM 2010 Signalized Intersection Summary
 22: I-26 WB Ramps & Columbia Ave

2020 Build DDI PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (veh/h)	0	510	0	0	0	0	0	0	0	0	669	0
Future Volume (veh/h)	0	510	0	0	0	0	0	0	0	0	669	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	567	0							0	743	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	796	0							0	1593	0
Arrive On Green	0.00	0.22	0.00							0.00	0.45	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	567	0							0	743	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	8.9	0.0							0.0	8.8	0.0
Cycle Q Clear(g_c), s	0.0	8.9	0.0							0.0	8.8	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	796	0							0	1593	0
V/C Ratio(X)	0.00	0.71	0.00							0.00	0.47	0.00
Avail Cap(c_a), veh/h	0	1239	0							0	1593	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	21.5	0.0							0.0	11.5	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0							0.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.5	0.0							0.0	4.4	0.0
LnGrp Delay(d),s/veh	0.0	22.7	0.0							0.0	12.5	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		567									743	
Approach Delay, s/veh		22.7									12.5	
Approach LOS		C									B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				19.5		33.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				21.0		27.0						
Max Q Clear Time (g_c+l1), s				10.9		10.8						
Green Ext Time (p_c), s				2.6		4.5						
Intersection Summary												
HCM 2010 Ctrl Delay			16.9									
HCM 2010 LOS			B									

SimTraffic Simulation Summary 2020 Build DDI PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6412	6287	6312	6337
Vehs Exited	6393	6283	6349	6341
Starting Vehs	206	195	226	208
Ending Vehs	225	199	189	202
Travel Distance (mi)	6935	6808	6870	6871
Travel Time (hr)	195.6	188.4	189.5	191.2
Total Delay (hr)	67.8	62.9	63.5	64.7
Total Stops	3682	3309	3448	3481
Fuel Used (gal)	286.7	279.3	281.2	282.4

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	6412	6287	6312	6337
Vehs Exited	6393	6283	6349	6341
Starting Vehs	206	195	226	208
Ending Vehs	225	199	189	202
Travel Distance (mi)	6935	6808	6870	6871
Travel Time (hr)	195.6	188.4	189.5	191.2
Total Delay (hr)	67.8	62.9	63.5	64.7
Total Stops	3682	3309	3448	3481
Fuel Used (gal)	286.7	279.3	281.2	282.4

Queuing and Blocking Report
2020 Build DDI PM

Intersection: 1: I-26 EB Ramps & Columbia Ave

Movement	WB	WB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	150	120	113	114	83
Average Queue (ft)	119	68	81	91	31
95th Queue (ft)	156	113	112	102	71
Link Distance (ft)	57	57	5	5	5
Upstream Blk Time (%)	41	13	23	39	8
Queuing Penalty (veh)	128	40	107	178	37
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	153	152	50	74
Average Queue (ft)	126	130	22	39
95th Queue (ft)	154	160	46	61
Link Distance (ft)	91	91	10	10
Upstream Blk Time (%)	20	22	17	41
Queuing Penalty (veh)	96	106	55	137
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 22: I-26 WB Ramps & Columbia Ave




















Movement	EB	EB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	103	113	109	165
Average Queue (ft)	55	81	51	136
95th Queue (ft)	108	128	101	178
Link Distance (ft)	22	22	16	16
Upstream Blk Time (%)	30	46	17	44
Queuing Penalty (veh)	77	118	56	149
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

APPENDIX K

BUILD ALT 2 2020 SYNCHRO AND SIM TRAFFIC REPORTS

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2020 Build Loop AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	8	129	0	0	0	0	433	942	143	1077	0
Future Volume (vph)	27	8	129	0	0	0	0	433	942	143	1077	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.963								0.950		
Satd. Flow (prot)	0	1794	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.963								0.480		
Satd. Flow (perm)	0	1794	1583	0	0	0	0	1863	1583	894	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95						1011			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1099			740	
Travel Time (s)		13.3			3.6			21.4			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	9	143	0	0	0	0	481	1047	159	1197	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	143	0	0	0	0	481	1047	159	1197	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2020 Build Loop AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	15.0	15.0	15.0					45.0	45.0	45.0	45.0	
Total Split (%)	25.0%	25.0%	25.0%					75.0%	75.0%	75.0%	75.0%	
Maximum Green (s)	9.0	9.0	9.0					39.0	39.0	39.0	39.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	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	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effect Green (s)		7.9	7.9					43.9	43.9	43.9	43.9	
Actuated g/C Ratio		0.13	0.13					0.73	0.73	0.73	0.73	
v/c Ratio		0.17	0.49					0.35	0.73	0.24	0.46	
Control Delay		24.4	16.3					2.6	7.7	5.3	5.3	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		24.4	16.3					2.6	7.7	5.3	5.3	
LOS		C	B					A	A	A	A	
Approach Delay		18.0						6.1			5.3	
Approach LOS		B						A			A	

Intersection Summary




















Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	23 (38%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	6.5
Intersection LOS:	A
Intersection Capacity Utilization	87.5%
ICU Level of Service	E
Analysis Period (min)	15

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps



HCM 2010 Signalized Intersection Summary
 1: Columbia Ave & I-26 EB Ramps

2020 Build Loop AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	8	129	0	0	0	0	433	942	143	1077	0
Future Volume (veh/h)	27	8	129	0	0	0	0	433	942	143	1077	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	30	9	0				0	481	0	159	1197	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	77	23	88				0	1386	1178	716	2634	0
Arrive On Green	0.06	0.06	0.00				0.00	0.74	0.00	0.74	0.74	0.00
Sat Flow, veh/h	1380	414	1583				0	1863	1583	910	3632	0
Grp Volume(v), veh/h	39	0	0				0	481	0	159	1197	0
Grp Sat Flow(s),veh/h/ln	1794	0	1583				0	1863	1583	910	1770	0
Q Serve(g_s), s	1.3	0.0	0.0				0.0	5.3	0.0	4.4	7.8	0.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0				0.0	5.3	0.0	9.7	7.8	0.0
Prop In Lane	0.77		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	100	0	88				0	1386	1178	716	2634	0
V/C Ratio(X)	0.39	0.00	0.00				0.00	0.35	0.00	0.22	0.45	0.00
Avail Cap(c_a), veh/h	269	0	237				0	1386	1178	716	2634	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.81	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.3	0.0	0.0				0.0	2.6	0.0	4.3	3.0	0.0
Incr Delay (d2), s/veh	2.5	0.0	0.0				0.0	0.6	0.0	0.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0				0.0	2.9	0.0	1.2	3.9	0.0
LnGrp Delay(d),s/veh	29.8	0.0	0.0				0.0	3.2	0.0	5.0	3.5	0.0
LnGrp LOS	C							A		A	A	
Approach Vol, veh/h		39						481			1356	
Approach Delay, s/veh		29.8						3.2			3.7	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		50.7		9.3		50.7						
Change Period (Y+Rc), s		6.0		6.0		6.0						
Max Green Setting (Gmax), s		39.0		9.0		39.0						
Max Q Clear Time (g_c+I1), s		7.3		3.3		11.7						
Green Ext Time (p_c), s		16.5		0.0		15.2						
Intersection Summary												
HCM 2010 Ctrl Delay			4.1									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗		↘		↙	↕			↕	↗
Traffic Vol, veh/h	0	0	691	0	2	157	90	370	0	0	529	49
Future Vol, veh/h	0	0	691	0	2	157	90	370	0	0	529	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	768	0	2	174	100	411	0	0	588	54

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	- 1199	411	588
Stage 1	- 611	-	-
Stage 2	- 588	-	-
Critical Hdwy	- 6.52	6.22	4.12
Critical Hdwy Stg 1	- 5.52	-	-
Critical Hdwy Stg 2	- 5.52	-	-
Follow-up Hdwy	- 4.018	3.318	2.218
Pot Cap-1 Maneuver	0 185	641	987
Stage 1	0 484	-	0
Stage 2	0 496	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	- 0	641	987
Mov Cap-2 Maneuver	- 0	-	-
Stage 1	- 0	-	-
Stage 2	- 0	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBTWBLn1	SBT	SBR
Capacity (veh/h)	987	- 641	-	-
HCM Lane V/C Ratio	0.101	- 0.276	-	-
HCM Control Delay (s)	9.1	- 12.7	-	-
HCM Lane LOS	A	- B	-	-
HCM 95th %tile Q(veh)	0.3	- 1.1	-	-

SimTraffic Simulation Summary 2020 Build Loop AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	5225	5258	5272	5251
Vehs Exited	5221	5265	5275	5255
Starting Vehs	131	150	145	139
Ending Vehs	135	143	142	139
Travel Distance (mi)	5855	5873	5894	5874
Travel Time (hr)	137.9	140.5	140.4	139.6
Total Delay (hr)	25.5	26.8	26.3	26.2
Total Stops	796	995	936	909
Fuel Used (gal)	223.1	225.4	227.7	225.4

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	5225	5258	5272	5251
Vehs Exited	5221	5265	5275	5255
Starting Vehs	131	150	145	139
Ending Vehs	135	143	142	139
Travel Distance (mi)	5855	5873	5894	5874
Travel Time (hr)	137.9	140.5	140.4	139.6
Total Delay (hr)	25.5	26.8	26.3	26.2
Total Stops	796	995	936	909
Fuel Used (gal)	223.1	225.4	227.7	225.4

Queuing and Blocking Report
2020 Build Loop AM

Intersection: 1: Columbia Ave & I-26 EB Ramps




















Movement	EB	NB	SB	SB	SB
Directions Served	LT	T	L	T	T
Maximum Queue (ft)	68	99	89	113	115
Average Queue (ft)	23	21	34	35	33
95th Queue (ft)	55	69	67	94	87
Link Distance (ft)		1032		690	690
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	225		150		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB
Directions Served	TR	L
Maximum Queue (ft)	71	59
Average Queue (ft)	32	24
95th Queue (ft)	53	52
Link Distance (ft)	543	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		175
Storage Blk Time (%)		
Queuing Penalty (veh)		

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2020 Build Loop PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	8	121	0	0	0	0	624	742	246	1376	0
Future Volume (vph)	45	8	121	0	0	0	0	624	742	246	1376	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	1786	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.959								0.346		
Satd. Flow (perm)	0	1786	1583	0	0	0	0	1863	1583	645	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55						824			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1090			740	
Travel Time (s)		13.3			3.6			21.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	134	0	0	0	0	693	824	273	1529	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	15.0	15.0	15.0					45.0	45.0	45.0	45.0	
Total Split (%)	25.0%	25.0%	25.0%					75.0%	75.0%	75.0%	75.0%	
Maximum Green (s)	9.0	9.0	9.0					39.0	39.0	39.0	39.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	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	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		8.1	8.1					43.7	43.7	43.7	43.7	
Actuated g/C Ratio		0.14	0.14					0.73	0.73	0.73	0.73	
v/c Ratio		0.25	0.52					0.51	0.60	0.58	0.59	
Control Delay		25.6	22.6					10.3	6.6	13.0	6.7	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	

Lanes, Volumes, Timings
 1: Columbia Ave & I-26 EB Ramps

2020 Build Loop PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		25.6	22.6					10.3	6.6	13.0	6.7	
LOS		C	C					B	A	B	A	
Approach Delay		23.5						8.3			7.6	
Approach LOS		C						A			A	
Queue Length 50th (ft)		19	26					108	0	48	142	
Queue Length 95th (ft)		48	71					380	343	#176	206	
Internal Link Dist (ft)		801			159			1010			660	
Turn Bay Length (ft)										150		
Base Capacity (vph)		267	284					1357	1377	470	2578	
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		0.22	0.47					0.51	0.60	0.58	0.59	

Intersection Summary




















Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 32 (53%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 8.8
 Intersection LOS: A
 Intersection Capacity Utilization 80.4%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps



HCM 2010 Signalized Intersection Summary
 1: Columbia Ave & I-26 EB Ramps

2020 Build Loop PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	8	121	0	0	0	0	624	742	246	1376	0
Future Volume (veh/h)	45	8	121	0	0	0	0	624	742	246	1376	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	50	9	0				0	693	0	273	1529	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	111	20	116				0	1354	1151	645	2573	0
Arrive On Green	0.07	0.07	0.00				0.00	0.97	0.00	0.73	0.73	0.00
Sat Flow, veh/h	1514	273	1583				0	1863	1583	748	3632	0
Grp Volume(v), veh/h	59	0	0				0	693	0	273	1529	0
Grp Sat Flow(s),veh/h/ln	1787	0	1583				0	1863	1583	748	1770	0
Q Serve(g_s), s	1.9	0.0	0.0				0.0	1.5	0.0	10.3	12.5	0.0
Cycle Q Clear(g_c), s	1.9	0.0	0.0				0.0	1.5	0.0	11.7	12.5	0.0
Prop In Lane	0.85		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	130	0	116				0	1354	1151	645	2573	0
V/C Ratio(X)	0.45	0.00	0.00				0.00	0.51	0.00	0.42	0.59	0.00
Avail Cap(c_a), veh/h	268	0	237				0	1354	1151	645	2573	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00				0.00	0.85	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.7	0.0	0.0				0.0	0.3	0.0	4.2	3.9	0.0
Incr Delay (d2), s/veh	2.4	0.0	0.0				0.0	1.2	0.0	2.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0				0.0	1.0	0.0	2.4	6.3	0.0
LnGrp Delay(d),s/veh	29.1	0.0	0.0				0.0	1.5	0.0	6.2	5.0	0.0
LnGrp LOS	C							A		A	A	
Approach Vol, veh/h		59						693			1802	
Approach Delay, s/veh		29.1						1.5			5.1	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		49.6		10.4		49.6						
Change Period (Y+Rc), s		6.0		6.0		6.0						
Max Green Setting (Gmax), s		39.0		9.0		39.0						
Max Q Clear Time (g_c+l1), s		3.5		3.9		14.5						
Green Ext Time (p_c), s		26.1		0.1		19.5						
Intersection Summary												
HCM 2010 Ctrl Delay			4.7									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗		↘		↖	↗			↗	↖
Traffic Vol, veh/h	0	0	953	0	2	245	159	510	0	0	669	35
Future Vol, veh/h	0	0	953	0	2	245	159	510	0	0	669	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1059	0	2	272	177	567	0	0	743	39

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	- 1663	567	743
Stage 1	- 920	-	-
Stage 2	- 743	-	-
Critical Hdwy	- 6.52	6.22	4.12
Critical Hdwy Stg 1	- 5.52	-	-
Critical Hdwy Stg 2	- 5.52	-	-
Follow-up Hdwy	- 4.018	3.318	2.218
Pot Cap-1 Maneuver	0 97	523	864
Stage 1	0 350	-	0
Stage 2	0 422	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	- 77	523	864
Mov Cap-2 Maneuver	- 154	-	-
Stage 1	- 278	-	-
Stage 2	- 422	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	2.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBTWBLn1	SBT	SBR
Capacity (veh/h)	864	- 513	-	-
HCM Lane V/C Ratio	0.204	- 0.535	-	-
HCM Control Delay (s)	10.2	- 19.8	-	-
HCM Lane LOS	B	- C	-	-
HCM 95th %tile Q(veh)	0.8	- 3.1	-	-

SimTraffic Simulation Summary 2020 Build Loop PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6331	6373	6113	6270
Vehs Exited	6335	6337	6152	6275
Starting Vehs	195	171	194	187
Ending Vehs	191	207	155	185
Travel Distance (mi)	7081	7118	6924	7041
Travel Time (hr)	181.2	184.6	173.4	179.7
Total Delay (hr)	44.3	46.7	40.8	43.9
Total Stops	1444	1351	1205	1333
Fuel Used (gal)	277.6	281.1	271.3	276.7

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	6331	6373	6113	6270
Vehs Exited	6335	6337	6152	6275
Starting Vehs	195	171	194	187
Ending Vehs	191	207	155	185
Travel Distance (mi)	7081	7118	6924	7041
Travel Time (hr)	181.2	184.6	173.4	179.7
Total Delay (hr)	44.3	46.7	40.8	43.9
Total Stops	1444	1351	1205	1333
Fuel Used (gal)	277.6	281.1	271.3	276.7

Queuing and Blocking Report
2020 Build Loop PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	EB	NB	SB	SB	SB
Directions Served	LT	R	T	L	T	T
Maximum Queue (ft)	102	18	172	160	140	126
Average Queue (ft)	39	1	58	76	51	52
95th Queue (ft)	81	10	142	141	117	113
Link Distance (ft)		762	1024		690	690
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	225			150		
Storage Blk Time (%)				1	0	
Queuing Penalty (veh)				4	0	

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	TR	L	R
Maximum Queue (ft)	117	114	7
Average Queue (ft)	53	44	0
95th Queue (ft)	94	80	4
Link Distance (ft)	543		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		175	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2
Jurisdiction:
Analysis Year: 2020 Build Alt 2 Ramp
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	1713	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	159	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	691	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1000	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1713	159	691	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	44	192	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2018	182	791	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 2018$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	2018	4800	No
$v_{FO} = v_F - v_R$	1836	4800	No
v_R	182	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2018$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2018	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 10.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.314	
Space mean speed in ramp influence area,	S = 64.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:
Analysis Year: 2020 Build Alt 2 Loop
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	1554	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	691	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	141	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	550	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1554	691	141	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	432	192	39	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1830	791	161	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 1830 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v = v_{12}$	1830	4800	No
$v_{FO} = v_F - v_R$	1039	4800	No
v_R	791	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1830$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1830	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 9.0 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.369	
Space mean speed in ramp influence area,	S _R = 62.8	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 62.8	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
 Agency/Co.: AECOM
 Date performed: 7/1/2016
 Analysis time period: PM Peak
 Freeway/Dir of Travel: I-26 WB
 Junction: S-48 WB Off-Ramp Alt 2
 Jurisdiction:
 Analysis Year: 2020 Build Alt 2 Ramp
 Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	2523	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	247	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	953	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1000	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2523	247	953	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	701	69	265	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2972	283	1091	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 2972$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	2972	4800	No
$v_{FO} = v_F - v_R$	2689	4800	No
v_R	283	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2972$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 18.8$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.323	
Space mean speed in ramp influence area,	S = 64.3	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.3	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:
Analysis Year: 2020 Build Alt 2 Loop
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2276	vph

-----Off Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	953	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	196	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	550	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2276	953	196	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	632	265	54	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2681	1091	224	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 2681$ pc/h
FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	2681	4800	No
$v_{FO} = v_F - v_R$	1590	4800	No
v_R	1091	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2681$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2681	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 16.3$ pc/mi/ln
Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

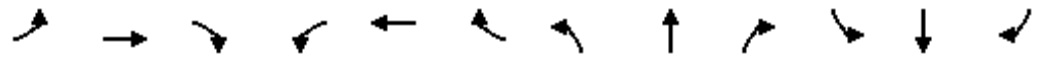
Intermediate speed variable,	D = 0.396	
Space mean speed in ramp influence area,	S = 61.9	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.9	mph

APPENDIX L

BUILD ALT 1 2040 SYNCHRO AND SIM TRAFFIC REPORTS

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2040 Build DDI AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	0	498	0	0	0	0	0	1461	0
Future Volume (vph)	0	0	0	0	498	0	0	0	0	0	1461	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		153			109			130			161	
Travel Time (s)		3.0			2.1			2.5			3.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	553	0	0	0	0	0	1623	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					27.0						43.0	
Total Split (%)					38.6%						61.4%	
Maximum Green (s)					21.0						37.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					16.5						41.5	
Actuated g/C Ratio					0.24						0.59	
v/c Ratio					0.66						0.54	
Control Delay					21.8						7.6	
Queue Delay					0.0						0.0	
Total Delay					21.8						7.6	
LOS					C						A	
Approach Delay					21.8						7.6	

Lanes, Volumes, Timings
 1: Columbia Ave & I-26 EB Ramps

2040 Build DDI AM

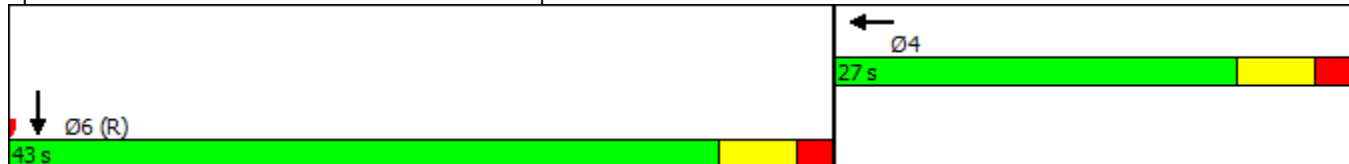


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					C							A
Queue Length 50th (ft)					102							43
Queue Length 95th (ft)					119							238
Internal Link Dist (ft)		73			29			50				81
Turn Bay Length (ft)												
Base Capacity (vph)					1061							3011
Starvation Cap Reductn					0							0
Spillback Cap Reductn					0							0
Storage Cap Reductn					0							0
Reduced v/c Ratio					0.52							0.54

Intersection Summary













Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	55 (79%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	11.2
Intersection LOS:	B
Intersection Capacity Utilization	58.1%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps













HCM 2010 Signalized Intersection Summary
 1: Columbia Ave & I-26 EB Ramps

2040 Build DDI AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (veh/h)	0	0	0	0	498	0	0	0	0	0	1461	0
Future Volume (veh/h)	0	0	0	0	498	0	0	0	0	0	1461	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	553	0				0	1623	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	738	0				0	2688	0
Arrive On Green				0.00	0.21	0.00				0.00	0.17	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	553	0				0	1623	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	10.3	0.0				0.0	20.6	0.0
Cycle Q Clear(g_c), s				0.0	10.3	0.0				0.0	20.6	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	738	0				0	2688	0
V/C Ratio(X)				0.00	0.75	0.00				0.00	0.60	0.00
Avail Cap(c_a), veh/h				0	1062	0				0	2688	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	26.0	0.0				0.0	22.1	0.0
Incr Delay (d2), s/veh				0.0	1.8	0.0				0.0	1.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	5.2	0.0				0.0	9.9	0.0
LnGrp Delay(d),s/veh				0.0	27.8	0.0				0.0	23.1	0.0
LnGrp LOS					C						C	
Approach Vol, veh/h					553						1623	
Approach Delay, s/veh					27.8						23.1	
Approach LOS					C						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				20.6		43.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				21.0		37.0						
Max Q Clear Time (g_c+I1), s				12.3		22.6						
Green Ext Time (p_c), s				2.3		9.4						
Intersection Summary												
HCM 2010 Ctrl Delay				24.3								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
 21: Columbia Ave & I-26 WB Off Ramp

2040 Build DDI AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 					 
Traffic Volume (vph)	1026	0	0	0	0	582
Future Volume (vph)	1026	0	0	0	0	582
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	191					
Link Speed (mph)	30		35			35
Link Distance (ft)	161		300			170
Travel Time (s)	3.7		5.8			3.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1140	0	0	0	0	647
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	22.0					22.0
Total Split (s)	39.0					31.0
Total Split (%)	55.7%					44.3%
Maximum Green (s)	33.0					25.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	27.3					30.7
Actuated g/C Ratio	0.39					0.44
v/c Ratio	0.78					0.42
Control Delay	19.3					8.9
Queue Delay	0.0					0.4
Total Delay	19.3					9.3
LOS	B					A
Approach Delay	19.3					9.3

Lanes, Volumes, Timings
 21: Columbia Ave & I-26 WB Off Ramp

2040 Build DDI AM

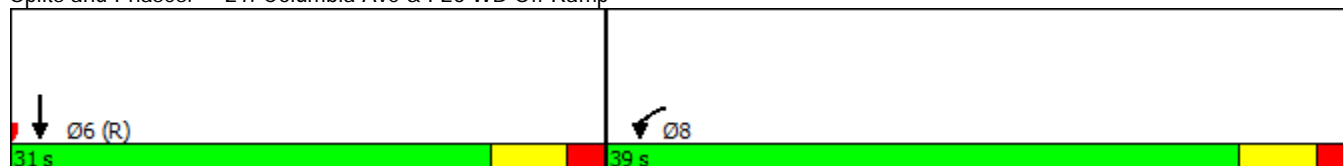












Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B			A		
Queue Length 50th (ft)	178			97		
Queue Length 95th (ft)	215			160		
Internal Link Dist (ft)	81		220		90	
Turn Bay Length (ft)						
Base Capacity (vph)	1719			1553		
Starvation Cap Reductn	0			451		
Spillback Cap Reductn	0			0		
Storage Cap Reductn	0			0		
Reduced v/c Ratio	0.66			0.59		

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	9 (13%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	15.6
Intersection LOS:	B
Intersection Capacity Utilization	55.4%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 21: Columbia Ave & I-26 WB Off Ramp



								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 					 		
Traffic Volume (veh/h)	1026	0	0	0	0	582		
Future Volume (veh/h)	1026	0	0	0	0	582		
Number	3	18			1	6		
Initial Q (Qb), veh	0	0			0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00			
Parking Bus, Adj	1.00	1.00			1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	0			0	1863		
Adj Flow Rate, veh/h	1140	0			0	647		
Adj No. of Lanes	2	0			0	2		
Peak Hour Factor	0.90	0.90			0.90	0.90		
Percent Heavy Veh, %	2	0			0	2		
Cap, veh/h	0	0			0	1264		
Arrive On Green	0.00	0.00			0.00	0.12		
Sat Flow, veh/h	0				0	3725		
Grp Volume(v), veh/h	0.0				0	647		
Grp Sat Flow(s),veh/h/ln					0	1770		
Q Serve(g_s), s					0.0	12.0		
Cycle Q Clear(g_c), s					0.0	12.0		
Prop In Lane					0.00			
Lane Grp Cap(c), veh/h					0	1264		
V/C Ratio(X)					0.00	0.51		
Avail Cap(c_a), veh/h					0	1264		
HCM Platoon Ratio					1.00	0.33		
Upstream Filter(l)					0.00	0.97		
Uniform Delay (d), s/veh					0.0	25.1		
Incr Delay (d2), s/veh					0.0	1.4		
Initial Q Delay(d3),s/veh					0.0	0.0		
%ile BackOfQ(50%),veh/ln					0.0	6.1		
LnGrp Delay(d),s/veh					0.0	26.6		
LnGrp LOS						C		
Approach Vol, veh/h						647		
Approach Delay, s/veh						26.6		
Approach LOS						C		
Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						31.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						25.0		
Max Q Clear Time (g_c+l1), s						14.0		
Green Ext Time (p_c), s						3.2		
Intersection Summary								
HCM 2010 Ctrl Delay			26.6					
HCM 2010 LOS			C					

Lanes, Volumes, Timings
 22: Columbia Ave & I-26 WB Ramps

2040 Build DDI AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	402	0	0	0	0	0	0	0	0	582	0
Future Volume (vph)	0	402	0	0	0	0	0	0	0	0	582	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		147			115			170			129	
Travel Time (s)		2.9			2.2			3.3			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	447	0	0	0	0	0	0	0	0	647	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		32.0									38.0	
Total Split (%)		45.7%									54.3%	
Maximum Green (s)		26.0									32.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		14.5									43.5	
Actuated g/C Ratio		0.21									0.62	
v/c Ratio		0.61									0.29	
Control Delay		6.1									7.1	
Queue Delay		0.0									0.1	
Total Delay		6.1									7.2	
LOS		A									A	
Approach Delay		6.1									7.2	

Lanes, Volumes, Timings
 22: Columbia Ave & I-26 WB Ramps

2040 Build DDI AM

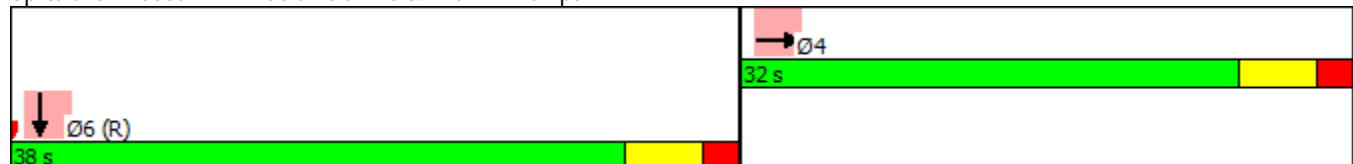


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A										A
Queue Length 50th (ft)		4										58
Queue Length 95th (ft)		5										101
Internal Link Dist (ft)		67			35			90				49
Turn Bay Length (ft)												
Base Capacity (vph)		1314										2199
Starvation Cap Reductn		0										0
Spillback Cap Reductn		0										439
Storage Cap Reductn		0										0
Reduced v/c Ratio		0.34										0.37

Intersection Summary













Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	5 (7%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	6.7
Intersection LOS:	A
Intersection Capacity Utilization	37.2%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 22: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
 22: Columbia Ave & I-26 WB Ramps

2040 Build DDI AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (veh/h)	0	402	0	0	0	0	0	0	0	0	582	0
Future Volume (veh/h)	0	402	0	0	0	0	0	0	0	0	582	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	447	0							0	647	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	646	0							0	1618	0
Arrive On Green	0.00	0.18	0.00							0.00	0.46	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	447	0							0	647	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	8.3	0.0							0.0	8.5	0.0
Cycle Q Clear(g_c), s	0.0	8.3	0.0							0.0	8.5	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	646	0							0	1618	0
V/C Ratio(X)	0.00	0.69	0.00							0.00	0.40	0.00
Avail Cap(c_a), veh/h	0	1315	0							0	1618	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	26.8	0.0							0.0	12.6	0.0
Incr Delay (d2), s/veh	0.0	1.3	0.0							0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0							0.0	4.3	0.0
LnGrp Delay(d),s/veh	0.0	28.1	0.0							0.0	13.4	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		447									647	
Approach Delay, s/veh		28.1									13.4	
Approach LOS		C									B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				18.8		38.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				26.0		32.0						
Max Q Clear Time (g_c+l1), s				10.3		10.5						
Green Ext Time (p_c), s				2.5		4.3						
Intersection Summary												
HCM 2010 Ctrl Delay				19.4								
HCM 2010 LOS				B								

SimTraffic Simulation Summary
2040 Build DDI AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	7063	7226	7216	7169
Vehs Exited	7023	7148	7084	7085
Starting Vehs	248	289	256	261
Ending Vehs	288	367	388	343
Travel Distance (mi)	7643	7805	7774	7741
Travel Time (hr)	266.1	346.3	275.9	296.1
Total Delay (hr)	125.2	203.6	133.2	154.0
Total Stops	7425	9634	6909	7988
Fuel Used (gal)	307.1	328.7	314.1	316.6

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	7063	7226	7216	7169
Vehs Exited	7023	7148	7084	7085
Starting Vehs	248	289	256	261
Ending Vehs	288	367	388	343
Travel Distance (mi)	7643	7805	7774	7741
Travel Time (hr)	266.1	346.3	275.9	296.1
Total Delay (hr)	125.2	203.6	133.2	154.0
Total Stops	7425	9634	6909	7988
Fuel Used (gal)	307.1	328.7	314.1	316.6

Queuing and Blocking Report
2040 Build DDI AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	WB	WB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	138	125	98	108	88
Average Queue (ft)	123	51	66	92	37
95th Queue (ft)	159	103	112	110	77
Link Distance (ft)	57	57	13	13	13
Upstream Blk Time (%)	44	9	18	33	14
Queuing Penalty (veh)	111	23	86	159	70
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 21: Columbia Ave & I-26 WB Off Ramp

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	168	186	62	96
Average Queue (ft)	136	151	26	43
95th Queue (ft)	175	183	62	72
Link Distance (ft)	103	103	30	30
Upstream Blk Time (%)	18	25	11	39
Queuing Penalty (veh)	94	127	32	112
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 22: Columbia Ave & I-26 WB Ramps

Movement	EB	EB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	94	90	83	171
Average Queue (ft)	59	73	23	127
95th Queue (ft)	100	111	60	177
Link Distance (ft)	13	13	16	16
Upstream Blk Time (%)	46	45	8	43
Queuing Penalty (veh)	92	90	23	124
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Lanes, Volumes, Timings
1: I-26 EB Ramps & Columbia Ave

2040 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	0	723	0	0	0	0	0	1781	0
Future Volume (vph)	0	0	0	0	723	0	0	0	0	0	1781	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		135			109			140			150	
Travel Time (s)		2.6			2.1			2.7			2.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	803	0	0	0	0	0	1979	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					25.0						35.0	
Total Split (%)					41.7%						58.3%	
Maximum Green (s)					19.0						29.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					18.0						30.0	
Actuated g/C Ratio					0.30						0.50	
v/c Ratio					0.76						0.78	
Control Delay					19.5						11.1	
Queue Delay					0.0						0.0	
Total Delay					19.5						11.1	
LOS					B						B	
Approach Delay					19.5						11.1	

Lanes, Volumes, Timings
 1: I-26 EB Ramps & Columbia Ave

2040 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B							B
Queue Length 50th (ft)					83							127
Queue Length 95th (ft)					m146							209
Internal Link Dist (ft)		55			29			60				70
Turn Bay Length (ft)												
Base Capacity (vph)					1120							2542
Starvation Cap Reductn					0							0
Spillback Cap Reductn					0							0
Storage Cap Reductn					0							0
Reduced v/c Ratio					0.72							0.78

Intersection Summary













Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 45 (75%), Referenced to phase 6:SBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 13.5
 Intersection LOS: B
 Intersection Capacity Utilization 64.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: I-26 EB Ramps & Columbia Ave



HCM 2010 Signalized Intersection Summary
 1: I-26 EB Ramps & Columbia Ave

2040 Build DDI PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Traffic Volume (veh/h)	0	0	0	0	723	0	0	0	0	0	1781	0
Future Volume (veh/h)	0	0	0	0	723	0	0	0	0	0	1781	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	803	0				0	1979	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	987	0				0	2458	0
Arrive On Green				0.00	0.28	0.00				0.00	0.16	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	803	0				0	1979	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	12.7	0.0				0.0	22.5	0.0
Cycle Q Clear(g_c), s				0.0	12.7	0.0				0.0	22.5	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	987	0				0	2458	0
V/C Ratio(X)				0.00	0.81	0.00				0.00	0.81	0.00
Avail Cap(c_a), veh/h				0	1121	0				0	2458	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	20.2	0.0				0.0	22.5	0.0
Incr Delay (d2), s/veh				0.0	4.2	0.0				0.0	2.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	6.7	0.0				0.0	11.2	0.0
LnGrp Delay(d),s/veh				0.0	24.4	0.0				0.0	25.4	0.0
LnGrp LOS					C						C	
Approach Vol, veh/h					803						1979	
Approach Delay, s/veh					24.4						25.4	
Approach LOS					C						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				22.7		35.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				19.0		29.0						
Max Q Clear Time (g_c+I1), s				14.7		24.5						
Green Ext Time (p_c), s				2.0		3.9						
Intersection Summary												
HCM 2010 Ctrl Delay				25.1								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
 21: Columbia Ave & I-26 WB Off Ramp

2040 Build DDI PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↘					↕↕
Traffic Volume (vph)	1325	0	0	0	0	713
Future Volume (vph)	1325	0	0	0	0	713
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	59					
Link Speed (mph)	30		35			35
Link Distance (ft)	149		327			152
Travel Time (s)	3.4		6.4			3.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1472	0	0	0	0	792
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	15.0					22.0
Total Split (s)	36.0					24.0
Total Split (%)	60.0%					40.0%
Maximum Green (s)	30.0					18.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	29.0					19.0
Actuated g/C Ratio	0.48					0.32
v/c Ratio	0.87					0.71
Control Delay	20.3					13.0
Queue Delay	0.0					0.5
Total Delay	20.3					13.5
LOS	C					B
Approach Delay	20.3					13.5

Lanes, Volumes, Timings
 21: Columbia Ave & I-26 WB Off Ramp

2040 Build DDI PM

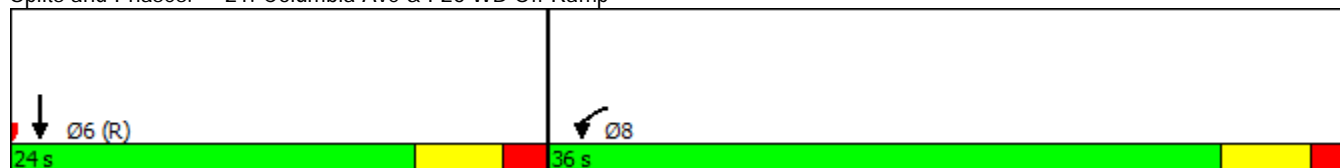












Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C					B
Queue Length 50th (ft)	210					134
Queue Length 95th (ft)	#308					193
Internal Link Dist (ft)	69		247		72	
Turn Bay Length (ft)						
Base Capacity (vph)	1746					1118
Starvation Cap Reductn	0					86
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.84					0.77

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 17.9
 Intersection Capacity Utilization 67.5%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 21: Columbia Ave & I-26 WB Off Ramp



								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 					 		
Traffic Volume (veh/h)	1325	0	0	0	0	713		
Future Volume (veh/h)	1325	0	0	0	0	713		
Number	3	18			1	6		
Initial Q (Qb), veh	0	0			0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00			
Parking Bus, Adj	1.00	1.00			1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	0			0	1863		
Adj Flow Rate, veh/h	1472	0			0	792		
Adj No. of Lanes	2	0			0	2		
Peak Hour Factor	0.90	0.90			0.90	0.90		
Percent Heavy Veh, %	2	0			0	2		
Cap, veh/h	0	0			0	1062		
Arrive On Green	0.00	0.00			0.00	0.10		
Sat Flow, veh/h	0				0	3725		
Grp Volume(v), veh/h	0.0				0	792		
Grp Sat Flow(s),veh/h/ln					0	1770		
Q Serve(g_s), s					0.0	13.1		
Cycle Q Clear(g_c), s					0.0	13.1		
Prop In Lane					0.00			
Lane Grp Cap(c), veh/h					0	1062		
V/C Ratio(X)					0.00	0.75		
Avail Cap(c_a), veh/h					0	1062		
HCM Platoon Ratio					1.00	0.33		
Upstream Filter(l)					0.00	0.91		
Uniform Delay (d), s/veh					0.0	24.8		
Incr Delay (d2), s/veh					0.0	4.4		
Initial Q Delay(d3),s/veh					0.0	0.0		
%ile BackOfQ(50%),veh/ln					0.0	7.0		
LnGrp Delay(d),s/veh					0.0	29.2		
LnGrp LOS						C		
Approach Vol, veh/h						792		
Approach Delay, s/veh						29.2		
Approach LOS						C		
Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						24.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						18.0		
Max Q Clear Time (g_c+l1), s						15.1		
Green Ext Time (p_c), s						1.4		
Intersection Summary								
HCM 2010 Ctrl Delay			29.2					
HCM 2010 LOS			C					

Lanes, Volumes, Timings
 22: Columbia Ave & I-26 WB Ramps

2040 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	543	0	0	0	0	0	0	0	0	713	0
Future Volume (vph)	0	543	0	0	0	0	0	0	0	0	713	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		159			115			152			129	
Travel Time (s)		3.1			2.2			3.0			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	603	0	0	0	0	0	0	0	0	792	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		27.0									33.0	
Total Split (%)		45.0%									55.0%	
Maximum Green (s)		21.0									27.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		16.2									31.8	
Actuated g/C Ratio		0.27									0.53	
v/c Ratio		0.63									0.42	
Control Delay		5.8									10.2	
Queue Delay		0.0									0.8	
Total Delay		5.8									11.0	
LOS		A									B	
Approach Delay		5.8									11.0	

Lanes, Volumes, Timings
 22: Columbia Ave & I-26 WB Ramps

2040 Build DDI PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A										B
Queue Length 50th (ft)		5										83
Queue Length 95th (ft)		6										144
Internal Link Dist (ft)		79			35			72				49
Turn Bay Length (ft)												
Base Capacity (vph)		1238										1875
Starvation Cap Reductn		0										0
Spillback Cap Reductn		0										718
Storage Cap Reductn		0										0
Reduced v/c Ratio		0.49										0.68

Intersection Summary













Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	4 (7%), Referenced to phase 6:SBT, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	8.8
Intersection LOS:	A
Intersection Capacity Utilization	44.7%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 22: Columbia Ave & I-26 WB Ramps



HCM 2010 Signalized Intersection Summary
 22: Columbia Ave & I-26 WB Ramps

2040 Build DDI PM




















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (veh/h)	0	543	0	0	0	0	0	0	0	0	713	0
Future Volume (veh/h)	0	543	0	0	0	0	0	0	0	0	713	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	603	0							0	792	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	834	0							0	1593	0
Arrive On Green	0.00	0.24	0.00							0.00	0.45	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	603	0							0	792	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	9.4	0.0							0.0	9.5	0.0
Cycle Q Clear(g_c), s	0.0	9.4	0.0							0.0	9.5	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	834	0							0	1593	0
V/C Ratio(X)	0.00	0.72	0.00							0.00	0.50	0.00
Avail Cap(c_a), veh/h	0	1239	0							0	1593	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	21.1	0.0							0.0	11.7	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0							0.0	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.7	0.0							0.0	4.9	0.0
LnGrp Delay(d),s/veh	0.0	22.3	0.0							0.0	12.8	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		603									792	
Approach Delay, s/veh		22.3									12.8	
Approach LOS		C									B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6						
Phs Duration (G+Y+Rc), s				20.1		33.0						
Change Period (Y+Rc), s				6.0		6.0						
Max Green Setting (Gmax), s				21.0		27.0						
Max Q Clear Time (g_c+I1), s				11.4		11.5						
Green Ext Time (p_c), s				2.7		4.8						
Intersection Summary												
HCM 2010 Ctrl Delay			16.9									
HCM 2010 LOS			B									

APPENDIX M

BUILD ALT 2 2040 SYNCHRO AND SIM TRAFFIC REPORTS

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2040 Build Loop AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	9	185	0	0	0	0	498	1261	147	1461	0
Future Volume (vph)	29	9	185	0	0	0	0	498	1261	147	1461	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.963								0.950		
Satd. Flow (prot)	0	1794	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.963								0.432		
Satd. Flow (perm)	0	1794	1583	0	0	0	0	1863	1583	805	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62						973			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1099			740	
Travel Time (s)		13.3			3.6			21.4			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	32	10	206	0	0	0	0	553	1401	163	1623	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	206	0	0	0	0	553	1401	163	1623	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		

Lanes, Volumes, Timings
1: Columbia Ave & I-26 EB Ramps

2040 Build Loop AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	16.0	16.0	16.0					74.0	74.0	74.0	74.0	
Total Split (%)	17.8%	17.8%	17.8%					82.2%	82.2%	82.2%	82.2%	
Maximum Green (s)	10.0	10.0	10.0					68.0	68.0	68.0	68.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	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	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effect Green (s)		9.9	9.9					68.1	68.1	68.1	68.1	
Actuated g/C Ratio		0.11	0.11					0.76	0.76	0.76	0.76	
v/c Ratio		0.21	0.90					0.39	0.98	0.27	0.61	
Control Delay		39.4	67.3					2.0	25.5	4.6	6.1	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		39.4	67.3					2.0	25.5	4.6	6.1	
LOS		D	E					A	C	A	A	
Approach Delay		62.6						18.8			6.0	
Approach LOS		E						B			A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 21 (23%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 107.2%

ICU Level of Service G




















Analysis Period (min) 15

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps



HCM 2010 Signalized Intersection Summary
 1: Columbia Ave & I-26 EB Ramps

2040 Build Loop AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	9	185	0	0	0	0	498	1261	147	1461	0
Future Volume (veh/h)	29	9	185	0	0	0	0	498	1261	147	1461	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	32	10	0				0	553	0	163	1623	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	69	22	80				0	1520	1292	709	2888	0
Arrive On Green	0.05	0.05	0.00				0.00	0.82	0.00	0.82	0.82	0.00
Sat Flow, veh/h	1367	427	1583				0	1863	1583	852	3632	0
Grp Volume(v), veh/h	42	0	0				0	553	0	163	1623	0
Grp Sat Flow(s),veh/h/ln	1794	0	1583				0	1863	1583	852	1770	0
Q Serve(g_s), s	2.0	0.0	0.0				0.0	7.0	0.0	5.6	14.0	0.0
Cycle Q Clear(g_c), s	2.0	0.0	0.0				0.0	7.0	0.0	12.6	14.0	0.0
Prop In Lane	0.76		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	91	0	80				0	1520	1292	709	2888	0
V/C Ratio(X)	0.46	0.00	0.00				0.00	0.36	0.00	0.23	0.56	0.00
Avail Cap(c_a), veh/h	199	0	176				0	1520	1292	709	2888	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00				0.00	0.69	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.5	0.0	0.0				0.0	2.2	0.0	3.8	2.8	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	0.5	0.0	0.8	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0				0.0	3.7	0.0	1.4	6.9	0.0
LnGrp Delay(d),s/veh	45.2	0.0	0.0				0.0	2.6	0.0	4.6	3.6	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		42						553			1786	
Approach Delay, s/veh		45.2						2.6			3.7	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		79.4		10.6		79.4						
Change Period (Y+Rc), s		6.0		6.0		6.0						
Max Green Setting (Gmax), s		68.0		10.0		68.0						
Max Q Clear Time (g_c+I1), s		9.0		4.0		16.0						
Green Ext Time (p_c), s		33.2		0.0		30.9						
Intersection Summary												
HCM 2010 Ctrl Delay			4.2									
HCM 2010 LOS			A									

Intersection													
Int Delay, s/veh	2.5												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations			↗		↘		↗	↘			↘	↗	
Traffic Vol, veh/h	0	0	1026	0	3	159	125	402	0	0	582	56	
Future Vol, veh/h	0	0	1026	0	3	159	125	402	0	0	582	56	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150	
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	1140	0	3	177	139	447	0	0	647	62	
Major/Minor				Minor1			Major1			Major2			
Conflicting Flow All				-	1371	447	647	0	-	-	-	0	
Stage 1				-	724	-	-	-	-	-	-		
Stage 2				-	647	-	-	-	-	-	-		
Critical Hdwy				-	6.52	6.22	4.12	-	-	-	-		
Critical Hdwy Stg 1				-	5.52	-	-	-	-	-	-		
Critical Hdwy Stg 2				-	5.52	-	-	-	-	-	-		
Follow-up Hdwy				-	4.018	3.318	2.218	-	-	-	-		
Pot Cap-1 Maneuver				0	146	612	939	-	0	0	-		
Stage 1				0	430	-	-	-	0	0	-		
Stage 2				0	467	-	-	-	0	0	-		
Platoon blocked, %													
Mov Cap-1 Maneuver				-	0	612	939	-	-	-	-		
Mov Cap-2 Maneuver				-	0	-	-	-	-	-	-		
Stage 1				-	0	-	-	-	-	-	-		
Stage 2				-	0	-	-	-	-	-	-		
Approach				WB			NB			SB			
HCM Control Delay, s				13.3			2.3			0			
HCM LOS				B									
Minor Lane/Major Mvmt				NBL	NBTWBLn1	SBT	SBR						
Capacity (veh/h)				939	-	612	-	-					
HCM Lane V/C Ratio				0.148	-	0.294	-	-					
HCM Control Delay (s)				9.5	-	13.3	-	-					
HCM Lane LOS				A	-	B	-	-					
HCM 95th %tile Q(veh)				0.5	-	1.2	-	-					

SimTraffic Simulation Summary
 2040 Build Loop AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	7126	7166	7170	7153
Vehs Exited	7053	7137	7105	7097
Starting Vehs	206	249	253	232
Ending Vehs	279	278	318	289
Travel Distance (mi)	7952	8033	8009	7998
Travel Time (hr)	264.0	268.1	284.3	272.1
Total Delay (hr)	110.8	114.2	130.7	118.5
Total Stops	5500	5470	6120	5699
Fuel Used (gal)	308.2	311.4	313.6	311.1

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	7126	7166	7170	7153
Vehs Exited	7053	7137	7105	7097
Starting Vehs	206	249	253	232
Ending Vehs	279	278	318	289
Travel Distance (mi)	7952	8033	8009	7998
Travel Time (hr)	264.0	268.1	284.3	272.1
Total Delay (hr)	110.8	114.2	130.7	118.5
Total Stops	5500	5470	6120	5699
Fuel Used (gal)	308.2	311.4	313.6	311.1

Queuing and Blocking Report
2040 Build Loop AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	R	L	T	T
Maximum Queue (ft)	105	94	404	738	93	126	158
Average Queue (ft)	30	4	44	82	36	49	54
95th Queue (ft)	74	43	180	456	69	117	127
Link Distance (ft)		761	1032	1032		690	690
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	225				150		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB
Directions Served	TR	L
Maximum Queue (ft)	74	72
Average Queue (ft)	35	30
95th Queue (ft)	56	59
Link Distance (ft)	543	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		175
Storage Blk Time (%)		
Queuing Penalty (veh)		

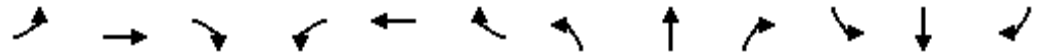
Lanes, Volumes, Timings
 1: Columbia Ave & I-26 EB Ramps

2040 Build Loop PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	9	173	0	0	0	0	723	1096	257	1781	0
Future Volume (vph)	48	9	173	0	0	0	0	723	1096	257	1781	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	1788	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.960								0.291		
Satd. Flow (perm)	0	1788	1583	0	0	0	0	1863	1583	542	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36						992			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1090			740	
Travel Time (s)		13.3			3.6			21.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	192	0	0	0	0	803	1218	286	1979	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	18.0	18.0	18.0					72.0	72.0	72.0	72.0	
Total Split (%)	20.0%	20.0%	20.0%					80.0%	80.0%	80.0%	80.0%	
Maximum Green (s)	12.0	12.0	12.0					66.0	66.0	66.0	66.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	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	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		11.6	11.6					66.4	66.4	66.4	66.4	
Actuated g/C Ratio		0.13	0.13					0.74	0.74	0.74	0.74	
v/c Ratio		0.27	0.82					0.58	0.85	0.72	0.76	
Control Delay		38.5	58.4					5.9	12.5	19.6	9.6	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	

Lanes, Volumes, Timings
 1: Columbia Ave & I-26 EB Ramps

2040 Build Loop PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		38.5	58.4					5.9	12.5	19.6	9.6	
LOS		D	E					A	B	B	A	
Approach Delay		53.5						9.9			10.8	
Approach LOS		D						A			B	
Queue Length 50th (ft)		33	87					117	215	76	295	
Queue Length 95th (ft)		71	#198					200	387	#260	381	
Internal Link Dist (ft)		801			159			1010			660	
Turn Bay Length (ft)										150		
Base Capacity (vph)		241	245					1378	1429	400	2618	
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		0.26	0.78					0.58	0.85	0.71	0.76	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 83 (92%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 12.8
 Intersection LOS: B
 Intersection Capacity Utilization 102.9%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps



HCM 2010 Signalized Intersection Summary
 1: Columbia Ave & I-26 EB Ramps

2040 Build Loop PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	9	173	0	0	0	0	723	1096	257	1781	0
Future Volume (veh/h)	48	9	173	0	0	0	0	723	1096	257	1781	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	53	10	0				0	803	0	286	1979	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	93	18	98				0	1499	1275	623	2849	0
Arrive On Green	0.06	0.06	0.00				0.00	1.00	0.00	0.80	0.80	0.00
Sat Flow, veh/h	1504	284	1583				0	1863	1583	675	3632	0
Grp Volume(v), veh/h	63	0	0				0	803	0	286	1979	0
Grp Sat Flow(s),veh/h/ln	1788	0	1583				0	1863	1583	675	1770	0
Q Serve(g_s), s	3.1	0.0	0.0				0.0	0.0	0.0	12.9	22.3	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0				0.0	0.0	0.0	12.9	22.3	0.0
Prop In Lane	0.84		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	110	0	98				0	1499	1275	623	2849	0
V/C Ratio(X)	0.57	0.00	0.00				0.00	0.54	0.00	0.46	0.69	0.00
Avail Cap(c_a), veh/h	238	0	211				0	1499	1275	623	2849	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.56	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.1	0.0	0.0				0.0	0.0	0.0	3.0	3.9	0.0
Incr Delay (d2), s/veh	4.6	0.0	0.0				0.0	0.8	0.0	2.4	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0				0.0	0.3	0.0	2.7	11.0	0.0
LnGrp Delay(d),s/veh	45.7	0.0	0.0				0.0	0.8	0.0	5.4	5.3	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		63						803			2265	
Approach Delay, s/veh		45.7						0.8			5.3	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		78.4		11.6		78.4						
Change Period (Y+Rc), s		6.0		6.0		6.0						
Max Green Setting (Gmax), s		66.0		12.0		66.0						
Max Q Clear Time (g_c+l1), s		2.0		5.1		24.3						
Green Ext Time (p_c), s		51.7		0.1		36.1						
Intersection Summary												
HCM 2010 Ctrl Delay			5.0									
HCM 2010 LOS			A									

Intersection

Int Delay, s/veh 4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗		↗		↗	↗			↗	↗
Traffic Vol, veh/h	0	0	1325	0	3	248	228	543	0	0	713	36
Future Vol, veh/h	0	0	1325	0	3	248	228	543	0	0	713	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1472	0	3	276	253	603	0	0	792	40

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	- 1902 603	792 0 -	- - 0
Stage 1	- 1110 -	- - -	- - -
Stage 2	- 792 -	- - -	- - -
Critical Hdwy	- 6.52 6.22	4.12 - -	- - -
Critical Hdwy Stg 1	- 5.52 -	- - -	- - -
Critical Hdwy Stg 2	- 5.52 -	- - -	- - -
Follow-up Hdwy	- 4.018 3.318	2.218 - -	- - -
Pot Cap-1 Maneuver	0 69 499	829 - 0	0 - -
Stage 1	0 285 -	- - 0	0 - -
Stage 2	0 401 -	- - 0	0 - -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	- 0 499	829 - -	- - -
Mov Cap-2 Maneuver	- 0 -	- - -	- - -
Stage 1	- 0 -	- - -	- - -
Stage 2	- 0 -	- - -	- - -

Approach	WB	NB	SB
HCM Control Delay, s	21	3.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBTWBLn1	SBT	SBR
Capacity (veh/h)	829	- 499	- -	
HCM Lane V/C Ratio	0.306	- 0.559	- -	
HCM Control Delay (s)	11.2	- 21	- -	
HCM Lane LOS	B	- C	- -	
HCM 95th %tile Q(veh)	1.3	- 3.4	- -	

SimTraffic Simulation Summary

2040 Build Loop PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	7947	7934	7944	7939
Vehs Exited	7774	7802	7793	7790
Starting Vehs	293	297	322	301
Ending Vehs	466	429	473	455
Travel Distance (mi)	8876	8865	8887	8876
Travel Time (hr)	714.6	740.6	789.1	748.1
Total Delay (hr)	545.6	571.2	620.8	579.2
Total Stops	7925	7708	9099	8242
Fuel Used (gal)	444.8	453.7	461.6	453.4

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	7947	7934	7944	7939
Vehs Exited	7774	7802	7793	7790
Starting Vehs	293	297	322	301
Ending Vehs	466	429	473	455
Travel Distance (mi)	8876	8865	8887	8876
Travel Time (hr)	714.6	740.6	789.1	748.1
Total Delay (hr)	545.6	571.2	620.8	579.2
Total Stops	7925	7708	9099	8242
Fuel Used (gal)	444.8	453.7	461.6	453.4

Queuing and Blocking Report
2040 Build Loop PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	R	L	T	T
Maximum Queue (ft)	103	80	629	606	160	171	160
Average Queue (ft)	45	7	189	173	70	70	71
95th Queue (ft)	94	43	669	758	124	155	151
Link Distance (ft)		762	1024	1024		690	690
Upstream Blk Time (%)			0	2			
Queuing Penalty (veh)			4	16			
Storage Bay Dist (ft)	225				150		
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					3	1	

Intersection: 3: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	TR	L	R
Maximum Queue (ft)	96	137	7
Average Queue (ft)	46	56	0
95th Queue (ft)	76	102	4
Link Distance (ft)	543		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		175	150
Storage Blk Time (%)		0	
Queuing Penalty (veh)		1	

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2
Jurisdiction:
Analysis Year: 2040 Build Alt 2 Ramp
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	1713	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	162	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	1026	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1000	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1713	162	1026	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	45	285	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2018	185	1174	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 2018$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	2018	4800	No
$v_{FO} = v_F - v_R$	1833	4800	No
v_R	185	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2018$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2018	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 10.6$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.315	
Space mean speed in ramp influence area,	S = 64.6	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: AM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:
Analysis Year: 2040 Build Alt 2 Loop
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	2256	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	1026	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	184	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	550	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2256	1026	184	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	627	285	51	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2657	1174	211	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 2657 \text{ pc/h}$

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	2657	4800	No
$v_{FO} = v_F - v_R$	1483	4800	No
v_R	1174	2100	No
$v_3 \text{ or } v_{av34}$	0 pc/h	(Equation 13-14 or 13-17)	
Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$		No	
Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2657$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2657	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 16.1 \text{ pc/mi/ln}$

Level of service for ramp-freeway junction areas of influence B

----- Speed Estimation -----

Intermediate speed variable,	D = 0.404	
Space mean speed in ramp influence area,	S _R = 61.7	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 61.7	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2
Jurisdiction:
Analysis Year: 2040 Build Alt 2 Ramp
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	1325	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	247	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	1026	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	1000	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1325	247	1026	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	368	69	285	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1561	283	1174	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 1561$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	1561	4800	No
$v_{FO} = v_F - v_R$	1278	4800	No
v_R	283	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 1561$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1561	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 6.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

----- Speed Estimation -----

Intermediate speed variable,	D = 0.323	
Space mean speed in ramp influence area,	S _R = 64.3	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 64.3	mph

Phone: Fax:
E-mail:

-----Diverge Analysis-----

Analyst: AECOM
Agency/Co.: AECOM
Date performed: 7/1/2016
Analysis time period: PM Peak
Freeway/Dir of Travel: I-26 WB
Junction: S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:
Analysis Year: 2040 Build Alt 2 Loop
Description: S-48 IMR

-----Freeway Data-----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	75.0	mph	
Volume on freeway	3216	vph	

-----Off Ramp Data-----

Side of freeway	Right		
Number of lanes in ramp	1		
Free-Flow speed on ramp	45.0	mph	
Volume on ramp	1325	vph	
Length of first accel/decel lane	1225	ft	
Length of second accel/decel lane		ft	

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes		
Volume on adjacent ramp	267	vph	
Position of adjacent ramp	Downstream		
Type of adjacent ramp	On		
Distance to adjacent ramp	550	ft	

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3216	1325	267	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	893	368	74	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

Heavy vehicle adjustment, fHV	0.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3788	1516	306	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P = 3788$ pc/h

12 R F R FD

----- Capacity Checks -----

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	3788	4800	No
$v_{FO} = v_F - v_R$	2272	4800	No
v_R	1516	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700$ pc/h?		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 3788$		(Equation 13-15, 13-16, 13-18, or 13-19)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3788	4400	No

----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 25.8$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

----- Speed Estimation -----

Intermediate speed variable,	D = 0.434	
Space mean speed in ramp influence area,	S = 60.7	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 60.7	mph

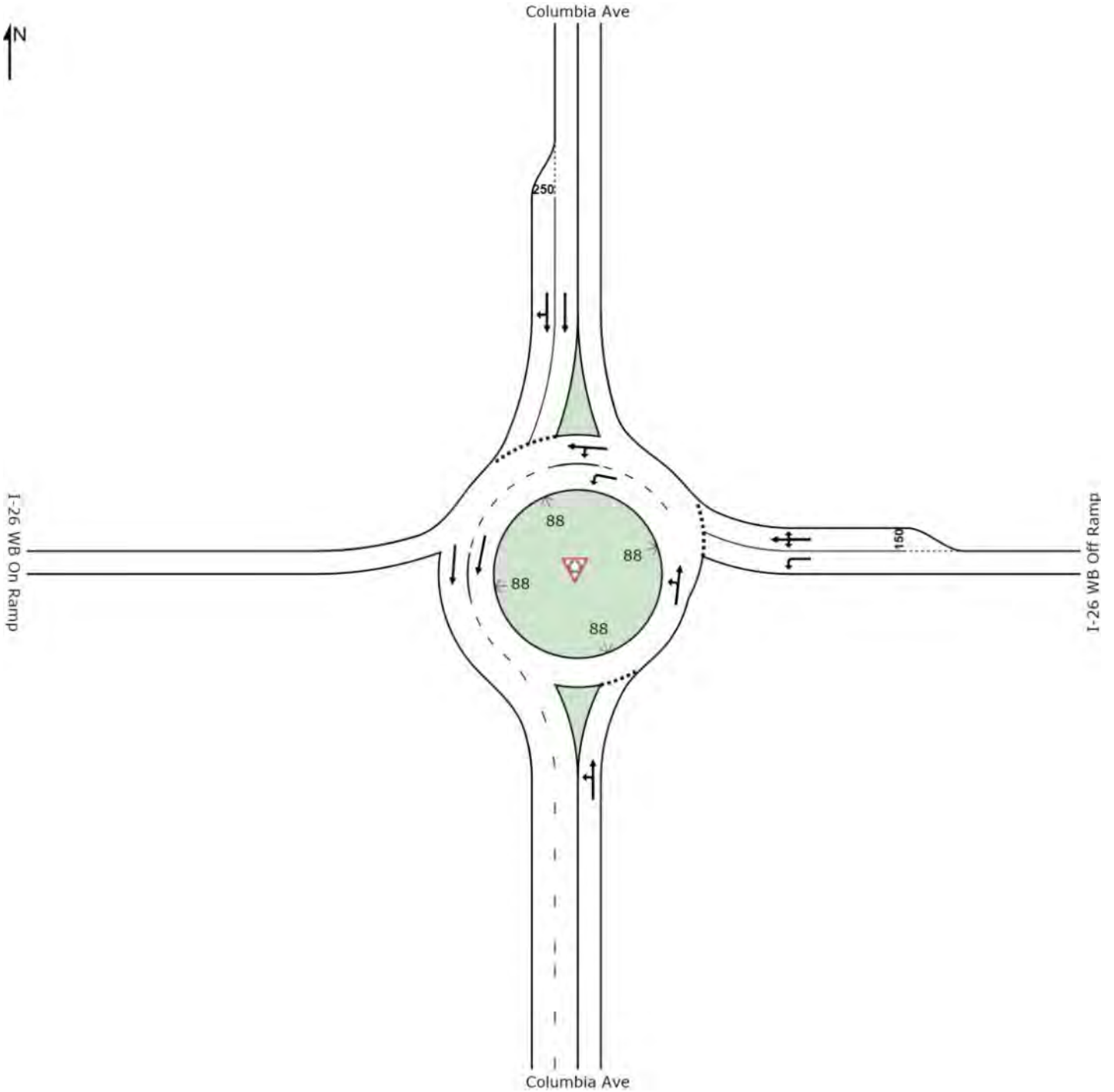
APPENDIX N

BUILD ALT 3 2020 AND 2040 SIDRA REPORTS

SITE LAYOUT

Site: I-26 WB Ramps 2020 AM - Alt 3

I-26 WB Ramps 2020 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 Site: I-26 WB Ramps 2020 AM - Alt 3

I-26 WB Ramps 2020 AM
Roundabout

Volume Display Method: Total and %

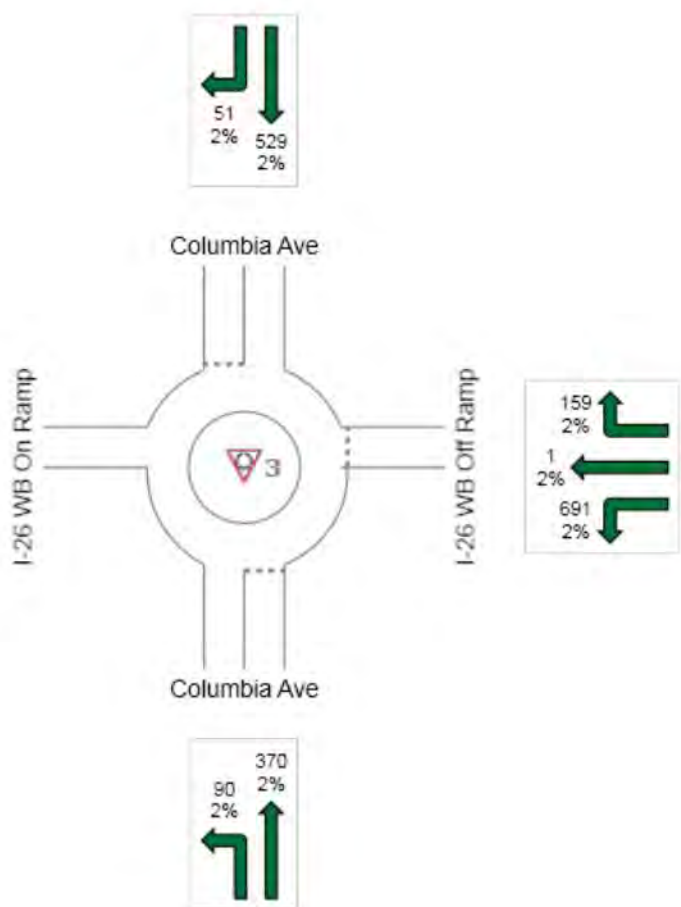
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 1891

Light Vehicles (LV): 1853

Heavy Vehicles (HV): 38



MOVEMENT SUMMARY

 Site: I-26 WB Ramps 2020 AM - Alt 3

I-26 WB Ramps 2020 AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	98	2.0	0.451	8.2	LOS A	0.0	0.0	0.00	0.00	26.0
8	T1	402	2.0	0.451	8.2	LOS A	0.0	0.0	0.00	0.00	25.5
Approach		500	2.0	0.451	8.2	LOS A	0.0	0.0	0.00	0.00	25.6
East: I-26 WB Off Ramp											
1	L2	751	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	20.6
6	T1	1	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	20.4
16	R2	173	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	19.9
Approach		925	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	20.4
North: Columbia Ave											
4	T1	575	2.0	0.533	15.5	LOS C	2.2	55.3	0.65	0.73	22.0
14	R2	55	2.0	0.533	15.2	LOS C	2.1	53.3	0.64	0.72	21.5
Approach		630	2.0	0.533	15.5	LOS C	2.2	55.3	0.65	0.73	22.0
All Vehicles		2055	2.0	0.695	15.9	LOS C	5.1	128.5	0.55	0.65	22.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

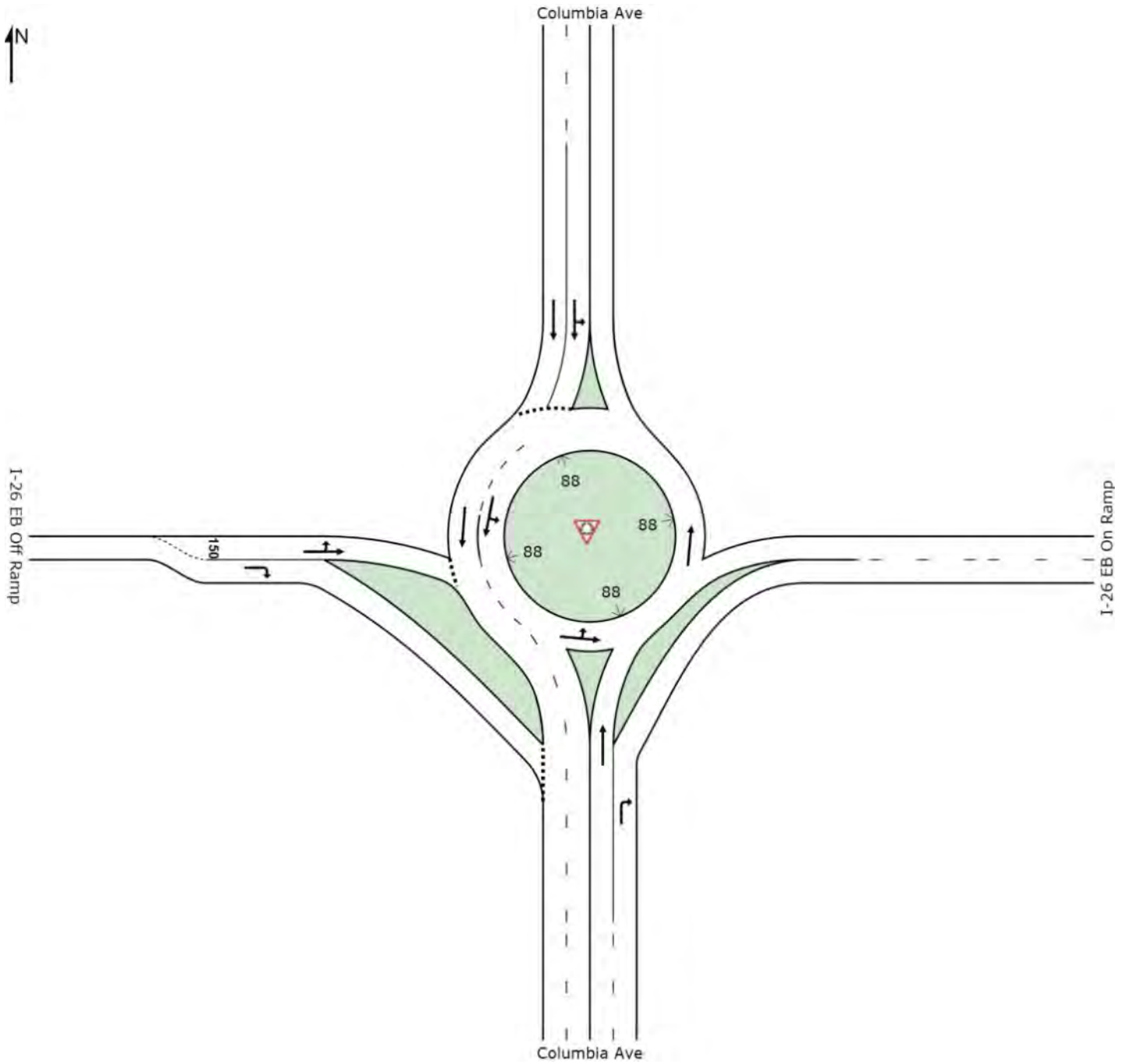
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

 Site: I-26 EB Ramps 2020 AM - Alt 3

I-26 EB Ramps 2020 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 Site: I-26 EB Ramps 2020 AM - Alt 3

I-26 EB Ramps 2020 AM
Roundabout

Volume Display Method: Total and %

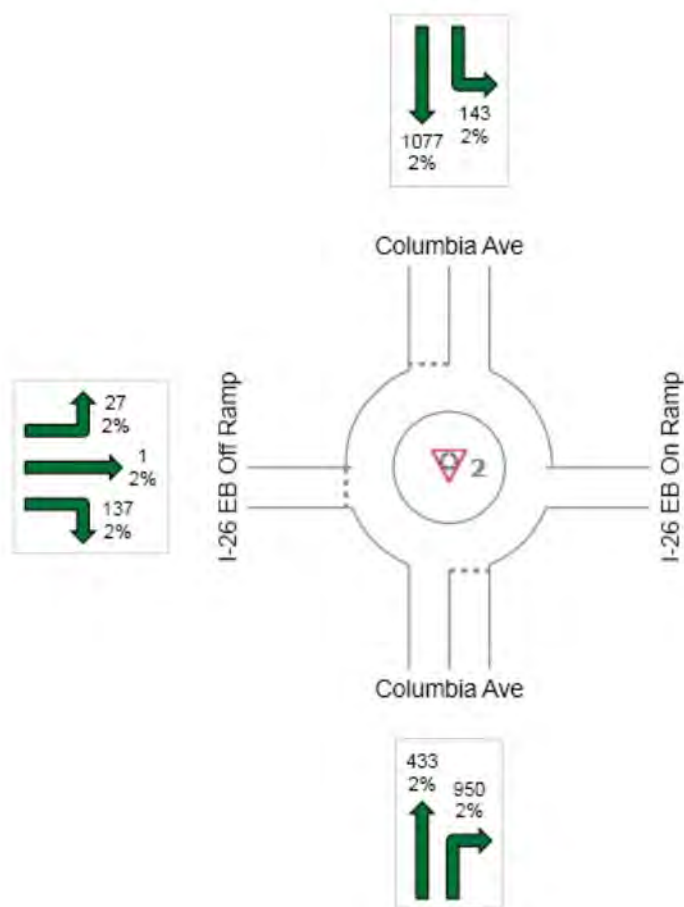
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 2768

Light Vehicles (LV): 2713

Heavy Vehicles (HV): 55



MOVEMENT SUMMARY

 **Site: I-26 EB Ramps 2020 AM - Alt 3**

I-26 EB Ramps 2020 AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	471	2.0	0.243	0.0	LOS A	0.0	0.0	0.00	0.00	25.8
18	R2	1033	2.0	0.629	0.2	LOS A	0.0	0.0	0.00	0.00	25.0
Approach		1503	2.0	0.629	0.1	NA	0.0	0.0	0.00	0.00	25.2
North: Columbia Ave											
7	L2	155	2.0	0.598	11.0	LOS B	0.0	0.0	0.00	0.00	25.9
4	T1	1171	2.0	0.598	11.0	LOS B	0.0	0.0	0.00	0.00	25.7
Approach		1326	2.0	0.598	11.0	LOS B	0.0	0.0	0.00	0.00	25.7
West: I-26 EB Off Ramp											
5	L2	29	2.0	0.071	9.4	LOS A	0.2	4.4	0.63	0.63	22.6
2	T1	1	2.0	0.071	9.4	LOS A	0.2	4.4	0.63	0.63	22.3
12	R2	149	2.0	0.310	12.4	LOS B	0.9	22.8	0.65	0.68	22.0
Approach		179	2.0	0.310	11.9	LOS B	0.9	22.8	0.65	0.67	22.1
All Vehicles		3009	2.0	0.629	5.6	LOS A	0.9	22.8	0.04	0.04	25.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

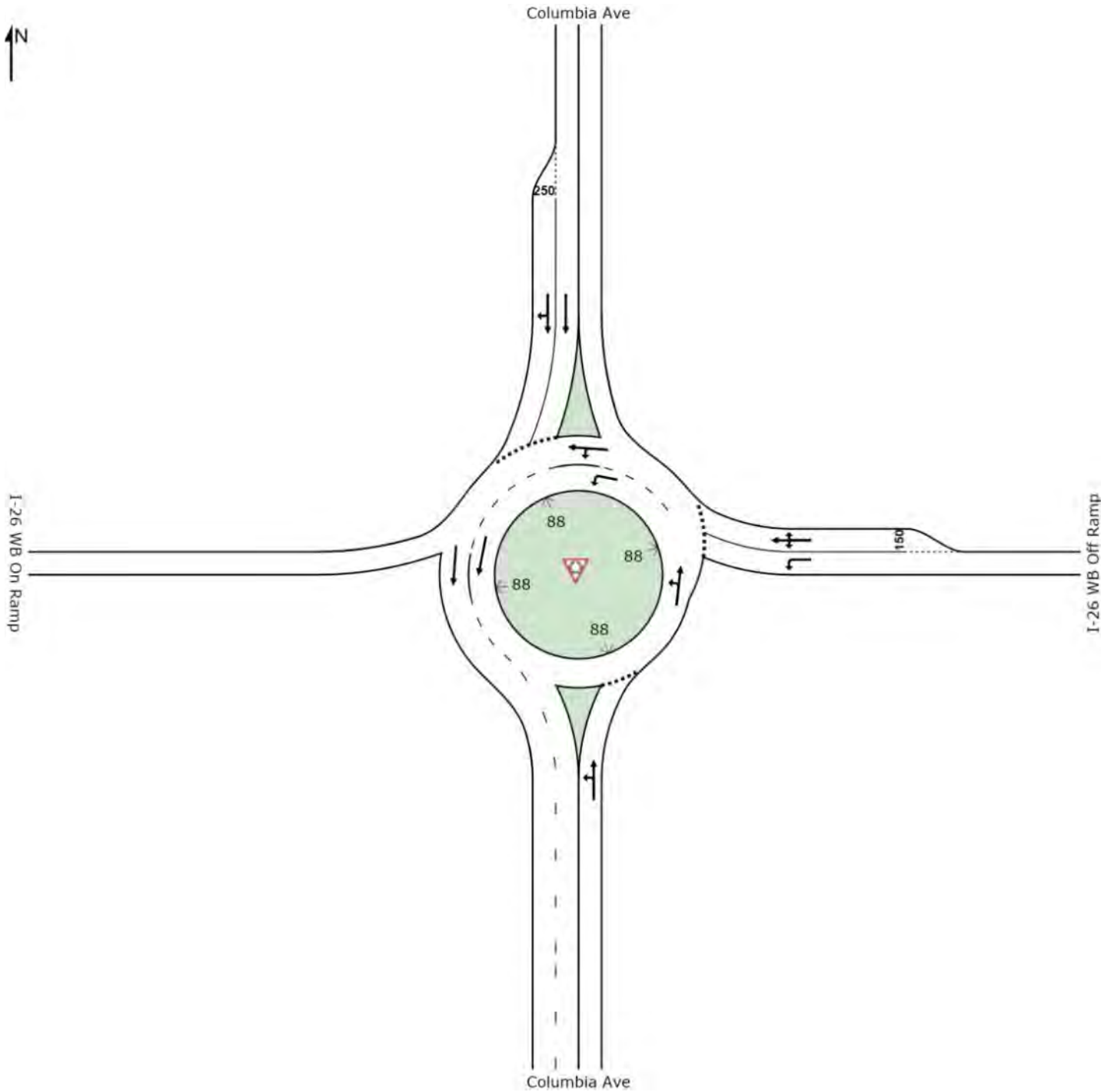
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

 Site: I-26 WB Ramps 2020 PM - Alt 3

I-26 WB Ramps 2042 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 **Site: I-26 WB Ramps 2020 PM - Alt 3**

I-26 WB Ramps 2042 PM
Roundabout

Volume Display Method: Total and %

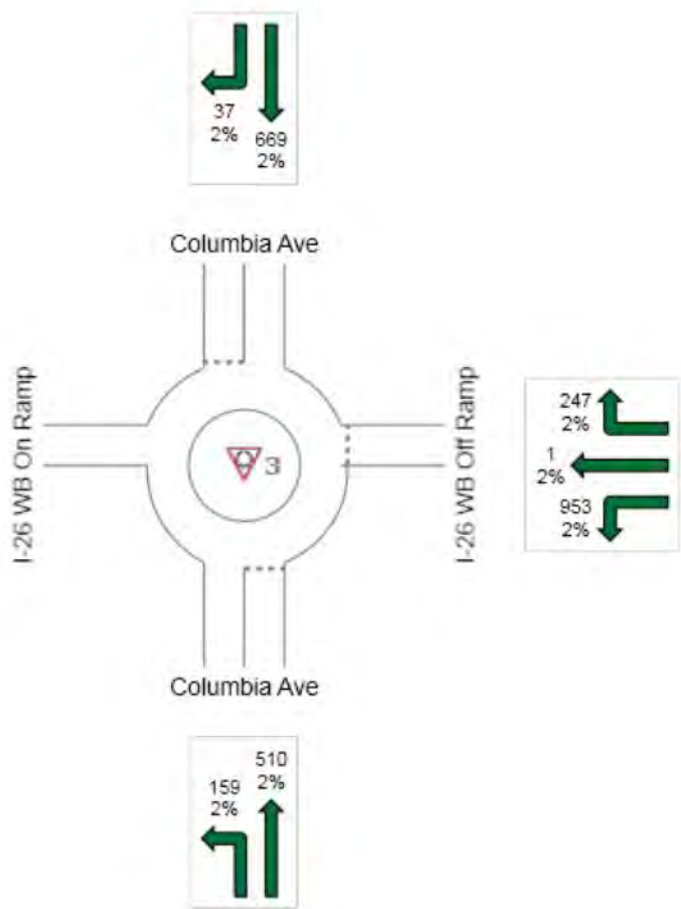
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 2576

Light Vehicles (LV): 2524

Heavy Vehicles (HV): 52



MOVEMENT SUMMARY

 Site: I-26 WB Ramps 2020 PM - Alt 3

I-26 WB Ramps 2042 PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	173	2.0	0.656	12.5	LOS B	0.0	0.0	0.00	0.00	25.9
8	T1	554	2.0	0.656	12.5	LOS B	0.0	0.0	0.00	0.00	25.4
Approach		727	2.0	0.656	12.5	LOS B	0.0	0.0	0.00	0.00	25.5
East: I-26 WB Off Ramp											
1	L2	1036	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.7
6	T1	1	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.6
16	R2	268	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.5
Approach		1305	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.6
North: Columbia Ave											
4	T1	727	2.0	0.731	27.0	LOS D	3.8	95.4	0.80	0.99	19.8
14	R2	40	2.0	0.731	26.4	LOS D	3.7	92.8	0.79	0.97	19.5
Approach		767	2.0	0.731	27.0	LOS D	3.8	95.4	0.80	0.99	19.8
All Vehicles		2800	2.0	1.237	79.0	LOS F	50.2	1275.0	0.68	2.20	13.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

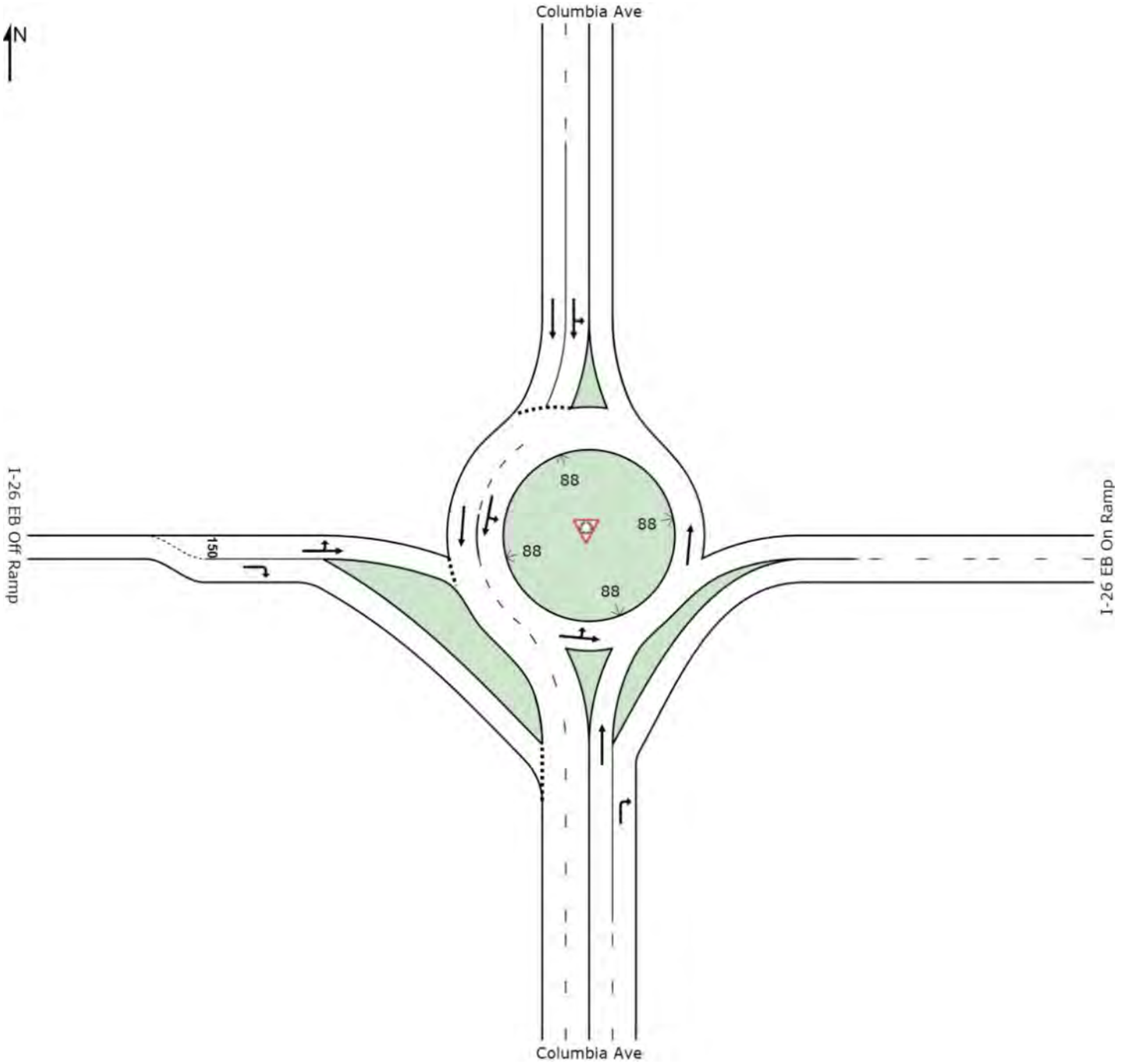
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

 Site: I-26 EB Ramps 2020 PM - Alt 3

I-26 EB Ramps 2020 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 Site: I-26 EB Ramps 2020 PM - Alt 3

I-26 EB Ramps 2020 PM
Roundabout

Volume Display Method: Total and %

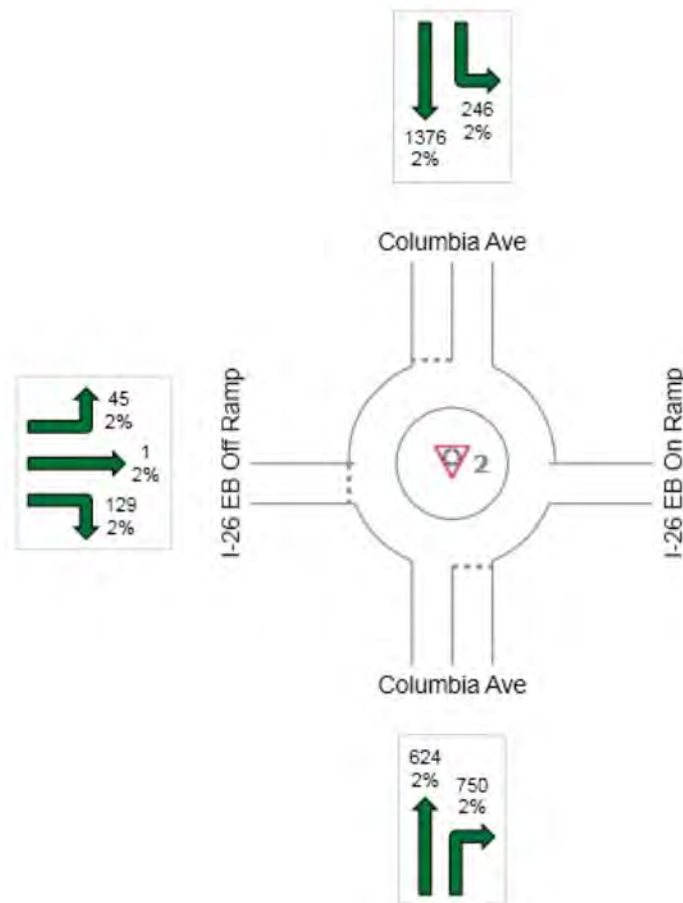
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 3171

Light Vehicles (LV): 3108

Heavy Vehicles (HV): 63



MOVEMENT SUMMARY

 Site: I-26 EB Ramps 2020 PM - Alt 3

I-26 EB Ramps 2020 PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	678	2.0	0.350	0.0	LOS A	0.0	0.0	0.00	0.00	25.8
18	R2	815	2.0	0.497	0.1	LOS A	0.0	0.0	0.00	0.00	25.0
Approach		1493	2.0	0.497	0.1	NA	0.0	0.0	0.00	0.00	25.3
North: Columbia Ave											
7	L2	267	2.0	0.796	18.5	LOS C	0.0	0.0	0.00	0.00	25.8
4	T1	1496	2.0	0.796	18.5	LOS C	0.0	0.0	0.00	0.00	25.7
Approach		1763	2.0	0.796	18.5	LOS C	0.0	0.0	0.00	0.00	25.7
West: I-26 EB Off Ramp											
5	L2	49	2.0	0.159	14.4	LOS B	0.4	10.0	0.75	0.75	21.6
2	T1	1	2.0	0.159	14.4	LOS B	0.4	10.0	0.75	0.75	21.3
12	R2	140	2.0	0.368	16.7	LOS C	1.1	27.5	0.75	0.81	21.1
Approach		190	2.0	0.368	16.1	LOS C	1.1	27.5	0.75	0.79	21.2
All Vehicles		3447	2.0	0.796	10.4	LOS B	1.1	27.5	0.04	0.04	25.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

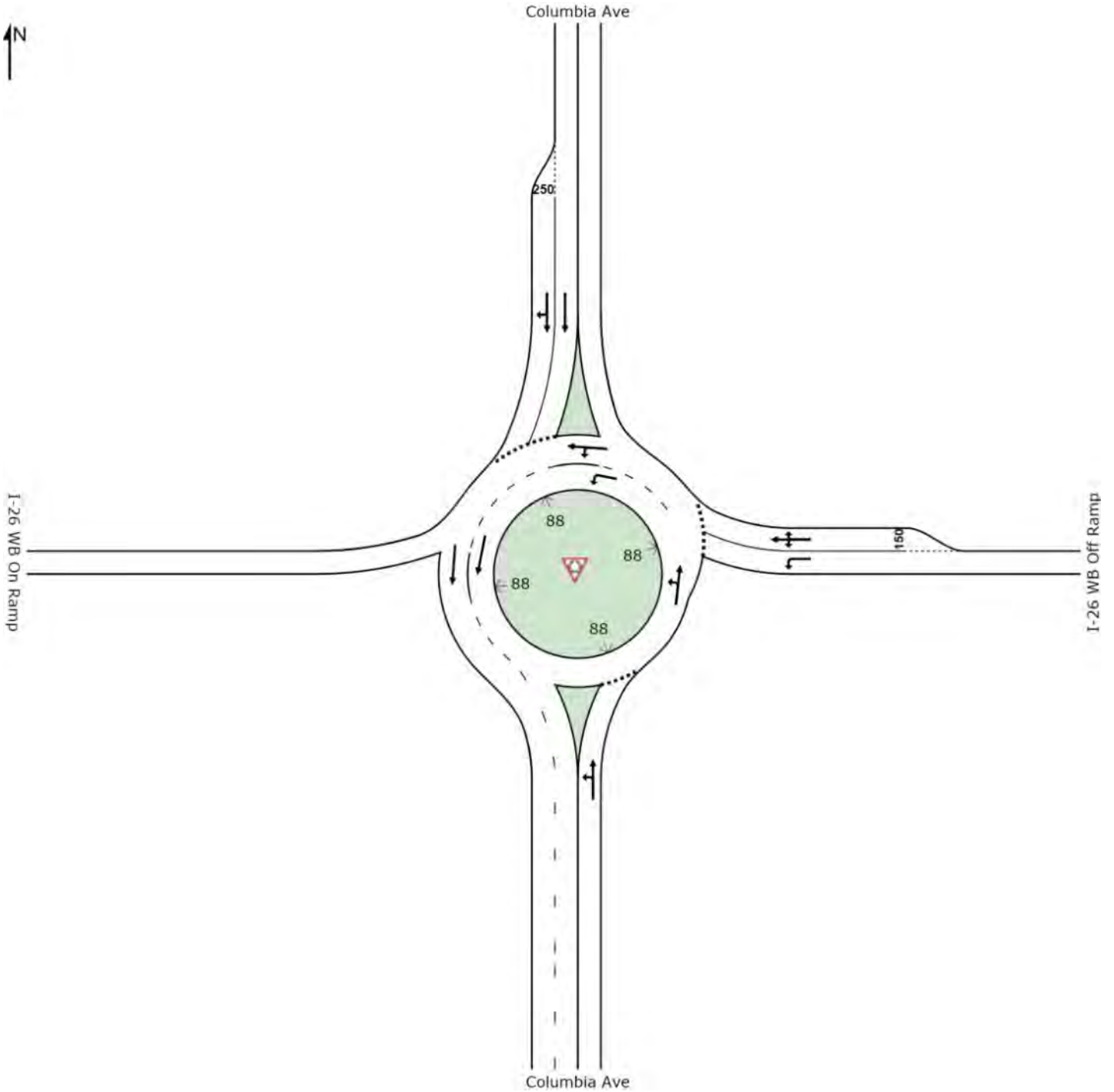
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

Site: I-26 WB Ramps 2040 AM - Alt 3

I-26 WB Ramps 2040 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 **Site: I-26 WB Ramps 2040 AM - Alt 3**

I-26 WB Ramps 2040 AM
Roundabout

Volume Display Method: Total and %

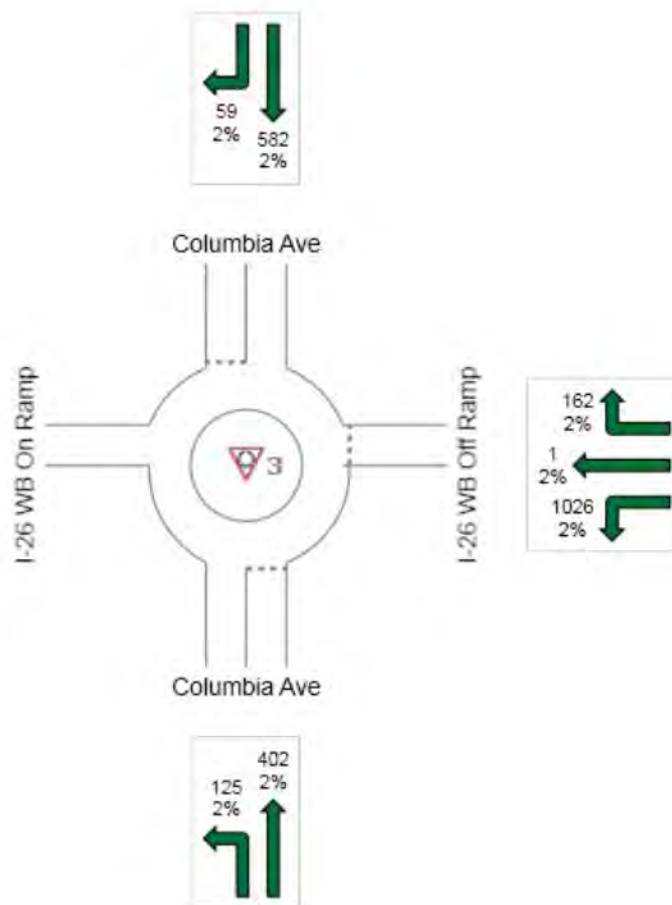
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 2357

Light Vehicles (LV): 2310

Heavy Vehicles (HV): 47



MOVEMENT SUMMARY

 **Site: I-26 WB Ramps 2040 AM - Alt 3**

I-26 WB Ramps 2040 AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV	v/c	sec		Vehicles	Distance		per veh	mph
		veh/h	%				veh	ft			
South: Columbia Ave											
3	L2	136	2.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.9
8	T1	437	2.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.4
Approach		573	2.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.5
East: I-26 WB Off Ramp											
1	L2	1115	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.9
6	T1	1	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.7
16	R2	176	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.5
Approach		1292	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.8
North: Columbia Ave											
4	T1	633	2.0	0.765	33.2	LOS D	3.9	98.1	0.85	1.08	18.8
14	R2	64	2.0	0.765	32.4	LOS D	3.8	95.9	0.84	1.07	18.5
Approach		697	2.0	0.765	33.1	LOS D	3.9	98.1	0.85	1.08	18.8
All Vehicles		2562	2.0	1.046	48.7	LOS E	25.7	653.2	0.74	1.52	16.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

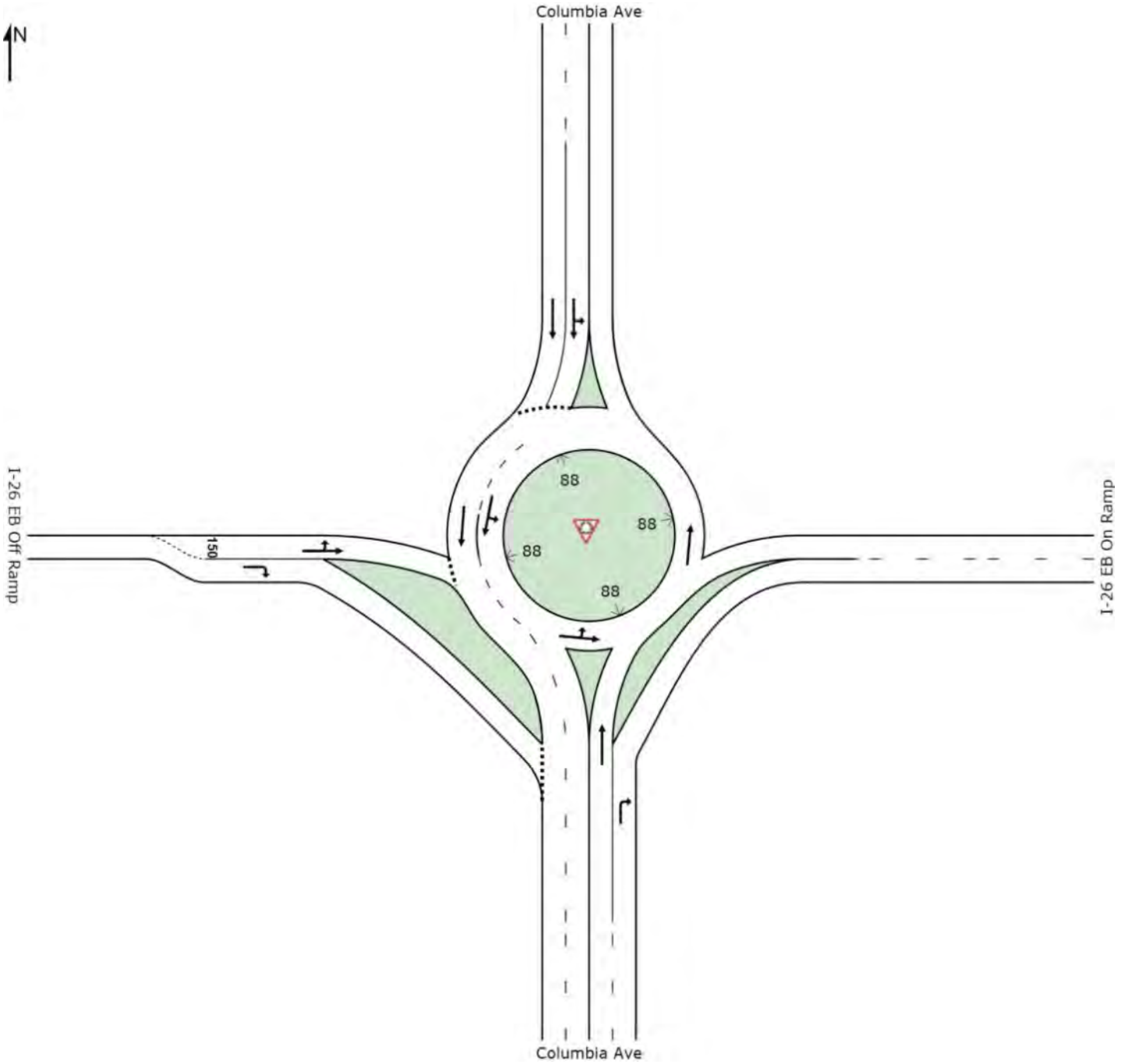
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

 Site: I-26 EB Ramps 2040 AM - Alt 3

I-26 EB Ramps 2040 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 Site: I-26 EB Ramps 2040 AM - Alt 3

I-26 EB Ramps 2040 AM
Roundabout

Volume Display Method: Total and %

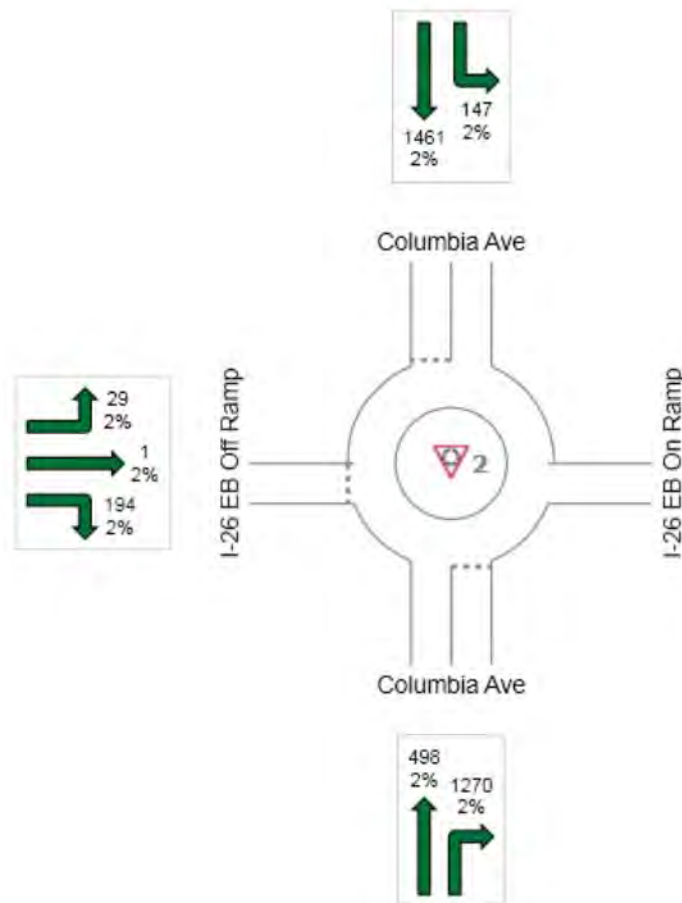
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 3600

Light Vehicles (LV): 3528

Heavy Vehicles (HV): 72



MOVEMENT SUMMARY

 **Site: I-26 EB Ramps 2040 AM - Alt 3**

I-26 EB Ramps 2040 AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	541	2.0	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	25.8
18	R2	1380	2.0	0.841	0.5	LOS A	0.0	0.0	0.00	0.00	24.8
Approach		1922	2.0	0.841	0.4	NA	0.0	0.0	0.00	0.00	25.1
North: Columbia Ave											
7	L2	160	2.0	0.789	18.1	LOS C	0.0	0.0	0.00	0.00	26.0
4	T1	1588	2.0	0.789	18.1	LOS C	0.0	0.0	0.00	0.00	25.7
Approach		1748	2.0	0.789	18.1	LOS C	0.0	0.0	0.00	0.00	25.8
West: I-26 EB Off Ramp											
5	L2	32	2.0	0.103	13.1	LOS B	0.2	6.3	0.73	0.73	21.8
2	T1	1	2.0	0.103	13.1	LOS B	0.2	6.3	0.73	0.73	21.6
12	R2	211	2.0	0.592	26.7	LOS D	2.1	52.5	0.83	0.96	19.3
Approach		243	2.0	0.592	24.9	LOS C	2.1	52.5	0.82	0.93	19.6
All Vehicles		3913	2.0	0.841	9.8	LOS A	2.1	52.5	0.05	0.06	24.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

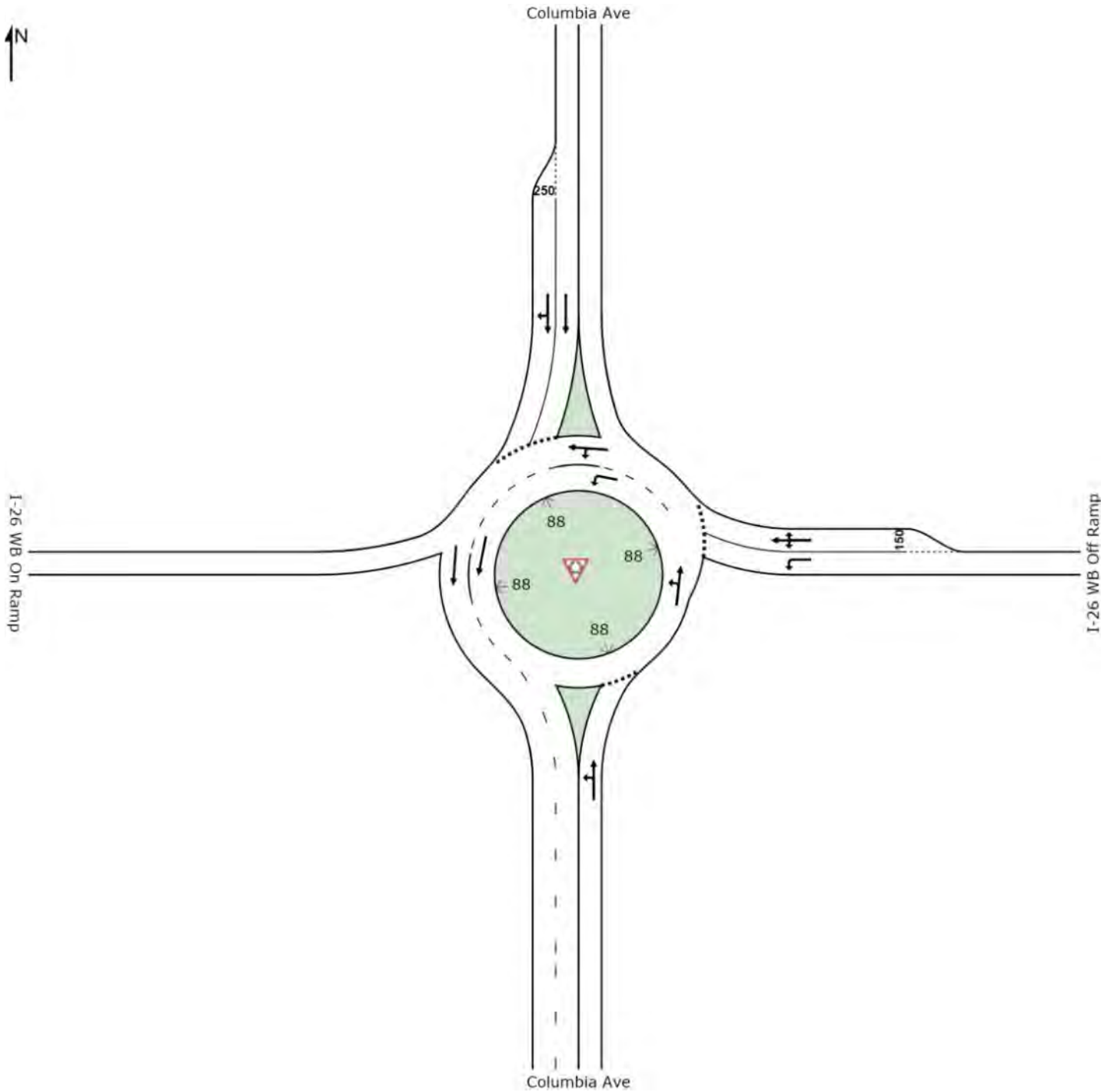
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

 Site: I-26 WB Ramps 2040 PM - Alt 3

I-26 WB Ramps 2040 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 Site: I-26 WB Ramps 2040 PM - Alt 3

I-26 WB Ramps 2040 PM
Roundabout

Volume Display Method: Total and %

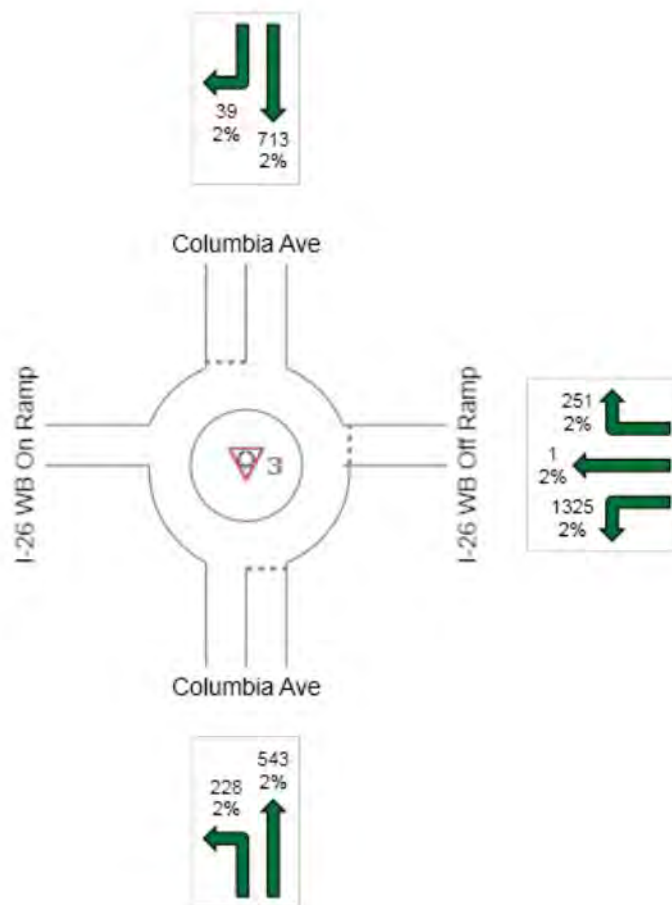
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 3100

Light Vehicles (LV): 3038

Heavy Vehicles (HV): 62



MOVEMENT SUMMARY

 Site: I-26 WB Ramps 2040 PM - Alt 3

I-26 WB Ramps 2040 PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	248	2.0	0.756	16.3	LOS C	0.0	0.0	0.00	0.00	25.9
8	T1	590	2.0	0.756	16.3	LOS C	0.0	0.0	0.00	0.00	25.3
Approach		838	2.0	0.756	16.3	LOS C	0.0	0.0	0.00	0.00	25.5
East: I-26 WB Off Ramp											
1	L2	1440	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
6	T1	1	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
16	R2	273	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
Approach		1714	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
North: Columbia Ave											
4	T1	775	2.0	0.796	33.1	LOS D	4.6	116.5	0.84	1.10	18.8
14	R2	42	2.0	0.796	32.4	LOS D	4.5	113.6	0.83	1.08	18.5
Approach		817	2.0	0.796	33.0	LOS D	4.6	116.5	0.84	1.10	18.8
All Vehicles		3370	2.0	1.819	214.2	LOS F	131.7	3345.1	0.71	4.04	7.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

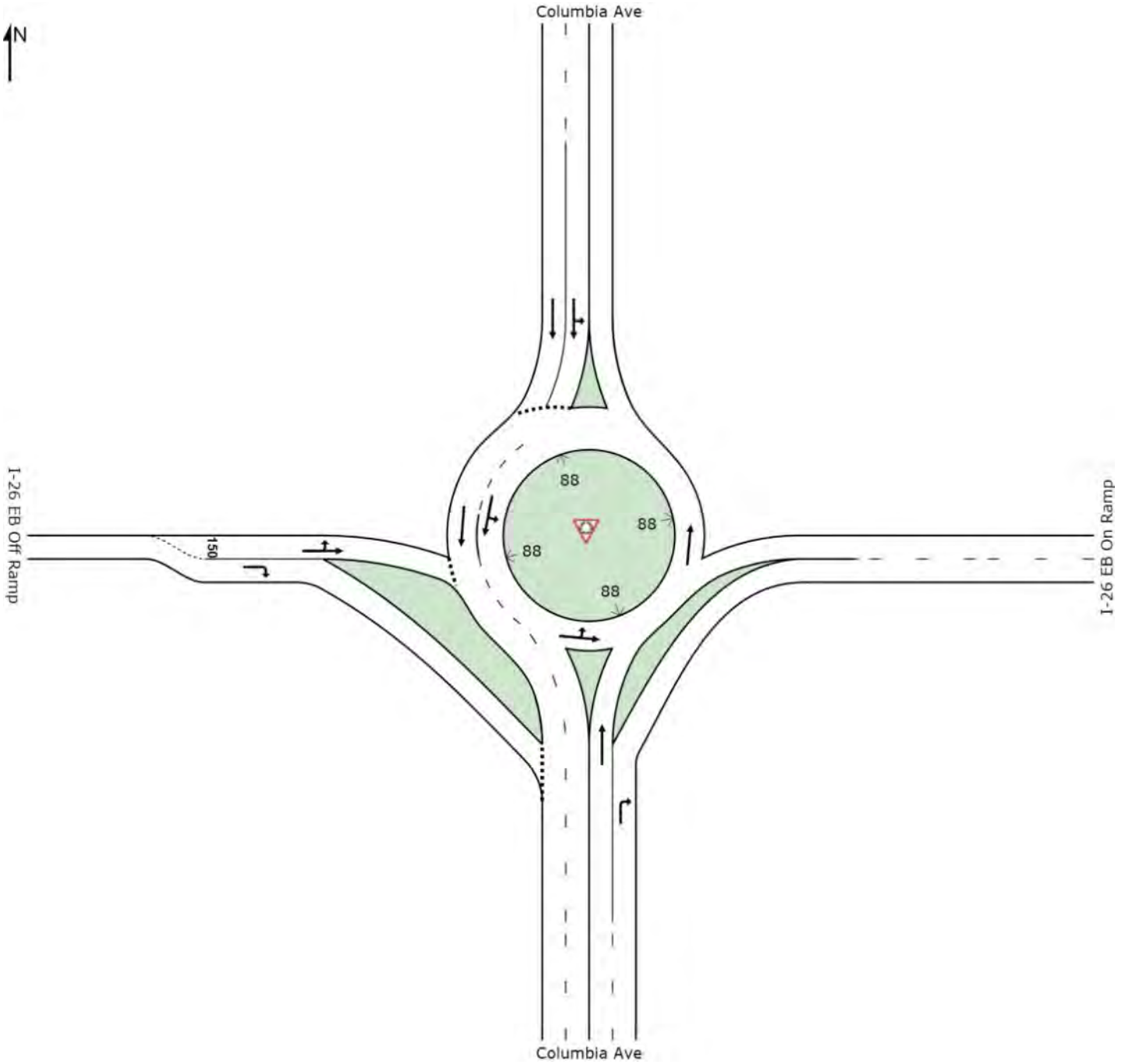
Gap-Acceptance Capacity: Traditional M1.

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

SITE LAYOUT

 Site: I-26 EB Ramps 2040 PM - Alt 3

I-26 EB Ramps 2040 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

 Site: I-26 EB Ramps 2040 PM - Alt 3

I-26 EB Ramps 2040 PM
Roundabout

Volume Display Method: Total and %

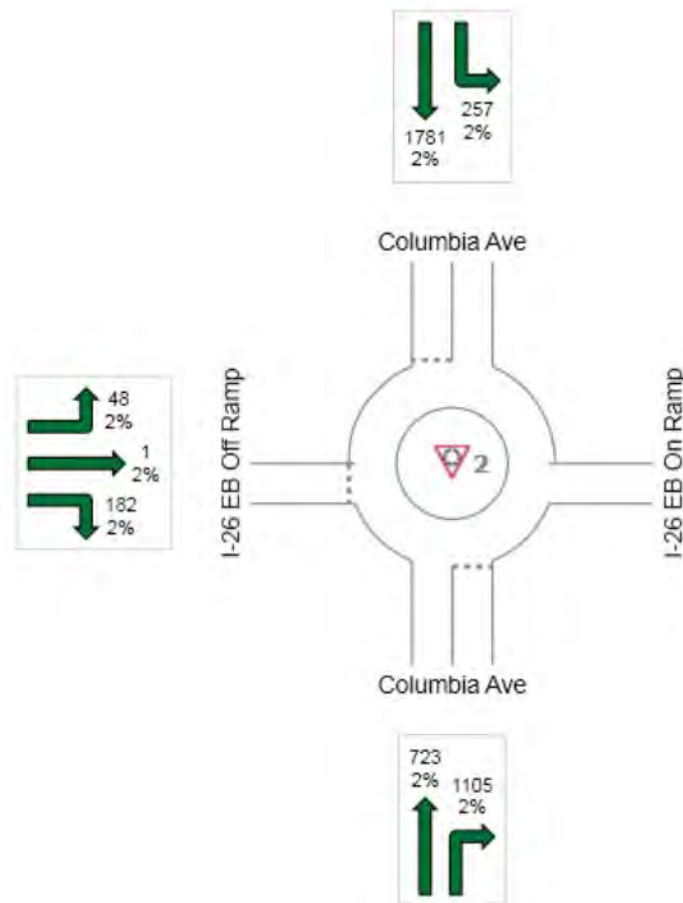
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 4097

Light Vehicles (LV): 4015

Heavy Vehicles (HV): 82



MOVEMENT SUMMARY

 **Site: I-26 EB Ramps 2040 PM - Alt 3**

I-26 EB Ramps 2040 PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	786	2.0	0.406	0.1	LOS A	0.0	0.0	0.00	0.00	25.7
18	R2	1201	2.0	0.732	0.3	LOS A	0.0	0.0	0.00	0.00	24.9
Approach		1987	2.0	0.732	0.2	NA	0.0	0.0	0.00	0.00	25.2
North: Columbia Ave											
7	L2	279	2.0	1.000	46.4	LOS E	0.0	0.0	1.00	0.04	17.0
4	T1	1936	2.0	1.000	46.4	LOS E	0.0	0.0	1.00	0.04	16.9
Approach		2215	2.0	1.000	46.4	LOS E	0.0	0.0	1.00	0.04	16.9
West: I-26 EB Off Ramp											
5	L2	52	2.0	0.234	21.7	LOS C	0.6	14.8	0.83	0.86	20.2
2	T1	1	2.0	0.234	21.7	LOS C	0.6	14.8	0.83	0.86	19.9
12	R2	198	2.0	0.711	43.0	LOS E	2.6	66.0	0.91	1.11	16.9
Approach		251	2.0	0.711	38.5	LOS E	2.6	66.0	0.89	1.06	17.5
All Vehicles		4453	2.0	1.000	25.4	LOS D	2.6	66.0	0.55	0.08	19.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

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

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

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.












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

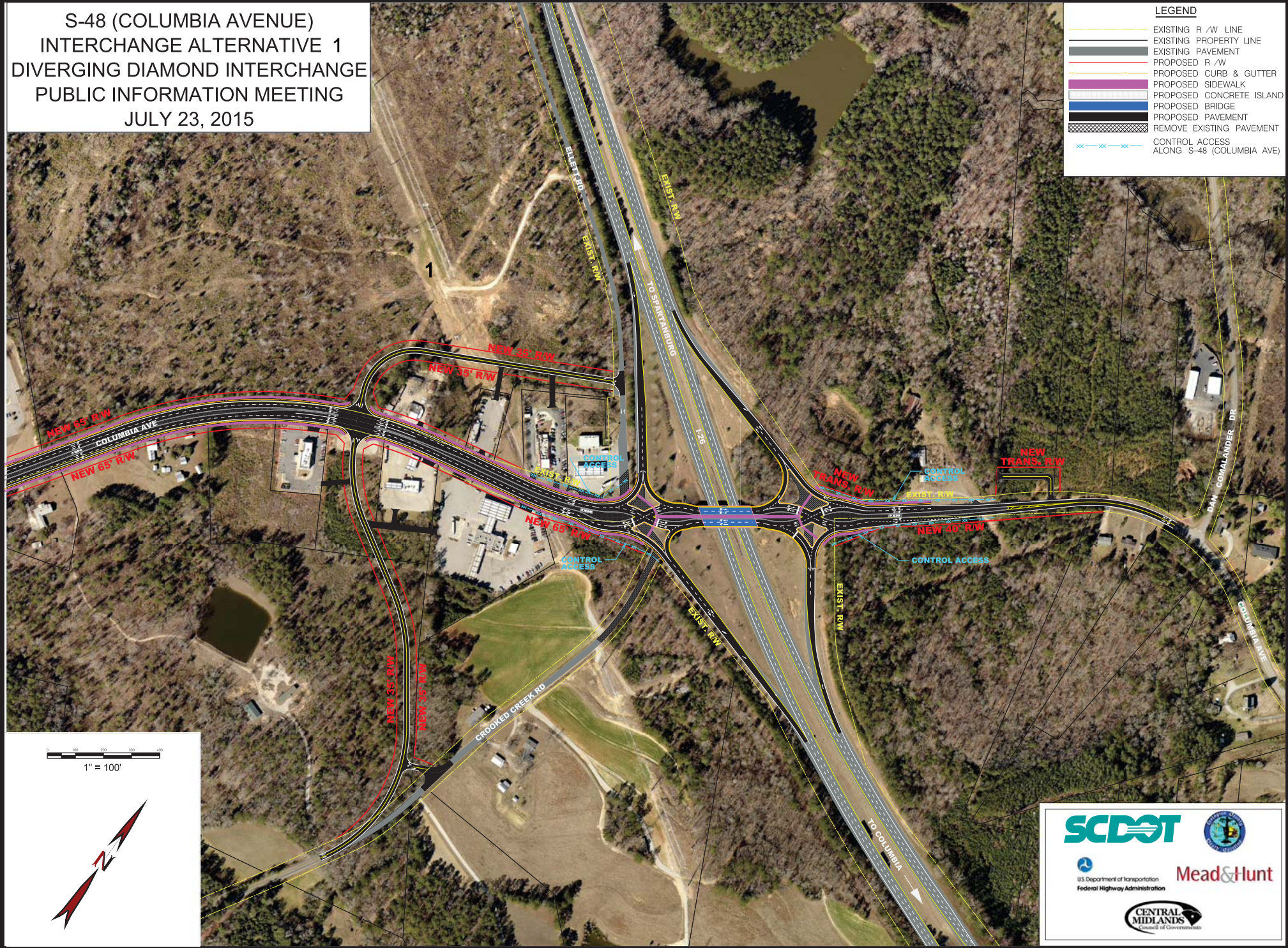
APPENDIX O

ALTERNATIVE 1, 2, & 3 CONCEPTUAL DESIGNS

S-48 (COLUMBIA AVENUE)
 INTERCHANGE ALTERNATIVE 1
 DIVERGING DIAMOND INTERCHANGE
 PUBLIC INFORMATION MEETING
 JULY 23, 2015

LEGEND

-  EXISTING R /W LINE
-  EXISTING PROPERTY LINE
-  EXISTING PAVEMENT
-  PROPOSED R /W
-  PROPOSED CURB & GUTTER
-  PROPOSED SIDEWALK
-  PROPOSED CONCRETE ISLAND
-  PROPOSED BRIDGE
-  PROPOSED PAVEMENT
-  REMOVE EXISTING PAVEMENT
-  CONTROL ACCESS ALONG S-48 (COLUMBIA AVE)














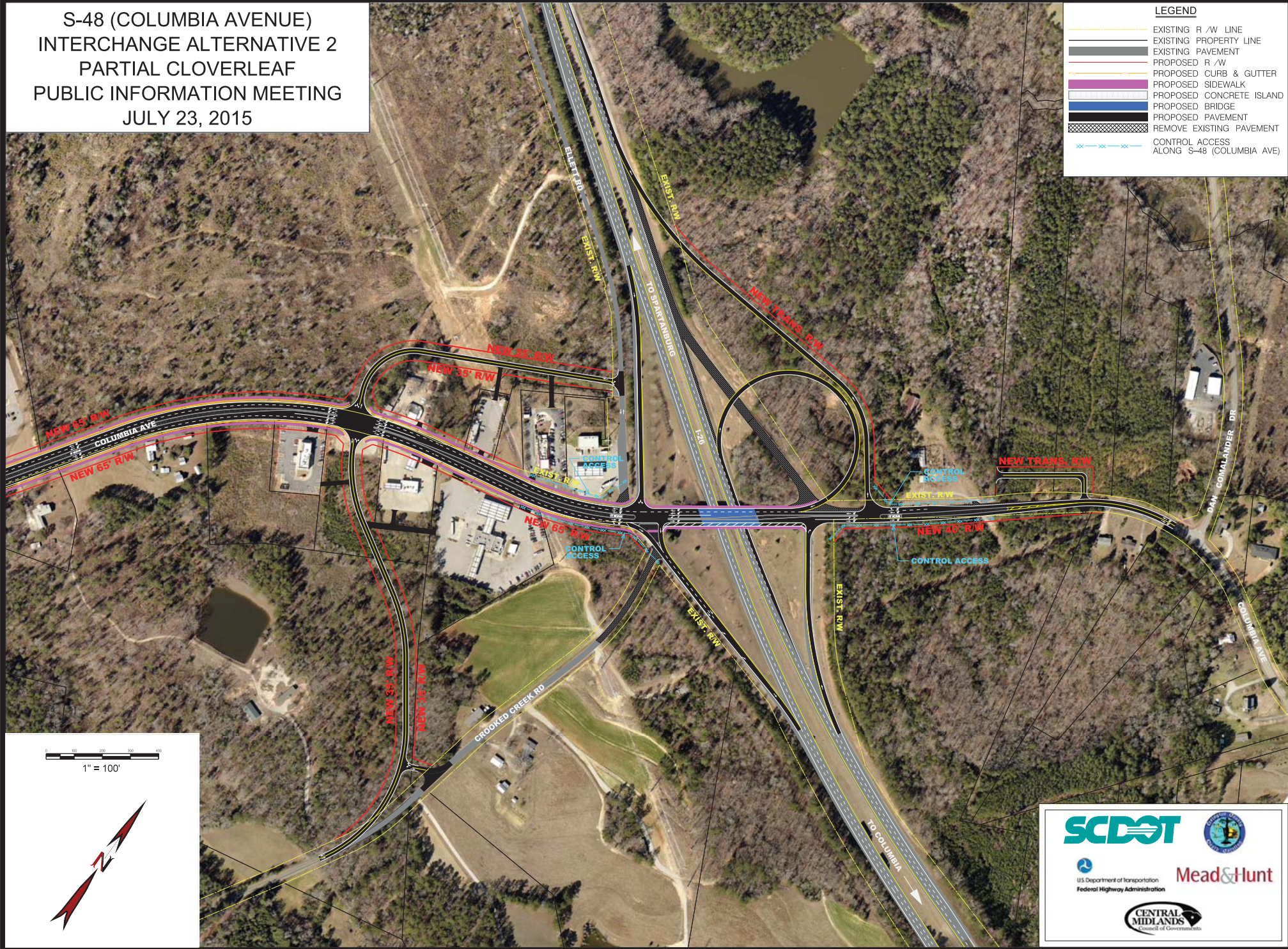
ALL RIGHT-OF-WAY (R/W) SHOWN IS PROPOSED AND SUBJECT TO CHANGE

SCDOT
 U.S. Department of Transportation
 Federal Highway Administration
 Mead & Hunt
 CENTRAL MIDLANDS
 Council of Governments

S-48 (COLUMBIA AVENUE)
 INTERCHANGE ALTERNATIVE 2
 PARTIAL CLOVERLEAF
 PUBLIC INFORMATION MEETING
 JULY 23, 2015

LEGEND











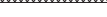

-  EXISTING R /W LINE
-  EXISTING PROPERTY LINE
-  EXISTING PAVEMENT
-  PROPOSED R /W
-  PROPOSED CURB & GUTTER
-  PROPOSED SIDEWALK
-  PROPOSED CONCRETE ISLAND
-  PROPOSED BRIDGE
-  REMOVE EXISTING PAVEMENT
-  REMOVE EXISTING PAVEMENT
-  CONTROL ACCESS ALONG S-48 (COLUMBIA AVE)

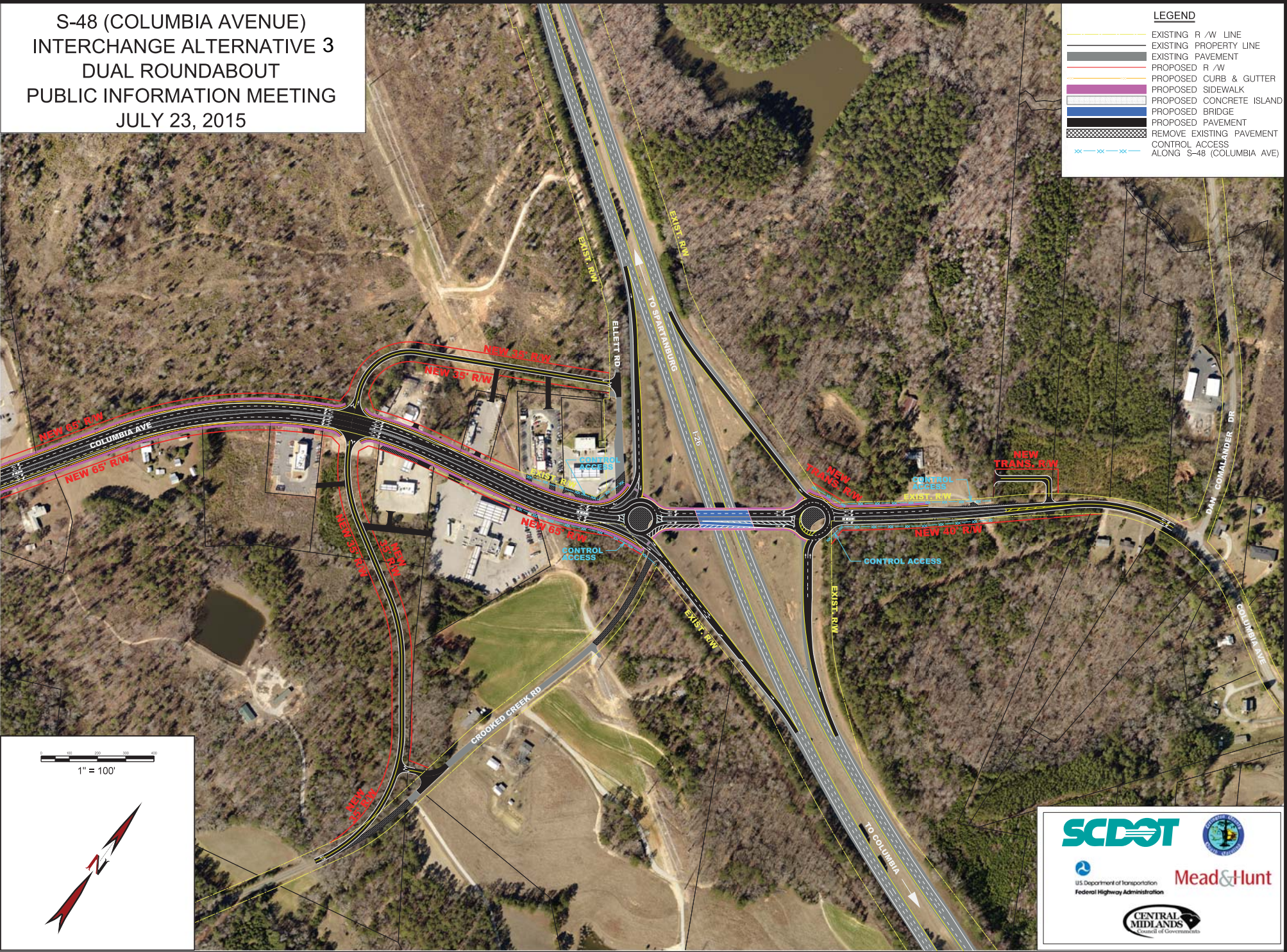


ALL RIGHT-OF-WAY (R/W) SHOWN IS PROPOSED AND SUBJECT TO CHANGE

S-48 (COLUMBIA AVENUE)
 INTERCHANGE ALTERNATIVE 3
 DUAL ROUNDABOUT
 PUBLIC INFORMATION MEETING
 JULY 23, 2015

LEGEND

-  EXISTING R /W LINE
-  EXISTING PROPERTY LINE
-  EXISTING PAVEMENT
-  PROPOSED R /W
-  PROPOSED CURB & GUTTER
-  PROPOSED SIDEWALK
-  PROPOSED CONCRETE ISLAND
-  PROPOSED BRIDGE
-  PROPOSED PAVEMENT
-  REMOVE EXISTING PAVEMENT
-  CONTROL ACCESS
-  CONTROL ACCESS ALONG S-48 (COLUMBIA AVE)



ALL RIGHT-OF-WAY (R/W) SHOWN IS PROPOSED AND SUBJECT TO CHANGE