This Interchange Justification Report (IJR) has not been approved by Federal Highway Administration. Once approval is issued, a final approved IJR will be provided.

I-26 & Volvo Car Drive Interchange Justification Report

Berkeley County, South Carolina

Prepared for:

Thomas & Hutton Engineering Co.

Prepared by:

Stantec Consulting Services Inc.

June 2016

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Berkeley County, South Carolina

Stantec

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June 2016

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SOUTH CAROLINA
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Signature　　　　　　　　　　Date

June 29, 2016

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1.0 Introduction

The purpose of this report is to document an Interchange Justification Report (IJR) for the proposed I-26 & Volvo Car Drive interchange in Berkeley County, South Carolina in accordance with Federal Highway Administration (FHWA) and South Carolina Department of Transportation (SCDOT) guidelines. This report summarizes the procedures and findings of the selection of study design hour, the traffic volume development for the design years, the results of the capacity analyses, and responses to FHWA's eight policy requirements for an Interstate System Access Change Request.

1.1 PROJECT BACKGROUND

Car manufacturer Volvo has recently selected Berkeley County to build its first car factory in North America. The proposed factory is located in the 6,800-acre Camp Hall Commerce Park on the north side of I-26 between SC 27/Ridgeville Road (Exit 187) and Jedburg Road (Exit 194). The Volvo factory is expected to accommodate approximately 4,000 employees by 2040. In addition to the Volvo factory, up to 9,900,000 square feet of supporting industrial warehouse and manufacturing development is expected to be developed in the Camp Hall Commerce Park for Volvo-related suppliers and manufacturers.

Several new roadways are planned to support the proposed development of the Camp Hall Commerce Park for Volvo. Volvo Car Drive is planned as the primary north/south roadway connection between I-26 and US 176 providing access to the development. There are two east/west roadway connections between SC 27/Ridgeville Road and Volvo Car Drive planned to provide additional access. They are currently named Westvaco Road and Lower Westvaco Road. A figure illustrating the location of the Volvo-related development, proposed roadways, and overall area is shown in Exhibit 1.1.

The proposed I-26 & Volvo Car Drive project is located near mile marker 189 approximately two miles from SC 27/Ridgeville Road (Exit 187) and approximately five miles from Jedburg Road (Exit 194). The proposed I-26 & Volvo Car Drive interchange configuration is a three-level, three-leg directional interchange that connects I-26 and the Camp Hall Commerce Park via Volvo Car Drive. Directional ramps are proposed for all movements that will be achieved through three bridge structures. Due to the expected high attraction to/from the Charleston area, the ramps to/from Charleston are proposed to be constructed as two-lane ramps.

A figure illustrating a concept of the proposed I-26 & Volvo Car Drive interchange is shown in Exhibit 1.2 and a figure illustrating a conceptual guide sign plan for the proposed interchange is shown in Exhibit 1.3.

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I-26 & Volvo Car Drive IJR
Exhibit 1.1 - Project Location Map

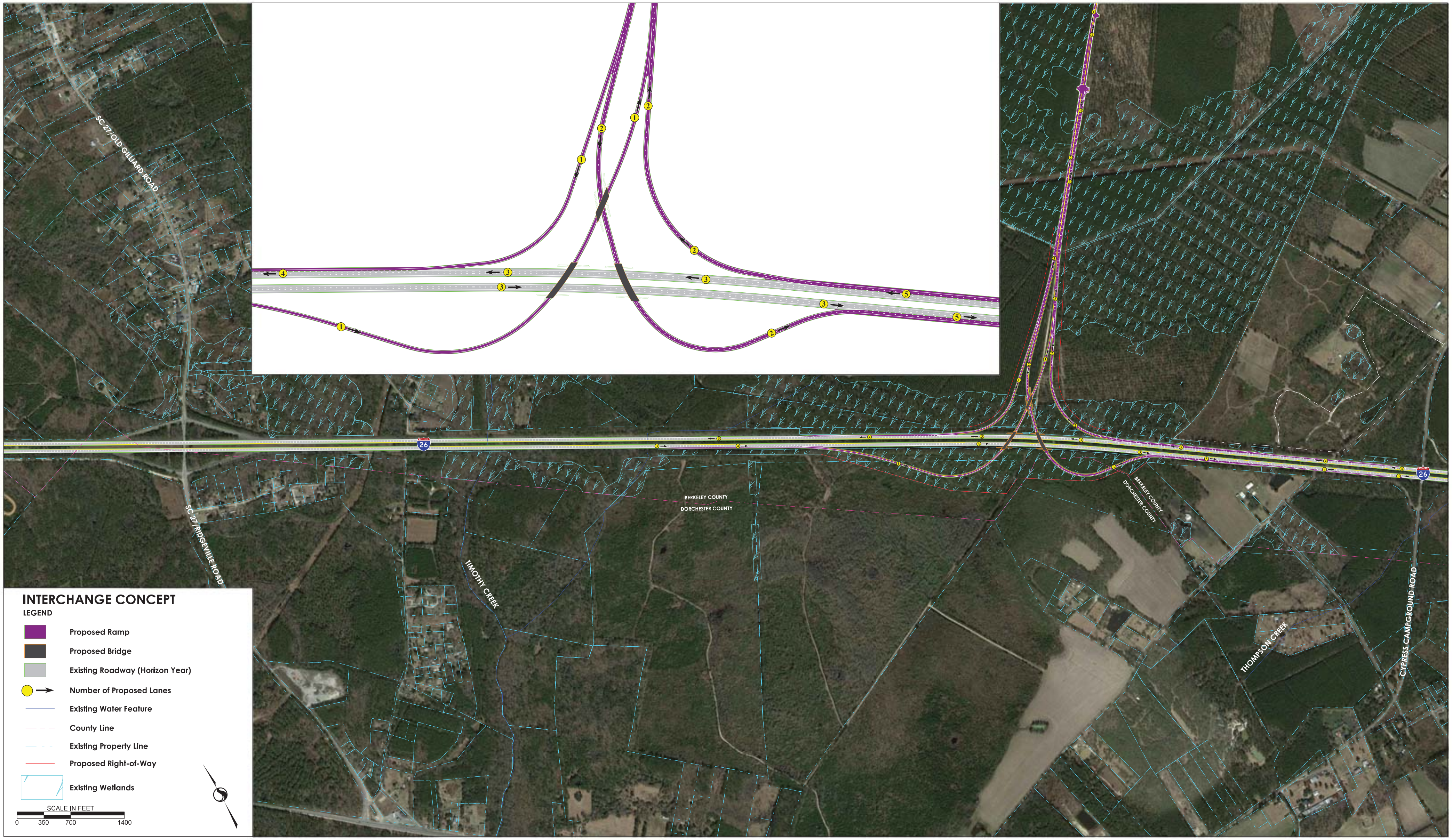

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Exhibit 1.2 - I-26 & Volvo Car Drive Interchange Concept
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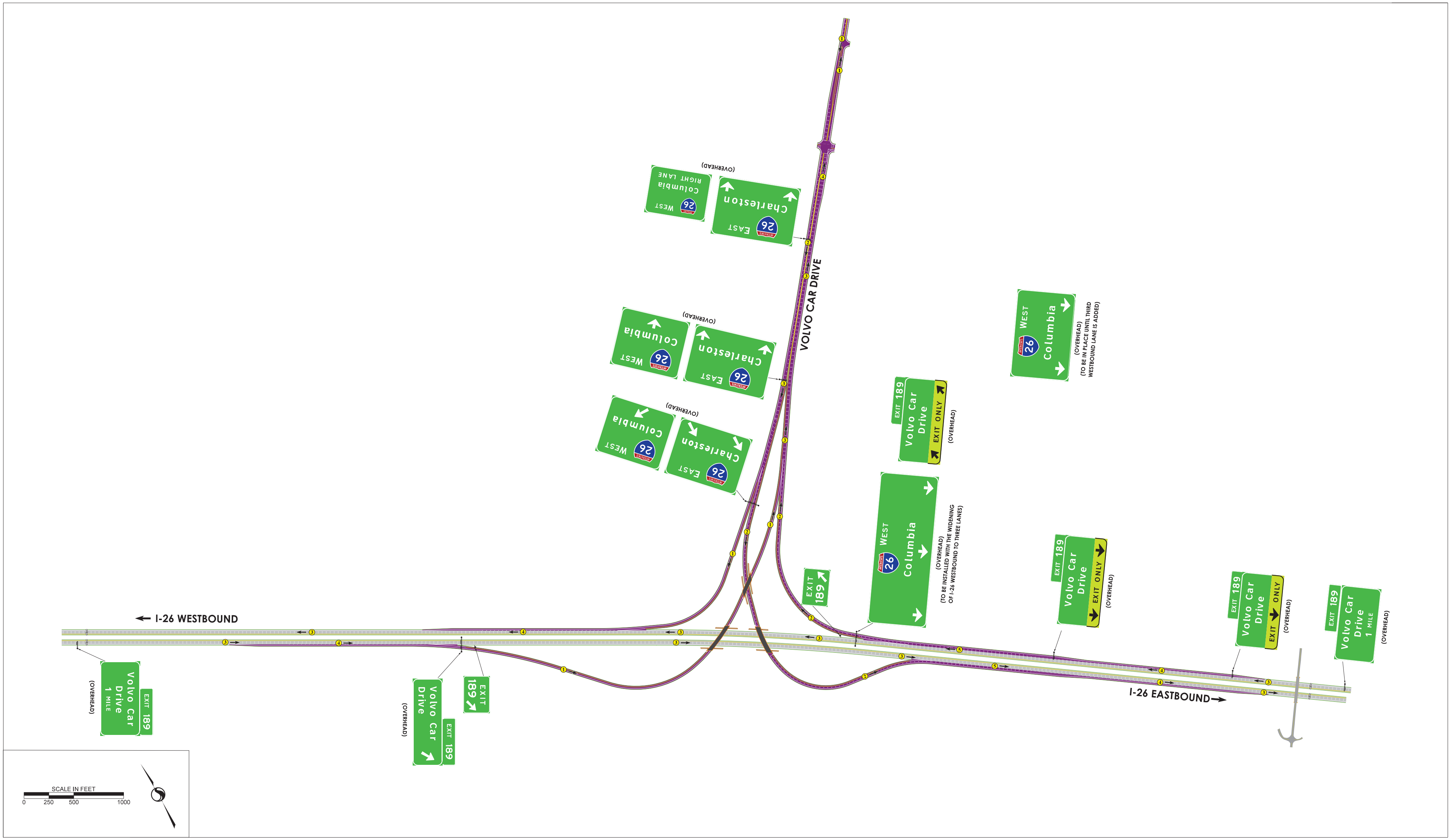

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Exhibit 1.3 - I-26 & Volvo Car Drive Interchange Signing Concept
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1.2 EXISTING ROADWAY CONDITIONS

I-26 is a four-lane interstate freeway that connects the Charleston area with the rest of South Carolina, including I-95 and the Columbia area. In the area of the proposed interchange, I-26 is divided by a wide grassed median and has a posted speed limit of 70 mph. The 2014 AADT along I-26 between SC 27/Ridgeville Road and Jedburg Road was 39,900 vpd and based upon classification data from the week of May 4, 2015, the percentage of heavy vehicles along I-26 between SC 27/Ridgeville Road and Jedburg Road is approximately 20%.

SC 27/Ridgeville Road is a two-lane major collector that primarily serves rural residential land uses. The 2014 AADT was 1,900 vpd north of I-26 and 8,400 vpd south of I-26. The posted speed limit is 55 mph from US 78 to near I-26, 45 mph through the I-26 interchange area, and 50 mph north to Westvaco Road. Based upon existing turning movement counts, the percentage of heavy vehicles along SC 27/Ridgeville Road is approximately 11%.

Jedburg Road is a two-lane major collector that primarily serves residential land uses. The 2014 AADT was 5,200 vpd north of I-26 and 10,700 south of I-26. The posted speed limit is 45 mph through the I-26 interchange area. Based upon existing turning movement counts, the percentage of heavy vehicles along Jedburg Road is approximately 6%.

1.3 FUTURE ROADWAY IMPROVEMENTS

As part of the IJR analyses, two future roadway projects were considered.

A new interchange at Sheep Island Parkway (new Exit 197) is planned to be constructed approximately three miles south of Jedburg Road (Exit 194). Improvements to the I-26 & Sheep Island Parkway and I-26 & Jedburg Road interchanges are documented in the May 2010 *Sheep Island Parkway IJR/Jedburg Road Interchange Modification Report (IMR)*. Improvements to the I-26 & Jedburg Road interchange were assumed to be in place as part of the 2019 and 2039 analyses and include the widening of Jedburg Road to a four-lane, median divided section in the interchange area and the addition of an I-26 westbound-to-Jedburg Road southbound loop off-ramp.

The widening of I-26 from SC 27/Ridgeville Road (Exit 187) to US 17A (Exit 199) to six lanes divided by a grass median is programmed in the South Carolina Statewide Transportation Improvement Program (STIP) for preliminary engineering in 2015. For the 2039 Build and No Build analyses, the widening of I-26 to a six-lane section from west of SC 27/Ridgeville Road to east of Jedburg Road was assumed to be in place.

1.4 STATEMENT OF NEED

Car manufacturer Volvo has recently selected Berkeley County to build its first car factory in North America. The Volvo factory is expected to accommodate approximately 4,000 employees by 2040. In addition to the Volvo factory, up to 9,900,000 square feet of supporting industrial warehouse and manufacturing development is expected to be developed in the Camp Hall Commerce Park for Volvo-related suppliers and manufacturers. The proposed I-26 & Volvo Car Drive interchange project is required to accommodate the design-year traffic demands from the new Volvo factory and supporting Volvo-related suppliers and manufacturers.

Based upon the results of 2039 No Build conditions, the three intersections along SC 27/Ridgeville Road between I-26 and Lower Westvaco Road are projected to operate at severe LOS F conditions that would represent gridlock along SC 27/Ridgeville Road. This gridlock will likely cause severe queuing on the I-26 off-ramps to SC 27/Ridgeville Road, which could potentially back-up to the I-26 mainlines in both directions. The severe failing conditions along SC 27/Ridgeville Road can be attributed to all of the Volvo-related traffic being assigned to that roadway to access I-26.

The results of an improvement analysis scenario indicate a typical widening improvement along SC 27/Ridgeville Road – including widening to a four-lane, median divided cross section; controlling access between I-26 and Lower Westvaco Road; and increasing the spacing of the I-26 ramp intersections from 700 feet to 1,320 feet – would <u>not</u> accommodate the 2039 No Build traffic demands. The two I-26 ramp intersections along SC 27/Ridgeville Road would still be projected to operate at severe LOS F conditions – although less severe than without improvements – that would still represent gridlock along SC 27/Ridgeville Road, which could still potentially back-up to the I-26 mainlines in both directions. The severe failing conditions along SC 27/Ridgeville Road can be attributed to all of the Volvo-related traffic being assigned to that roadway to access I-26.

Therefore, based upon the results of the 2039 No Build conditions analysis and the 2039 No Build conditions with improvements analysis, the I-26 & Volvo Car Drive interchange is justified and needed to accommodate design-year traffic demands of the new Volvo factory and the supporting industrial warehouse and manufacturing development of Volvo-related suppliers and manufacturers of the Camp Hall Commerce Park.

In addition, it should be noted that the proposed two points of access to I-26 through Volvo Car Drive and SC 27/Ridgeville Road for the Volvo factory and Volvo-related industrial development would be equal to the access of the existing BMW factory in Greer, South Carolina.

1.5 IJR ANALYSIS METHODOLOGY

Numerous coordination meetings have been held to discuss and agree to the IJR analysis methodology and assumptions. The meetings' attendees have included U. S. Army Corps of Engineers (USACE), FHWA, SCDOT, SC Department of Commerce, and project consultant staffs. The following documents a summary of assumptions agreed to and used in the analyses. The analyses were conducted in accordance with FHWA's *Interstate System Access Informational Guide* (August 2010).

The proposed I-26 & Volvo Car Drive interchange is planned to be opened in 2019; therefore, the design years of the IJR analyses are opening-year 2019 conditions and horizon-year 2039 conditions. For the IJR analyses, Build and No Build conditions of the proposed interchange for the respective analysis years have been considered.

The adjacent interchanges of I-26 & SC 27/Ridgeville Road and I-26 & Jedburg Road were considered in the project study area.

The V0lvo factory is planned to open in 2017 with approximately 1,000 manufacturing employees. The Volvo factory is projected to increase to 4,000 employees by 2040. In 2017, it is expected that approximately 1,000,000 square feet of Volvo-related suppliers and manufacturers would be operating with approximately 1,000 additional employees. By 2040, it is projected that the Volvo-related suppliers and manufacturers will total approximately 9,900,000 square feet of industrial uses in the Camp Hall Commerce Park. For the purposes of this analysis, a conservative ratio of 1.0 employees per 1,000 square feet of industrial development was utilized for the Volvo-related industrial development. The ratio of 1.0 employees per 1,000 square feet of development is the same ratio that is utilized by the CHATS regional transportation model for trip generation and was determined to be conservative when compared to data from existing developments in Georgia which have ratios ranging from 1.0 employees per 2,415 square feet to 1.0 employees per 5,890 square feet.

To develop an annual background growth rate for traffic in the study area, including I-26, not related to the Volvo factory and Volvo-related industrial development, three sources of data were reviewed: historical count data along I-26 between SC 27/Ridgeville Road and Jedburg Road (SCDOT count station #2179) over the past 10 years; growth rate assumptions from the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR;* and traffic volume projections of BCDCOG's Charleston Area Transportation Study (CHATS) travel demand model.

2.0 Selection of Design Hour

As required in the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Design Standards Interstate System,* 5th Edition (January 2005), the 30th Design Hour shall be used to determine the appropriate traffic volume used for the design. The Transportation Research Board's *Highway Capacity Manual 2010* and the Institute of Transportation Engineers' (ITE) *Traffic Engineering Handbook,* 6th Edition (2012) have nearly identical language with respect to the selection of the design hour volume. All publications indicate the rationale by which 30th highest hour traffic volume is selected for use as the design hour traffic volume for rural highways.

The 30th highest hourly volume is determined by listing traffic volumes for every hour of every day in a calendar year in descending order from highest to lowest. The 30th volume in this list is the 30th highest-hour volume. Graphing the volumes in descending order can show a large variation in volumes, generally taking the form of a curve that initially descends steeply and ends in a more gently declining, almost linear slope. The design hour is usually selected from the "knee of the curve" – the area between the initial steep descent and the more gradually declining linear slope. The reason for this is described in the *Highway Capacity Manual*, "The selection of an appropriate hour for planning, design, and operational purposes is a compromise between providing an adequate level of service (LOS) for every (or almost every) hour of the year and economic efficiency." Simply put, building a highway to accommodate traffic volumes on the initial steep slope of the volume curve can be very expensive and provide under-used capacity. Some measure of infrequent congestion under exceptional circumstances may be appropriate and allowable from a design standpoint.

Standard practice is to base rural highway design on an hour between the 30th and 100th highest hour of the year. This range of hours generally falls within the "knee" in the graphed curve of the volume data. In standard practice, the knee is assumed to occur at the 30th highest hour which is why this hour is used as the basis for estimates of design-hour volume. In reality, the 30th highest hour may or may not be the correct choice to identify the design-hour volume.

For the proposed I-26 & Volvo Car Drive interchange, the existing traffic volumes along I-26 were reviewed to determine if the use of the 30th highest hour was appropriate for the existing conditions and context of the improvement.

A review was conducted of available traffic data from Automatic Traffic Recorder (ATR) station P-54 along I-26 between SC 27/Ridgeville Road and Jedburg Road between May 2014 and April 2015. The results of the review indicated that the majority of the highest 30 hours and 100 hours are Friday afternoons, which is likely due to the high amount of tourist traffic coming into the Charleston area for the weekends via I-26 eastbound during the normal commuter afternoon peak heading out of the Charleston area via I-26 westbound. A graph of the volume data was created and no discernible “knee” is visible. The 100 highest hours occurred on only 41 different days, and the only hours of the top 100 occurring on non-Fridays were related to holiday travel:

- Sunday, April 5, 2015 – Easter Sunday;
- Sunday, April 12, 2015 – the Sunday after the Berkeley County School District spring break week;
- Sunday, July 6, 2014 – the Sunday after the July 4th holiday; and
- Tuesday, November 25, 2014; Wednesday, November 26, 2014; and Sunday, November 30, 2014 – before and after the Thanksgiving holiday.

Based upon 30 and 100 highest hours, it was agreed that selecting a Friday time period due to holiday travel did not seem appropriate and would potentially result in an uneconomical and excessive design for the new interchange. Therefore, Fridays containing the top 100 highest hours of the year during non-holiday weekends were reviewed to determine a representative day for the analysis. It was determined and agreed to that Friday, October 3, 2014 would be an appropriate representative day since it contained four consecutive hours in the afternoon that fell in the top 100, including two hours that fell in the top 49. A summary of the two-way volumes for this day and corresponding yearly volume rank is provided below.

- 2:00 – 3:00 PM: 4,160, 98th highest hour
- 3:00 – 4:00 PM: 4,407, 41st highest hour – Study Design Hour
- 4:00 – 5:00 PM: 4,342, 49th highest hour
- 5:00 – 6:00 PM: 4,164, 97th highest hour

With consideration of the projected peak Volvo volumes that are discussed in the next section, it was determined that the 3:00 – 4:00 PM hour would be the I-26 & Volvo Car Drive IJR Study Design Hour. The selection of this design hour is within the range of hours specified in standard practices and methodologies and reflects best design practices for the unique circumstances and context of this section of I-26 in Berkeley County.

3.0 Traffic Volume Development

For the IJR analyses, opening-year 2019 and horizon-year 2039 conditions were considered. For both of the respective study years, Build and No Build conditions of the proposed interchange were evaluated. Existing 2015 traffic volumes were collected along SC 27/Ridgeville Road and Jedburg Road for use in the analysis; the development of the I-26 Design Hour was discussed in the previous section; and the horizon-year 2039 traffic volumes along Jedburg Road were based upon information in the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR* document.

3.1 BACKGROUND GROWTH RATE

To develop an annual background growth rate for traffic not related to the Volvo factory and Volvo-related industrial development, three sources of data were reviewed: historical count data along I-26 between SC 27/Ridgeville Road and Jedburg Road (SCDOT count station #2179) over the past 10 years; growth rate assumptions from the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR;* and traffic volume projections of BCDCOG's Charleston Area Transportation Study (CHATS) travel demand model.

Based upon the historical data, I-26 between SC 27/Ridgeville Road and Jedburg Road has experienced approximately 0.87% annual growth. The May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR* considered an annual growth assumption of 2.1%. The CHATS travel demand model projects approximately 1.85% annual growth along I-26 considering 2040 projections.

Based upon this information, a 2.0% annual linear growth rate was utilized to develop opening-year 2019 and horizon-year 2039 traffic volumes not related to the Volvo factory and Volvo-related industrial development. For Jedburg Road, the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR* traffic volumes for 2035 conditions were utilized and grown to horizon-year 2039 conditions using the 2.0% annual growth rate.

3.2 OPENING-YEAR 2019 TRAFFIC VOLUMES

The opening-year 2019 traffic volumes were developed for projected 2019 conditions by applying an annual growth rate to the existing traffic volumes and adding the projected traffic volumes of the Volvo factory, Volvo-related industrial development, and construction traffic.

3.2.1 Volvo Developments Trip Generation (2019)

The trip generation potential of the Volvo factory and Volvo-related industrial development was developed based upon information of other large-scale manufacturing factories in South Carolina, including the BMW factory in Greer, South Carolina. The trip generation for the developments was separated into three land uses, Volvo Office, Volvo Manufacturing, and Volvo-related Industrial. The trip generation potential was also estimated for construction traffic associated with the Volvo Manufacturing and Volvo-Related Industrial developments during the 2019 analyses.

- *Volvo Office (200 employees):* the trip generation was estimated using information contained in ITE's *Trip Generation Manual*, 9th Edition (2012) reference for land use code 710 – General Office Building.
- *Volvo Manufacturing (1,000 employees):* the trip generation was estimated considering 1.0 employees per vehicle and a 90%/10% directional split during ingress and egress. This assumption is based upon the trip generation characteristics of other large-scale manufacturing factories in South Carolina.
- *Volvo-Related Industrial Development (1,000,000 square feet):* for the purposes of this analysis, a conservative ratio of 1.0 employees per 1,000 square feet of industrial development was utilized for the Volvo-related industrial development. The trip generation was estimated using information contained in ITE's *Trip Generation Manual*, 9th Edition (2012) reference for land use codes 140 – Manufacturing and 150 – Warehousing. It was assumed that approximately 60% of the Volvo-related industrial development would be manufacturing (600 employees by 2019) and approximately 40% of the Volvo-related industrial development would be warehousing (400 employees by 2019).
- *Construction (500 employees by 2019):* the trip generation was estimated considering 1.0 employees per vehicle and a 90%/10% directional split during ingress and egress.

Due to the conservative estimate of additional construction traffic and considering the limited opening-year operations of the Volvo factory and Volvo-Related Industrial developments, potential truck trips generated by the manufacturing facilities were not considered as additional trips. Instead, a heavy vehicle percentage of 20% was utilized for the opening year capacity analyses, as discussed in section 4.0.

The total 2019 opening year trip generation estimates for the Volvo developments are shown in Table 3.1 and documented in Appendix A.

Table 3.1 – Opening-Year 2019 Trip Generation Summary

Land Use	Scale	Ingress Peak		Egress Peak	
		Entering	Exiting	Entering	Exiting
Volvo Office	200 employees	105	15	25	110
Volvo Manufacturing	1,000 employees	900	100	100	900
Volvo-Related Industrial	1,000 employees	325	125	185	285
Construction	500 employees	450	50	50	450

3.2.2 Volvo Developments Shifts (2019)

Based upon the trip generation results, the trips were distributed throughout the day considering one shift. The shift assumptions are summarized herein.

- *Volvo Office:* it was assumed that the office operations would occur during typical workday operations, from 8:30 AM – 5:00 PM, with 10% of the PM peak hour trips occurring during the 3:00 – 4:00 PM Design Hour.
- *Volvo Manufacturing:* it was assumed that manufacturing would be one shift for opening-year 2019 conditions beginning at 6:30 AM, which is the start time of the 1st shift of Volvo's existing Gothenburg, Sweden factory. It was assumed that the shift would end at 3:00 PM, with 100% of the PM peak hour trips occurring during the 3:00 PM – 4:00 PM Design hour.
- *Volvo-Related Industrial Development:* it was assumed that 25% of the Volvo-related industrial development traffic would coincide with the Volvo Manufacturing operations during the 3:00 – 4:00 PM design hour.
- *Construction:* it was assumed that 40% of the construction-related traffic would coincide with the Volvo Manufacturing operations during the 3:00 PM – 4:00 PM Design Hour.

3.2.3 Trip Distribution (2019)

Traffic expected to be generated by the Volvo factory and Volvo-related industrial development for opening-year 2019 conditions was distributed and assigned to the adjacent roadway network.

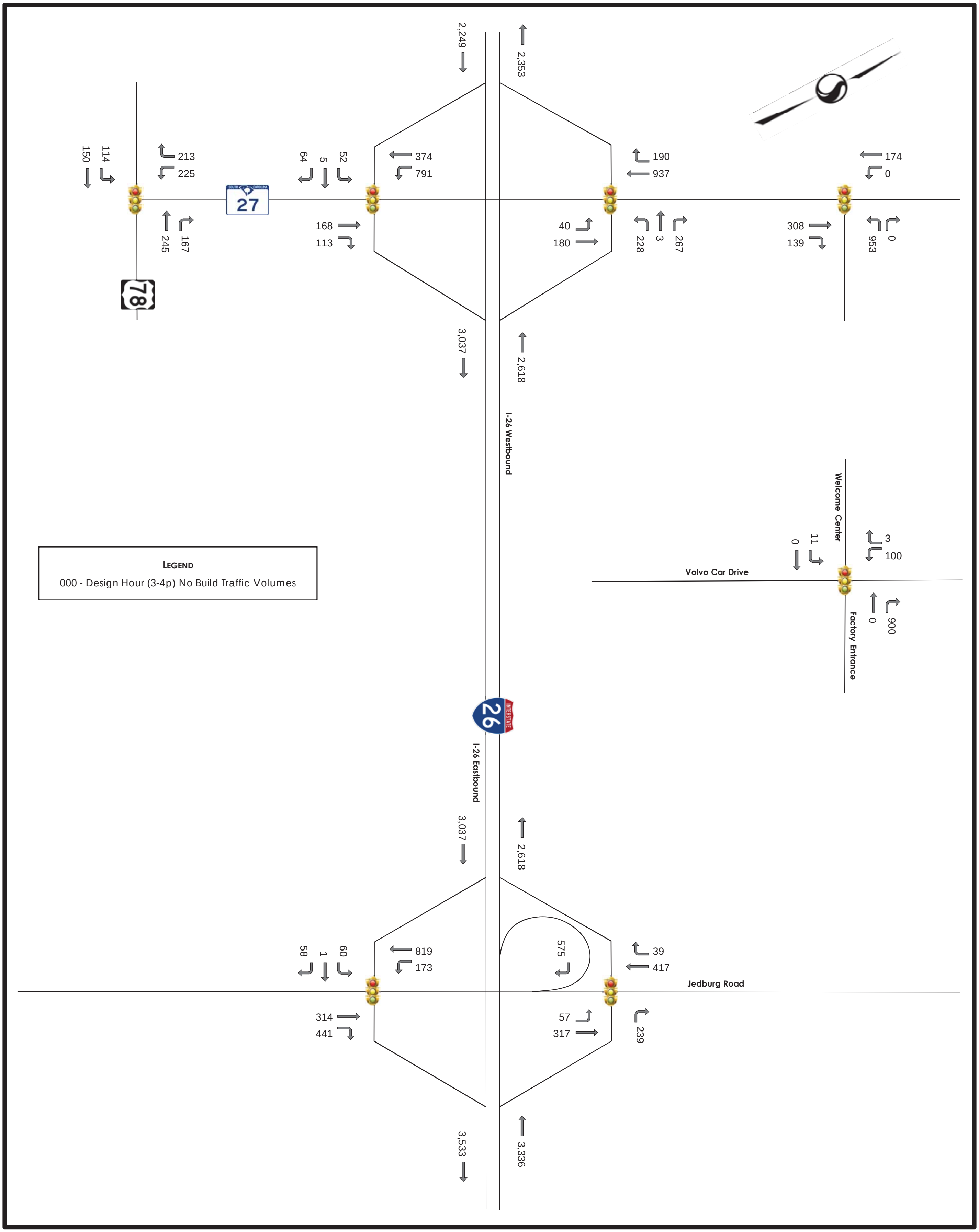
The distribution was based upon the location of existing population centers and census tract information for the four counties of Berkeley, Charleston, Dorchester, and Orangeburg. The distribution also considered future residential development projects and expected travel patterns for the Volvo factory and Volvo-related industrial development. The distribution agreed to by USACE, FHWA, SCDOT, SC Department of Commerce, and project consultant staffs during the coordination meetings is:

- 15% to/from the west via I-26 (towards Orangeburg);
- 60% to/from the east via I-26 (towards Charleston);
- 3% to/from the west via US 78 and SC 27/Ridgeville Road;
- 4% to/from the east via US 78 and SC 27/Ridgeville Road;
- 8% to/from the west via US 176; and
- 10% to/from the east via US 176.

3.2.4 Opening-year 2019 Traffic Volume Development Summary

Based upon the traffic volume development impacts of the Volvo factory and Volvo-related industrial development and considering the 2.0% annual growth rate, the effective annual growth rate along I-26 eastbound between Volvo Car Drive and Jedburg Road (the peak direction during the Volvo Manufacturing egress) during the 3:00 – 4:00 PM Design Hour is approximately 10.1% per year. Worksheets documenting the traffic volume development are provided in Appendix B.

Figures illustrating the proposed opening-year Design Hour traffic volumes for No Build and Build conditions are shown in Exhibits 3.1 and 3.2, respectively.



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Volvo Car Drive
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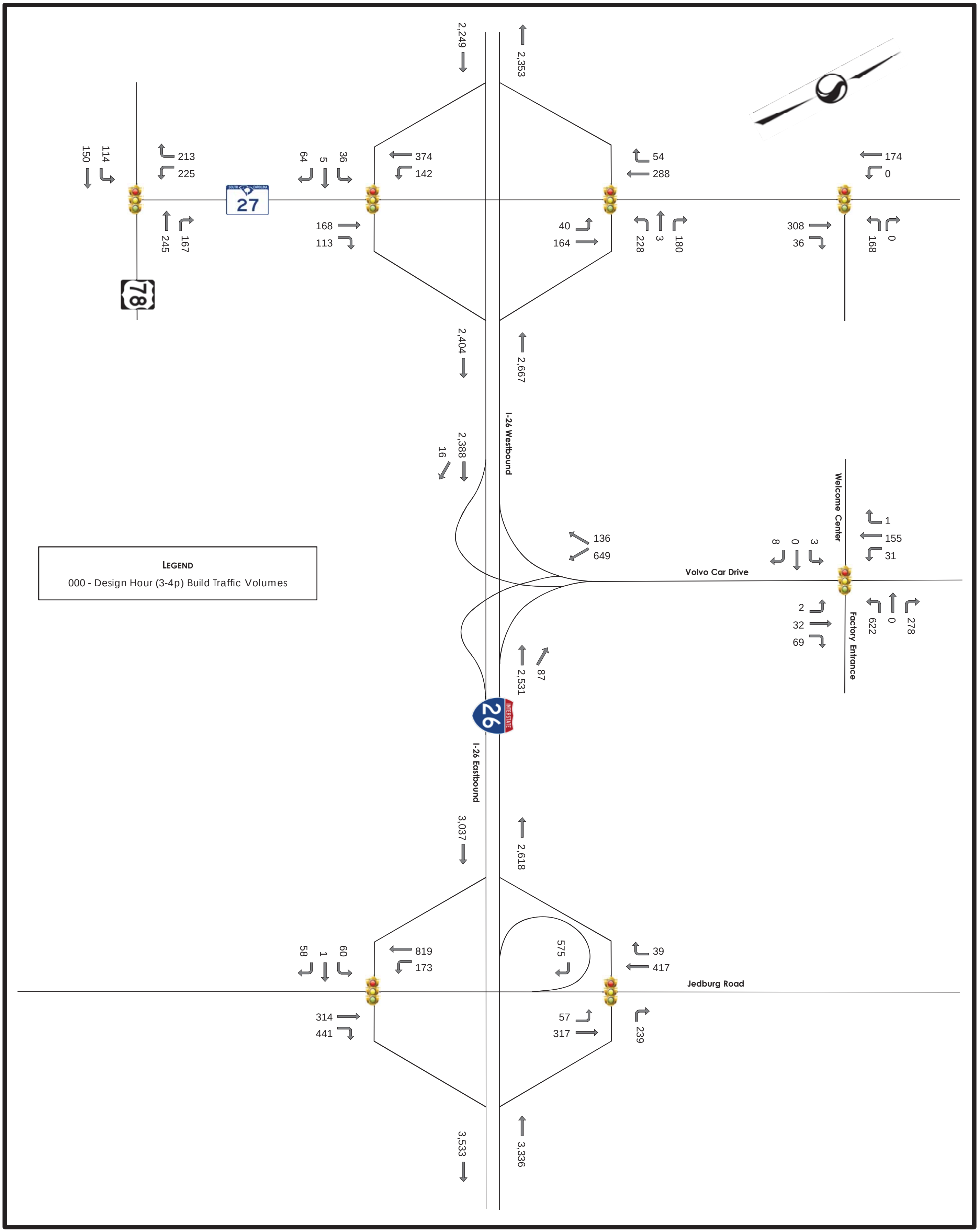
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Volvo Car Drive
Welcome Center
Factory Entrance
Jedburg Road
Legend
000 - Design Hour (3-4p) Build Traffic Volumes
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3.3 HORIZON-YEAR 2039 TRAFFIC VOLUMES

The horizon-year 2039 traffic volumes were developed for projected 2039 conditions by applying an annual growth rate to the existing traffic volumes and adding the projected traffic volumes of the Volvo factory and Volvo-related industrial development, with the exception of the Jedburg Road volumes, which were based upon the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR* document.

3.3.1 Volvo Developments Trip Generation (2039)

The trip generation potential of the Volvo factory and Volvo-related industrial development was developed based upon information of other large-scale manufacturing factories in South Carolina, including the BMW factory in Greer, South Carolina. The trip generation for the developments was separated into three land uses, Volvo Office, Volvo Manufacturing, and Volvo-related Industrial. Additional truck trips generated by the manufacturing facilities were considered in the horizon year.

- *Volvo Office (500 employees):* the trip generation was estimated using information contained in ITE's *Trip Generation Manual*, 9th Edition (2012) reference for land use code 710 – General Office Building.
- *Volvo Manufacturing (4,000 employees):* the trip generation was estimated considering 1.0 employees per vehicle and a 90%/10% directional split during ingress and egress. This assumption is based upon the trip generation characteristics of other large-scale manufacturing factories in South Carolina.
- *Volvo Manufacturing Trucks (712 trucks daily):* the trip generation was estimated based on a production-based rate provided by Volvo Cars. The estimated trips were distributed throughout the entire 24-hours of operation for the Volvo Factory and a 50%/50% directional split for ingress and egress was assumed.
- *Volvo-Related Industrial Development (9,900,000 square feet):* using a conservative ratio of 1.0 employees per 1,000 square feet of industrial development, the trip generation was estimated using information contained in ITE's *Trip Generation Manual*, 9th Edition (2012) reference for land use codes 140 – Manufacturing and 150 – Warehousing. It was assumed that approximately 60% of the Volvo-related industrial development would be manufacturing (6,000 employees by 2039) and approximately 40% of the Volvo-related industrial development would be warehousing (3,900 employees by 2039).
- *Volvo-Related Industrial Development Trucks (10% of employee trips):* the trip generation was estimated considering additional truck trips equal to 10% of the total Volvo-Related Industrial Development employee trips, which is approximately 360 trucks entering daily and 285 trucks exiting daily.

The total horizon-year 2039 trip generation estimates for the Volvo developments are shown in Table 3.2 and documented in Appendix A.

Table 3.2 – Horizon-Year 2039 Trip Generation Summary

Land Use	Scale	Ingress Peak		Egress Peak	
		Entering	Exiting	Entering	Exiting
Volvo Office	500 employees	240	31	41	210
Volvo Manufacturing	4,000 employees	3,600	400	400	3,600
Volvo Manufacturing Trucks	712 trucks daily	32	32	50	50
Volvo-Related Industrial	9,900 employees	2,355	890	1,250	1,950
Volvo-Related Industrial Trucks	10% of employee trips	235	90	125	195

3.3.2 Volvo Developments Shifts (2039)

Based upon the total trip generation results, the trips were distributed throughout the day based upon several shifts. The shift potential of the Volvo factory and Volvo-related industrial development was developed based upon data of other large-scale manufacturing factories in South Carolina, including the BMW factory in Greer, South Carolina.

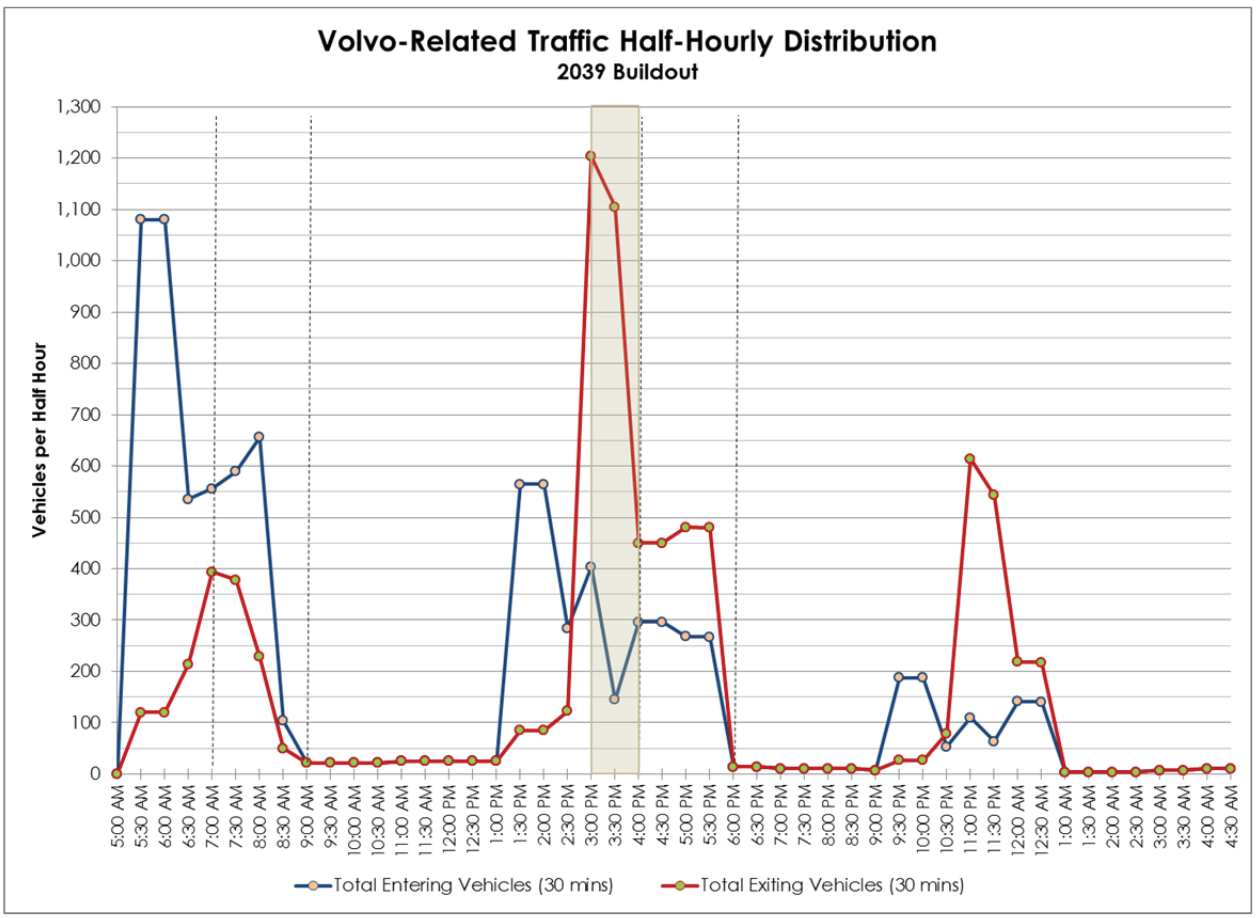
- *Volvo Office:* it was assumed that the office operations would occur during typical workday operations, from 8:30 AM – 5:00 PM.
- *Volvo Manufacturing (employees):* it was assumed that manufacturing would be separated into three shifts, with 60% of the employees working during the 1st shift, 30% of the employees working during the 2nd shift, and 10% of the employees working during the 3rd shift. It was assumed that the 1st shift would begin at 6:30 AM, which is the start time of the 1st shift of Volvo's existing Gothenburg, Sweden factory. The starts of the 2nd and 3rd shifts were assumed to be staggered by 8 hours and 16 hours respectively from the 1st shift. It was assumed that the egress of the 1st shift would be from 3:00 – 4:00 PM and that the egress of the 2nd and 3rd shifts would be staggered by 8 hours and 16 hours respectively.
- *Volvo Manufacturing Trucks:* it was assumed that the truck trips generated by the Volvo factory would be distributed throughout the day based upon the existing hourly distribution of trucks along I-26 as determined by data collected from SCDOT ATR station P-54 along I-26 between SC 27/Ridgeville Road and Jedburg Road.
- *Volvo-Related Industrial Development (employees and trucks):* it was assumed that one-third of the Volvo-related industrial development would operate similar to the Volvo office operations from 8:30 AM – 5:00 PM. It was assumed that the other two-thirds of the Volvo-related development would operate on three shifts similar to the Volvo Manufacturing operations, but staggered one hour later with the Volvo-related industrial development 1st shift beginning at 7:30 AM. It was assumed that the egress of the 1st shift would be from 4:00 – 5:00 PM and the ingress of the 2nd shift would be from 2:30 – 3:30 PM.

The shift assumptions are summarized in Table 3.3 and documented in Appendix A. The resulting half-hourly distribution of Volvo-related traffic is illustrated in Exhibit 3.3.

Table 3.3 – Horizon-Year 2039 Shift Assumptions Summary

Land Use	Shift	% of Workers in Shift	Operation Hours	Ingress Peak	Egress Peak
Volvo Office	--	--	8:30 AM – 5:00 PM	7:30 AM to 8:30 AM	5:00 PM to 6:00 PM
Volvo Manufacturing (employees)	1st	60%	6:30 AM to 3:00 PM	5:30 AM to 6:30 AM	3:00 PM to 4:00 PM
	2nd	30%	2:30 PM to 11:00 PM	1:30 PM to 2:30 PM	11:00 PM to 12:00 AM
	3rd	10%	10:30 PM to 7:00 AM	9:30 PM to 10:30 PM	7:00 AM to 8:00 AM
Volvo Manufacturing (trucks)	--	--	24-hours	11:00 AM to 4:00 PM	11:00 AM to 4:00 PM
Volvo-Related Industrial Office	--	--	8:30 AM – 5:00 PM	7:30 AM to 8:30 AM	5:00 PM to 6:00 PM
Volvo-Related Industrial (employees and trucks)	1st	60%	7:30 AM to 4:00 PM	6:30 AM to 7:30 AM	4:00 PM to 5:00 PM
	2nd	30%	3:30 PM to 12:00 AM	2:30 PM to 3:30 PM	12:00 AM to 1:00 AM
	3rd	10%	11:30 PM to 8:00 AM	10:30 PM to 11:30 PM	8:00 AM to 9:00 AM

Exhibit 3.3 – Volvo-Related Traffic Half-Hourly Distribution



The peak of the Volvo-related traffic throughout the day occurs between 3:00 PM and 4:00 PM with the egress of the Volvo Manufacturing 1st-shift employees. This 3:00 PM to 4:00 PM hour corresponds to the I-26 Design Hour and was considered the selected Design Hour for the IJR analyses.

The peak of ingress for Volvo-related traffic throughout the day occurs between 5:30 AM and 6:30 AM. Due to the fact that the ingress peak is less than the egress peak and that the ingress peak time period occurs away from the typical AM peak period (between 7:00 AM and 9:00 AM) for I-26 and area traffic, the ingress peak time period was not considered in the IJR analyses, with the exception of the Factory Entrance analyses discussed in section 4.2.4.

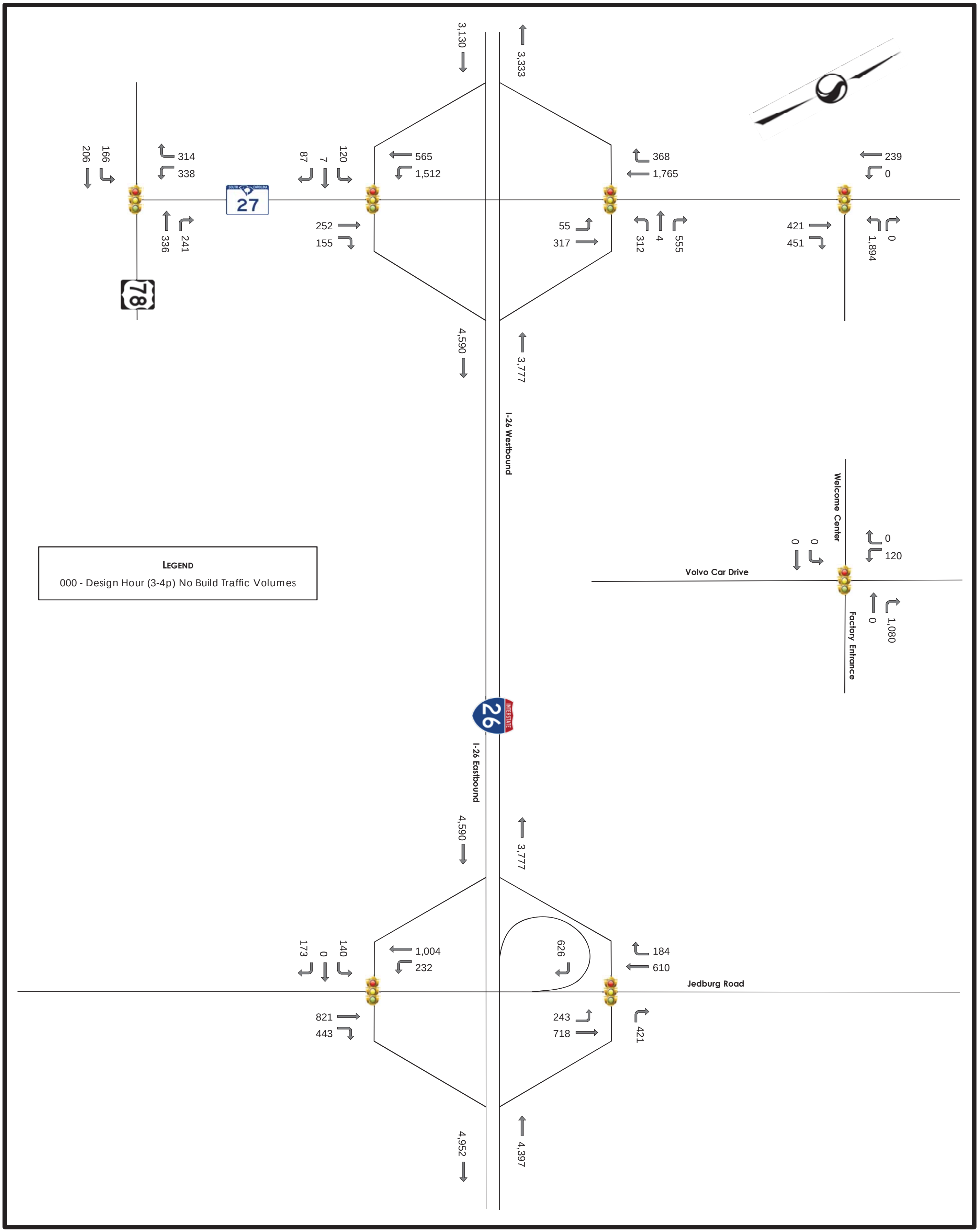
3.3.3 Trip Distribution (2039)

Employee traffic expected to be generated by the Volvo factory and Volvo-related industrial development for horizon-year 2039 conditions was distributed and assigned to the adjacent roadway network based upon the assumptions for opening-year 2019 conditions as documented in Section 3.2.3. Truck traffic, as described in Section 3.3.1, was distributed in the same manner as employee traffic.

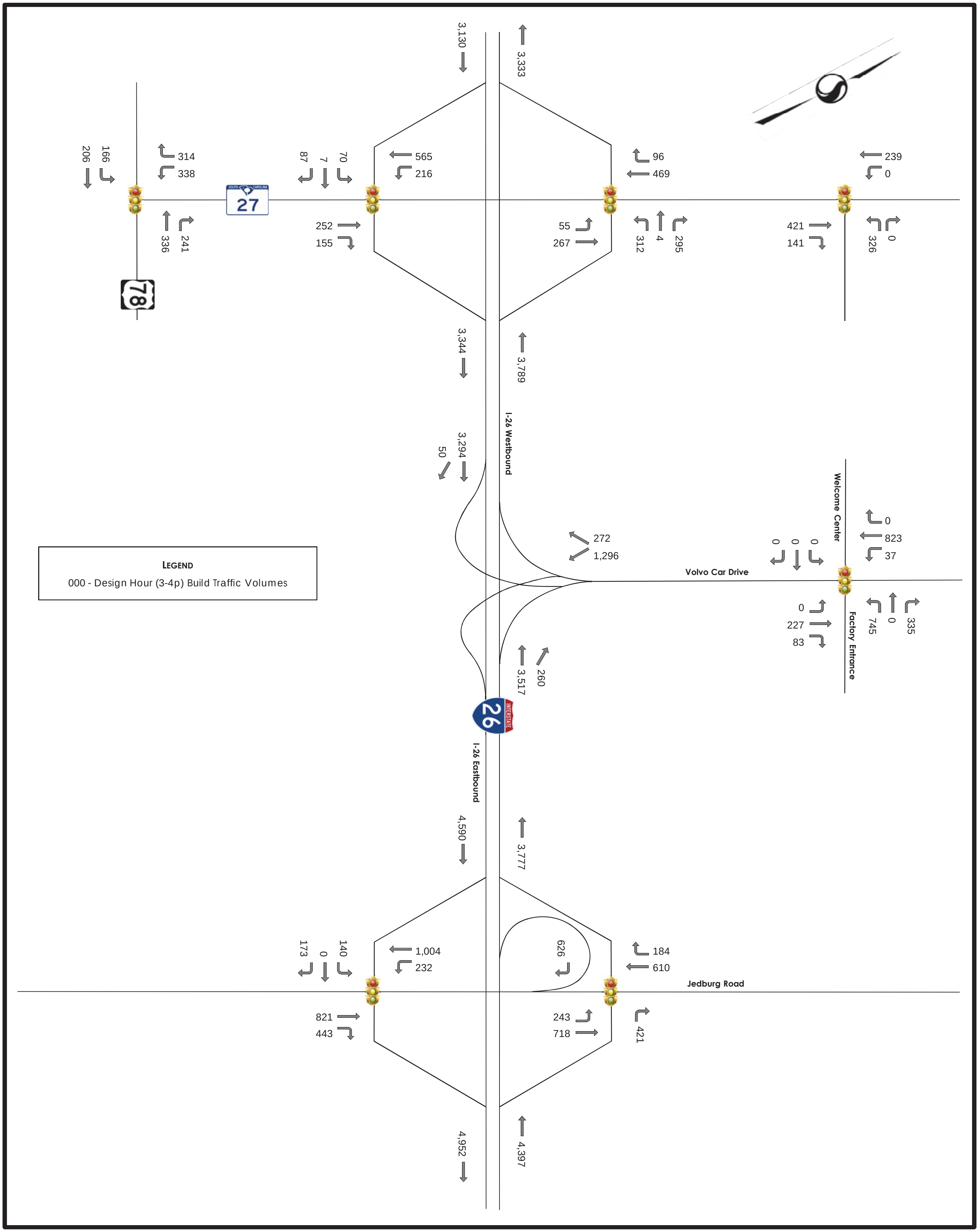
3.3.4 Horizon-year 2039 Traffic Volume Development Summary

Based upon the traffic volume development impacts of the Volvo factory and Volvo-related industrial development and considering the 2.0% annual growth rate, the effective annual growth rate along I-26 eastbound between Volvo Car Drive and Jedburg Road (the peak direction during the Volvo Manufacturing egress) during the 3:00 – 4:00 PM Design Hour is approximately 4.7% per year. Worksheets documenting the traffic volume development are provided in Appendix C.

Figures illustrating the proposed horizon-year 2039 Design Hour traffic volumes for No Build and Build conditions are shown in Exhibits 3.4 and 3.5, respectively.



3,130
3,333
206
166
314
338
336
241
27
78
87
7
120
565
1,512
252
155
368
1,765
55
317
312
4
555
239
0
421
451
0
1,894
4,590
3,777
I-26 Westbound
Welcome Center
0
0
0
120
Volvo Car Drive
0
1,080
Factory Entrance
LEGEND
000 - Design Hour (3-4p) No Build Traffic Volumes
26
INTERSTATE
I-26 Eastbound
4,590
3,777
173
0
140
1,004
232
626
184
610
Jedburg Road
821
443
243
718
421
4,952
4,397



I-26 Westbound
I-26 Eastbound
Volvo Car Drive
Welcome Center
Factory Entrance
Jedburg Road
LEGEND
000 - Design Hour (3-4p) Build Traffic Volumes

4.0 Capacity Analysis

Using the projected opening-year 2019 and horizon-year 2039 traffic volumes for No Build and Build conditions of the proposed I-26 & Volvo Car Drive interchange, capacity analyses were conducted for the study area freeway facilities and intersections using the *Highway Capacity Software (HCS 2010)* and the *Highway Capacity Manual 2010 (HCM 2010)* methodologies of the *Synchro* Version 9 software. The *Synchro* analyses were conducted at a planning level and exact signal timings and phases will be determined during the design phase in accordance with the SCDOT *Signal Design Guidelines*.

Level of service (LOS) grades range from LOS A to LOS F, which are directly related to traffic density of freeway facilities and the level of control delay at intersections. LOS A operations typically represent ideal, free-flow conditions where vehicles experience low densities or little delays, and LOS F operations typically represent poor, forced-flow (bumper-to-bumper) conditions with high densities or vehicular delays and are generally considered undesirable. Table 4.1 summarizes the *HCM 2010* density and control delay thresholds associated with each LOS grade for freeway facilities and signalized intersections.

Table 4.1 – HCM 2010 LOS Criteria

LOS	Ramp Merge & Diverge Areas	Freeway Segments
	Density (passenger cars/mile/lane)	
A	≤ 10	≤ 11
B	> 10 and ≤ 20	> 11 and ≤ 18
C	> 20 and ≤ 28	> 18 and ≤ 26
D	> 28 and ≤ 35	> 26 and ≤ 35
E	> 35	> 35 and ≤ 45
F	Demand exceeds capacity	> 45

Signalized Intersections	
LOS	Delay Per Vehicle (seconds)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

As part of the analyses, a peak hour factor of 0.90 and truck percentage of 20% were assumed for all freeway facilities and intersections. The truck percentage was based upon existing data collected from SCDOT ATR station P-54 along I-26 between SC 27/Ridgeville Road and Jedburg Road.

4.1 OPENING-YEAR 2019 ANALYSES

For 2019 Build conditions, the proposed I-26 & Volvo Car Drive interchange configuration is a three-level, three-leg directional interchange that connects I-26 and the Camp Hall Commerce Park via Volvo Car Drive. Directional ramps are proposed for all movements that will be achieved through three bridge structures. Due to the expected high attraction to/from the Charleston area, the ramps to/from Charleston are proposed to be constructed as two-lane ramps. All proposed new ramp lengths exceed Highway Capacity Ramp Analysis values and are therefore analyzed as a freeway segment.

As part of the 2019 Build and No Build analyses, the existing configuration of I-26 as a four-lane section from west of SC 27/Ridgeville Road to east of Jedburg Road was assumed.

4.1.1 Freeway Facility Analyses – 2019 No Build

The results of the freeway facility analyses considering 2019 No Build conditions for the 3:00 – 4:00 PM Design Hour are summarized in Table 4.2 and illustrated in Exhibit 4.1 and indicate that the study area freeway facilities are projected to operate at acceptable conditions considering 2019 No Build conditions with one exception. Worksheets documenting the freeway analyses for 2019 No Build conditions are included in Appendix D.

Table 4.2 – Freeway Facility LOS Analysis Summary (2019 No Build)

I-26 Section	Eastbound						Westbound					
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Average Speed (mph)	Density (pc/mi/ln)	Type	LOS	LOS	Type	Density (pc/mi/ln)	Average Speed (mph)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
West of SC 27		2,249	73.5	18.7	FS	C	C	FS	19.7	72.9	2,353	
On/Off West of SC 27	121	2,249	60.4	23.8	D	C	C	M	22.0	64.3	2,120	233
At SC 27		2,128	74.0	17.6	FS	B	B	FS	17.5	74.0	2,120	
On/Off East of SC 27	909	2,128	61.0	28.9	M	D	C	D	27.3	59.1	2,618	498
SC 27 to Jedburg		3,037	66.9	27.7	FS	D	C	FS	22.5	71.0	2,618	
On/Off West of Jedburg Road	119	3,037	60.4	31.7	D	D	C	M	22.2	61.8	2,522	96
Loop Off-Ramp to On-Ramp							C	FS	22.4	68.7	2,522	
Loop Off-Ramp							D	D	30.1	56.9	3,097	575
On/Off Ramp to Loop Off-Ramp		2,918	68.2	26.1	FS	D	D	FS	29.4	64.4	3,097	
On/Off East of Jedburg Road	615	2,918	57.4	31.6	M	D	D	D	32.6	58.0	3,336	239
East of Jedburg Road		3,533	59.3	36.4	FS	E	D	FS	33.0	61.8	3,336	

For the I-26 eastbound Freeway Segment between Jedburg Road and Sheep Island Parkway the 2019 No Build traffic volume is 3,533, which is equivalent to LOS E conditions. It should be noted that SCDOT has identified this section of I-26 for widening to six lanes.

4.1.2 Freeway Facility Analyses – 2019 Build

The results of the freeway facility analyses considering 2019 Build conditions for the 3:00 – 4:00 PM Design Hour are summarized in Table 4.3 and illustrated in Exhibit 4.2 and indicate that the study area freeway facilities are projected to operate at acceptable conditions considering 2019 Build conditions with one exception. Worksheets documenting the freeway analyses for 2019 Build conditions are included in Appendix D.

Table 4.3 – Freeway Facility LOS Analysis Summary (2019 Build)

I-26 Section	Eastbound						Westbound					
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Average Speed (mph)	Density (pc/mi/ln)	Type	LOS	LOS	Type	Density (pc/mi/ln)	Average Speed (mph)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
West of SC 27		2,249	73.5	18.7	FS	C	C	FS	19.7	72.9	2,353	
On/Off West of SC 27	105	2,249	60.5	23.8	D	C	C	M	22.1	63.0	2,256	97
At SC 27		2,144	73.9	17.7	FS	B	C	FS	18.8	73.4	2,256	
On/Off East of SC 27	260	2,144	63.8	23.2	M	C	C	D	27.8	58.4	2,667	411
SC 27 to New Interchange		2,404	72.6	20.2	FS	C	C	FS	23.1	70.6	2,667	
Three-Lane On/Off West of New Interchange		2,404	75.0	13.1	FS	B	B	FS	14.5	74.9	2,667	
At New Interchange		2,388	72.7	20.1	FS	C	C	FS	21.6	71.7	2,531	
Four-Lane On/Off East of New Interchange		3,037	75.0	12.4	FS	B	A	FS	10.7	75.0	2,618	
Three-Lane On/Off East of New Interchange		3,037	74.4	16.6	FS	B	B	FS	14.2	75.0	2,618	
New Interchange to Jedburg Road		3,037	66.9	27.7	FS	D	C	FS	22.5	71.0	2,618	
On/Off West of Jedburg Road	119	3,037	59.4	31.7	D	D	C	M	22.2	61.8	2,522	96
Loop Off-Ramp to On-Ramp							C	FS	22.4	68.7	2,522	
Loop Off-Ramp							D	D	30.1	56.9	3,097	575
On/Off Ramp to Loop Off-Ramp		2,918	68.2	26.1	FS	D	D	FS	29.4	64.4	3,097	
On/Off East of Jedburg Road	615	2,918	56.5	31.6	M	D	D	D	32.6	58.0	3,336	239
East of Jedburg Road		3,533	59.3	36.4	FS	E	D	FS	33.0	61.8	3,336	

For the I-26 eastbound Freeway Segment between Jedburg Road and Sheep Island Parkway the 2019 Build traffic volume is the same as the 2019 No Build traffic volume of 3,533, which is equivalent to LOS E conditions. It should be noted that SCDOT has identified this section of I-26 for widening to six lanes.

4.1.3 Intersection Analyses – 2019 No Build and Build

As part of the 2019 Build and No Build intersection analyses, improvements to SC 27/Ridgeville Road were assumed to be in place in conjunction with construction of the initial phases of the Volvo factory to be open in 2017. The assumed improvements are listed below.

- At the SC 27/Ridgeville Road & I-26 Eastbound Ramps intersection, the addition of an exclusive eastbound right-turn lane, an exclusive southbound left-turn lane, and intersection signalization with coordinated control and protected-permitted left-turn phasing for the southbound left-turn were assumed in place.
- At the SC 27/Ridgeville Road & I-26 Westbound Ramps intersection, the addition of an exclusive westbound right-turn lane, an exclusive southbound right-turn lane, an exclusive northbound left-turn lane, and intersection signalization with coordinated control were assumed in place.
- Along SC 27/Ridgeville Road between I-26 and Lower Westvaco Road, an improved two-lane section with left-turn lanes and median separation was assumed to be in place.

No improvements to the existing SC 27/Ridgeville Road bridge over I-26 are proposed at this time. It is recommended that the SC 27/Ridgeville Road bridge over I-26 be replaced to provide for a more typical cross section, but replacement of the SC 27/Ridgeville Road bridge is not part of the I-26 & Volvo Car Drive interchange construction.

Improvements to the I-26 & Jedburg Road interchange were also assumed to be in place as part of the 2019 Build and No Build intersection analyses. These improvements are documented in the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR,* and include the widening of Jedburg Road to a four-lane, median divided section in the interchange area and the addition of an I-26 westbound-to-Jedburg Road southbound loop off-ramp.

As part of the analyses, a peak hour factor of 0.90 and truck percentage of 20% were assumed for all intersections. The truck percentage was based upon existing data collected from SCDOT ATR station P-54 along I-26 between SC 27/Ridgeville Road and Jedburg Road. To provide for a conservative analysis of intersection capacity, the 20% estimated truck percentage considered in the freeway analyses was utilized throughout the roadway network in place of exact truck percentages derived from the estimated volume of trucks at each intersection.

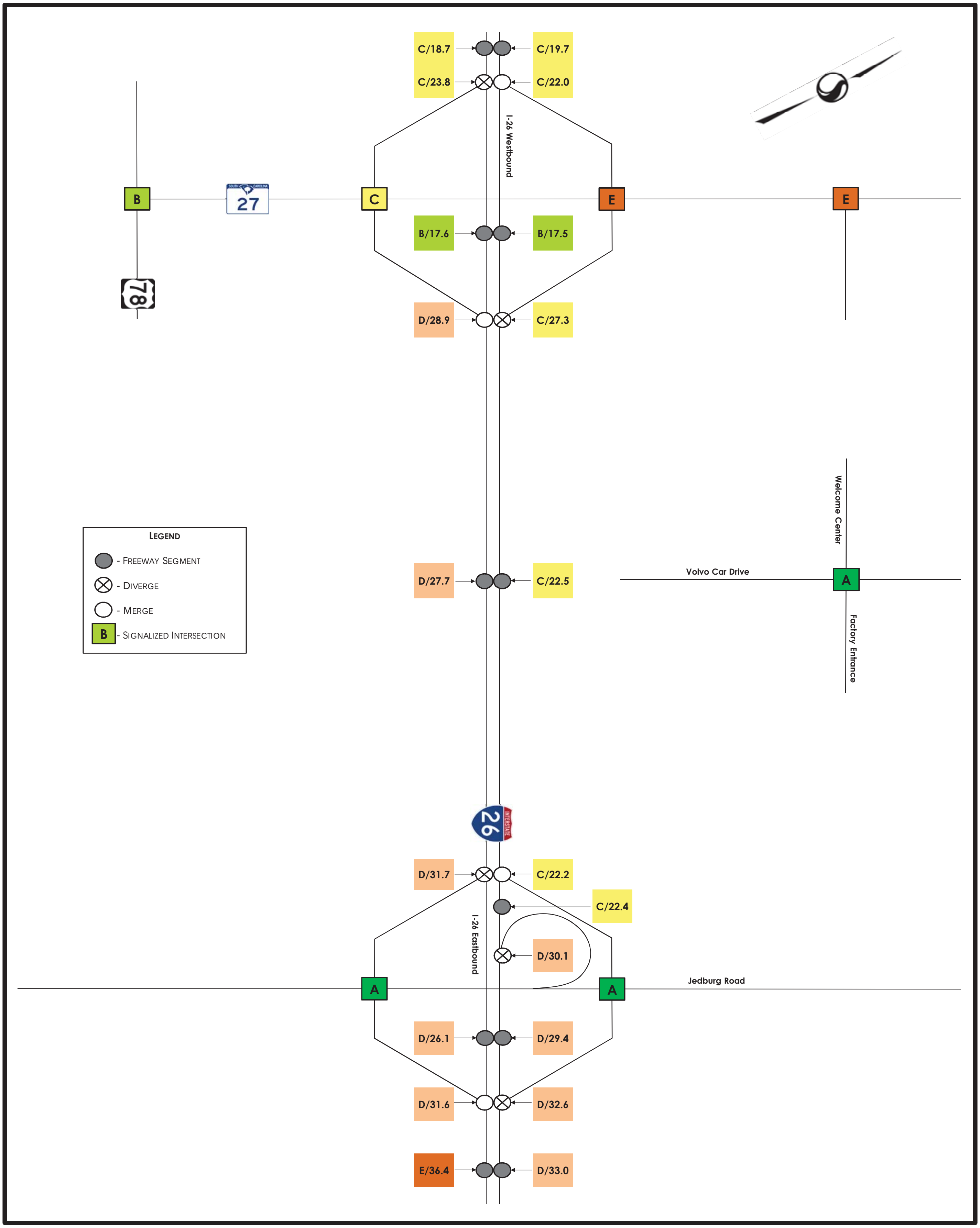
The results of the intersection analyses considering 2019 No Build and 2019 Build conditions are summarized in Table 4.4 for the 3:00 – 4:00 PM Design Hour. Worksheets documenting the intersection analyses are included in Appendix E.

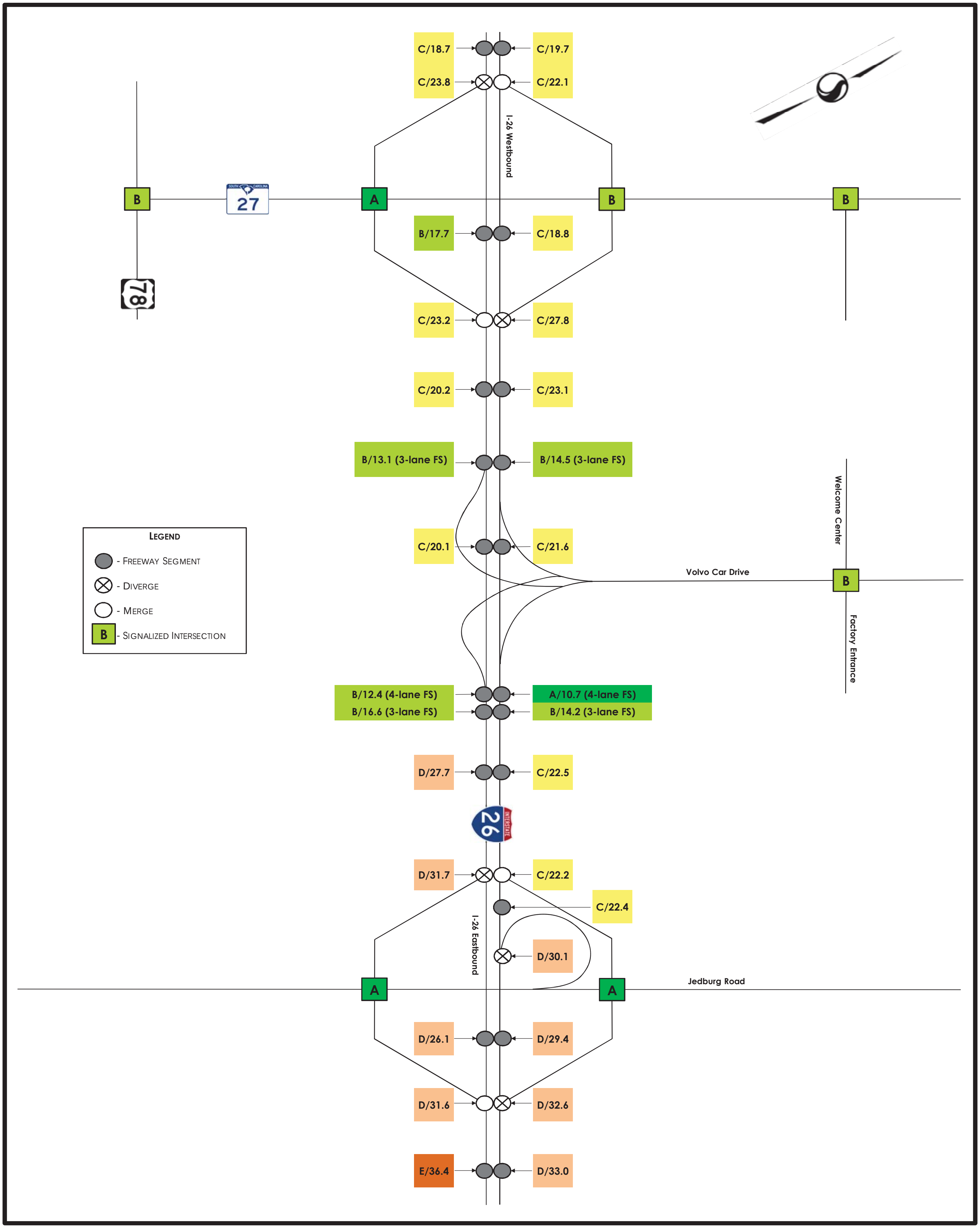
The results indicate that the study area intersections are projected to operate at acceptable conditions considering 2019 Build conditions. The results indicate that for 2019 No Build conditions, the SC 27/Ridgeville Road & I-26 Westbound Ramps intersection and SC 27/Ridgeville Road & Lower Westvaco Road intersections are projected to operate at LOS E conditions.

Table 4.4 – Design Hour Intersection LOS Analysis Summary (2019)

Intersection	Level Of Service/Delay (seconds)	
	2019 Build	2019 No Build
SC 27 & US 78	B/15.0	B/15.0
SC 27 & I-26 Eastbound Ramps	A/7.9	C/27.6
SC 27 & I-26 Westbound Ramps	B/18.6	E/55.5
SC 27 & Lower Westvaco Road	B/10.4	E/60.9
Volvo Car Drive & Factory Entrance	B/18.3	A/6.1
Jedburg Road & I-26 Eastbound Ramps	A/6.7	A/6.7
Jedburg Road & I-26 Westbound Ramps	A/1.8	A/1.8

For 2019 No Build conditions, the LOS E conditions at the SC 27/Ridgeville Road & I-26 Westbound Ramps intersection and SC 27/Ridgeville Road & Lower Westvaco Road intersection can be attributed to all of the Volvo-related traffic being assigned to the roadway to access I-26 and the egress of Volvo factory workers during the 3:00 PM – 4:00 PM design hour.


C/18.7
C/19.7
C/23.8
C/22.0
I-26 Westbound
B
27
C
E
E
B/17.6
B/17.5
78
D/28.9
C/27.3
Welcome Center
LEGEND
- FREEWAY SEGMENT
- DIVERGE
- MERGE
B - SIGNALIZED INTERSECTION
D/27.7
C/22.5
Volvo Car Drive
A
Factory Entrance
26
D/31.7
C/22.2
C/22.4
I-26 Eastbound
D/30.1
A
A
Jedburg Road
D/26.1
D/29.4
D/31.6
D/32.6
E/36.4
D/33.0



Stantec

I-26 & Volvo Car Drive IJR
Exhibit 4.2 - Opening-year 2019 Build Level of Service

4.2 HORIZON-YEAR 2039 ANALYSES

For 2039 Build conditions, the proposed I-26 & Volvo Car Drive interchange configuration is a three-level, three-leg directional interchange that connects I-26 and the Camp Hall Commerce Park via Volvo Car Drive. Directional ramps are proposed for all movements that will be achieved through three bridge structures. Due to the expected high attraction to/from the Charleston area, the ramps to/from Charleston are proposed to be constructed as two-lane ramps. All proposed new ramp lengths exceed Highway Capacity Ramp Analysis values and are therefore analyzed as a freeway segment.

As part of the 2039 Build and No Build analyses, the widening of I-26 to a six-lane section from west of SC 27/Ridgeville Road to east of Jedburg Road was assumed to be in place.

4.2.1 Freeway Facility Analyses – 2039 No Build

The results of the freeway facility analyses considering 2039 No Build conditions for the 3:00 – 4:00 PM Design Hour are summarized in Table 4.5 and Exhibit 4.3 and indicate that the study area freeway facilities are projected to operate at acceptable conditions considering 2039 No Build conditions. Worksheets documenting the freeway analyses for 2039 No Build conditions are included in Appendix F.

Table 4.5 – Freeway Facility LOS Analysis Summary (2039 No Build)

I-26 Section	Eastbound						Westbound					
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Average Speed (mph)	Density (pc/mi/ln)	Type	LOS	LOS	Type	Density (pc/mi/ln)	Average Speed (mph)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Two-Lane West of SC 27		3,130	65.8	29.1	FS	D	D	FS	32.3	63.1	3,333	
West of SC 27		3,130	74.2	17.2	FS	B	C	FS	18.5	73.6	3,333	
On/Off West of SC 27	214	3,130	65.7	22.5	D	C	C	M	20.2	67.0	2,906	427
At SC 27		2,916	74.6	15.9	FS	B	B	FS	15.9	74.6	2,906	
On/Off East of SC 27	1,674	2,916	60.8	32.2	M	D	C	D	27.1	63.3	3,777	871
SC 27 to Jedburg		4,590	66.6	28.1	FS	D	C	FS	21.4	71.8	3,777	
On/Off West of Jedburg Road	313	4,590	65.4	30.1	D	D	C	M	20.6	63.9	3,350	427
Loop Off-Ramp to On-Ramp							C	FS	19.6	69.7	3,350	
Loop Off-Ramp							C	D	25.3	61.9	3,976	626
On/Off Ramp to Loop Off-Ramp		4,277	68.9	25.3	FS	C	C	FS	23.8	68.0	3,976	
On/Off East of Jedburg Road	675	4,277	62.9	29.2	M	D	D	D	28.2	62.3	4,397	421
East of Jedburg Road		4,952	62.3	32.4	FS	D	D	FS	27.2	65.9	4,397	
East of Jedburg Road*		***3,725***	***65.0***	***21.2***	***FS***	C	C	***FS***	***20.0***	***65.0***	***3,505***	

*LOS Results from the *Sheep Island Parkway IJR/Jedburg Road IMR* for 2035 Build PM peak-hour conditions.

4.2.2 Freeway Facility Analyses – 2039 Build

The results of the freeway facility analyses considering 2039 Build conditions for the 3:00 – 4:00 PM Design Hour are summarized in Table 4.6 and illustrated in Exhibit 4.4 and indicate that the study area freeway facilities are projected to operate at acceptable conditions considering 2039 Build conditions. Worksheets documenting the freeway analyses for 2039 Build conditions are included in Appendix F.

Table 4.6 – Freeway Facility LOS Analysis Summary (2039 Build)

I-26 Section	Eastbound						Westbound					
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Average Speed (mph)	Density (pc/mi/ln)	Type	LOS	LOS	Type	Density (pc/mi/ln)	Average Speed (mph)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Two-Lane West of SC 27		3,130	65.8	29.1	FS	D	D	FS	32.3	63.1	3,333	
West of SC 27		3,130	74.2	17.2	FS	B	C	FS	18.5	73.6	3,333	
On/Off West of SC 27	164	3,130	65.8	22.4	D	C	B	M	19.3	65.7	3,178	155
At SC 27		2,966	74.5	16.2	FS	B	B	FS	17.5	74.0	3,178	
On/Off East of SC 27	378	2,966	66.8	20.8	M	C	C	D	26.5	63.1	3,789	611
SC 27 to New Interchange		3,344	73.5	18.5	FS	C	C	FS	21.5	71.7	3,789	
Four-Lane On/Off West of New Interchange		3,344	75.0	13.6	FS	B	B	FS	15.5	74.7	3,789	
At New Interchange		3,294	73.7	18.2	FS	C	C	FS	19.7	72.9	3,517	
Five-Lane On/Off East of New Interchange		4,590	74.8	15.0	FS	B	B	FS	12.3	75.0	3,777	
Four-Lane On/Off East of New Interchange		4,590	73.2	19.2	FS	C	B	FS	15.4	74.7	3,777	
New Interchange to Jedburg Road		4,590	66.6	28.1	FS	D	C	FS	21.4	71.8	3,777	
On/Off West of Jedburg Road	313	4,590	64.1	30.1	D	D	C	M	20.6	63.9	3,350	427
Loop Off-Ramp to On-Ramp							C	FS	19.6	69.7	3,350	
Loop Off-Ramp							C	D	25.3	61.9	3,976	626
On/Off Ramp to Loop Off-Ramp		4,277	68.9	25.3	FS	C	C	FS	23.8	68.0	3,976	
On/Off East of Jedburg Road	675	4,277	61.6	29.2	M	D	D	D	28.2	62.3	4,397	421
East of Jedburg Road		4,952	62.3	32.4	FS	D	D	FS	27.2	65.9	4,397	
East of Jedburg Road*		***3,725***	***65.0***	***21.2***	***FS***	C	C	***FS***	***20.0***	***65.0***	***3,505***	

*LOS Results from the *Sheep Island Parkway IJR/Jedburg Road IMR* for 2035 Build PM peak-hour conditions.

4.2.3 Intersection Analyses – 2039 No Build and Build

As part of the 2039 Build and No Build intersection analyses, improvements to SC 27/Ridgeville Road were assumed to be in place in conjunction with construction of the initial phases of the Volvo factory to be open in 2017. The assumed improvements are listed below.

- At the SC 27/Ridgeville Road & I-26 Eastbound Ramps intersection, the addition of an exclusive eastbound right-turn lane, an exclusive southbound left-turn lane, and intersection signalization with coordinated control and protected-permitted left-turn phasing for the southbound left-turn were assumed in place.
- At the SC 27/Ridgeville Road & I-26 Westbound Ramps intersection, the addition of an exclusive westbound right-turn lane, an exclusive southbound right-turn lane, an exclusive northbound left-turn lane, and intersection signalization with coordinated control were assumed in place.
- Along SC 27/Ridgeville Road between I-26 and Lower Westvaco Road, an improved two-lane section with left-turn lanes and median separation was assumed to be in place.

It should be noted that no improvements to the existing SC 27/Ridgeville Road overpass over I-26 are proposed at this time. It is recommended that the SC 27/Ridgeville Road overpass over I-26 be replaced to provide for a more typical cross section, but replacement of the SC 27/Ridgeville Road overpass is not part of the I-26 & Volvo Car Drive interchange construction.

In addition, improvements to the I-26 & Jedburg Road interchange were also assumed to be in place as part of the 2039 No Build and Build intersection analyses. These improvements are documented in the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR,* and include the widening of Jedburg Road to a four-lane, median divided section in the interchange area and the addition of an I-26 westbound-to-Jedburg Road southbound loop off-ramp.

As part of the analyses, a peak hour factor of 0.90 and truck percentage of 20% were assumed for all intersections. The truck percentage was based upon existing data collected from SCDOT ATR station P-54 along I-26 between SC 27/Ridgeville Road and Jedburg Road. To provide for a conservative analysis of intersection capacity, the 20% estimated truck percentage considered in the freeway analyses was utilized throughout the roadway network in place of exact truck percentages derived from the estimated volume of trucks at each intersection, with the exception of the Volvo Car Drive & Factory Entrance intersection analysis, which utilized truck percentages derived from the estimated truck volumes projected for the horizon year.

The results of the intersection analyses considering 2039 Build and 2039 No Build conditions are summarized in Table 4.7 for the 3:00 – 4:00 PM Design Hour. Worksheets documenting the intersection analyses are included in Appendix G.

Table 4.7 – Design Hour Intersection LOS Analysis Summary (2039)

Intersection	Level Of Service/Delay (seconds)	
	2039 Build	2039 No Build
SC 27 & US 78	C/23.6	C/23.6
SC 27 & I-26 Eastbound Ramps	B/10.2	F/250.9
SC 27 & I-26 Westbound Ramps	C/25.5	F/337.4
SC 27 & Lower Westvaco Road	B/14.8	F/337.3
Volvo Car Drive & Factory Entrance	C/30.9	A/6.1
Jedburg Road & I-26 Eastbound Ramps	B/12.4	B/12.4
Jedburg Road & I-26 Westbound Ramps	A/3.2	A/3.2

The results indicate that the study area intersections are projected to operate at acceptable conditions considering 2039 Build conditions.

The results indicate that for 2039 No Build conditions, the three intersections along SC 27/Ridgeville Road between I-26 and Lower Westvaco Road are projected to operate at severe LOS F conditions that would represent gridlock along SC 27/Ridgeville Road. This gridlock will likely cause severe queuing on the I-26 off-ramps to SC 27/Ridgeville Road, which could potentially back-up to the I-26 mainlines in both directions. The severe failing conditions along SC 27/Ridgeville Road can be attributed to all of the Volvo-related traffic being assigned to the roadway to access I-26.

4.2.4 Intersection Analyses – 2039 No Build Plus Improvements

Due to the projected severe LOS F conditions that would represent gridlock along SC 27/Ridgeville Road in the 2039 No Build intersection analyses, an improvement analysis scenario for 2039 No Build conditions was evaluated considering a typical widening project for SC 27/Ridgeville Road. The improvements included widening SC 27/Ridgeville Road to a four-lane, median divided cross section; controlling access between I-26 and Lower Westvaco Road; and increasing the spacing of the I-26 ramp intersections from 700 feet to 1,320 feet. The results of the intersection analyses considering 2039 No

Build conditions plus improvements are summarized in Table 4.8 for the 3:00 – 4:00 PM Design Hour. Worksheets documenting the intersection analyses are included in Appendix G.

Table 4.8 – Design Hour Intersection LOS Analysis Summary (2039 No Build plus Improvements)

Intersection	Level Of Service/Delay (seconds)		
	2039 Build	2039 No Build	2039 No Build Plus Improvements
SC 27 & US 78	C/23.6	C/23.6	C/23.6
SC 27 & I-26 Eastbound Ramps	B/10.2	F/250.9	F/173.2
SC 27 & I-26 Westbound Ramps	C/25.5	F/337.4	F/146.8
SC 27 & Lower Westvaco Road	B/14.8	F/337.3	C/34.8
Volvo Car Drive & Factory Entrance	C/30.9	A/6.1	A/6.1
Jedburg Road & I-26 Eastbound Ramps	B/12.4	B/12.4	B/12.4
Jedburg Road & I-26 Westbound Ramps	A/3.2	A/3.2	A/3.2

The results indicate that for 2039 No Build conditions plus improvements, the typical widening improvements along SC 27/Ridgeville Road would not accommodate the 2039 No Build traffic demands. The two I-26 ramp intersections along SC 27/Ridgeville Road would still be projected to operate at severe LOS F conditions – although less severe than without improvements – that would still represent gridlock along SC 27/Ridgeville Road, which could still potentially back-up to the I-26 mainlines in both directions. The severe failing conditions along SC 27/Ridgeville Road can be attributed to all of the Volvo-related traffic being assigned to the roadway to access I-26.

The peak-direction design-hour traffic volumes along SC 27/Ridgeville Road between Lower Westvaco Road and I-26 (2,133 southbound) indicate that improvements beyond widening to a four-lane, median divided section would be required for SC 27/Ridgeville Road to operate acceptably. Furthermore, the proposed design-hour traffic demands of SC 27/Ridgeville Road traffic accessing I-26 eastbound (1,512 southbound left-turning vehicles) would require a major reconfiguration of the existing interchange beyond typical widening and turn lane improvements.

Therefore, based upon the results of the 2039 No Build conditions analysis and the 2039 No Build conditions with improvements analysis, the I-26 & Volvo Car Drive interchange is justified and needed to accommodate design-year traffic demands of the new Volvo factory and the supporting industrial warehouse and manufacturing development of Volvo-related suppliers and manufacturers of the Camp Hall Commerce Park.

4.2.5 Volvo Car Drive & Factory Entrance Analyses – 2039 Build

Volvo Car Drive, a rural collector road, will begin at the point where the eastbound and westbound I-26 exit ramps converge after passing over I-26. The eastbound ramp creates the left-most lane and the westbound ramp creates the two right lanes for a total of three northbound lanes on Volvo Car Drive. Access will be fully controlled to a point 2,650 feet north of this point of convergence, where a Berkeley County project will begin, constructing the remaining 4.5 miles of Volvo Car Drive to its intersection with US 176.

The Berkeley County project will include a signalized intersection approximately 500 feet north of the access control point, and this Factory Entrance intersection will serve as the employee entrance to the Volvo factory to the east, and to the visitors' center on the west. The primary truck entrance for the Volvo factory will be located 1,000 feet north of the Factory Entrance intersection.

The Volvo Car Drive & Factory Entrance intersection will serve as the primary entrance for the Volvo Factory. The left-most lane of northbound Volvo Car Drive will terminate at the Factory Entrance intersection as a left-turn only lane into the Welcome Center while the two right lanes will continue as through lanes, with an added right-turn only lane into the Volvo Factory being developed prior to the intersection. The Volvo Car Drive & Factory Entrance intersection is also planned to be the first signalized intersection along Volvo Car Drive after entering the project site via the proposed new interchange with I-26. Therefore, intersection capacity, queueing and weaving analyses were performed to determine potential impacts that the Volvo Car Drive & Factory Entrance intersection may have on operations of the proposed new interchange during the peak ingress and peak egress time periods in horizon year 2039 Build conditions.

The peak ingress time period of the Volvo-related traffic throughout the day occurs between 5:30 AM and 6:30 AM with the ingress of the Volvo Manufacturing 1st-shift employees and was considered in the Volvo Car Drive & Factory Entrance intersection analyses.

The peak egress time period of the Volvo-related traffic throughout the day occurs between 3:00 PM and 4:00 PM with the egress of the Volvo Manufacturing 1st-shift employees and was considered in the Volvo Car Drive & Factory Entrance intersection analyses.

As part of the analyses, a peak hour factor of 0.90 was assumed for the Volvo Car Drive & Factory Entrance intersection. The analyses utilized truck percentages derived from the estimated truck volumes projected for the horizon year.

The results of the intersection capacity analyses considering 2039 Build conditions for the 5:30 – 6:30 AM peak ingress hour and 3:00 – 4:00 PM peak egress hour are summarized in Table 4.9. Worksheets documenting the intersection analyses are included in Appendix G.

Table 4.9 – Volvo Car Drive & Factory Entrance Intersection LOS Analysis Summary (2039 Build)

Intersection	Level Of Service/Delay (seconds)	
	Peak Ingress Hour (5:30-6:30AM)	Peak Egress Hour (3:00-4:00PM)
Volvo Car Drive & Factory Entrance	B/17.9	C/30.9

The results indicate that for horizon year 2039 Build conditions, the proposed Volvo Car Drive & Factory Entrance intersection is projected to operate at an acceptable level of service during both the 5:30 – 6:30 AM peak ingress and 3:00 – 4:00 PM peak egress time periods.

Based upon the results of the Volvo Car Drive & Factory Entrance intersection analyses, the 95th percentile back-of-queue for the eastbound approach was determined to be 270 feet during the 5:30 – 6:30 AM peak ingress time period and 85 feet during the 3:00 – 4:00 PM peak egress period. Worksheets documenting the queues associated with the intersection analyses are included in Appendix G.

To determine the effect of the signalized Volvo Car Drive & Factory Entrance intersection on the I-26 & Volvo Car Drive interchange, a weaving analysis was performed for the 5:30 – 6:30 AM peak ingress and 3:00 – 4:00 PM peak egress time periods. The weaving analysis considered the section of eastbound Volvo Car Drive between where the two ramps from I-26 meet to the back of the 95th percentile queue at the first signalized intersection.

Anticipated truck volumes were also considered an important factor in the weave analysis. Representatives of Volvo Cars reported that trucks will access the Volvo factory at a separate intersection, located 1,000 feet further north of the Factory Entrance intersection. The anticipated truck volumes coinciding with the peak ingress and peak egress hours are documented in Appendix A.

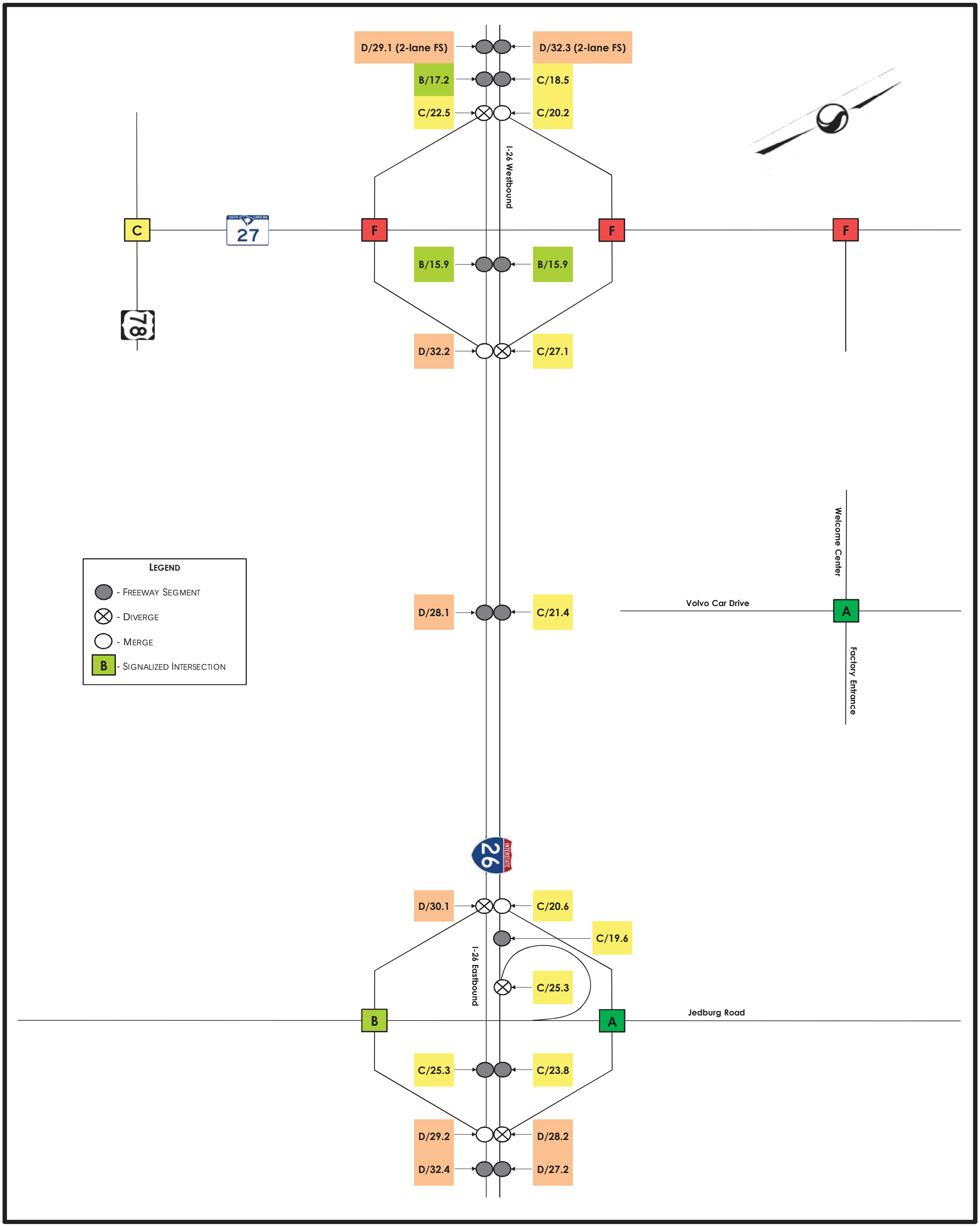
The horizon-year volume of 712 trucks per day was distributed throughout the day based upon the existing hourly distribution of trucks along I-26 as determined by data collected from SCDOT ATR station P-54 along I-26 between SC 27/Ridgeville Road and Jedburg Road. Based upon this distribution, it was determined that 4.5% of the daily truck trips would coincide with the peak ingress hour and 7.0% of the daily truck trips would coincide with the peak egress hour. The resulting truck percentages for eastbound Volvo Car Drive between the new interchange and the Factory Entrance are 2% during the peak ingress hour and 16% during the peak egress hour.

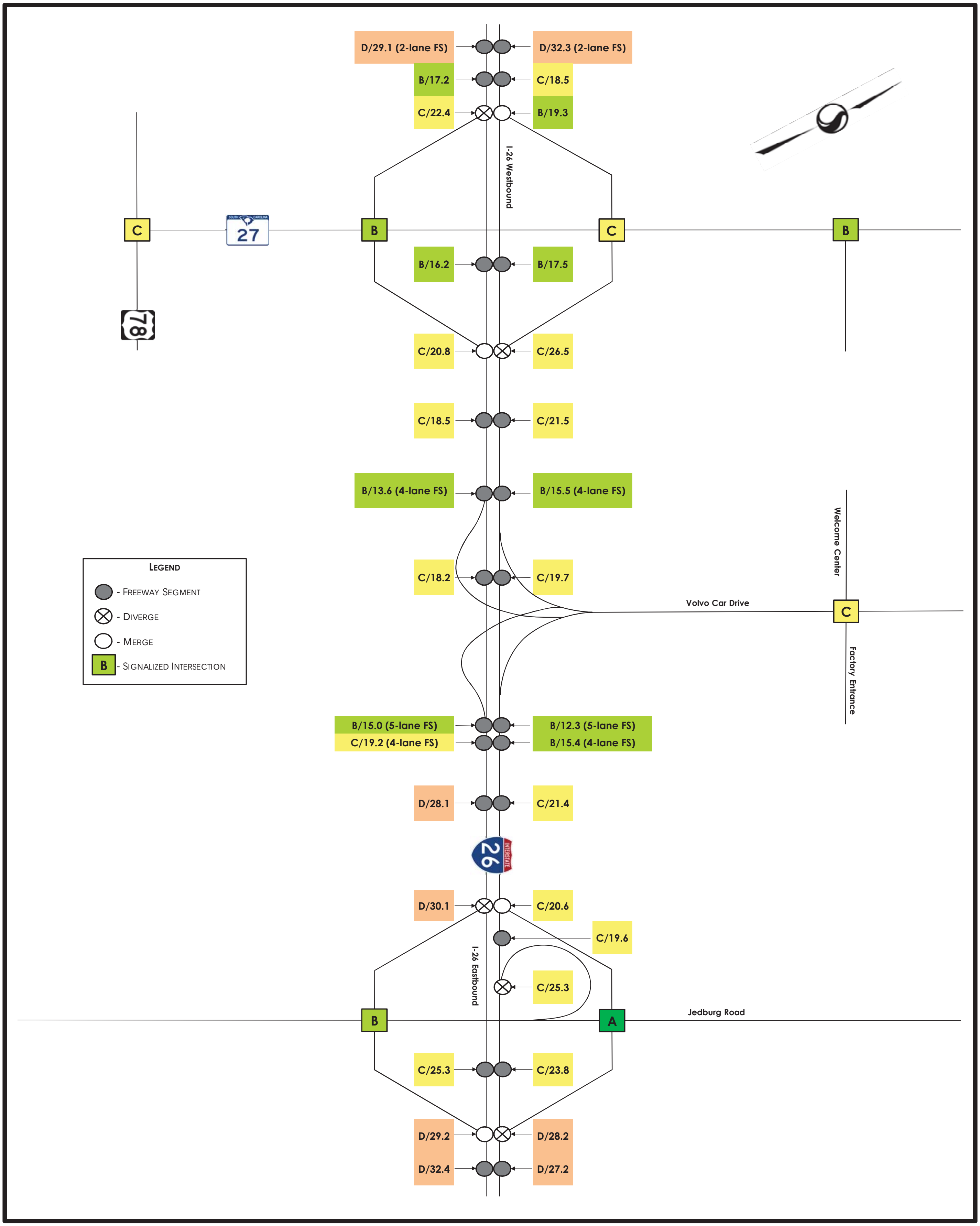
Since the analysis of the proposed interchange including freeway and ramp operations was based on twenty percent (20%) trucks, the weaving analysis was expanded to compare the capacity of Volvo Car Drive with the horizon-year ramp volumes. The results of the Volvo Car Drive weaving analysis for the 5:30 – 6:30 AM peak ingress and 3:00 – 4:00 PM peak egress time periods in the 2039 Build conditions are summarized in Table 4.10. Worksheets documenting the weaving analyses are included in Appendix H.

Table 4.10 – Volvo Car Drive Weaving Analysis Summary (2039 Build)

Segment	Heavy Vehicle Percentage	LOS/Density (pc/mi/ln)	
		Peak Ingress Hour (5:30-6:30 AM)	Peak Egress Hour (3:00-4:00 PM)
Volvo Car Drive between I-26 and Factory Entrance	2%	B/15.0	--
	16%	--	A/3.1
	20%	B/16.5	A/3.1

The results indicate that for 2039 Build conditions, the proposed roadway segment between I-26 and the Volvo Car Drive & Factory Entrance intersection is projected to operate at an acceptable level of service during both the 5:30 – 6:30 AM peak ingress and 3:00 – 4:00 PM peak egress time periods.


D/29.1 (2-lane FS)
D/32.3 (2-lane FS)
B/17.2
C/18.5
C/22.5
C/20.2
I-26 Westbound
C
27
F
F
F
B/15.9
B/15.9
78
D/32.2
C/27.1
Welcome Center
LEGEND
- FREEWAY SEGMENT
- DIVERGE
- MERGE
B - SIGNALIZED INTERSECTION
D/28.1
C/21.4
Volvo Car Drive
A
Factory Entrance
26
D/30.1
C/20.6
C/19.6
I-26 Eastbound
C/25.3
B
A
Jedburg Road
C/25.3
C/23.8
D/29.2
D/28.2
D/32.4
D/27.2


D/29.1 (2-lane FS)
D/32.3 (2-lane FS)
B/17.2
C/18.5
C/22.4
B/19.3
I-26 Westbound
C
B
C
B
27
78
B/16.2
B/17.5
C/20.8
C/26.5
C/18.5
C/21.5
B/13.6 (4-lane FS)
B/15.5 (4-lane FS)
Welcome Center
LEGEND
- FREEWAY SEGMENT
- DIVERGE
- MERGE
B - SIGNALIZED INTERSECTION
C/18.2
C/19.7
Volvo Car Drive
C
Factory Entrance
B/15.0 (5-lane FS)
C/19.2 (4-lane FS)
B/12.3 (5-lane FS)
B/15.4 (4-lane FS)
D/28.1
C/21.4
26
D/30.1
C/20.6
C/19.6
I-26 Eastbound
C/25.3
B
A
Jedburg Road
C/25.3
C/23.8
D/29.2
D/28.2
D/32.4
D/27.2

5.0 Eight Policy Requirements

FHWA policy requires that all requests for new or revised access should address eight policy requirements and the appropriate issues and provide the information necessary to allow the FHWA to make an informed decision considering the potential consequences of a change in access. The policy requirements are outlined in FHWA's *Interstate System Access Informational Guide* (August 2010) reference, which was used as a basis for this justification of the I-26 & Volvo Car Drive interchange.

The eight policy requirements (in bold) and responses specific to the proposed I-26 & Volvo Car Drive interchange are provided herein.

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)).

Car manufacturer Volvo has recently selected Berkeley County to build its first car factory in North America. The Volvo factory is expected to accommodate approximately 4,000 employees by 2040. In addition to the Volvo factory, up to 9,900,000 square feet of supporting industrial warehouse and manufacturing development is expected to be developed in the Camp Hall Commerce Park for Volvo-related suppliers and manufacturers. The proposed I-26 & Volvo Car Drive interchange project is required to accommodate the design-year traffic demands from the new Volvo factory and supporting Volvo-related suppliers and manufacturers.

Based upon the results of 2039 No Build condition, as summarized in Table 4.7, the three intersections along SC 27/Ridgeville Road between I-26 and Lower Westvaco Road are projected to operate at severe LOS F conditions that would represent gridlock along SC 27/Ridgeville Road. This gridlock will likely cause severe queuing on the I-26 off-ramps to SC 27/Ridgeville Road, which could potentially back-up to the I-26 mainlines in both directions. The severe failing conditions along SC 27/Ridgeville Road can be attributed to all of the Volvo-related traffic being assigned to the roadway to access I-26.

Therefore, an improvement analysis scenario for 2039 No Build conditions was evaluated considering a typical widening project for SC 27/Ridgeville Road. The improvements included widening SC 27/Ridgeville Road to a four-lane, median divided cross section; controlling access between I-26 and Lower Westvaco Road; and increasing the spacing of the I-26 ramp intersections from 700 feet to 1,320 feet.

The results of the improvement analysis scenario, as summarized in Table 4.8, indicate a typical widening improvement along SC 27/Ridgeville Road would not accommodate the 2039 No Build traffic demands. The two I-26 ramp intersections along SC 27/Ridgeville Road would still be projected to operate at severe LOS F conditions – although less severe than without improvements – that would still represent gridlock along SC 27/Ridgeville Road, which could still potentially back-up to the I-26 mainlines in both directions. The severe failing conditions along SC 27/Ridgeville Road can be attributed to all of the Volvo-related traffic being assigned to the roadway to access I-26.

As shown in Exhibit 3.4, the peak-direction design-hour traffic volumes along SC 27/Ridgeville Road between Lower Westvaco Road and I-26 (2,133 southbound) indicate that improvements beyond widening to a four-lane, median divided section would be required for SC 27/Ridgeville Road to operate acceptably. Furthermore, the proposed design-hour traffic demands of SC 27/Ridgeville Road traffic accessing I-26 eastbound (1,512 southbound left-turning vehicles) would require a major reconfiguration of the existing interchange beyond typical widening and turn lane improvements.

Therefore, based upon the results of the 2039 No Build conditions analysis and the 2039 No Build conditions with improvements analysis summarized in Table 4.8, the I-26 & Volvo Car Drive interchange is justified and needed to accommodate design-year traffic demands of the new Volvo factory and the supporting industrial warehouse and manufacturing development of Volvo-related suppliers and manufacturers of the Camp Hall Commerce Park.

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 V0lvo factory is planned to open in 2017 with approximately 1,000 manufacturing employees. The Volvo factory is projected to increase to 4,000 employees by 2040. In 2017, it is expected that approximately 1,000,000 square feet of Volvo-related suppliers and manufacturers would be operating with approximately 1,000 additional employees. By 2040, it is projected that the Volvo-related suppliers and manufacturers will total approximately 9,900,000 square feet of industrial uses in the Camp Hall Commerce Park.

As shown in Exhibit 1.2, the proposed I-26 & Volvo Car Drive interchange configuration is a three-level, three-leg directional interchange that connects I-26 and the Camp Hall Commerce Park via Volvo Car Drive. Directional ramps are proposed for all movements that will be achieved through three bridge structures. Due to the expected high attraction to/from the Charleston area, the ramps to/from Charleston are proposed to be constructed as two-lane ramps.

Due to the scope of the proposed Volvo factory and Volvo-related industrial development, Transportation System Management (TSM) improvements would not be effective in mitigating the future traffic impacts to an acceptable LOS. Charleston area transit providers CARTA and Tri-County Link currently do not serve this area of rural Berkeley County. There are currently no HOV facilities in South Carolina and SCDOT conducted a *HOV/HOT Lane Feasibility Study* in 2009 that found that HOV and HOT lanes along I-26 in the Charleston area would not be cost feasible.

The IJR traffic analyses consider shifting of employees and staggered work hours, as described in sections 3.2.2 and 3.3.2 and documented in Appendix A, to minimize and spread out the peak travel demands of the Volvo factory and Volvo-related industrial development; however, the I-26 & Volvo Car Drive interchange is still required to accommodate the design-year traffic demand. Other travel demand management options such as carpooling were considered, but it was noted that at the BMW factory in Greer, South Carolina, employee carpooling has been difficult to achieve due to changing shifts and the staggered schedules that are currently in use.

Without the proposed I-26 & Volvo Car Drive interchange, the peak-direction design-hour traffic volumes shown in Exhibit 3.4 along SC 27/Ridgeville Road between Lower Westvaco Road and I-26 (2,133 southbound) indicate that improvements beyond widening to a four-lane, median divided section would be required for SC 27/Ridgeville Road to operate acceptably. Furthermore, the proposed design-hour traffic demands of SC 27/Ridgeville Road traffic accessing I-26 eastbound (1,512 southbound left-turning vehicles) would require a major reconfiguration of the existing interchange beyond typical widening and turn lane improvements.

Therefore, the I-26 & Volvo Car Drive interchange is justified and needed to accommodate design-year traffic demands of the new Volvo factory and the supporting industrial warehouse and manufacturing development of Volvo-related suppliers and manufacturers of the Camp Hall Commerce Park.

It should be noted that the proposed two points of access to I-26 through Volvo Car Drive and SC 27/Ridgeville Road for the Volvo factory and Volvo-related industrial development would be equal to the access of the existing BMW factory in Greer, South Carolina.

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)).

Using the projected opening-year 2019 and horizon-year 2039 traffic volumes for No Build and Build conditions of the proposed I-26 & Volvo Car Drive interchange, capacity analyses were conducted for the study area freeway facilities and intersections using the *Highway Capacity Software 2010* and the Transportation Research Board's *Highway Capacity Manual 2010* methodologies of the *Synchro* Version 9 software.

Based upon the results of the 2039 Build analysis for the 3:00 – 4:00 PM Design Hour, the operations of the proposed I-26 & Volvo Car Drive interchange and the I-26 freeway between SC 27/Ridgeville Road and Jedburg Road will be improved from the 2039 No Build scenario. As shown in Table 4.6 and Exhibit 4.4, the results of the freeway facility analyses considering 2039 Build conditions indicate that the study area freeway facilities are projected to operate at acceptable conditions considering 2039 Build conditions.

The adjacent interchanges of I-26 & SC 27/Ridgeville Road and I-26 & Jedburg Road were considered in the project study area. Improvements to the I-26 & Jedburg Road interchange, as documented in the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR*, were assumed to be in place as part of the 2019 and 2039 analyses. The improvements include the widening of Jedburg Road to a four-lane, median divided section in the interchange area and the addition of an I-26 westbound-to-Jedburg Road southbound loop off-ramp. For analysis purposes, the IMR year 2035 traffic volumes, assumptions, and results for the I-26

& Jedburg Road interchange were considered as a base for the development of the 2039 Build and No Build analyses.

Based upon the results of the 2039 Build analysis at the study intersections along SC 27/Ridgeville Road and Jedburg Road summarized in Table 4.7, the results indicate that the study intersections are projected to operate at acceptable conditions considering 2039 Build conditions.

A figure illustrating a concept of the proposed I-26 & Volvo Car Drive interchange is shown in Exhibit 1.2 and a figure illustrating a conceptual guide sign plan for the proposed interchange is shown in Exhibit 1.3.

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)).

As illustrated in Exhibit 1.2, the proposed I-26 & Volvo Car Drive interchange configuration is a three-level, three-leg directional interchange that connects I-26 and the Camp Hall Commerce Park via Volvo Car Drive. Volvo Car Drive is proposed to be a new Berkeley County roadway from the I-26 limited access right of way to US 176.

Directional ramps are proposed at the new interchange for all movements that will be achieved through three bridge structures. Due to the expected high attraction to/from the Charleston area, the ramps to/from Charleston are proposed to be constructed as two-lane ramps.

The new interchange will provide the four basic movements to/from I-26 in both the eastbound and westbound directions and will be designed to meet the current standards.

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 I-26 & Volvo Car Drive interchange project is currently included in the South Carolina Statewide Transportation Improvement Program as amended January 21, 2016.

The project is located within the rural planning area served by the Berkeley-Charleston-Dorchester Council of Governments (BCDCOG). Overall, the I-26 & Volvo Car Drive interchange project is a major project in Berkeley County that supports the region's and state's economic development goals. The I-26 & Volvo Car Drive interchange project is incorporated in the current South Carolina Statewide Transportation Improvement Program (STIP), which is the State's six-year transportation improvement program for all projects or program areas receiving federal funding. The STIP covers all federally funded improvements for which funding has been approved and that are expected to be undertaken during the upcoming six-year period. The amended STIP revision was published on January 21, 2016 with $35M beginning in FY2016 and intended only for these improvements.

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).

The proposed I-26 & Volvo Car Drive project is located approximately two miles from SC 27/Ridgeville Road (Exit 187) and approximately five miles from Jedburg Road (Exit 194). No other new interchanges are currently planned along I-26 between the proposed Volvo Car Drive and Jedburg Road.

A new interchange at Sheep Island Parkway (new Exit 197) is planned to be constructed approximately three miles south of Jedburg Road (Exit 194). Improvements to the I-26 & Sheep Island Parkway and I-26 & Jedburg Road interchanges are documented in the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR*.

It should be noted that SCDOT is currently advertising for an I-26 Corridor Management Plan project that will evaluate existing and future projection congestion along the corridor from SC 27/Ridgeville Road (Exit 187) east to the Charleston peninsula at Meeting Street/US 17 South (Exit 221).

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)).

Numerous coordination meetings have been held to discuss the development of the Camp Hall Commerce Park for the Volvo factory and Volvo-related industrial development. The meetings' attendees have included USACE, FHWA, SCDOT, SC Department of Commerce, and project consultant staffs.

Several new roadways are planned to support the proposed development of the Camp Hall Commerce Park for Volvo. Volvo Car Drive is planned as the primary north/south roadway connection between I-26 and US 176 providing access to the development. There are two east/west roadway connections between SC 27/Ridgeville Road and Volvo Car Drive planned to provide additional access which are currently named Westvaco Road and Lower Westvaco Road.

The adjacent interchanges of I-26 & SC 27/Ridgeville Road and I-26 & Jedburg Road were considered in the project study area. Improvements to the I-26 & Jedburg Road interchange, as documented in the May 2010 *Sheep Island Parkway IJR/Jedburg Road IMR*, were assumed to be in place as part of the 2019 and 2039 analyses. The improvements include the widening of Jedburg Road to a four-lane, median divided section in the interchange area and the addition of an I-26 westbound-to-Jedburg Road southbound loop off-ramp. For analysis purposes, the IMR year 2035 traffic volumes, assumptions, and results for the I-26 & Jedburg Road interchange were considered as a base for the development of the 2039 Build and No Build analyses.

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 I-26 & Volvo Car Drive interchange in Berkeley County, South Carolina has been included as part of the National Environmental Policy Act (NEPA) permitting process for the Camp Hall Commerce Park. FHWA was a contributing agency to the NEPA document prepared by the U.S. Army Corps of Engineers for the permit issued for the Camp Hall Commerce Park site, which included the proposed new interchange area. FHWA will utilize the information prepared and included as a part of the U.S. Corps of Engineers NEPA document to prepare a Finding of No Significant Impact (FONSI) for their file on the interchange project.

Appendix A

Trip Generation & Shift Assumption Worksheets

I-26 & Volvo Car Drive IJR

Shift Summary Assumptions

2019 Buildout

TRIP GENERATION ASSUMPTIONS

Use	Size	AM Entering	AM Exiting	PM Entering	PM Exiting	Notes
Volvo Office	200 emps	105	15	25	110	ITE LUC 710
Volvo Manufacturing	1,000 emps	900	100	100	900	1.0 emps/veh, 90/10 directional split
Camp Hall Warehousing	400 emps	145	55	80	150	ITE LUC 150
Camp Hall Manufacturing	600 emps	180	70	105	135	ITE LUC 140
Total Camp Hall	1,000 emps	325	125	185	285	Warehousing + Manufacturing
Construction	500 emps	450	50	50	450	1.0 emps/veh, 90/10 directional split

Volvo Office (assume 10% during Volvo peaks)

Entering Peak: 5:30 AM to 6:30 AM
Exiting Peak: 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
11	2	3	11

Volvo Manufacturing (One Shift)

Entering Peak: 5:30 AM to 6:30 AM
Exiting Peak: 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
900	100	100	900

TOTAL

Entering Peak: 5:30 AM to 6:30 AM
Exiting Peak: 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
1,172	153	169	1,162

Total Camp Hall (assume 25% during Volvo peaks)

Entering Peak: 5:30 AM to 6:30 AM
Exiting Peak: 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
81	31	46	71

Construction (assume 40% during Volvo peaks)

Entering Peak: 5:30 AM to 6:30 AM
Exiting Peak: 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
180	20	20	180

ASSUMPTIONS

> 6:30 AM starting time for Volvo based upon information from Volvo (same as Boeing 1st shift starting time).

I-26 & Volvo Car Drive IJR

Shift Summary Assumptions

2039 Buildout

TRIP GENERATION ASSUMPTIONS

Use	Size	AM Entering	AM Exiting	PM Entering	PM Exiting	Notes
Volvo Office	500 emps	240	31	41	210	ITE LUC 710
Volvo Manufacturing	4,000 emps	3,600	400	400	3,600	1.0 emps/veh, 90/10 directional split
Volvo Trucks	712 daily trips	32	32	50	50	Daily rate provided by Volvo
Camp Hall Warehousing	3,900 emps	1,080	420	620	1,150	ITE LUC 150
Camp Hall Manufacturing	6,000 emps	1,275	470	630	800	ITE LUC 140
Camp Hall Trucks	10% of employee trips	235	90	125	195	Additional 10%
Total Camp Hall	9,900 emps	2,590	980	1,375	2,145	Warehousing + Manufacturing + Trucks

PROPOSED SHIFT ASSUMPTIONS

Volvo Office

Operations: 8:30 AM to 5:00 PM
Entering Peak: 7:30 AM to 8:30 AM
Exiting Peak: 5:00 PM to 6:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
240	31	41	210

Volvo Manufacturing - 1st Shift

Assume: 60% of total workers
Operations: 6:30 AM to 3:00 PM
Entering Peak: 5:30 AM to 6:30 AM
Exiting Peak: 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
2,160	240	240	2,160

Volvo Manufacturing - 2nd Shift

Assume: 30% of total workers
Operations: 2:30 PM to 11:00 PM
Entering Peak: 1:30 PM to 2:30 PM
Exiting Peak: 11:00 PM to 12:00 AM

AM Entering	AM Exiting	PM Entering	PM Exiting
1,080	120	120	1,080

Volvo Manufacturing - 3rd Shift

Assume: 10% of total workers
Operations: 10:30 PM to 7:00 AM
Entering Peak: 9:30 PM to 10:30 PM
Exiting Peak: 7:00 AM to 8:00 AM

AM Entering	AM Exiting	PM Entering	PM Exiting
360	40	40	360

Volvo Trucks

Basis	Value
Employees	4,000
Production (Cars Produced/Year)	300,000
Trucks/Day	712

Assume: 50/50 directional split
4.5% during 5:30 AM to 6:30 AM
7.0% during 3:00 PM to 4:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
32	32	50	50

Total Camp Hall - 1/3 Office Operations

Assume: Office Operations
Operations: 8:30 AM to 5:00 PM
Entering Peak: 7:30 AM to 8:30 AM
Exiting Peak: 5:00 PM to 6:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
863	327	458	715

Total Camp Hall - 2/3 Manufacturing - 1st Shift

Assume: 60% of total workers
Operations: 7:30 AM to 4:00 PM
Entering Peak: 6:30 AM to 7:30 AM
Exiting Peak: 4:00 PM to 5:00 PM

AM Entering	AM Exiting	PM Entering	PM Exiting
1,036	392	550	858

Total Camp Hall - 2/3 Manufacturing - 2nd Shift

Assume: 30% of total workers
Operations: 3:30 PM to 12:00 AM
Entering Peak: 2:30 PM to 3:30 PM
Exiting Peak: 12:00 AM to 1:00 AM

AM Entering	AM Exiting	PM Entering	PM Exiting
518	196	275	429

Total Camp Hall - 2/3 Manufacturing - 3rd Shift

Assume: 10% of total workers
Operations: 11:30 PM to 8:00 AM
Entering Peak: 10:30 PM to 11:30 PM
Exiting Peak: 8:00 AM to 9:00 AM

AM Entering	AM Exiting	PM Entering	PM Exiting
173	65	92	143

Volvo Trucks Hourly Distribution

Hour Beginning At	%	Hour Beginning At	%
12:00 AM	1.0%	12:00 PM	7.0%
1:00 AM	1.0%	1:00 PM	7.0%
2:00 AM	1.0%	2:00 PM	7.0%
3:00 AM	2.0%	3:00 PM	7.0%
4:00 AM	3.0%	4:00 PM	6.0%
5:00 AM	4.0%	5:00 PM	5.0%
6:00 AM	5.0%	6:00 PM	4.0%
7:00 AM	5.0%	7:00 PM	3.0%
8:00 AM	5.0%	8:00 PM	3.0%
9:00 AM	6.0%	9:00 PM	2.0%
10:00 AM	6.0%	10:00 PM	2.0%
11:00 AM	7.0%	11:00 PM	1.0%

ASSUMPTIONS

> 6:30 AM starting time for Volvo 1st shift based upon information from Volvo (same as Boeing 1st shift starting time).

> 60%/30%/10% shift split percentage based upon existing shifts of other large developments in the area.

> Assume Volvo Truck trips follow the hourly distribution of heavy vehicles on I-26 based on permanent count station information.

> Assume 2/3 of the total Camp Hall trips are manufacturing-related and use shifts staggered one hour from the Volvo shifts and 1/3 of the total Camp Hall trips are office-related and follow the Volvo Office operations (this is a similar split as other large-scale developments in the area).

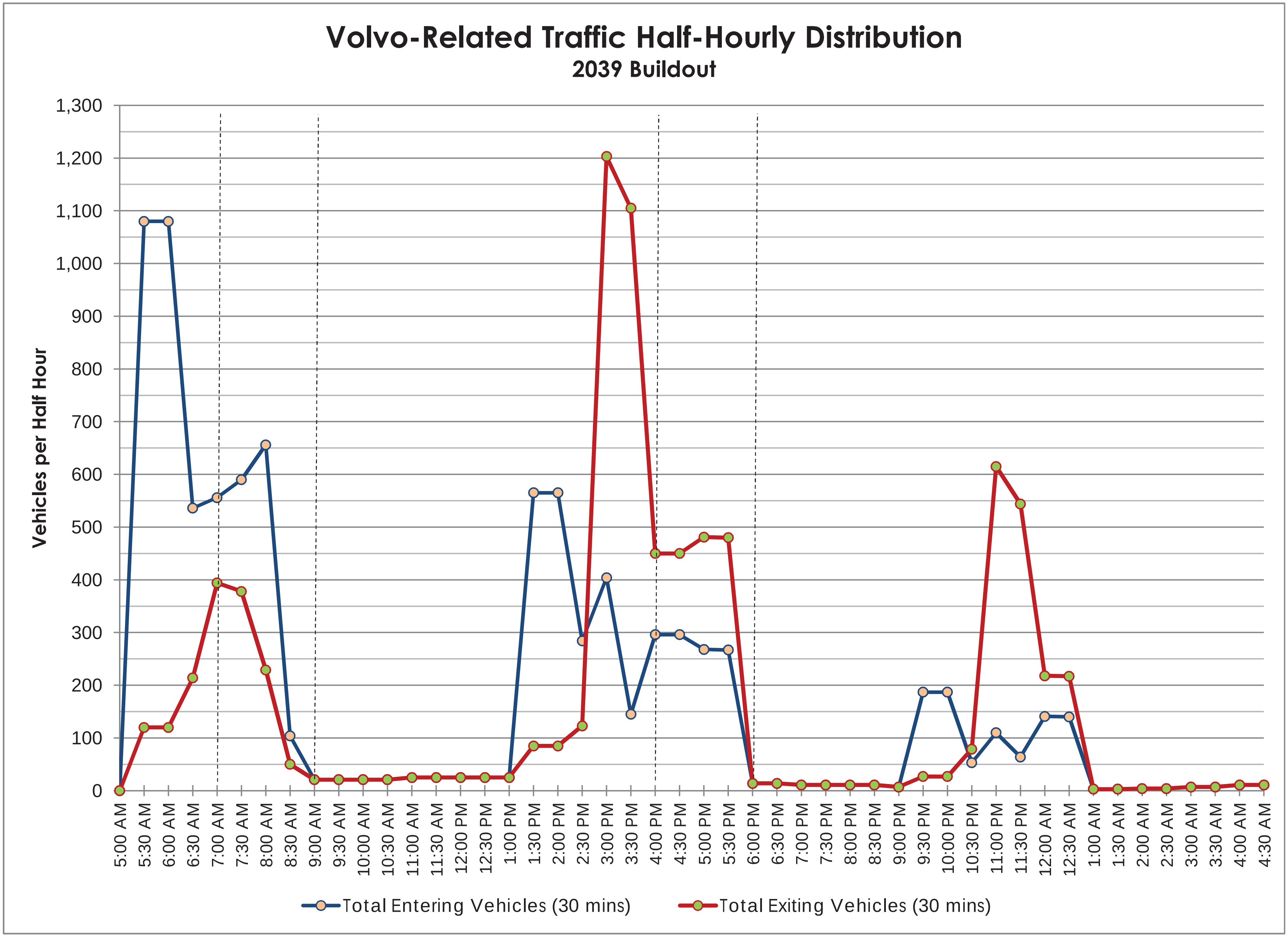
> Assume Camp Hall Truck trips follow the same assumptions as the employee trips

I-26 & Volvo Car Drive IJR

Hourly Distribution Assumptions

2039 Buildout

Time	Volvo Office		Volvo 1st Shift		Volvo 2nd Shift		Volvo 3rd Shift		Volvo Trucks		Total Camp Hall - 1/3 Office Operations		Total Camp Hall - 2/3 Mnfctrng - 1st Shift		Total Camp Hall - 2/3 Mnfctrng - 2nd Shift		Total Camp Hall - 2/3 Mnfctrng - 3rd Shift		Total Entering Vehicles (30 mins)	Total Exiting Vehicles (30 mins)
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit		
5:00 AM									14	14									0	0
5:30 AM			1,080	120					14	14									**1,080**	120
6:00 AM			1,080	120					18	18									**1,080**	120
6:30 AM									18	18			518	196					536	214
7:00 AM							20	180	18	18			518	196					556	394
7:30 AM	120	16					20	180	18	18	432	164							590	378
8:00 AM	120	15							18	18	431	163					87	33	656	229
8:30 AM									18	18							86	32	104	50
9:00 AM									21	21									21	21
9:30 AM									21	21									21	21
10:00 AM									21	21									21	21
10:30 AM									21	21									21	21
11:00 AM									25	25									25	25
11:30 AM									25	25									25	25
12:00 PM									25	25									25	25
12:30 PM									25	25									25	25
1:00 PM									25	25									25	25
1:30 PM					540	60			25	25									565	85
2:00 PM					540	60			25	25									565	85
2:30 PM									25	25					259	98			284	123
3:00 PM			120	1,080					25	25					259	98			404	**1,203**
3:30 PM			120	1,080					25	25									145	**1,105**
4:00 PM									21	21			275	429					296	450
4:30 PM									21	21			275	429					296	450
5:00 PM	21	105							18	18	229	358							268	481
5:30 PM	20	105							18	18	229	357							267	480
6:00 PM									14	14									14	14
6:30 PM									14	14									14	14
7:00 PM									11	11									11	11
7:30 PM									11	11									11	11
8:00 PM									11	11									11	11
8:30 PM									11	11									11	11
9:00 PM									7	7									7	7
9:30 PM							180	20	7	7									187	27
10:00 PM							180	20	7	7									187	27
10:30 PM									7	7							46	72	53	79
11:00 PM					60	540			4	4							46	71	110	615
11:30 PM					60	540			4	4									64	544
12:00 AM									3	3					138	215			141	218
12:30 AM									3	3					137	214			140	217
1:00 AM									3	3									3	3
1:30 AM									3	3									3	3
2:00 AM									4	4									4	4
2:30 AM									4	4									4	4
3:00 AM									7	7									7	7
3:30 AM									7	7									7	7
4:00 AM									11	11									11	11
4:30 AM									11	11									11	11



Volvo-Related Traffic Half-Hourly Distribution
2039 Buildout
Vehicles per Half Hour
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5:00 AM
5:30 AM
6:00 AM
6:30 AM
7:00 AM
7:30 AM
8:00 AM
8:30 AM
9:00 AM
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12:30 AM
1:00 AM
1:30 AM
2:00 AM
2:30 AM
3:00 AM
3:30 AM
4:00 AM
4:30 AM
Total Entering Vehicles (30 mins)
Total Exiting Vehicles (30 mins)

Appendix B

2019 Traffic Volume Development Worksheets

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Ridgeville Road & US 78

TRAFFIC CONTROL: Signalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES	**87**	**139**			**227**	**129**				**150**		**150**
Years To Buildout (2019)	4	4			4	4				4		4
Yearly Growth Rate	2.0%	2.0%			2.0%	2.0%				2.0%		2.0%
Background Traffic Growth	7	11			18	10				12		12
Volvo Traffic	3					4				36		27
Camp Hall Traffic	1					2				3		2
Construction Traffic	1					1				7		5
2019 NO BUILD TRAFFIC VOLUMES	**99**	**150**			**245**	**146**				**208**		**196**
Balance Adjustment	15					21				17		17
2019 NO BUILD TRAFFIC VOLUMES	**114**	**150**			**245**	**167**				**225**		**213**
Years To Buildout (2019)	4	4			4	4				4		4
Yearly Growth Rate	2.0%	2.0%			2.0%	2.0%				2.0%		2.0%
Background Traffic Growth	7	11			18	10				12		12
Volvo Traffic	3					4				36		27
Camp Hall Traffic	1					2				3		2
Construction Traffic	1					1				7		5
2019 BUILD TRAFFIC VOLUMES	**99**	**150**			**245**	**146**				**208**		**196**
Balance Adjustment	15					21				17		17
2019 BUILD TRAFFIC VOLUMES	**114**	**150**			**245**	**167**				**225**		**213**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Ridgeville Road & I-26 Eastbound Ramps

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES	**25**	**5**	**59**					**144**	**105**	**86**	**272**	
Years To Buildout (2019)	4	4	4					4	4	4	4	
Yearly Growth Rate	2.0%	2.0%	2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	2	0	5					12	8	7	22	
Volvo Traffic	15							7		547	63	
Camp Hall Traffic	7							3		43	5	
Construction Traffic	3							2		108	12	
2019 NO BUILD TRAFFIC VOLUMES	**52**	**5**	**64**					**168**	**113**	**791**	**374**	
Balance Adjustment												
2019 NO BUILD TRAFFIC VOLUMES	**52**	**5**	**64**					**168**	**113**	**791**	**374**	
Years To Buildout (2019)	4	4	4					4	4	4	4	
Yearly Growth Rate	2.0%	2.0%	2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	2	0	5					12	8	7	22	
Volvo Traffic	3							7		27	63	
Camp Hall Traffic	5							3		17	5	
Construction Traffic	1							2		5	12	
2019 BUILD TRAFFIC VOLUMES	**36**	**5**	**64**					**168**	**113**	**142**	**374**	
Balance Adjustment												
2019 BUILD TRAFFIC VOLUMES	**36**	**5**	**64**					**168**	**113**	**142**	**374**	

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Ridgeville Road & I-26 Westbound Ramps

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES				**211**	**3**	**153**	**37**	**125**			**135**	**14**
Years To Buildout (2019)				4	4	4	4	4			4	4
Yearly Growth Rate				2.0%	2.0%	2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth				17	0	12	3	10			11	1
Volvo Traffic						62		22			610	137
Camp Hall Traffic						28		10			48	11
Construction Traffic						12		5			120	27
2019 NO BUILD TRAFFIC VOLUMES				**228**	**3**	**267**	**40**	**172**			**924**	**190**
Balance Adjustment								8			13	
2019 NO BUILD TRAFFIC VOLUMES				**228**	**3**	**267**	**40**	**180**			**937**	**190**
Years To Buildout (2019)				4	4	4	4	4			4	4
Yearly Growth Rate				2.0%	2.0%	2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth				17	0	12	3	10			11	1
Volvo Traffic						3		10			90	27
Camp Hall Traffic						11		8			22	7
Construction Traffic						1		3			17	5
2019 BUILD TRAFFIC VOLUMES				**228**	**3**	**180**	**40**	**156**			**275**	**54**
Balance Adjustment								8			13	
2019 BUILD TRAFFIC VOLUMES				**228**	**3**	**180**	**40**	**164**			**288**	**54**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Old Gilliard Road & Lower Westvaco Road

TRAFFIC CONTROL: Unsignalized

DATE COUNTED:

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES				**0**		**0**		**278**	**0**	**0**	**149**	
Years To Buildout (2019)				4		4		4	4	4	4	
Yearly Growth Rate				2.0%		2.0%		2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth				0		0		22	0	0	12	
Volvo Traffic				747					84			
Camp Hall Traffic				59					38			
Construction Traffic				147					17			
2019 NO BUILD TRAFFIC VOLUMES				**953**		**0**		**300**	**139**	**0**	**161**	
Balance Adjustment								8			13	
2019 NO BUILD TRAFFIC VOLUMES				**953**		**0**		**308**	**139**	**0**	**174**	
Years To Buildout (2019)				4		4		4	4	4	4	
Yearly Growth Rate				2.0%		2.0%		2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth				0		0		22	0	0	12	
Volvo Traffic				117					13			
Camp Hall Traffic				29					19			
Construction Traffic				22					4			
2019 BUILD TRAFFIC VOLUMES				**168**		**0**		**300**	**36**	**0**	**161**	
Balance Adjustment								8			13	
2019 BUILD TRAFFIC VOLUMES				**168**		**0**		**308**	**36**	**0**	**174**	

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

Jedburg Road & I-26 Eastbound Ramps

TRAFFIC CONTROL: Signalized

DATE COUNTED: May 13, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES	**56**	**1**	**54**					**291**	**408**	**160**	**758**	
Years To Buildout (2019)	4	4	4					4	4	4	4	
Yearly Growth Rate	2.0%	2.0%	2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	4	0	4					23	33	13	61	
2019 NO BUILD TRAFFIC VOLUMES	**60**	**1**	**58**					**314**	**441**	**173**	**819**	
Balance Adjustment												
2019 NO BUILD TRAFFIC VOLUMES	**60**	**1**	**58**					**314**	**441**	**173**	**819**	
Years To Buildout (2019)	4	4	4					4	4	4	4	
Yearly Growth Rate	2.0%	2.0%	2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	4	0	4					23	33	13	61	
2019 BUILD TRAFFIC VOLUMES	**60**	**1**	**58**					**314**	**441**	**173**	**819**	
Balance Adjustment												
2019 BUILD TRAFFIC VOLUMES	**60**	**1**	**58**					**314**	**441**	**173**	**819**	

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

Jedburg Road & I-26 Westbound Ramps

TRAFFIC CONTROL: Signalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES				**532**	**3**	**221**	**53**	**241**			**378**	**36**
Years To Buildout (2019)			4	4	4	4	4	4			4	4
Yearly Growth Rate			2.0%	2.0%	2.0%	2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth			43	43	0	18	4	19			30	3
2019 NO BUILD TRAFFIC VOLUMES			**575**			**239**	**57**	**260**			**408**	**39**
Balance Adjustment								57			9	
2019 NO BUILD TRAFFIC VOLUMES			**575**			**239**	**57**	**317**			**417**	**39**
Years To Buildout (2019)			4	4	4	4	4	4			4	4
Yearly Growth Rate			2.0%	2.0%	2.0%	2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth			43	43	0	18	4	19			30	3
2019 BUILD TRAFFIC VOLUMES			**575**			**239**	**57**	**260**			**408**	**39**
Balance Adjustment								57			9	
2019 BUILD TRAFFIC VOLUMES			**575**			**239**	**57**	**317**			**417**	**39**

TRAFFIC VOLUME DEVELOPMENT

I-26

DATE COUNTED: Friday, October 3, 2014

DESIGN PEAK HOUR (3:00-4:00 PM)	West of SC 27*		SC 27 to Volvo Car Drive		Volvo Car Drive to Jedburg Road		East of Jedburg Road*	
	EB	WB	EB	WB	EB	WB	EB	WB
2014 TRAFFIC VOLUMES			**2,123**	**2,284**	**2,123**	**2,284**		
2015 TRAFFIC VOLUMES	**2,059**	**2,017**	**2,165**	**2,330**	**2,165**	**2,330**	**2,625**	**2,994**
Years To Buildout (2019)	4	4	4	4	4	4	4	4
Yearly Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Background Traffic Growth	165	161	173	186	173	186	210	240
Volvo Traffic	15	137	547	62	547	62	547	62
Camp Hall Traffic	7	11	43	28	43	28	43	28
Construction Traffic	3	27	108	12	108	12	108	12
2019 NO BUILD TRAFFIC VOLUMES	**2,249**	**2,353**	**3,037**	**2,618**	**3,037**	**2,618**	**3,533**	**3,336**
Years To Buildout (2019)	4	4	4	4	4	4	4	4
Yearly Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Background Traffic Growth	165	161	173	186	173	186	210	240
Volvo Traffic	15	137	39	113	547	62	547	62
Camp Hall Traffic	7	11	19	15	43	28	43	28
Construction Traffic	3	27	7	23	108	12	108	12
2019 BUILD TRAFFIC VOLUMES	**2,249**	**2,353**	**2,404**	**2,667**	**3,037**	**2,618**	**3,533**	**3,336**

*Freeway volumes derived from the I-26 freeway volumes between Volvo Car Drive and Jedburg Road.

Appendix C

2039 Traffic Volume Development Worksheets

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Ridgeville Road & US 78

TRAFFIC CONTROL: Signalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES	**87**	**139**			**227**	**129**				**150**		**150**
Years to Design Year (2039)	24	24			24	24				24		24
Yearly Growth Rate	2.0%	2.0%			2.0%	2.0%				2.0%		2.0%
Background Traffic Growth	42	67			109	62				72		72
Volvo Traffic	9					12				88		67
Camp Hall Traffic	8					10				4		3
2039 NO BUILD TRAFFIC VOLUMES	**146**	**206**			**336**	**213**				**314**		**292**
Balance Adjustment	20					28				24		22
2039 NO BUILD TRAFFIC VOLUMES	**166**	**206**			**336**	**241**				**338**		**314**
Years to Design Year (2039)	24	24			24	24				24		24
Yearly Growth Rate	2.0%	2.0%			2.0%	2.0%				2.0%		2.0%
Background Traffic Growth	42	67			109	62				72		72
Volvo Traffic	9					12				88		67
Camp Hall Traffic	8					10				4		3
2039 BUILD TRAFFIC VOLUMES	**146**	**206**			**336**	**213**				**314**		**292**
Balance Adjustment	20					28				24		22
2039 BUILD TRAFFIC VOLUMES	**166**	**206**			**336**	**241**				**338**		**314**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Ridgeville Road & I-26 Eastbound Ramps

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES	**25**	**5**	**59**					**144**	**105**	**86**	**272**	
Years to Design Year (2039)	24	24	24					24	24	24	24	
Yearly Growth Rate	2.0%	2.0%	2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	12	2	28					69	50	41	131	
Volvo Traffic	44							21		1,326	155	
Camp Hall Traffic	39							18		59	7	
2039 NO BUILD TRAFFIC VOLUMES	**120**	**7**	**87**					**252**	**155**	**1,512**	**565**	
Balance Adjustment												
2039 NO BUILD TRAFFIC VOLUMES	**120**	**7**	**87**					**252**	**155**	**1,512**	**565**	
Years to Design Year (2039)	24	24	24					24	24	24	24	
Yearly Growth Rate	2.0%	2.0%	2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	12	2	28					69	50	41	131	
Volvo Traffic	7							21		65	155	
Camp Hall Traffic	26							18		24	7	
2039 BUILD TRAFFIC VOLUMES	**70**	**7**	**87**					**252**	**155**	**216**	**565**	
Balance Adjustment												
2039 BUILD TRAFFIC VOLUMES	**70**	**7**	**87**					**252**	**155**	**216**	**565**	

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Ridgeville Road & I-26 Westbound Ramps

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: May 7, 2015

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES				**211**	**3**	**153**	**37**	**125**			**135**	**14**
Years to Design Year (2039)				24	24	24	24	24			24	24
Yearly Growth Rate				2.0%	2.0%	2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth				101	1	73	18	60			65	7
Volvo Traffic						174		65			1,481	332
Camp Hall Traffic						155		57			66	15
2039 NO BUILD TRAFFIC VOLUMES				**312**	**4**	**555**	**55**	**307**			**1,747**	**368**
Balance Adjustment								10			18	
2039 NO BUILD TRAFFIC VOLUMES				**312**	**4**	**555**	**55**	**317**			**1,765**	**368**
Years to Design Year (2039)				24	24	24	24	24			24	24
Yearly Growth Rate				2.0%	2.0%	2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth				101	1	73	18	60			65	7
Volvo Traffic						7		28			220	65
Camp Hall Traffic						62		44			31	10
2039 BUILD TRAFFIC VOLUMES				**312**	**4**	**295**	**55**	**257**			**451**	**96**
Balance Adjustment								10			18	
2039 BUILD TRAFFIC VOLUMES				**312**	**4**	**295**	**55**	**267**			**469**	**96**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

SC 27/Old Gilliard Road & Lower Westvaco Road

TRAFFIC CONTROL: Unsignalized

DATE COUNTED:

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2015 TRAFFIC VOLUMES				**0**		**0**		**278**	**0**	**0**	**149**	
Years to Design Year (2039)				24		24		24	24	24	24	
Yearly Growth Rate				2.0%		2.0%		2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth				0		0		133	0	0	72	
Volvo Traffic				1,813					239			
Camp Hall Traffic				81					212			
2039 NO BUILD TRAFFIC VOLUMES				**1,894**		**0**		**411**	**451**	**0**	**221**	
Balance Adjustment								10			18	
2039 NO BUILD TRAFFIC VOLUMES				**1,894**		**0**		**421**	**451**	**0**	**239**	
Years to Design Year (2039)				24		24		24	24	24	24	
Yearly Growth Rate				2.0%		2.0%		2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth				0		0		133	0	0	72	
Volvo Traffic				285					35			
Camp Hall Traffic				41					106			
2039 BUILD TRAFFIC VOLUMES				**326**		**0**		**411**	**141**	**0**	**221**	
Balance Adjustment								10			18	
2039 BUILD TRAFFIC VOLUMES				**326**		**0**		**421**	**141**	**0**	**239**	

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

Jedburg Road & I-26 Eastbound Ramps

TRAFFIC CONTROL: Signalized

From Sheep Island Parkway IJR/Jedburg Road IMR

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2035 NO BUILD TRAFFIC VOLUMES*	**130**		**160**					**760**	**410**	**215**	**930**	
Years to Design Year (2039)	4		4					4	4	4	4	
Yearly Growth Rate	2.0%		2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	10		13					61	33	17	74	
Balance Adjustment												
2039 NO BUILD TRAFFIC VOLUMES	**140**		**173**					**821**	**443**	**232**	**1,004**	
2035 BUILD TRAFFIC VOLUMES*	**130**		**160**					**760**	**410**	**215**	**930**	
Years to Design Year (2039)	4		4					4	4	4	4	
Yearly Growth Rate	2.0%		2.0%					2.0%	2.0%	2.0%	2.0%	
Background Traffic Growth	10		13					61	33	17	74	
Balance Adjustment												
2039 BUILD TRAFFIC VOLUMES	**140**		**173**					**821**	**443**	**232**	**1,004**	

* Traffic Volumes taken from the May 2010 Sheep Island Parkway IJR/Jedburg Road IMR

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

Jedburg Road & I-26 Westbound Ramps

TRAFFIC CONTROL: Signalized

From Sheep Island Parkway IJR/Jedburg Road IMR

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2035 NO BUILD TRAFFIC VOLUMES*			**580**			**390**	**225**	**665**			**565**	**170**
Years to Design Year (2039)			4			4	4	4			4	4
Yearly Growth Rate			2.0%			2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth			46			31	18	53			45	14
Balance Adjustment												
2039 NO BUILD TRAFFIC VOLUMES			**626**			**421**	**243**	**718**			**610**	**184**
2035 BUILD TRAFFIC VOLUMES*			**580**			**390**	**225**	**665**			**565**	**170**
Years to Design Year (2039)			4			4	4	4			4	4
Yearly Growth Rate			2.0%			2.0%	2.0%	2.0%			2.0%	2.0%
Background Traffic Growth			46			31	18	53			45	14
Balance Adjustment												
2039 BUILD TRAFFIC VOLUMES			**626**			**421**	**243**	**718**			**610**	**184**

* Traffic Volumes taken from the May 2010 Sheep Island Parkway IJR/Jedburg Road IMR

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

Volvo Car Drive & Factory Entrance

TRAFFIC CONTROL: Signalized

DESIGN PEAK HOUR (3:00-4:00 PM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volvo Traffic				120					1080			
Camp Hall Traffic												
2039 NO BUILD TRAFFIC VOLUMES				**120**		**0**		**0**	**1,080**	**0**	**0**	
Volvo Traffic		121	83	37	783		745		335			
Camp Hall Traffic		106			40							
2039 BUILD TRAFFIC VOLUMES	**0**	**227**	**83**	**37**	**823**	**0**	**745**	**0**	**335**	**0**	**0**	**0**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

Volvo Car Drive & Factory Entrance

TRAFFIC CONTROL: Signalized

INGRESS PEAK HOUR (5:30-6:30 AM)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volvo Traffic				1080					120			
Camp Hall Traffic												
2039 NO BUILD TRAFFIC VOLUMES				**1,080**		**0**		**0**	**120**	**0**	**0**	
Volvo Traffic		769	745	335	107		83		37			
Camp Hall Traffic												
2039 BUILD TRAFFIC VOLUMES	**0**	**769**	**745**	**335**	**107**	**0**	**83**	**0**	**37**	**0**	**0**	**0**

TRAFFIC VOLUME DEVELOPMENT

I-26

DATE COUNTED: Friday, October 3, 2014

DESIGN PEAK HOUR (3:00-4:00 PM)	West of SC 27*		SC 27 to Volvo Car Drive		Volvo Car Drive To Jedburg Road		East of Jedburg Rd.*	
	EB	WB	EB	WB	EB	WB	EB	WB
2014 TRAFFIC VOLUMES			**2,123**	**2,284**	**2,123**	**2,284**		
2015 TRAFFIC VOLUMES	**2,059**	**2,018**	**2,165**	**2,330**	**2,165**	**2,330**	**2,410**	**2,749**
Years to Design Year (2039)	24	24	24	24	24	24	24	24
Yearly Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Background Traffic Growth	988	968	1,039	1,118	1,039	1,118	1,157	1,319
Volvo Traffic	44	332	1,326	174	1,326	174	1,326	174
Camp Hall Traffic	39	15	59	155	59	155	59	155
2039 NO BUILD TRAFFIC VOLUMES	**3,130**	**3,333**	**4,590**	**3,777**	**4,590**	**3,777**	**4,952**	**4,397**
Balance Adjustment								
2039 NO BUILD TRAFFIC VOLUMES	**3,130**	**3,333**	**4,590**	**3,777**	**4,590**	**3,777**	**4,952**	**4,397**
Years to Design Year (2039)	24	24	24	24	24	24	24	24
Yearly Growth Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Background Traffic Growth	988	968	1,039	1,118	1,039	1,118	1,157	1,319
Volvo Traffic	44	332	102	274	1,326	174	1,326	174
Camp Hall Traffic	39	15	37	67	59	155	59	155
2039 BUILD TRAFFIC VOLUMES	**3,130**	**3,333**	**3,344**	**3,789**	**4,590**	**3,777**	**4,952**	**4,397**
Balance Adjustment								
2039 BUILD TRAFFIC VOLUMES	**3,130**	**3,333**	**3,344**	**3,789**	**4,590**	**3,777**	**4,952**	**4,397**

*Freeway volumes derived from the I-26 freeway volumes between Volvo Car Drive and Jedburg Road.

Appendix D

2019 Freeway Analysis Worksheets

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2249	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	625	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1374	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1374	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	2	
Density, D	18.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2249	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	121	vph
Length of first accel/decel lane	450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	909	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2249		121		909	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	625		34		253	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           2749        148         1111      pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  2749   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                           Actual        Maximum         LOS F?
     v  = v                2749          4800            No
      Fi   F
     v  = v - v            2601          4800            No
      FO   F   R
     v                     148           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 2749                     (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable         Violation?
     v                2749          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   23.8    pc/mi/ln
                        R                 12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                 D  = 0.441
                                              S
Space mean speed in ramp influence area,     S  = 60.4    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 60.4    mph
________________________________________________________________________________
```

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2128	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	591	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1300	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1300	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	2	
Density, D	17.6	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - No Build	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2128	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	909	vph
Length of first accel/decel lane	800	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	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2128	909	121	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	591	253	34	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          2601        1111        148       pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  2601   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     3712          4800            No
      FO
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 2601                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                3712          4600                 No
      R12
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   28.9    pc/mi/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                  M  = 0.425
                                               S
Space mean speed in ramp influence area,      S  = 61.0    mph
                                               R
Space mean speed in outer lanes,              S  =  N/A    mph
                                               0
Space mean speed for all vehicles,            S  = 61.0    mph
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 to Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	3037	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	844	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1856	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1856	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	66.9	mi/h
Number of lanes, N	2	
Density, D	27.7	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 8/21/2015
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Eastbound
Junction: Jedburg Off-Ramp
Jurisdiction: SCDOT
Analysis Year: 2019 Opening Year
Description: 171001612 - No Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3037	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	119	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	615	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3037		119		615	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	844		33		171	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3712        145         752        pcph

_________________________Estimation of V12 Diverge Areas______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3712   pc/h
                   12   R      F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3712          4800            No
      Fi   F
     v  = v - v            3567          4800            No
      FO   F   R
     v                     145           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3712                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                3712          4400                 No
      12
_________________Level of Service Determination (if not F)____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   31.7    pc/mi/ln
                        R                 12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                D  = 0.441
                                             S
Space mean speed in ramp influence area,    S  = 60.4    mph
                                             R
Space mean speed in outer lanes,            S  =  N/A    mph
                                             0
Space mean speed for all vehicles,          S  = 60.4    mph
_______________________________________________________________________________
```

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	Jedburg Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2918	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	811	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1783	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1783	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	68.2	mi/h
Number of lanes, N	2	
Density, D	26.1	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2918	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	119	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2918	615	119	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	811	171	33	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3566        752         145       pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  3566   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4318          4800            No
      FO
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34        12
If yes, v    = 3566                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                4318          4600                 No
      R12
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   31.6    pc/mi/ln
          R                   R          12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.533
                                              S
Space mean speed in ramp influence area,     S  = 57.4    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 57.4    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - No Build	

Flow Inputs and Adjustments

Volume, V	3533	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	981	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2159	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.17	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	3.7	mi/h
Free-flow speed, FFS	71.7	mi/h

LOS and Performance Measures

Flow rate, vp	2159	pc/h/ln
Free-flow speed, FFS	71.7	mi/h
Average passenger-car speed, S	59.3	mi/h
Number of lanes, N	2	
Density, D	36.4	pc/mi/ln
Level of service, LOS	E	

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - No Build	

Flow Inputs and Adjustments

Volume, V	3336	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	927	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2039	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	2039	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	61.8	mi/h
Number of lanes, N	2	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 8/21/2015
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Westbound
Junction: Jedburg Off-Ramp
Jurisdiction: SCDOT
Analysis Year: 2019 Opening Year
Description: 171001612 - No Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3336	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	239	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	575	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3336		239		575	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	927		66		160	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          4077        292         703       pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  4077   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                4077          4800            No
      Fi   F
     v  = v - v            3785          4800            No
      FO   F   R
     v                     292           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 4077                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable         Violation?
     v                4077          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   32.6    pc/mi/ln
                        R                12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.454
                                              S
Space mean speed in ramp influence area,     S  = 58.0    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 58.0    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - No Build	

Flow Inputs and Adjustments

Volume, V	3097	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	860	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1893	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1893	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	64.4	mi/h
Number of lanes, N	2	
Density, D	29.4	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg Loop Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year

Description: 171001612 - No Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3097	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	239	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3097		575		239	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	860		160		66	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3785        703         292       pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3785   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3785          4800            No
      Fi   F
     v  = v - v            3082          4800            No
      FO   F   R
     v                     703           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3785                     (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area______________________
                      Actual        Max Desirable         Violation?
     v                3785          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   30.1    pc/mi/ln
                        R                12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.491
                                              S
Space mean speed in ramp influence area,     S  = 56.9    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 56.9    mph
________________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Loop Ramp to On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2522	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	701	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1541	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1541	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	68.7	mi/h
Number of lanes, N	2	
Density, D	22.4	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	71.3	mph
Volume on freeway	2522	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	96	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	575	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)	2522	96	575	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	701	27	160	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3082        117         703       pcph

________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  3082   pc/h
                   12   F   FM

______________________________Capacity Checks_________________________________

                          Actual        Maximum         LOS F?
     v                    3199          4800            No
      FO
     v  or v              0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?          No
      3     av34
Is   v  or v      > 1.5 v  /2           No
      3     av34         12
If yes, v    = 3082                  (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

_______________________Flow Entering Merge Influence Area_____________________
                     Actual        Max Desirable        Violation?
     v               3199          4600                 No
      R12
________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   22.2    pc/mi/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  C

_____________________________Speed Estimation_________________________________

Intermediate speed variable,                 M  = 0.326
                                              S
Space mean speed in ramp influence area,     S  = 61.8    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 61.8    mph
______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg to SC 27
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2618	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	727	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1600	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1600	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	71.0	mi/h
Number of lanes, N	2	
Density, D	22.5	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2618	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	498	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	233	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2618		498		233	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	727		138		65	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3200        609         285       pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3200   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                           Actual        Maximum         LOS F?
     v  = v                3200          4800            No
      Fi   F
     v  = v - v            2591          4800            No
      FO   F   R
     v                     609           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34        12
If yes, v    = 3200                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area______________________
                      Actual        Max Desirable        Violation?
     v                3200          4400                 No
      12
_________________Level of Service Determination (if not F)______________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   27.3    pc/mi/ln
                         R                12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                 D  = 0.483
                                              S
Space mean speed in ramp influence area,     S  = 59.1    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 59.1    mph
________________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year

Description: 171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2120	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	589	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1296	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1296	pc/h/ln
Free-flow speed, FFS	75.4	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	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

______________Merge Analysis______________

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year

Description: 171001612 - No Build

______________Freeway Data______________

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2120	vph

______________On Ramp Data______________

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	233	vph
Length of first accel/decel lane	925	ft
Length of second accel/decel lane		ft

______________Adjacent Ramp Data (if one exists)______________

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	498	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2175	ft

______________Conversion to pc/h Under Base Conditions______________

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2120		233		498	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	589		65		138	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          2591        285         609       pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  2591   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     2876          4800            No
      FO
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 2591                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable         Violation?
     v                2876          4600                  No
      R12
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   22.0    pc/mi/ln
         R                    R           12            A
Level of service for ramp-freeway junction areas of influence  C

______________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.325
                                              S
Space mean speed in ramp influence area,     S  = 64.3    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 64.3    mph
________________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - No Build

Flow Inputs and Adjustments

Volume, V	2353	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	654	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1438	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1438	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	2	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2249	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	625	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1374	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1374	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	2	
Density, D	18.7	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2249	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	105	vph
Length of first accel/decel lane	450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2249		105		260	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	625		29		72	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2749	128	318	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2749 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2749	4800	No
$v_{FO} = v_F - v_R$	2621	4800	No
v_R	128	2000	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} = 2749 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2749	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.440

Space mean speed in ramp influence area, S_R = 60.5 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 60.5 mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2144	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	596	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1310	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1310	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	73.9	mi/h
Number of lanes, N	2	
Density, D	17.7	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year

Description: 171001612 - Build

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2144	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	800	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	105	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2144		260		105	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	596		72		29	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          2620        318         128       pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  2620   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     2938          4800            No
      FO
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 2620                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                2938          4600                 No
      R12
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   23.2    pc/mi/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  C

______________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.339
                                              S
Space mean speed in ramp influence area,     S  = 63.8    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 63.8    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 to New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

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	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1469	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1469	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	72.6	mi/h
Number of lanes, N	2	
Density, D	20.2	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange Off-Ramp Area
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

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	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	979	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	979	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	3	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2388	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	663	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1459	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1459	pc/h/ln
Free-flow speed, FFS	73.1	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	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange 2 On Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	3037	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	844	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	928	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	4	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	928	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.4	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange 1 On Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	3037	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	844	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1237	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1237	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	3	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange to Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year

Description: 171001612 - Build

Flow Inputs and Adjustments

Volume, V	3037	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	844	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1856	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1856	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	66.9	mi/h
Number of lanes, N	2	
Density, D	27.7	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	73.1	mph
Volume on freeway	3037	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	119	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	615	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3037		119		615	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	844		33		171	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3712        145         752       pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3712   pc/h
                   12   R      F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3712          4800            No
      Fi   F
     v  = v - v            3567          4800            No
      FO   F   R
     v                     145           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3712                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable         Violation?
     v                3712          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   31.7    pc/mi/ln
                        R                 12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.441
                                              S
Space mean speed in ramp influence area,     S  = 59.4    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 59.4    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	Jedburg Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2918	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	811	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1783	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1783	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	68.2	mi/h
Number of lanes, N	2	
Density, D	26.1	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	73.1	mph
Volume on freeway	2918	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	119	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2918	615	119	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	811	171	33	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           3566        752         145        pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  3566   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4318          4800            No
      FO
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3566                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual       Max Desirable        Violation?
     v                4318         4600                 No
      R12
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   31.6    pc/mi/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.533
                                              S
Space mean speed in ramp influence area,     S  = 56.5    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 56.5    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - Build	

Flow Inputs and Adjustments

Volume, V	3533	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	981	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2159	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.17	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	3.7	mi/h
Free-flow speed, FFS	71.7	mi/h

LOS and Performance Measures

Flow rate, vp	2159	pc/h/ln
Free-flow speed, FFS	71.7	mi/h
Average passenger-car speed, S	59.3	mi/h
Number of lanes, N	2	
Density, D	36.4	pc/mi/ln
Level of service, LOS	E	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	3336	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	927	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2039	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	2039	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	61.8	mi/h
Number of lanes, N	2	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 8/21/2015
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Westbound
Junction: Jedburg Off-Ramp
Jurisdiction: SCDOT
Analysis Year: 2019 Opening Year
Description: 171001612 - Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3336	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	239	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	575	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3336		239		575	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	927		66		160	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909        0.909        0.909
Driver population factor, fP           1.00         1.00         1.00
Flow rate, vp                          4077         292          703       pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  4077   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                4077          4800            No
      Fi   F
     v  = v - v            3785          4800            No
      FO   F   R
     v                     292           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 4077                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area______________________
                      Actual        Max Desirable         Violation?
     v                4077          4400                  No
      12
_________________Level of Service Determination (if not F)______________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   32.6    pc/mi/ln
                        R                12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.454
                                              S
Space mean speed in ramp influence area,     S  = 58.0    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 58.0    mph
________________________________________________________________________________
```

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - Build	

Flow Inputs and Adjustments

Volume, V	3097	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	860	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1893	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1893	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	64.4	mi/h
Number of lanes, N	2	
Density, D	29.4	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg Loop Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3097	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	239	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3097		575		239	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	860		160		66	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3785        703         292       pcph

________________________Estimation of V12 Diverge Areas______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3785   pc/h
                   12   R     F   R   FD

______________________________Capacity Checks_________________________________

                          Actual        Maximum         LOS F?
     v  = v               3785          4800            No
      Fi   F
     v  = v - v           3082          4800            No
      FO   F   R
     v                    703           2000            No
      R
     v  or v              0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?          No
      3     av34
Is   v  or v      > 1.5 v  /2           No
      3     av34         12
If yes, v    = 3785                  (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area____________________
                      Actual        Max Desirable        Violation?
     v                3785          4400                 No
      12
_________________Level of Service Determination (if not F)___________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   30.1    pc/mi/ln
                        R                12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation_________________________________

Intermediate speed variable,                 D  = 0.491
                                              S
Space mean speed in ramp influence area,     S  = 56.9    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 56.9    mph
______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Loop Ramp to On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - Build	

Flow Inputs and Adjustments

Volume, V	2522	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	701	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1541	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1541	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	68.7	mi/h
Number of lanes, N	2	
Density, D	22.4	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year

Description: 171001612 - Build

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	71.3	mph
Volume on freeway	2522	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	96	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	575	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)	2522		96		575	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	701		27		160	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3082        117         703        pcph

________________________Estimation of V12 Merge Areas_________________________

                  L  =            (Equation 13-6 or 13-7)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  3082   pc/h
                   12   F   FM

______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     3199          4800            No
      FO
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3082                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

_______________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                3199          4600                 No
      R12
________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   22.2    pc/mi/ln
         R                    R           12            A
Level of service for ramp-freeway junction areas of influence  C

_____________________________Speed Estimation_________________________________

Intermediate speed variable,                 M  = 0.326
                                              S
Space mean speed in ramp influence area,     S  = 61.8    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 61.8    mph
______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg to New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2618	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	727	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1600	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1600	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	71.0	mi/h
Number of lanes, N	2	
Density, D	22.5	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange 1 Off Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2618	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	727	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1067	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	3	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1067	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	3	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange 2 Off Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2618	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	727	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	800	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	4	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	800	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.7	pc/mi/ln
Level of service, LOS	A	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2531	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	703	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1547	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1547	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	71.7	mi/h
Number of lanes, N	2	
Density, D	21.6	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange On Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - Build	

Flow Inputs and Adjustments

Volume, V	2667	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	741	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1087	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	3	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1087	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	3	
Density, D	14.5	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange to SC 27
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2667	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	741	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1630	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1630	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	70.6	mi/h
Number of lanes, N	2	
Density, D	23.1	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 8/21/2015
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Westbound
Junction: SC 27 Off-Ramp
Jurisdiction: SCDOT
Analysis Year: 2019 Opening Year
Description: 171001612 - Build

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	73.1	mph
Volume on freeway	2667	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	411	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	97	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2667		411		97	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	741		114		27	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3260        502         119       pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =           (Equation 13-12 or 13-13)
                   EQ
                  P  =    1.000   Using Equation  0
                   FD
                  v  = v  + (v - v ) P  =  3260   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3260          4800            No
      Fi   F
     v  = v - v            2758          4800            No
      FO   F   R
     v                     502           2000            No
      R
     v  or v               0    pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3260                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                3260          4400                 No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   27.8    pc/mi/ln
                        R                  12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.473
                                              S
Space mean speed in ramp influence area,     S  = 58.4    mph
                                              R
Space mean speed in outer lanes,             S  =  N/A    mph
                                              0
Space mean speed for all vehicles,           S  = 58.4    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description: 171001612 - Build	

Flow Inputs and Adjustments

Volume, V	2256	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	627	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1379	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1379	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	2	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	8/21/2015
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	73.1	mph
Volume on freeway	2256	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	97	vph
Length of first accel/decel lane	925	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	411	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2256		97		411	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	627		27		114	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2757	119	502	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2876	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} = 2757 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2876	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.325	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.0	mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	8/21/2015
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2019 Opening Year
Description:	171001612 - Build

Flow Inputs and Adjustments

Volume, V	2353	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	654	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1438	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1438	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	2	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

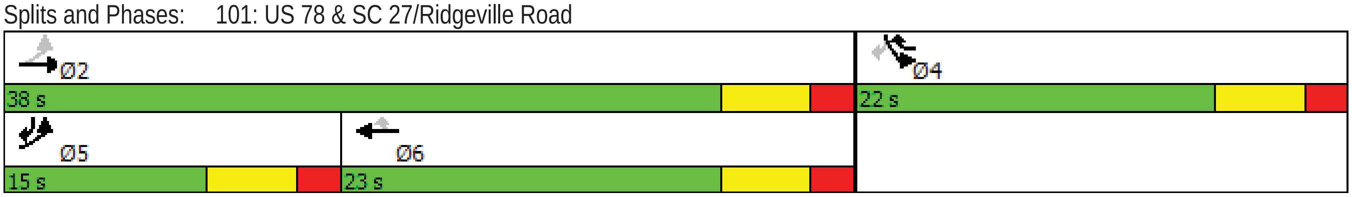
Appendix E

2019 Intersection Analysis Worksheets

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	114	150	245	167	225	213
Future Volume (vph)	114	150	245	167	225	213
Turn Type	pm+pt	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	4	4	5
Permitted Phases	2			6		4
Detector Phase	5	2	6	4	4	5
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0	22.0	22.0	22.0	15.0
Total Split (s)	15.0	38.0	23.0	22.0	22.0	15.0
Total Split (%)	25.0%	63.3%	38.3%	36.7%	36.7%	25.0%
Yellow Time (s)	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
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			Lead
Lead-Lag Optimize?						
Recall Mode	None	Max	Max	Min	Min	None
Act Effct Green (s)	32.1	32.1	18.4	37.8	13.4	27.0
Actuated g/C Ratio	0.56	0.56	0.32	0.66	0.23	0.47
v/c Ratio	0.26	0.19	0.54	0.20	0.71	0.31
Control Delay	8.4	7.7	22.1	1.3	32.6	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	7.7	22.1	1.3	32.6	2.5
LOS	A	A	C	A	C	A
Approach Delay		8.0	13.7		18.0	
Approach LOS		A	B		B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 57.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 46.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 101: US 78 & SC 27/Ridgeville Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	150	245	167	225	213
Future Volume (veh/h)	114	150	245	167	225	213
Number	5	2	6	16	7	14
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	127	167	272	186	250	237
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	452	912	627	813	314	377
Arrive On Green	0.07	0.58	0.40	0.40	0.21	0.21
Sat Flow, veh/h	1508	1583	1583	1346	1508	1346
Grp Volume(v), veh/h	127	167	272	186	250	237
Grp Sat Flow(s),veh/h/ln	1508	1583	1583	1346	1508	1346
Q Serve(g_s), s	2.5	2.8	7.0	3.5	8.7	8.6
Cycle Q Clear(g_c), s	2.5	2.8	7.0	3.5	8.7	8.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	452	912	627	813	314	377
V/C Ratio(X)	0.28	0.18	0.43	0.23	0.80	0.63
Avail Cap(c_a), veh/h	588	912	627	813	434	484
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.3	5.6	12.2	5.0	20.9	17.5
Incr Delay (d2), s/veh	0.3	0.4	2.2	0.7	7.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	2.4	6.1	3.8	7.6	10.6
LnGrp Delay(d),s/veh	8.7	6.0	14.4	5.7	27.8	19.2
LnGrp LOS	A	A	B	A	C	B
Approach Vol, veh/h		294	458		487	
Approach Delay, s/veh		7.2	10.9		23.6	
Approach LOS		A	B		C	

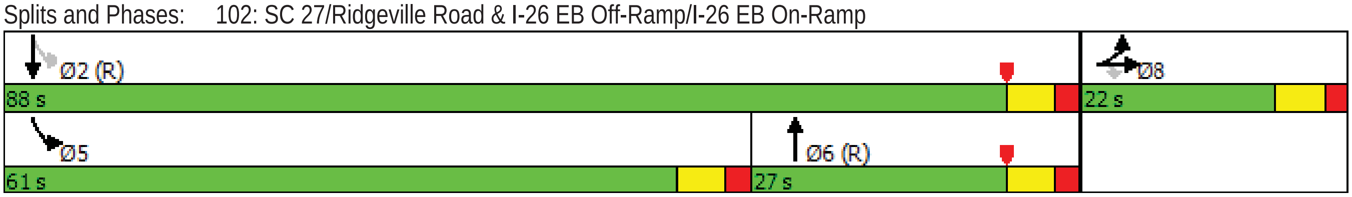
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		38.0		17.6	10.0	28.0		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		32.0		16.0	9.0	17.0		
Max Q Clear Time (g_c+I1), s		4.8		10.7	4.5	9.0		
Green Ext Time (p_c), s		8.3		0.8	0.1	3.9		

Intersection Summary		
HCM 2010 Ctrl Delay		15.0
HCM 2010 LOS		B

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	5	64	168	791	374
Future Volume (vph)	5	64	168	791	374
Turn Type	NA	Perm	NA	pm+pt	NA
Protected Phases	8		6	5	2
Permitted Phases		8		2	
Detector Phase	8	8	6	5	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	27.0	61.0	88.0
Total Split (%)	20.0%	20.0%	24.5%	55.5%	80.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	C-Min	None	C-Min
Act Effct Green (s)	9.6	9.6	21.0	90.7	91.9
Actuated g/C Ratio	0.09	0.09	0.19	0.82	0.84
v/c Ratio	0.44	0.36	1.03	0.94	0.31
Control Delay	56.4	11.4	100.3	22.6	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	11.4	100.3	22.6	3.5
LOS	E	B	F	C	A
Approach Delay	32.7		100.3		16.5
Approach LOS	C		F		B

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 34 (31%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 32.8	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 102: SC 27/Ridgeville Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	5	64	0	0	0	0	168	113	791	374	0
Future Volume (veh/h)	52	5	64	0	0	0	0	168	113	791	374	0
Number	3	8	18				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	1881	1630	1568				0	1568	1881	1583	1583	0
Adj Flow Rate, veh/h	58	6	71				0	187	126	879	416	0
Adj No. of Lanes	0	1	1				0	1	0	1	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	101	10	95				0	232	156	878	1298	0
Arrive On Green	0.07	0.07	0.07				0.00	0.26	0.26	0.67	1.00	0.00
Sat Flow, veh/h	1413	146	1332				0	874	589	1508	1583	0
Grp Volume(v), veh/h	64	0	71				0	0	313	879	416	0
Grp Sat Flow(s),veh/h/ln	1560	0	1332				0	0	1464	1508	1583	0
Q Serve(g_s), s	4.4	0.0	5.7				0.0	0.0	22.0	55.0	0.0	0.0
Cycle Q Clear(g_c), s	4.4	0.0	5.7				0.0	0.0	22.0	55.0	0.0	0.0
Prop In Lane	0.91		1.00				0.00		0.40	1.00		0.00
Lane Grp Cap(c), veh/h	111	0	95				0	0	388	878	1298	0
V/C Ratio(X)	0.57	0.00	0.75				0.00	0.00	0.81	1.00	0.32	0.00
Avail Cap(c_a), veh/h	227	0	194				0	0	388	878	1298	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	0.26	0.26	0.00
Uniform Delay (d), s/veh	49.5	0.0	50.1				0.0	0.0	37.8	10.9	0.0	0.0
Incr Delay (d2), s/veh	4.6	0.0	11.0				0.0	0.0	16.3	15.6	0.2	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(95%),veh/ln	3.6	0.0	4.3				0.0	0.0	16.0	52.8	0.1	0.0
LnGrp Delay(d),s/veh	54.1	0.0	61.1				0.0	0.0	54.1	26.6	0.2	0.0
LnGrp LOS	D		E						D	F	A	
Approach Vol, veh/h		135						313			1295	
Approach Delay, s/veh		57.8						54.1			18.1	
Approach LOS		E						D			B	

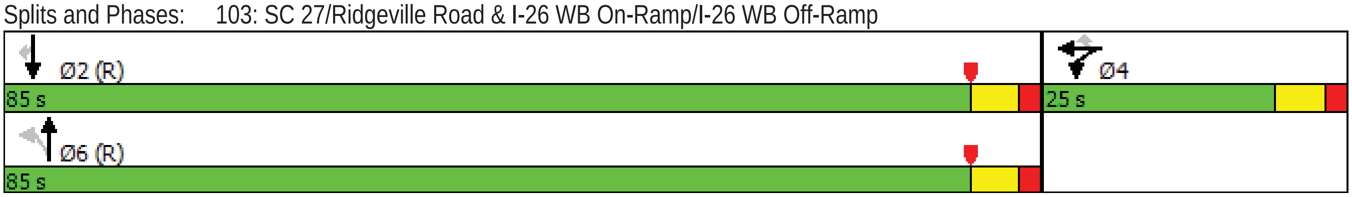
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		96.1			61.0	35.1		13.9
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		82.0			55.0	21.0		16.0
Max Q Clear Time (g_c+I1), s		2.0			57.0	24.0		7.7
Green Ext Time (p_c), s		24.2			0.0	0.0		0.2

Intersection Summary			
HCM 2010 Ctrl Delay			27.6
HCM 2010 LOS			C

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	267	40	180	937	190
Future Volume (vph)	3	267	40	180	937	190
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	25.0	25.0	85.0	85.0	85.0	85.0
Total Split (%)	22.7%	22.7%	77.3%	77.3%	77.3%	77.3%
Yellow Time (s)	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
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?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	19.2	19.2	78.8	78.8	78.8	78.8
Actuated g/C Ratio	0.17	0.17	0.72	0.72	0.72	0.72
v/c Ratio	0.90	0.62	0.25	0.18	0.93	0.21
Control Delay	77.2	11.0	8.3	2.0	29.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	11.0	8.3	2.0	29.0	1.5
LOS	E	B	A	A	C	A
Approach Delay	41.7			3.1	24.4	
Approach LOS	D			A	C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 26.5	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 103: SC 27/Ridgeville Road & I-26 WB On-Ramp/I-26 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	228	3	267	40	180	0	0	937	190
Future Volume (veh/h)	0	0	0	228	3	267	40	180	0	0	937	190
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				1881	1630	1568	1583	1583	0	0	1568	1568
Adj Flow Rate, veh/h				253	3	297	44	200	0	0	1041	211
Adj No. of Lanes				0	1	1	1	1	0	0	1	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				20	20	20	20	20	0	0	20	20
Cap, veh/h				265	3	230	126	1137	0	0	1126	957
Arrive On Green				0.17	0.17	0.17	1.00	1.00	0.00	0.00	0.72	0.72
Sat Flow, veh/h				1535	18	1332	376	1583	0	0	1568	1332
Grp Volume(v), veh/h				256	0	297	44	200	0	0	1041	211
Grp Sat Flow(s),veh/h/ln				1553	0	1332	376	1583	0	0	1568	1332
Q Serve(g_s), s				18.0	0.0	19.0	11.9	0.0	0.0	0.0	61.3	5.8
Cycle Q Clear(g_c), s				18.0	0.0	19.0	73.2	0.0	0.0	0.0	61.3	5.8
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				268	0	230	126	1137	0	0	1126	957
V/C Ratio(X)				0.95	0.00	1.29	0.35	0.18	0.00	0.00	0.92	0.22
Avail Cap(c_a), veh/h				268	0	230	126	1137	0	0	1126	957
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.09	0.09	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				45.1	0.0	45.5	28.4	0.0	0.0	0.0	13.0	5.2
Incr Delay (d2), s/veh				42.4	0.0	159.3	0.7	0.0	0.0	0.0	13.9	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(95%),veh/ln				16.2	0.0	30.9	1.8	0.0	0.0	0.0	39.4	4.1
LnGrp Delay(d),s/veh				87.5	0.0	204.8	29.1	0.0	0.0	0.0	26.9	5.7
LnGrp LOS				F		F	C	A			C	A
Approach Vol, veh/h					553			244			1252	
Approach Delay, s/veh					150.5			5.3			23.4	
Approach LOS					F			A			C	

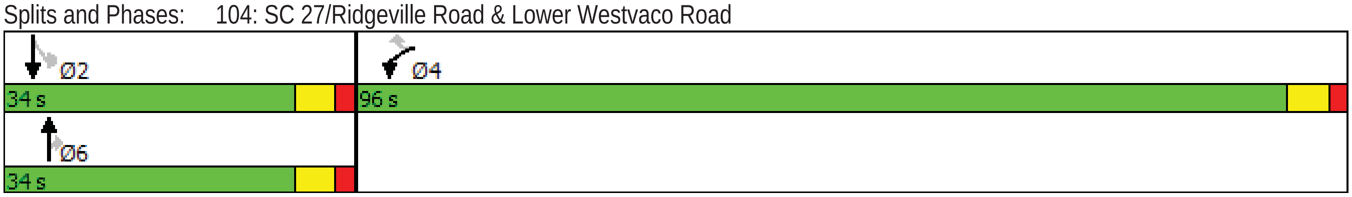
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		85.0		25.0		85.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		79.0		19.0		79.0		
Max Q Clear Time (g_c+I1), s		63.3		21.0		75.2		
Green Ext Time (p_c), s		14.8		0.0		3.6		

Intersection Summary	
HCM 2010 Ctrl Delay	55.5
HCM 2010 LOS	E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	953	10	308	139	10	174
Future Volume (vph)	953	10	308	139	10	174
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	4		6			2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	96.0	96.0	34.0	34.0	34.0	34.0
Total Split (%)	73.8%	73.8%	26.2%	26.2%	26.2%	26.2%
Yellow Time (s)	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
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?						
Recall Mode	None	None	Max	Max	Max	Max
Act Effct Green (s)	90.0	90.0	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.69	0.69	0.22	0.22	0.22	0.22
v/c Ratio	1.02	0.01	1.01	0.38	0.16	0.57
Control Delay	53.2	4.7	101.0	11.1	48.4	53.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.2	4.7	101.0	11.1	48.4	53.1
LOS	D	A	F	B	D	D
Approach Delay	52.7		73.1			52.8
Approach LOS	D		E			D

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 58.4	Intersection LOS: E
Intersection Capacity Utilization 79.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 104: SC 27/Ridgeville Road & Lower Westvaco Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	953	10	308	139	10	174
Future Volume (veh/h)	953	10	308	139	10	174
Number	7	14	6	16	5	2
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	1059	11	342	154	11	193
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	1044	932	341	290	55	341
Arrive On Green	0.69	0.69	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1508	1346	1583	1346	763	1583
Grp Volume(v), veh/h	1059	11	342	154	11	193
Grp Sat Flow(s),veh/h/ln	1508	1346	1583	1346	763	1583
Q Serve(g_s), s	90.0	0.3	28.0	13.2	0.0	14.2
Cycle Q Clear(g_c), s	90.0	0.3	28.0	13.2	28.0	14.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1044	932	341	290	55	341
V/C Ratio(X)	1.01	0.01	1.00	0.53	0.20	0.57
Avail Cap(c_a), veh/h	1044	932	341	290	55	341
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	6.2	51.0	45.2	65.0	45.6
Incr Delay (d2), s/veh	31.5	0.0	49.5	6.8	7.9	6.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	82.7	0.2	30.4	9.3	0.9	11.1
LnGrp Delay(d),s/veh	51.5	6.2	100.5	52.0	72.9	52.2
LnGrp LOS	F	A	F	D	E	D
Approach Vol, veh/h	1070		496			204
Approach Delay, s/veh	51.0		85.4			53.3
Approach LOS	D		F			D

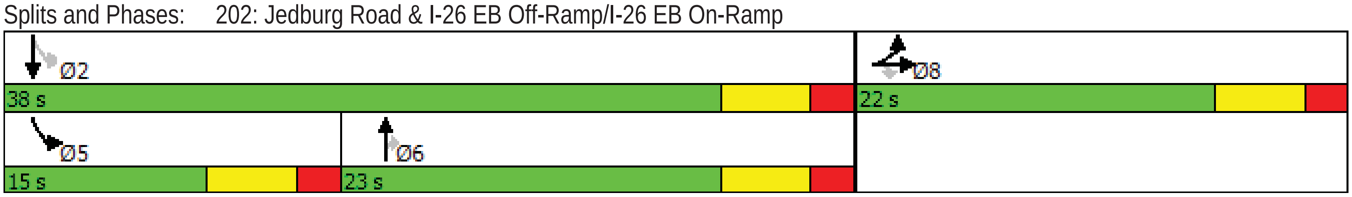
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.0		96.0		34.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		28.0		90.0		28.0		
Max Q Clear Time (g_c+I1), s		30.0		92.0		30.0		
Green Ext Time (p_c), s		0.0		0.0		0.0		

Intersection Summary		
HCM 2010 Ctrl Delay		60.9
HCM 2010 LOS		E

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	58	314	441	173	819
Future Volume (vph)	1	58	314	441	173	819
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		6		5	2
Permitted Phases		8		6	2	
Detector Phase	8	8	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	23.0	23.0	15.0	38.0
Total Split (%)	36.7%	36.7%	38.3%	38.3%	25.0%	63.3%
Yellow Time (s)	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
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			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	7.8	7.8	21.0	21.0	35.0	36.2
Actuated g/C Ratio	0.15	0.15	0.40	0.40	0.67	0.69
v/c Ratio	0.30	0.19	0.29	0.59	0.34	0.44
Control Delay	23.2	1.2	13.5	5.2	6.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	1.2	13.5	5.2	6.4	6.1
LOS	C	A	B	A	A	A
Approach Delay	12.5		8.7			6.1
Approach LOS	B		A			A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 52.5	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 202: Jedburg Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	58	0	0	0	0	314	441	173	819	0
Future Volume (veh/h)	60	1	58	0	0	0	0	314	441	173	819	0
Number	3	8	18				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	1583	1583				0	1583	1583	1583	1583	0
Adj Flow Rate, veh/h	67	1	0				0	349	0	192	910	0
Adj No. of Lanes	0	1	1				0	2	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	78	1	71				0	1393	623	644	2073	0
Arrive On Green	0.05	0.05	0.00				0.00	0.46	0.00	0.10	0.69	0.00
Sat Flow, veh/h	1487	22	1346				0	3088	1346	1508	3088	0
Grp Volume(v), veh/h	68	0	0				0	349	0	192	910	0
Grp Sat Flow(s),veh/h/ln	1509	0	1346				0	1504	1346	1508	1504	0
Q Serve(g_s), s	2.1	0.0	0.0				0.0	3.3	0.0	2.7	6.3	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0				0.0	3.3	0.0	2.7	6.3	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	79	0	71				0	1393	623	644	2073	0
V/C Ratio(X)	0.86	0.00	0.00				0.00	0.25	0.00	0.30	0.44	0.00
Avail Cap(c_a), veh/h	520	0	464				0	1393	623	790	2073	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	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.8	0.0	0.0				0.0	7.6	0.0	4.6	3.2	0.0
Incr Delay (d2), s/veh	21.9	0.0	0.0				0.0	0.4	0.0	0.3	0.7	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(95%),veh/ln	2.4	0.0	0.0				0.0	2.6	0.0	2.0	4.9	0.0
LnGrp Delay(d),s/veh	43.7	0.0	0.0				0.0	8.0	0.0	4.8	3.9	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		68						349			1102	
Approach Delay, s/veh		43.7						8.0			4.1	
Approach LOS		D						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		38.0			10.5	27.5		8.4
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		32.0			9.0	17.0		16.0
Max Q Clear Time (g_c+I1), s		8.3			4.7	5.3		4.1
Green Ext Time (p_c), s		20.0			0.2	10.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	6.7
HCM 2010 LOS	A

Lane Group	NBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	57	317	417
Future Volume (vph)	57	317	417
Turn Type	D.P+P	NA	NA
Protected Phases	1	Free	2
Permitted Phases	2		
Detector Phase	1		2
Switch Phase			
Minimum Initial (s)	4.0		4.0
Minimum Split (s)	15.0		22.0
Total Split (s)	22.0		38.0
Total Split (%)	36.7%		63.3%
Yellow Time (s)	4.0		4.0
All-Red Time (s)	2.0		2.0
Lost Time Adjust (s)	0.0		0.0
Total Lost Time (s)	6.0		6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None		Max
Act Effct Green (s)	41.6	51.3	40.3
Actuated g/C Ratio	0.81	1.00	0.79
v/c Ratio	0.09	0.12	0.22
Control Delay	1.0	0.1	3.1
Queue Delay	0.0	0.0	0.0
Total Delay	1.0	0.1	3.1
LOS	A	A	A
Approach Delay		0.2	3.1
Approach LOS		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 51.3	
Natural Cycle: 40	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.22	
Intersection Signal Delay: 1.8	Intersection LOS: A
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 203: Jedburg Road & I-26 WB On-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	57	317	417	39
Future Volume (vph)	0	0	57	317	417	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0	6.0	
Lane Util. Factor			1.00	0.95	0.95	
Frt			1.00	1.00	0.99	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1504	3008	2970	
Flt Permitted			0.47	1.00	1.00	
Satd. Flow (perm)			738	3008	2970	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	63	352	463	43
RTOR Reduction (vph)	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	63	352	499	0
Turn Type			D.P+P	NA	NA	
Protected Phases			1	Free	2	
Permitted Phases			2			
Actuated Green, G (s)			41.6	53.6	38.0	
Effective Green, g (s)			41.6	53.6	38.0	
Actuated g/C Ratio			0.78	1.00	0.71	
Clearance Time (s)			6.0		6.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)			624	3008	2105	
v/s Ratio Prot			0.01	0.12	c0.17	
v/s Ratio Perm			0.07			
v/c Ratio			0.10	0.12	0.24	
Uniform Delay, d1			1.4	0.0	2.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			0.1	0.1	0.3	
Delay (s)			1.5	0.1	3.0	
Level of Service			A	A	A	
Approach Delay (s)	0.0			0.3	3.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

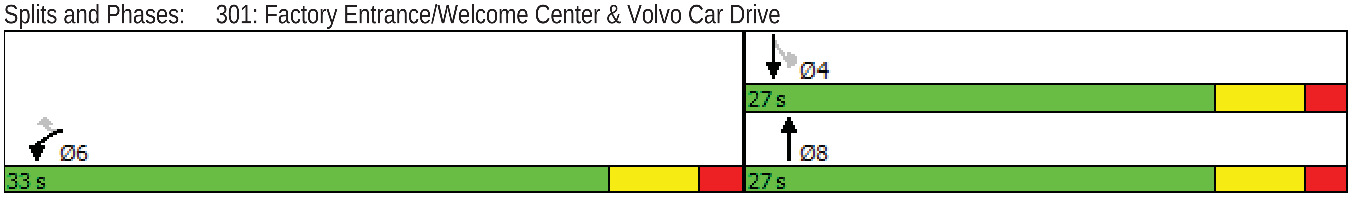
c Critical Lane Group

HCM 2010 analysis expects strict NEMA phasing.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	100	10	10	900	11	10
Future Volume (vph)	100	10	10	900	11	10
Turn Type	Prot	Perm	NA	Free	Perm	NA
Protected Phases	6		8			4
Permitted Phases		6		Free	4	
Detector Phase	6	6	8		4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	15.0	15.0	22.0		22.0	22.0
Total Split (s)	33.0	33.0	27.0		27.0	27.0
Total Split (%)	55.0%	55.0%	45.0%		45.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	None		None	None
Act Effct Green (s)	25.5	25.5	5.8	28.5	5.9	5.9
Actuated g/C Ratio	0.89	0.89	0.20	1.00	0.21	0.21
v/c Ratio	0.07	0.01	0.03	0.63	0.03	0.03
Control Delay	2.5	2.3	10.5	1.9	10.5	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	2.3	10.5	1.9	10.5	10.5
LOS	A	A	B	A	B	B
Approach Delay	2.5		2.0			10.5
Approach LOS	A		A			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 28.5	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 2.2	Intersection LOS: A
Intersection Capacity Utilization 22.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 301: Factory Entrance/Welcome Center & Volvo Car Drive



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	100	10	10	900	11	10
Future Volume (veh/h)	100	10	10	900	11	10
Number	1	16	8	18	7	4
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	111	11	11	0	12	11
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	428	382	65	55	475	65
Arrive On Green	0.24	0.24	0.03	0.00	0.03	0.03
Sat Flow, veh/h	1774	1583	1863	1583	1398	1863
Grp Volume(v), veh/h	111	11	11	0	12	11
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1583	1398	1863
Q Serve(g_s), s	0.8	0.1	0.1	0.0	0.1	0.1
Cycle Q Clear(g_c), s	0.8	0.1	0.1	0.0	0.2	0.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	428	382	65	55	475	65
V/C Ratio(X)	0.26	0.03	0.17	0.00	0.03	0.17
Avail Cap(c_a), veh/h	2889	2578	2359	2005	2197	2359
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	5.1	4.8	7.8	0.0	7.9	7.8
Incr Delay (d2), s/veh	0.3	0.0	1.2	0.0	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	0.1	0.1	0.0	0.1	0.1
LnGrp Delay(d),s/veh	5.4	4.8	9.0	0.0	7.9	9.0
LnGrp LOS	A	A	A		A	A
Approach Vol, veh/h	122		11			23
Approach Delay, s/veh	5.4		9.0			8.4
Approach LOS	A		A			A

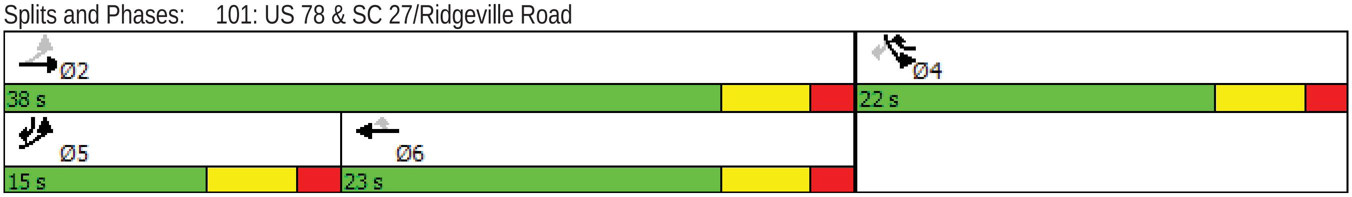
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				6.6		10.0		6.6
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				21.0		27.0		21.0
Max Q Clear Time (g_c+I1), s				2.2		2.8		2.1
Green Ext Time (p_c), s				0.0		0.3		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		6.1
HCM 2010 LOS		A

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	114	150	245	167	225	213
Future Volume (vph)	114	150	245	167	225	213
Turn Type	pm+pt	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	4	4	5
Permitted Phases	2			6		4
Detector Phase	5	2	6	4	4	5
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0	22.0	22.0	22.0	15.0
Total Split (s)	15.0	38.0	23.0	22.0	22.0	15.0
Total Split (%)	25.0%	63.3%	38.3%	36.7%	36.7%	25.0%
Yellow Time (s)	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
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			Lead
Lead-Lag Optimize?						
Recall Mode	None	Max	Max	None	None	None
Act Effct Green (s)	32.1	32.1	18.4	37.8	13.4	27.0
Actuated g/C Ratio	0.56	0.56	0.32	0.66	0.23	0.47
v/c Ratio	0.26	0.19	0.54	0.20	0.71	0.31
Control Delay	8.4	7.7	22.1	1.3	32.6	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	7.7	22.1	1.3	32.6	2.5
LOS	A	A	C	A	C	A
Approach Delay		8.0	13.7		18.0	
Approach LOS		A	B		B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 57.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 46.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 101: US 78 & SC 27/Ridgeville Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	150	245	167	225	213
Future Volume (veh/h)	114	150	245	167	225	213
Number	5	2	6	16	7	14
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	127	167	272	186	250	237
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	452	912	627	813	314	377
Arrive On Green	0.07	0.58	0.40	0.40	0.21	0.21
Sat Flow, veh/h	1508	1583	1583	1346	1508	1346
Grp Volume(v), veh/h	127	167	272	186	250	237
Grp Sat Flow(s),veh/h/ln	1508	1583	1583	1346	1508	1346
Q Serve(g_s), s	2.5	2.8	7.0	3.5	8.7	8.6
Cycle Q Clear(g_c), s	2.5	2.8	7.0	3.5	8.7	8.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	452	912	627	813	314	377
V/C Ratio(X)	0.28	0.18	0.43	0.23	0.80	0.63
Avail Cap(c_a), veh/h	588	912	627	813	434	484
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.3	5.6	12.2	5.1	20.9	17.5
Incr Delay (d2), s/veh	0.3	0.4	2.2	0.7	7.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	2.4	6.1	3.8	7.6	10.6
LnGrp Delay(d),s/veh	8.7	6.0	14.4	5.7	27.8	19.2
LnGrp LOS	A	A	B	A	C	B
Approach Vol, veh/h		294	458		487	
Approach Delay, s/veh		7.2	10.9		23.6	
Approach LOS		A	B		C	

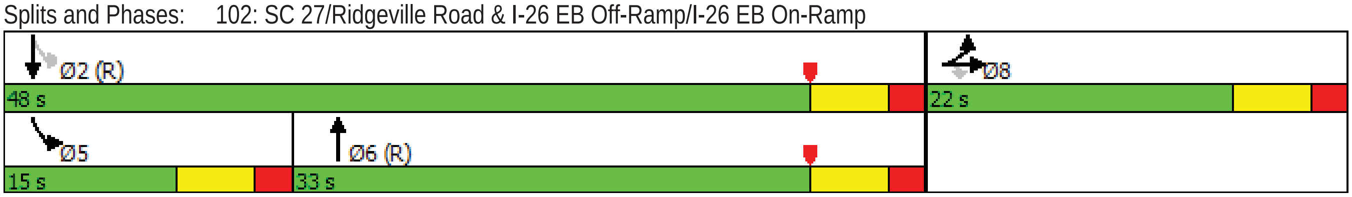
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		38.0		17.6	10.0	28.0		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		32.0		16.0	9.0	17.0		
Max Q Clear Time (g_c+I1), s		4.8		10.7	4.5	9.0		
Green Ext Time (p_c), s		8.3		0.8	0.1	3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	5	64	168	142	374
Future Volume (vph)	5	64	168	142	374
Turn Type	NA	Perm	NA	pm+pt	NA
Protected Phases	8		6	5	2
Permitted Phases		8		2	
Detector Phase	8	8	6	5	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	33.0	15.0	48.0
Total Split (%)	31.4%	31.4%	47.1%	21.4%	68.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	C-Min	None	C-Min
Act Effct Green (s)	7.5	7.5	39.0	52.8	54.0
Actuated g/C Ratio	0.11	0.11	0.56	0.75	0.77
v/c Ratio	0.26	0.27	0.37	0.24	0.34
Control Delay	31.8	3.0	10.2	2.5	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	3.0	10.2	2.5	2.4
LOS	C	A	B	A	A
Approach Delay	14.3		10.2		2.4
Approach LOS	B		B		A

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 58 (83%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 6.2	Intersection LOS: A
Intersection Capacity Utilization 46.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 102: SC 27/Ridgeville Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	5	64	0	0	0	0	168	113	142	374	0
Future Volume (veh/h)	36	5	64	0	0	0	0	168	113	142	374	0
Number	3	8	18				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	1881	1630	1568				0	1568	1881	1583	1583	0
Adj Flow Rate, veh/h	40	6	71				0	187	126	158	416	0
Adj No. of Lanes	0	1	1				0	1	0	1	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	102	15	100				0	527	355	647	1193	0
Arrive On Green	0.08	0.08	0.08				0.00	0.60	0.60	0.13	1.00	0.00
Sat Flow, veh/h	1358	204	1332				0	874	589	1508	1583	0
Grp Volume(v), veh/h	46	0	71				0	0	313	158	416	0
Grp Sat Flow(s),veh/h/ln	1562	0	1332				0	0	1464	1508	1583	0
Q Serve(g_s), s	2.0	0.0	3.6				0.0	0.0	7.6	2.6	0.0	0.0
Cycle Q Clear(g_c), s	2.0	0.0	3.6				0.0	0.0	7.6	2.6	0.0	0.0
Prop In Lane	0.87		1.00				0.00		0.40	1.00		0.00
Lane Grp Cap(c), veh/h	118	0	100				0	0	882	647	1193	0
V/C Ratio(X)	0.39	0.00	0.71				0.00	0.00	0.35	0.24	0.35	0.00
Avail Cap(c_a), veh/h	357	0	305				0	0	882	743	1193	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	30.8	0.0	31.6				0.0	0.0	7.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	8.8				0.0	0.0	1.1	0.2	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(95%),veh/ln	1.6	0.0	2.9				0.0	0.0	6.0	1.8	0.5	0.0
LnGrp Delay(d),s/veh	33.0	0.0	40.5				0.0	0.0	8.2	4.3	0.8	0.0
LnGrp LOS	C		D						A	A	A	
Approach Vol, veh/h		117						313			574	
Approach Delay, s/veh		37.5						8.2			1.7	
Approach LOS		D						A			A	

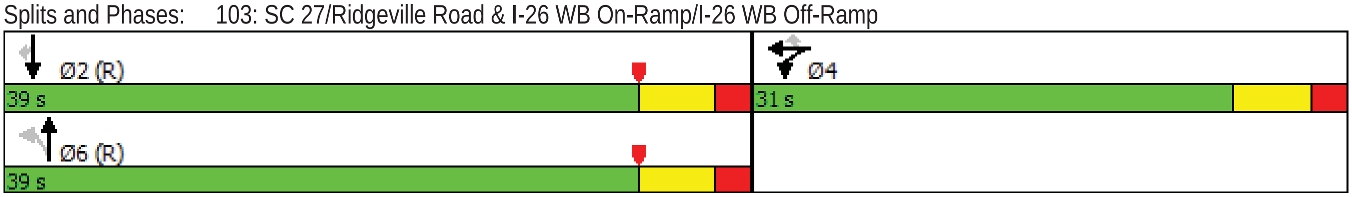
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		58.7			10.6	48.2		11.3
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		42.0			9.0	27.0		16.0
Max Q Clear Time (g_c+I1), s		2.0			4.6	9.6		5.6
Green Ext Time (p_c), s		18.6			0.2	10.8		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		7.9
HCM 2010 LOS		A

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	180	40	164	288	54
Future Volume (vph)	3	180	40	164	288	54
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0	39.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	55.7%	55.7%	55.7%	55.7%
Yellow Time (s)	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
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?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	16.3	16.3	41.7	41.7	41.7	41.7
Actuated g/C Ratio	0.23	0.23	0.60	0.60	0.60	0.60
v/c Ratio	0.67	0.43	0.08	0.19	0.34	0.07
Control Delay	32.6	6.3	6.2	6.1	9.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	6.3	6.2	6.1	9.6	2.9
LOS	C	A	A	A	A	A
Approach Delay	21.0			6.2	8.6	
Approach LOS	C			A	A	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 46.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 103: SC 27/Ridgeville Road & I-26 WB On-Ramp/I-26 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	228	3	180	40	164	0	0	288	54
Future Volume (veh/h)	0	0	0	228	3	180	40	164	0	0	288	54
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				1881	1630	1568	1583	1583	0	0	1568	1568
Adj Flow Rate, veh/h				253	3	200	44	182	0	0	320	60
Adj No. of Lanes				0	1	1	1	1	0	0	1	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				20	20	20	20	20	0	0	20	20
Cap, veh/h				315	4	273	550	987	0	0	978	831
Arrive On Green				0.20	0.20	0.20	0.21	0.21	0.00	0.00	0.62	0.62
Sat Flow, veh/h				1535	18	1332	849	1583	0	0	1568	1332
Grp Volume(v), veh/h				256	0	200	44	182	0	0	320	60
Grp Sat Flow(s),veh/h/ln				1553	0	1332	849	1583	0	0	1568	1332
Q Serve(g_s), s				11.0	0.0	9.8	3.0	6.6	0.0	0.0	6.8	1.2
Cycle Q Clear(g_c), s				11.0	0.0	9.8	9.8	6.6	0.0	0.0	6.8	1.2
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				318	0	273	550	987	0	0	978	831
V/C Ratio(X)				0.80	0.00	0.73	0.08	0.18	0.00	0.00	0.33	0.07
Avail Cap(c_a), veh/h				555	0	476	550	987	0	0	978	831
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.94	0.94	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				26.5	0.0	26.0	17.2	13.1	0.0	0.0	6.2	5.2
Incr Delay (d2), s/veh				4.8	0.0	3.8	0.3	0.4	0.0	0.0	0.9	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.8	0.0	7.0	1.4	5.5	0.0	0.0	5.6	0.9
LnGrp Delay(d),s/veh				31.3	0.0	29.8	17.5	13.5	0.0	0.0	7.1	5.4
LnGrp LOS				C		C	B	B			A	A
Approach Vol, veh/h					456			226			380	
Approach Delay, s/veh					30.6			14.3			6.8	
Approach LOS					C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		49.7		20.3		49.7		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		33.0		25.0		33.0		
Max Q Clear Time (g_c+I1), s		8.8		13.0		11.8		
Green Ext Time (p_c), s		9.8		1.4		9.1		

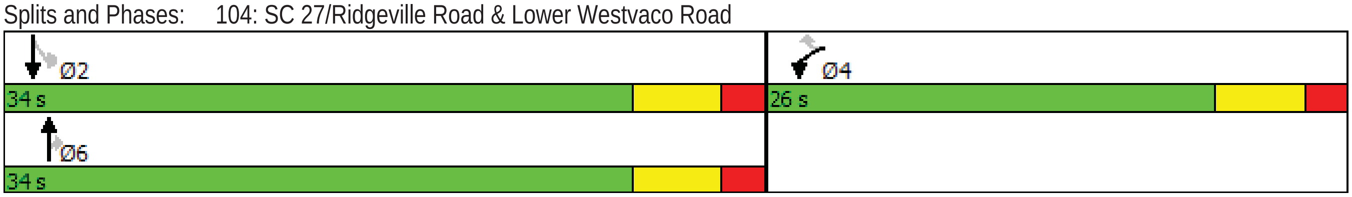
Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 LOS	B

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	168	10	308	36	10	174
Future Volume (vph)	168	10	308	36	10	174
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	4		6			2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	26.0	26.0	34.0	34.0	34.0	34.0
Total Split (%)	43.3%	43.3%	56.7%	56.7%	56.7%	56.7%
Yellow Time (s)	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
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?						
Recall Mode	None	None	Max	Max	Max	Max
Act Effct Green (s)	11.6	11.6	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.22	0.22	0.62	0.62	0.62	0.62
v/c Ratio	0.56	0.04	0.35	0.05	0.02	0.20
Control Delay	24.5	8.8	8.8	3.1	7.1	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	8.8	8.8	3.1	7.1	7.6
LOS	C	A	A	A	A	A
Approach Delay	23.6		8.2			7.6
Approach LOS	C		A			A

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 52.1
Natural Cycle: 45
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 11.9 Intersection LOS: B
Intersection Capacity Utilization 35.5% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 104: SC 27/Ridgeville Road & Lower Westvaco Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	168	10	308	36	10	174
Future Volume (veh/h)	168	10	308	36	10	174
Number	7	14	6	16	5	2
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	187	11	342	40	11	193
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	239	214	932	792	554	932
Arrive On Green	0.16	0.16	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1508	1346	1583	1346	847	1583
Grp Volume(v), veh/h	187	11	342	40	11	193
Grp Sat Flow(s),veh/h/ln	1508	1346	1583	1346	847	1583
Q Serve(g_s), s	5.7	0.3	5.4	0.6	0.3	2.7
Cycle Q Clear(g_c), s	5.7	0.3	5.4	0.6	5.7	2.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	239	214	932	792	554	932
V/C Ratio(X)	0.78	0.05	0.37	0.05	0.02	0.21
Avail Cap(c_a), veh/h	634	566	932	792	554	932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	17.0	5.1	4.1	6.6	4.6
Incr Delay (d2), s/veh	5.5	0.1	1.1	0.1	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	0.2	4.6	0.4	0.2	2.4
LnGrp Delay(d),s/veh	24.7	17.1	6.2	4.3	6.7	5.1
LnGrp LOS	C	B	A	A	A	A
Approach Vol, veh/h	198		382			204
Approach Delay, s/veh	24.3		6.0			5.2
Approach LOS	C		A			A

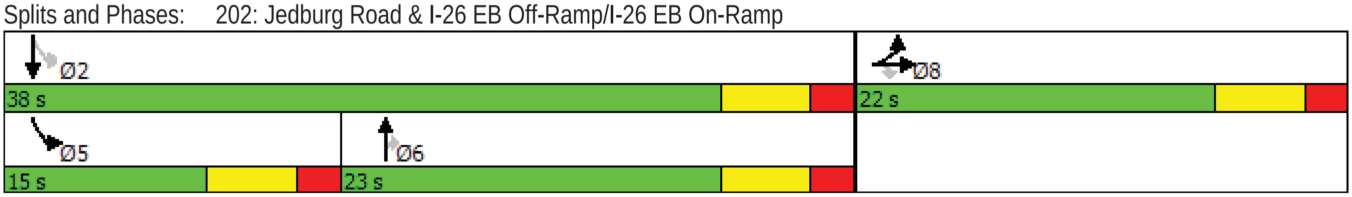
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.0		13.6		34.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		28.0		20.0		28.0		
Max Q Clear Time (g_c+I1), s		7.7		7.7		7.4		
Green Ext Time (p_c), s		8.8		0.5		8.9		

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 LOS	B

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	58	314	441	173	819
Future Volume (vph)	1	58	314	441	173	819
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		6		5	2
Permitted Phases		8		6	2	
Detector Phase	8	8	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	23.0	23.0	15.0	38.0
Total Split (%)	36.7%	36.7%	38.3%	38.3%	25.0%	63.3%
Yellow Time (s)	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
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			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	7.8	7.8	21.0	21.0	35.0	36.2
Actuated g/C Ratio	0.15	0.15	0.40	0.40	0.67	0.69
v/c Ratio	0.30	0.19	0.29	0.59	0.34	0.44
Control Delay	23.2	1.2	13.5	5.2	6.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	1.2	13.5	5.2	6.4	6.1
LOS	C	A	B	A	A	A
Approach Delay	12.5		8.7			6.1
Approach LOS	B		A			A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 52.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 202: Jedburg Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1	58	0	0	0	0	314	441	173	819	0
Future Volume (veh/h)	60	1	58	0	0	0	0	314	441	173	819	0
Number	3	8	18				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	1583	1583				0	1583	1583	1583	1583	0
Adj Flow Rate, veh/h	67	1	0				0	349	0	192	910	0
Adj No. of Lanes	0	1	1				0	2	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	78	1	71				0	1393	623	644	2073	0
Arrive On Green	0.05	0.05	0.00				0.00	0.46	0.00	0.10	0.69	0.00
Sat Flow, veh/h	1487	22	1346				0	3088	1346	1508	3088	0
Grp Volume(v), veh/h	68	0	0				0	349	0	192	910	0
Grp Sat Flow(s),veh/h/ln	1509	0	1346				0	1504	1346	1508	1504	0
Q Serve(g_s), s	2.1	0.0	0.0				0.0	3.3	0.0	2.7	6.3	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0				0.0	3.3	0.0	2.7	6.3	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	79	0	71				0	1393	623	644	2073	0
V/C Ratio(X)	0.86	0.00	0.00				0.00	0.25	0.00	0.30	0.44	0.00
Avail Cap(c_a), veh/h	520	0	464				0	1393	623	790	2073	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	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.8	0.0	0.0				0.0	7.6	0.0	4.6	3.2	0.0
Incr Delay (d2), s/veh	21.9	0.0	0.0				0.0	0.4	0.0	0.3	0.7	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(95%),veh/ln	2.4	0.0	0.0				0.0	2.6	0.0	2.0	4.9	0.0
LnGrp Delay(d),s/veh	43.7	0.0	0.0				0.0	8.0	0.0	4.8	3.9	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		68						349			1102	
Approach Delay, s/veh		43.7						8.0			4.1	
Approach LOS		D						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		38.0			10.5	27.5		8.4
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		32.0			9.0	17.0		16.0
Max Q Clear Time (g_c+I1), s		8.3			4.7	5.3		4.1
Green Ext Time (p_c), s		20.0			0.2	10.5		0.1

Intersection Summary			
HCM 2010 Ctrl Delay			6.7
HCM 2010 LOS			A

Lane Group	NBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	57	317	417
Future Volume (vph)	57	317	417
Turn Type	D.P+P	NA	NA
Protected Phases	1	Free	2
Permitted Phases	2		
Detector Phase	1		2
Switch Phase			
Minimum Initial (s)	4.0		4.0
Minimum Split (s)	15.0		22.0
Total Split (s)	22.0		38.0
Total Split (%)	36.7%		63.3%
Yellow Time (s)	4.0		4.0
All-Red Time (s)	2.0		2.0
Lost Time Adjust (s)	0.0		0.0
Total Lost Time (s)	6.0		6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None		Max
Act Effct Green (s)	41.6	51.3	40.3
Actuated g/C Ratio	0.81	1.00	0.79
v/c Ratio	0.09	0.12	0.22
Control Delay	1.0	0.1	3.1
Queue Delay	0.0	0.0	0.0
Total Delay	1.0	0.1	3.1
LOS	A	A	A
Approach Delay		0.2	3.1
Approach LOS		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 51.3	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.22	
Intersection Signal Delay: 1.8	Intersection LOS: A
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 203: Jedburg Road & I-26 WB On-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	57	317	417	39
Future Volume (vph)	0	0	57	317	417	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0	6.0	
Lane Util. Factor			1.00	0.95	0.95	
Frt			1.00	1.00	0.99	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1504	3008	2970	
Flt Permitted			0.47	1.00	1.00	
Satd. Flow (perm)			738	3008	2970	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	63	352	463	43
RTOR Reduction (vph)	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	63	352	499	0
Turn Type			D.P+P	NA	NA	
Protected Phases			1	Free	2	
Permitted Phases			2			
Actuated Green, G (s)			41.6	53.6	38.0	
Effective Green, g (s)			41.6	53.6	38.0	
Actuated g/C Ratio			0.78	1.00	0.71	
Clearance Time (s)			6.0		6.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)			624	3008	2105	
v/s Ratio Prot			0.01	0.12	c0.17	
v/s Ratio Perm			0.07			
v/c Ratio			0.10	0.12	0.24	
Uniform Delay, d1			1.4	0.0	2.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			0.1	0.1	0.3	
Delay (s)			1.5	0.1	3.0	
Level of Service			A	A	A	
Approach Delay (s)	0.0			0.3	3.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

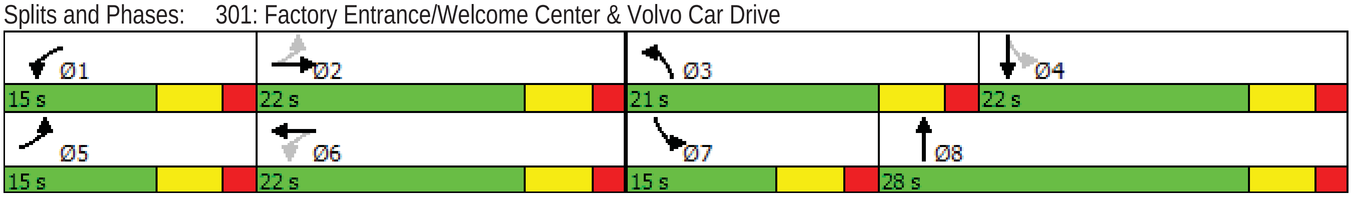
c Critical Lane Group

HCM 2010 analysis expects strict NEMA phasing.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	32	69	31	155	622	10	10	10
Future Volume (vph)	10	32	69	31	155	622	10	10	10
Turn Type	pm+pt	NA	Free	pm+pt	NA	Prot	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		Free	6				4	
Detector Phase	5	2		1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0		15.0	22.0	15.0	22.0	15.0	22.0
Total Split (s)	15.0	22.0		15.0	22.0	21.0	28.0	15.0	22.0
Total Split (%)	18.8%	27.5%		18.8%	27.5%	26.3%	35.0%	18.8%	27.5%
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	0.0	0.0		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	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min		None	Min	None	None	None	None
Act Effct Green (s)	7.8	4.8	39.6	9.4	7.2	16.1	16.3	7.1	6.3
Actuated g/C Ratio	0.20	0.12	1.00	0.24	0.18	0.41	0.41	0.18	0.16
v/c Ratio	0.03	0.10	0.05	0.09	0.33	0.49	0.38	0.03	0.08
Control Delay	12.1	20.4	0.1	12.1	17.1	14.2	4.3	12.8	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	20.4	0.1	12.1	17.1	14.2	4.3	12.8	15.8
LOS	B	C	A	B	B	B	A	B	B
Approach Delay		7.0			16.3		11.1		14.8
Approach LOS		A			B		B		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 39.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 42.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 301: Factory Entrance/Welcome Center & Volvo Car Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	32	69	31	155	10	622	10	278	10	10	10
Future Volume (veh/h)	10	32	69	31	155	10	622	10	278	10	10	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1583	1863	1863	1598	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	36	0	34	172	11	691	11	309	11	11	11
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	1	1	0
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
Percent Heavy Veh, %	2	20	2	2	20	20	2	2	2	2	2	2
Cap, veh/h	279	376	198	362	418	27	878	18	503	260	71	71
Arrive On Green	0.01	0.13	0.00	0.03	0.14	0.14	0.26	0.33	0.33	0.01	0.08	0.08
Sat Flow, veh/h	1774	3008	1583	1774	2899	184	3442	55	1537	1774	856	856
Grp Volume(v), veh/h	11	36	0	34	89	94	691	0	320	11	0	22
Grp Sat Flow(s),veh/h/ln	1774	1504	1583	1774	1518	1565	1721	0	1592	1774	0	1712
Q Serve(g_s), s	0.3	0.5	0.0	0.8	2.5	2.6	8.9	0.0	8.0	0.3	0.0	0.6
Cycle Q Clear(g_c), s	0.3	0.5	0.0	0.8	2.5	2.6	8.9	0.0	8.0	0.3	0.0	0.6
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.97	1.00		0.50
Lane Grp Cap(c), veh/h	279	376	198	362	219	226	878	0	521	260	0	143
V/C Ratio(X)	0.04	0.10	0.00	0.09	0.41	0.41	0.79	0.00	0.61	0.04	0.00	0.15
Avail Cap(c_a), veh/h	596	1014	534	645	512	528	1088	0	738	576	0	577
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	18.4	0.0	17.3	18.5	18.5	16.5	0.0	13.4	19.6	0.0	20.2
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.1	1.2	1.2	3.1	0.0	1.2	0.1	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	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.4	0.0	0.7	2.1	2.1	8.1	0.0	6.5	0.2	0.0	0.5
LnGrp Delay(d),s/veh	17.9	18.5	0.0	17.4	19.7	19.7	19.6	0.0	14.6	19.6	0.0	20.7
LnGrp LOS	B	B		B	B	B	B		B	B		C
Approach Vol, veh/h		47			217			1011			33	
Approach Delay, s/veh		18.4			19.3			18.0			20.3	
Approach LOS		B			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	11.9	18.1	10.0	6.5	12.8	6.5	21.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	16.0	15.0	16.0	9.0	16.0	9.0	22.0
Max Q Clear Time (g_c+I1), s	2.8	2.5	10.9	2.6	2.3	4.6	2.3	10.0
Green Ext Time (p_c), s	0.0	2.5	1.2	1.1	0.0	2.3	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B

Appendix F

2039 Freeway Analysis Worksheets

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	3130	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	869	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1913	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1913	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	65.8	mi/h
Number of lanes, N	2	
Density, D	29.1	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description: 171001612	- No Build - 4k

Flow Inputs and Adjustments

Volume, V	3130	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	869	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1275	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1275	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	3	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 6/15/16
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Eastbound
Junction: SC 27 Off-Ramp
Jurisdiction: SCDOT
Analysis Year: 2039 Design Year
Description: 171001612 - No Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	214	vph
Length of first accel/decel lane	450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1674	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3130		214		1674	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	869		59		465	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3826        262         2046      pcph

_________________________Estimation of V12 Diverge Areas______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.652   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  2587   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3826          7200            No
      Fi   F
     v  = v - v            3564          7200            No
      FO   F   R
     v                     262           2000            No
      R
     v  or v               1239 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 2587                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                2587          4400                 No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   22.5    pc/mi/ln
                        R                12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.452
                                              S
Space mean speed in ramp influence area,     S  = 60.1    mph
                                              R
Space mean speed in outer lanes,             S  = 81.3    mph
                                              0
Space mean speed for all vehicles,           S  = 65.7    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst: ae
Agency or Company: Stantec
Date Performed: 6/15/16
Analysis Time Period: 3:00 - 4:00 PM
Freeway/Direction: I-26 Eastbound
From/To: SC 27 Interchange
Jurisdiction: SCDOT
Analysis Year: 2039 Design Year
Description: 171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	2916	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	810	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1188	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1188	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	3	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2916	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1674	vph
Length of first accel/decel lane	800	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	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2916	1674	214	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	810	465	59	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3564	2046	262	pcph

Estimation of V12 Merge Areas

L_{EQ} = 983.94 (Equation 13-6 or 13-7)

P_{FM} = 0.600 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2138 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5610	7200	No
v_3 or v_{av34}	1426 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 Yes

If yes, v_{12A} = 2138 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4184	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.521	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_0 = 71.7	mph
Space mean speed for all vehicles,	S = 60.8	mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 to Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	4590	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1275	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1870	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1870	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	66.6	mi/h
Number of lanes, N	3	
Density, D	28.1	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	4590	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	313	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	675	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4590		313		675	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1275		87		188	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5610	383	825	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.602 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3530 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5610	7200	No
$v_{FO} = v_F - v_R$	5227	7200	No
v_R	383	2000	No
v_3 or v_{av34}	2080 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} = 3530 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3530	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.462

Space mean speed in ramp influence area, S_R = 59.7 mph

Space mean speed in outer lanes, S_0 = 78.1 mph

Space mean speed for all vehicles, S = 65.4 mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	Jedburg Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	4277	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1188	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1742	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1742	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	68.9	mi/h
Number of lanes, N	3	
Density, D	25.3	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year

Description: 171001612 - No Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	4277	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	675	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	313	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4277	675	313	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1188	188	87	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           5227        825         383        pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =    1233.93 (Equation 13-6 or 13-7)
                   EQ
                  P  =    0.610   Using Equation  1
                   FM
                  v  = v  (P  ) =  3187   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     6052          7200            No
      FO
     v  or v               2040 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            Yes
      3     av34         12
If yes, v    = 3187                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                        Actual        Max Desirable         Violation?
     v                  4012          4600                  No
      12A
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   29.2    pc/mi/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.456
                                              S
Space mean speed in ramp influence area,     S  = 60.0    mph
                                              R
Space mean speed in outer lanes,             S  = 69.5    mph
                                              0
Space mean speed for all vehicles,           S  = 62.9    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	4952	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1376	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2017	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.17	ramps/mi
Number of lanes, N	3	
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	3.7	mi/h
Free-flow speed, FFS	71.7	mi/h

LOS and Performance Measures

Flow rate, vp	2017	pc/h/ln
Free-flow speed, FFS	71.7	mi/h
Average passenger-car speed, S	62.3	mi/h
Number of lanes, N	3	
Density, D	32.4	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	4397	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1221	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1791	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	ramps/mi
Number of lanes, N	3	
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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1791	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	65.9	mi/h
Number of lanes, N	3	
Density, D	27.2	pc/mi/ln
Level of service, LOS	D	

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	71.3	mph
Volume on freeway	4397	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	421	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	626	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4397		421		626	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1221		117		174	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           5374        515         765       pcph

_________________________Estimation of V12 Diverge Areas________________________

                  L  =    971.54  (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.630   Using Equation  7
                   FD
                  v  = v  + (v - v ) P  =  3574   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks__________________________________

                             Actual        Maximum         LOS F?
     v  = v                  5374          7200            No
      Fi   F
     v  = v - v              4859          7200            No
      FO   F   R
     v                       515           2000            No
      R
     v  or v                 1800 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?            No
      3     av34
Is   v  or v      > 1.5 v  /2             No
      3     av34        12
If yes, v    = 3574                    (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area______________________
                      Actual        Max Desirable         Violation?
     v                3574          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   28.2    pc/mi/ln
                        R                 12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation___________________________________

Intermediate speed variable,                 D  = 0.474
                                              S
Space mean speed in ramp influence area,     S  = 57.4    mph
                                              R
Space mean speed in outer lanes,             S  = 75.1    mph
                                              0
Space mean speed for all vehicles,           S  = 62.3    mph
________________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Off-Ramp to Loop Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3976	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1104	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1620	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	ramps/mi
Number of lanes, N	3	
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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1620	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	3	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg Loop Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3976	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	626	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	421	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3976		626		421	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1104		174		117	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           4860        765         515       pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.603   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  3236   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                4860          7200            No
      Fi   F
     v  = v - v            4095          7200            No
      FO   F   R
     v                     765           2000            No
      R
     v  or v               1624 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3236                    (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable          Violation?
     v                3236          4400                   No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   25.3    pc/mi/ln
                        R                 12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.497
                                              S
Space mean speed in ramp influence area,     S  = 56.7    mph
                                              R
Space mean speed in outer lanes,             S  = 75.8    mph
                                              0
Space mean speed for all vehicles,           S  = 61.9    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Loop Ramp to On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description: 171001612	- No Build - 4k

Flow Inputs and Adjustments

Volume, V	3350	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	931	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1365	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	ramps/mi
Number of lanes, N	3	
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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1365	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	69.7	mi/h
Number of lanes, N	3	
Density, D	19.6	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 6/15/16
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Westbound
Junction: Jedburg On-Ramp
Jurisdiction: SCDOT
Analysis Year: 2039 Design Year
Description: 171001612 - No Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	427	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	626	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)	3350		427		626	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	931		119		174	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4094	522	765	pcph

Estimation of V12 Merge Areas

L_{EQ} = 993.22 (Equation 13-6 or 13-7)

P_{FM} = 0.608 Using Equation 2

$v_{12} = v_F (P_{FM})$ = 2489 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4616	7200	No
v_3 or v_{av34}	1605 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		Yes	

If yes, v_{12A} = 2489 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3011	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 62.2	mph
Space mean speed in outer lanes,	S_0 = 67.3	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg to SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description: 171001612	- No Build - 4k

Flow Inputs and Adjustments

Volume, V	3777	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1049	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1539	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1539	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	3	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3777	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	871	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	427	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3777		871		427	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1049		242		119	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909        0.909        0.909
Driver population factor, fP           1.00         1.00         1.00
Flow rate, vp                          4616         1065         522        pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.596   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  3180   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                4616          7200            No
      Fi   F
     v  = v - v            3551          7200            No
      FO   F   R
     v                     1065          2000            No
      R
     v  or v               1436 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3180                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                3180          4400                 No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   27.1    pc/mi/ln
                        R                  12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.524
                                              S
Space mean speed in ramp influence area,     S  = 57.7    mph
                                              R
Space mean speed in outer lanes,             S  = 80.6    mph
                                              0
Space mean speed for all vehicles,           S  = 63.3    mph
_______________________________________________________________________________
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HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	2906	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	807	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1184	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1184	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	3	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2906	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	427	vph
Length of first accel/decel lane	925	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	871	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2906	427	871	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	807	119	242	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3552        522         1065      pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L   =    710.74  (Equation 13-6 or 13-7)
                   EQ
                  P   =    0.603   Using Equation  1
                   FM
                  v   = v  (P  ) =  2143   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4074          7200            No
      FO
     v  or v               1409 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            Yes
      3     av34         12
If yes, v    = 2143                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                2665          4600                 No
      12A
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   20.2    pc/mi/ln
         R                    R            12            A
Level of service for ramp-freeway junction areas of influence  C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.312
                                              S
Space mean speed in ramp influence area,     S  = 64.7    mph
                                              R
Space mean speed in outer lanes,             S  = 71.7    mph
                                              0
Space mean speed for all vehicles,           S  = 67.0    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	3333	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	926	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1358	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1358	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	3	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - No Build - 4k

Flow Inputs and Adjustments

Volume, V	3333	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	926	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2037	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	2037	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	63.1	mi/h
Number of lanes, N	2	
Density, D	32.3	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst: ae
Agency or Company: Stantec
Date Performed: 6/15/16
Analysis Time Period: 3:00 - 4:00 PM
Freeway/Direction: I-26 Eastbound
From/To: West of SC 27
Jurisdiction: SCDOT
Analysis Year: 2039 Design Year
Description: 171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3130	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	869	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1913	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1913	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	65.8	mi/h
Number of lanes, N	2	
Density, D	29.1	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3130	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	869	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1275	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1275	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	3	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year

Description: 171001612 - Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	164	vph
Length of first accel/decel lane	450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	378	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3130		164		378	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	869		46		105	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          3826        200         462       pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.655   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  2576   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                3826          7200            No
      Fi   F
     v  = v - v            3626          7200            No
      FO   F   R
     v                     200           2000            No
      R
     v  or v               1250 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 2576                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                2576          4400                 No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   22.4    pc/mi/ln
                        R                  12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.446
                                              S
Space mean speed in ramp influence area,     S  = 60.3    mph
                                              R
Space mean speed in outer lanes,             S  = 81.3    mph
                                              0
Space mean speed for all vehicles,           S  = 65.8    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	2966	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	824	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1208	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1208	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	3	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2966	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	378	vph
Length of first accel/decel lane	800	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	2330	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2966	378	164	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	824	105	46	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           3625        462         200       pcph

_________________________Estimation of V12 Merge Areas_________________________

                  L  =    658.02  (Equation 13-6 or 13-7)
                   EQ
                  P  =    0.600   Using Equation  1
                   FM
                  v  = v  (P  ) =  2175   pc/h
                   12   F   FM

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     4087          7200            No
      FO
     v  or v               1450 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            Yes
      3     av34         12
If yes, v    = 2175                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable         Violation?
     v                2637          4600                  No
      12A
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   20.8    pc/mi/ln
          R                  R          12             A
Level of service for ramp-freeway junction areas of influence  C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.319
                                              S
Space mean speed in ramp influence area,     S  = 64.5    mph
                                              R
Space mean speed in outer lanes,             S  = 71.6    mph
                                              0
Space mean speed for all vehicles,           S  = 66.8    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	SC 27 to New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3344	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	929	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1362	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1362	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	3	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange Off-Ramp Area
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3344	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	929	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1022	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	4	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1022	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.6	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year

Description: 171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3294	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	915	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1342	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1342	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	3	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange 2 On Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	4590	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1275	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1122	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	5	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1122	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.0	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange 1 On Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	4590	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1275	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1402	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	4	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1402	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	4	
Density, D	19.2	pc/mi/ln
Level of service, LOS	C	

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	New Interchange to Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description: 171001612 - Build - 4k	

Flow Inputs and Adjustments

Volume, V	4590	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1275	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1870	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1870	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	66.6	mi/h
Number of lanes, N	3	
Density, D	28.1	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year

Description: 171001612 - Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	73.1	mph
Volume on freeway	4590	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	313	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	675	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4590		313		675	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1275		87		188	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           5610        383         825       pcph

_________________________Estimation of V12 Diverge Areas______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.602   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  3530   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                5610          7200            No
      Fi   F
     v  = v - v            5227          7200            No
      FO   F   R
     v                     383           2000            No
      R
     v  or v               2080 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3530                    (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                        Actual        Max Desirable         Violation?
     v                  3530          4400                  No
      12
_________________Level of Service Determination (if not F)____________________

Density,                 D = 4.252 + 0.0086 v  - 0.009  L   =   30.1    pc/mi/ln
                          R                12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.462
                                              S
Space mean speed in ramp influence area,     S  = 58.7    mph
                                              R
Space mean speed in outer lanes,             S  = 76.0    mph
                                              0
Space mean speed for all vehicles,           S  = 64.1    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	Jedburg Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	4277	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1188	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1742	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1742	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	68.9	mi/h
Number of lanes, N	3	
Density, D	25.3	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Eastbound
Junction:	Jedburg On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year

Description: 171001612 - Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	73.1	mph
Volume on freeway	4277	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	675	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	313	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1620	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4277	675	313	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1188	188	87	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          5227        825         383       pcph

________________________Estimation of V12 Merge Areas_________________________

                  L  =    1233.93 (Equation 13-6 or 13-7)
                   EQ
                  P  =    0.610   Using Equation  1
                   FM
                  v  = v  (P  ) =  3187   pc/h
                   12   F   FM

______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v                     6052          7200            No
      FO
     v  or v               2040 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            Yes
      3     av34         12
If yes, v    = 3187                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

________________________Flow Entering Merge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                4012          4600                 No
      12A
_________________Level of Service Determination (if not F)_____________________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   29.2    pc/mi/ln
          R                   R           12            A
Level of service for ramp-freeway junction areas of influence  D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 M  = 0.456
                                              S
Space mean speed in ramp influence area,     S  = 58.9    mph
                                              R
Space mean speed in outer lanes,             S  = 67.6    mph
                                              0
Space mean speed for all vehicles,           S  = 61.6    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Eastbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description: 171001612	- Build - 4k

Flow Inputs and Adjustments

Volume, V	4952	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1376	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2017	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.17	ramps/mi
Number of lanes, N	3	
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	3.7	mi/h
Free-flow speed, FFS	71.7	mi/h

LOS and Performance Measures

Flow rate, vp	2017	pc/h/ln
Free-flow speed, FFS	71.7	mi/h
Average passenger-car speed, S	62.3	mi/h
Number of lanes, N	3	
Density, D	32.4	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	East of Jedburg
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	4397	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1221	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1791	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	ramps/mi
Number of lanes, N	3	
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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1791	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	65.9	mi/h
Number of lanes, N	3	
Density, D	27.2	pc/mi/ln
Level of service, LOS	D	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 6/15/16
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Westbound
Junction: Jedburg Off-Ramp
Jurisdiction: SCDOT
Analysis Year: 2039 Design Year
Description: 171001612 - Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	71.3	mph
Volume on freeway	4397	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	421	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	626	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4397		421		626	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1221		117		174	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV           0.909        0.909        0.909
Driver population factor, fP            1.00         1.00         1.00
Flow rate, vp                           5374         515          765        pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =    971.54  (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.630   Using Equation  7
                   FD
                  v  = v  + (v - v ) P  =  3574   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                             Actual        Maximum         LOS F?
     v  = v                  5374          7200            No
      Fi   F
     v  = v - v              4859          7200            No
      FO   F   R
     v                       515           2000            No
      R
     v  or v                 1800 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?             No
      3     av34
Is   v  or v      > 1.5 v  /2              No
      3     av34         12
If yes, v    = 3574                     (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                        Actual        Max Desirable         Violation?
     v                  3574          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,                 D = 4.252 + 0.0086 v  - 0.009  L   =   28.2    pc/mi/ln
                          R                12          D
Level of service for ramp-freeway junction areas of influence D

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.474
                                              S
Space mean speed in ramp influence area,     S  = 57.4    mph
                                              R
Space mean speed in outer lanes,             S  = 75.1    mph
                                              0
Space mean speed for all vehicles,           S  = 62.3    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Off-Ramp to Loop Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3976	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1104	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1620	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	ramps/mi
Number of lanes, N	3	
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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1620	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	3	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	Jedburg Loop Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3976	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	626	vph
Length of first accel/decel lane	750	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	421	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	750	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3976		626		421	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1104		174		117	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV          0.909       0.909       0.909
Driver population factor, fP           1.00        1.00        1.00
Flow rate, vp                          4860        765         515       pcph

_________________________Estimation of V12 Diverge Areas______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.603   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  3236   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                4860          7200            No
      Fi   F
     v  = v - v            4095          7200            No
      FO   F   R
     v                     765           2000            No
      R
     v  or v               1624 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3236                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable         Violation?
     v                3236          4400                  No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   25.3    pc/mi/ln
                        R                12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.497
                                              S
Space mean speed in ramp influence area,     S  = 56.7    mph
                                              R
Space mean speed in outer lanes,             S  = 75.8    mph
                                              0
Space mean speed for all vehicles,           S  = 61.9    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg Loop Ramp to On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3350	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	931	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1365	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	1.33	ramps/mi
Number of lanes, N	3	
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	4.1	mi/h
Free-flow speed, FFS	71.3	mi/h

LOS and Performance Measures

Flow rate, vp	1365	pc/h/ln
Free-flow speed, FFS	71.3	mi/h
Average passenger-car speed, S	69.7	mi/h
Number of lanes, N	3	
Density, D	19.6	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Merge Analysis

Analyst: ae
Agency/Co.: Stantec
Date performed: 6/15/16
Analysis time period: 3:00 - 4:00 PM
Freeway/Dir of Travel: I-26 Westbound
Junction: Jedburg On-Ramp
Jurisdiction: SCDOT
Analysis Year: 2039 Design Year
Description: 171001612 - Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	71.3	mph
Volume on freeway	3350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	427	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	626	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)	3350	427	626	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	931	119	174	v
Trucks and buses	20	20	20	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4094	522	765	pcph

Estimation of V12 Merge Areas

L_{EQ} = 993.22 (Equation 13-6 or 13-7)

P_{FM} = 0.608 Using Equation 2

$v_{12} = v_F (P_{FM})$ = 2489 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4616	7200	No
v_3 or v_{av34}	1605 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 Yes

If yes, v_{12A} = 2489 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3011	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 62.2	mph
Space mean speed in outer lanes,	S_0 = 67.3	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	Jedburg to New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3777	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1049	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1539	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	3	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1539	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	3	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange 1 Off Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3777	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1049	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1154	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	4	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1154	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange 2 Off Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3777	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1049	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	923	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	5	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	923	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	12.3	pc/mi/ln
Level of service, LOS	B	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3517	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	977	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1433	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	3	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1433	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	3	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange Off Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3789	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1053	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1158	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.83	ramps/mi
Number of lanes, N	4	
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	2.8	mi/h
Free-flow speed, FFS	72.6	mi/h

LOS and Performance Measures

Flow rate, vp	1158	pc/h/ln
Free-flow speed, FFS	72.6	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	New Interchange to SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3789	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1053	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1544	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1544	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	71.7	mi/h
Number of lanes, N	3	
Density, D	21.5	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Freeway Merge and Diverge Segments Release 6.60

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 Off-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	73.1	mph
Volume on freeway	3789	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	611	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	155	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3789		611		155	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1053		170		43	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

```
Heavy vehicle adjustment, fHV           0.909       0.909       0.909
Driver population factor, fP            1.00        1.00        1.00
Flow rate, vp                           4631        747         189       pcph

_________________________Estimation of V12 Diverge Areas_______________________

                  L  =            (Equation 13-12 or 13-13)
                   EQ
                  P  =    0.610   Using Equation  5
                   FD
                  v  = v  + (v - v ) P  =  3116   pc/h
                   12   R     F   R   FD

_______________________________Capacity Checks_________________________________

                           Actual        Maximum         LOS F?
     v  = v                4631          7200            No
      Fi   F
     v  = v - v            3884          7200            No
      FO   F   R
     v                     747           2000            No
      R
     v  or v               1515 pc/h     (Equation 13-14 or 13-17)
      3     av34
Is   v  or v      > 2700 pc/h?           No
      3     av34
Is   v  or v      > 1.5 v  /2            No
      3     av34         12
If yes, v    = 3116                   (Equation 13-15, 13-16, 13-18, or 13-19)
         12A

______________________Flow Entering Diverge Influence Area_____________________
                      Actual        Max Desirable        Violation?
     v                3116          4400                 No
      12
_________________Level of Service Determination (if not F)_____________________

Density,               D = 4.252 + 0.0086 v  - 0.009  L   =   26.5    pc/mi/ln
                        R                 12          D
Level of service for ramp-freeway junction areas of influence C

_____________________________Speed Estimation__________________________________

Intermediate speed variable,                 D  = 0.495
                                              S
Space mean speed in ramp influence area,     S  = 57.7    mph
                                              R
Space mean speed in outer lanes,             S  = 78.2    mph
                                              0
Space mean speed for all vehicles,           S  = 63.1    mph
_______________________________________________________________________________
```

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	SC 27 Interchange
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3178	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	883	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1295	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.67	ramps/mi
Number of lanes, N	3	
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	2.3	mi/h
Free-flow speed, FFS	73.1	mi/h

LOS and Performance Measures

Flow rate, vp	1295	pc/h/ln
Free-flow speed, FFS	73.1	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	3	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date performed:	6/15/16
Analysis time period:	3:00 - 4:00 PM
Freeway/Dir of Travel:	I-26 Westbound
Junction:	SC 27 On-Ramp
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year

Description: 171001612 - Build - 4k

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	73.1	mph
Volume on freeway	3178	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	155	vph
Length of first accel/decel lane	925	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	611	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2175	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3178		155		611	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	883		43		170	v
Trucks and buses	20		20		20	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.909	0.909	0.909	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3884	189	747	pcph

Estimation of V12 Merge Areas

L_{EQ} = 710.52 (Equation 13-6 or 13-7)

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2344 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4073	7200	No

v_3 or v_{av34} 1540 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 Yes

If yes, v_{12A} = 2344 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2533	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 19.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.305	
Space mean speed in ramp influence area,	S_R = 63.6	mph
Space mean speed in outer lanes,	S_0 = 69.4	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3333	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	926	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1358	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	ramps/mi
Number of lanes, N	3	
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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	1358	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	3	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

HCS 2010: Basic Freeway Segments Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency or Company:	Stantec
Date Performed:	6/15/16
Analysis Time Period:	3:00 - 4:00 PM
Freeway/Direction:	I-26 Westbound
From/To:	West of SC 27
Jurisdiction:	SCDOT
Analysis Year:	2039 Design Year
Description:	171001612 - Build - 4k

Flow Inputs and Adjustments

Volume, V	3333	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	926	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	2037	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.00	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	0.0	mi/h
Free-flow speed, FFS	75.4	mi/h

LOS and Performance Measures

Flow rate, vp	2037	pc/h/ln
Free-flow speed, FFS	75.4	mi/h
Average passenger-car speed, S	63.1	mi/h
Number of lanes, N	2	
Density, D	32.3	pc/mi/ln
Level of service, LOS	D	

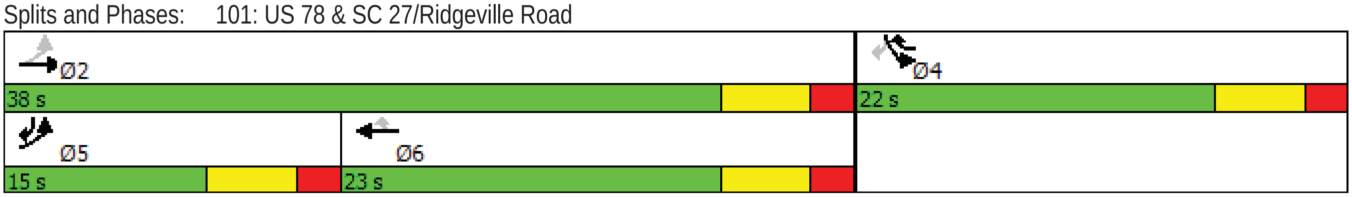
Appendix G

2039 Intersection Analysis Worksheets

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	166	206	336	241	338	314
Future Volume (vph)	166	206	336	241	338	314
Turn Type	pm+pt	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	4	4	5
Permitted Phases	2			6		4
Detector Phase	5	2	6	4	4	5
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0	22.0	22.0	22.0	15.0
Total Split (s)	15.0	38.0	23.0	22.0	22.0	15.0
Total Split (%)	25.0%	63.3%	38.3%	36.7%	36.7%	25.0%
Yellow Time (s)	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
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			Lead
Lead-Lag Optimize?						
Recall Mode	None	Max	Max	Min	Min	None
Act Effct Green (s)	32.0	32.0	17.7	39.7	16.0	30.3
Actuated g/C Ratio	0.53	0.53	0.30	0.66	0.27	0.50
v/c Ratio	0.47	0.27	0.80	0.27	0.94	0.45
Control Delay	11.9	8.7	36.0	1.4	57.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	8.7	36.0	1.4	57.4	6.1
LOS	B	A	D	A	E	A
Approach Delay		10.1	21.5		32.7	
Approach LOS		B	C		C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 60.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 101: US 78 & SC 27/Ridgeville Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	166	206	336	241	338	314
Future Volume (veh/h)	166	206	336	241	338	314
Number	5	2	6	16	7	14
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	184	229	373	268	376	349
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	359	844	521	802	402	499
Arrive On Green	0.10	0.53	0.33	0.33	0.27	0.27
Sat Flow, veh/h	1508	1583	1583	1346	1508	1346
Grp Volume(v), veh/h	184	229	373	268	376	349
Grp Sat Flow(s),veh/h/ln	1508	1583	1583	1346	1508	1346
Q Serve(g_s), s	4.4	4.7	12.4	6.0	14.6	13.2
Cycle Q Clear(g_c), s	4.4	4.7	12.4	6.0	14.6	13.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	359	844	521	802	402	499
V/C Ratio(X)	0.51	0.27	0.72	0.33	0.94	0.70
Avail Cap(c_a), veh/h	428	844	521	802	402	499
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.1	7.6	17.7	6.1	21.5	16.0
Incr Delay (d2), s/veh	1.1	0.8	8.2	1.1	29.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.5	4.0	10.8	7.2	14.3	15.2
LnGrp Delay(d),s/veh	13.2	8.4	25.9	7.2	50.5	20.3
LnGrp LOS	B	A	C	A	D	C
Approach Vol, veh/h		413	641		725	
Approach Delay, s/veh		10.6	18.1		36.0	
Approach LOS		B	B		D	

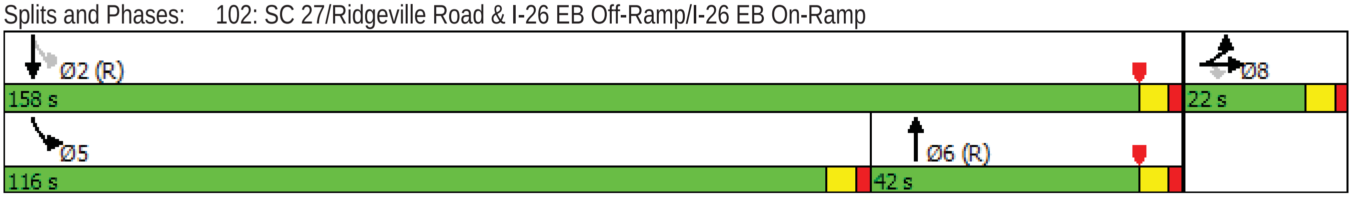
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		38.0		22.0	12.3	25.7		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		32.0		16.0	9.0	17.0		
Max Q Clear Time (g_c+I1), s		6.7		16.6	6.4	14.4		
Green Ext Time (p_c), s		11.4		0.0	0.1	1.8		

Intersection Summary		
HCM 2010 Ctrl Delay		23.6
HCM 2010 LOS		C

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	87	252	1512	565
Future Volume (vph)	7	87	252	1512	565
Turn Type	NA	Perm	NA	pm+pt	NA
Protected Phases	8		6	5	2
Permitted Phases		8		2	
Detector Phase	8	8	6	5	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	42.0	116.0	158.0
Total Split (%)	12.2%	12.2%	23.3%	64.4%	87.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	C-Min	None	C-Min
Act Effct Green (s)	16.0	16.0	36.0	152.0	152.0
Actuated g/C Ratio	0.09	0.09	0.20	0.84	0.84
v/c Ratio	0.96	0.47	1.45	1.76	0.47
Control Delay	142.7	20.0	264.6	365.6	3.2
Queue Delay	0.0	0.0	0.0	0.5	3.4
Total Delay	142.7	20.0	264.6	366.1	6.5
LOS	F	B	F	F	A
Approach Delay	92.7		264.6		268.3
Approach LOS	F		F		F

Intersection Summary	
Cycle Length: 180	
Actuated Cycle Length: 180	
Offset: 48 (27%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.76	
Intersection Signal Delay: 253.8	Intersection LOS: F
Intersection Capacity Utilization 128.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 102: SC 27/Ridgeville Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	7	87	0	0	0	0	252	155	1512	565	0
Future Volume (veh/h)	120	7	87	0	0	0	0	252	155	1512	565	0
Number	3	8	18				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	1647	1583				0	1583	1900	1583	1583	0
Adj Flow Rate, veh/h	133	8	97				0	280	172	1680	628	0
Adj No. of Lanes	0	1	1				0	1	0	1	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	132	8	120				0	184	113	962	1337	0
Arrive On Green	0.09	0.09	0.09				0.00	0.20	0.20	1.00	1.00	0.00
Sat Flow, veh/h	1483	89	1346				0	919	565	1508	1583	0
Grp Volume(v), veh/h	141	0	97				0	0	452	1680	628	0
Grp Sat Flow(s),veh/h/ln	1573	0	1346				0	0	1484	1508	1583	0
Q Serve(g_s), s	16.0	0.0	12.7				0.0	0.0	36.0	110.0	0.0	0.0
Cycle Q Clear(g_c), s	16.0	0.0	12.7				0.0	0.0	36.0	110.0	0.0	0.0
Prop In Lane	0.94		1.00				0.00		0.38	1.00		0.00
Lane Grp Cap(c), veh/h	140	0	120				0	0	297	962	1337	0
V/C Ratio(X)	1.01	0.00	0.81				0.00	0.00	1.52	1.75	0.47	0.00
Avail Cap(c_a), veh/h	140	0	120				0	0	297	962	1337	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	82.0	0.0	80.5				0.0	0.0	72.0	3.9	0.0	0.0
Incr Delay (d2), s/veh	78.4	0.0	32.8				0.0	0.0	252.0	336.7	0.1	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(95%),veh/ln	18.0	0.0	9.8				0.0	0.0	63.9	217.3	0.1	0.0
LnGrp Delay(d),s/veh	160.5	0.0	113.3				0.0	0.0	324.0	340.5	0.1	0.0
LnGrp LOS	F		F						F	F	A	
Approach Vol, veh/h		238						452			2308	
Approach Delay, s/veh		141.2						324.0			247.9	
Approach LOS		F						F			F	

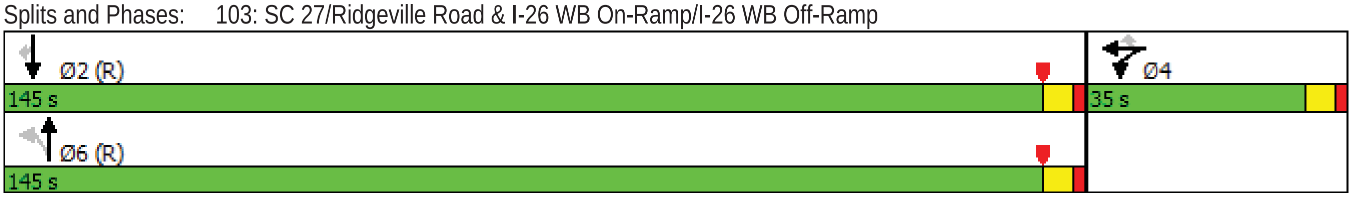
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		158.0			116.0	42.0		22.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		152.0			110.0	36.0		16.0
Max Q Clear Time (g_c+I1), s		2.0			112.0	38.0		18.0
Green Ext Time (p_c), s		57.5			0.0	0.0		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			250.9
HCM 2010 LOS			F

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	555	55	317	1765	368
Future Volume (vph)	4	555	55	317	1765	368
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	35.0	35.0	145.0	145.0	145.0	145.0
Total Split (%)	19.4%	19.4%	80.6%	80.6%	80.6%	80.6%
Yellow Time (s)	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
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?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	29.0	29.0	139.0	139.0	139.0	139.0
Actuated g/C Ratio	0.16	0.16	0.77	0.77	0.77	0.77
v/c Ratio	1.31	0.85	1.74	0.29	1.60	0.38
Control Delay	220.0	17.0	377.3	10.0	298.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	2.1	0.0
Total Delay	220.0	17.0	377.3	10.0	300.1	5.0
LOS	F	B	F	A	F	A
Approach Delay	90.6			64.2	249.2	
Approach LOS	F			E	F	

Intersection Summary	
Cycle Length: 180	
Actuated Cycle Length: 180	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.74	
Intersection Signal Delay: 187.9	Intersection LOS: F
Intersection Capacity Utilization 128.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 103: SC 27/Ridgeville Road & I-26 WB On-Ramp/I-26 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	312	4	555	55	317	0	0	1765	368
Future Volume (veh/h)	0	0	0	312	4	555	55	317	0	0	1765	368
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	1647	1583	1583	1583	0	0	1583	1583
Adj Flow Rate, veh/h				347	4	617	61	352	0	0	1961	409
Adj No. of Lanes				0	1	1	1	1	0	0	1	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				20	20	20	20	20	0	0	20	20
Cap, veh/h				250	3	217	40	1223	0	0	1223	1039
Arrive On Green				0.16	0.16	0.16	1.00	1.00	0.00	0.00	0.77	0.77
Sat Flow, veh/h				1551	18	1346	126	1583	0	0	1583	1346
Grp Volume(v), veh/h				351	0	617	61	352	0	0	1961	409
Grp Sat Flow(s),veh/h/ln				1569	0	1346	126	1583	0	0	1583	1346
Q Serve(g_s), s				29.0	0.0	29.0	0.0	0.0	0.0	0.0	139.0	17.9
Cycle Q Clear(g_c), s				29.0	0.0	29.0	139.0	0.0	0.0	0.0	139.0	17.9
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				253	0	217	40	1223	0	0	1223	1039
V/C Ratio(X)				1.39	0.00	2.85	1.52	0.29	0.00	0.00	1.60	0.39
Avail Cap(c_a), veh/h				253	0	217	40	1223	0	0	1223	1039
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.09	0.09	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				75.5	0.0	75.5	69.5	0.0	0.0	0.0	20.5	6.7
Incr Delay (d2), s/veh				197.3	0.0	843.1	247.5	0.1	0.0	0.0	275.6	1.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				47.6	0.0	110.8	8.5	0.0	0.0	0.0	276.1	11.2
LnGrp Delay(d),s/veh				272.8	0.0	918.6	317.0	0.1	0.0	0.0	296.1	7.8
LnGrp LOS				F		F	F	A			F	A
Approach Vol, veh/h					968			413			2370	
Approach Delay, s/veh					684.5			46.9			246.3	
Approach LOS					F			D			F	

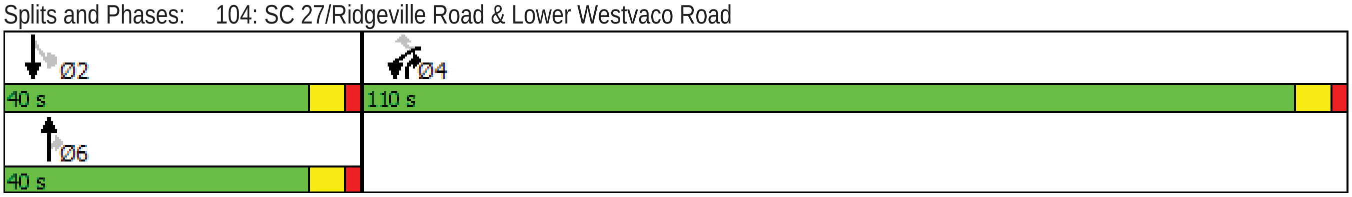
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		145.0		35.0		145.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		139.0		29.0		139.0		
Max Q Clear Time (g_c+I1), s		141.0		31.0		141.0		
Green Ext Time (p_c), s		0.0		0.0		0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	337.4
HCM 2010 LOS	F

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1894	10	421	451	10	239
Future Volume (vph)	1894	10	421	451	10	239
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	4		6	4		2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	4	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	110.0	110.0	40.0	110.0	40.0	40.0
Total Split (%)	73.3%	73.3%	26.7%	73.3%	26.7%	26.7%
Yellow Time (s)	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
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?						
Recall Mode	None	None	Max	None	Max	Max
Act Effct Green (s)	104.0	104.0	34.0	150.0	34.0	34.0
Actuated g/C Ratio	0.69	0.69	0.23	1.00	0.23	0.23
v/c Ratio	2.02	0.01	1.31	0.37	0.26	0.74
Control Delay	482.7	6.3	201.7	0.8	66.1	67.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	482.7	6.3	201.7	0.8	66.1	67.8
LOS	F	A	F	A	E	E
Approach Delay	480.2		97.8			67.7
Approach LOS	F		F			E

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.02	
Intersection Signal Delay: 335.9	Intersection LOS: F
Intersection Capacity Utilization 137.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 104: SC 27/Ridgeville Road & Lower Westvaco Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1894	10	421	451	10	239
Future Volume (veh/h)	1894	10	421	451	10	239
Number	7	14	6	16	5	2
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	2104	11	468	501	11	266
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	1046	933	359	1238	48	359
Arrive On Green	0.69	0.69	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1508	1346	1583	1346	491	1583
Grp Volume(v), veh/h	2104	11	468	501	11	266
Grp Sat Flow(s),veh/h/ln	1508	1346	1583	1346	491	1583
Q Serve(g_s), s	104.0	0.4	34.0	7.1	0.0	23.4
Cycle Q Clear(g_c), s	104.0	0.4	34.0	7.1	34.0	23.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1046	933	359	1238	48	359
V/C Ratio(X)	2.01	0.01	1.30	0.40	0.23	0.74
Avail Cap(c_a), veh/h	1046	933	359	1238	48	359
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	7.1	58.0	0.8	75.0	53.9
Incr Delay (d2), s/veh	459.0	0.0	155.7	1.0	10.8	12.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	315.3	0.3	54.7	28.6	1.1	17.1
LnGrp Delay(d),s/veh	482.0	7.1	213.7	1.7	85.8	66.8
LnGrp LOS	F	A	F	A	F	E
Approach Vol, veh/h	2115		969			277
Approach Delay, s/veh	479.5		104.1			67.6
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		40.0		110.0		40.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		34.0		104.0		34.0		
Max Q Clear Time (g_c+I1), s		36.0		106.0		36.0		
Green Ext Time (p_c), s		0.0		0.0		0.0		

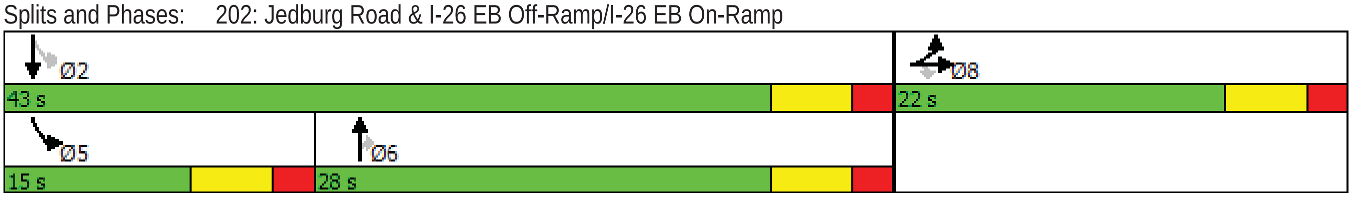
Intersection Summary		
HCM 2010 Ctrl Delay		337.3
HCM 2010 LOS		F

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	173	821	443	232	1004
Future Volume (vph)	0	173	821	443	232	1004
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		6		5	2
Permitted Phases		8		6	2	
Detector Phase	8	8	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	28.0	28.0	15.0	43.0
Total Split (%)	33.8%	33.8%	43.1%	43.1%	23.1%	66.2%
Yellow Time (s)	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
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			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.3	11.3	22.1	22.1	37.1	37.1
Actuated g/C Ratio	0.19	0.19	0.37	0.37	0.61	0.61
v/c Ratio	0.56	0.51	0.83	0.67	0.76	0.60
Control Delay	30.1	11.9	26.8	9.9	27.4	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	11.9	26.8	9.9	27.4	9.5
LOS	C	B	C	A	C	A
Approach Delay	20.0		20.9			12.9
Approach LOS	C		C			B

Intersection Summary

Cycle Length: 65
Actuated Cycle Length: 60.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 17.3 Intersection LOS: B
Intersection Capacity Utilization 63.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 202: Jedburg Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	0	173	0	0	0	0	821	443	232	1004	0
Future Volume (veh/h)	140	0	173	0	0	0	0	821	443	232	1004	0
Number	3	8	18				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	1583	1583				0	1583	1583	1583	1583	0
Adj Flow Rate, veh/h	156	0	0				0	912	0	258	1116	0
Adj No. of Lanes	0	1	1				0	2	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	194	0	173				0	1292	578	406	1979	0
Arrive On Green	0.13	0.00	0.00				0.00	0.43	0.00	0.12	0.66	0.00
Sat Flow, veh/h	1508	0	1346				0	3088	1346	1508	3088	0
Grp Volume(v), veh/h	156	0	0				0	912	0	258	1116	0
Grp Sat Flow(s),veh/h/ln	1508	0	1346				0	1504	1346	1508	1504	0
Q Serve(g_s), s	5.7	0.0	0.0				0.0	14.0	0.0	4.8	11.3	0.0
Cycle Q Clear(g_c), s	5.7	0.0	0.0				0.0	14.0	0.0	4.8	11.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	194	0	173				0	1292	578	406	1979	0
V/C Ratio(X)	0.80	0.00	0.00				0.00	0.71	0.00	0.64	0.56	0.00
Avail Cap(c_a), veh/h	429	0	383				0	1292	578	463	1979	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	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	0.0				0.0	13.1	0.0	10.0	5.2	0.0
Incr Delay (d2), s/veh	7.6	0.0	0.0				0.0	3.3	0.0	2.3	1.2	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(95%),veh/ln	4.9	0.0	0.0				0.0	10.4	0.0	3.8	8.6	0.0
LnGrp Delay(d),s/veh	31.4	0.0	0.0				0.0	16.4	0.0	12.4	6.4	0.0
LnGrp LOS	C							B		B	A	
Approach Vol, veh/h		156						912			1374	
Approach Delay, s/veh		31.4						16.4			7.5	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		43.0			12.9	30.1		13.2
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		37.0			9.0	22.0		16.0
Max Q Clear Time (g_c+I1), s		13.3			6.8	16.0		7.7
Green Ext Time (p_c), s		23.1			0.2	6.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.4
HCM 2010 LOS	B

Lane Group	NBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	243	718	610
Future Volume (vph)	243	718	610
Turn Type	D.P+P	NA	NA
Protected Phases	1	Free	2
Permitted Phases	2		
Detector Phase	1		2
Switch Phase			
Minimum Initial (s)	4.0		4.0
Minimum Split (s)	15.0		22.0
Total Split (s)	22.0		38.0
Total Split (%)	36.7%		63.3%
Yellow Time (s)	4.0		4.0
All-Red Time (s)	2.0		2.0
Lost Time Adjust (s)	0.0		0.0
Total Lost Time (s)	6.0		6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None		Max
Act Effct Green (s)	39.4	51.4	32.0
Actuated g/C Ratio	0.77	1.00	0.62
v/c Ratio	0.51	0.27	0.48
Control Delay	5.5	0.2	5.8
Queue Delay	0.0	0.0	0.0
Total Delay	5.5	0.2	5.8
LOS	A	A	A
Approach Delay		1.6	5.8
Approach LOS		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 51.4	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 3.5	Intersection LOS: A
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 203: Jedburg Road & I-26 WB On-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	243	718	610	184
Future Volume (vph)	0	0	243	718	610	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0	6.0	
Lane Util. Factor			1.00	0.95	0.95	
Frt			1.00	1.00	0.97	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1504	3008	2904	
Flt Permitted			0.31	1.00	1.00	
Satd. Flow (perm)			498	3008	2904	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	270	798	678	204
RTOR Reduction (vph)	0	0	0	0	38	0
Lane Group Flow (vph)	0	0	270	798	844	0
Turn Type			D.P+P	NA	NA	
Protected Phases			1	Free	2	
Permitted Phases			2			
Actuated Green, G (s)			39.4	51.4	32.0	
Effective Green, g (s)			39.4	51.4	32.0	
Actuated g/C Ratio			0.77	1.00	0.62	
Clearance Time (s)			6.0		6.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)			526	3008	1807	
v/s Ratio Prot			c0.07	0.27	0.29	
v/s Ratio Perm			c0.32			
v/c Ratio			0.51	0.27	0.47	
Uniform Delay, d1			1.7	0.0	5.2	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			0.8	0.2	0.9	
Delay (s)			2.6	0.2	6.0	
Level of Service			A	A	A	
Approach Delay (s)	0.0			0.8	6.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

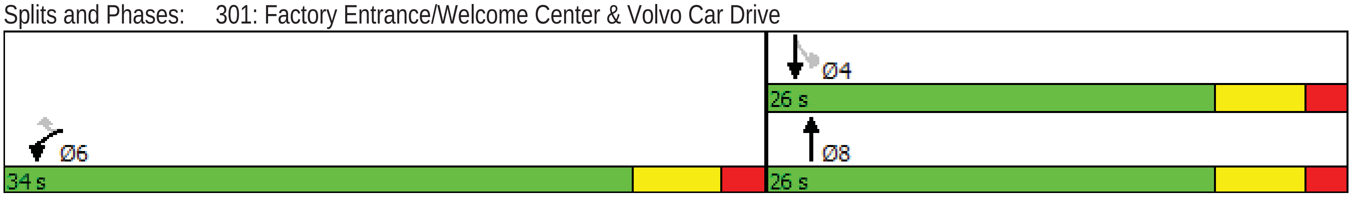
c Critical Lane Group

HCM 2010 analysis expects strict NEMA phasing.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	120	10	10	1080	10	10
Future Volume (vph)	120	10	10	1080	10	10
Turn Type	Prot	Perm	NA	Free	Perm	NA
Protected Phases	6		8			4
Permitted Phases		6		Free	4	
Detector Phase	6	6	8		4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	15.0	15.0	22.0		22.0	22.0
Total Split (s)	34.0	34.0	26.0		26.0	26.0
Total Split (%)	56.7%	56.7%	43.3%		43.3%	43.3%
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	None		None	None
Act Effct Green (s)	25.7	25.7	5.8	28.7	5.9	5.9
Actuated g/C Ratio	0.90	0.90	0.20	1.00	0.21	0.21
v/c Ratio	0.08	0.01	0.03	0.76	0.03	0.03
Control Delay	2.4	2.2	10.8	3.8	10.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.2	10.8	3.8	10.8	10.8
LOS	A	A	B	A	B	B
Approach Delay	2.4		3.9			10.8
Approach LOS	A		A			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 28.7	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 3.8	Intersection LOS: A
Intersection Capacity Utilization 23.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 301: Factory Entrance/Welcome Center & Volvo Car Drive



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	120	10	10	1080	10	10
Future Volume (veh/h)	120	10	10	1080	10	10
Number	1	16	8	18	7	4
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	133	11	11	0	11	11
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	428	382	63	54	474	63
Arrive On Green	0.24	0.24	0.03	0.00	0.03	0.03
Sat Flow, veh/h	1774	1583	1863	1583	1398	1863
Grp Volume(v), veh/h	133	11	11	0	11	11
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1583	1398	1863
Q Serve(g_s), s	1.0	0.1	0.1	0.0	0.1	0.1
Cycle Q Clear(g_c), s	1.0	0.1	0.1	0.0	0.2	0.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	428	382	63	54	474	63
V/C Ratio(X)	0.31	0.03	0.17	0.00	0.02	0.17
Avail Cap(c_a), veh/h	2999	2677	2249	1912	2114	2249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	5.2	4.8	7.8	0.0	7.9	7.8
Incr Delay (d2), s/veh	0.4	0.0	1.3	0.0	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	0.1	0.1	0.0	0.1	0.1
LnGrp Delay(d),s/veh	5.6	4.8	9.1	0.0	7.9	9.1
LnGrp LOS	A	A	A		A	A
Approach Vol, veh/h	144		11			22
Approach Delay, s/veh	5.5		9.1			8.5
Approach LOS	A		A			A

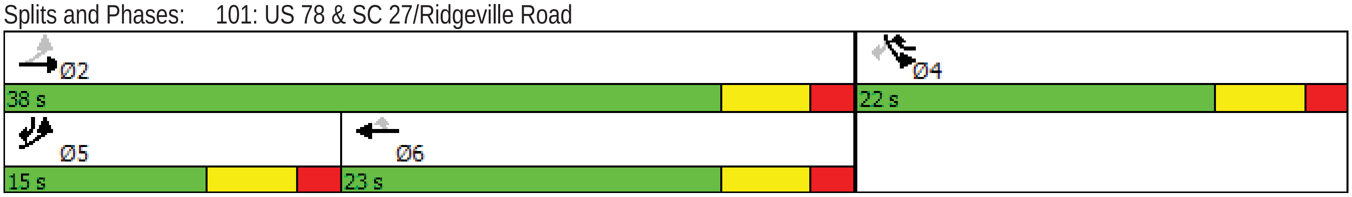
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				6.6		10.0		6.6
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				20.0		28.0		20.0
Max Q Clear Time (g_c+I1), s				2.2		3.0		2.1
Green Ext Time (p_c), s				0.0		0.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.1
HCM 2010 LOS	A

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	166	206	336	241	338	314
Future Volume (vph)	166	206	336	241	338	314
Turn Type	pm+pt	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	4	4	5
Permitted Phases	2			6		4
Detector Phase	5	2	6	4	4	5
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0	22.0	22.0	22.0	15.0
Total Split (s)	15.0	38.0	23.0	22.0	22.0	15.0
Total Split (%)	25.0%	63.3%	38.3%	36.7%	36.7%	25.0%
Yellow Time (s)	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
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			Lead
Lead-Lag Optimize?						
Recall Mode	None	Max	Max	Min	Min	None
Act Effct Green (s)	32.0	32.0	17.7	39.7	16.0	30.3
Actuated g/C Ratio	0.53	0.53	0.30	0.66	0.27	0.50
v/c Ratio	0.47	0.27	0.80	0.27	0.94	0.45
Control Delay	11.9	8.7	36.0	1.4	57.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	8.7	36.0	1.4	57.4	6.1
LOS	B	A	D	A	E	A
Approach Delay		10.1	21.5		32.7	
Approach LOS		B	C		C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 60.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 101: US 78 & SC 27/Ridgeville Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	166	206	336	241	338	314
Future Volume (veh/h)	166	206	336	241	338	314
Number	5	2	6	16	7	14
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	184	229	373	268	376	349
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	359	844	521	802	402	499
Arrive On Green	0.10	0.53	0.33	0.33	0.27	0.27
Sat Flow, veh/h	1508	1583	1583	1346	1508	1346
Grp Volume(v), veh/h	184	229	373	268	376	349
Grp Sat Flow(s),veh/h/ln	1508	1583	1583	1346	1508	1346
Q Serve(g_s), s	4.4	4.7	12.4	6.0	14.6	13.2
Cycle Q Clear(g_c), s	4.4	4.7	12.4	6.0	14.6	13.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	359	844	521	802	402	499
V/C Ratio(X)	0.51	0.27	0.72	0.33	0.94	0.70
Avail Cap(c_a), veh/h	428	844	521	802	402	499
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.1	7.6	17.7	6.1	21.5	16.0
Incr Delay (d2), s/veh	1.1	0.8	8.2	1.1	29.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.2	6.6	4.0	9.3	10.0
LnGrp Delay(d),s/veh	13.2	8.4	25.9	7.2	50.5	20.3
LnGrp LOS	B	A	C	A	D	C
Approach Vol, veh/h		413	641		725	
Approach Delay, s/veh		10.6	18.1		36.0	
Approach LOS		B	B		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		38.0		22.0	12.3	25.7		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		32.0		16.0	9.0	17.0		
Max Q Clear Time (g_c+I1), s		6.7		16.6	6.4	14.4		
Green Ext Time (p_c), s		11.4		0.0	0.1	1.8		

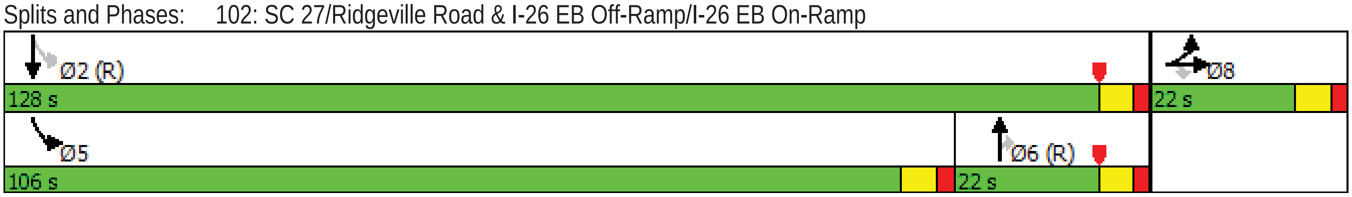
Intersection Summary		
HCM 2010 Ctrl Delay		23.6
HCM 2010 LOS		C

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	87	252	155	1512	565
Future Volume (vph)	7	87	252	155	1512	565
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		6		5	2
Permitted Phases		8		6	2	
Detector Phase	8	8	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0	106.0	128.0
Total Split (%)	14.7%	14.7%	14.7%	14.7%	70.7%	85.3%
Yellow Time (s)	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
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			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	14.1	14.1	16.0	16.0	123.9	123.9
Actuated g/C Ratio	0.09	0.09	0.11	0.11	0.83	0.83
v/c Ratio	0.90	0.45	0.88	0.58	1.55	0.25
Control Delay	116.3	18.0	92.4	16.6	265.3	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.3	18.0	92.4	16.6	265.3	1.6
LOS	F	B	F	B	F	A
Approach Delay	76.2		63.5			193.6
Approach LOS	E		E			F

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.55
Intersection Signal Delay: 164.7 Intersection LOS: F
Intersection Capacity Utilization 112.1% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 102: SC 27/Ridgeville Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	7	87	0	0	0	0	252	155	1512	565	0
Future Volume (veh/h)	120	7	87	0	0	0	0	252	155	1512	565	0
Number	3	8	18				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	1647	1583				0	1583	1583	1583	1583	0
Adj Flow Rate, veh/h	133	8	97				0	280	172	1680	628	0
Adj No. of Lanes	0	1	1				0	2	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	153	9	138				0	332	149	1069	2458	0
Arrive On Green	0.10	0.10	0.10				0.00	0.11	0.11	1.00	1.00	0.00
Sat Flow, veh/h	1483	89	1346				0	3088	1346	1508	3088	0
Grp Volume(v), veh/h	141	0	97				0	280	172	1680	628	0
Grp Sat Flow(s),veh/h/ln	1573	0	1346				0	1504	1346	1508	1504	0
Q Serve(g_s), s	13.3	0.0	10.5				0.0	13.7	16.6	100.0	0.0	0.0
Cycle Q Clear(g_c), s	13.3	0.0	10.5				0.0	13.7	16.6	100.0	0.0	0.0
Prop In Lane	0.94		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	162	0	138				0	332	149	1069	2458	0
V/C Ratio(X)	0.87	0.00	0.70				0.00	0.84	1.16	1.57	0.26	0.00
Avail Cap(c_a), veh/h	168	0	144				0	332	149	1069	2458	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.09	0.09	0.00
Uniform Delay (d), s/veh	66.3	0.0	65.0				0.0	65.4	66.7	4.0	0.0	0.0
Incr Delay (d2), s/veh	35.2	0.0	13.6				0.0	22.1	122.3	257.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.0	4.4				0.0	6.7	11.2	113.5	0.0	0.0
LnGrp Delay(d),s/veh	101.5	0.0	78.6				0.0	87.6	189.0	262.0	0.0	0.0
LnGrp LOS	F		E					F	F	F	A	
Approach Vol, veh/h		238						452			2308	
Approach Delay, s/veh		92.2						126.2			190.7	
Approach LOS		F						F			F	

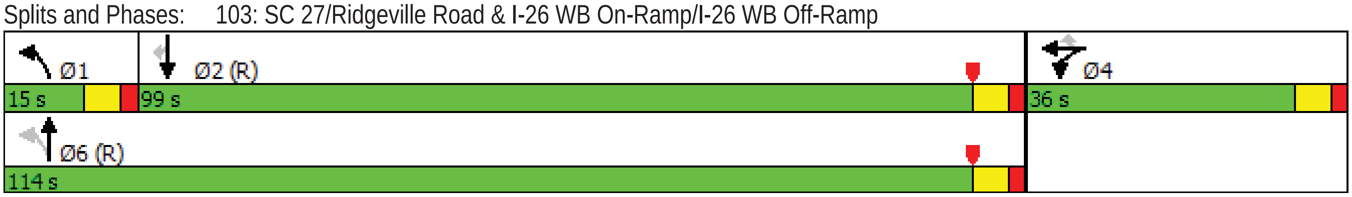
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		128.6			106.0	22.6		21.4
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		122.0			100.0	16.0		16.0
Max Q Clear Time (g_c+I1), s		2.0			102.0	18.6		15.3
Green Ext Time (p_c), s		37.6			0.0	0.0		0.2

Intersection Summary			
HCM 2010 Ctrl Delay			173.2
HCM 2010 LOS			F

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	555	55	317	1765	368
Future Volume (vph)	4	555	55	317	1765	368
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	1	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	15.0	22.0	22.0	22.0
Total Split (s)	36.0	36.0	15.0	114.0	99.0	99.0
Total Split (%)	24.0%	24.0%	10.0%	76.0%	66.0%	66.0%
Yellow Time (s)	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
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	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	30.0	30.0	108.0	108.0	96.8	96.8
Actuated g/C Ratio	0.20	0.20	0.72	0.72	0.65	0.65
v/c Ratio	1.06	0.84	0.52	0.16	1.01	0.41
Control Delay	121.3	17.4	45.3	0.1	49.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	121.3	17.4	45.3	0.1	49.9	2.9
LOS	F	B	D	A	D	A
Approach Delay	55.1			6.8	41.8	
Approach LOS	E			A	D	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 111 (74%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 107.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 103: SC 27/Ridgeville Road & I-26 WB On-Ramp/I-26 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	312	4	555	55	317	0	0	1765	368
Future Volume (veh/h)	0	0	0	312	4	555	55	317	0	0	1765	368
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	1647	1583	1583	1583	0	0	1583	1583
Adj Flow Rate, veh/h				347	4	617	61	352	0	0	1961	409
Adj No. of Lanes				0	1	1	1	2	0	0	2	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				20	20	20	20	20	0	0	20	20
Cap, veh/h				310	4	269	86	2166	0	0	1971	882
Arrive On Green				0.20	0.20	0.20	0.05	1.00	0.00	0.00	0.66	0.66
Sat Flow, veh/h				1551	18	1346	1508	3088	0	0	3088	1346
Grp Volume(v), veh/h				351	0	617	61	352	0	0	1961	409
Grp Sat Flow(s),veh/h/ln				1569	0	1346	1508	1504	0	0	1504	1346
Q Serve(g_s), s				30.0	0.0	30.0	2.0	0.0	0.0	0.0	96.8	22.6
Cycle Q Clear(g_c), s				30.0	0.0	30.0	2.0	0.0	0.0	0.0	96.8	22.6
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				314	0	269	86	2166	0	0	1971	882
V/C Ratio(X)				1.12	0.00	2.29	0.71	0.16	0.00	0.00	0.99	0.46
Avail Cap(c_a), veh/h				314	0	269	140	2166	0	0	1971	882
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.36	0.36	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				60.0	0.0	60.0	39.8	0.0	0.0	0.0	25.6	12.8
Incr Delay (d2), s/veh				86.6	0.0	593.1	3.8	0.1	0.0	0.0	19.1	1.8
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				20.5	0.0	55.5	1.7	0.0	0.0	0.0	45.0	8.7
LnGrp Delay(d),s/veh				146.6	0.0	653.1	43.7	0.1	0.0	0.0	44.6	14.6
LnGrp LOS				F		F	D	A			D	B
Approach Vol, veh/h					968			413			2370	
Approach Delay, s/veh					469.5			6.5			39.5	
Approach LOS					F			A			D	

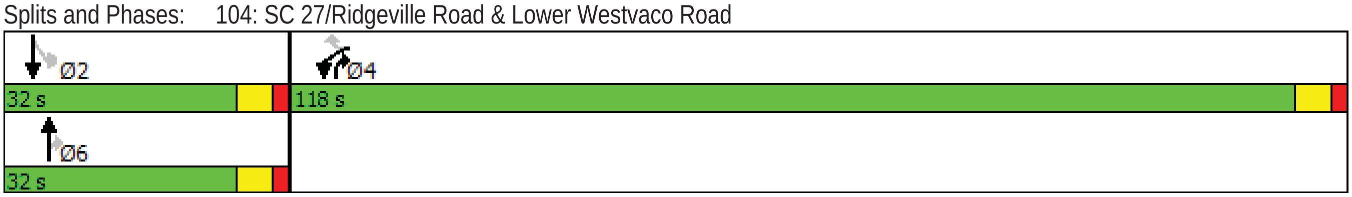
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.7	104.3		36.0		114.0		
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		
Max Green Setting (Gmax), s	9.0	93.0		30.0		108.0		
Max Q Clear Time (g_c+I1), s	4.0	98.8		32.0		2.0		
Green Ext Time (p_c), s	0.0	0.0		0.0		103.6		

Intersection Summary	
HCM 2010 Ctrl Delay	146.8
HCM 2010 LOS	F

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1894	10	421	451	10	239
Future Volume (vph)	1894	10	421	451	10	239
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	4		6	4		2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	4	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	118.0	118.0	32.0	118.0	32.0	32.0
Total Split (%)	78.7%	78.7%	21.3%	78.7%	21.3%	21.3%
Yellow Time (s)	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
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?						
Recall Mode	None	None	Max	None	Max	Max
Act Effct Green (s)	108.6	108.6	26.0	146.7	26.0	26.0
Actuated g/C Ratio	0.74	0.74	0.18	1.00	0.18	0.18
v/c Ratio	0.97	0.01	0.88	0.37	0.16	0.50
Control Delay	32.2	3.6	77.4	0.8	60.0	58.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	3.6	77.4	0.8	60.0	58.9
LOS	C	A	E	A	E	E
Approach Delay	32.1		37.8			59.0
Approach LOS	C		D			E

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 146.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 35.9	Intersection LOS: D
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 104: SC 27/Ridgeville Road & Lower Westvaco Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1894	10	421	451	10	239
Future Volume (veh/h)	1894	10	421	451	10	239
Number	7	14	6	16	5	2
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	2104	11	468	501	11	266
Adj No. of Lanes	2	1	2	1	1	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	2165	996	535	1235	62	535
Arrive On Green	0.74	0.74	0.18	0.18	0.18	0.18
Sat Flow, veh/h	2925	1346	3088	1346	491	3088
Grp Volume(v), veh/h	2104	11	468	501	11	266
Grp Sat Flow(s),veh/h/ln	1463	1346	1504	1346	491	1504
Q Serve(g_s), s	97.3	0.3	22.2	7.1	3.3	11.7
Cycle Q Clear(g_c), s	97.3	0.3	22.2	7.1	25.4	11.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2165	996	535	1235	62	535
V/C Ratio(X)	0.97	0.01	0.88	0.41	0.18	0.50
Avail Cap(c_a), veh/h	2240	1031	535	1235	62	535
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	5.0	58.5	0.8	70.9	54.2
Incr Delay (d2), s/veh	12.9	0.0	17.9	1.0	6.1	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	42.4	0.1	10.6	20.5	0.5	5.1
LnGrp Delay(d),s/veh	30.4	5.0	76.4	1.8	77.0	57.5
LnGrp LOS	C	A	E	A	E	E
Approach Vol, veh/h	2115		969			277
Approach Delay, s/veh	30.3		37.8			58.3
Approach LOS	C		D			E

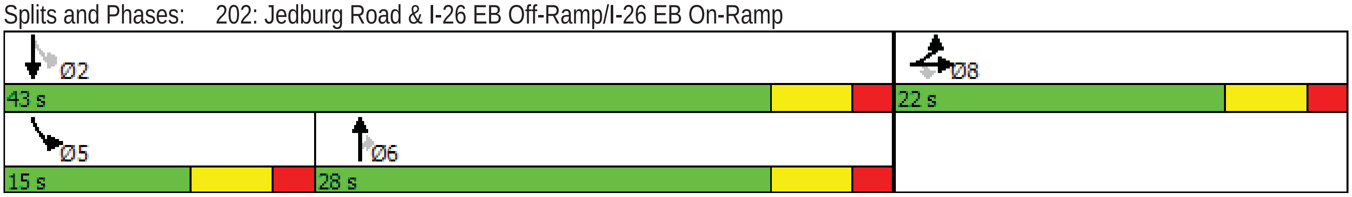
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		32.0		114.3		32.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		26.0		112.0		26.0		
Max Q Clear Time (g_c+I1), s		27.4		99.3		24.2		
Green Ext Time (p_c), s		0.0		8.9		1.6		

Intersection Summary	
HCM 2010 Ctrl Delay	34.8
HCM 2010 LOS	C

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	173	821	443	232	1004
Future Volume (vph)	0	173	821	443	232	1004
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		6		5	2
Permitted Phases		8		6	2	
Detector Phase	8	8	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	28.0	28.0	15.0	43.0
Total Split (%)	33.8%	33.8%	43.1%	43.1%	23.1%	66.2%
Yellow Time (s)	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
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			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.3	11.3	22.1	22.1	37.1	37.1
Actuated g/C Ratio	0.19	0.19	0.37	0.37	0.61	0.61
v/c Ratio	0.56	0.51	0.83	0.67	0.76	0.60
Control Delay	30.1	11.9	26.8	9.9	27.4	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	11.9	26.8	9.9	27.4	9.5
LOS	C	B	C	A	C	A
Approach Delay	20.0		20.9			12.9
Approach LOS	C		C			B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 60.4	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 63.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 202: Jedburg Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	0	173	0	0	0	0	821	443	232	1004	0
Future Volume (veh/h)	140	0	173	0	0	0	0	821	443	232	1004	0
Number	3	8	18				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	1583	1583				0	1583	1583	1583	1583	0
Adj Flow Rate, veh/h	156	0	0				0	912	0	258	1116	0
Adj No. of Lanes	0	1	1				0	2	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	194	0	173				0	1292	578	406	1979	0
Arrive On Green	0.13	0.00	0.00				0.00	0.43	0.00	0.12	0.66	0.00
Sat Flow, veh/h	1508	0	1346				0	3088	1346	1508	3088	0
Grp Volume(v), veh/h	156	0	0				0	912	0	258	1116	0
Grp Sat Flow(s),veh/h/ln	1508	0	1346				0	1504	1346	1508	1504	0
Q Serve(g_s), s	5.7	0.0	0.0				0.0	14.0	0.0	4.8	11.3	0.0
Cycle Q Clear(g_c), s	5.7	0.0	0.0				0.0	14.0	0.0	4.8	11.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	194	0	173				0	1292	578	406	1979	0
V/C Ratio(X)	0.80	0.00	0.00				0.00	0.71	0.00	0.64	0.56	0.00
Avail Cap(c_a), veh/h	429	0	383				0	1292	578	463	1979	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	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	0.0				0.0	13.1	0.0	10.0	5.2	0.0
Incr Delay (d2), s/veh	7.6	0.0	0.0				0.0	3.3	0.0	2.3	1.2	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	2.7	0.0	0.0				0.0	6.3	0.0	2.1	5.0	0.0
LnGrp Delay(d),s/veh	31.4	0.0	0.0				0.0	16.4	0.0	12.4	6.4	0.0
LnGrp LOS	C							B		B	A	
Approach Vol, veh/h		156						912			1374	
Approach Delay, s/veh		31.4						16.4			7.5	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		43.0			12.9	30.1		13.2
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		37.0			9.0	22.0		16.0
Max Q Clear Time (g_c+I1), s		13.3			6.8	16.0		7.7
Green Ext Time (p_c), s		23.1			0.2	6.0		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		12.4
HCM 2010 LOS		B

Lane Group	NBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	243	718	610
Future Volume (vph)	243	718	610
Turn Type	D.P+P	NA	NA
Protected Phases	1	Free	2
Permitted Phases	2		
Detector Phase	1		2
Switch Phase			
Minimum Initial (s)	4.0		4.0
Minimum Split (s)	15.0		22.0
Total Split (s)	22.0		38.0
Total Split (%)	36.7%		63.3%
Yellow Time (s)	4.0		4.0
All-Red Time (s)	2.0		2.0
Lost Time Adjust (s)	0.0		0.0
Total Lost Time (s)	6.0		6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None		Max
Act Effct Green (s)	39.4	51.4	32.0
Actuated g/C Ratio	0.77	1.00	0.62
v/c Ratio	0.51	0.27	0.48
Control Delay	5.5	0.2	5.8
Queue Delay	0.0	0.0	0.0
Total Delay	5.5	0.2	5.8
LOS	A	A	A
Approach Delay		1.6	5.8
Approach LOS		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 51.4	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 3.5	Intersection LOS: A
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 203: Jedburg Road & I-26 WB On-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	243	718	610	184
Future Volume (vph)	0	0	243	718	610	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0	6.0	
Lane Util. Factor			1.00	0.95	0.95	
Frt			1.00	1.00	0.97	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1504	3008	2904	
Flt Permitted			0.31	1.00	1.00	
Satd. Flow (perm)			498	3008	2904	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	270	798	678	204
RTOR Reduction (vph)	0	0	0	0	38	0
Lane Group Flow (vph)	0	0	270	798	844	0
Turn Type			D.P+P	NA	NA	
Protected Phases			1	Free	2	
Permitted Phases			2			
Actuated Green, G (s)			39.4	51.4	32.0	
Effective Green, g (s)			39.4	51.4	32.0	
Actuated g/C Ratio			0.77	1.00	0.62	
Clearance Time (s)			6.0		6.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)			526	3008	1807	
v/s Ratio Prot			c0.07	0.27	0.29	
v/s Ratio Perm			c0.32			
v/c Ratio			0.51	0.27	0.47	
Uniform Delay, d1			1.7	0.0	5.2	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			0.8	0.2	0.9	
Delay (s)			2.6	0.2	6.0	
Level of Service			A	A	A	
Approach Delay (s)	0.0			0.8	6.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

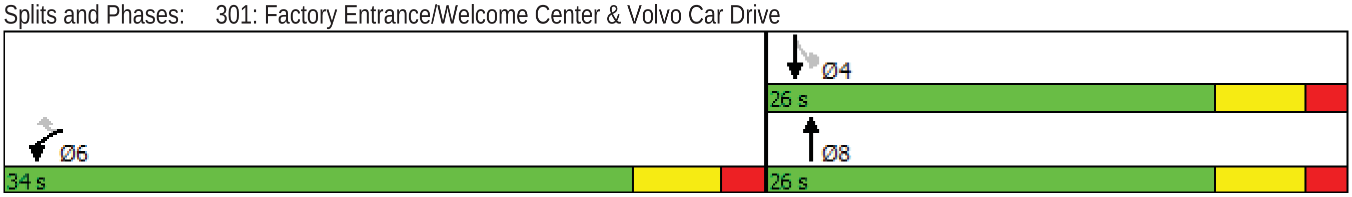
c Critical Lane Group

HCM 2010 analysis expects strict NEMA phasing.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	120	10	10	1080	10	10
Future Volume (vph)	120	10	10	1080	10	10
Turn Type	Prot	Perm	NA	Free	Perm	NA
Protected Phases	6		8			4
Permitted Phases		6		Free	4	
Detector Phase	6	6	8		4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	15.0	15.0	22.0		22.0	22.0
Total Split (s)	34.0	34.0	26.0		26.0	26.0
Total Split (%)	56.7%	56.7%	43.3%		43.3%	43.3%
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	None		None	None
Act Effct Green (s)	25.7	25.7	5.8	28.7	5.9	5.9
Actuated g/C Ratio	0.90	0.90	0.20	1.00	0.21	0.21
v/c Ratio	0.08	0.01	0.03	0.76	0.03	0.03
Control Delay	2.4	2.2	10.8	3.8	10.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.2	10.8	3.8	10.8	10.8
LOS	A	A	B	A	B	B
Approach Delay	2.4		3.9			10.8
Approach LOS	A		A			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 28.7	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 3.8	Intersection LOS: A
Intersection Capacity Utilization 23.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 301: Factory Entrance/Welcome Center & Volvo Car Drive



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	120	10	10	1080	10	10
Future Volume (veh/h)	120	10	10	1080	10	10
Number	1	16	8	18	7	4
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	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	133	11	11	0	11	11
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	428	382	63	54	474	63
Arrive On Green	0.24	0.24	0.03	0.00	0.03	0.03
Sat Flow, veh/h	1774	1583	1863	1583	1398	1863
Grp Volume(v), veh/h	133	11	11	0	11	11
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1583	1398	1863
Q Serve(g_s), s	1.0	0.1	0.1	0.0	0.1	0.1
Cycle Q Clear(g_c), s	1.0	0.1	0.1	0.0	0.2	0.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	428	382	63	54	474	63
V/C Ratio(X)	0.31	0.03	0.17	0.00	0.02	0.17
Avail Cap(c_a), veh/h	2999	2677	2249	1912	2114	2249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	5.2	4.8	7.8	0.0	7.9	7.8
Incr Delay (d2), s/veh	0.4	0.0	1.3	0.0	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	0.1	0.1	0.0	0.1	0.1
LnGrp Delay(d),s/veh	5.6	4.8	9.1	0.0	7.9	9.1
LnGrp LOS	A	A	A		A	A
Approach Vol, veh/h	144		11			22
Approach Delay, s/veh	5.5		9.1			8.5
Approach LOS	A		A			A

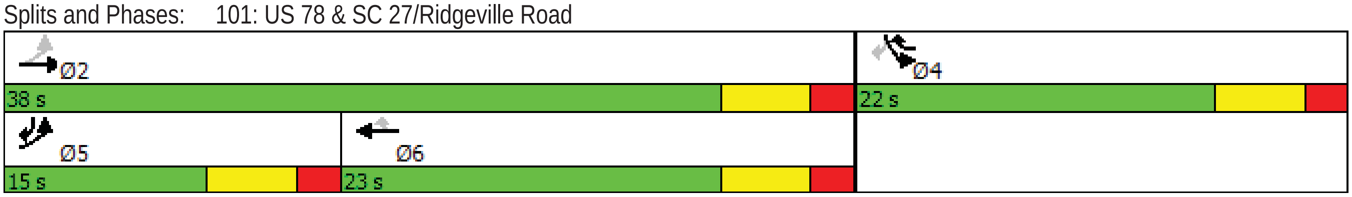
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				6.6		10.0		6.6
Change Period (Y+Rc), s				6.0		6.0		6.0
Max Green Setting (Gmax), s				20.0		28.0		20.0
Max Q Clear Time (g_c+I1), s				2.2		3.0		2.1
Green Ext Time (p_c), s				0.0		0.4		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			6.1
HCM 2010 LOS			A

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	166	206	336	241	338	314
Future Volume (vph)	166	206	336	241	338	314
Turn Type	pm+pt	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	4	4	5
Permitted Phases	2			6		4
Detector Phase	5	2	6	4	4	5
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0	22.0	22.0	22.0	15.0
Total Split (s)	15.0	38.0	23.0	22.0	22.0	15.0
Total Split (%)	25.0%	63.3%	38.3%	36.7%	36.7%	25.0%
Yellow Time (s)	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
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			Lead
Lead-Lag Optimize?						
Recall Mode	None	Max	Max	None	None	None
Act Effct Green (s)	32.0	32.0	17.7	39.7	16.0	30.3
Actuated g/C Ratio	0.53	0.53	0.30	0.66	0.27	0.50
v/c Ratio	0.47	0.27	0.80	0.27	0.94	0.45
Control Delay	11.9	8.7	36.0	1.4	57.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	8.7	36.0	1.4	57.4	6.1
LOS	B	A	D	A	E	A
Approach Delay		10.1	21.5		32.7	
Approach LOS		B	C		C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 60.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 101: US 78 & SC 27/Ridgeville Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	166	206	336	241	338	314
Future Volume (veh/h)	166	206	336	241	338	314
Number	5	2	6	16	7	14
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	1583	1583	1583	1583	1583	1583
Adj Flow Rate, veh/h	184	229	373	268	376	349
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	359	844	521	802	402	499
Arrive On Green	0.10	0.53	0.33	0.33	0.27	0.27
Sat Flow, veh/h	1508	1583	1583	1346	1508	1346
Grp Volume(v), veh/h	184	229	373	268	376	349
Grp Sat Flow(s),veh/h/ln	1508	1583	1583	1346	1508	1346
Q Serve(g_s), s	4.4	4.7	12.4	6.0	14.6	13.2
Cycle Q Clear(g_c), s	4.4	4.7	12.4	6.0	14.6	13.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	359	844	521	802	402	499
V/C Ratio(X)	0.51	0.27	0.72	0.33	0.94	0.70
Avail Cap(c_a), veh/h	428	844	521	802	402	499
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.1	7.6	17.7	6.1	21.5	16.0
Incr Delay (d2), s/veh	1.1	0.8	8.2	1.1	29.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.5	4.0	10.8	7.2	14.3	15.2
LnGrp Delay(d),s/veh	13.2	8.4	25.9	7.2	50.5	20.3
LnGrp LOS	B	A	C	A	D	C
Approach Vol, veh/h		413	641		725	
Approach Delay, s/veh		10.6	18.1		36.0	
Approach LOS		B	B		D	

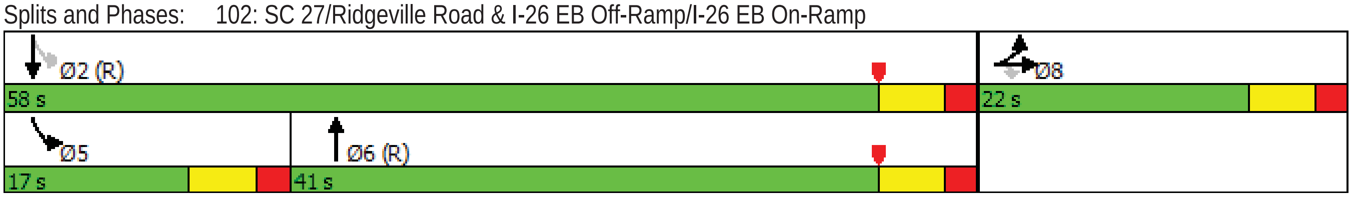
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		38.0		22.0	12.3	25.7		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		32.0		16.0	9.0	17.0		
Max Q Clear Time (g_c+I1), s		6.7		16.6	6.4	14.4		
Green Ext Time (p_c), s		11.4		0.0	0.1	1.8		

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	87	252	216	565
Future Volume (vph)	7	87	252	216	565
Turn Type	NA	Perm	NA	pm+pt	NA
Protected Phases	8		6	5	2
Permitted Phases		8		2	
Detector Phase	8	8	6	5	2
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	41.0	17.0	58.0
Total Split (%)	27.5%	27.5%	51.3%	21.3%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	C-Min	None	C-Min
Act Effct Green (s)	9.5	9.5	45.3	60.9	62.1
Actuated g/C Ratio	0.12	0.12	0.57	0.76	0.78
v/c Ratio	0.44	0.36	0.52	0.42	0.51
Control Delay	39.1	8.0	14.7	6.7	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	8.0	14.7	6.7	7.3
LOS	D	A	B	A	A
Approach Delay	22.6		14.7		7.1
Approach LOS	C		B		A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 57 (71%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 102: SC 27/Ridgeville Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	7	87	0	0	0	0	252	155	216	565	0
Future Volume (veh/h)	70	7	87	0	0	0	0	252	155	216	565	0
Number	3	8	18				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	1881	1630	1568				0	1568	1881	1583	1583	0
Adj Flow Rate, veh/h	78	8	97				0	280	172	240	628	0
Adj No. of Lanes	0	1	1				0	1	0	1	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	139	14	131				0	533	327	546	1190	0
Arrive On Green	0.10	0.10	0.10				0.00	0.59	0.59	0.18	1.00	0.00
Sat Flow, veh/h	1414	145	1332				0	910	559	1508	1583	0
Grp Volume(v), veh/h	86	0	97				0	0	452	240	628	0
Grp Sat Flow(s),veh/h/ln	1559	0	1332				0	0	1469	1508	1583	0
Q Serve(g_s), s	4.2	0.0	5.7				0.0	0.0	14.7	5.0	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	5.7				0.0	0.0	14.7	5.0	0.0	0.0
Prop In Lane	0.91		1.00				0.00		0.38	1.00		0.00
Lane Grp Cap(c), veh/h	154	0	131				0	0	860	546	1190	0
V/C Ratio(X)	0.56	0.00	0.74				0.00	0.00	0.53	0.44	0.53	0.00
Avail Cap(c_a), veh/h	312	0	266				0	0	860	617	1190	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.00	1.00	0.79	0.79	0.00
Uniform Delay (d), s/veh	34.4	0.0	35.1				0.0	0.0	9.9	6.0	0.0	0.0
Incr Delay (d2), s/veh	3.2	0.0	7.9				0.0	0.0	2.3	0.4	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.5	0.0	4.3				0.0	0.0	10.6	3.7	0.8	0.0
LnGrp Delay(d),s/veh	37.6	0.0	42.9				0.0	0.0	12.2	6.5	1.3	0.0
LnGrp LOS	D		D						B	A	A	
Approach Vol, veh/h		183						452			868	
Approach Delay, s/veh		40.4						12.2			2.8	
Approach LOS		D						B			A	

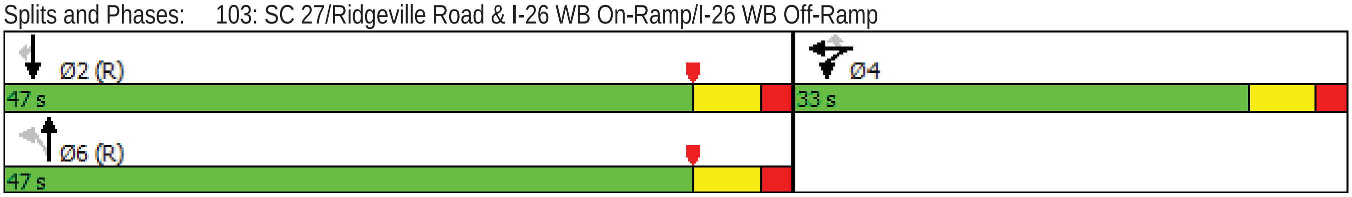
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		66.1			13.3	52.9		13.9
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		52.0			11.0	35.0		16.0
Max Q Clear Time (g_c+I1), s		2.0			7.0	16.7		7.7
Green Ext Time (p_c), s		33.3			0.3	15.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	10.2
HCM 2010 LOS	B

Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	295	55	267	469	96
Future Volume (vph)	4	295	55	267	469	96
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	33.0	33.0	47.0	47.0	47.0	47.0
Total Split (%)	41.3%	41.3%	58.8%	58.8%	58.8%	58.8%
Yellow Time (s)	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
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?						
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Act Effct Green (s)	22.0	22.0	46.0	46.0	46.0	46.0
Actuated g/C Ratio	0.28	0.28	0.58	0.58	0.58	0.58
v/c Ratio	0.78	0.54	0.17	0.33	0.58	0.13
Control Delay	38.7	6.2	4.4	4.9	15.3	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	6.2	4.4	4.9	15.3	2.7
LOS	D	A	A	A	B	A
Approach Delay	23.0			4.8	13.2	
Approach LOS	C			A	B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 103: SC 27/Ridgeville Road & I-26 WB On-Ramp/I-26 WB Off-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	312	4	295	55	267	0	0	469	96
Future Volume (veh/h)	0	0	0	312	4	295	55	267	0	0	469	96
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				1881	1630	1568	1583	1583	0	0	1568	1568
Adj Flow Rate, veh/h				347	4	328	61	297	0	0	521	107
Adj No. of Lanes				0	1	1	1	1	0	0	1	1
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				20	20	20	20	20	0	0	20	20
Cap, veh/h				429	5	372	331	903	0	0	894	760
Arrive On Green				0.28	0.28	0.28	0.19	0.19	0.00	0.00	0.57	0.57
Sat Flow, veh/h				1536	18	1332	675	1583	0	0	1568	1332
Grp Volume(v), veh/h				351	0	328	61	297	0	0	521	107
Grp Sat Flow(s),veh/h/ln				1553	0	1332	675	1583	0	0	1568	1332
Q Serve(g_s), s				16.8	0.0	18.8	6.6	13.0	0.0	0.0	17.1	3.0
Cycle Q Clear(g_c), s				16.8	0.0	18.8	23.7	13.0	0.0	0.0	17.1	3.0
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				434	0	372	331	903	0	0	894	760
V/C Ratio(X)				0.81	0.00	0.88	0.18	0.33	0.00	0.00	0.58	0.14
Avail Cap(c_a), veh/h				524	0	450	331	903	0	0	894	760
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.84	0.84	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				26.8	0.0	27.6	31.3	19.2	0.0	0.0	11.0	8.0
Incr Delay (d2), s/veh				7.8	0.0	15.9	1.0	0.8	0.0	0.0	2.8	0.4
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(95%),veh/ln				12.8	0.0	13.4	2.4	9.6	0.0	0.0	12.7	2.1
LnGrp Delay(d),s/veh				34.6	0.0	43.5	32.4	20.0	0.0	0.0	13.8	8.4
LnGrp LOS				C		D	C	C			B	A
Approach Vol, veh/h					679			358			628	
Approach Delay, s/veh					38.9			22.1			12.9	
Approach LOS					D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		51.7		28.3		51.7		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		41.0		27.0		41.0		
Max Q Clear Time (g_c+I1), s		19.1		20.8		25.7		
Green Ext Time (p_c), s		14.8		1.5		11.2		

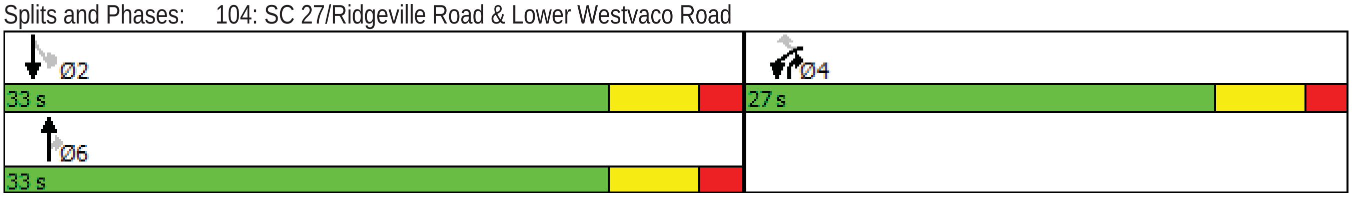
Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	322	10	421	137	10	239
Future Volume (vph)	322	10	421	137	10	239
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	4		6	4		2
Permitted Phases		4		6	2	
Detector Phase	4	4	6	4	2	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	27.0	27.0	33.0	27.0	33.0	33.0
Total Split (%)	45.0%	45.0%	55.0%	45.0%	55.0%	55.0%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Max	None	Max	Max
Act Effct Green (s)	17.2	17.2	27.1	56.4		27.1
Actuated g/C Ratio	0.30	0.30	0.48	1.00		0.48
v/c Ratio	0.78	0.03	0.61	0.11		0.37
Control Delay	31.0	7.6	16.2	0.2		12.1
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.0	7.6	16.2	0.2		12.1
LOS	C	A	B	A		B
Approach Delay	30.3		12.2			12.1
Approach LOS	C		B			B

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 56.4
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 17.5 — Intersection LOS: B
Intersection Capacity Utilization 50.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 104: SC 27/Ridgeville Road & Lower Westvaco Road



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	322	10	421	137	10	239
Future Volume (veh/h)	322	10	421	137	10	239
Number	7	14	6	16	5	2
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	1583	1583	1583	1583	1900	1583
Adj Flow Rate, veh/h	358	11	468	152	11	266
Adj No. of Lanes	1	1	1	1	0	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	416	371	794	1046	79	772
Arrive On Green	0.28	0.28	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1508	1346	1583	1346	19	1539
Grp Volume(v), veh/h	358	11	468	152	277	0
Grp Sat Flow(s),veh/h/ln	1508	1346	1583	1346	1558	0
Q Serve(g_s), s	12.1	0.3	11.3	1.5	0.0	0.0
Cycle Q Clear(g_c), s	12.1	0.3	11.3	1.5	5.7	0.0
Prop In Lane	1.00	1.00		1.00	0.04	
Lane Grp Cap(c), veh/h	416	371	794	1046	851	0
V/C Ratio(X)	0.86	0.03	0.59	0.15	0.33	0.00
Avail Cap(c_a), veh/h	588	525	794	1046	851	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.5	14.2	9.5	1.5	8.1	0.0
Incr Delay (d2), s/veh	9.0	0.0	3.2	0.3	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.0	0.2	9.4	2.4	4.9	0.0
LnGrp Delay(d),s/veh	27.5	14.3	12.7	1.8	9.1	0.0
LnGrp LOS	C	B	B	A	A	
Approach Vol, veh/h	369		620			277
Approach Delay, s/veh	27.2		10.0			9.1
Approach LOS	C		B			A

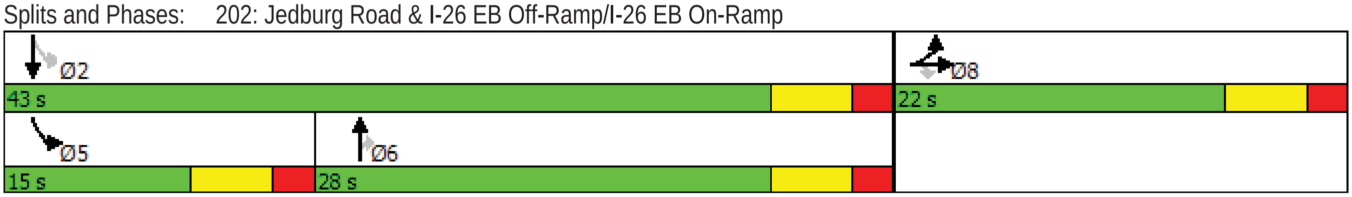
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.0		20.9		33.0		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		27.0		21.0		27.0		
Max Q Clear Time (g_c+I1), s		7.7		14.1		13.3		
Green Ext Time (p_c), s		11.8		0.8		9.1		

Intersection Summary		
HCM 2010 Ctrl Delay		14.8
HCM 2010 LOS		B

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	173	821	443	232	1004
Future Volume (vph)	0	173	821	443	232	1004
Turn Type	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		6		5	2
Permitted Phases		8		6	2	
Detector Phase	8	8	6	6	5	2
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	15.0	22.0
Total Split (s)	22.0	22.0	28.0	28.0	15.0	43.0
Total Split (%)	33.8%	33.8%	43.1%	43.1%	23.1%	66.2%
Yellow Time (s)	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
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			Lag	Lag	Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	Max	Max	None	Max
Act Effct Green (s)	11.3	11.3	22.1	22.1	37.1	37.1
Actuated g/C Ratio	0.19	0.19	0.37	0.37	0.61	0.61
v/c Ratio	0.56	0.51	0.83	0.67	0.76	0.60
Control Delay	30.1	11.9	26.8	9.9	27.4	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	11.9	26.8	9.9	27.4	9.5
LOS	C	B	C	A	C	A
Approach Delay	20.0		20.9			12.9
Approach LOS	C		C			B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 60.4	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 63.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 202: Jedburg Road & I-26 EB Off-Ramp/I-26 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	0	173	0	0	0	0	821	443	232	1004	0
Future Volume (veh/h)	140	0	173	0	0	0	0	821	443	232	1004	0
Number	3	8	18				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	1583	1583				0	1583	1583	1583	1583	0
Adj Flow Rate, veh/h	156	0	0				0	912	0	258	1116	0
Adj No. of Lanes	0	1	1				0	2	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, %	20	20	20				0	20	20	20	20	0
Cap, veh/h	194	0	173				0	1292	578	406	1979	0
Arrive On Green	0.13	0.00	0.00				0.00	0.43	0.00	0.12	0.66	0.00
Sat Flow, veh/h	1508	0	1346				0	3088	1346	1508	3088	0
Grp Volume(v), veh/h	156	0	0				0	912	0	258	1116	0
Grp Sat Flow(s),veh/h/ln	1508	0	1346				0	1504	1346	1508	1504	0
Q Serve(g_s), s	5.7	0.0	0.0				0.0	14.0	0.0	4.8	11.3	0.0
Cycle Q Clear(g_c), s	5.7	0.0	0.0				0.0	14.0	0.0	4.8	11.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	194	0	173				0	1292	578	406	1979	0
V/C Ratio(X)	0.80	0.00	0.00				0.00	0.71	0.00	0.64	0.56	0.00
Avail Cap(c_a), veh/h	429	0	383				0	1292	578	463	1979	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	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.8	0.0	0.0				0.0	13.1	0.0	10.0	5.2	0.0
Incr Delay (d2), s/veh	7.6	0.0	0.0				0.0	3.3	0.0	2.3	1.2	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(95%),veh/ln	4.9	0.0	0.0				0.0	10.4	0.0	3.8	8.6	0.0
LnGrp Delay(d),s/veh	31.4	0.0	0.0				0.0	16.4	0.0	12.4	6.4	0.0
LnGrp LOS	C							B		B	A	
Approach Vol, veh/h		156						912			1374	
Approach Delay, s/veh		31.4						16.4			7.5	
Approach LOS		C						B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		43.0			12.9	30.1		13.2
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		37.0			9.0	22.0		16.0
Max Q Clear Time (g_c+I1), s		13.3			6.8	16.0		7.7
Green Ext Time (p_c), s		23.1			0.2	6.0		0.3

Intersection Summary			
HCM 2010 Ctrl Delay			12.4
HCM 2010 LOS			B

Lane Group	NBL	NBT	SBT
Lane Configurations			
Traffic Volume (vph)	243	718	610
Future Volume (vph)	243	718	610
Turn Type	D.P+P	NA	NA
Protected Phases	1	Free	2
Permitted Phases	2		
Detector Phase	1		2
Switch Phase			
Minimum Initial (s)	4.0		4.0
Minimum Split (s)	15.0		22.0
Total Split (s)	22.0		38.0
Total Split (%)	36.7%		63.3%
Yellow Time (s)	4.0		4.0
All-Red Time (s)	2.0		2.0
Lost Time Adjust (s)	0.0		0.0
Total Lost Time (s)	6.0		6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None		Max
Act Effct Green (s)	39.4	51.4	32.0
Actuated g/C Ratio	0.77	1.00	0.62
v/c Ratio	0.51	0.27	0.48
Control Delay	5.5	0.2	5.8
Queue Delay	0.0	0.0	0.0
Total Delay	5.5	0.2	5.8
LOS	A	A	A
Approach Delay		1.6	5.8
Approach LOS		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 51.4	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 3.5	Intersection LOS: A
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 203: Jedburg Road & I-26 WB On-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	243	718	610	184
Future Volume (vph)	0	0	243	718	610	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0	6.0	
Lane Util. Factor			1.00	0.95	0.95	
Frt			1.00	1.00	0.97	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1504	3008	2904	
Flt Permitted			0.31	1.00	1.00	
Satd. Flow (perm)			498	3008	2904	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	270	798	678	204
RTOR Reduction (vph)	0	0	0	0	38	0
Lane Group Flow (vph)	0	0	270	798	844	0
Turn Type			D.P+P	NA	NA	
Protected Phases			1	Free	2	
Permitted Phases			2			
Actuated Green, G (s)			39.4	51.4	32.0	
Effective Green, g (s)			39.4	51.4	32.0	
Actuated g/C Ratio			0.77	1.00	0.62	
Clearance Time (s)			6.0		6.0	
Vehicle Extension (s)			3.0		3.0	
Lane Grp Cap (vph)			526	3008	1807	
v/s Ratio Prot			c0.07	0.27	0.29	
v/s Ratio Perm			c0.32			
v/c Ratio			0.51	0.27	0.47	
Uniform Delay, d1			1.7	0.0	5.2	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			0.8	0.2	0.9	
Delay (s)			2.6	0.2	6.0	
Level of Service			A	A	A	
Approach Delay (s)	0.0			0.8	6.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

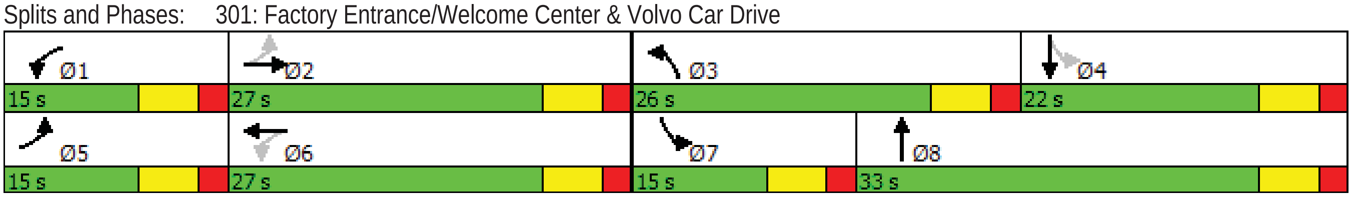
c Critical Lane Group

HCM 2010 analysis expects strict NEMA phasing.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	227	83	37	823	745	10	10	10
Future Volume (vph)	10	227	83	37	823	745	10	10	10
Turn Type	pm+pt	NA	Free	pm+pt	NA	Prot	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		Free	6				4	
Detector Phase	5	2		1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0		15.0	22.0	15.0	22.0	15.0	22.0
Total Split (s)	15.0	27.0		15.0	27.0	26.0	33.0	15.0	22.0
Total Split (%)	16.7%	30.0%		16.7%	30.0%	28.9%	36.7%	16.7%	24.4%
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	0.0	0.0		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	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min		None	Min	None	None	None	None
Act Effct Green (s)	21.1	18.8	58.5	23.0	21.8	20.5	20.7	7.1	6.2
Actuated g/C Ratio	0.36	0.32	1.00	0.39	0.37	0.35	0.35	0.12	0.11
v/c Ratio	0.04	0.26	0.06	0.08	0.72	0.69	0.48	0.05	0.11
Control Delay	12.2	18.7	0.1	12.0	22.5	22.6	5.1	18.9	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	18.7	0.1	12.0	22.5	22.6	5.1	18.9	21.6
LOS	B	B	A	B	C	C	A	B	C
Approach Delay		13.7			22.1		17.1		20.7
Approach LOS		B			C		B		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 58.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 68.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 301: Factory Entrance/Welcome Center & Volvo Car Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	227	83	37	823	10	745	10	335	10	10	10
Future Volume (veh/h)	10	227	83	37	823	10	745	10	335	10	10	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1557	1863	1863	1810	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	252	0	41	914	11	828	11	372	11	11	11
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	1	1	0
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
Percent Heavy Veh, %	2	22	2	2	5	5	2	2	2	2	2	2
Cap, veh/h	159	840	450	405	1060	13	939	15	498	185	52	52
Arrive On Green	0.01	0.28	0.00	0.03	0.30	0.30	0.27	0.32	0.32	0.01	0.06	0.06
Sat Flow, veh/h	1774	2959	1583	1774	3480	42	3442	46	1545	1774	856	856
Grp Volume(v), veh/h	11	252	0	41	452	473	828	0	383	11	0	22
Grp Sat Flow(s),veh/h/ln	1774	1480	1583	1774	1720	1803	1721	0	1590	1774	0	1712
Q Serve(g_s), s	0.3	4.6	0.0	1.1	16.9	16.9	15.8	0.0	14.7	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.3	4.6	0.0	1.1	16.9	16.9	15.8	0.0	14.7	0.4	0.0	0.8
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.97	1.00		0.50
Lane Grp Cap(c), veh/h	159	840	450	405	524	549	939	0	513	185	0	104
V/C Ratio(X)	0.07	0.30	0.00	0.10	0.86	0.86	0.88	0.00	0.75	0.06	0.00	0.21
Avail Cap(c_a), veh/h	373	908	486	583	528	553	1006	0	628	399	0	400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	19.2	0.0	16.6	22.4	22.4	23.8	0.0	20.7	29.7	0.0	30.6
Incr Delay (d2), s/veh	0.2	0.2	0.0	0.1	13.6	13.1	8.9	0.0	3.9	0.1	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	3.4	0.0	1.0	15.2	15.7	13.4	0.0	11.3	0.4	0.0	0.8
LnGrp Delay(d),s/veh	19.1	19.4	0.0	16.7	36.1	35.5	32.7	0.0	24.6	29.8	0.0	31.6
LnGrp LOS	B	B		B	D	D	C		C	C		C
Approach Vol, veh/h		263			966			1211			33	
Approach Delay, s/veh		19.4			35.0			30.1			31.0	
Approach LOS		B			C			C			C	

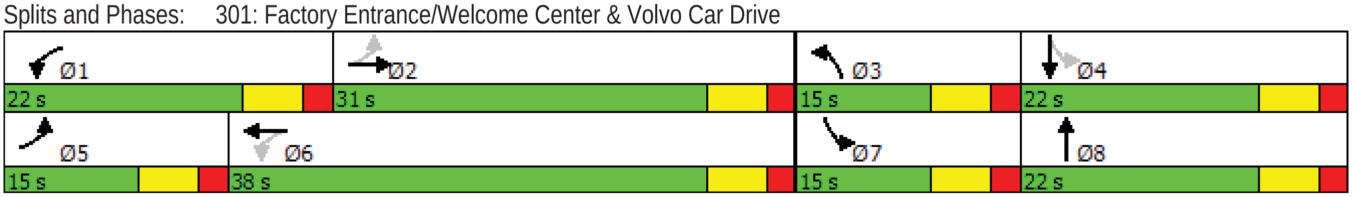
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	25.4	24.7	10.2	6.8	26.8	6.8	28.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	9.0	21.0	20.0	16.0	9.0	21.0	9.0	27.0
Max Q Clear Time (g_c+I1), s	3.1	6.6	17.8	2.8	2.3	18.9	2.4	16.7
Green Ext Time (p_c), s	0.0	12.1	0.9	1.3	0.0	1.9	0.0	1.2

Intersection Summary			
HCM 2010 Ctrl Delay			30.9
HCM 2010 LOS			C

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	769	745	335	115	83	10	10	10
Future Volume (vph)	10	769	745	335	115	83	10	10	10
Turn Type	pm+pt	NA	Free	pm+pt	NA	Prot	NA	pm+pt	NA
Protected Phases	5	2		1	6	3	8	7	4
Permitted Phases	2		Free	6				4	
Detector Phase	5	2		1	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	15.0	22.0		15.0	22.0	15.0	22.0	15.0	22.0
Total Split (s)	15.0	31.0		22.0	38.0	15.0	22.0	15.0	22.0
Total Split (%)	16.7%	34.4%		24.4%	42.2%	16.7%	24.4%	16.7%	24.4%
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	0.0	0.0		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	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	Min		None	Min	None	None	None	None
Act Effct Green (s)	26.3	19.9	62.6	41.9	42.3	7.7	9.8	8.7	6.8
Actuated g/C Ratio	0.42	0.32	1.00	0.67	0.68	0.12	0.16	0.14	0.11
v/c Ratio	0.02	0.77	0.52	0.66	0.07	0.22	0.18	0.04	0.11
Control Delay	8.4	26.6	1.2	19.4	8.0	31.8	14.4	23.1	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	26.6	1.2	19.4	8.0	31.8	14.4	23.1	25.1
LOS	A	C	A	B	A	C	B	C	C
Approach Delay		14.1			16.3		25.5		24.4
Approach LOS		B			B		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 62.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 63.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 301: Factory Entrance/Welcome Center & Volvo Car Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	769	745	335	115	10	83	10	37	10	10	10
Future Volume (veh/h)	10	769	745	335	115	10	83	10	37	10	10	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1845	1863	1863	1578	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	854	0	372	128	11	92	11	41	11	11	11
Adj No. of Lanes	1	2	1	1	2	0	2	1	0	1	1	0
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
Percent Heavy Veh, %	2	3	2	2	22	22	2	2	2	2	2	2
Cap, veh/h	584	1270	574	499	1431	122	174	31	114	199	42	42
Arrive On Green	0.01	0.36	0.00	0.16	0.51	0.51	0.05	0.09	0.09	0.01	0.05	0.05
Sat Flow, veh/h	1774	3505	1583	1774	2797	238	3442	346	1289	1774	856	856
Grp Volume(v), veh/h	11	854	0	372	68	71	92	0	52	11	0	22
Grp Sat Flow(s),veh/h/ln	1774	1752	1583	1774	1499	1536	1721	0	1635	1774	0	1712
Q Serve(g_s), s	0.2	13.0	0.0	7.5	1.5	1.5	1.7	0.0	1.9	0.4	0.0	0.8
Cycle Q Clear(g_c), s	0.2	13.0	0.0	7.5	1.5	1.5	1.7	0.0	1.9	0.4	0.0	0.8
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.79	1.00		0.50
Lane Grp Cap(c), veh/h	584	1270	574	499	767	786	174	0	144	199	0	84
V/C Ratio(X)	0.02	0.67	0.00	0.75	0.09	0.09	0.53	0.00	0.36	0.06	0.00	0.26
Avail Cap(c_a), veh/h	816	1380	623	661	767	786	488	0	412	431	0	431
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.5	17.1	0.0	11.6	7.9	7.9	29.4	0.0	27.3	28.2	0.0	29.1
Incr Delay (d2), s/veh	0.0	1.2	0.0	3.2	0.0	0.0	2.5	0.0	1.5	0.1	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	10.7	0.0	7.1	1.1	1.2	1.5	0.0	1.6	0.3	0.0	0.7
LnGrp Delay(d),s/veh	12.6	18.2	0.0	14.8	8.0	8.0	31.9	0.0	28.8	28.3	0.0	30.7
LnGrp LOS	B	B		B	A	A	C		C	C		C
Approach Vol, veh/h		865			511			144			33	
Approach Delay, s/veh		18.2			12.9			30.8			29.9	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.2	29.0	9.2	9.1	6.7	38.5	6.7	11.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	16.0	25.0	9.0	16.0	9.0	32.0	9.0	16.0
Max Q Clear Time (g_c+I1), s	9.5	15.0	3.7	2.8	2.2	3.5	2.4	3.9
Green Ext Time (p_c), s	0.7	8.0	0.1	0.1	0.0	19.3	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

Appendix H

2039 Weaving Analysis Worksheets

HCS 2010: Freeway Weaving Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date Performed:	6/16/16
Analysis Time Period:	5:30a-6:30a
Freeway/Dir of Travel:	Volvo Car Drive
Weaving Location:	
Analysis Year:	2039
Description:	Weave Distance Less Queue (2%HV)

Inputs

Segment Type	C-D Roadway/ Multilane Highways	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	2840	ft
Freeway free-flow speed, FFS	45	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1800*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	1251	263	10	10	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.90	
Peak 15-min volume, v15	348	73	3	3	
Trucks and buses	2	2	2	2	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.990	0.990	0.990	0.990	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	1404	295	11	11	pc/h
Volume ratio, VR		0.178			

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.0	int/mi
Minimum RF lane changes, LCRF	2	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	601	lc/h
Weaving lane changes, LCW	778	lc/h
Non-weaving vehicle index, INW	0	
Non-weaving lane change, LCNW	1253	lc/h
Total lane changes, LCALL	2031	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W	0.173

Average weaving speed, SW	40.6	mi/h
Average non-weaving speed, SNW	37.9	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	38.4	mi/h
Weaving segment density, D	15.0	pc/mi/ln
Level of service, LOS	B	
Weaving segment v/c ratio	0.340	
Weaving segment flow rate, v	1705	veh/h
Weaving segment capacity, cW	5011	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	4311	2840	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1800*	1687	c
		Maximum	Analyzed	
v/c ratio		1.00	0.340	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

HCS 2010: Freeway Weaving Release 6.60

Phone: Fax:

E-mail:

Operational Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date Performed:	6/16/16
Analysis Time Period:	5:30a-6:30a
Freeway/Dir of Travel:	Volvo Car Drive
Weaving Location:	
Analysis Year:	2039
Description:	Weave Distance Less Queue (20%HV)

Inputs

Segment Type	C-D Roadway/ Multilane Highways	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	2840	ft
Freeway free-flow speed, FFS	45	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1800*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	1251	263	10	10	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.90	
Peak 15-min volume, v15	348	73	3	3	
Trucks and buses	20	20	20	20	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.909	0.909	0.909	0.909	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	1529	321	12	12	pc/h
Volume ratio, VR		0.178			

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.0	int/mi
Minimum RF lane changes, LCRF	2	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	654	lc/h
Weaving lane changes, LCW	831	lc/h
Non-weaving vehicle index, INW	0	
Non-weaving lane change, LCNW	1279	lc/h
Total lane changes, LCALL	2110	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W	0.179

Average weaving speed, SW	40.5	mi/h
Average non-weaving speed, SNW	37.3	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	37.8	mi/h
Weaving segment density, D	16.5	pc/mi/ln
Level of service, LOS	B	
Weaving segment v/c ratio	0.370	
Weaving segment flow rate, v	1705	veh/h
Weaving segment capacity, cW	4604	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	4309	2840	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1800*	1688	c
		Maximum	Analyzed	
v/c ratio		1.00	0.370	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

HCS 2010: Freeway Weaving Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date Performed:	6/16/16
Analysis Time Period:	3:00p-4:00p
Freeway/Dir of Travel:	Volvo Car Drive
Weaving Location:	
Analysis Year:	2039
Description:	Weave Distance Less Queue (16%HV)

Inputs

Segment Type	C-D Roadway/ Multilane Highways	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	3025	ft
Freeway free-flow speed, FFS	45	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1800*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	260	50	10	10	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.90	
Peak 15-min volume, v15	72	14	3	3	
Trucks and buses	16	16	16	16	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.926	0.926	0.926	0.926	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	312	60	12	12	pc/h
Volume ratio, VR		0.182			

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.0	int/mi
Minimum RF lane changes, LCRF	2	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	132	lc/h
Weaving lane changes, LCW	315	lc/h
Non-weaving vehicle index, INW	0	
Non-weaving lane change, LCNW	1128	lc/h
Total lane changes, LCALL	1443	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W	0.126

Average weaving speed, SW	41.6	mi/h
Average non-weaving speed, SNW	43.4	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	43.1	mi/h
Weaving segment density, D	3.1+	pc/mi/ln
Level of service, LOS	A	
Weaving segment v/c ratio	0.078	
Weaving segment flow rate, v	367	veh/h
Weaving segment capacity, cW	4719	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	4351	3025	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1800*	1699	c
		Maximum	Analyzed	
v/c ratio		1.00	0.078	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.

HCS 2010: Freeway Weaving Release 6.60

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	ae
Agency/Co.:	Stantec
Date Performed:	6/16/16
Analysis Time Period:	3:00p-4:00p
Freeway/Dir of Travel:	Volvo Car Drive
Weaving Location:	
Analysis Year:	2039
Description:	Weave Distance Less Queue (20%HV)

Inputs

Segment Type	C-D Roadway/ Multilane Highways	
Weaving configuration	One-Sided	
Number of lanes, N	3	ln
Weaving segment length, LS	3025	ft
Freeway free-flow speed, FFS	45	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	1800*	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

Conversion to pc/h Under Base Conditions

	Volume Components				
	VFF	VRF	VFR	VRR	
Volume, V	260	50	10	10	veh/h
Peak hour factor, PHF	0.90	0.90	0.90	0.90	
Peak 15-min volume, v15	72	14	3	3	
Trucks and buses	20	20	20	20	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.909	0.909	0.909	0.909	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	318	61	12	12	pc/h
Volume ratio, VR		0.181			

Configuration Characteristics

Number of maneuver lanes, NWL	2	ln
Interchange density, ID	0.0	int/mi
Minimum RF lane changes, LCRF	2	lc/pc
Minimum FR lane changes, LCFR	1	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	134	lc/h
Weaving lane changes, LCW	317	lc/h
Non-weaving vehicle index, INW	0	
Non-weaving lane change, LCNW	1130	lc/h
Total lane changes, LCALL	1447	lc/h

Weaving and Non-Weaving Speeds

Weaving intensity factor, W 0.126

Average weaving speed, SW	41.6	mi/h
Average non-weaving speed, SNW	43.4	mi/h

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	43.1	mi/h
Weaving segment density, D	3.1+	pc/mi/ln
Level of service, LOS	A	
Weaving segment v/c ratio	0.079	
Weaving segment flow rate, v	367	veh/h
Weaving segment capacity, cW	4634	veh/h

Limitations on Weaving Segments

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	4344	3025	a,b
		Maximum	Analyzed	
Density-based capacty, cIWL (pc/h/ln)		1800*	1699	c
		Maximum	Analyzed	
v/c ratio		1.00	0.079	d

Notes:

a. In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.

b. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."

c. The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.

d. Volumes exceed the weaving segment capacity. The level of service is F.