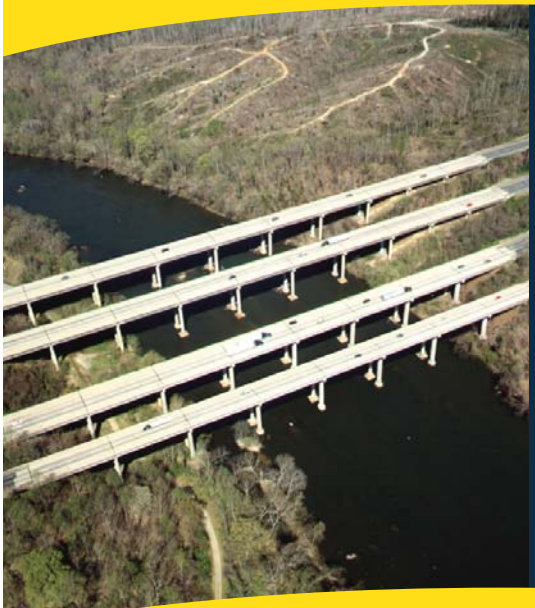
I-95 Interchange Modification Report

Improvements to I-95 between Exit 133 and Exit 130

APPENDICES



VDOT Virginia Department of Transportation

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Appendix A - Existing Conditions

I-95 Interstate Modification Study
Improvements to I-95 between Exit 133 and Exit 130
Existing Volumes Methodology

In 2010/2011 GWRC/FAMPO in coordination with VDOT completed an I-95 Access Study that recommended a new interchange on I-95 between Exit 130 and Exit 133. The new interchange provided access to a 4-mile toll road that provided an alternate route to highly congested Route 3. The I-95 Access Study was submitted to FHWA as an Interchange Justification Report and approved in April 2011. The NEPA process was then initiated by VDOT. With a change in the Spotsylvania County Board of Supervisors, the County removed their support for the project and the project and NEPA work was put on hold. The Spotsylvania concerns were associated with the toll road connector portion of the larger project.

Due to the need to offset the negative effects of the additional access, the Study had included a number of improvements along this portion of the I-95 corridor. However, even without the additional volumes and movements resulting from the additional access, there were already operational deficiencies on I-95 and at the Exit 130 and Exit 133 interchanges. VDOT is interested in reconsidering and updating some elements of the I-95 Access Study to determine new improvements on I-95 that do not include the new interchange and toll road. This Interstate Modification Report (IMR) will develop and analyze improvements for I-95.

The new IMR will use as much as possible relevant data from the previous I-95 Access Study. **In coordination with VDOT and FHWA, it was decided that the 2008 traffic volumes used in the I-95 Access Study are representative of the 2013 traffic conditions and will be used as the existing traffic volumes in this IMR.** That decision is based on the following information:

- Neither major construction projects nor new large land development projects around the study area have occurred since the collection of data for the original I-95 Access Study in 2008. Therefore, it is not expected that there will be any significant change in travel patterns within the study area.

- The data was also collected prior to the beginning of the last economic recession which has not completely recovered from a jobs/travel perspective.

- A quick review of 2011 traffic volumes show that traffic volumes have not fully returned to 2008 levels (see table below); further supporting the fact that 2008 data is still relevant.

	2008 I-95 Access Study			2011 VDOT Traffic Engineering			2012 VDOT Traffic Engineering			2013 VDOT Traffic Engineering		
I-95	**Northbound[1]**	**Southbound[1]**	**Total**	**Northbound[2]**	**Southbound[2]**	**Total**	**Northbound[3]**	**Southbound[3]**	**Total**	**Northbound[10]**	**Southbound[10]**	**Total**
I-95 South of Exit 130	58,000	57,100	115,100	56,000	57,000	113,000	55,200	54,800	110,000	56,000	56,100	112,100
I-95 At River	76,800	75,800	152,600	72,000	69,000	141,000	72,800	68,700	141,500	74,000	70,000	144,000
I-95 North of Exit 133	68,300	66,400	134,700	66,000	65,000	131,000	66,700	64,300	131,000	66,700	65,600	132,300
ROUTE 3	**Eastbound[6]**	**Westbound[6]**	**Total**	**Eastbound[2]**	**Westbound[2]**	**Total**	**Eastbound**	**Westbound**	**Total[8]**	**Eastbound**	**Westbound**	**Total**
Route 3 East of I-95	30,800	25,300	56,100	N/A	N/A	54,200	N/A	N/A	54,000			
Route 3 West of I-95	43,600	39,500	83,100	N/A	N/A	80,300	N/A	N/A	80,000			
ROUTE 17	**North/Westbound**	**South/Eastbound**	**Total[9]**	**North/Westbound**	**South/Eastbound**	**Total**	**North/Westbound**	**South/Eastbound**	**Total**			
Route 17 Northwest of I-95[4]	N/A	N/A	39,900	N/A	N/A	39,600	N/A	N/A	37,700			
Route 17 Southeast of I-95[5]	N/A	N/A	29,700	N/A	N/A	29,900	N/A	N/A	29,700			
RAMPS			**ADT[6]**			**ADT[7]**			**ADT[8]**			**ADT[11]**
I-95 SB to Route 3 WB			22,500			18,899			18,899			Not Available
I-95 SB to Route 3 EB			7,600			6,861			6,861			Not Available
I-95 NB to Route 3 WB			6,500			6,009			6,009			Not Available
I-95 NB to Route 3 EB			3,900			3,464			3,464			Not Available
I-95 SB to Route 17 EB/SB			6,400			6,450			6,450			Not Available
I-95 SB to Route 17 WB/NB			7,400			5,811			5,811			Not Available
I-95 NB to Route 17 EB/SB			2,900			2,045			2,045			Not Available
I-95 NB to Route 17 WB/NB			18,300			15,093			N/A			16,468
Route 17 WB/NB to I-95 SB			2,100			1,800			1,800			Not Available
Route 17 WB/NB to I-95 NB			6,100			5,700			6,300			Not Available
Route 17 EB/SB to I-95 NB			6,600			5,800			5,300			Not Available
Route 17 EB/SB to I-95 SB			21,100			15,000			22,115			Not Available

1. Source: VDOT Continuous Traffic Count Data Sets, Daily Volume Estimates, May 13-16, 2008
2. Source: VDOT Continuous Traffic Count Data Sets, Daily Traffic Volume Estimates, 2011
3. Source: VDOT Traffic Engineering Data Set, May 15-17, 2012
4. Source: VDOT Continuous Traffic Count Data Sets, Daily Traffic Volume Estimates, 2008, 2011, 2012 - Location US 17 from I-95 to Urban Boundary
5. Source: VDOT Continuous Traffic Count Data Sets, Daily Traffic Volume Estimates, 2008, 2011, 2012 - US 1 to I-95
6. Source: Peggy Malone & Associates traffic counts, May 13-16, 2008
7. Source: VDOT Continuous Traffic Count Data Sets, Daily Traffic Volume Estimates, 2011
8. Source: VDOT Traffic Engineering Division
9. Source: Peggy Malone & Associates traffic counts, June 12-13, 2008
10. Source: VDOT Traffic Engineering, May 12-18, 2013
11. Source: VDOT count: average of daily count on October 15th & 16th, 2013.

Note: Highlighted volume is only volumes higher than 2008.

The following methodology was used in the I-95 Access Study to develop representative existing traffic volumes for I-95, Route 3, and Route 17. These volumes are considered representative of 2013 existing conditions and will be used in this IMR.

I-95 Mainline and Ramp Average Daily Traffic Volumes (ADT)

Tube counts (volume-only) were conducted for at least 96-hours on the following I-95 interchange ramps from Tuesday, May 13, 2008 through Saturday, May 17, 2008:

- Exit 126 – US 1 (all 5 ramps)
- Exit 130 – VA 3 (all 8 ramps)
- Exit 133 – US 17 (all 8 ramps)

96-hours of good data was collected for all ramps except for the I-95 NB to US 17 EB/SB on-ramp and the US 17 EB/SB to I-95 SB on-ramp for which only 72 hours of good data was obtained.

Since conducting tube counts on the I-95 mainline is both difficult and cost inhibitive, data was obtained from the VDOT continuous count stations. 15-minute traffic volume and vehicle classification data was obtained from the VDOT continuous count stations on I-95 south of Exit 126.

- Northbound VDOT Counter ID = 60164 (mile marker 119.99)
- Southbound VDOT Counter ID = 160005 (mile marker 120.56)

To determine the northbound and southbound mainline I-95 traffic volumes in the study area (adjacent to the Route 3 and Route 17 interchanges), the tube-counted ramp volumes were either added or subtracted from the continuous count station volumes. Since the continuous count station data was pulled for the same time frame as the ramp tube-counts (the week of Monday, May 12, 2008 through Sunday, May 18, 2008) the resulting Mainline I-95 volumes in the study area should be rather accurate.

VDOT also has a continuous count station on I-95 in Stafford County, but is located further from our study area (at mile marker 143) and would have required more ramp tube-counts at Exits 136 & 140 (12) than at Exit 126 (5). Counting more ramps would add more potential for tube count failure and uncertainty.

The ramp tube-counts and the continuous count station mainline I-95 volumes varied by day. There was no pattern of which day each ramp had the highest volumes (i.e. Tuesday may have had the highest volume on one ramp, while Wednesday was the highest on another, and Thursday or Friday on others). Representative weekday ramp and mainline I-95 traffic volumes were determined by averaging the weekday counts from Tuesday-Friday. While Friday is sometimes omitted from traffic volume averaging due to being an abnormal weekday, it was included in averaging these representative volumes due to Friday being slightly higher in mainline volume. There was not a large difference between the Tuesday-Thursday and Tuesday-Friday averages.

As discussed previously, once the representative weekday and Saturday volumes were determined the 24-hour ramp traffic volumes were added to and subtracted from the 24-hour mainline volume at the continuous count station to develop northbound and southbound mainline volumes at locations south of the Exit 130, between Exit 130 and 133, and north of Exit 133. The same process was used for Saturday volumes and is outlined below for both northbound and southbound directions. Please see the attached spreadsheet for the northbound and southbound directions showing the addition and subtraction of ramp volumes. Later in the 2013 Existing Conditions Appendix are the ramp counts with their Tues-Friday averages.

Northbound:

NB Mainline Volume at Continuous Count Station *(known)*
- Subtract NB to NB Off-Ramp at Exit 126 *(known)*
- Subtract NB to SB Off-Ramp at Exit 126 *(known)*
- Add NB On-Ramp at Exit 126 *(known)*

NB Mainline Volume south of Route 3 Interchange *(calculated)*
- Subtract NB to EB Off-Ramp at Exit 130 *(known)*
- Add EB to NB On-Ramp at Exit 130 *(known)*
- Subtract NB to WB Off-Ramp at Exit 130 *(known)*
- Add WB to NB On-Ramp at Exit 130 *(known)*

NB Mainline Volume between Route 3 & Route 17 Interchanges *(calculated)*
- Subtract NB to EB Off-Ramp at Exit 133 *(known)*
- Add EB to NB On-Ramp at Exit 133 *(known)*
- Subtract NB to WB Off-Ramp at Exit 133 *(known)*
- Add WB to NB On-Ramp at Exit 133 *(known)*

NB Mainline Volume north of Route 17 Interchange *(calculated)*

Southbound:

SB Mainline Volume at Continuous Count Station *(known)*
- Subtract SB On-Ramp at Exit 126 *(known)*
- Add NB Off-Ramp at Exit 126 *(known)*

SB Mainline Volume south of Route 3 Interchange *(calculated)*
- Subtract EB to SB On-Ramp at Exit 130 *(known)*
- Add SB to EB Off-Ramp at Exit 130 *(known)*
- Subtract WB to SB On-Ramp at Exit 130 *(known)*
- Add SB to WB Off-Ramp at Exit 130 *(known)*

SB Mainline Volume between Route 3 & Route 17 Interchanges *(calculated)*
- Subtract EB to SB On-Ramp at Exit 133 *(known)*
- Add SB to EB Off-Ramp at Exit 133 *(known)*
- Subtract WB to SB On-Ramp at Exit 133 *(known)*
- Add SB to WB Off-Ramp at Exit 133 *(known)*

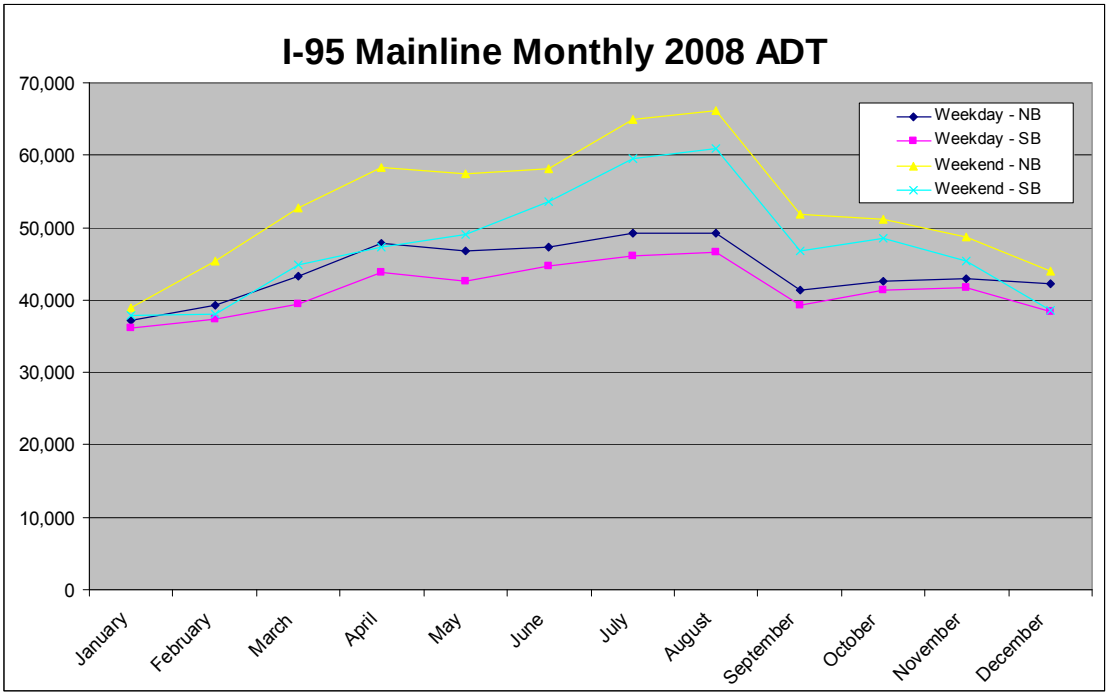
SB Mainline Volume north of Route 17 Interchange *(calculated)*

Seasonal Adjustment

Monthly traffic factors were obtained from VDOT to determine if the traffic counts (conducted in May) should be adjusted accordingly. The monthly factors for northbound and southbound I-95 mainline were derived from the VDOT continuous count station on I-95 in Spotsylvania, south of the study area.

As can be seen in the chart below, weekday peak hour volumes in May were determined to be representative of typical weekday throughout the year. A high weekday daily volume in each direction would occur during the summer months, while the May volume is only slightly below these highs. Applying seasonal factor to normalize the May traffic volumes would result in lower volumes, therefore no seasonal or monthly factors were used.

The daily weekend volumes are typically higher in the summer months of July and August (particularly on Saturdays); however, the peak hour volumes in May were found to be comparable to these months. Typical monthly ADT volumes are shown in the figure below.



I-95 Mainline and Ramp Peak Hour Determination

AM Peak Hour:
To determine the AM peak hour of the mainline and ramps, the northbound ramps were added or subtracted to the northbound mainline continuous count traffic data (as described above under the I-95 Mainline and Ramp Average Daily Traffic Volumes). The hourly northbound volumes at the Rappahannock River Crossing were analyzed. The hour during the morning commute with the highest total traffic volume was designated as the AM peak hour.

PM Peak Hour:
A similar process was done to determine the PM peak hour, except the southbound hourly volumes at the Rappahannock River Crossing were used to determine the PM peak hour. The hour during the evening commute with the highest total traffic volume was designated as the PM peak hour.

The resulting peak hours:

I-95 Mainline and Ramp Peak Hours	
Weekday AM Peak Hour	6:45 - 7:45 AM
Weekday PM Peak Hour	4:00 - 5:00 PM

The same peak hours were used for all I-95 mainline sections and ramps for purposes of balancing.

Saturday Peak Hour:

This section is based on the assumption that the Saturday (May 17, 2008) on which the volume counts were taken was operating with typical conditions. Graphs (shown below) were created comparing the weekday average volumes versus the Saturday volumes on I-95 at the Rappahannock River crossing and along Route 3 (east of Kennedy Lane, approximately 1.5 miles west of the interchange).

The developed volumes for northbound I-95 at the river crossing show that the Saturday peak hour volumes are 4% lower than the AM peak hour volumes (5,460 for Saturday compared to 5,689 for AM) and peaks from 2:30 - 3:30 PM.

The developed volumes for southbound I-95 at the river crossing show that the Saturday peak hour volumes are 1% higher than the PM peak hour volumes (6,226 for Saturday compared to 6,148 for PM) and peaks from 10:15 - 11:15 AM.

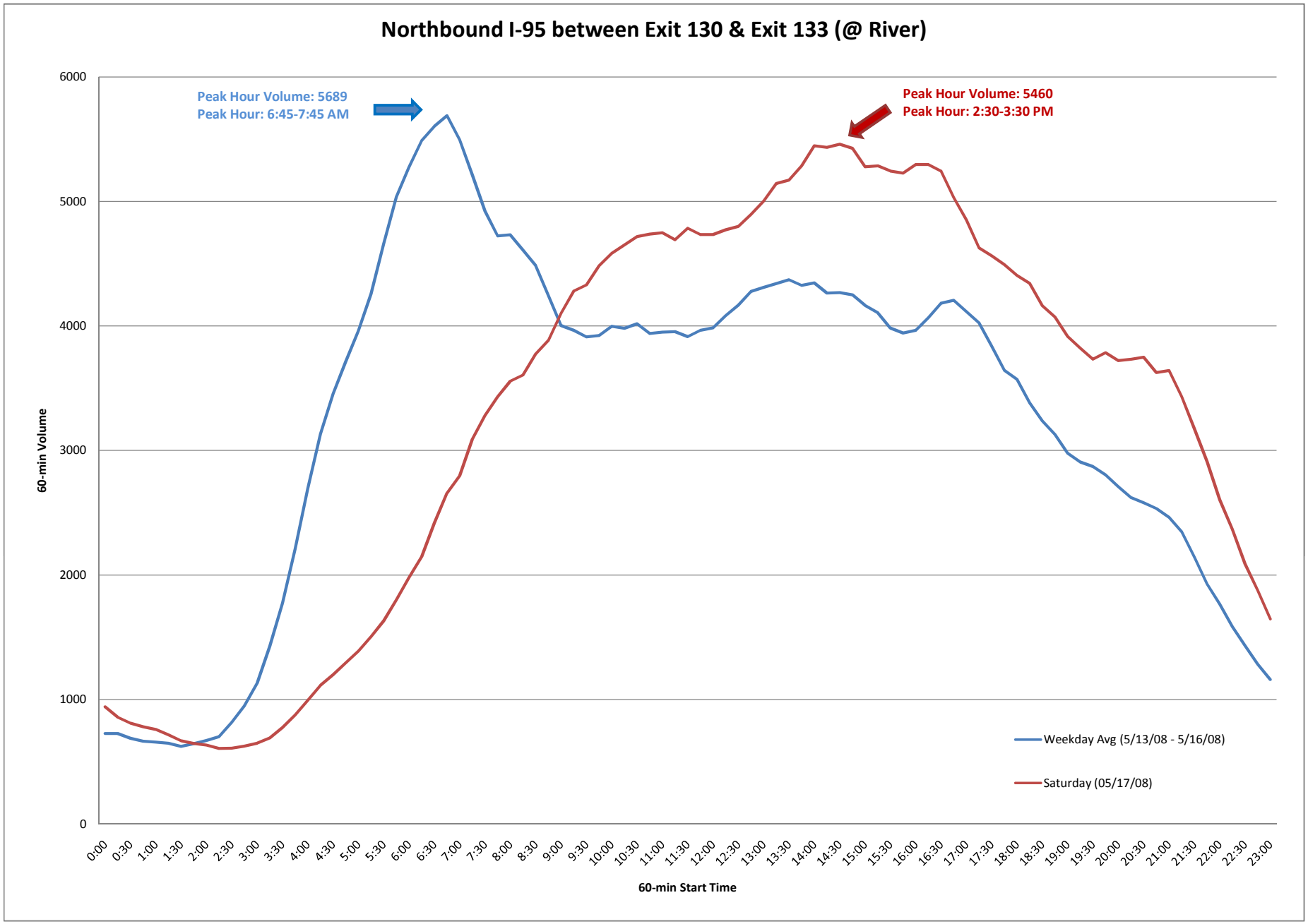
The combined tube count volumes from all ramps at Exits 126, 130, and 133 show a Saturday peak from 12:00 – 1:00 PM. The total ramp volumes also show that the weekday PM peak hour ramps volumes are 13% higher than the Saturday mid-day peak volumes (14,070 vph vs. 12,441 vph). The AM peak hour ramps are higher than the Saturday ramp volumes by 1% (12,590 vph vs. 12,441 vph). In addition the peak Saturday ramp and mainline volumes do not coincide.

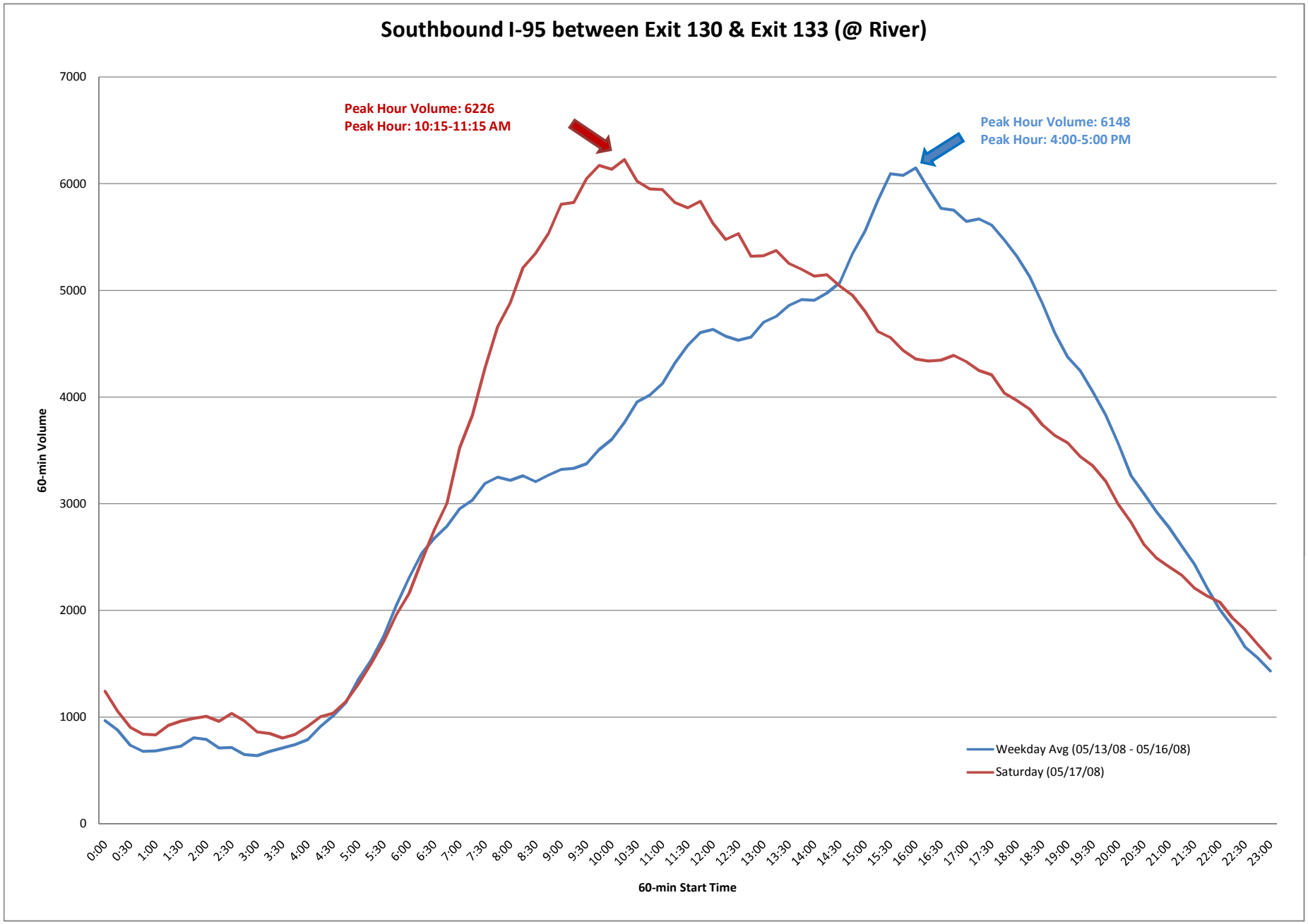
Taking into consideration the ramp volumes, the weekday PM peak represents a condition where merging, diverging, and weaving movements are highest for the southbound direction. It is recommended that the weekday ***PM peak hour volumes would then be used as representative volumes and the basis for making design decisions for the I-95 mainline and ramps, eliminating the need for analyzing a mid-day Saturday peak hour scenario.***

The weekday AM peak represents a condition where merging, diverging, and weaving movements are highest for the northbound direction. It is recommended that the weekday ***AM peak hour volumes would then be used as representative volumes and the basis for making design decisions for the I-95 mainline and ramps, eliminating the need for analyzing a mid-day Saturday peak hour scenario.***

Counts along Route 3 show that for the eastbound travel on Route 3, the weekday AM peak hour has higher traffic volumes than the Saturday peak hour. Likewise, for westbound travel, the weekday PM peak hour has higher traffic volumes than the Saturday peak hour. When combining both directions of travel, the weekday PM peak hour has the highest levels of traffic. ***Therefore it is recommended that the weekday AM and PM peak hours be used for analysis in this study, eliminating the need for analyzing a mid-day Saturday peak hour scenario.***

Further supporting these recommendations is the fact that the regional travel demand model does not forecast weekend traffic meaning all Saturday forecasts will be based off of model results and growth rates made for the weekday.


Northbound I-95 between Exit 130 & Exit 133 (@ River)
Peak Hour Volume: 5689
Peak Hour: 6:45-7:45 AM
Peak Hour Volume: 5460
Peak Hour: 2:30-3:30 PM
60-min Volume
60-min Start Time
Weekday Avg (5/13/08 - 5/16/08)
Saturday (05/17/08)


Southbound I-95 between Exit 130 & Exit 133 (@ River)
Peak Hour Volume: 6226
Peak Hour: 10:15-11:15 AM
Peak Hour Volume: 6148
Peak Hour: 4:00-5:00 PM
60-min Volume
7000
6000
5000
4000
3000
2000
1000
0
0:00
0:30
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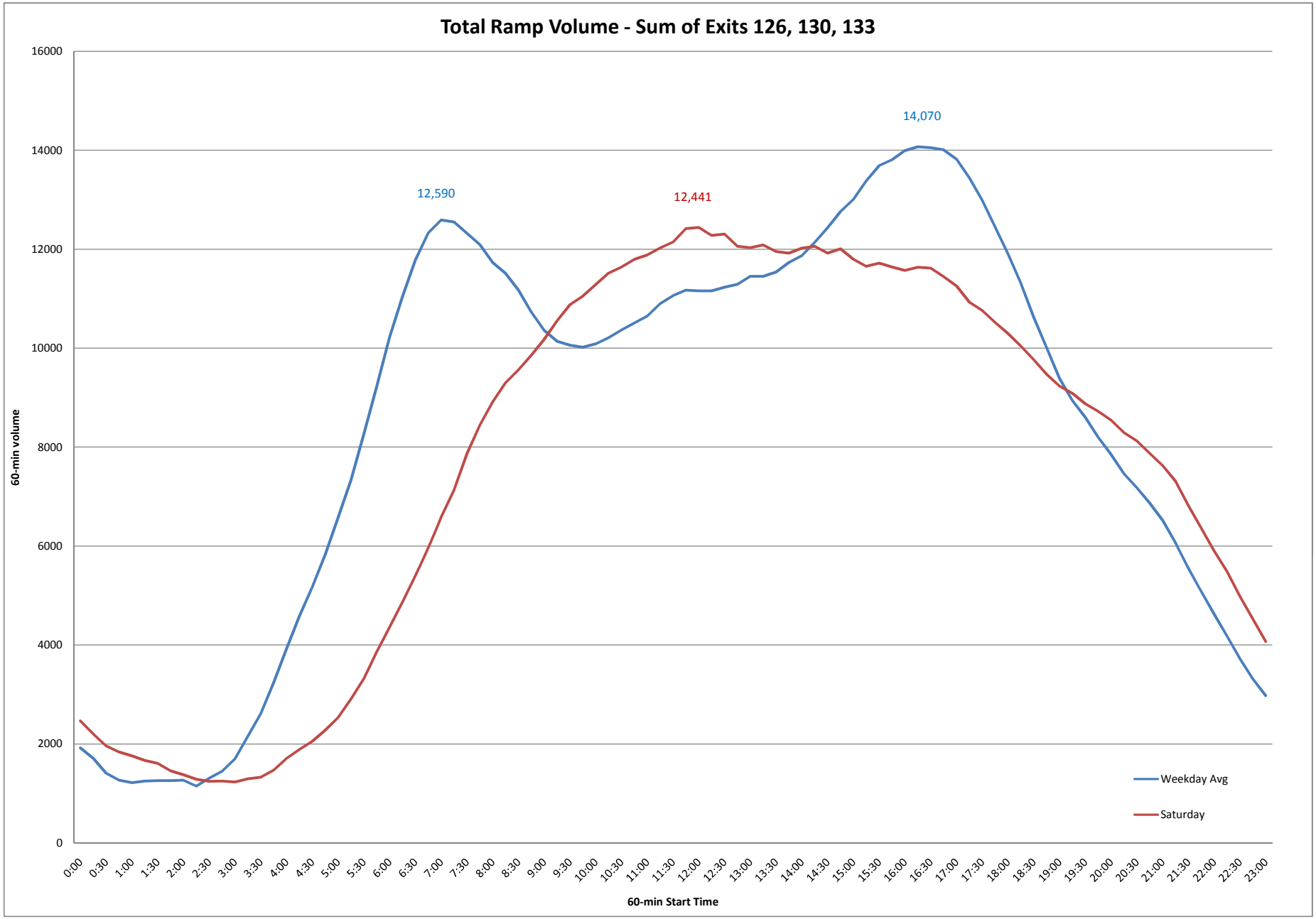
60-min Start Time
Weekday Avg (05/13/08 - 05/16/08)
Saturday (05/17/08)


Total Ramp Volume - Sum of Exits 126, 130, 133
16000
14000
12000
10000
8000
6000
4000
2000
0
60-min volume
14,070
12,590
12,441
Weekday Avg
Saturday
0:00
0:30
1:00
1:30
2:00
2:30
3:00
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4:00
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20:00
20:30
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21:30
22:00
22:30
23:00
60-min Start Time

		BAKER Existing 2008 Counts Daily			BAKER Existing 2008 Counts AM Peak Hour			BAKER Existing 2008 Counts PM Peak Hour		
		Mainline Vol	Ramp Vol	CD Road Vol	Mainline Vol	Ramp Vol	CD Road Vol	Mainline Vol	Ramp Vol	CD Road Vol
SOUTHBOUND I-95										
	Entering Volume (N of US 17)	**66,430**			**2,610**			**5,360**		
	E) SB to WB Off Ramp		7,430			420			470	
		59,000			**2,190**			**4,890**		
US 17 Interchange	F) WB to SB On Loop Ramp		2,070			110			140	
		61,070			**2,300**			**5,030**		
	G) SB to EB Off Loop Ramp		6,360			340			470	
		54,710			**1,960**			**4,560**		
	H) EB to SB On Ramp		21,130			830			1,590	
	River Crossing	**75,840**			**2,790**			**6,150**		
	SB to WB Off Ramp		2,000			90			160	
Rest Area		**73,840**			**2,700**			**5,990**		
	WB to SB On Ramp		2,000			90			160	
	Cowan Boulevard Underpass	**75,840**			**2,790**			**6,150**		
	M) SB to WB Off Ramp		22,530			610			2,250	
		53,310			**2,180**			**3,900**		
Route 3 Interchange	N) WB to SB On Loop Ramp		3,260			140			270	
		56,570			**2,320**			**4,170**		
	O) SB to EB Off Loop Ramp		7,630			400			570	
		48,940			**1,920**			**3,600**		
	P) EB to SB On Ramp		8,150			320			630	
	South of Route 3	**57,090**			**2,240**			**4,230**		
	SB Off Ramp		17,150			700			1,600	
		39,940			**1,540**			**2,630**		
US 1 Interchange	SB On Ramp		5,760			330			430	
	South of US 1	**45,700**			**1,870**			**3,060**		
NORTHBOUND I-95										
	Entering Volume (S of Route1)	**47,060**			**2,340**			**2,860**		
	NB to EB Off Ramp		5,470			400			360	
		41,590			**1,940**			**2,500**		
US 1 Interchange	NB to WB Off Loop Ramp		1,950			120			140	
		39,640			**1,820**			**2,360**		
	EB/WB to NB On Ramp		18,380			1,670			950	
	Entering Volume (S of Route3)	**58,020**			**3,490**			**3,310**		
	I) NB to EB Off Ramp		3,920			270			240	
		54,100			**3,220**			**3,070**		
	J) EB to NB On Loop Ramp		20,160			1,920			900	
Route 3 Interchange		**74,260**			**5,140**			**3,970**		
	K) NB to WB Off Loop Ramp		6,520			280			490	
		67,740			**4,860**			**3,480**		
	L) WB to NB On Ramp		9,090			830			490	
	Cowan Boulevard Underpass	**76,830**			**5,690**			**3,970**		
				21,180			1,620			1,330
	A) NB to EB Off Ramp		2,930			120			180	
		55,650		18,250	**4,070**		1,500	**2,640**		1,150
	B) EB to NB On Loop Ramp		6,620			610			340	
US 17 Interchange		**55,650**		24,870	**4,070**		2,110	**2,640**		1,490
	C) NB to WB Off Loop Ramp		18,250			1,500			1,150	
		55,650		6,620	**4,070**		610	**2,640**		340
	D) WB to NB On Ramp		6,050			410			330	
				12,670			1,020			670
	North of Route 17	**68,320**			**5,090**			**3,310**		

Route 3 and Route 17 Volumes Average Daily Traffic Volumes (ADT)

Tube counts (volume-only) were also conducted on Route 3 and on Route 17. The 4-day tube counts on Route 3 were conducted east of Kennedy Lane, approximately 1.5 miles west of the interchange from Wednesday May 14, 2008 through Saturday May 17, 2008. Tube counts (volume-only) were conducted on Route 17, between Falls Runs Drive and Powell Lane, approximately ¾ mile north of the interchange. Tube counts were initially conducted from Wednesday May 14, 2008 through Saturday May 17, 2008, but the tube-counters failed and had to be replaced. The recount on Route 17 was conducted from Thursday June 12, 2008 through Sunday June 15, 2008.

ADT volumes were developed on Route 3 and Route 17 to the immediate east and west of the I-95 interchange. The ramp tube counts at Exit 130 and Exit 133 were utilized to determine AM and PM peak hour K-Factors for both East bound and Westbound Route 3 and Northbound and Southbound Route 17. The respective K-Factors were applied to the peak hour turn movements of the intersections adjacent to the interchange. The ADT volumes developed based on the AM peak hour turn movements and K-Factor were averaged with the ADT volumes developed based on the PM peak hour turn movements and K-Factor for each roadway direction. Detailed information for each location is shown below.

Route 3 – West of Interchange:
The intersection turn movements at Route 3/Carl D Silver Pkwy were used to determine the peak hour volume on Route 3 immediately west of the I-95 interchange. The westbound left, thru, and right turn movements were totaled to determine the westbound volume, while the eastbound thru, northbound right, and southbound left turn movements were totaled to determine the eastbound volume. Using the tube count data for all ramps at Exit 130, the K-Factors for AM and PM were determined to be 0.06 and 0.07, respectively. These K-Factors were applied to the AM and PM peak hours for both eastbound and westbound directions to develop ADT volumes at this location, shown below.

Route 3 - West of Interchange

	Peak Hour Route 3 west of Interchange		K-Factor Route 3 west of Interchange		Calculated Daily Volume Route 3 west of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	2,880	1,240	0.06	0.06	50,994	21,956	**72,949**	(based on AM peaks)
PM Peak Hour	2,020	2,780	0.07	0.07	28,807	39,646	**68,453**	(based on PM peaks)
					39,900	30,800	**70,700**	AM & PM Average
	based on Carl D Silver Pkwy TMs		based on Exit 130 Ramps					

Route 3 – East of Interchange:
The intersection turn movements at Route 3/Gateway Blvd were used to determine the peak hour volume on Route 3 immediately east of the I-95 interchange. The eastbound left, thru, and right turn movements were totaled to determine the eastbound volume, while the westbound thru, northbound left, and southbound right turn movements were totaled to determine the westbound volume. The K-factors determined from all the Exit 130 ramps were also used to the east of the interchange. Again, the K-Factors were applied to the AM and PM peak hours for both eastbound and westbound directions to develop ADT volumes at this location, shown below.

Route 3 - East of Interchange								
	Peak Hour		K-Factor		Calculated Daily Volume			
	Route 3 east of Interchange		Route 3 east of Interchange		Route 3 east of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	1,430	1,500	0.06	0.06	25,320	26,559	**51,879**	(based on AM peaks)
PM Peak Hour	1,730	1,620	0.07	0.07	24,672	23,103	**47,774**	(based on PM peaks)
					25,000	24,800	**49,800**	AM & PM Average
	based on Gateway Blvd TMs		based on Exit 130 Ramps					

Route 17 – West of Interchange:

The intersection turn movements at Route 17/Sanford Dr were used to determine the peak hour volume on Route 17 immediately west of the I-95 interchange. The northbound left, thru, and right turn movements were totaled to determine the northbound volume, while the southbound thru, eastbound right, and westbound left turn movements were totaled to determine the southbound volume. Using the tube count data for all ramps at Exit 133, the K-Factors for AM and PM were determined to be 0.06 and 0.07, similar to the Exit 130 K-factors. These K-Factors were applied to the AM and PM peak hours for both northbound and southbound directions to develop ADT volumes at this location, shown below.

Route 17 - West of Interchange								
	Peak Hour		K-Factor		Calculated Daily Volume			
	Route 17 west of Interchange		Route 17 west of Interchange		Route 17 west of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	2,220	1,820	0.06	0.06	36,020	29,530	**65,549**	(based on AM peaks)
PM Peak Hour	2,230	2,350	0.07	0.07	33,594	35,402	**68,995**	(based on PM peaks)
					34,800	32,500	**67,300**	AM & PM Average
	based on Sanford Dr TMs		based on Exit 133 Ramps					

Route 17 – East of Interchange:

The intersection turn movements at Route 17/Short Rd were used to determine the peak hour volume on Route 17 immediately east of the I-95 interchange. The southbound left, thru, and right turn movements were totaled to determine the southbound volume, while the northbound thru, eastbound left, and westbound right turn movements were totaled to determine the northbound volume. The K-factors determined from all the Exit 133 ramps were also used to the east of the interchange. Again, the K-Factors were applied to the AM and PM peak hours for both northbound and southbound directions to develop ADT volumes at this location, shown below.

Route 17 - East of Interchange								
	Peak Hour		K-Factor		Calculated Daily Volume			
	Route 17 east of Interchange		Route 17 east of Interchange		Route 17 east of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	1,130	1,070	0.06	0.06	18,334	17,361	**35,695**	(based on AM peaks)
PM Peak Hour	1,000	1,820	0.07	0.07	15,064	27,417	**42,482**	(based on PM peaks)
					16,700	22,400	**39,100**	AM & PM Average
	based on Short St TMs		based on Exit 133 Ramps					

Other Area Roadways
Volume tube counts were also conducted along the I-95 overpass locations on Fall Hill Avenue and Cowan Boulevard. Volumes were collected at these locations in case build alternatives incorporated these streets.

Intersection Peak Hour Turning Movements
Existing intersection turning movement volume data (July 2007) was obtained from VDOT for the intersections on US 17 east of I-95 in our study area. Additional turning movement counts were conducted during Tuesday May 13, 2008 and Wednesday May 14, 2008 for intersections on Route 3 and ones not previously collected on US 17. Intersection turn movement volumes were counted for two hours each in the AM (6:30-8:30am) and PM (4:00-6:00pm) during a typical weekday. Intersection turn movement counts were also conducted for two hours during the mid-day peak (11:00am-1:00pm) on a typical Saturday (May 17, 2008 or May 31, 2008, excluding Memorial Day weekend).

Turn movement counts collected on July 31, 2012 at the Route 17/Stanstead Drive intersection were used to modify the 2008 counts. A Target store opened up on the north side of the intersection resulting in a change in traffic patterns at the intersection. The turn movements into and out of Target are higher than the 2008 counts, however, the through movements along Route 17 are much lower as is the turn movements into and out of Sanford Drive. Therefore the approach volumes on Route 17 will be kept the same but turn movements from Sanford Drive and Stanstead Road will be adjusted to better reflect the 2012 counts.

Intersection Turning Movement Adjustment
The intersection peak hours were determined for each individual intersection. Peak hour turn movement volumes were developed for each individual intersection based on that specific intersection's AM and PM peak hour. Due to differing peak hours, the intersection turn movements along Route 3 and Route 17 were not balanced. The number of access points between intersections was another factor that led to the decision to not balance the intersection turn movement volumes, but instead use the actual peak hour volume as the design volume for each intersection. The turn movement counts for each intersection with calculated peak hour are included as an attachment. For each intersection, peak hour factor (PHF) and peak hour truck percentages were calculated for each movement.

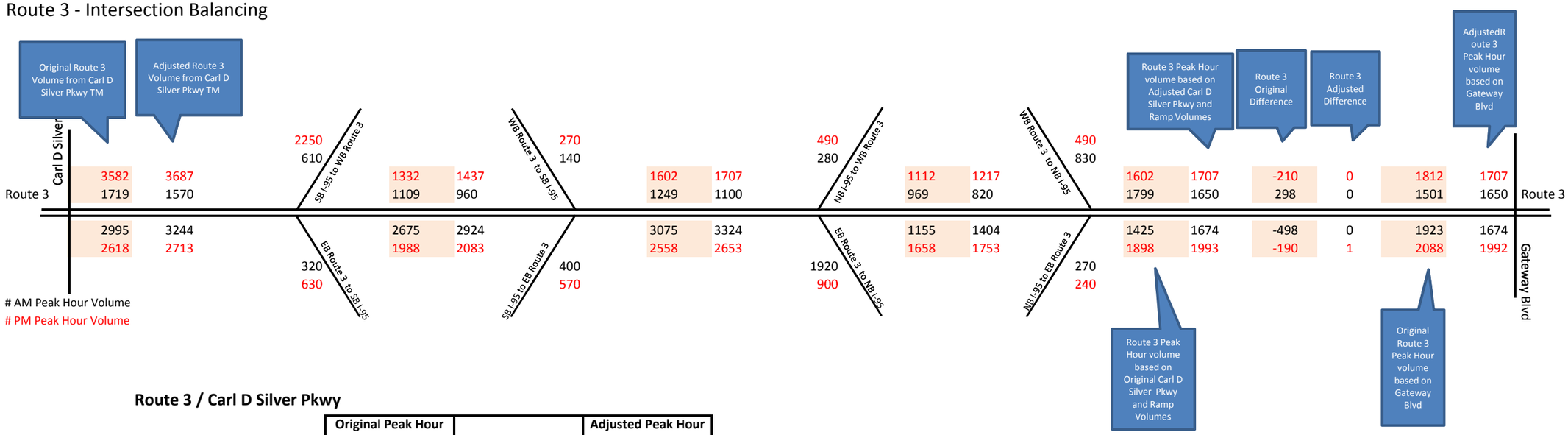
The turn movement volumes at the intersections adjacent to the I-95 interchanges at Exit 130 (Route 3) and Exit 133 (Route 17), however, were adjusted to balance the intersection volumes with the ramp volumes through the interchange. The methodology of balancing volumes at the Route 3 and Route 17 interchanges is discussed below. Route 3 and Route 17 intersection balancing adjustment spreadsheets are shown after the discussion for reference.

Route 3 Intersection Balancing Adjustment:
The intersections of Route 3/Carl D Silver Pkwy (west of the Exit 130 interchange) and Route 3/Gateway Blvd (east of the Exit 130 interchange) were adjusted to balance the volumes across the interchange. To balance the eastbound and westbound directions, the turn movements at the

Carl D Silver Pkwy intersection were totaled to determine the eastbound and westbound volumes to the west of the intersection. The previously developed eastbound and westbound ramp peak hour volumes were then added or subtracted to the appropriate Route 3 directional volume to determine the peak hour volume of Route 3 to the west of the Gateway Blvd intersection. These eastbound and westbound volumes were compared to the volumes based on the Gateway Blvd intersection turn movement volumes. The Carl D Silver and the Gateway Blvd turn movement volumes were adjusted to balance the intersection turn movements. Half of the volume difference was applied to the intersection at Carl D Silver Pkwy and the other half applied to the Gateway Blvd intersection. The applied adjusted approach volumes were divided among the appropriate turn movements based on the actual turn movement percentages of each approach (i.e. 12% Left, 72% Thru, 16% Right, etc.).

Route 17 Intersection Balancing Adjustment:
The intersections of Route 17/Sanford Dr (west of the Exit 133 interchange) and Route 17/Short Rd (east of the Exit 133 interchange) were adjusted to balance the volumes across the interchange. To balance the northbound and southbound directions, the turn movements at the Sanford Dr intersection were totaled to determine the northbound and southbound volumes to the west of the intersection. The developed northbound and southbound ramp peak hour volumes were then added or subtracted to the appropriate Route 17 directional volume to determine the peak hour volume of Route 17 to the west of the Short Rd intersection. These northbound and southbound volumes were compared to the volumes based on the Short Rd intersection turn movement volumes. The Sanford Dr and the Short Rd turn movement volumes were adjusted to balance the intersection turn movements. Half of the volume difference was applied to the intersection at Sanford Dr and the other half applied to the Short Rd intersection. The applied adjusted approach volumes were divided among the appropriate turn movements based on the actual turn movement percentages of each approach (i.e. 12% Left, 72% Thru, 16% Right, etc.).

Route 3 - Intersection Balancing



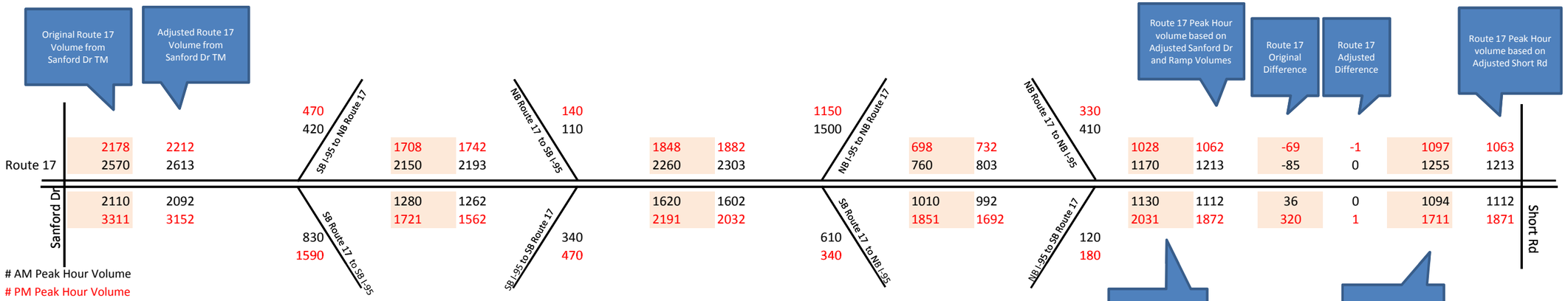
Route 3 / Carl D Silver Pkwy

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	12	21			12	21
	Thru	7	10			7	10
	Right	17	25	1.41	0.91	18	26
Southbound	Left	324	818	26.94	29.68	351	848
	Thru	7	13			7	13
	Right	55	303			55	303
Eastbound	Left	144	273			144	273
	Thru	2654	1775	220.65	64.41	2875	1839
	Right	12	11			12	11
Westbound	Left	23	36	-1.99	1.06	21	37
	Thru	1198	2638	-103.84	77.33	1094	2715
	Right	498	908	-43.17	26.62	455	935

Route 3 / Gateway Blvd

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	217	327	21.54	-18.95	239	308
	Thru	10	2			10	2
	Right	109	217			109	217
Southbound	Left	10	10			10	10
	Thru	3	1			3	1
	Right	21	3	2.08	-0.17	23	3
Eastbound	Left	38	33	-4.92	-1.50	33	31
	Thru	1505	1578	-194.88	-71.80	1310	1506
	Right	380	477	-49.20	-21.70	331	455
Westbound	Left	107	228			107	228
	Thru	1263	1482	125.37	-85.88	1388	1396
	Right	9	0			9	0

Route 17 - Intersection Balancing



Route 17 / Sanford Dr

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	287	319	4.75	5.05	292	324
	Thru	2172	1779	35.92	28.18	2208	1807
	Right	111	80	1.84	1.27	113	81
Southbound	Left	11	6			11	6
	Thru	1823	2369	-15.55	-114.48	1807	2255
	Right	20	44			20	44
Eastbound	Left	52	32			52	32
	Thru	5	4			5	4
	Right	243	872	-2.07	-42.14	241	830
Westbound	Left	44	70	-0.38	-3.38	44	67
	Thru	61	19			61	19
	Right	15	6			15	6

Route 17 / Short Rd

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	14	11			14	11
	Thru	1152	1016	-39.01	-31.95	1113	984
	Right	1	1			1	1
Southbound	Left	8	5	0.13	0.47	8	5
	Thru	1035	1636	17.03	152.99	1052	1789
	Right	51	70	0.84	6.55	52	77
Eastbound	Left	91	74	-3.08	-2.33	88	72
	Thru	0	2			0	2
	Right	11	26			11	26
Westbound	Left	2	2			2	2
	Thru	0	1			0	1
	Right	12	7	-0.41	-0.22	12	7

Existing and Future No-Build Intersection Volume Adjustment at Intersection #4 (US 17 & McLane Drive)

Upon review of the existing intersection turn-movement counts, it was determined that the thru-movements at intersection #4 (US 17 & McLane Drive) needed to be adjusted. The intersections had previously been balanced, but it was then decided to not balance the intersections and just use the actual peak hour of each intersection to analyze the worst case scenario. The turn movement counts used for this intersection were conducted in mid-July 2007, while the adjacent intersection turn movements were conducted in early-June 2007, with schools still in session. Due to these factors and the close proximity of the intersection to its adjacent intersections, it was decided that the peak hour volumes at Intersection #4 should be adjusted. Peak hour volume adjustments are shown below.

AM Existing Conditions Adjustment for Southbound US 17 Thru-Movement:
2,687 veh/hr (original) → 1,770 veh/hr (adjusted)

AM Existing Conditions Adjustment for Northbound US 17 Thru-Movement:
1,712 veh/hr (original) → 2,190 veh/hr (adjusted)

PM Existing Conditions Adjustment for Southbound US 17 Thru-Movement:
2,321 veh/hr (original) → 2,321 veh/hr (no adjustment required)

PM Existing Conditions Adjustment for Northbound US 17 Thru-Movement:
2,206 veh/hr (original) → 1,856 veh/hr (adjusted)

I-95 Truck Percentages

Truck percentage was obtained from the VDOT continuous count stations. I-95 northbound and southbound truck percentages were pulled for the week of May 12, 2008 through Friday May 16, 2008. A lack of vehicle classification data on the interchange ramps prevents the development of different truck percentages on Mainline I-95 at the Rappahannock River crossing and also on the ramps themselves.

Peak Hour (Direction)	Year	Monday	Tuesday	Wednesday	Thursday	Friday	**Average**
AM Peak Hour (Northbound I-95)	2008	10.4%	12.5%	11.2%	15.3%	13.8%	**12.6%**
	2012	9.3%	13.6%	14.6%	14.2%	13.2%	**13.0%**
	2013	9.2%	14.4%	14.2%	15.6%	14.8%	**13.7%**
AM Peak Hour (Southbound I-95)	2008	13.5%	21.7%	17.6%	17.6%	17.6%	**17.6%**
	2012	11.8%	20.2%	17.9%	17.8%	15.2%	**16.5%**
	2013	11.8%	17.8%	18.5%	24.4%	13.8%	**17.2%**
PM Peak Hour (Northbound I-95)	2008	11.9%	11.9%	14.8%	13.5%	9.6%	**12.3%**
	2012	10.9%	14.5%	13.9%	11.2%	6.5%	**11.1%**
	2013	10.8%	14.7%	14.8%	10.3%	8.8%	**11.9%**
PM Peak Hour (Southbound I-95)	2008	13.3%	15.1%	14.5%	11.7%	7.9%	**12.5%**
	2012	11.3%	14.0%	11.9%	9.8%	8.4%	**10.9%**
	2013	11%	13%	12%	12%	8%	**11.2%**

A review of 2012 and 2013 traffic volumes form VDOT Traffic Engineering show that the truck percentage for I-95 northbound increased in the AM peak hour when compared to 2008 and 2012; the 2013 truck percentages will be used for I-95 northbound AM peak hour. 2008 percentages will be used in the analysis for all other directions and peak hours.

Intersection Turn Movement Counts

- Route 3 & Central Park Blvd
- Route 3 & Carl D. Silver
- Route 3 & Gateway Blvd
- Route 17 & McLane Dr
- Route 17 & Sanford Dr
- Route 17 & Short Rd

Intersection: Route 3 / Central Park Blvd

Start Date 5/13/2008
Start Time 6:30

	Street Name	Central Park Blvd--Southbound			Route 3--Westbound			Central Park Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	7	0	4	3	174	11	30	5	2	10	644	53	943
Trucks	6:30 AM	0	0	0	0	13	0	1	0	0	1	12	0	27
Total	**6:30 AM**	**7**	**0**	**4**	**3**	**187**	**11**	**31**	**5**	**2**	**11**	**656**	**53**	**970**
Cars	6:45 AM	10	2	2	7	191	27	37	2	2	6	720	59	1065
Trucks	6:45 AM	0	0	0	1	8	0	2	0	0	0	8	0	19
Total	**6:45 AM**	**10**	**2**	**2**	**8**	**199**	**27**	**39**	**2**	**2**	**6**	**728**	**59**	**1084**
Cars	7:00 AM	28	1	9	3	216	11	36	2	0	9	694	58	1067
Trucks	7:00 AM	1	0	0	0	7	0	2	0	0	0	17	0	27
Total	**7:00 AM**	**29**	**1**	**9**	**3**	**223**	**11**	**38**	**2**	**0**	**9**	**711**	**58**	**1094**
Cars	7:15 AM	27	1	10	3	228	10	35	2	1	5	642	35	999
Trucks	7:15 AM	0	0	0	0	6	2	1	0	0	0	15	0	24
Total	**7:15 AM**	**27**	**1**	**10**	**3**	**234**	**12**	**36**	**2**	**1**	**5**	**657**	**35**	**1023**
Cars	7:30 AM	14	1	1	6	238	13	38	7	1	14	708	45	1086
Trucks	7:30 AM	1	0	0	0	6	3	1	0	0	0	10	1	22
Total	**7:30 AM**	**15**	**1**	**1**	**6**	**244**	**16**	**39**	**7**	**1**	**14**	**718**	**46**	**1108**
Cars	7:45 AM	18	2	3	9	301	29	46	7	1	12	611	63	1102
Trucks	7:45 AM	1	0	1	1	15	0	0	0	0	0	8	0	26
Total	**7:45 AM**	**19**	**2**	**4**	**10**	**316**	**29**	**46**	**7**	**1**	**12**	**619**	**63**	**1128**
Cars	8:00 AM	20	3	1	6	269	21	39	4	1	11	631	77	1083
Trucks	8:00 AM	1	1	0	0	19	3	1	0	0	0	14	1	40
Total	**8:00 AM**	**21**	**4**	**1**	**6**	**288**	**24**	**40**	**4**	**1**	**11**	**645**	**78**	**1123**
Cars	8:15 AM	20	5	1	7	288	22	32	6	1	15	571	67	1035
Trucks	8:15 AM	2	1	0	0	23	1	0	1	0	0	12	2	42
Total	**8:15 AM**	**22**	**6**	**1**	**7**	**311**	**23**	**32**	**7**	**1**	**15**	**583**	**69**	**1077**
	Grand Total	**300**	**34**	**64**	**92**	**4004**	**306**	**602**	**72**	**18**	**166**	**10634**	**922**	**17214**

2008	**7:30-8:30**	**77**	**13**	**7**	**29**	**1159**	**92**	**157**	**25**	**4**	**52**	**2565**	**256**	**4436**

	Vehicles	144	15	31	44	1905	144	293	35	9	82	5221	457	8380
	Trucks	6	2	1	2	97	9	8	1	0	1	96	4	227
	% Trucks	**4.0%**	**11.8%**	**3.1%**	**4.3%**	**4.8%**	**5.9%**	**2.7%**	**2.8%**	**0.0%**	**1.2%**	**1.8%**	**0.9%**	**2.6%**
	PHF	0.88	0.54	0.44	0.73	0.92	0.79	0.85	0.89	1.00	0.87	0.89	0.82	0.98

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	77	13	7	29	1159	92	157	25	4	52	2565	256	**4436**

There has been no growth in the corridor between 2008 and 2013.

AM Total Intersection Peak Hour Volume
4436

AM Total Truck Percentage
2.6%

AM Intersection PHF
0.98

Start Date 5/13/2008
Start Time 16:00

	Street Name	Central Park Blvd--Southbound			Route 3--Westbound			Central Park Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	92	50	31	18	615	121	125	22	16	21	372	63	1546
Trucks	4:00 PM	2	0	0	0	8	0	0	0	0	1	14	1	26
Total	**4:00 PM**	**94**	**50**	**31**	**18**	**623**	**121**	**125**	**22**	**16**	**22**	**386**	**64**	**1572**
Cars	4:15 PM	88	44	27	13	541	117	82	28	23	27	386	80	1456
Trucks	4:15 PM	0	0	1	0	15	0	0	0	0	0	9	0	25
Total	**4:15 PM**	**88**	**44**	**28**	**13**	**556**	**117**	**82**	**28**	**23**	**27**	**395**	**80**	**1481**
Cars	4:30 PM	95	40	19	15	586	120	97	24	18	30	430	83	1557
Trucks	4:30 PM	0	0	1	0	7	0	2	0	0	0	18	0	28
Total	**4:30 PM**	**95**	**40**	**20**	**15**	**593**	**120**	**99**	**24**	**18**	**30**	**448**	**83**	**1585**
Cars	4:45 PM	85	46	18	20	553	127	88	25	23	24	364	86	1459
Trucks	4:45 PM	0	0	0	0	9	0	0	0	0	0	10	0	19
Total	**4:45 PM**	**85**	**46**	**18**	**20**	**562**	**127**	**88**	**25**	**23**	**24**	**374**	**86**	**1478**
Cars	5:00 PM	88	51	31	10	562	90	99	34	29	20	431	80	1525
Trucks	5:00 PM	1	0	0	0	8	0	0	0	0	0	8	1	18
Total	**5:00 PM**	**89**	**51**	**31**	**10**	**570**	**90**	**99**	**34**	**29**	**20**	**439**	**81**	**1543**
Cars	5:15 PM	98	47	32	12	546	117	88	17	19	20	402	76	1474
Trucks	5:15 PM	0	0	0	0	6	2	0	0	0	0	12	0	20
Total	**5:15 PM**	**98**	**47**	**32**	**12**	**552**	**119**	**88**	**17**	**19**	**20**	**414**	**76**	**1494**
Cars	5:30 PM	109	49	26	13	534	124	92	22	21	22	390	66	1468
Trucks	5:30 PM	0	0	0	0	8	2	0	0	0	0	7	0	17
Total	**5:30 PM**	**109**	**49**	**26**	**13**	**542**	**126**	**92**	**22**	**21**	**22**	**397**	**66**	**1485**
Cars	5:45 PM	87	39	22	13	563	99	82	30	18	24	378	86	1441
Trucks	5:45 PM	0	0	0	0	15	0	0	0	0	0	6	0	21
Total	**5:45 PM**	**87**	**39**	**22**	**13**	**578**	**99**	**82**	**30**	**18**	**24**	**384**	**86**	**1462**
	Grand Total	**1490**	**732**	**416**	**228**	**9152**	**1838**	**1510**	**404**	**334**	**378**	**6474**	**1244**	**24200**

2008	**4:00-5:00**	**362**	**180**	**97**	**66**	**2334**	**485**	**394**	**99**	**80**	**103**	**1603**	**313**	**6116**

	Vehicles	742	366	206	114	4500	915	753	202	167	188	3153	620	11926
	Trucks	3	0	2	0	76	4	2	0	0	1	84	2	174
	% Trucks	**0.4%**	**0.0%**	**1.0%**	**0.0%**	**1.7%**	**0.4%**	**0.3%**	**0.0%**	**0.0%**	**0.5%**	**2.6%**	**0.3%**	**1.4%**
	PHF	0.95	0.90	0.78	0.83	0.94	0.95	0.79	0.88	0.87	0.86	0.89	0.91	0.96

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	362	180	97	66	2334	485	394	99	80	103	1603	313	**6116**

There has been no growth in the corridor between 2008 and 2013.

PM Total Intersection Peak Hour Volume
6116

PM Total Truck Percentage
1.4%

PM Intersection PHF
0.96

Start Date 5/17/2008
Start Time 11:00

	Street Name	Central Park Blvd--Southbound			Route 3--Westbound			Central Park Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	11:00 AM	74	47	15	17	416	134	129	30	23	48	456	140	1529
Trucks	11:00 AM	1	0	0	0	10	0	0	0	0	0	6	1	18
Total	**11:00 AM**	**75**	**47**	**15**	**17**	**426**	**134**	**129**	**30**	**23**	**48**	**462**	**141**	**1547**
Cars	11:15 AM	83	51	32	24	403	178	148	47	16	35	491	125	1633
Trucks	11:15 AM	1	0	0	0	9	0	1	0	0	0	11	0	22
Total	**11:15 AM**	**84**	**51**	**32**	**24**	**412**	**178**	**149**	**47**	**16**	**35**	**502**	**125**	**1655**
Cars	11:30 AM	91	52	29	24	376	130	158	67	20	35	406	131	1519
Trucks	11:30 AM	0	0	0	0	9	0	0	0	0	0	5	1	15
Total	**11:30 AM**	**91**	**52**	**29**	**24**	**385**	**130**	**158**	**67**	**20**	**35**	**411**	**132**	**1534**
Cars	11:45 AM	95	56	23	33	450	149	179	59	23	51	442	123	1683
Trucks	11:45 AM	0	0	1	1	10	0	0	0	0	0	6	1	19
Total	**11:45 AM**	**95**	**56**	**24**	**34**	**460**	**149**	**179**	**59**	**23**	**51**	**448**	**124**	**1702**
Cars	12:00 PM	85	45	19	25	461	160	203	64	24	37	520	153	1796
Trucks	12:00 PM	0	0	0	0	14	0	0	0	0	0	7	1	22
Total	**12:00 PM**	**85**	**45**	**19**	**25**	**475**	**160**	**203**	**64**	**24**	**37**	**527**	**154**	**1818**
Cars	12:15 PM	105	73	30	20	430	166	159	64	25	39	427	131	1669
Trucks	12:15 PM	0	0	0	0	9	0	1	0	0	0	5	1	16
Total	**12:15 PM**	**105**	**73**	**30**	**20**	**439**	**166**	**160**	**64**	**25**	**39**	**432**	**132**	**1685**
Cars	12:30 PM	106	81	23	23	413	94	186	71	22	32	430	133	1614
Trucks	12:30 PM	0	0	0	0	7	0	0	0	0	0	9	0	16
Total	**12:30 PM**	**106**	**81**	**23**	**23**	**420**	**94**	**186**	**71**	**22**	**32**	**439**	**133**	**1630**
Cars	12:45 PM	77	56	23	13	431	81	156	63	24	25	445	93	1487
Trucks	12:45 PM	1	1	0	1	9	0	0	0	0	0	8	0	20
Total	**12:45 PM**	**78**	**57**	**23**	**14**	**440**	**81**	**156**	**63**	**24**	**25**	**453**	**93**	**1507**
	Grand Total	**1438**	**924**	**390**	**362**	**6914**	**2184**	**2640**	**930**	**354**	**604**	**7348**	**2068**	**26156**

2008	**11:45-12:45**	**391**	**255**	**96**	**102**	**1794**	**569**	**728**	**258**	**94**	**159**	**1846**	**543**	**6835**

	Vehicles	716	461	194	179	3380	1092	1318	465	177	302	3617	1029	12930
	Trucks	3	1	1	2	77	0	2	0	0	0	57	5	148
	% Trucks	**0.4%**	**0.2%**	**0.5%**	**1.1%**	**2.2%**	**0.0%**	**0.2%**	**0.0%**	**0.0%**	**0.0%**	**1.6%**	**0.5%**	**1.1%**
	PHF	0.92	0.79	0.80	0.75	0.94	0.86	0.90	0.91	0.94	0.78	0.88	0.88	0.94

SAT Total Intersection Peak Hour Volume
6835

SAT Total Truck Percentage
1.1%

SAT Intersection PHF
0.94

Intersection: Route 3 / Carl D Silver

Start Date 5/13/2008
Start Time 6:30

	Street Name	Carl D Silver --Southbound			Route 3--Westbound			Carl D Silver--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	7	2	65	83	181	2	5	1	2	1	649	11	1009
Trucks	6:30 AM	0	0	0	1	7	0	1	0	0	0	13	0	22
Total	**6:30 AM**	**7**	**2**	**65**	**84**	**188**	**2**	**6**	**1**	**2**	**1**	**662**	**11**	**1031**
Cars	6:45 AM	9	2	65	75	214	6	2	3	2	4	731	19	1132
Trucks	6:45 AM	0	0	1	2	5	1	0	0	0	0	5	1	15
Total	**6:45 AM**	**9**	**2**	**66**	**77**	**219**	**7**	**2**	**3**	**2**	**4**	**736**	**20**	**1147**
Cars	7:00 AM	10	1	64	72	224	6	8	4	5	2	665	26	1087
Trucks	7:00 AM	0	0	0	0	6	0	0	0	0	0	13	0	19
Total	**7:00 AM**	**10**	**1**	**64**	**72**	**230**	**6**	**8**	**4**	**5**	**2**	**678**	**26**	**1106**
Cars	7:15 AM	4	3	93	71	248	7	8	4	3	1	697	22	1161
Trucks	7:15 AM	0	0	3	2	6	0	0	0	0	0	9	0	20
Total	**7:15 AM**	**4**	**3**	**96**	**73**	**254**	**7**	**8**	**4**	**3**	**1**	**706**	**22**	**1181**
Cars	7:30 AM	14	1	84	98	245	4	6	3	3	1	749	27	1235
Trucks	7:30 AM	0	0	7	1	6	0	1	0	0	1	9	0	25
Total	**7:30 AM**	**14**	**1**	**91**	**99**	**251**	**4**	**7**	**3**	**3**	**2**	**758**	**27**	**1260**
Cars	7:45 AM	9	4	77	123	311	9	3	1	4	3	656	42	1242
Trucks	7:45 AM	0	0	1	2	14	0	0	0	0	0	8	0	25
Total	**7:45 AM**	**9**	**4**	**78**	**125**	**325**	**9**	**3**	**1**	**4**	**3**	**664**	**42**	**1267**
Cars	8:00 AM	14	1	72	126	288	4	3	3	1	5	651	33	1201
Trucks	8:00 AM	0	0	0	2	20	0	1	0	0	0	12	0	35
Total	**8:00 AM**	**14**	**1**	**72**	**128**	**308**	**4**	**4**	**3**	**1**	**5**	**663**	**33**	**1236**
Cars	8:15 AM	18	1	83	143	304	6	2	0	4	2	565	42	1170
Trucks	8:15 AM	0	0	0	3	10	0	1	0	0	0	4	0	18
Total	**8:15 AM**	**18**	**1**	**83**	**146**	**314**	**6**	**3**	**0**	**4**	**2**	**569**	**42**	**1188**
	Grand Total	**170**	**30**	**1230**	**1608**	**4178**	**90**	**82**	**38**	**48**	**40**	**10872**	**446**	**18832**
2008	**7:30-8:30**	**55**	**7**	**324**	**498**	**1198**	**23**	**17**	**7**	**12**	**12**	**2654**	**144**	**4951**
	Vehicles	85	15	603	791	2015	44	37	19	24	19	5363	222	9237
	Trucks	0	0	12	13	74	1	4	0	0	1	73	1	179
	% Trucks	**0.0%**	**0.0%**	**2.0%**	**1.6%**	**3.5%**	**2.2%**	**9.8%**	**0.0%**	**0.0%**	**5.0%**	**1.3%**	**0.4%**	**1.9%**
	PHF	0.76	0.44	0.89	0.85	0.92	0.64	0.61	0.58	0.75	0.60	0.88	0.86	0.98
2008 Balanced*	7:30-8:30	55	7	351	455	1094	21	18	7	12	12	2875	144	**5051**
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	55	7	351	455	1094	21	18	7	12	12	2875	144	**5051**

* Intersection volumes adjsuted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

There has been no growth in the corridor between 2008 and 2013.

AM Total Intersection Peak Hour Volume
4951

AM Total Truck Percentage
1.9%

AM Intersection PHF
0.98

Start Date 5/14/2008
Start Time 16:00

	Street Name	Carl D Silver --Southbound			Route 3--Westbound			Carl D Silver--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	77	3	242	208	680	12	8	5	6	6	452	61	1760
Trucks	4:00 PM	0	0	0	2	9	0	0	0	0	0	9	0	20
Total	**4:00 PM**	**77**	**3**	**242**	**210**	**689**	**12**	**8**	**5**	**6**	**6**	**461**	**61**	**1780**
Cars	4:15 PM	90	1	241	230	615	6	9	3	7	1	437	59	1699
Trucks	4:15 PM	0	0	0	0	8	0	0	0	0	0	5	0	13
Total	**4:15 PM**	**90**	**1**	**241**	**230**	**623**	**6**	**9**	**3**	**7**	**1**	**442**	**59**	**1712**
Cars	4:30 PM	75	2	177	226	678	10	3	1	4	2	446	59	1683
Trucks	4:30 PM	0	0	0	1	2	1	0	0	0	0	14	0	18
Total	**4:30 PM**	**75**	**2**	**177**	**227**	**680**	**11**	**3**	**1**	**4**	**2**	**460**	**59**	**1701**
Cars	4:45 PM	61	7	158	240	638	7	5	1	4	2	403	94	1620
Trucks	4:45 PM	0	0	0	1	8	0	0	0	0	0	9	0	18
Total	**4:45 PM**	**61**	**7**	**158**	**241**	**646**	**7**	**5**	**1**	**4**	**2**	**412**	**94**	**1638**
Cars	5:00 PM	75	7	237	202	601	5	6	4	4	1	476	59	1677
Trucks	5:00 PM	0	0	1	2	7	0	0	1	0	0	8	0	19
Total	**5:00 PM**	**75**	**7**	**238**	**204**	**608**	**5**	**6**	**5**	**4**	**1**	**484**	**59**	**1696**
Cars	5:15 PM	71	3	205	245	597	11	1	6	4	3	376	63	1585
Trucks	5:15 PM	0	0	0	1	3	0	1	0	0	0	7	0	12
Total	**5:15 PM**	**71**	**3**	**205**	**246**	**600**	**11**	**2**	**6**	**4**	**3**	**383**	**63**	**1597**
Cars	5:30 PM	88	0	193	260	568	11	7	3	8	1	415	63	1617
Trucks	5:30 PM	0	0	2	0	7	1	0	0	0	0	9	0	19
Total	**5:30 PM**	**88**	**0**	**195**	**260**	**575**	**12**	**7**	**3**	**8**	**1**	**424**	**63**	**1636**
Cars	5:45 PM	65	3	171	247	592	12	4	1	2	4	392	57	1550
Trucks	5:45 PM	0	0	1	0	8	2	0	0	0	0	7	0	18
Total	**5:45 PM**	**65**	**3**	**172**	**247**	**600**	**14**	**4**	**1**	**2**	**4**	**399**	**57**	**1568**
	Grand Total	**1204**	**52**	**3256**	**3730**	**10042**	**156**	**88**	**50**	**78**	**40**	**6930**	**1030**	**26656**
2008	**4:00-5:00**	**303**	**13**	**818**	**908**	**2638**	**36**	**25**	**10**	**21**	**11**	**1775**	**273**	**6831**
	Vehicles	602	26	1624	1858	4969	74	43	24	39	20	3397	515	13191
	Trucks	0	0	4	7	52	4	1	1	0	0	68	0	137
	% Trucks	**0.0%**	**0.0%**	**0.2%**	**0.4%**	**1.0%**	**5.1%**	**2.3%**	**4.0%**	**0.0%**	**0.0%**	**2.0%**	**0.0%**	**1.0%**
	PHF	0.84	0.46	0.85	0.94	0.96	0.75	0.69	0.50	0.75	0.46	0.96	0.73	0.96
2008 Balanced*	4:00-5:00	303	13	848	935	2715	37	26	10	21	11	1839	273	**7031**
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	303	13	848	935	2715	37	26	10	21	11	1839	273	**7031**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

There has been no growth in the corridor between 2008 and 2013.

PM Total Intersection Peak Hour Volume
6831

PM Total Truck Percentage
1.0%

PM Intersection PHF
0.96

Start Date 5/31/2008
Start Time 11:00

	Street Name	Carl D Silver --Southbound			Route 3--Westbound			Carl D Silver--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	11:00 AM	80	6	174	215	410	7	8	8	6	5	463	80	1462
Trucks	11:00 AM	0	0	2	0	9	0	0	0	0	0	6	2	19
Total	**11:00 AM**	**80**	**6**	**176**	**215**	**419**	**7**	**8**	**8**	**6**	**5**	**469**	**82**	**1481**
Cars	11:15 AM	96	8	221	271	516	8	11	10	8	7	459	95	1710
Trucks	11:15 AM	0	0	3	1	10	0	0	0	0	0	4	1	19
Total	**11:15 AM**	**96**	**8**	**224**	**272**	**526**	**8**	**11**	**10**	**8**	**7**	**463**	**96**	**1729**
Cars	11:30 AM	100	8	216	337	455	20	13	12	9	7	471	110	1758
Trucks	11:30 AM	0	0	1	1	10	0	0	0	0	0	5	3	20
Total	**11:30 AM**	**100**	**8**	**217**	**338**	**465**	**20**	**13**	**12**	**9**	**7**	**476**	**113**	**1778**
Cars	11:45 AM	102	6	249	336	539	10	8	12	5	5	516	77	1865
Trucks	11:45 AM	0	0	1	3	10	0	0	0	0	0	5	3	22
Total	**11:45 AM**	**102**	**6**	**250**	**339**	**549**	**10**	**8**	**12**	**5**	**5**	**521**	**80**	**1887**
Cars	12:00 PM	136	4	205	342	528	9	15	4	6	4	661	113	2027
Trucks	12:00 PM	3	0	5	2	12	0	0	0	0	0	4	1	27
Total	**12:00 PM**	**139**	**4**	**210**	**344**	**540**	**9**	**15**	**4**	**6**	**4**	**665**	**114**	**2054**
Cars	12:15 PM	158	7	280	310	506	7	7	4	11	7	554	88	1939
Trucks	12:15 PM	0	0	1	2	11	0	0	0	0	0	3	1	18
Total	**12:15 PM**	**158**	**7**	**281**	**312**	**517**	**7**	**7**	**4**	**11**	**7**	**557**	**89**	**1957**
Cars	12:30 PM	158	3	275	328	423	8	14	6	4	4	543	101	1867
Trucks	12:30 PM	0	0	4	1	4	0	0	0	0	0	2	1	12
Total	**12:30 PM**	**158**	**3**	**279**	**329**	**427**	**8**	**14**	**6**	**4**	**4**	**545**	**102**	**1879**
Cars	12:45 PM	102	3	247	306	510	9	10	8	4	6	521	79	1805
Trucks	12:45 PM	0	1	1	2	13	0	0	0	0	0	3	0	20
Total	**12:45 PM**	**102**	**4**	**248**	**308**	**523**	**9**	**10**	**8**	**4**	**6**	**524**	**79**	**1825**
	Grand Total	**1870**	**92**	**3770**	**4914**	**7932**	**156**	**172**	**128**	**106**	**90**	**8440**	**1510**	**29180**
2008	**11:45-12:45**	**557**	**20**	**1020**	**1324**	**2033**	**34**	**44**	**26**	**26**	**20**	**2288**	**385**	**7777**
	Vehicles	932	45	1867	2445	3887	78	86	64	53	45	4188	743	14433
	Trucks	3	1	18	12	79	0	0	0	0	0	32	12	157
	% Trucks	**0.3%**	**2.2%**	**1.0%**	**0.5%**	**2.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.8%**	**1.6%**	**1.1%**
	PHF	0.88	0.71	0.91	0.96	0.93	0.85	0.73	0.54	0.59	0.71	0.86	0.84	0.95

SAT Total Intersection Peak Hour Volume
7777

SAT Total Truck Percentage
1.1%

SAT Intersection PHF
0.95

Intersection: Route 3 / Gateway Blvd

Start Date 5/13/2008
Start Time 6:30

	Street Name	Gateway Blvd--Southbound			Route 3--Westbound			Gateway Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	19	1	0	0	255	20	24	9	47	41	239	27	682
Trucks	6:30 AM	0	0	0	0	15	0	0	0	1	2	9	0	27
Total	**6:30 AM**	**19**	**1**	**0**	**0**	**270**	**20**	**24**	**9**	**48**	**43**	**248**	**27**	**709**
Cars	6:45 AM	16	0	0	1	238	37	32	2	48	47	285	28	734
Trucks	6:45 AM	0	0	0	0	9	1	0	0	1	1	9	0	21
Total	**6:45 AM**	**16**	**0**	**0**	**1**	**247**	**38**	**32**	**2**	**49**	**48**	**294**	**28**	**755**
Cars	7:00 AM	18	0	3	2	242	21	27	6	78	48	249	24	718
Trucks	7:00 AM	0	0	1	0	8	0	2	0	0	1	10	0	22
Total	**7:00 AM**	**18**	**0**	**4**	**2**	**250**	**21**	**29**	**6**	**78**	**49**	**259**	**24**	**740**
Cars	7:15 AM	19	0	1	2	232	15	25	3	38	61	296	12	704
Trucks	7:15 AM	0	0	0	0	19	0	2	0	1	0	14	0	36
Total	**7:15 AM**	**19**	**0**	**1**	**2**	**251**	**15**	**27**	**3**	**39**	**61**	**310**	**12**	**740**
Cars	7:30 AM	9	1	2	4	268	35	19	4	53	70	338	15	818
Trucks	7:30 AM	0	0	0	0	25	0	0	0	0	3	5	0	33
Total	**7:30 AM**	**9**	**1**	**2**	**4**	**293**	**35**	**19**	**4**	**53**	**73**	**343**	**15**	**851**
Cars	7:45 AM	7	2	0	2	276	22	24	1	55	97	392	4	882
Trucks	7:45 AM	0	0	0	0	38	1	0	0	1	3	16	0	59
Total	**7:45 AM**	**7**	**2**	**0**	**2**	**314**	**23**	**24**	**1**	**56**	**100**	**408**	**4**	**941**
Cars	8:00 AM	1	0	3	1	284	22	20	4	51	101	353	10	850
Trucks	8:00 AM	0	0	0	0	35	2	1	0	1	6	14	0	59
Total	**8:00 AM**	**1**	**0**	**3**	**1**	**319**	**24**	**21**	**4**	**52**	**107**	**367**	**10**	**909**
Cars	8:15 AM	4	0	5	2	299	24	40	1	56	90	377	9	907
Trucks	8:15 AM	0	0	0	0	38	1	5	0	0	10	10	0	64
Total	**8:15 AM**	**4**	**0**	**5**	**2**	**337**	**25**	**45**	**1**	**56**	**100**	**387**	**9**	**971**
	Grand Total	**186**	**8**	**30**	**28**	**4562**	**402**	**442**	**60**	**862**	**1162**	**5232**	**258**	**13232**

2008	**7:30-8:30**	**21**	**3**	**10**	**9**	**1263**	**107**	**109**	**10**	**217**	**380**	**1505**	**38**	**3672**

Vehicles	93	4	14	14	2094	196	211	30	426	555	2529	129	6295
Trucks	0	0	1	0	187	5	10	0	5	26	87	0	321
% Trucks	**0.0%**	**0.0%**	**6.7%**	**0.0%**	**8.2%**	**2.5%**	**4.5%**	**0.0%**	**1.2%**	**4.5%**	**3.3%**	**0.0%**	**4.9%**
PHF	0.58	0.38	0.50	0.56	0.94	0.76	0.61	0.63	0.97	0.89	0.92	0.63	0.95

2008 Balanced*	7:30-8:30	23	3	10	9	1388	107	109	10	239	331	1310	33	3572

* Intersection volumes adjsuted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	23	3	10	9	1388	107	109	10	239	331	1310	33	3572

There has been no growth in the corridor between 2008 and 2013.

AM Total Intersection Peak Hour Volume
3672

AM Total Truck Percentage
4.9%

AM Intersection PHF
0.95

Start Date 5/13/2008
Start Time 16:00

	Street Name	Gateway Blvd--Southbound			Route 3--Westbound			Gateway Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	4	0	2	1	389	59	65	0	71	116	340	14	1061
Trucks	4:00 PM	0	0	0	0	15	0	0	0	0	0	4	0	19
Total	**4:00 PM**	**4**	**0**	**2**	**1**	**404**	**59**	**65**	**0**	**71**	**116**	**344**	**14**	**1080**
Cars	4:15 PM	1	2	3	0	387	60	48	0	110	160	390	17	1178
Trucks	4:15 PM	0	0	0	0	15	1	1	0	1	0	12	0	30
Total	**4:15 PM**	**1**	**2**	**3**	**0**	**402**	**61**	**49**	**0**	**111**	**160**	**402**	**17**	**1208**
Cars	4:30 PM	3	0	3	0	335	49	53	0	81	121	352	8	1005
Trucks	4:30 PM	0	0	0	1	13	1	1	0	0	0	16	0	32
Total	**4:30 PM**	**3**	**0**	**3**	**1**	**348**	**50**	**54**	**0**	**81**	**121**	**368**	**8**	**1037**
Cars	4:45 PM	4	0	2	0	307	68	42	0	84	97	347	15	966
Trucks	4:45 PM	0	0	0	0	5	3	1	0	2	1	10	0	22
Total	**4:45 PM**	**4**	**0**	**2**	**0**	**312**	**71**	**43**	**0**	**86**	**98**	**357**	**15**	**988**
Cars	5:00 PM	2	1	4	0	333	87	69	0	74	114	391	7	1082
Trucks	5:00 PM	0	0	0	0	10	0	1	0	2	0	11	0	24
Total	**5:00 PM**	**2**	**1**	**4**	**0**	**343**	**87**	**70**	**0**	**76**	**114**	**402**	**7**	**1106**
Cars	5:15 PM	0	0	4	0	400	52	51	1	95	130	385	9	1127
Trucks	5:15 PM	0	0	0	0	16	0	0	0	4	4	7	1	32
Total	**5:15 PM**	**0**	**0**	**4**	**0**	**416**	**52**	**51**	**1**	**99**	**134**	**392**	**10**	**1159**
Cars	5:30 PM	1	0	1	0	318	58	46	1	77	106	366	5	979
Trucks	5:30 PM	0	0	0	0	17	0	0	0	0	1	10	0	28
Total	**5:30 PM**	**1**	**0**	**1**	**0**	**335**	**58**	**46**	**1**	**77**	**107**	**376**	**5**	**1007**
Cars	5:45 PM	0	0	1	0	377	31	49	0	73	122	399	11	1063
Trucks	5:45 PM	0	0	0	0	11	0	1	0	2	0	9	0	23
Total	**5:45 PM**	**0**	**0**	**1**	**0**	**388**	**31**	**50**	**0**	**75**	**122**	**408**	**11**	**1086**
	Grand Total	**30**	**6**	**40**	**4**	**5896**	**938**	**856**	**4**	**1352**	**1944**	**6098**	**174**	**17342**

2008	**5:00-6:00**	**3**	**1**	**10**	**0**	**1482**	**228**	**217**	**2**	**327**	**477**	**1578**	**33**	**4358**

Vehicles	15	3	20	1	2846	464	423	2	665	966	2970	86	8461
Trucks	0	0	0	1	102	5	5	0	11	6	79	1	210
% Trucks	**0.0%**	**0.0%**	**0.0%**	**50.0%**	**3.5%**	**1.1%**	**1.2%**	**0.0%**	**1.6%**	**0.6%**	**2.6%**	**1.1%**	**2.4%**
PHF	0.38	0.25	0.63	-	0.89	0.66	0.78	0.50	0.83	0.89	0.97	0.75	0.94

2008 Balanced*	5:00-6:00	3	1	10	0	1396	228	217	2	308	455	1506	31	**4157**

* Intersection volumes adjsuted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	3	1	10	0	1396	228	217	2	308	455	1506	31	4157

There has been no growth in the corridor between 2008 and 2013.

PM Total Intersection Peak Hour Volume
4358

PM Total Truck Percentage
2.4%

PM Intersection PHF
0.94

Start Date 5/31/2008
Start Time 11:00

	Street Name	Short Road--Southbound			Route 17--Westbound			Short Road--Northbound			Route 17--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	11:00 AM	1	0	3	7	441	54	79	0	107	131	364	30	1217
Trucks	11:00 AM	0	0	0	0	12	1	1	0	2	1	5	0	22
Total	**11:00 AM**	**1**	**0**	**3**	**7**	**453**	**55**	**80**	**0**	**109**	**132**	**369**	**30**	**1239**
Cars	11:15 AM	7	4	6	4	430	65	90	0	113	158	392	14	1283
Trucks	11:15 AM	0	0	0	0	3	1	1	0	2	1	7	0	15
Total	**11:15 AM**	**7**	**4**	**6**	**4**	**433**	**66**	**91**	**0**	**115**	**159**	**399**	**14**	**1298**
Cars	11:30 AM	10	3	5	6	404	68	80	2	95	139	385	26	1223
Trucks	11:30 AM	0	0	0	0	10	1	0	0	0	1	3	0	15
Total	**11:30 AM**	**10**	**3**	**5**	**6**	**414**	**69**	**80**	**2**	**95**	**140**	**388**	**26**	**1238**
Cars	11:45 AM	5	2	8	3	474	69	93	0	87	122	368	23	1254
Trucks	11:45 AM	0	0	0	0	8	0	2	0	0	0	7	0	17
Total	**11:45 AM**	**5**	**2**	**8**	**3**	**482**	**69**	**95**	**0**	**87**	**122**	**375**	**23**	**1271**
Cars	12:00 PM	6	3	1	6	479	51	85	0	117	159	372	22	1301
Trucks	12:00 PM	0	0	0	0	9	1	0	0	2	3	9	0	24
Total	**12:00 PM**	**6**	**3**	**1**	**6**	**488**	**52**	**85**	**0**	**119**	**162**	**381**	**22**	**1325**
Cars	12:15 PM	8	2	2	2	464	44	91	0	122	144	370	15	1264
Trucks	12:15 PM	0	0	0	0	4	0	1	0	2	0	9	0	16
Total	**12:15 PM**	**8**	**2**	**2**	**2**	**468**	**44**	**92**	**0**	**124**	**144**	**379**	**15**	**1280**
Cars	12:30 PM	3	2	5	3	360	63	85	1	99	127	388	29	1165
Trucks	12:30 PM	1	0	0	0	4	2	0	0	0	1	7	0	15
Total	**12:30 PM**	**4**	**2**	**5**	**3**	**364**	**65**	**85**	**1**	**99**	**128**	**395**	**29**	**1180**
Cars	12:45 PM	6	1	1	3	417	59	96	0	82	199	427	24	1315
Trucks	12:45 PM	0	0	0	0	10	0	1	0	1	0	10	1	23
Total	**12:45 PM**	**6**	**1**	**1**	**3**	**427**	**59**	**97**	**0**	**83**	**199**	**437**	**25**	**1338**
	Grand Total	**94**	**34**	**62**	**68**	**7058**	**958**	**1410**	**6**	**1662**	**2372**	**6246**	**368**	**20338**

2008	**11:15-12:15**	**28**	**12**	**20**	**19**	**1817**	**256**	**351**	**2**	**416**	**583**	**1543**	**85**	**5132**

Vehicles	46	17	31	34	3469	473	699	3	822	1179	3066	183	10022
Trucks	1	0	0	0	60	6	6	0	9	7	57	1	147
% Trucks	**2.1%**	**0.0%**	**0.0%**	**0.0%**	**1.7%**	**1.3%**	**0.9%**	**0.0%**	**1.1%**	**0.6%**	**1.8%**	**0.5%**	**1.4%**
PHF	0.70	0.75	0.83	0.79	0.93	0.93	0.92	0.25	0.87	0.90	0.97	0.82	0.97

SAT Total Intersection Peak Hour Volume
5132

SAT Total Truck Percentage
1.4%

SAT Intersection PHF
0.97

Intersection: Route 17 / McLane Drive

Start Date 7/17/2007
Start Time 7:00

	Street Name	Route 17--Southbound			McLane Dr--Westbound			Route 17--Northbound			Hardee's Access--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM													0
Trucks	6:30 AM													0
Total	**6:30 AM**													**0**
Cars	6:45 AM													0
Trucks	6:45 AM													0
Total	**6:45 AM**													**0**
Cars	7:00 AM													0
Trucks	7:00 AM													0
Total	**7:00 AM**	**9**	**582**	**5**	**3**	**0**	**11**	**8**	**317**	**2**	**0**	**0**	**0**	**937**
Cars	7:15 AM													0
Trucks	7:15 AM													0
Total	**7:15 AM**	**8**	**631**	**9**	**4**	**0**	**2**	**5**	**340**	**2**	**1**	**2**	**5**	**1009**
Cars	7:30 AM													0
Trucks	7:30 AM													0
Total	**7:30 AM**	**12**	**734**	**4**	**6**	**0**	**9**	**7**	**433**	**3**	**2**	**4**	**7**	**1221**
Cars	7:45 AM													0
Trucks	7:45 AM													0
Total	**7:45 AM**	**8**	**721**	**15**	**4**	**1**	**6**	**5**	**416**	**2**	**3**	**2**	**4**	**1187**
Cars	8:00 AM													0
Trucks	8:00 AM													0
Total	**8:00 AM**	**3**	**687**	**5**	**0**	**0**	**5**	**10**	**428**	**3**	**0**	**1**	**3**	**1145**
Cars	8:15 AM													0
Trucks	8:15 AM													0
Total	**8:15 AM**	**2**	**545**	**2**	**2**	**0**	**12**	**11**	**435**	**7**	**1**	**1**	**3**	**1021**
	Grand Total	**42**	**3900**	**40**	**19**	**1**	**45**	**46**	**2369**	**19**	**7**	**10**	**22**	**6520**
2008	**7:30-8:30**	**25**	**1770***	**26**	**12**	**1**	**32**	**33**	**2190***	**15**	**6**	**8**	**17**	**4135**

*Adjusted to balance between adjacent intersections

	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.52	0.92	0.43	0.50	0.25	0.67	0.75	0.98	0.54	0.50	0.50	0.61	0.85
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	**25**	**1770***	**26**	**12**	**1**	**32**	**33**	**2190***	**15**	**6**	**8**	**17**	**4135**

There has been no growth in the corridor between 2008 and 2013

AM Total Intersection Peak Hour Volume
4135

AM Total Truck Percentage
#DIV/0!

AM Intersection PHF
0.85

Start Date 7/17/2007
Start Time 16:00

	Street Name	Route 17--Southbound			McLane Dr--Westbound			Route 17--Northbound			Hardee's Access--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM													0
Trucks	4:00 PM													0
Total	**4:00 PM**	4	554	5	3	0	7	2	424	0	2	0	3	**1004**
Cars	4:15 PM													0
Trucks	4:15 PM													0
Total	**4:15 PM**	2	451	3	0	0	6	2	642	2	0	0	1	**1109**
Cars	4:30 PM													0
Trucks	4:30 PM													0
Total	**4:30 PM**	3	521	5	3	0	18	5	685	2	0	0	1	**1243**
Cars	4:45 PM													0
Trucks	4:45 PM													0
Total	**4:45 PM**	3	448	3	1	0	3	3	560	2	2	1	3	**1029**
Cars	5:00 PM													0
Trucks	5:00 PM													0
Total	**5:00 PM**	3	513	3	7	2	11	6	581	2	0	0	5	**1133**
Cars	5:15 PM													0
Trucks	5:15 PM													0
Total	**5:15 PM**	2	535	4	6	1	15	5	565	3	1	0	0	**1137**
Cars	5:30 PM													0
Trucks	5:30 PM													0
Total	**5:30 PM**	10	671	1	2	0	8	1	521	2	6	0	1	**1223**
Cars	5:45 PM													0
Trucks	5:45 PM													0
Total	**5:45 PM**	5	602	2	2	1	4	3	539	2	0	1	3	**1164**
	Grand Total	**32**	**4295**	**26**	**24**	**4**	**72**	**27**	**4517**	**15**	**11**	**2**	**17**	**9042**
2008	**5:00-6:00**	**20**	**2321**	**10**	**17**	**4**	**38**	**15**	**2206**	**9**	**7**	**1**	**9**	**4657**

	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.50	0.86	0.63	0.61	0.50	0.63	0.63	0.95	0.75	0.29	0.25	0.45	0.95
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	20	2321	10	17	4	38	15	1856*	9	7	1	9	4657

There has been no growth in the corridor between 2008 and 2013

*Adjusted to balance between adjacent intersections

PM Total Intersection Peak Hour Volume
4657

PM Total Truck Percentage
#DIV/0!

PM Intersection PHF
0.95

Start Date 5/31/2008
Start Time 11:00

	Street Name	Route 17--Southbound			McLane Dr--Westbound			Route 17--Northbound			Hardee's Access--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	11:00 AM	0	370	5	2	0	3	3	361	4	6	6	2	762
Trucks	11:00 AM	0	15	0	0	0	1	0	25	1	0	0	0	42
Total	**11:00 AM**	**0**	**385**	**5**	**2**	**0**	**4**	**3**	**386**	**5**	**6**	**6**	**2**	**804**
Cars	11:15 AM	1	379	4	0	0	2	0	393	11	2	4	0	796
Trucks	11:15 AM	0	7	0	0	0	0	0	16	1	0	1	0	25
Total	**11:15 AM**	**1**	**386**	**4**	**0**	**0**	**2**	**0**	**409**	**12**	**2**	**5**	**0**	**821**
Cars	11:30 AM	0	454	8	2	0	22	4	409	9	2	4	2	916
Trucks	11:30 AM	0	12	0	0	0	0	0	25	0	0	0	0	37
Total	**11:30 AM**	**0**	**466**	**8**	**2**	**0**	**22**	**4**	**434**	**9**	**2**	**4**	**2**	**953**
Cars	11:45 AM	0	405	5	0	0	18	2	437	14	2	2	1	886
Trucks	11:45 AM	0	11	0	0	0	0	0	18	3	0	0	0	32
Total	**11:45 AM**	**0**	**416**	**5**	**0**	**0**	**18**	**2**	**455**	**17**	**2**	**2**	**1**	**918**
Cars	12:00 PM	4	384	7	1	0	7	2	393	25	2	0	5	830
Trucks	12:00 PM	0	9	0	0	0	0	0	16	1	0	0	0	26
Total	**12:00 PM**	**4**	**393**	**7**	**1**	**0**	**7**	**2**	**409**	**26**	**2**	**0**	**5**	**856**
Cars	12:15 PM	2	419	7	4	0	15	3	435	5	1	2	4	897
Trucks	12:15 PM	0	15	0	0	0	0	0	20	1	0	0	0	36
Total	**12:15 PM**	**2**	**434**	**7**	**4**	**0**	**15**	**3**	**455**	**6**	**1**	**2**	**4**	**933**
Cars	12:30 PM	6	396	10	0	0	7	0	445	10	9	7	0	890
Trucks	12:30 PM	0	8	0	0	0	0	0	18	0	0	0	0	26
Total	**12:30 PM**	**6**	**404**	**10**	**0**	**0**	**7**	**0**	**463**	**10**	**9**	**7**	**0**	**916**
Cars	12:45 PM	5	426	10	0	0	5	3	374	16	1	3	5	848
Trucks	12:45 PM	2	9	0	0	0	0	0	13	4	0	0	0	28
Total	**12:45 PM**	**7**	**435**	**10**	**0**	**0**	**5**	**3**	**387**	**20**	**1**	**3**	**5**	**876**
	Grand Total	**40**	**6638**	**112**	**18**	**0**	**160**	**34**	**6796**	**210**	**50**	**58**	**38**	**14154**
2008	**11:30-12:30**	**6**	**1709**	**27**	**7**	**0**	**62**	**11**	**1753**	**58**	**7**	**8**	**12**	**3660**

	Vehicles	18	3233	56	9	0	79	17	3247	94	25	28	19	6825
	Trucks	2	86	0	0	0	1	0	151	11	0	1	0	252
	% Trucks	**10.0%**	**2.6%**	**0.0%**	**0.0%**	**#DIV/0!**	**1.3%**	**0.0%**	**4.4%**	**10.5%**	**0.0%**	**3.4%**	**0.0%**	**3.6%**
	PHF	0.38	0.92	0.84	0.44	#DIV/0!	0.70	0.69	0.96	0.56	0.88	0.50	0.60	0.96

SAT Total Intersection Peak Hour Volume
3660

SAT Total Truck Percentage
3.6%

SAT Intersection PHF
0.96

Intersection: Route 17 / Sanford Drive

Start Date 6/6/2007
Start Time 7:00

	Street Name	Route 17--Southbound			Sanford Dr--Westbound			Route 17--Northbound			Sanford Dr--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM													0
Trucks	6:30 AM													0
Total	**6:30 AM**													**0**
Cars	6:45 AM													0
Trucks	6:45 AM													0
Total	**6:45 AM**													**0**
Cars	7:00 AM													0
Trucks	7:00 AM													0
Total	**7:00 AM**	3	466	2	6	2	12	23	522	52	39	1	14	**1142**
Cars	7:15 AM													0
Trucks	7:15 AM													0
Total	**7:15 AM**	5	445	1	3	7	16	15	552	63	39	3	12	**1161**
Cars	7:30 AM													0
Trucks	7:30 AM													0
Total	**7:30 AM**	7	463	4	3	28	9	41	538	105	60	0	11	**1269**
Cars	7:45 AM													0
Trucks	7:45 AM													0
Total	**7:45 AM**	5	449	4	3	24	7	32	560	67	105	1	15	**1272**
Cars	8:00 AM													0
Trucks	8:00 AM													0
Total	**8:00 AM**	6	428	1	7	8	9	28	549	61	32	1	1	**1131**
Cars	8:15 AM													0
Trucks	8:15 AM													0
Total	**8:15 AM**	12	459	2	0	7	11	16	421	48	40	1	10	**1027**
	Grand Total	**38**	**2710**	**14**	**22**	**76**	**64**	**155**	**3142**	**396**	**315**	**7**	**63**	**7002**

2008	**7:00-8:00**	**20**	**1823**	**11**	**15**	**61**	**44**	**111**	**2172**	**287**	**243**	**5**	**52**	**4844**

	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.71	0.98	0.69	0.63	0.54	0.69	0.68	0.97	0.68	0.58	0.42	0.87	0.95

2008 Balanced*	7:00-8:00	20	1807	11	15	61	144	213	2208	192	141	5	52	**4869**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	20	1807	11	15	61	144	213	2208	192	141	5	52	**4869**

There has been no growth in the corridor between 2008 and 2013.

AM Total Intersection Peak Hour Volume
4844

AM Total Truck Percentage
#DIV/0!

AM Intersection PHF
0.95

Start Date 6/6/2007
Start Time 16:00

	Street Name	Route 17--Southbound			Sanford Dr--Westbound			Route 17--Northbound			Sanford Dr--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM													0
Trucks	4:00 PM													0
Total	**4:00 PM**	6	603	1	4	5	28	16	498	29	81	5	25	**1301**
Cars	4:15 PM													0
Trucks	4:15 PM													0
Total	**4:15 PM**	7	621	1	0	3	12	21	445	20	141	0	11	**1282**
Cars	4:30 PM													0
Trucks	4:30 PM													0
Total	**4:30 PM**	6	589	0	2	3	12	13	476	43	161	2	7	**1314**
Cars	4:45 PM													0
Trucks	4:45 PM													0
Total	**4:45 PM**	7	593	3	1	2	21	14	454	66	319	1	1	**1482**
Cars	5:00 PM													0
Trucks	5:00 PM													0
Total	**5:00 PM**	7	639	1	0	5	10	26	424	84	184	2	13	**1395**
Cars	5:15 PM													0
Trucks	5:15 PM													0
Total	**5:15 PM**	17	579	1	3	6	26	22	449	58	147	0	6	**1314**
Cars	5:30 PM													0
Trucks	5:30 PM													0
Total	**5:30 PM**	13	558	1	2	6	13	18	452	111	222	1	12	**1409**
Cars	5:45 PM													0
Trucks	5:45 PM													0
Total	**5:45 PM**	7	491	0	0	7	13	29	429	49	99	0	6	**1130**
	Grand Total	**70**	**4673**	**8**	**12**	**37**	**135**	**159**	**3627**	**460**	**1354**	**11**	**81**	**10627**

2008	**4:45-5:45**	**44**	**2369**	**6**	**6**	**19**	**70**	**80**	**1779**	**319**	**872**	**4**	**32**	**5600**

	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.65	0.93	0.50	0.50	0.79	0.67	0.77	0.98	0.72	0.68	0.50	0.62	0.94

2008 Balanced*	4:45-5:45	44	2255	6	6	19	317	181	1807	224	580	4	32	**5475**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	44	2255	6	6	19	317	181	1807	224	580	4	32	**5475**

There has been no growth in the corridor between 2008 and 2013.

PM Total Intersection Peak Hour Volume
5600

PM Total Truck Percentage
#DIV/0!

PM Intersection PHF
0.94

Start Date 5/31/2008
Start Time 11:00

	Street Name	Route 17--Southbound			Sanford Dr--Westbound			Route 17--Northbound			Sanford Dr--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	11:00 AM	4	415	30	19	4	19	10	311	17	29	1	12	871
Trucks	11:00 AM	0	13	1	1	0	0	1	20	2	0	0	1	39
Total	**11:00 AM**	**4**	**428**	**31**	**20**	**4**	**19**	**11**	**331**	**19**	**29**	**1**	**13**	**910**
Cars	11:15 AM	9	419	18	19	6	26	34	394	21	29	1	3	979
Trucks	11:15 AM	0	10	0	0	0	0	0	25	1	0	0	0	36
Total	**11:15 AM**	**9**	**429**	**18**	**19**	**6**	**26**	**34**	**419**	**22**	**29**	**1**	**3**	**1015**
Cars	11:30 AM	5	440	20	24	1	31	24	374	12	44	0	16	991
Trucks	11:30 AM	0	13	0	0	1	4	1	26	0	1	0	0	46
Total	**11:30 AM**	**5**	**453**	**20**	**24**	**2**	**35**	**25**	**400**	**12**	**45**	**0**	**16**	**1037**
Cars	11:45 AM	4	417	30	25	2	26	28	391	25	29	2	9	988
Trucks	11:45 AM	0	20	0	0	0	0	1	22	1	1	0	0	45
Total	**11:45 AM**	**4**	**437**	**30**	**25**	**2**	**26**	**29**	**413**	**26**	**30**	**2**	**9**	**1033**
Cars	12:00 PM	5	386	16	30	7	28	30	387	29	32	4	8	962
Trucks	12:00 PM	0	13	0	0	0	2	2	19	1	0	0	0	37
Total	**12:00 PM**	**5**	**399**	**16**	**30**	**7**	**30**	**32**	**406**	**30**	**32**	**4**	**8**	**999**
Cars	12:15 PM	9	421	18	22	3	33	37	397	25	26	4	12	1007
Trucks	12:15 PM	0	21	0	1	0	1	2	22	1	1	0	0	49
Total	**12:15 PM**	**9**	**442**	**18**	**23**	**3**	**34**	**39**	**419**	**26**	**27**	**4**	**12**	**1056**
Cars	12:30 PM	13	391	32	36	8	24	33	405	33	27	2	13	1017
Trucks	12:30 PM	0	11	0	0	0	0	2	20	0	0	0	1	34
Total	**12:30 PM**	**13**	**402**	**32**	**36**	**8**	**24**	**35**	**425**	**33**	**27**	**2**	**14**	**1051**
Cars	12:45 PM	13	412	16	30	3	24	39	354	48	29	1	3	972
Trucks	12:45 PM	0	13	0	1	0	2	2	15	0	3	0	0	36
Total	**12:45 PM**	**13**	**425**	**16**	**31**	**3**	**26**	**41**	**369**	**48**	**32**	**1**	**3**	**1008**
	Grand Total	**124**	**6830**	**362**	**416**	**70**	**440**	**492**	**6364**	**432**	**502**	**30**	**156**	**16218**

2008	**11:45-12:45**	**31**	**1680**	**96**	**114**	**20**	**114**	**135**	**1663**	**115**	**116**	**12**	**43**	**4139**

	Vehicles	62	3301	180	205	34	211	235	3013	210	245	15	76	7787
	Trucks	0	114	1	3	1	9	11	169	6	6	0	2	322
	% Trucks	**0.0%**	**3.3%**	**0.6%**	**1.4%**	**2.9%**	**4.1%**	**4.5%**	**5.3%**	**2.8%**	**2.4%**	**0.0%**	**2.6%**	**4.0%**
	PHF	0.60	0.95	0.75	0.79	0.63	0.84	0.87	0.98	0.87	0.91	0.75	0.77	0.98

SAT Total Intersection Peak Hour Volume
4139

SAT Total Truck Percentage
4.0%

SAT Intersection PHF
0.98

Intersection: Route 17 / Short Road

Start Date 5/14/2008

	Start Time	Changed from SB to WB			Changed from WB to NB			Changed from NB to EB			Changed from EB to SB			Total
	Street Name	Short Road--Westbound			Route 17--Northbound			Short Road--Eastbound			Route 17--Southbound			
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	1	0	1	0	268	1	4	0	25	10	169	1	480
Trucks	6:30 AM	0	0	0	0	2	0	0	0	1	0	6	0	9
Total	**6:30 AM**	**1**	**0**	**1**	**0**	**270**	**1**	**4**	**0**	**26**	**10**	**175**	**1**	**489**
Cars	6:45 AM	5	0	2	1	273	3	4	0	28	14	214	1	545
Trucks	6:45 AM	0	0	0	0	2	0	1	0	1	0	5	0	9
Total	**6:45 AM**	**5**	**0**	**2**	**1**	**275**	**3**	**5**	**0**	**29**	**14**	**219**	**1**	**554**
Cars	7:00 AM	2	0	0	2	255	3	3	0	28	14	177	1	485
Trucks	7:00 AM	0	0	0	0	7	0	0	0	1	0	7	0	15
Total	**7:00 AM**	**2**	**0**	**0**	**2**	**262**	**3**	**3**	**0**	**29**	**14**	**184**	**1**	**500**
Cars	7:15 AM	3	0	2	0	301	3	3	0	20	13	216	2	563
Trucks	7:15 AM	0	0	0	0	5	0	0	0	1	1	8	0	15
Total	**7:15 AM**	**3**	**0**	**2**	**0**	**306**	**3**	**3**	**0**	**21**	**14**	**224**	**2**	**578**
Cars	7:30 AM	4	0	0	1	307	3	5	0	24	10	254	3	611
Trucks	7:30 AM	0	0	0	0	4	0	0	0	2	0	8	1	15
Total	**7:30 AM**	**4**	**0**	**0**	**1**	**311**	**3**	**5**	**0**	**26**	**10**	**262**	**4**	**626**
Cars	7:45 AM	1	0	0	0	287	2	3	0	22	11	293	1	620
Trucks	7:45 AM	4	0	0	0	10	0	0	0	0	0	10	1	25
Total	**7:45 AM**	**5**	**0**	**0**	**0**	**297**	**2**	**3**	**0**	**22**	**11**	**303**	**2**	**645**
Cars	8:00 AM	0	0	0	0	227	6	0	0	21	15	240	0	509
Trucks	8:00 AM	0	0	0	0	11	0	0	0	1	1	6	0	19
Total	**8:00 AM**	**0**	**0**	**0**	**0**	**238**	**6**	**0**	**0**	**22**	**16**	**246**	**0**	**528**
Cars	8:15 AM	1	0	1	0	249	2	7	0	30	4	268	0	562
Trucks	8:15 AM	0	0	0	0	7	0	0	0	0	0	4	0	11
Total	**8:15 AM**	**1**	**0**	**1**	**0**	**256**	**2**	**7**	**0**	**30**	**4**	**272**	**0**	**573**
	Grand Total	**42**	**0**	**12**	**8**	**4430**	**46**	**60**	**0**	**410**	**186**	**3770**	**22**	**8986**
2008	**7:15-8:15**	**12**	**0**	**2**	**1**	**1152**	**14**	**11**	**0**	**91**	**51**	**1035**	**8**	**2377**
	Vehicles	17	0	6	4	2167	23	29	0	198	91	1831	9	4375
	Trucks	4	0	0	0	48	0	1	0	7	2	54	2	118
	% Trucks	**19.0%**	**#DIV/0!**	**0.0%**	**0.0%**	**2.2%**	**0.0%**	**3.3%**	**#DIV/0!**	**3.4%**	**2.2%**	**2.9%**	**18.2%**	**2.6%**
	PHF	0.60	#DIV/0!	0.25	0.25	0.93	1.17	0.55	#DIV/0!	0.88	0.80	0.85	0.50	0.92
2008 Balanced*	7:15-8:15	12	0	2	1	1113	14	11	0	88	52	1052	8	**2353**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	12	0	2	1	1113	14	11	0	88	52	1052	8	**2353**

There has been no growth in the corridor between 2008 and 2013.

AM Total Intersection Peak Hour Volume
2377

AM Total Truck Percentage
2.6%

AM Intersection PHF
0.92

Start Date 5/14/2008

	Start Time	Changed from SB to WB			Changed from WB to NB			Changed from NB to EB			Changed from EB to SB			Total
	Street Name	Short Road--Westbound			Route 17--Northbound			Short Road--Eastbound			Route 17--Southbound			
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	0	0	2	0	255	3	4	1	27	20	406	2	720
Trucks	4:00 PM	0	0	0	0	9	0	0	0	1	0	8	0	18
Total	**4:00 PM**	**0**	**0**	**2**	**0**	**264**	**3**	**4**	**1**	**28**	**20**	**414**	**2**	**738**
Cars	4:15 PM	1	0	1	0	240	5	2	0	19	18	369	3	658
Trucks	4:15 PM	0	0	0	0	2	0	0	0	0	0	12	0	14
Total	**4:15 PM**	**1**	**0**	**1**	**0**	**242**	**5**	**2**	**0**	**19**	**18**	**381**	**3**	**672**
Cars	4:30 PM	1	0	0	0	257	4	6	0	17	25	362	1	673
Trucks	4:30 PM	0	0	0	0	3	0	0	0	2	0	10	0	15
Total	**4:30 PM**	**1**	**0**	**0**	**0**	**260**	**4**	**6**	**0**	**19**	**25**	**372**	**1**	**688**
Cars	4:45 PM	1	0	0	0	233	0	1	1	28	17	387	1	669
Trucks	4:45 PM	0	0	0	0	5	1	0	0	0	0	9	0	15
Total	**4:45 PM**	**1**	**0**	**0**	**0**	**238**	**1**	**1**	**1**	**28**	**17**	**396**	**1**	**684**
Cars	5:00 PM	1	1	1	1	240	4	9	0	13	22	429	2	723
Trucks	5:00 PM	0	0	0	0	4	0	0	0	0	2	11	0	17
Total	**5:00 PM**	**1**	**1**	**1**	**1**	**244**	**4**	**9**	**0**	**13**	**24**	**440**	**2**	**740**
Cars	5:15 PM	2	0	0	0	284	3	10	1	13	13	380	1	707
Trucks	5:15 PM	0	0	0	0	2	0	0	0	0	1	9	0	12
Total	**5:15 PM**	**2**	**0**	**0**	**0**	**286**	**3**	**10**	**1**	**13**	**14**	**389**	**1**	**719**
Cars	5:30 PM	3	0	1	0	247	3	6	0	20	15	403	1	699
Trucks	5:30 PM	0	0	0	0	1	0	0	0	0	0	8	0	9
Total	**5:30 PM**	**3**	**0**	**1**	**0**	**248**	**3**	**6**	**0**	**20**	**15**	**411**	**1**	**708**
Cars	5:45 PM	3	1	3	1	208	6	5	1	22	23	346	3	622
Trucks	5:45 PM	0	0	0	0	5	0	0	0	0	1	9	0	15
Total	**5:45 PM**	**3**	**1**	**3**	**1**	**213**	**6**	**5**	**1**	**22**	**24**	**355**	**3**	**637**
	Grand Total	**24**	**4**	**16**	**4**	**3990**	**58**	**86**	**8**	**324**	**314**	**6316**	**28**	**11172**
2008	**4:45-5:45**	**7**	**1**	**2**	**1**	**1016**	**11**	**26**	**2**	**74**	**70**	**1636**	**5**	**2851**
	Vehicles	12	2	8	2	1964	28	43	4	159	153	3082	14	5471
	Trucks	0	0	0	0	31	1	0	0	3	4	76	0	115
	% Trucks	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.6%**	**3.4%**	**0.0%**	**0.0%**	**1.9%**	**2.5%**	**2.4%**	**0.0%**	**2.1%**
	PHF	0.58	0.25	0.50	0.25	0.89	0.69	0.65	0.50	0.66	0.73	0.93	0.63	0.96
2008 Balanced*	4:45-5:45	7	1	2	1	984	11	26	2	72	77	1789	5	**2977**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	7	1	2	1	984	11	26	2	72	77	1789	5	2977

There has been no growth in the corridor between 2008 and 2013.

PM Total Intersection Peak Hour Volume
2851

PM Total Truck Percentage
2.1%

PM Intersection PHF
0.96

Start Date 5/17/2008
Start Time 11:00

	Street Name	Short Road--Southbound			Route 17--Westbound			Short Road--Northbound			Route 17--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	11:00 AM	6	2	2	0	189	2	1	1	19	4	233	4	463
Trucks	11:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2
Total	**11:00 AM**	**6**	**2**	**2**	**0**	**189**	**2**	**1**	**1**	**19**	**4**	**235**	**4**	**465**
Cars	11:15 AM	3	0	0	1	204	27	6	1	24	21	229	1	517
Trucks	11:15 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
Total	**11:15 AM**	**3**	**0**	**0**	**1**	**205**	**27**	**6**	**1**	**24**	**21**	**230**	**1**	**519**
Cars	11:30 AM	4	0	1	2	185	4	4	0	22	14	289	3	528
Trucks	11:30 AM	0	0	0	0	0	0	1	0	0	0	3	0	4
Total	**11:30 AM**	**4**	**0**	**1**	**2**	**185**	**4**	**5**	**0**	**22**	**14**	**292**	**3**	**532**
Cars	11:45 AM	5	1	2	2	169	4	4	0	21	16	272	3	499
Trucks	11:45 AM	0	0	0	0	3	0	0	1	1	0	3	0	8
Total	**11:45 AM**	**5**	**1**	**2**	**2**	**172**	**4**	**4**	**1**	**22**	**16**	**275**	**3**	**507**
Cars	12:00 PM	2	0	0	1	174	2	4	0	20	18	277	4	502
Trucks	12:00 PM	0	0	0	0	0	1	0	0	0	0	1	0	2
Total	**12:00 PM**	**2**	**0**	**0**	**1**	**174**	**3**	**4**	**0**	**20**	**18**	**278**	**4**	**504**
Cars	12:15 PM	7	0	1	1	214	4	4	1	13	11	335	5	596
Trucks	12:15 PM	0	0	0	0	1	0	0	0	0	0	2	0	3
Total	**12:15 PM**	**7**	**0**	**1**	**1**	**215**	**4**	**4**	**1**	**13**	**11**	**337**	**5**	**599**
Cars	12:30 PM	3	0	2	2	212	5	4	0	21	19	219	2	489
Trucks	12:30 PM	0	0	0	0	1	0	0	0	0	0	1	0	2
Total	**12:30 PM**	**3**	**0**	**2**	**2**	**213**	**5**	**4**	**0**	**21**	**19**	**220**	**2**	**491**
Cars	12:45 PM	5	1	1	1	178	7	4	2	18	14	234	5	470
Trucks	12:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	**12:45 PM**	**5**	**1**	**1**	**1**	**178**	**7**	**4**	**2**	**19**	**14**	**234**	**5**	**471**
	Grand Total	**70**	**8**	**18**	**20**	**3062**	**112**	**64**	**12**	**320**	**234**	**4202**	**54**	**8176**
2008	**11:30-12:30**	**18**	**1**	**4**	**6**	**746**	**15**	**17**	**2**	**77**	**59**	**1182**	**15**	**2142**
	Vehicles	35	4	9	10	1525	55	31	5	158	117	2088	27	4064
	Trucks	0	0	0	0	6	1	1	1	2	0	13	0	24
	% Trucks	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.4%**	**1.8%**	**3.1%**	**16.7%**	**1.3%**	**0.0%**	**0.6%**	**0.0%**	**0.6%**
	PHF	0.64	0.25	0.50	0.75	0.87	0.94	0.85	0.50	0.88	0.82	0.88	0.75	0.89

SAT Total Intersection Peak Hour Volume
2142

SAT Total Truck Percentage
0.6%

SAT Intersection PHF
0.89

Arterial Tube Counts

- VA 3 – Eastbound
- VA 3 – Westbound
- VA 3 – Total (EB + WB)

Loc: Rt. 3 e/o Kennedy Lane GPS: 38.28897 77.53644
Direction: EAST

TIME		WED		THU		FRI		SAT	
		14		15		16		17	
Lane 1		AM	PM	AM	PM	AM	PM	AM	PM
0:15		39	420	38	425	36	483	73	482
0:30		25	406	34	400	31	448	70	482
0:45		39	403	32	412	28	468	56	511
1:00		35	382	33	411	27	427	53	515
1:15	AM Period	21	347	25	389	25	419	48	544
1:30	PM Perod	23	409	19	382	19	404	34	480
1:45	SAT Period	20	399	23	400	26	437	54	448
2:00		25	388	28	363	23	450	37	476
2:15		28	380	23	354	24	386	33	467
2:30		31	377	31	376	25	439	31	411
2:45		29	427	23	437	31	445	19	460
3:00		27	402	43	412	24	439	32	455
3:15		30	381	46	428	44	463	26	467
3:30		54	388	48	395	31	432	31	480
3:45		73	435	68	431	78	451	50	442
4:00		112	406	118	444	89	437	41	420
4:15		144	403	153	387	152	444	55	490
4:30		188	442	204	445	170	474	58	439
4:45		320	409	311	410	262	462	69	469
5:00		323	429	332	436	264	483	84	504
5:15		328	428	333	433	272	449	65	482
5:30		372	417	356	346	330	434	95	416
5:45		472	420	442	472	396	464	135	375
6:00		478	417	449	395	446	438	141	469
6:15		499	401	523	408	404	488	147	415
6:30		606	363	607	413	488	474	160	411
6:45		600	358	616	357	543	470	268	375
7:00		608	373	606	359	573	440	254	394
7:15		585	288	540	302	519	370	245	386
7:30		639	246	633	309	546	400	280	328
7:45		649	280	676	272	629	392	342	342
8:00		612	222	647	250	611	302	328	348
8:15		494	267	525	245	595	329	349	334
8:30		589	211	596	194	546	273	389	338
8:45		613	216	607	208	664	262	411	277
9:00		628	177	581	151	617	240	462	285
9:15		531	213	522	190	463	251	444	258
9:30		443	183	490	187	493	208	504	263
9:45		538	177	521	138	548	207	522	321
10:00		467	133	495	127	499	228	563	235
10:15		442	132	458	129	467	214	512	185
10:30		434	88	419	100	447	174	499	205
10:45		407	112	420	100	489	191	544	200
11:00		411	91	461	78	470	136	549	186
11:15		422	54	428	75	453	140	522	153
11:30		425	70	410	75	456	94	549	150
11:45		406	51	469	46	476	92	536	122
12:00		407	58	461	46	473	102	507	122
TOTALS		30170		30465		32475		29093	

Loc: Rt. 3 e/o Kennedy Lane GPS: 38.28897 77.53644
Direction: WEST

TIME		WED		THU		FRI		SAT	
		14		15		16		17	
Lane 1		AM	PM	AM	PM	AM	PM	AM	PM
0:15		87	391	80	405	89	451	155	463
0:30		85	408	83	381	81	494	162	523
0:45		83	430	91	445	85	489	156	507
1:00		63	412	62	482	66	509	107	483
1:15	AM Period	63	435	60	426	61	525	81	500
1:30	PM Perod	68	417	50	400	53	523	96	504
1:45	SAT Period	41	449	36	433	36	526	90	519
2:00		42	502	38	464	43	521	64	466
2:15		28	440	41	480	55	518	65	500
2:30		22	468	37	486	33	580	81	558
2:45		41	521	24	544	42	590	68	498
3:00		16	525	20	515	33	594	48	482
3:15		12	562	29	535	46	573	34	508
3:30		16	582	26	647	29	613	42	560
3:45		16	561	27	580	29	552	44	521
4:00		24	573	33	631	32	485	27	496
4:15		22	571	32	613	18	589	29	512
4:30		27	598	33	620	28	612	30	515
4:45		34	665	39	648	34	649	25	502
5:00		31	636	29	637	30	631	21	465
5:15		33	659	48	659	37	608	25	489
5:30		63	652	55	664	63	667	37	522
5:45		48	657	56	642	48	621	32	454
6:00		64	708	56	644	58	673	59	454
6:15		96	657	94	627	89	606	61	497
6:30		133	668	121	601	87	554	65	474
6:45		119	659	142	637	133	595	84	482
7:00		170	625	175	604	141	593	110	440
7:15		171	566	173	578	186	601	121	477
7:30		238	556	211	571	229	570	158	414
7:45		230	505	219	539	220	557	167	457
8:00		239	435	201	516	206	567	173	417
8:15		222	452	241	487	259	518	250	463
8:30		296	402	307	453	250	497	215	440
8:45		271	449	277	470	304	491	270	477
9:00		317	451	309	458	273	483	274	438
9:15		287	419	290	423	245	505	314	411
9:30		290	399	282	359	312	480	316	401
9:45		268	365	279	398	270	466	350	394
10:00		260	328	274	332	296	419	372	422
10:15		303	263	324	287	317	436	371	397
10:30		288	244	325	272	311	422	406	336
10:45		355	219	329	232	334	333	452	329
11:00		321	159	326	180	352	324	452	312
11:15		352	150	334	161	418	290	420	293
11:30		345	155	370	138	376	222	475	240
11:45		375	111	386	123	407	220	456	207
12:00		400	91	375	118	453	161	414	200
TOTALS		29525		29994		32100		29743	

Loc: Rt. 3 e/o Kennedy Lane GPS: 38.28897 77.53644
Direction: TOTAL

TIME		WED		THU		FRI		SAT	
		14		15		16		17	
Lane 1		AM	PM	AM	PM	AM	PM	AM	PM
0:15		126	811	118	830	125	934	228	945
0:30		110	814	117	781	112	942	232	1005
0:45		122	833	123	857	113	957	212	1018
1:00		98	794	95	893	93	936	160	998
1:15	AM Period	84	782	85	815	86	944	129	1044
1:30	PM Perod	91	826	69	782	72	927	130	984
1:45	SAT Period	61	848	59	833	62	963	144	967
2:00		67	890	66	827	66	971	101	942
2:15		56	820	64	834	79	904	98	967
2:30		53	845	68	862	58	1019	112	969
2:45		70	948	47	981	73	1035	87	958
3:00		43	927	63	927	57	1033	80	937
3:15		42	943	75	963	90	1036	60	975
3:30		70	970	74	1042	60	1045	73	1040
3:45		89	996	95	1011	107	1003	94	963
4:00		136	979	151	1075	121	922	68	916
4:15		166	974	185	1000	170	1033	84	1002
4:30		215	1040	237	1065	198	1086	88	954
4:45		354	1074	350	1058	296	1111	94	971
5:00		354	1065	361	1073	294	1114	105	969
5:15		361	1087	381	1092	309	1057	90	971
5:30		435	1069	411	1010	393	1101	132	938
5:45		520	1077	498	1114	444	1085	167	829
6:00		542	1125	505	1039	504	1111	200	923
6:15		595	1058	617	1035	493	1094	208	912
6:30		739	1031	728	1014	575	1028	225	885
6:45		719	1017	758	994	676	1065	352	857
7:00		778	998	781	963	714	1033	364	834
7:15		756	854	713	880	705	971	366	863
7:30		877	802	844	880	775	970	438	742
7:45		879	785	895	811	849	949	509	799
8:00		851	657	848	766	817	869	501	765
8:15		716	719	766	732	854	847	599	797
8:30		885	613	903	647	796	770	604	778
8:45		884	665	884	678	968	753	681	754
9:00		945	628	890	609	890	723	736	723
9:15		818	632	812	613	708	756	758	669
9:30		733	582	772	546	805	688	820	664
9:45		806	542	800	536	818	673	872	715
10:00		727	461	769	459	795	647	935	657
10:15		745	395	782	416	784	650	883	582
10:30		722	332	744	372	758	596	905	541
10:45		762	331	749	332	823	524	996	529
11:00		732	250	787	258	822	460	1001	498
11:15		774	204	762	236	871	430	942	446
11:30		770	225	780	213	832	316	1024	390
11:45		781	162	855	169	883	312	992	329
12:00		807	149	836	164	926	263	921	322
TOTALS		59695		60459		64575		58836	
K Factor		0.059167	0.073004	0.056948	0.070941	0.053318	0.066419	0.069090353	

K Factor - AM 0.056478
K Factor - PM 0.070121
K Factor - SAT 0.06909

Arterial Tube Counts

- US 17 – Northbound
- US 17 – Southbound
- US 17 – Total (NB + SB)

Loc: Rt. 17 btw Falls Run and Powell GPS: 38.34901 77.50241
Direction: NORTH

TIME		THU		FRI		SAT		SUN	
		12		13		14		15	
Lane 1		AM	PM	AM	PM	AM	PM	AM	PM
0:15		84	425	104	435	113	458	125	412
0:30		95	467	81	404	126	441	107	417
0:45		66	450	70	421	116	398	78	441
1:00		53	468	66	424	99	409	55	429
1:15	AM Period	35	467	37	462	83	393	59	412
1:30	PM Perod	42	454	63	408	86	397	72	453
1:45	SAT Period	43	444	68	491	86	456	53	471
2:00		53	469	53	441	74	436	46	399
2:15		45	447	56	421	85	509	49	421
2:30		39	466	53	447	78	440	38	401
2:45		54	493	65	471	58	489	36	401
3:00		53	571	45	552	41	472	47	418
3:15		37	506	42	515	56	484	42	402
3:30		32	528	45	524	42	505	52	432
3:45		32	556	47	513	34	478	37	420
4:00		66	458	72	489	45	508	25	387
4:15		88	525	86	483	33	483	21	391
4:30		70	496	78	567	45	515	20	384
4:45		97	522	75	523	66	475	23	392
5:00		106	518	99	518	51	427	26	410
5:15		154	493	107	469	61	474	28	355
5:30		156	435	160	540	50	417	42	399
5:45		218	480	216	491	115	403	45	360
6:00		311	473	277	398	99	367	48	380
6:15		263	466	287	428	100	346	52	388
6:30		356	472	326	436	127	447	57	379
6:45		357	381	343	357	157	336	82	404
7:00		451	465	460	415	204	249	83	388
7:15		445	350	416	377	195	252	105	305
7:30		500	382	494	385	214	400	107	328
7:45		527	338	578	359	243	310	145	342
8:00		499	342	553	336	285	267	133	290
8:15		438	311	447	313	259	275	164	338
8:30		405	369	460	313	288	289	155	304
8:45		394	320	457	329	331	251	188	279
9:00		483	342	456	334	319	231	217	231
9:15		408	319	453	346	382	247	219	275
9:30		435	324	459	356	345	262	244	252
9:45		418	296	383	336	392	228	301	229
10:00		370	207	398	356	413	203	290	172
10:15		371	234	388	303	403	180	299	174
10:30		372	176	399	273	411	197	325	161
10:45		373	146	441	244	439	201	341	129
11:00		376	106	413	224	409	168	370	123
11:15		393	138	442	207	424	149	360	135
11:30		443	130	455	176	433	140	402	106
11:45		421	109	399	163	443	160	372	99
12:00		449	90	509	145	447	144	431	80
TOTALS		30400		31399		26171		22314	

Loc: Rt. 17 btw Falls Run and Powell GPS: 38.34901 77.50241
Direction: SOUTH

TIME		THU		FRI		SAT		SUN	
		12		13		14		15	
Lane 1		AM	PM	AM	PM	AM	PM	AM	PM
0:15		131	434	121	497	150	521	82	441
0:30		103	398	91	451	114	477	101	427
0:45		81	437	103	450	86	466	62	413
1:00		67	500	74	459	87	465	55	371
1:15	AM Period	72	443	68	419	75	449	58	346
1:30	PM Perod	71	469	94	421	66	464	54	379
1:45	SAT Period	49	467	72	465	56	406	37	383
2:00		53	404	38	433	53	421	37	375
2:15		45	469	43	464	29	414	45	413
2:30		56	443	51	448	45	371	30	369
2:45		43	495	64	455	55	396	32	410
3:00		41	440	68	506	56	372	32	367
3:15		58	435	58	511	42	346	34	349
3:30		48	473	49	487	35	368	28	336
3:45		48	506	60	510	65	400	11	384
4:00		67	524	62	481	49	360	20	368
4:15		82	531	91	563	43	377	37	333
4:30		125	488	98	531	55	360	31	336
4:45		156	493	125	514	55	415	35	339
5:00		191	549	164	503	89	401	26	309
5:15		201	576	189	484	78	414	33	357
5:30		197	556	196	528	83	396	54	339
5:45		265	530	260	519	114	361	62	333
6:00		286	521	263	498	130	379	60	295
6:15		316	519	301	530	172	280	53	330
6:30		359	478	281	506	135	329	79	324
6:45		319	519	336	482	206	305	88	290
7:00		452	454	414	490	255	277	99	295
7:15		419	457	398	491	253	329	100	311
7:30		439	411	472	465	233	295	122	292
7:45		492	319	499	435	329	268	141	252
8:00		488	315	485	351	325	279	179	290
8:15		434	323	403	373	365	242	172	247
8:30		423	286	392	353	320	206	209	308
8:45		472	300	481	324	418	251	235	239
9:00		461	295	469	271	429	214	230	230
9:15		460	289	468	312	413	238	261	256
9:30		479	332	436	349	442	207	320	244
9:45		473	251	457	250	444	207	300	188
10:00		436	214	507	237	473	186	333	169
10:15		454	201	457	262	475	181	335	172
10:30		468	220	497	230	475	167	399	133
10:45		438	170	459	178	482	172	409	143
11:00		451	130	527	158	477	150	422	112
11:15		424	132	495	178	449	125	386	106
11:30		422	143	490	140	570	103	424	87
11:45		410	125	446	151	543	98	355	96
12:00		432	111	502	94	461	87	436	57
TOTALS		31532		32381		25849		21086	

Loc: Rt. 17 btw Falls Run and Powell GPS: 38.34901 77.50241
Direction: TOTAL

TIME		THU		FRI		SAT		SUN	
		12-May		13-May		14-May		15-May	
Lane 1		AM	PM	AM	PM	AM	PM	AM	PM
0:15		215	859	225	932	263	979	207	853
0:30		198	865	172	855	240	918	208	844
0:45		147	887	173	871	202	864	140	854
1:00		120	968	140	883	186	874	110	800
1:15	AM Period	107	910	105	881	158	842	117	758
1:30	PM Perod	113	923	157	829	152	861	126	832
1:45	SAT Period	92	911	140	956	142	862	90	854
2:00		106	873	91	874	127	857	83	774
2:15		90	916	99	885	114	923	94	834
2:30		95	909	104	895	123	811	68	770
2:45		97	988	129	926	113	885	68	811
3:00		94	1011	113	1058	97	844	79	785
3:15		95	941	100	1026	98	830	76	751
3:30		80	1001	94	1011	77	873	80	768
3:45		80	1062	107	1023	99	878	48	804
4:00		133	982	134	970	94	868	45	755
4:15		170	1056	177	1046	76	860	58	724
4:30		195	984	176	1098	100	875	51	720
4:45		253	1015	200	1037	121	890	58	731
5:00		297	1067	263	1021	140	828	52	719
5:15		355	1069	296	953	139	888	61	712
5:30		353	991	356	1068	133	813	96	738
5:45		483	1010	476	1010	229	764	107	693
6:00		597	994	540	896	229	746	108	675
6:15		579	985	588	958	272	626	105	718
6:30		715	950	607	942	262	776	136	703
6:45		676	900	679	839	363	641	170	694
7:00		903	919	874	905	459	526	182	683
7:15		864	807	814	868	448	581	205	616
7:30		939	793	966	850	447	695	229	620
7:45		1019	657	1077	794	572	578	286	594
8:00		987	657	1038	687	610	546	312	580
8:15		872	634	850	686	624	517	336	585
8:30		828	655	852	666	608	495	364	612
8:45		866	620	938	653	749	502	423	518
9:00		944	637	925	605	748	445	447	461
9:15		868	608	921	658	795	485	480	531
9:30		914	656	895	705	787	469	564	496
9:45		891	547	840	586	836	435	601	417
10:00		806	421	905	593	886	389	623	341
10:15		825	435	845	565	878	361	634	346
10:30		840	396	896	503	886	364	724	294
10:45		811	316	900	422	921	373	750	272
11:00		827	236	940	382	886	318	792	235
11:15		817	270	937	385	873	274	746	241
11:30		865	273	945	316	1003	243	826	193
11:45		831	234	845	314	986	258	727	195
12:00		881	201	1011	239	908	231	867	137
TOTALS		61932		63780		52020		43400	
K Factor		0.061632	0.06688	0.061634	0.065883	0.074509804		0.089308756	

K Factor - AM 0.061633
K Factor - PM 0.066381
K Factor - SAT 0.07451

I-95 Ramp Tube Counts

Exit 126 - Off Ramp – I-95 Northbound to US 1 Northbound

Exit 126 - Off Ramp – I-95 Northbound to US 1 Southbound

Exit 126 - Off Ramp – I-95 Southbound to US 1

Exit 126 - On Ramp – US 1 to I-95 Northbound

Exit 126 - On Ramp – US 1 to I-95 Southbound

Loc: I-95 NB Off to Rt. 1 NB GPS: 38.23998 77.49876
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15		75	12	87	17	69	23	91	15	96	15	101	19	
0:30		86	18	99	19	82	20	84	20	97	14	74	25	
0:45		89	7	85	13	77	5	84	8	78	24	87	24	
1:00		76	10	71	5	76	10	73	12	112	12	77	17	
1:15		87	6	60	7	67	12	77	9	93	17	79	8	
1:30		76	13	67	10	74	9	77	14	108	14	85	10	
1:45		103	9	73	7	75	7	82	15	93	14	89	12	
2:00		85	8	76	3	67	10	74	8	83	19	87	19	
2:15		71	12	63	4	79	12	68	9	84	9	88	12	
2:30		59	4	80	9	79	12	92	12	89	9	82	8	
2:45		78	6	65	5	87	12	64	9	99	5	88	7	
3:00		101	9	81	14	67	9	61	7	89	10	92	10	
3:15		83	10	64	6	84	7	77	10	108	8	98	11	
3:30		77	10	59	9	75	4	72	9	82	13	89	3	
3:45		81	14	79	6	64	13	97	8	93	8	90	4	
4:00		70	12	72	11	91	15	85	18	112	12	102	6	
4:15		78	17	69	24	85	26	81	17	100	8	94	5	
4:30		74	16	80	19	86	24	81	19	95	9	97	14	
4:45		78	20	60	18	89	23	104	21	94	14	93	6	
5:00		74	22	90	30	107	24	108	22	78	28	85	13	
5:15		68	17	90	25	83	30	93	19	85	7	95	5	
5:30		80	42	73	26	90	40	87	31	120	13	91	5	
5:45		77	52	72	51	88	48	107	38	105	11	75	8	
6:00		76	48	89	50	102	48	106	49	108	21	83	16	
6:15		59	40	69	60	75	63	93	42	97	22	115	11	
6:30		80	65	68	61	81	63	75	69	100	28	84	12	
6:45		66	81	81	79	95	81	73	85	92	33	83	17	
7:00		69	103	59	86	75	105	77	93	87	30	69	15	
7:15		48	93	48	90	58	94	60	74	82	37	59	22	
7:30		52	122	47	98	63	109	53	82	72	41	70	6	
7:45		44	117	54	128	57	128	47	112	71	47	78		
8:00		52	162	45	146	41	159	48	142	62	61	74		
8:15		29	96	39	89	39	103	46	83	68	54	73		
8:30		33	109	39	78	37	94	44	77	52	67	69		
8:45		36	76	37	80	29	72	38	101	60	68	61		
9:00		39	111	33	85	43	91	41	81	57	70	75		
9:15		46	79	38	88	30	83	35	85	58	58	64		
9:30		31	60	29	69	27	68	27	58	43	68	65		
9:45		24	65	23	75	29	75	37	80	28	55	57		
10:00		22	74	19	79	22	65	46	85	47	61	56		
10:15		28	68	30	76	25	51	30	62	35	54	64		
10:30		32	103	23	59	27	79	39	68	41	56	58		
10:45		19	69	18	52	22	71	27	73	43	72	46		
11:00		17	70	16	74	15	76	16	88	34	80	39		
11:15		26	82	15	65	17	81	17	82	18	85	51		
11:30		18	67	15	58	13	82	10	69	35	70	39		
11:45		17	83	15	69	18	77	25	85	28	83	40		
12:00	61	16	59	21	75	17	84	12	66	24	94	32		
TOTALS	2866		5133		5205		5538		5976		5350		350	

Loc: I-95 NB Off Ramp to Route 1 SB GPS: 38.21481 77.49980
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15		33	0	0	0	16	4	31	9	45	5	45		
0:30		31	0	0	0	30	2	43	2	31	9	23		
0:45		36	0	0	0	23	4	32	5	29	10	41		
1:00		30	0	0	0	24	1	37	4	35	3	29		
1:15		42	0	0	0	25	3	26	4	30	2	29		
1:30		32	0	0	0	17	2	23	3	40	0	36		
1:45		31	0	0	0	28	1	27	3	33	5	41		
2:00		26	0	0	0	31	2	30	1	31	8	39		
2:15		27	0	0	0	21	7	22	1	31	8	31		
2:30		27	0	0	0	23	5	15	7	44	7	26		
2:45		35	0	0	0	16	0	22	9	30	5	30		
3:00		38	0	0	0	17	5	29	5	31	0	26		
3:15		26	0	0	0	28	1	18	1	36	1	34		
3:30		30	0	0	0	23	1	29	3	25	0	27		
3:45		25	0	0	0	28	3	29	0	28	7	42		
4:00		39	0	0	0	19	2	27	3	32	7	29		
4:15		23	0	0	0	28	6	45	1	36	5	34		
4:30		35	0	0	0	32	2	30	1	34	1	42		
4:45		33	0	0	0	29	7	36	4	43	1	40		
5:00		23	0	0	0	31	5	29	13	33	5	36		
5:15		34	0	0	0	50	9	45	4	43	1	43		
5:30		29	0	0	0	41	8	30	7	38	3	40		
5:45		35	0	0	0	28	9	38	5	45	8	34		
6:00		37	0	0	0	34	10	47	7	41	3	30		
6:15		35	0	0	0	40	4	35	10	38	1	25		
6:30		31	0	0	0	28	14	27	14	31	7	24		
6:45		35	0	0	0	30	24	44	16	42	13	29		
7:00		29	0	0	0	23	28	29	36	39	13	43		
7:15		16	0	0	0	29	27	26	8	36	23	32		
7:30		18	0	0	0	18	33	31	39	36	14	33		
7:45		24	0	0	0	23	42	15	23	27	17	26		
8:00		17	0	0	0	15	35	30	29	25	27	26		
8:15		10	0	0	0	15	29	23	28	28	21	27		
8:30		0	1	0	0	16	29	19	37	23	24	18		
8:45		0	0	0	0	23	37	23	23	15	16	18		
9:00		0	0	0	0	21	32	9	37	33	32	35		
9:15		0	0	0	1	9	28	11	29	34	23	14		
9:30		0	0	0	28	12	15	7	29	18	22	25		
9:45		0	0	0	20	7	23	9	33	10	27	22		
10:00		0	0	0	24	15	33	17	22	18	31	18		
10:15		0	0	0	27	9	18	12	25	18	30	25		
10:30		1	0	0	19	11	30	6	25	27	29	22		
10:45		0	0	0	18	10	25	10	43	10	28	17		
11:00	28	0	0	0	36	7	26	5	28	13	37	17		
11:15	50	0	0	0	21	6	23	12	16	14	30	17		
11:30	39	0	0	0	37	7	19	11	36	7	33	9		
11:45	23	0	0	0	22	1	21	2	34	3	31	13		
12:00	41	0	0	0	40	5	32	7	39	3	34	6		
TOTALS	1154		1		1315		1886		2153		2035		0	

Loc: I-95 SB Off to Rt. 1 NB & SB GPS: 38.23782 77.50699
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15		168	46	248	48	206	43	236	42	277	93	276		
0:30		218	43	201	45	199	50	245	49	334	64	252		
0:45		207	34	234	35	226	47	294	25	283	62	277		
1:00		193	14	230	35	242	35	253	32	276	53	289		
1:15		214	31	228	27	233	36	214	17	348	30	236		
1:30		214	23	245	26	240	22	218	25	295	42	273		
1:45		250	15	229	25	248	33	259	31	306	54	290		
2:00		213	19	257	13	239	29	262	47	306	33	266		
2:15		244	18	224	19	249	25	264	25	260	45	285		
2:30		251	12	205	18	295	15	316	33	275	26	253		
2:45		257	21	274	17	276	22	281	37	291	43	255		
3:00		291	10	258	20	325	24	306	15	310	26	267		
3:15		301	12	284	12	310	20	338	11	308	29	295		
3:30		315	12	367	16	350	14	332	22	303	31	249		
3:45		352	17	372	22	362	20	377	19	346	27	289		
4:00		334	22	433	21	355	27	378	24	322	16	248		
4:15		337	21	387	24	375	26	379	20	362	29	254		
4:30		350	18	411	32	406	28	425	32	366	31	289		
4:45		324	27	425	37	438	20	396	28	379	30	272		
5:00		396	38	451	40	437	29	364	35	402	21	204		
5:15		440	47	441	46	455	39	272	33	351	21	265		
5:30		396	43	450	43	471	39	286	47	372	26	286		
5:45		390	56	433	54	367	62	304	46	415	42	245		
6:00		319	62	357	74	454	71	331	64	372	61	251		
6:15		314	75	395	76	351	84	338	76	366	70	227		
6:30		262	73	357	99	319	105	390	98	362	58	273		
6:45		262	125	319	156	321	138	345	135	306	78	245		
7:00		262	160	295	165	291	183	317	153	311	103	212		
7:15		245	142	262	169	273	172	294	168	359	109	232		
7:30		208	173	226	189	226	169	247	168	301	126	242		
7:45		173	197	231	201	229	212	264	197	289	114	203		
8:00		197	212	197	232	209	243	248	210	270	192	221		
8:15		150	196	187	205	199	183	240	188	277	148	214		
8:30		160	200	186	197	199	205	194	197	224	164	213		
8:45		153	161	211	185	196	156	204	188	209	173	197		
9:00		133	181	140	187	194	182	162	189	198	216	193		
9:15		133	157	162	162	180	171	160	178	213	192	199		
9:30		145	155	188	157	180	158	165	160	172	170	222		
9:45		125	177	143	163	139	175	168	190	202	210	175		
10:00		99	159	123	202	123	197	156	179	206	224	169		
10:15		81	158	117	148	118	174	127	173	163	224	165		
10:30		76	151	114	160	120	169	109	173	168	220	133		
10:45		90	150	82	214	92	163	93	204	136	211	145		
11:00		79	172	87	190	92	215	86	233	129	236	151		
11:15	66	64	165	78	184	59	203	73	236	129	248	148		
11:30	174	40	190	62	199	57	207	63	239	99	248	97		
11:45	166	38	176	60	206	44	178	64	257	98	270	82		
12:00	205	50	223	55	207	50	205	46	253	62	268	99		
TOTALS	11124		16510		17021		16906		18309		16030		0	

Loc: Route 1 SB On Ramp to I-95 NB GPS: 38.24181 77.49979
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15		216	22	236	26	239	39	225	25	281	76	287		
0:30		225	34	205	29	233	26	231	34	241	52	291		
0:45		224	20	216	20	240	24	243	25	265	31	304		
1:00		211	22	237	33	229	21	256	26	269	32	271		
1:15		203	28	225	19	248	30	251	21	255	43	243		
1:30		225	17	231	19	227	22	221	13	271	32	249		
1:45		215	20	211	17	209	20	234	13	246	22	254		
2:00		203	26	195	28	184	27	239	18	244	31	288		
2:15		197	24	205	25	228	29	210	20	248	28	275		
2:30		206	21	208	19	247	22	268	19	265	24	273		
2:45		217	23	214	21	243	15	210	16	275	20	276		
3:00		214	26	226	21	233	38	209	30	283	30	298		
3:15		211	25	232	23	234	36	204	39	259	23	236		
3:30		225	35	240	47	234	43	238	38	237	17	264		
3:45		234	53	235	63	217	60	249	54	227	30	256		
4:00		208	74	232	58	227	63	244	69	234	29	250		
4:15		225	102	233	111	236	86	237	86	250	29	259		
4:30		215	146	215	121	222	135	217	95	222	35	241		
4:45		198	205	241	197	245	216	218	189	280	47	274		
5:00		205	229	237	215	224	215	226	191	281	71	255		
5:15		236	247	263	258	274	245	273	218	249	62	253		
5:30		230	244	254	231	262	241	271	195	259	57	222		
5:45		206	262	198	312	275	297	241	270	249	82	233		
6:00		203	279	224	326	210	295	209	292	240	89	220		
6:15		200	333	208	369	210	328	225	302	244	85	221		
6:30		171	349	216	350	175	352	203	300	228	86	238		
6:45		182	408	176	385	171	432	162	368	215	139	214		
7:00		178	450	135	441	186	395	187	381	218	126	226		
7:15		160	384	146	418	162	453	168	377	209	132	211		
7:30		157	414	151	429	161	441	167	412	196	132	213		
7:45		139	433	140	435	159	435	172	369	178	205	211		
8:00		119	402	159	367	156	413	165	355	179	182	198		
8:15		132	336	142	334	132	383	155	352	187	185	202		
8:30		115	348	126	318	148	339	135	351	150	217	212		
8:45		99	378	147	368	124	399	164	344	185	269	218		
9:00		113	332	123	360	136	335	150	342	163	201	186		
9:15		115	255	127	282	144	305	119	259	144	214	183		
9:30		83	261	129	279	134	280	112	252	129	261	182		
9:45		87	279	92	269	87	265	110	240	148	266	162		
10:00		72	249	90	262	90	229	109	271	129	255	158		
10:15		52	249	66	237	89	250	100	260	108	229	145		
10:30		79	245	70	240	87	260	68	238	99	299	134		
10:45		42	228	56	214	71	238	56	244	99	241	104		
11:00	129	49	235	49	198	58	241	43	239	78	261	92		
11:15	169	60	210	63	240	58	264	57	249	83	258	103		
11:30	214	47	225	41	254	44	243	45	215	73	271	108		
11:45	222	39	235	36	248	31	243	40	257	61	282	98		
12:00	221	33	227	24	219	37	243	37	236	58	250	83		
TOTALS	8630		17774		18225		18584		18900		16412		0	

Loc: Route 1 NB & SB On to I-95 SB GPS: 38.23680 77.49957
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15		89	26	71	10	85	19	76	16	95	18	103		
0:30		67	19	79	15	68	19	86	19	94	20	95		
0:45		74	19	73	17	86	19	78	19	125	15	106		
1:00		65	13	81	19	71	16	77	11	90	28	103		
1:15		69	9	72	17	62	17	112	13	106	16	106		
1:30		72	7	67	20	62	10	89	8	89	8	95		
1:45		79	5	72	8	78	6	73	10	103	13	92		
2:00		71	7	84	6	82	17	87	8	97	19	73		
2:15		84	8	77	7	88	11	95	13	112	9	99		
2:30		109	17	70	11	91	14	99	6	108	11	79		
2:45		81	4	86	6	79	7	113	18	99	7	100		
3:00		99	6	109	10	105	10	103	12	113	21	93		
3:15		84	9	77	8	78	9	95	9	91	19	94		
3:30		109	6	81	6	91	7	108	5	114	8	84		
3:45		88	4	83	6	99	16	90	7	97	14	78		
4:00		88	5	77	15	109	12	97	18	106	11	64		
4:15		103	17	117	13	99	17	112	18	104	11	84		
4:30		87	16	91	20	91	8	98	13	117	7	62		
4:45		78	15	99	13	98	13	108	13	116	13	80		
5:00		97	19	107	21	101	14	88	33	124	23	68		
5:15		108	42	95	31	111	28	106	26	131	14	68		
5:30		106	31	115	43	126	32	128	29	134	21	70		
5:45		99	39	97	34	112	33	147	39	105	17	75		
6:00		83	47	92	42	87	48	124	46	91	18	71		
6:15		79	47	91	65	104	52	108	47	118	37	72		
6:30		59	61	79	60	80	60	94	63	129	31	61		
6:45		85	68	67	72	75	79	92	65	96	35	65		
7:00		46	75	51	91	73	87	103	85	101	43	68		
7:15		56	73	62	82	66	85	85	76	97	58	73		
7:30		61	91	58	88	55	101	65	77	99	66	53		
7:45		57	81	53	85	60	81	77	76	98	65	60		
8:00		43	81	59	65	78	99	67	78	83	64	56		
8:15		49	70	60	82	54	81	79	102	67	88	64		
8:30		49	65	50	66	65	71	47	85	69	84	45		
8:45		35	61	55	73	59	83	57	94	75	94	55		
9:00		42	82	39	91	56	77	67	94	60	94	57		
9:15		52	68	32	74	59	57	42	74	56	93	41		
9:30		29	60	61	80	43	81	50	75	53	102	50		
9:45		28	51	43	61	35	65	34	77	53	98	56		
10:00		30	58	46	62	57	71	31	73	44	94	48		
10:15		25	69	39	59	43	53	36	89	57	86	49		
10:30		16	56	29	68	28	72	34	64	40	95	38		
10:45		25	60	28	53	35	51	21	83	45	101	39		
11:00		25	77	20	71	18	69	27	86	42	95	33		
11:15		21	77	19	62	15	61	23	94	38	89	30		
11:30	36	27	68	24	62	29	60	19	89	31	98	21		
11:45	69	22	58	20	68	18	73	18	87	28	88	24		
12:00	66	14	67	19	61	11	64	10	72	19	97	23		
TOTALS	3235		5190		5474		5810		6473		5479		0	

I-95 Ramp Tube Counts

Exit 130 - Off Ramp – I-95 Northbound to VA 3 Eastbound

Exit 130 - Off Ramp – I-95 Northbound to VA 3 Westbound

Exit 130 - Off Ramp – I-95 Southbound to VA 3 Eastbound

Exit 130 - Off Ramp – I-95 Southbound to VA 3 Westbound

Exit 130 - On Ramp – VA 3 Eastbound to I-95 Northbound

Exit 130 - On Ramp – VA 3 Eastbound to I-95 Southbound

Exit 130 - On Ramp – VA 3 Westbound to I-95 Northbound

Exit 130 - On Ramp – VA 3 Westbound to I-95 Southbound

Loc: I-95 NB to Rt. 3 EB GPS: 38.29618 77.50203
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					58	10	65	3	53	7	71	11	56	13
0:30					57	4	41	4	57	15	62	7	81	5
0:45					43	4	46	9	54	9	50	13	67	13
1:00					66	7	52	10	66	7	64	5	69	3
1:15					51	15	45	6	49	12	57	3	71	13
1:30					53	5	52	2	59	2	66	7	65	10
1:45					47	6	34	7	39	8	52	3	57	9
2:00					50	8	48	5	45	8	62	10	58	5
2:15					44	16	32	4	54	6	42	7	46	5
2:30					43	5	57	4	48	4	53	5	66	4
2:45					59	6	42	2	42	9	102	1	63	7
3:00					40	12	43	7	38	12	98	2	67	5
3:15					61	6	54	1	51	4	105	4	73	3
3:30					54	7	55	7	48	3	88	5	63	2
3:45					34	17	33	9	57	9	69	5	73	1
4:00					50	23	44	22	64	17	88	5	80	3
4:15					54	21	46	11	51	14	106	9	53	4
4:30					43	17	52	13	48	13	95	11	41	1
4:45					50	17	49	20	70	14	68	14	55	7
5:00					64	28	56	20	67	21	71	9	65	6
5:15					48	19	56	27	54	27	45	4	67	7
5:30					58	28	47	34	49	32	68	9	61	14
5:45					44	33	55	28	44	29	68	12	73	12
6:00					51	41	46	23	47	25	62	14	51	4
6:15					52	47	43	31	52	27	65	14	43	9
6:30					53	42	59	40	57	34	62	22	65	9
6:45					29	66	52	45	49	49	61	30	66	16
7:00					23	79	48	74	44	68	45	30	55	19
7:15					29	59	28	53	45	56	56	29	49	22
7:30					27	68	23	58	42	43	53	33	58	23
7:45					28	59	19	94	35	74	26	31	47	7
8:00					28	93	23	118	30	68	41	37	40	
8:15					34	72	25	81	24	72	36	38	40	
8:30					19	81	27	81	32	69	41	53	58	
8:45					26	81	17	89	28	96	25	57	27	
9:00					22	90	28	79	20	84	37	49	29	
9:15					22	81	12	99	14	83	36	44	30	
9:30					25	75	21	72	17	79	21	43	32	
9:45					13	55	20	63	14	62	38	52	31	
10:00			37		19	56	24	70	31	76	23	61	32	
10:15			52		15	57	19	44	18	63	39	63	32	
10:30			51		19	55	14	60	26	63	22	58	23	
10:45			60		18	49	15	59	16	64	17	58	18	
11:00			65		22	61	9	63	17	64	20	67	21	
11:15			45		17	53	16	64	15	57	18	46	15	
11:30			62		4	48	16	59	3	49	17	63	19	
11:45			69		9	65	15	50	19	70	21	71	22	
12:00			51		13	70	3	59	13	81	11	53	12	
TOTALS		0		2280		3643		3798		4401		3662		261

Loc: I-95 NB to Rt. 3 WB GPS: 38.29651 77.50302
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15				109	10	110	25	106	13	112	31	146	24	
0:30				118	10	100	8	108	14	131	28	143	27	
0:45				109	12	107	15	88	12	115	23	134	28	
1:00				95	7	102	12	107	12	126	13	164	19	
1:15				93	8	99	13	96	11	123	21	134	17	
1:30				84	17	78	4	83	5	111	8	114	19	
1:45				76	7	87	11	123	5	118	13	114	18	
2:00				99	6	91	5	73	9	116	9	151	16	
2:15				83	12	99	6	104	8	96	12	124	11	
2:30				85	8	93	5	108	5	104	12	141	14	
2:45				100	4	103	4	98	1	132	3	148	14	
3:00				89	5	107	8	101	17	139	5	135	11	
3:15				96	2	76	4	69	7	107	7	136	9	
3:30				111	15	93	18	88	8	137	16	122	5	
3:45				96	4	112	17	102	7	107	9	154	7	
4:00				90	9	108	11	132	13	110	8	120	9	
4:15				89	13	83	16	108	14	187	11	130	11	
4:30				91	17	92	10	93	23	302	5	140	8	
4:45				99	20	102	15	108	22	160	13	151	10	
5:00				108	23	112	25	93	25	114	15	141	10	
5:15				85	28	88	20	107	19	120	7	142	17	
5:30				100	24	105	14	102	14	112	10	136	31	
5:45				81	54	89	24	90	31	144	27	147	56	
6:00				94	44	100	51	105	46	117	26	128	130	
6:15				83	47	106	50	110	30	120	18	120	142	
6:30				92	39	90	44	99	56	127	32	129	103	
6:45				87	51	92	57	74	63	111	42	121	50	
7:00				76	66	79	73	82	65	119	46	128	38	
7:15				56	66	80	64	83	62	107	39	122	27	
7:30				76	76	64	98	89	67	104	33	112	24	
7:45				75	80	73	80	98	60	107	58	118	34	
8:00				59	93	64	136	75	106	107	84	85		
8:15				63	93	51	114	73	102	91	61	103		
8:30				61	108	63	112	87	123	73	80	105		
8:45				54	107	60	103	61	106	88	96	105		
9:00				52	116	49	123	69	131	65	104	80		
9:15				50	111	40	102	42	113	72	96	67		
9:30				34	116	43	109	43	72	48	102	83		
9:45				43	125	32	86	25	106	60	132	72		
10:00				34	104	20	140	32	121	63	120	74		
10:15			42	28	113	32	123	38	98	46	127	57		
10:30			98	28	97	35	111	26	112	41	131	60		
10:45			115	28	76	26	91	26	102	60	102	52		
11:00			98	22	82	23	107	19	120	25	132	43		
11:15			91	28	99	21	93	9	110	36	111	52		
11:30			77	21	113	22	101	15	119	37	136	56		
11:45			95	18	124	13	110	23	115	28	141	29		
12:00			101	16	109	14	98	11	114	32	146	48		
TOTALS	0		4181		6098		6367		7521		7817		939	

Loc: I-95 SB On to Rt. 3 EB GPS: 38.29593 77.50791
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					115	26	146	15	131	20	113	28	105	36
0:30					95	33	123	15	102	12	114	27	94	25
0:45					93	26	118	10	116	14	134	29	120	21
1:00					122	25	115	32	86	6	160	15	113	23
1:15					130	21	105	12	90	5	137	11	105	20
1:30					111	18	92	15	81	4	136	15	119	23
1:45					113	5	115	20	111	15	114	18	154	19
2:00					182	10	119	13	122	13	118	12	86	15
2:15					130	10	127	10	125	11	109	11	75	10
2:30					140	10	141	7	124	32	106	19	94	11
2:45					122	8	137	24	113	13	107	15	88	11
3:00					127	8	136	11	131	7	121	9	110	9
3:15					94	7	122	5	149	11	105	14	95	6
3:30					179	6	136	4	137	9	97	8	96	7
3:45					158	20	173	18	154	16	130	5	96	6
4:00					143	11	123	6	150	5	103	12	92	7
4:15					141	16	136	14	147	13	126	9	89	2
4:30					176	11	147	14	144	18	134	6	73	6
4:45					157	13	148	9	128	14	120	9	91	3
5:00					133	20	173	17	120	19	126	8	84	12
5:15					166	16	142	30	59	29	116	9	89	8
5:30					173	23	141	14	60	33	108	9	75	17
5:45					152	42	136	33	74	35	121	25	84	12
6:00					162	50	165	58	73	56	94	38	63	15
6:15					144	57	126	52	91	45	106	38	90	19
6:30					122	75	117	86	97	57	120	38	84	19
6:45					126	86	123	97	105	80	104	49	81	24
7:00					105	110	113	88	117	94	106	51	82	25
7:15					86	103	98	105	82	87	83	58	76	29
7:30					91	93	102	93	79	89	91	67	79	28
7:45					76	102	71	120	110	110	86	78	65	50
8:00					71	138	76	138	84	126	89	89	63	42
8:15					76	138	63	116	84	115	98	86	59	46
8:30					74	128	66	124	58	143	101	85	50	41
8:45					56	135	68	127	63	133	70	92	43	2
9:00					54	114	65	131	56	149	53	96	40	
9:15					46	103	46	106	49	117	57	93	50	
9:30					52	118	67	107	67	119	58	102	47	
9:45			76		70	95	50	114	38	113	62	92	49	
10:00			117		59	118	48	135	43	125	51	105	52	
10:15			110		43	91	46	100	35	109	54	106	48	
10:30			114		32	105	40	89	43	86	50	96	37	
10:45			118		28	131	28	107	31	120	42	125	45	
11:00			147		56	120	29	119	48	113	39	121	46	
11:15			96		33	105	27	90	39	108	41	102	34	
11:30			101		30	111	17	93	36	103	40	89	39	
11:45			85		32	123	25	115	37	143	28	96	36	
12:00			122		28	129	35	137	21	114	25	141	39	
TOTALS		0		5990		7825		7235		7511		6080		649

Loc: I-95 SB to Rt. 3 WB GPS: 38.29627 77.50896
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					280	64	295	70	315	85	374	82	372	112
0:30					268	66	257	74	342	73	380	89	374	107
0:45					287	55	284	53	361	39	356	70	462	70
1:00					276	43	298	53	256	28	364	63	392	65
1:15					299	37	276	44	215	32	366	41	391	59
1:30					273	36	278	42	216	20	422	39	433	59
1:45					285	31	323	47	320	25	404	52	398	43
2:00					293	25	304	34	318	53	490	38	457	52
2:15					307	25	300	36	386	42	347	48	380	35
2:30					332	32	345	9	375	60	254	46	406	45
2:45					337	22	419	15	380	61	352	38	415	27
3:00					294	18	365	16	435	68	389	34	428	40
3:15					357	19	391	20	452	30	380	20	376	27
3:30					416	20	403	37	536	29	378	33	362	29
3:45					568	16	472	25	602	31	496	31	387	32
4:00					510	33	473	32	573	42	530	25	363	34
4:15					553	17	516	32	509	30	606	24	362	27
4:30					581	29	547	31	558	26	574	22	373	33
4:45					531	58	544	38	521	49	570	20	348	38
5:00					556	46	519	41	584	42	684	40	377	34
5:15					601	42	594	50	252	59	610	35	382	42
5:30					675	41	664	64	243	42	579	29	360	88
5:45					728	47	733	48	345	47	600	41	430	160
6:00					704	83	724	93	345	92	547	63	372	249
6:15					624	104	487	101	389	75	412	50	365	355
6:30					475	123	468	97	501	111	494	67	354	223
6:45					419	146	468	135	469	119	641	122	318	117
7:00					405	131	390	155	472	150	585	121	319	95
7:15					337	173	377	145	363	150	496	147	320	70
7:30					328	173	356	142	324	142	394	108	313	103
7:45					312	156	330	147	354	152	355	164	294	127
8:00					271	202	266	220	334	262	391	235	264	113
8:15					259	190	296	194	305	214	358	233	246	
8:30					236	235	283	227	245	245	319	246	275	
8:45					236	246	228	202	286	231	298	284	221	
9:00					197	200	196	238	241	244	239	298	214	
9:15					180	240	213	211	192	276	219	287	185	
9:30					175	203	234	234	243	218	246	344	201	
9:45					164	217	210	241	205	281	205	344	177	
10:00					152	242	157	262	187	309	209	430	185	
10:15					137	196	133	243	157	251	168	349	170	
10:30			90		112	197	121	208	147	281	162	359	192	
10:45			210		134	257	96	235	130	303	195	399	155	
11:00			235		134	239	96	266	120	295	155	386	167	
11:15			201		91	237	82	262	84	317	147	390	115	
11:30			238		85	253	89	281	84	322	122	344	105	
11:45			271		83	244	78	272	90	356	130	357	114	
12:00			306		54	260	51	293	71	358	92	384	109	
TOTALS	0		17462		21798		21447		24851		22249		2710	

Loc: Rt. 3 EB to I-95 NB GPS: 38.29612 77.50333
Direction: EAST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					233	40	224	29	236	25	217	56	285	65
0:30					228	32	218	37	247	22	253	55	293	64
0:45					204	28	210	35	247	40	208	52	302	43
1:00					203	25	208	34	223	21	256	44	308	52
1:15					210	20	237	18	234	21	261	46	312	32
1:30					203	25	249	13	240	14	251	44	311	46
1:45					226	11	229	39	258	26	244	39	296	48
2:00					229	25	225	13	228	17	272	36	318	29
2:15					227	21	216	0	210	17	279	35	301	44
2:30					223	24	232	1	226	25	245	28	304	31
2:45					247	25	231	0	233	24	277	14	296	29
3:00					240	25	224	0	215	29	278	16	341	17
3:15					208	29	238	0	288	31	227	19	313	13
3:30					209	35	210	2	252	24	249	27	279	21
3:45					225	63	227	2	235	58	214	27	341	21
4:00					223	91	193	0	230	88	232	24	304	27
4:15					241	126	199	3	245	129	212	43	303	21
4:30					257	184	227	4	219	163	235	37	329	30
4:45					249	247	238	4	242	212	214	61	348	36
5:00					218	357	247	5	229	300	217	75	352	38
5:15					260	334	255	6	240	312	255	77	324	42
5:30					219	351	244	4	229	301	228	69	305	57
5:45					229	404	252	3	242	335	238	99	318	40
6:00					196	446	200	0	241	377	221	96	275	44
6:15					240	455	246	1	230	412	229	109	292	53
6:30					205	488	225	2	254	445	205	115	298	76
6:45					184	479	220	1	229	410	217	135	312	70
7:00					186	507	211	3	196	474	232	143	295	81
7:15					200	500	181	3	197	432	212	133	259	83
7:30					174	515	175	2	201	426	181	151	259	101
7:45					176	520	191	1	166	469	184	181	280	91
8:00					183	412	179	1	201	390	191	165	276	83
8:15					174	320	190	1	197	328	211	194	279	106
8:30					181	320	201	1	178	322	238	221	261	98
8:45					171	361	154	0	161	339	190	198	280	45
9:00					177	360	152	3	165	312	197	181	271	
9:15					193	276	190	2	183	270	228	191	280	
9:30					175	260	172	105	176	212	199	223	276	
9:45				43	146	241	166	218	150	253	220	234	286	
10:00				224	155	214	130	234	116	233	193	224	252	
10:15				192	125	218	119	235	98	213	193	271	208	
10:30				241	83	203	80	236	98	236	150	212	183	
10:45				218	63	255	89	208	80	237	149	238	164	
11:00				199	59	179	86	231	85	232	128	303	156	
11:15				193	63	204	58	201	49	247	113	331	134	
11:30				191	47	230	53	224	55	235	77	261	115	
11:45				192	44	205	44	239	40	251	68	280	114	
12:00				214	36	211	38	236	33	251	85	270	87	
TOTALS		0		10754		19884		11867		20313		19158		1777

Loc: Rt. 3 EB On to I-95 SB GPS: 38.29592 77.50956
Direction: EAST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					115	31	126	15	119	18	166	47	147	38
0:30					114	24	108	19	123	14	146	33	143	43
0:45					130	14	126	16	146	24	139	32	191	31
1:00					142	8	133	21	118	12	141	23	178	28
1:15					114	7	120	14	149	9	148	17	152	28
1:30					120	7	133	15	131	17	168	35	163	38
1:45					138	8	118	15	142	6	157	41	170	20
2:00					147	8	130	15	152	12	183	20	158	19
2:15					118	3	152	12	145	15	158	23	179	17
2:30					108	14	119	10	132	8	171	17	178	15
2:45					134	12	152	6	134	18	172	11	179	12
3:00					134	1	140	7	135	19	163	12	167	8
3:15					152	5	153	18	183	7	164	16	192	6
3:30					144	10	145	11	139	14	174	16	160	8
3:45					142	8	127	22	158	10	147	10	161	6
4:00					124	12	140	19	163	15	137	8	150	13
4:15					173	21	135	14	169	18	151	14	171	14
4:30					176	17	150	9	176	14	178	14	159	17
4:45					161	19	152	13	162	14	174	13	163	11
5:00					143	18	140	19	145	18	132	10	164	21
5:15					168	28	152	22	190	18	146	16	164	21
5:30					154	32	151	43	135	19	156	20	174	17
5:45					156	42	135	41	122	33	171	26	148	17
6:00					131	34	118	44	145	40	176	31	163	24
6:15					134	42	109	52	159	38	158	25	159	20
6:30					151	59	136	50	131	48	192	38	155	30
6:45					112	65	108	81	115	53	146	37	140	34
7:00					111	89	103	58	114	67	166	56	143	24
7:15					96	70	132	67	121	78	173	50	141	29
7:30					95	75	86	73	105	86	162	77	137	33
7:45					106	79	87	98	100	109	129	71	116	27
8:00					100	85	97	96	110	102	138	69	131	43
8:15					91	89	94	88	123	98	150	80	151	53
8:30					95	88	112	79	117	98	147	79	128	28
8:45					113	85	101	86	89	87	151	105	138	
9:00					93	57	98	61	101	83	141	89	159	
9:15					101	78	74	63	83	89	138	84	145	
9:30				13	93	75	93	103	123	85	130	84	147	
9:45				70	82	73	66	83	76	114	125	107	119	
10:00				82	64	83	65	96	70	89	124	100	114	
10:15				70	57	95	67	79	80	102	101	133	115	
10:30				62	44	81	54	86	51	113	93	134	101	
10:45				85	39	87	42	103	44	101	68	130	85	
11:00				104	33	99	31	128	23	128	73	165	89	
11:15				88	38	96	27	95	34	141	69	151	97	
11:30				103	32	103	23	124	24	134	62	160	43	
11:45				111	24	98	24	92	25	135	31	137	37	
12:00				100	19	98	13	90	26	127	32	166	34	
TOTALS		0		6149		7429		8028		9414		9630		793

Loc: Rt. 3 WB to I-95 NB GPS: 38.29652 77.50194
Direction: WEST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					133	11	131	12	124	14	128	21	84	27
0:30					105	12	125	13	104	16	123	17	110	26
0:45					120	10	111	8	126	22	123	16	100	15
1:00					119	11	136	10	109	13	111	12	103	25
1:15					152	25	109	11	127	16	106	22	108	13
1:30					106	21	141	14	116	22	138	6	105	17
1:45					105	11	140	13	130	15	128	24	107	19
2:00					103	14	97	21	119	15	128	14	98	16
2:15					110	11	145	19	122	20	138	17	105	24
2:30					115	8	136	14	109	6	119	19	110	11
2:45					138	19	128	15	143	19	131	11	133	9
3:00					127	22	131	16	101	28	138	16	113	9
3:15					131	15	135	10	109	22	145	14	114	17
3:30					149	34	130	31	132	17	140	26	102	12
3:45					138	27	142	23	154	34	120	12	119	6
4:00					110	37	137	54	156	26	128	14	136	7
4:15					108	61	116	55	127	67	143	13	103	5
4:30					125	86	115	76	135	58	142	29	104	16
4:45					108	94	108	95	151	83	121	36	118	16
5:00					125	114	112	122	129	106	107	40	118	16
5:15					139	115	148	121	179	106	139	33	102	16
5:30					152	107	143	115	153	105	150	40	128	16
5:45					136	103	106	129	116	95	117	34	91	15
6:00					97	144	126	140	93	136	109	52	117	18
6:15					127	160	92	165	90	124	84	36	108	22
6:30					73	173	98	201	93	147	101	38	104	38
6:45					95	205	95	195	90	178	85	64	101	31
7:00					81	221	77	201	100	199	85	61	105	24
7:15					86	220	77	218	67	182	69	68	89	26
7:30					61	224	91	197	65	196	62	80	86	26
7:45					68	215	56	216	65	178	75	74	72	33
8:00					56	164	59	189	69	155	64	60	86	
8:15					77	171	75	190	73	184	69	88	73	
8:30					59	117	63	161	63	151	61	108	93	
8:45					66	174	59	168	66	155	59	91	80	
9:00					53	167	45	123	59	124	53	84	90	
9:15					60	128	50	131	60	146	57	86	72	
9:30					55	149	54	134	53	127	73	90	82	
9:45					51	130	50	133	63	162	59	92	64	
10:00				12	39	117	52	112	51	115	63	84	80	
10:15				111	50	120	36	117	42	118	48	82	60	
10:30				103	35	110	43	114	34	107	70	86	50	
10:45				95	22	119	26	132	33	116	47	87	54	
11:00				148	16	138	23	111	27	128	53	100	44	
11:15				127	30	115	12	123	33	125	45	112	32	
11:30				112	22	93	21	132	24	134	26	120	34	
11:45				90	15	100	19	105	21	86	30	131	34	
12:00				113	11	121	13	130	30	130	32	103	28	
TOTALS		0		5170		9097		9270		9070		6912		571

Loc: Rt. 3 WB to I-95 SB GPS: 38.29638 77.50758
Direction: WEST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					48	6	45	11	44	6	45	17	47	14
0:30					49	6	43	6	54	4	53	17	50	5
0:45					46	3	62	4	48	8	45	9	52	10
1:00					50	5	39	4	39	8	59	4	57	10
1:15					38	3	53	6	46	5	58	11	43	6
1:30					38	12	45	1	44	4	51	4	46	13
1:45					38	4	55	2	42	9	52	3	38	7
2:00					41	0	36	10	44	9	74	5	49	10
2:15					55	3	58	3	49	10	51	6	44	13
2:30					57	4	53	5	48	3	75	2	36	5
2:45					59	11	56	4	58	9	59	9	41	7
3:00					44	2	44	3	66	2	48	8	49	4
3:15					55	4	50	7	61	6	78	5	45	5
3:30					49	3	76	6	66	5	58	7	44	1
3:45					84	9	77	3	79	3	89	3	52	1
4:00					45	5	58	16	58	2	52	2	51	1
4:15					64	9	71	3	75	8	74	5	31	1
4:30					61	5	70	18	70	10	81	5	50	3
4:45					91	5	57	7	57	4	78	0	51	1
5:00					67	4	65	4	66	10	60	2	42	5
5:15					90	6	95	5	87	6	91	5	45	4
5:30					83	5	81	3	96	7	78	2	48	9
5:45					60	14	79	14	76	16	64	6	48	2
6:00					72	19	61	15	74	23	77	5	37	1
6:15					52	18	52	22	60	19	43	13	35	4
6:30					48	18	42	19	54	20	39	14	44	1
6:45					43	29	34	25	43	35	64	14	41	5
7:00					51	29	48	35	50	34	40	18	37	12
7:15					44	48	45	34	46	31	50	27	33	8
7:30					31	42	33	47	40	37	45	19	36	8
7:45					45	34	33	34	27	35	37	18	36	5
8:00					28	38	29	40	31	47	39	28	33	3
8:15					28	53	40	40	42	55	38	17	39	
8:30					40	47	29	38	46	44	42	35	31	
8:45					42	41	23	43	32	44	33	34	40	
9:00					23	33	31	40	26	39	31	40	21	
9:15					19	28	20	26	32	34	32	39	30	
9:30					24	31	19	30	27	39	31	37	32	
9:45					17	42	13	36	23	38	27	47	20	
10:00					19	38	10	45	17	46	31	54	28	
10:15				0	14	44	22	35	24	26	29	35	26	
10:30				40	12	25	15	33	12	32	23	43	25	
10:45				34	10	23	17	29	9	51	35	35	16	
11:00				43	17	44	21	37	8	53	15	36	15	
11:15				29	16	34	10	41	9	62	12	43	19	
11:30				30	6	46	7	39	15	44	11	55	15	
11:45				30	15	49	9	39	10	34	21	39	11	
12:00				33	5	46	6	61	7	52	10	46	13	
TOTALS		0		2272		3064		3165		3456		2700		184

I-95 Ramp Tube Counts

Rest Area to I-95 Southbound

Loc: I-95 SB Rest Area Exit Ramp GPS: 38.31556 77.50462
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					11	47	4	48	15	32	12	31		
0:30					11	36	17	39	14	27	15	32		
0:45					23	35	12	26	6	48	14	41		
1:00					15	33	13	38	7	41	20	33		
1:15		AM Period			11	38	11	30	6	45	6	35		
1:30		PM Perod		15	22	44	11	22	13	31	8	37		
1:45		SAT Period		39	8	51	15	36	4	41	9	31		
2:00				30	17	40	19	37	16	55	17	32		
2:15				50	23	27	13	44	14	42	13	65		
2:30				29	24	36	5	41	38	26	33	47		
2:45				17	18	27	7	41	31	21	15	28		
3:00				34	7	34	18	32	14	37	20	31		
3:15				24	12	29	11	28	8	38	26	39		
3:30				27	11	25	16	22	14	24	22	38		
3:45				42	15	27	14	28	11	23	22	38		
4:00				35	16	33	19	40	8	39	17	26		
4:15				15	13	22	23	24	15	47	22	34		
4:30				12	21	30	23	22	12	37	12	31		
4:45				19	44	26	10	25	21	49	24	27		
5:00				8	24	26	7	15	12	31	24	28		
5:15				13	20	28	9	23	26	26	39	28		
5:30				22	15	35	31	13	22	17	10	24		
5:45				28	38	17	23	15	19	46	23	15		
6:00				14	22	14	37	18	17	25	21	15		
6:15				20	21	11	26	15	20	34	35	25		
6:30				19	16	20	19	22	31	28	22	18		
6:45				19	22	19	15	22	21	30	15	27		
7:00				20	16	16	22	27	19	30	19	10		
7:15				21	24	15	21	18	16	35	24	22		
7:30				18	23	25	23	16	21	24	32	12		
7:45				22	29	18	21	24	18	28	28	14		
8:00				10	12	24	27	24	18	41	32	19		
8:15				11	37	18	24	27	30	28	34	11		
8:30				21	15	26	30	18	28	29	27	14		
8:45				15	22	15	18	15	35	24	23	12		
9:00				14	20	19	14	5	34	18	29	13		
9:15				12	6	18	21	5	13	18	47	7		
9:30				12	18	6	25	18	28	15	36	22		
9:45				10	19	20	17	24	30	17	40	10		
10:00				14	29	20	10	11	29	17	45	14		
10:15				18	31	9	28	2	38	21	47	10		
10:30				10	20	13	25	12	53	12	36	15		
10:45				14	22	8	41	11	39	10	54	5		
11:00				18	32	6	23	6	51	3	46	3		
11:15				15	33	10	25	15	40	8	51	12		
11:30				13	34	19	30	10	35	13	64	6		
11:45				10	43	10	38	11	35	15	44	13		
12:00				24	33	12	29	5	43	16	63	11		
TOTALS	0		853		2155		2010		2450		2448		0	

I-95 Ramp Tube Counts

Exit 133 - Off Ramp – I-95 Northbound to US 17 Northbound

Exit 133 - Off Ramp – I-95 Northbound to US 17 Southbound

Exit 133 - Off Ramp – I-95 Southbound to US 17 Northbound

Exit 133 - Off Ramp – I-95 Southbound to US 17 Southbound

Exit 133 - On Ramp – US 17 Northbound to I-95 Northbound

Exit 133 - On Ramp – US 17 Northbound to I-95 Southbound

Exit 133 - On Ramp – US 17 Southbound to I-95 Northbound

Exit 133 - On Ramp – US 17 Southbound to I-95 Southbound

Loc: I-95 NB to Rt. 17 WB GPS: 38.34113 77.49034
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					250	0	239	46	272	36	263	53	238	63
0:30					270	0	264	42	247	38	283	49	262	47
0:45					215	1	278	41	291	56	272	52	272	40
1:00					235	0	254	51	244	38	254	46	255	36
1:15					271	1	256	46	265	34	277	44	240	37
1:30					271	4	281	26	281	28	270	50	260	36
1:45					225	1	289	34	317	30	289	37	276	36
2:00					270	0	265	24	312	38	295	35	264	39
2:15					230	0	251	49	276	48	309	31	268	39
2:30					244	3	276	42	305	26	264	31	256	19
2:45					285	1	259	27	280	31	283	20	247	19
3:00					282	0	290	28	252	31	352	26	291	15
3:15					274	0	280	49	299	37	258	16	333	11
3:30					313	2	312	34	289	43	322	24	276	21
3:45					269	2	254	54	306	37	350	25	301	13
4:00					267	0	267	80	325	64	300	28	306	17
4:15					260	1	272	81	315	73	337	37	268	20
4:30					276	3	279	72	318	61	299	25	271	19
4:45					289	6	301	95	274	83	293	33	274	28
5:00					240	0	269	93	294	99	262	47	243	37
5:15					319	45	302	103	334	103	289	63	269	14
5:30					276	141	284	122	317	99	289	48	224	30
5:45					247	190	261	204	300	146	286	69	247	33
6:00					246	218	269	229	259	211	246	79	245	35
6:15					220	224	251	168	208	157	246	78	241	52
6:30					201	243	228	258	246	226	248	86	207	56
6:45					171	278	185	346	220	267	217	78	222	58
7:00					183	386	195	369	211	363	235	102	216	48
7:15					172	312	185	348	200	273	225	100	175	60
7:30					167	394	158	400	156	360	173	100	221	74
7:45					164	477	172	426	169	411	145	153	206	67
8:00					156	382	157	371	191	384	181	124	238	73
8:15					172	269	147	341	195	280	194	134	191	90
8:30					174	284	140	361	175	288	203	176	213	100
8:45					138	313	170	369	154	355	147	183	209	111
9:00					166	342	123	372	164	265	183	194	218	100
9:15					160	259	153	293	140	268	181	173	228	
9:30					146	241	127	312	145	164	176	182	204	
9:45					126	250	131	265	118	230	184	219	185	
10:00					132	219	132	259	142	228	143	217	194	
10:15					109	208	113	264	100	241	154	242	176	
10:30					106	243	108	236	97	265	116	217	142	
10:45					3	241	126	267	111	232	125	220	107	
11:00					7	258	97	273	86	261	124	252	107	
11:15				190	3	211	87	243	63	240	110	250	107	
11:30				227	0	237	83	239	60	257	74	240	93	
11:45				209	1	239	57	261	48	254	63	223	83	
12:00				203	0	239	67	243	43	355	71	269	70	
TOTALS		0		10030		17312		19370		18974		15819		1593

Loc: I-95 NB to Rt. 17 SB GPS: 38.33780 77.49416
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15							8	28	29	34	7	30	9	24
0:30							20	36	32	76	14	24	10	37
0:45							16	29	15	85	5	23	6	29
1:00							13	37	22	99	3	26	9	32
1:15							16	36	26	96	6	17	4	32
1:30							13	42	18	69	8	18	4	26
1:45							20	35	7	46	9	24	5	38
2:00							18	48	22	65	6	26	3	36
2:15							21	29	33	46	2	26	6	27
2:30							21	40	53	40	6	21	4	32
2:45							13	37	16	38	5	20	3	31
3:00							36	46	22	54	1	23	2	26
3:15							22	41	23	32	7	25	3	40
3:30							38	37	26	45	6	25	4	31
3:45							27	35	32	35	2	27	0	20
4:00							41	28	46	65	5	36	4	21
4:15							30	38	39	69	3	41	1	27
4:30							37	43	11	58	7	35	0	29
4:45							6	26	11	38	6	43	5	19
5:00							22	41	7	50	7	28	2	24
5:15							13	38	13	35	8	36	2	24
5:30							8	30	16	42	0	32	2	26
5:45							19	31	15	32	6	35	3	16
6:00							18	22	23	43	5	33	5	19
6:15							29	35	30	30	13	21	4	19
6:30							33	24	31	35	13	37	10	19
6:45							31	37	31	27	13	29	9	12
7:00							32	36	33	25	9	28	3	26
7:15							20	31	35	20	13	18	10	27
7:30							37	25	30	27	18	23	5	27
7:45							37	23	27	31	20	26	9	25
8:00							41	18	29	29	22	28	11	21
8:15							30	17	40	32	18	21	12	21
8:30							26	31	26	25	19	27	9	22
8:45							23	33	22	30	22	22	17	19
9:00							25	20	28	17	25	15	12	17
9:15							24	28	35	18	22	17	8	28
9:30							29	32	18	27	31	14	20	28
9:45							27	17	22	28	26	19	14	26
10:00							30	46	34	21	26	16	24	28
10:15							26	71	28	16	28	19	21	8
10:30							22	54	38	17	37	20	22	13
10:45							24	41	31	22	41	21	21	15
11:00							33	31	28	15	28	21	27	12
11:15							28	27	32	17	35	17	27	5
11:30							25	29	37	13	34	6	22	7
11:45							42	26	27	19	31	18	25	8
12:00							23	14	36	19	34	7	24	11
TOTALS	0		0		0		2792		3137		1876		1572	

Loc: I-95 SB to Rt. 17 WB GPS: 38.34301 77.48960
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					102	52	101	46	108	17	128	30	100	25
0:30					99	63	99	31	133	16	115	27	85	29
0:45					88	66	99	41	70	9	107	20	94	25
1:00					88	56	102	23	62	11	102	14	88	21
1:15					106	40	97	22	72	9	103	19	87	16
1:30					90	49	102	44	112	27	109	30	83	22
1:45					92	34	99	32	81	26	82	23	66	21
2:00					96	42	94	22	107	22	62	24	83	15
2:15					96	40	110	25	105	45	65	23	91	12
2:30					110	30	106	21	105	36	82	30	92	17
2:45					74	51	94	10	158	11	114	16	91	9
3:00					114	42	99	13	130	13	75	31	94	11
3:15					119	50	122	27	120	15	83	19	66	9
3:30					140	44	98	15	103	14	90	24	65	5
3:45					150	38	133	25	118	23	90	16	70	5
4:00					128	57	115	15	115	15	101	13	89	5
4:15					135	43	140	16	142	15	75	17	77	6
4:30					137	64	140	6	131	8	68	16	91	6
4:45					126	53	138	24	124	18	81	23	83	9
5:00					127	73	128	25	103	20	93	21	65	12
5:15					146	36	158	29	89	24	94	13	84	28
5:30					154	43	152	28	111	42	106	27	93	50
5:45					157	63	168	61	82	51	98	27	68	74
6:00					124	53	124	54	98	46	127	38	68	49
6:15					137	72	130	57	126	63	109	47	77	36
6:30					130	74	111	84	131	75	92	45	80	32
6:45					113	115	108	97	113	105	84	50	75	25
7:00					116	80	100	118	94	75	94	48	59	27
7:15					94	105	105	94	92	113	80	43	62	36
7:30					97	124	107	123	113	106	106	64	86	36
7:45					88	124	107	120	91	93	68	64	73	32
8:00					72	115	84	92	105	84	97	97	60	36
8:15					84	92	98	109	70	97	66	81	64	33
8:30					58	86	79	127	80	101	72	77	77	36
8:45					70	118	73	131	82	100	62	82	55	43
9:00					53	93	72	123	81	77	63	70	59	42
9:15					64	76	67	100	80	79	76	74	59	
9:30					49	82	57	81	71	94	76	87	59	
9:45					56	94	64	125	62	101	74	87	62	
10:00					63	67	48	89	52	92	51	74	52	
10:15					40	116	41	93	55	83	61	74	54	
10:30					69	113	45	90	42	100	49	91	35	
10:45					107	92	44	90	44	107	48	101	44	
11:00					67	87	29	87	64	95	45	82	57	
11:15					65	102	26	96	30	104	42	91	48	
11:30				101	51	101	52	116	43	87	41	83	35	
11:45				95	78	125	43	99	42	116	32	101	38	
12:00				84	67	114	40	117	32	105	33	73	42	
TOTALS		0		4966		8097		7487		6656		5712		895

Loc: I-95 SB to Rt. 17 EB GPS: 38.34121 77.49338
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15						24	76	14	56	14	77	21	98	
0:30						19	72	14	71	17	97	27	135	
0:45						12	76	15	87	6	115	11	72	
1:00					0	14	88	15	52	9	103	23	84	
1:15					76	16	106	18	42	4	89	15	61	
1:30					70	13	95	10	49	14	102	14	93	
1:45					83	5	96	9	73	8	97	9	87	
2:00					82	14	95	4	76	10	96	13	85	
2:15					96	11	100	15	86	9	86	9	76	
2:30					93	15	100	9	97	19	82	7	64	
2:45					106	9	110	9	128	5	67	13	63	
3:00					76	18	106	9	149	12	116	6	93	
3:15					99	8	102	4	136	7	87	13	78	
3:30					115	9	122	5	125	6	79	11	91	
3:45					120	7	139	3	122	6	93	6	67	
4:00					153	14	128	12	126	11	92	11	79	
4:15					106	15	134	10	143	8	103	6	86	
4:30					122	13	140	6	133	7	96	13	81	
4:45					107	13	138	13	137	17	83	15	75	
5:00					126	17	147	14	110	19	65	15	100	
5:15					129	20	157	15	185	11	74	7	100	
5:30					107	30	141	21	108	20	71	12	61	
5:45					108	37	142	33	163	27	61	17	84	
6:00					120	47	109	37	125	44	103	18	87	
6:15					120	45	137	41	95	33	100	14	81	
6:30					118	58	107	63	134	57	111	26	77	
6:45					114	84	135	77	175	79	101	51	69	
7:00					116	87	113	84	103	76	83	42	72	
7:15					90	77	110	92	92	76	78	38	61	
7:30					78	87	89	87	114	67	89	34	77	
7:45					66	105	97	96	92	96	110	60	55	
8:00					79	109	79	124	86	106	76	45	58	
8:15					51	113	77	96	70	99	103	59	61	
8:30					67	98	51	120	63	105	67	57	53	
8:45					65	98	63	106	62	104	79	72	76	
9:00					59	90	63	108	62	99	67	83	53	
9:15					63	90	61	93	52	75	66	67	62	
9:30					55	90	42	92	46	96	45	59	40	
9:45					50	95	39	72	42	111	49	83	56	
10:00					57	81	34	94	59	76	52	79	40	
10:15					47	74	35	81	38	83	43	70	41	
10:30					34	97	43	79	54	92	52	86	47	
10:45					45	82	28	59	38	70	54	97	53	
11:00					40	73	29	87	27	87	37	76	42	
11:15					30	86	30	78	29	77	32	67	52	
11:30					26	71	24	67	33	87	33	82	40	
11:45					22	83	20	58	19	78	30	119	45	
12:00					34	67	22	90	22	89	32	100	34	
TOTALS	0		3620		6687		6544		6051		5223		0	

Loc: Rt. 17 WB to I-95 NB GPS: 38.34280 77.48850
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					91	19	77	11	82	8	74	12	85	26
0:30					70	21	60	21	50	8	89	17	62	20
0:45					55	25	83	8	71	11	72	18	56	21
1:00					62	13	70	14	69	8	67	2	60	13
1:15					62	19	62	11	74	7	69	12	84	18
1:30					88	11	64	13	65	5	56	12	79	18
1:45					57	6	70	10	72	7	72	18	56	40
2:00					70	4	82	10	64	19	87	7	72	36
2:15					80	5	64	9	69	8	78	14	81	15
2:30					70	3	82	9	81	12	78	12	81	11
2:45					71	9	73	4	74	6	54	8	60	8
3:00					76	3	82	15	82	15	74	7	70	12
3:15					85	21	64	25	96	13	55	6	82	9
3:30					77	17	76	26	72	35	81	11	79	7
3:45					64	37	78	34	82	26	61	13	70	5
4:00					96	24	81	42	86	48	75	22	81	9
4:15					70	67	85	69	89	55	74	12	64	6
4:30					79	91	84	117	81	80	59	27	65	13
4:45					75	103	86	140	102	114	100	23	75	14
5:00					81	118	82	121	93	94	72	26	81	21
5:15					80	112	88	115	98	116	93	42	84	20
5:30					86	100	72	123	87	90	83	39	77	30
5:45					74	119	58	122	56	102	81	29	80	39
6:00					82	124	79	116	60	123	55	32	86	31
6:15					67	147	70	129	60	116	65	41	58	30
6:30					51	142	58	120	56	94	60	34	70	22
6:45					57	108	56	134	77	95	34	43	66	29
7:00					50	102	53	116	56	108	62	42	64	34
7:15					67	107	60	104	73	103	60	60	56	29
7:30					58	107	55	111	67	87	61	67	56	23
7:45					65	98	54	81	59	126	58	64	73	50
8:00					39	114	44	109	66	99	55	54	53	29
8:15					39	106	59	79	70	94	39	59	71	35
8:30					47	89	55	112	48	99	40	68	55	35
8:45					43	89	55	93	47	88	34	70	58	42
9:00					51	81	59	99	53	87	46	75	58	
9:15					34	92	44	101	50	103	42	70	46	
9:30					37	83	32	85	33	71	36	64	61	
9:45					38	70	21	78	35	70	30	63	42	
10:00					24	70	31	92	31	64	34	57	40	
10:15					22	93	23	71	31	71	5	63	51	
10:30					15	65	25	73	24	91	15	72	54	
10:45					23	66	15	81	16	75	16	75	43	
11:00					38	73	18	76	15	87	21	65	39	
11:15				40	24	78	20	80	17	72	18	70	36	
11:30				66	26	60	17	68	15	72	17	77	27	
11:45				69	16	89	15	82	15	76	24	67	29	
12:00				85	21	67	8	58	5	79	18	67	21	
TOTALS		0		3013		6016		6291		5786		4905		800

Loc: Rt. 17 WB to I-95 SB GPS: 38.34139 77.49304
Direction: NORTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					6	30	7	24	4	31	5	30		
0:30					5	23	6	32	1	34	3	22		
0:45					2	21	4	26	3	36	6	36		
1:00					1	31	1	29	0	34	2	30		
1:15				24	4	23	1	28	1	44	4	37		
1:30				25	5	29	5	36	4	46	1	42		
1:45				26	4	39	4	28	3	42	3	26		
2:00				28	3	27	5	32	0	34	5	36		
2:15				28	2	19	6	33	9	26	8	49		
2:30				22	0	27	2	37	1	25	5	34		
2:45				37	10	29	0	27	5	33	2	36		
3:00				18	0	30	2	18	3	35	4	26		
3:15				26	1	33	3	34	4	31	8	37		
3:30				37	9	23	3	29	8	33	6	31		
3:45				37	2	42	1	59	2	31	2	33		
4:00				24	6	29	8	44	8	28	4	32		
4:15				38	6	33	9	30	8	47	6	36		
4:30				35	15	31	13	45	14	47	5	23		
4:45				29	7	24	6	45	10	37	8	34		
5:00				28	16	26	13	36	14	35	11	26		
5:15				38	12	55	5	67	12	34	6	23		
5:30				41	15	37	19	38	7	32	4	23		
5:45				26	18	39	22	57	13	42	6	22		
6:00				32	32	25	21	54	9	36	12	28		
6:15				34	14	31	19	46	11	41	10	31		
6:30				29	16	28	19	36	24	31	15	20		
6:45				27	21	25	21	39	22	28	18	23		
7:00				24	28	25	27	33	21	34	14	13		
7:15				24	26	19	19	26	27	37	21	35		
7:30				14	34	26	33	15	26	27	14	20		
7:45				19	26	30	33	21	32	33	28	21		
8:00				21	28	26	24	23	24	28	14	19		
8:15				20	35	26	26	23	27	35	25	26		
8:30				21	35	21	37	16	28	25	31	23		
8:45				17	21	19	31	23	31	26	15	13		
9:00				21	22	11	33	23	30	27	19	11		
9:15				20	28	15	20	19	34	14	31	13		
9:30				11	26	14	29	11	30	23	25	13		
9:45				15	24	10	15	6	33	14	20	25		
10:00				14	31	11	31	8	20	16	29	14		
10:15				17	19	9	19	4	24	9	20	18		
10:30				15	22	14	21	6	28	1	27	10		
10:45				10	34	7	27	2	24	5	38	17		
11:00				6	27	9	26	13	33	19	27	10		
11:15				9	20	6	32	5	29	10	30	14		
11:30				6	26	4	29	2	30	7	30	19		
11:45				3	51	9	45	5	33	10	37	13		
12:00				3	21	15	31	2	36	7	34	12		
TOTALS	0		999		1951		2108		2160		1883		0	

Loc: Rt. 17 EB to I-95 NB GPS: 38.33912 77.49271
Direction: EAST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15				98	3	73	24	64	18	59	16	80	26	
0:30				74	3	82	26	73	20	73	12	75	12	
0:45				77	1	73	20	83	13	88	11	70	21	
1:00				66	4	73	21	98	8	79	13	57	9	
1:15				65	0	94	18	116	13	86	15	57	12	
1:30				71	6	85	13	110	15	70	15	66	15	
1:45				76	10	85	14	87	8	66	10	58	10	
2:00				75	16	78	6	85	12	69	11	71	13	
2:15				75	5	67	23	121	15	85	8	73	14	
2:30				60	18	71	18	96	12	77	11	75	13	
2:45				59	11	80	20	111	10	76	9	62	11	
3:00				57	16	50	10	93	6	67	16	79	3	
3:15				76	30	71	18	96	5	74	3	68	7	
3:30				78	22	102	21	99	21	79	9	61	4	
3:45				75	22	85	14	97	7	79	9	66	5	
4:00				79	30	74	15	101	17	80	13	57	6	
4:15				77	23	89	33	105	41	75	9	69	10	
4:30				90	39	75	61	107	51	62	11	60	18	
4:45				105	77	91	60	111	61	62	20	57	8	
5:00				83	103	86	91	89	80	72	25	52	12	
5:15				75	128	80	119	130	94	76	25	65	22	
5:30				79	121	93	137	97	116	99	16	84	12	
5:45				79	117	79	107	107	91	50	21	44	15	
6:00				93	139	91	123	86	103	69	20	67	13	
6:15				63	155	99	177	65	143	89	42	53	21	
6:30				63	173	82	174	81	158	82	28	52	28	
6:45				58	137	68	155	85	122	63	33	47	14	
7:00				53	148	44	161	75	150	50	50	59	22	
7:15				53	190	63	170	51	190	59	48	49	34	
7:30				44	155	52	168	65	132	53	63	34	43	
7:45				35	112	51	142	42	123	35	64	33	35	
8:00				48	153	40	145	50	134	36	53	43	31	
8:15				57	119	56	139	50	97	50	75	55	40	
8:30				51	129	59	84	46	112	48	75	43	39	
8:45				46	138	34	125	51	132	46	77	54	42	
9:00				43	119	43	109	59	112	45	81	41	17	
9:15				62	109	46	94	49	99	58	87	53		
9:30				71	93	71	106	64	105	43	71	65		
9:45				48	103	44	83	49	95	42	64	47		
10:00				41	82	42	80	26	88	30	60	38		
10:15				33	87	39	69	24	65	32	92	40		
10:30				35	80	49	67	25	87	30	81	41		
10:45				28	89	22	79	26	86	37	70	47		
11:00			38	15	89	18	86	17	86	39	72	45		
11:15			55	1	84	29	84	24	68	33	71	32		
11:30			71	3	77	31	75	18	83	33	72	34		
11:45			63	3	70	32	82	18	85	19	59	22		
12:00			62	4	66	28	79	10	84	18	52	17		
TOTALS	0		3089		6770		7177		6315		4485		657	

Loc: Rt. 17 SB to I-95 SB GPS: 38.34196 77.49455
Direction: SOUTH

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15							85	340	80	336	90	384	59	289
0:30							83	300	56	313	91	345	58	292
0:45							91	296	82	310	74	375	37	298
1:00							62	290	73	301	72	315	39	264
1:15							47	325	38	327	69	344	44	222
1:30							51	359	67	339	49	327	37	262
1:45							42	335	63	359	49	303	26	265
2:00							38	317	34	322	51	274	24	242
2:15							43	322	30	333	20	296	28	270
2:30							57	348	49	369	44	258	36	257
2:45							27	353	66	364	53	270	27	268
3:00							32	328	71	396	49	278	22	244
3:15							52	343	42	388	32	241	21	277
3:30							39	315	42	406	28	223	17	253
3:45							49	394	58	433	52	276	10	267
4:00							52	357	47	401	43	260	11	282
4:15							45	379	35	393	46	279	24	238
4:30							73	394	63	415	43	230	19	224
4:45							53	384	61	382	55	246	16	252
5:00							69	425	64	416	53	274	21	217
5:15							50	387	60	379	73	249	16	221
5:30							77	383	79	399	70	251	41	263
5:45							76	355	103	397	74	219	49	266
6:00							136	339	127	391	84	197	41	189
6:15							118	400	111	385	139	183	45	215
6:30							124	333	118	377	119	219	48	219
6:45							150	343	122	365	138	208	57	214
7:00							195	319	177	325	156	158	56	216
7:15							194	304	187	347	186	209	68	209
7:30							226	304	208	323	157	193	68	195
7:45							224	227	229	326	204	166	106	177
8:00							249	192	264	258	222	164	115	173
8:15							242	201	247	267	218	155	112	184
8:30							234	218	214	256	234	137	138	184
8:45							239	197	245	226	259	139	161	166
9:00							261	200	268	183	295	131	181	127
9:15							260	185	265	196	325	126	174	166
9:30							288	226	292	229	297	117	218	139
9:45							269	203	262	190	327	132	218	143
10:00							269	150	300	155	337	128	234	119
10:15							299	133	336	156	350	88	246	123
10:30							297	144	300	174	357	117	275	113
10:45							265	132	337	165	347	127	256	90
11:00							271	104	322	113	337	100	295	83
11:15							273	86	330	120	347	79	284	71
11:30							307	99	335	101	346	61	303	66
11:45							281	88	338	102	329	49	285	95
12:00							300	79	335	87	364	60	304	52
TOTALS	0		0		0		20499		21927		17714		14631	

Other Tube Counts

Fall Hill Avenue – I-95 Overpass

Cowan Boulevard – I-95 Overpass

Loc: Fall Hill Ave. at I-95 Overpass GPS: 38.31302 77.50440
Direction: EAST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					22	101	21	100	19	113	35	134		
0:30					20	92	10	118	14	114	38	134		
0:45					12	107	21	123	15	129	33	138		
1:00					11	124	14	134	9	109	20	142		
1:15		AM Period			12	110	27	122	14	144	17	134		
1:30		PM Perod			6	105	8	107	5	148	24	151		
1:45		SAT Period			9	121	12	121	17	121	23	168		
2:00					8	105	19	114	5	137	26	152		
2:15				37	7	131	12	139	12	128	17	135		
2:30				120	8	104	10	114	6	142	22	160		
2:45				109	2	110	15	118	2	109	8	150		
3:00				118	7	112	8	134	2	145	6	151		
3:15				107	7	117	8	130	3	141	12	154		
3:30				133	3	131	7	123	4	118	7	172		
3:45				109	7	105	10	125	5	125	4	168		
4:00				120	7	103	8	134	4	116	6	156		
4:15				139	6	119	10	133	6	140	4	154		
4:30				123	9	117	4	117	9	127	7	146		
4:45				134	6	130	18	105	10	123	5	140		
5:00				122	15	123	11	115	9	113	6	139		
5:15				104	10	88	12	112	13	81	11	155		
5:30				117	18	134	17	124	16	91	5	153		
5:45				112	20	112	20	105	16	83	8	122		
6:00				111	27	129	27	115	21	86	10	132		
6:15				104	29	112	24	98	24	97	11	134		
6:30				115	45	123	51	104	38	128	16	143		
6:45				108	45	113	54	108	45	133	20	132		
7:00				113	58	99	45	107	51	123	24	131		
7:15				97	76	110	58	126	63	121	39	141		
7:30				85	101	107	95	111	97	102	32	150		
7:45				101	87	96	101	108	79	116	49	147		
8:00				105	103	98	107	109	89	125	49	133		
8:15				101	74	111	100	105	90	113	41	120		
8:30				95	106	79	87	93	99	135	60	133		
8:45				106	92	87	111	81	110	106	80	111		
9:00				90	109	84	102	88	101	112	61	139		
9:15				64	97	72	87	89	88	126	64	123		
9:30				85	104	52	81	89	92	112	83	107		
9:45				79	81	60	95	88	89	97	93	102		
10:00				54	107	69	109	70	107	96	79	124		
10:15				52	101	64	84	56	91	82	91	85		
10:30				49	78	47	100	59	89	65	97	86		
10:45				52	79	35	101	44	100	81	103	78		
11:00				32	80	33	90	29	96	72	126	73		
11:15				38	110	27	118	38	102	72	138	66		
11:30				33	97	33	91	27	117	73	125	61		
11:45				25	88	23	115	31	114	62	126	54		
12:00				31	93	21	96	28	143	41	133	67		
TOTALS	0		3629		6784		7199		7623		8274		0	

Loc: Fall Hill Ave. at I-95 Overpass GPS: 38.31302 77.50440
Direction: WEST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 2	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					16	141	17	147	21	162	29	195		
0:30					17	163	18	159	14	195	22	171		
0:45					11	139	9	148	11	177	22	166		
1:00					8	135	9	150	14	183	18	165		
1:15					8	126	12	137	12	171	15	170		
1:30					5	126	10	135	8	149	14	146		
1:45					6	124	7	143	10	162	21	160		
2:00					4	135	9	150	11	166	24	182		
2:15				33	4	154	11	132	11	154	24	199		
2:30				150	7	157	7	146	4	149	17	184		
2:45				141	14	153	4	125	2	180	13	182		
3:00				135	7	127	13	182	2	174	15	143		
3:15				156	9	167	8	188	5	190	5	164		
3:30				162	1	159	5	174	5	201	7	169		
3:45				188	7	165	11	169	10	182	6	165		
4:00				191	3	190	4	165	9	203	5	190		
4:15				186	9	164	7	202	6	180	5	159		
4:30				203	13	199	15	231	12	228	9	174		
4:45				204	10	219	10	213	10	250	6	168		
5:00				211	14	239	11	213	7	249	12	173		
5:15				244	16	240	17	222	17	262	6	167		
5:30				234	20	227	20	257	13	241	10	146		
5:45				207	23	222	22	259	24	258	15	186		
6:00				206	32	187	29	253	28	207	23	152		
6:15				200	32	185	28	257	32	201	18	150		
6:30				169	38	156	41	229	28	181	21	145		
6:45				171	48	169	62	242	41	195	35	151		
7:00				135	52	157	58	226	52	174	60	154		
7:15				143	58	120	55	189	45	174	42	131		
7:30				109	70	116	74	142	65	130	37	149		
7:45				126	84	104	87	125	71	138	35	129		
8:00				107	94	92	83	132	86	133	76	102		
8:15				110	72	108	77	107	78	119	75	111		
8:30				107	104	100	88	106	93	86	71	119		
8:45				95	92	74	84	85	69	97	92	125		
9:00				72	92	82	82	78	94	95	107	103		
9:15				72	104	67	102	58	97	82	111	106		
9:30				58	80	61	95	62	85	79	125	87		
9:45				74	107	61	101	66	111	62	130	87		
10:00				53	119	63	141	60	135	60	157	82		
10:15				50	88	41	112	59	100	71	153	80		
10:30				28	129	39	121	26	144	54	129	63		
10:45				29	123	29	126	26	136	51	175	55		
11:00				29	138	30	136	24	150	50	172	68		
11:15				34	126	28	120	31	148	45	170	73		
11:30				32	114	28	125	23	149	47	185	43		
11:45				23	119	16	122	21	143	43	194	47		
12:00				17	143	17	152	9	173	27	187	44		
TOTALS	0		4894		8491		9240		9658		9380		0	

Loc: Fall Hill Ave. at I-95 Overpass GPS: 38.31302 77.50440
Direction: TOTAL

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					38	242	38	247	40	275	64	329		
0:30					37	255	28	277	28	309	60	305		
0:45					23	246	30	271	26	306	55	304		
1:00					19	259	23	284	23	292	38	307		
1:15		AM Period			20	236	39	259	26	315	32	304		
1:30		PM Perod			11	231	18	242	13	297	38	297		
1:45		SAT Period			15	245	19	264	27	283	44	328		
2:00					12	240	28	264	16	303	50	334		
2:15				70	11	285	23	271	23	282	41	334		
2:30				270	15	261	17	260	10	291	39	344		
2:45				250	16	263	19	243	4	289	21	332		
3:00				253	14	239	21	316	4	319	21	294		
3:15				263	16	284	16	318	8	331	17	318		
3:30				295	4	290	12	297	9	319	14	341		
3:45				297	14	270	21	294	15	307	10	333		
4:00				311	10	293	12	299	13	319	11	346		
4:15				325	15	283	17	335	12	320	9	313		
4:30				326	22	316	19	348	21	355	16	320		
4:45				338	16	349	28	318	20	373	11	308		
5:00				333	29	362	22	328	16	362	18	312		
5:15				348	26	328	29	334	30	343	17	322		
5:30				351	38	361	37	381	29	332	15	299		
5:45				319	43	334	42	364	40	341	23	308		
6:00				317	59	316	56	368	49	293	33	284		
6:15				304	61	297	52	355	56	298	29	284		
6:30				284	83	279	92	333	66	309	37	288		
6:45				279	93	282	116	350	86	328	55	283		
7:00				248	110	256	103	333	103	297	84	285		
7:15				240	134	230	113	315	108	295	81	272		
7:30				194	171	223	169	253	162	232	69	299		
7:45				227	171	200	188	233	150	254	84	276		
8:00				212	197	190	190	241	175	258	125	235		
8:15				211	146	219	177	212	168	232	116	231		
8:30				202	210	179	175	199	192	221	131	252		
8:45				201	184	161	195	166	179	203	172	236		
9:00				162	201	166	184	166	195	207	168	242		
9:15				136	201	139	189	147	185	208	175	229		
9:30				143	184	113	176	151	177	191	208	194		
9:45				153	188	121	196	154	200	159	223	189		
10:00				107	226	132	250	130	242	156	236	206		
10:15				102	189	105	196	115	191	153	244	165		
10:30				77	207	86	221	85	233	119	226	149		
10:45				81	202	64	227	70	236	132	278	133		
11:00				61	218	63	226	53	246	122	298	141		
11:15				72	236	55	238	69	250	117	308	139		
11:30				65	211	61	216	50	266	120	310	104		
11:45				48	207	39	237	52	257	105	320	101		
12:00				48	236	38	248	37	316	68	320	111		
TOTALS	0		8523		15275		16439		17281		17654		0	

Loc: Cowan Blvd. @ I-95 Overpass GPS: 38.30596 77.50450
Direction: EAST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					16	125	13	145	25	159	26	152		
0:30					13	153	10	138	9	161	41	155		
0:45					15	143	6	148	9	154	19	134		
1:00					6	149	6	164	12	174	18	160		
1:15		AM Period			7	146	10	150	9	170	17	154		
1:30		PM Perod			7	179	5	179	14	162	20	152		
1:45		SAT Period			4	170	8	180	11	168	10	165		
2:00				133	7	173	11	158	5	212	17	163		
2:15				149	8	157	7	167	4	157	12	182		
2:30				158	3	155	5	150	5	179	8	166		
2:45				155	8	164	3	176	8	163	6	143		
3:00				167	3	163	4	156	13	178	9	163		
3:15				149	2	138	3	168	8	182	7	170		
3:30				140	4	138	5	160	5	139	6	165		
3:45				128	5	135	4	154	4	156	9	145		
4:00				137	5	139	6	143	6	127	5	145		
4:15				145	3	142	8	145	6	158	4	213		
4:30				132	5	131	1	133	4	145	1	173		
4:45				162	3	148	5	136	6	122	1	134		
5:00				120	8	131	4	136	7	141	3	152		
5:15				127	12	155	8	146	11	149	3	133		
5:30				147	11	154	12	152	12	127	8	145		
5:45				141	17	132	25	141	13	152	5	133		
6:00				156	34	123	31	117	27	169	12	127		
6:15				145	36	167	30	163	28	147	9	107		
6:30				148	46	127	61	158	59	133	31	143		
6:45				150	89	141	84	142	79	148	44	144		
7:00				121	111	140	102	152	110	187	52	162		
7:15				121	67	126	72	132	66	150	26	149		
7:30				147	90	115	83	119	86	138	26	131		
7:45				114	109	99	120	120	95	125	29	138		
8:00				123	131	121	134	154	122	122	55	129		
8:15				122	139	110	137	128	127	119	47	149		
8:30				102	114	105	123	114	125	174	30	164		
8:45				92	130	101	104	119	105	154	62	120		
9:00				91	105	100	128	110	103	129	57	104		
9:15				96	90	98	120	90	103	121	57	136		
9:30				96	92	91	115	83	101	107	83	134		
9:45				69	103	64	105	86	86	103	74	90		
10:00				54	78	55	92	64	86	114	80	98		
10:15				67	112	35	106	53	95	106	94	105		
10:30				44	100	50	89	45	109	111	92	86		
10:45				52	106	41	112	37	127	80	106	88		
11:00				37	126	39	135	42	126	76	124	84		
11:15				20	121	38	109	33	107	49	126	83		
11:30				27	116	15	124	29	114	48	130	57		
11:45				22	102	20	128	16	126	41	127	33		
12:00				18	151	16	129	15	137	34	157	37		
TOTALS	0		4524		8227		8588		9175		8380		0	

Loc: Cowan Blvd. @ I-95 Overpass GPS: 38.30596 77.50450
Direction: WEST

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
	12-May		13-May		14-May		15-May		16-May		17-May		18-May	
Lane 2	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					22	200	24	234	25	230	36	194		
0:30					14	178	12	181	17	225	19	174		
0:45					13	186	10	184	11	203	18	174		
1:00					7	215	13	194	7	206	15	201		
1:15	AM Period				5	164	6	183	9	196	9	165		
1:30	PM Perod				3	176	8	192	8	173	14	178		
1:45	SAT Period				7	168	6	133	2	172	11	178		
2:00				99	5	154	7	153	3	173	8	172		
2:15				155	3	174	6	169	5	192	17	173		
2:30				144	4	127	7	171	5	178	11	186		
2:45				165	6	138	6	166	4	183	12	152		
3:00				158	6	152	5	166	5	151	6	148		
3:15				166	6	154	12	162	7	188	13	145		
3:30				177	7	175	5	191	6	190	10	148		
3:45				216	5	208	4	200	4	212	8	157		
4:00				200	4	212	3	246	5	246	5	156		
4:15				208	2	216	4	236	5	211	4	141		
4:30				229	9	217	4	234	3	252	8	143		
4:45				238	11	234	10	270	5	274	2	147		
5:00				243	9	238	12	257	12	249	9	179		
5:15				227	7	248	5	241	9	280	5	131		
5:30				253	7	253	14	275	7	293	9	144		
5:45				218	14	241	9	242	17	264	9	132		
6:00				204	22	209	20	215	20	258	8	162		
6:15				189	15	178	17	201	17	226	17	120		
6:30				141	29	146	21	171	29	204	20	132		
6:45				163	27	144	30	154	19	199	23	143		
7:00				124	44	148	50	160	37	175	31	151		
7:15				153	61	114	67	168	64	187	37	145		
7:30				140	47	124	57	145	56	186	42	110		
7:45				110	56	113	71	138	65	164	52	132		
8:00				109	84	106	101	113	85	127	58	139		
8:15				119	81	104	81	110	87	127	59	114		
8:30				96	88	83	85	96	80	119	76	91		
8:45				103	112	105	112	89	109	111	68	110		
9:00				51	96	61	103	74	96	91	104	79		
9:15				74	95	64	108	61	99	87	114	72		
9:30				51	99	45	94	66	116	74	144	74		
9:45				38	114	39	130	37	137	83	145	72		
10:00				47	121	43	155	38	140	57	178	58		
10:15				36	116	38	135	49	134	52	157	45		
10:30				39	141	26	125	36	135	48	163	49		
10:45				29	139	27	131	36	182	36	169	41		
11:00				21	134	17	153	30	160	35	171	49		
11:15				22	157	21	174	28	182	36	185	48		
11:30				20	153	23	176	25	185	39	163	38		
11:45				33	164	16	174	29	193	44	188	30		
12:00				11	181	26	188	12	197	25	208	23		
TOTALS	0		5219		9000		9711		10536		8783		0	

Loc: Cowan Blvd. @ I-95 Overpass GPS: 38.30596 77.50450
Direction: TOTAL

TIME	MON		TUE		WED		THU		FRI		SAT		SUN	
			13		14		15		16		17			
Lane 1	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
0:15					38	325	37	379	50	389	62	346		
0:30					27	331	22	319	26	386	60	329		
0:45					28	329	16	332	20	357	37	308		
1:00					13	364	19	358	19	380	33	361		
1:15		AM Period			12	310	16	333	18	366	26	319		
1:30		PM Perod			10	355	13	371	22	335	34	330		
1:45		SAT Period			11	338	14	313	13	340	21	343		
2:00				133	12	327	18	311	8	385	25	335		
2:15				149	11	331	13	336	9	349	29	355		
2:30				158	7	282	12	321	10	357	19	352		
2:45				155	14	302	9	342	12	346	18	295		
3:00				167	9	315	9	322	18	329	15	311		
3:15				149	8	292	15	330	15	370	20	315		
3:30				140	11	313	10	351	11	329	16	313		
3:45				128	10	343	8	354	8	368	17	302		
4:00				137	9	351	9	389	11	373	10	301		
4:15				145	5	358	12	381	11	369	8	354		
4:30				132	14	348	5	367	7	397	9	316		
4:45				162	14	382	15	406	11	396	3	281		
5:00				120	17	369	16	393	19	390	12	331		
5:15				127	19	403	13	387	20	429	8	264		
5:30				147	18	407	26	427	19	420	17	289		
5:45				141	31	373	34	383	30	416	14	265		
6:00				156	56	332	51	332	47	427	20	289		
6:15				145	51	345	47	364	45	373	26	227		
6:30				148	75	273	82	329	88	337	51	275		
6:45				150	116	285	114	296	98	347	67	287		
7:00				121	155	288	152	312	147	362	83	313		
7:15				121	128	240	139	300	130	337	63	294		
7:30				147	137	239	140	264	142	324	68	241		
7:45				114	165	212	191	258	160	289	81	270		
8:00				123	215	227	235	267	207	249	113	268		
8:15				122	220	214	218	238	214	246	106	263		
8:30				102	202	188	208	210	205	293	106	255		
8:45				92	242	206	216	208	214	265	130	230		
9:00				91	201	161	231	184	199	220	161	183		
9:15				96	185	162	228	151	202	208	171	208		
9:30				96	191	136	209	149	217	181	227	208		
9:45				69	217	103	235	123	223	186	219	162		
10:00				54	199	98	247	102	226	171	258	156		
10:15				67	228	73	241	102	229	158	251	150		
10:30				44	241	76	214	81	244	159	255	135		
10:45				52	245	68	243	73	309	116	275	129		
11:00				37	260	56	288	72	286	111	295	133		
11:15				20	278	59	283	61	289	85	311	131		
11:30				27	269	38	300	54	299	87	293	95		
11:45				22	266	36	302	45	319	85	315	63		
12:00				18	332	42	317	27	334	59	365	60		
TOTALS		0		4524		17227		18299		19711		17163		0

Capacity Analysis Output – 2013 Existing Conditions

Intersections

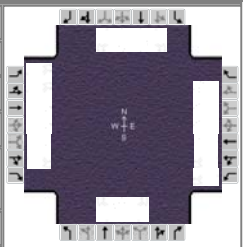
Mainline / Ramp Junctions

2013 HCS Intersection Analysis Summary

Intersection		Approach	Movement	AM Peak Hour Exisiting Condition						PM Peak Hour Exisiting Condition					
				Movement		Approach		Intersection		Movement		Approach		Intersection	
				Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Route 3 / Mall Dr. / Central Park Blvd.	NB	Left	65.0	E	115.0	F	15.1	B	73.9	E	520.3	F	103.8	F
			Through	65.9	E					76.7	E				
			Right	125.1	F					744.6	F				
		SB	Left	68.8	E	76.7	E			70.8	E	276.6	F		
			Through	68.8	E					69.8	E				
			Right	79.0	E					452.0	F				
		EB	Left	62.7	E	8.9	A			67.4	E	64.3	E		
			Through	3.6	A					64.9	E				
			Right	0.1	A					43.1	D				
		WB	Left	66.6	E	11.4	B			58.2	E	18.1	B		
			Through	6.6	A					9.1	A				
			Right	8.7	A					12.7	B				
2	Route 3 / Carl D. Silver Pkwy	NB	Left	70.9	E	70.2	E	29.7	C	76.8	E	76.0	E	97.8	F
			Through	70.9	E					76.8	E				
			Right	69.5	E					74.9	E				
		SB	Left	57.9	E	57.2	E			120.3	F	107.7	F		
			Through	51.8	D					51.2	D				
			Right	53.4	D					71.3	E				
		EB	Left	62.6	E	23.1	C			63.0	E	14.5	B		
			Through	21.1	C					7.3	A				
			Right	24.5	C					5.7	A				
		WB	Left	69.5	E	34.6	C			75.7	E	143.0	F		
			Through	31.0	C					74.1	F				
			Right	41.7	D					345.6	F				
3	Route 3 / Gateway Blvd.	NB	Left	52.6	D	48.9	D	20.6	C	87.9	F	74.3	E	27.5	C
			Through	38.2	D					38.0	D				
			Right	40.9	D					54.4	D				
		SB	Left	48.7	D	49.8	D			48.7	D	48.8	D		
			Through	50.2	D					49.0	D				
			Right	50.2	D					49.0	D				
		EB	Left	47.2	D	25.4	C			47.1	D	27.8	C		
			Through	25.4	C					27.4	C				
			Right	23.2	C					27.9	C				
		WB	Left	46.0	D	8.2	A			52.5	D	11.9	B		
			Through	5.3	A					5.3	A				
			Right	3.0	A					0.0	A				
4	Route 17 / McLane Dr.	NB	Left	54.1	D	21.4	C	25.8	C	68.9	E	2.7	A	19.1	B
			Through	21.5	C					2.4	A				
			Right	1.1	A					0.0	A				
		SB	Left	53.6	D	30.9	C			68.0	E	31.2	C		
			Through	30.7	C					31.2	C				
			Right	17.6	B					14.2	B				
		EB	Left	32.6	C	32.6	C			46.6	D	46.6	D		
			Through	32.6	C					46.6	D				
			Right	32.6	C					46.6	D				
		WB	Left	33.1	C	33.1	C			48.0	D	48.0	D		
			Through	33.1	C					48.0	D				
			Right	33.1	C					48.0	D				
5	Route 17 /Sanford Dr.	NB	Left	63.2	E	80.5	F	36.4	D	101.4	F	2489.3	F	291.7	F
			Through	54.0	D					74.3	E				
			Right	89.3	F					2662.5	F				
		SB	Left	61.3	E	61.0	E			72.5	E	71.6	E		
			Through	60.9	E					59.6	E				
			Right	57.8	E					60.8	E				
		EB	Left	57.6	E	38.5	D			59.5	E	60.2	E		
			Through	38.5	D					60.9	F				
			Right	21.1	C					23.1	C				
		WB	Left	54.6	D	29.8	C			72.4	E	36.1	D		
			Through	29.0	C					33.0	C				
			Right	15.3	B					21.3	C				
6	Route 17 /Short St.	NB	Left	34.7	C	34.3	C	34.9	C	42.1	D	41.4	D	105.6	F
			Through	34.7	C					42.1	D				
			Right	31.4	C					39.1	D				
		SB	Left	40.9	D	40.9	D			44.8	D	44.8	D		
			Through	40.9	D					44.8	D				
			Right	40.9	D					44.8	D				
		EB	Left	52.1	D	50.0	D			166.9	F	157.6	F		
			Through	50.3	D					158.5	F				
			Right	22.1	C					19.9	B				
		WB	Left	19.2	B	20.1	C			21.7	C	15.2	B		
			Through	20.2	C					15.3	B				
			Right	20.0	B					14.9	B				

HCS 2010 Signalized Intersection Results Summary

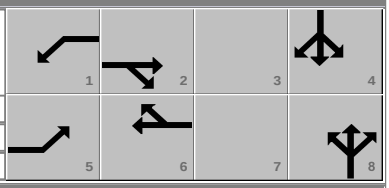
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 31, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{1_am} Rte 3 @ Central Pa	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	1_2013Ex_AM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	256	2565	52	92	1159	29	4	25	157	7	13	77

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.5	59.5	12.5	14.0	10.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



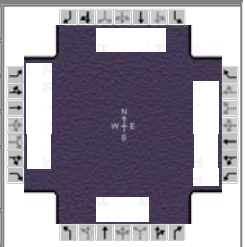
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	35.0	102.0	20.0	87.0		21.0		17.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	13.4		6.2			16.9		9.2
Green Extension Time (g_e), s	0.4	0.0	1.9	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.31			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	267	2672	49	96	932	306	4	26	147	7	14	72
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1691	1594	1658	1810	1778	1810	1845	1563	1757	1696	1548
Queue Service Time (g_s), s	11.4	0.0	0.0	4.2	5.6	6.9	0.3	2.1	14.9	0.6	0.6	7.2
Cycle Queue Clearance Time (g_c), s	11.4	0.0	0.0	4.2	5.6	6.9	0.3	2.1	14.9	0.6	0.6	7.2
Green Ratio (*g*/*C*)	0.18	0.61	0.61	0.09	0.51	0.51	0.10	0.10	0.10	0.08	0.08	0.08
Capacity (*c*), veh/h	631	3076	967	290	2782	883	181	184	156	132	254	116
Volume-to-Capacity Ratio (*X*)	0.423	0.869	0.051	0.330	0.335	0.346	0.023	0.141	0.940	0.055	0.053	0.619
Available Capacity (c_a), veh/h	631	3076	967	290	2782	883	181	184	156	132	254	116
Back of Queue (*Q*), veh/ln (50th percentile)	5.2	1.0	0.0	1.8	1.9	2.5	0.2	1.0	8.3	0.3	0.3	3.1
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	62.6	0.0	0.0	66.4	6.3	7.7	64.9	65.7	71.5	68.7	68.7	71.8
Incremental Delay (d_2), s/veh	0.2	3.6	0.1	0.2	0.3	1.0	0.0	0.1	53.6	0.1	0.0	7.2
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	62.7	3.6	0.1	66.6	6.6	8.7	65.0	65.9	125.1	68.8	68.8	79.0
Level of Service (LOS)	E	A	A	E	A	A	E	E	F	E	E	E
Approach Delay, s/veh / LOS	8.9	A		11.4	B		115.0	F		76.7	E	
Intersection Delay, s/veh / LOS	15.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.1	B	1.0	A	0.8	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

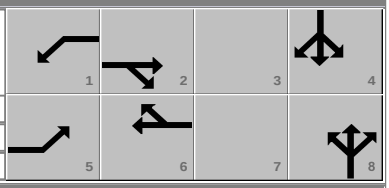
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{1_pm} Rte 3 @ Central Pa	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	1_2013Ex_PM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	313	1603	103	485	2334	66	80	99	394	97	180	362

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.5	42.5	33.5	14.0	18.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



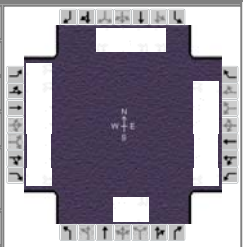
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	33.0	83.0	41.0	91.0		21.0		25.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	16.6		23.9			18.0		22.0
Green Extension Time (g_e), s	0.4	0.0	5.6	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.55			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	326	1670	97	505	1884	616	83	103	370	101	188	340
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1675	1594	1757	1863	1826	1810	1900	1610	1792	1900	1610
Queue Service Time (g_s), s	14.6	53.8	8.9	21.9	20.5	24.3	7.4	8.8	16.0	9.0	7.8	20.0
Cycle Queue Clearance Time (g_c), s	14.6	53.8	8.9	21.9	20.5	24.3	7.4	8.8	16.0	9.0	7.8	20.0
Green Ratio (*g/C*)	0.16	0.46	0.46	0.21	0.51	0.51	0.09	0.09	0.09	0.12	0.12	0.12
Capacity (*c*), veh/h	558	2306	731	723	2827	897	170	179	152	211	447	189
Volume-to-Capacity Ratio (*X*)	0.584	0.724	0.132	0.698	0.666	0.687	0.489	0.577	2.440	0.479	0.419	1.793
Available Capacity (c_a), veh/h	558	2306	731	723	2827	897	170	179	152	211	447	189
Back of Queue (*Q*), veh/ln (50th percentile)	6.7	24.9	3.9	9.6	4.7	6.7	3.5	4.5	34.8	4.2	3.8	28.2
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	66.3	62.9	42.7	56.9	8.5	10.6	73.1	73.8	77.0	70.1	69.6	75.0
Incremental Delay (d_2), s/veh	1.1	2.0	0.4	1.2	0.6	2.1	0.8	3.0	667.6	0.6	0.2	377.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	67.4	64.9	43.1	58.2	9.1	12.7	73.9	76.7	744.6	70.8	69.8	452.0
Level of Service (LOS)	E	E	D	E	A	B	E	E	F	E	E	F
Approach Delay, s/veh / LOS	64.3	E		18.1	B		520.3	F		276.6	F	
Intersection Delay, s/veh / LOS	103.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	1.6	A	1.7	A	1.4	A	1.0	A

HCS 2010 Signalized Intersection Results Summary

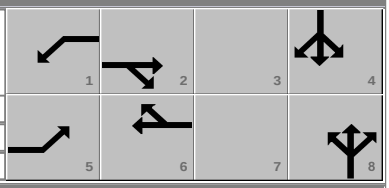
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{2_am} Rte 3 @ Carl D Silv	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	2_2013Ex_AM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	144	2875	12	21	1094	455	12	7	18	351	7	55

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.5	50.5	9.5	10.0	29.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



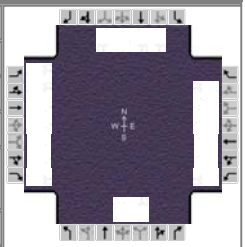
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	32.0	90.0	17.0	75.0		17.0		36.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	8.3		3.8			3.7		16.8
Green Extension Time (g_e), s	0.2	0.0	2.2	0.0		0.0		0.7
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.48			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	150	2995	11	22	1140	474		20	17	366	7	51
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1708	1533	1774	1827	1579		1842	1464	1774	1900	1610
Queue Service Time (g_s), s	6.3	49.2	0.8	1.8	16.6	38.6		1.6	1.7	14.8	0.5	4.2
Cycle Queue Clearance Time (g_c), s	6.3	49.2	0.8	1.8	16.6	38.6		1.6	1.7	14.8	0.5	4.2
Green Ratio (*g/C*)	0.16	0.53	0.53	0.08	0.44	0.44		0.08	0.08	0.20	0.20	0.20
Capacity (*c*), veh/h	571	3630	815	133	3197	691		138	110	699	374	317
Volume-to-Capacity Ratio (*X*)	0.263	0.825	0.014	0.164	0.356	0.686		0.143	0.152	0.523	0.019	0.161
Available Capacity (c_a), veh/h	571	3630	815	133	3197	691		115	110	699	374	317
Back of Queue (*Q*), veh/ln (50th percentile)	2.9	17.0	0.3	0.9	7.5	16.0		0.8	0.7	6.7	0.2	1.7
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	62.5	18.8	24.5	69.3	30.7	36.2		70.7	69.2	57.5	51.8	53.3
Incremental Delay (d_2), s/veh	0.1	2.3	0.0	0.2	0.3	5.5		0.2	0.2	0.3	0.0	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	62.6	21.1	24.5	69.5	31.0	41.7		70.9	69.5	57.9	51.8	53.4
Level of Service (LOS)	E	C	C	E	C	D		E	E	E	D	D
Approach Delay, s/veh / LOS	23.1	C		34.6	C		70.2	E		57.2	E	
Intersection Delay, s/veh / LOS	29.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.8	A	1.2	A	0.5	A	1.2	A

HCS 2010 Signalized Intersection Results Summary

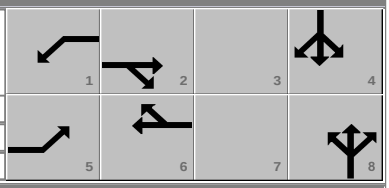
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{2_pm} Rte 3 @ Carl D Silv	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	2_2013Ex_PM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	273	1839	11	37	2715	935	21	10	26	848	13	303

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	34.5	43.5	9.5	10.0	36.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



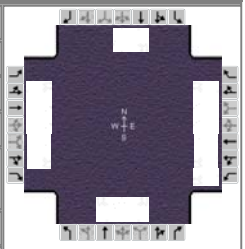
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	42.0	93.0	17.0	68.0		17.0		43.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.9
Queue Clearance Time (g_s), s	14.5		5.6			5.0		40.5
Green Extension Time (g_e), s	0.5	0.0	3.4	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.96			0.04		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	284	1916	10	39	2828	974		32	24	883	14	284
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1691	1610	1723	1881	1610		1767	1579	1810	1900	1610
Queue Service Time (g_s), s	12.5	12.5	0.2	3.6	63.0	63.0		3.0	2.4	38.5	0.9	28.2
Cycle Queue Clearance Time (g_c), s	12.5	12.5	0.2	3.6	63.0	63.0		3.0	2.4	38.5	0.9	28.2
Green Ratio (*g*/*C*)	0.21	0.52	0.52	0.07	0.37	0.37		0.07	0.07	0.23	0.23	0.23
Capacity (*c*), veh/h	744	3502	833	122	2789	597		125	111	820	430	365
Volume-to-Capacity Ratio (*X*)	0.382	0.547	0.012	0.317	1.014	1.632		0.259	0.215	1.078	0.031	0.780
Available Capacity (c_a), veh/h	744	3502	833	122	2789	597		104	111	820	430	365
Back of Queue (*Q*), veh/ln (50th percentile)	5.8	3.1	0.1	1.6	33.7	73.8		1.4	1.0	24.0	0.5	12.6
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	62.9	6.7	5.6	75.1	53.5	53.5		76.4	74.6	65.8	51.2	61.8
Incremental Delay (d_2), s/veh	0.1	0.6	0.0	0.5	20.6	292.1		0.4	0.4	54.5	0.0	9.5
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.0	7.3	5.7	75.7	74.1	345.6		76.8	74.9	120.3	51.2	71.3
Level of Service (LOS)	E	A	A	E	F	F		E	E	F	D	E
Approach Delay, s/veh / LOS	14.5	B		143.0	F		76.0	E		107.7	F	
Intersection Delay, s/veh / LOS	97.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.4	A	2.1	B	0.6	A	2.4	B

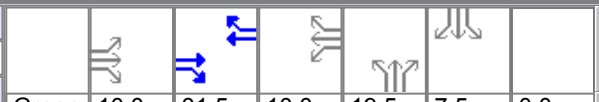
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	3_2013Ex_AM.xus				
Project Description	I-95 Interchange Modification Report				

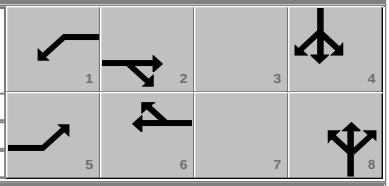


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	33	1310	331	107	1388	9	239	10	109	10	3	23

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	31.5	10.0	19.5	7.5	0.0
Yellow	4.0	3.5	4.0	4.5	4.5	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



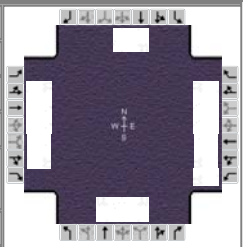
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, (Y+R_c), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.2
Queue Clearance Time (g_s), s	4.0		5.4			17.0		3.8
Green Extension Time (g_e), s	0.0	0.0	2.0	0.0		0.2		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.60			1.00		0.42

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	34	1365	310	111	1446	8	249	10	102	10	27	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1639	
Queue Service Time (g_s), s	2.0	23.1	15.7	3.4	8.4	0.1	15.0	0.5	6.6	0.7	1.8	
Cycle Queue Clearance Time (g_c), s	2.0	23.1	15.7	3.4	8.4	0.1	15.0	0.5	6.6	0.7	1.8	
Green Ratio (*g*/*C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	108	
Volume-to-Capacity Ratio (*X*)	0.188	0.595	0.444	0.324	0.668	0.011	0.754	0.030	0.361	0.078	0.251	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	108	
Back of Queue (*Q*), veh/ln (50th percentile)	0.9	9.2	6.0	1.4	1.6	0.0	7.4	0.2	2.5	0.3	0.7	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.0	24.3	21.1	45.8	3.6	3.0	44.1	38.1	40.6	48.7	49.8	
Incremental Delay (d_2), s/veh	0.2	1.1	2.0	0.2	1.7	0.0	8.5	0.0	0.3	0.1	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.2	25.4	23.2	46.0	5.3	3.0	52.6	38.2	40.9	48.7	50.2	
Level of Service (LOS)	D	C	C	D	A	A	D	D	D	D	D	
Approach Delay, s/veh / LOS	25.4	C		8.2	A		48.9	D		49.8	D	
Intersection Delay, s/veh / LOS	20.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.4	A	1.3	A	1.1	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

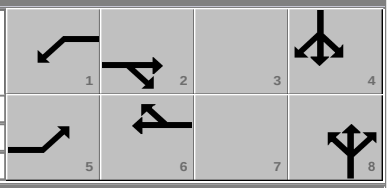
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	3_2013Ex_PM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	31	1506	455	228	1396	0	308	2	217	10	1	3

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



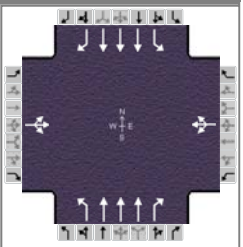
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, (Y+R_c), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.0
Queue Clearance Time (g_s), s	3.9		9.6			22.3		2.7
Green Extension Time (g_e), s	0.0	0.0	0.3	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	32	1569	440	238	1454	0	321	2	215	10	4	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1674	
Queue Service Time (g_s), s	1.9	28.1	24.9	7.6	8.5	0.0	20.3	0.1	15.1	0.7	0.3	
Cycle Queue Clearance Time (g_c), s	1.9	28.1	24.9	7.6	8.5	0.0	20.3	0.1	15.1	0.7	0.3	
Green Ratio (*g*/*C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	110	
Volume-to-Capacity Ratio (*X*)	0.177	0.684	0.628	0.690	0.672	0.000	0.972	0.006	0.760	0.078	0.038	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	110	
Back of Queue (*Q*), veh/ln (50th percentile)	0.8	11.3	9.7	3.4	1.6	0.0	12.8	0.0	6.5	0.3	0.1	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	46.9	25.7	23.6	47.6	3.6	0.0	46.2	38.0	44.1	48.7	49.0	
Incremental Delay (d_2), s/veh	0.2	1.7	4.2	4.8	1.7	0.0	41.7	0.0	10.3	0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.1	27.4	27.9	52.5	5.3	0.0	87.9	38.0	54.4	48.7	49.0	
Level of Service (LOS)	D	C	C	D	A		F	D	D	D	D	
Approach Delay, s/veh / LOS	27.8	C		11.9	B		74.3	E		48.8	D	
Intersection Delay, s/veh / LOS	27.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.6	A	1.4	A	1.4	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

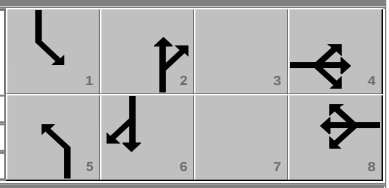
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{4_am} Rte 17 @ McLane I	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	4_2013Ex_AM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	17	8	6	32	1	12	15	2190	33	26	1770	25

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	60.5	38.5	0.0	0.0	0.0	
Yellow	3.5	4.5	3.5	0.0	0.0	0.0	
Red	3.0	3.0	3.0	0.0	0.0	0.0	



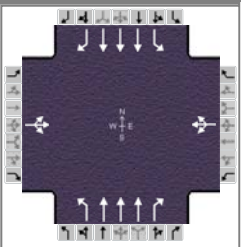
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	68.0	17.0	68.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		3.7		4.7	3.1		3.8	
Green Extension Time (g_e), s		0.1		0.1	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		32			47		16	2281	31	27	1844	24
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1519			1435		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			1.0		1.1	48.6	0.1	1.8	39.4	1.1
Cycle Queue Clearance Time (g_c), s		1.7			2.7		1.1	48.6	0.1	1.8	39.4	1.1
Green Ratio (*g/C*)		0.32			0.32		0.09	0.48	0.48	0.10	0.48	0.48
Capacity (*c*), veh/h		493			472		161	2412	750	174	2412	750
Volume-to-Capacity Ratio (*X*)		0.066			0.099		0.097	0.946	0.042	0.156	0.764	0.032
Available Capacity (c_a), veh/h		493			472		161	2412	750	174	2412	750
Back of Queue (*Q*), veh/ln (50th percentile)		0.7			1.1		0.5	8.9	0.1	0.8	15.9	0.4
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		32.6			33.1		54.0	12.1	1.0	53.5	28.3	17.5
Incremental Delay (d_2), s/veh		0.0			0.0		0.1	9.4	0.1	0.2	2.4	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		32.6			33.1		54.1	21.5	1.1	53.6	30.7	17.6
Level of Service (LOS)		C			C		D	C	A	D	C	B
Approach Delay, s/veh / LOS	32.6	C		33.1	C		21.4	C		30.9	C	
Intersection Delay, s/veh / LOS	25.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.6	A	1.8	A	1.5	A

HCS 2010 Signalized Intersection Results Summary

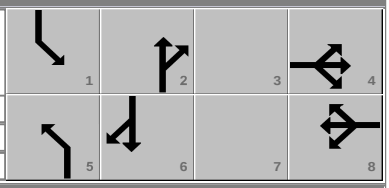
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{4_pm} Rte 17 @ McLane I	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	4_2013Ex_PM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	9	1	7	38	4	17	9	1856	15	10	2321	20

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	90.5	38.5	0.0	0.0	0.0						
Yellow	3.5	4.5	3.5	0.0	0.0	0.0						
Red	3.0	3.0	3.0	0.0	0.0	0.0						



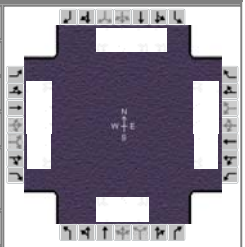
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	98.0	17.0	98.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		3.3		7.1	2.8		2.9	
Green Extension Time (g_e), s		0.1		0.1	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		18			61		9	1933	13	10	2418	19
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1477			1455		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			3.8		0.8	5.5	0.0	0.9	63.3	0.8
Cycle Queue Clearance Time (g_c), s		1.3			5.1		0.8	5.5	0.0	0.9	63.3	0.8
Green Ratio (*g/C*)		0.26			0.26		0.08	0.58	0.58	0.08	0.58	0.58
Capacity (*c*), veh/h		390			387		130	2893	900	141	2893	900
Volume-to-Capacity Ratio (*X*)		0.045			0.159		0.072	0.668	0.014	0.074	0.836	0.021
Available Capacity (c_a), veh/h		390			387		130	2893	900	141	2893	900
Back of Queue (*Q*), veh/ln (50th percentile)		0.6			2.0		0.4	1.1	0.0	0.4	25.4	0.3
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		46.6			47.9		68.8	1.2	0.0	67.9	28.2	14.2
Incremental Delay (d_2), s/veh		0.0			0.1		0.1	1.2	0.0	0.1	3.0	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		46.6			48.0		68.9	2.4	0.0	68.0	31.2	14.2
Level of Service (LOS)		D			D		E	A	A	E	C	B
Approach Delay, s/veh / LOS	46.6	D		48.0	D		2.7	A		31.2	C	
Intersection Delay, s/veh / LOS	19.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.6	A	1.6	A	1.8	A

HCS 2010 Signalized Intersection Results Summary

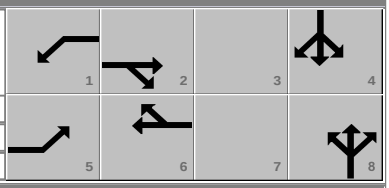
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{5_am} Rte 17 @ Sanford I	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	5_2013Ex_AM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	11	1807	20	192	2208	213	52	5	141	144	61	15

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.5	39.5	9.5	11.0	10.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



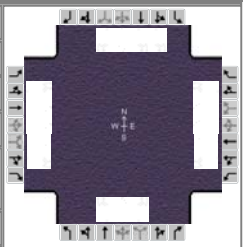
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	17.0	64.0	31.0	78.0		18.0		17.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.9
Queue Clearance Time (g_s), s	2.8		15.6			12.0		7.5
Green Extension Time (g_e), s	3.1	0.0	0.2	0.0		0.0		0.1
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.46		0.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	11	1882	19	200	2300	206	54	5	122	150	64	14
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1659	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.8	44.7	0.9	13.6	51.1	8.8	3.8	0.3	10.0	5.5	4.2	1.1
Cycle Queue Clearance Time (g_c), s	0.8	44.7	0.9	13.6	51.1	8.8	3.8	0.3	10.0	5.5	4.2	1.1
Green Ratio (*g/C*)	0.07	0.43	0.43	0.20	0.54	0.54	0.10	0.10	0.10	0.10	0.10	0.10
Capacity (*c*), veh/h	127	2163	673	341	2699	863	147	183	155	312	176	119
Volume-to-Capacity Ratio (*X*)	0.090	0.870	0.028	0.586	0.852	0.239	0.368	0.029	0.787	0.481	0.362	0.114
Available Capacity (c_a), veh/h	127	2163	673	341	2699	863	147	183	155	312	176	119
Back of Queue (*Q*), veh/ln (50th percentile)	0.4	18.7	0.3	6.6	20.3	3.3	2.0	0.2	5.3	2.6	2.2	0.5
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	56.2	33.4	21.0	47.5	25.3	14.7	56.2	53.7	57.1	56.0	55.2	55.9
Incremental Delay (d_2), s/veh	1.4	5.1	0.1	7.2	3.6	0.7	6.9	0.3	32.2	5.2	5.7	1.9
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	57.6	38.5	21.1	54.6	29.0	15.3	63.2	54.0	89.3	61.3	60.9	57.8
Level of Service (LOS)	E	D	C	D	C	B	E	D	F	E	E	E
Approach Delay, s/veh / LOS	38.5	D		29.8	C		80.5	F		61.0	E	
Intersection Delay, s/veh / LOS	36.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	2.6	B	3.4	C	3.4	C
Bicycle LOS Score / LOS	1.5	A	2.0	A	0.8	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

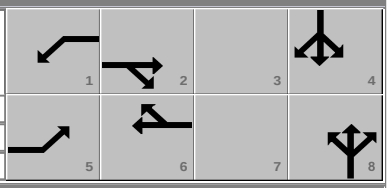
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{5_pm} Rte 17 @ Sanford I	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	5_2013Ex_PM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	6	2255	44	224	1807	181	32	4	580	317	19	6

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.5	45.5	22.5	6.0	21.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



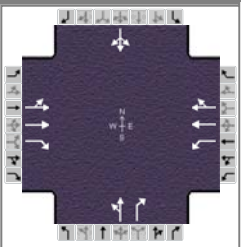
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	30.0	83.0	36.0	89.0		13.0		28.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.8
Queue Clearance Time (g_s), s	2.5		22.1			10.0		16.8
Green Extension Time (g_e), s	7.1	0.0	0.2	0.0		0.0		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.11		0.02			1.00		0.27

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	6	2349	42	233	1882	180	33	4	518	330	20	5
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1659	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.5	75.5	2.3	20.1	47.8	10.1	3.0	0.3	8.0	14.8	1.5	0.5
Cycle Queue Clearance Time (g_c), s	0.5	75.5	2.3	20.1	47.8	10.1	3.0	0.3	8.0	14.8	1.5	0.5
Green Ratio (*g*/*C*)	0.14	0.47	0.47	0.19	0.51	0.51	0.05	0.05	0.05	0.15	0.15	0.15
Capacity (*c*), veh/h	245	2348	731	332	2535	808	65	91	77	486	268	203
Volume-to-Capacity Ratio (*X*)	0.026	1.000	0.057	0.704	0.743	0.223	0.511	0.046	6.688	0.680	0.074	0.026
Available Capacity (c_a), veh/h	245	2348	731	332	2535	808	65	91	77	486	268	203
Back of Queue (*Q*), veh/ln (50th percentile)	0.2	34.6	0.9	10.0	19.6	3.9	1.8	0.2	58.8	6.9	0.7	0.2
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	59.3	42.3	22.9	60.5	31.0	20.7	75.6	73.3	76.0	65.0	59.1	60.6
Incremental Delay (d_2), s/veh	0.2	18.6	0.1	11.8	2.0	0.6	25.8	0.9	2586.5	7.5	0.5	0.2
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	59.5	60.9	23.1	72.4	33.0	21.3	101.4	74.3	2662.5	72.5	59.6	60.8
Level of Service (LOS)	E	F	C	E	C	C	F	E	F	E	E	E
Approach Delay, s/veh / LOS	60.2	E		36.1	D		2489.3	F		71.6	E	
Intersection Delay, s/veh / LOS	291.7						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	B	2.6	B	3.4	C	3.4	C
Bicycle LOS Score / LOS	1.8	A	1.8	A	1.4	A	1.1	A

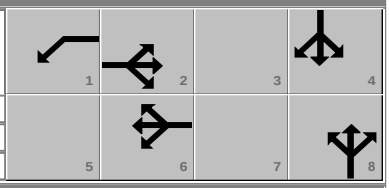
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{6_am} Rte 17 @ Short St	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	6_2013Ex_AM.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	8	1052	52	14	1113	1	88	0	11	2	0	12

Signal Information					EB		WB		NB		SB	
Cycle, s	100.0	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	10.0	32.5	19.0	10.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.5	4.0	4.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	3.0	0.0	0.0		



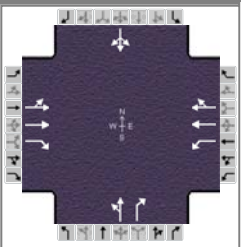
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		40.0	17.0	57.0		26.0		17.0
Change Period, (*Y*+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.4			6.3		2.8
Green Extension Time (g_e), s		0.0	0.0	0.0		0.1		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	575	529	49	15	580	580		92	10		15	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1821	1679	1579	1810	1863	1862		1810	1563		1636	
Queue Service Time (g_s), s	9.2	29.9	2.1	0.4	21.7	21.7		4.3	0.5		0.8	
Cycle Queue Clearance Time (g_c), s	31.0	29.9	2.1	0.4	21.7	21.7		4.3	0.5		0.8	
Green Ratio (*g*/*C*)	0.35	0.35	0.35	0.48	0.52	0.52		0.21	0.21		0.12	
Capacity (*c*), veh/h	628	588	553	301	969	922		380	328		196	
Volume-to-Capacity Ratio (*X*)	0.915	0.901	0.089	0.048	0.599	0.629		0.241	0.032		0.074	
Available Capacity (c_a), veh/h	628	588	553	301	969	922		344	328		164	
Back of Queue (*Q*), veh/ln (50th percentile)	16.5	14.9	0.8	0.2	9.5	9.6		1.9	0.2		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	31.9	30.9	21.8	19.1	17.5	16.7		34.6	31.4		40.9	
Incremental Delay (d_2), s/veh	20.2	19.4	0.3	0.0	2.7	3.3		0.1	0.0		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	52.1	50.3	22.1	19.2	20.2	20.0		34.7	31.4		40.9	
Level of Service (LOS)	D	D	C	B	C	B		C	C		D	
Approach Delay, s/veh / LOS	50.0	D		20.1	C		34.3	C		40.9	D	
Intersection Delay, s/veh / LOS	34.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.4	A	1.5	A	0.7	A	0.5	A

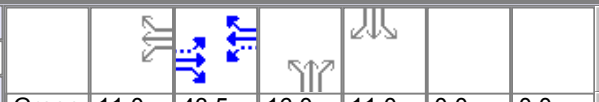
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Oct 17, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{6_pm} Rte 17 @ Short St	Analysis Year	2013 Existing Condition	Analysis Period	1> 7:00
File Name	6_2013Ex_PM.xus				
Project Description	I-95 Interchange Modification Report				

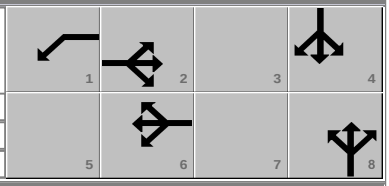


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	5	1789	77	11	984	1	72	2	26	2	1	7

Signal Information			
Cycle, s	110.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	11.0	43.5	16.0	11.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.0	18.0	69.0		23.0		18.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.3			6.2		2.6
Green Extension Time (g_e), s		0.0	0.0	0.0		0.1		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	978	890	72	11	513	513		77	24		10	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1857	1695	1548	1757	1863	1862		1812	1610		1673	
Queue Service Time (g_s), s	11.1	46.0	3.1	0.3	17.5	17.5		4.2	1.4		0.6	
Cycle Queue Clearance Time (g_c), s	43.5	46.0	3.1	0.3	17.5	17.5		4.2	1.4		0.6	
Green Ratio (*g*/*C*)	0.42	0.42	0.42	0.54	0.58	0.58		0.16	0.16		0.12	
Capacity (*c*), veh/h	767	709	647	265	1084	1041		296	263		198	
Volume-to-Capacity Ratio (*X*)	1.275	1.256	0.111	0.043	0.473	0.493		0.260	0.091		0.053	
Available Capacity (c_a), veh/h	767	709	647	265	1084	1041		264	263		167	
Back of Queue (*Q*), veh/ln (50th percentile)	48.6	43.0	1.2	0.1	7.4	7.5		1.9	0.6		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.9	32.0	19.5	21.7	13.9	13.3		41.9	39.1		44.7	
Incremental Delay (d_2), s/veh	134.0	126.5	0.3	0.0	1.5	1.7		0.2	0.1		0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	166.9	158.5	19.9	21.7	15.3	14.9		42.1	39.1		44.8	
Level of Service (LOS)	F	F	B	C	B	B		D	D		D	
Approach Delay, s/veh / LOS	157.6	F		15.2	B		41.4	D		44.8	D	
Intersection Delay, s/veh / LOS	105.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.1	B	1.3	A	0.7	A	0.5	A

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3490*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1497*	pc/h/ln
S	*69.0*	mph
D = v_p / S	*21.7*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3310*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1329*	pc/h/ln
S	*69.8*	mph
D = v_p / S	*19.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2240*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1020*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*14.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4230*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1755*	pc/h/ln
S	*66.4*	mph
D = v_p / S	*26.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2790*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1230*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6150*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2526*	pc/h/ln
S	*49.6*	mph
D = v_p / S	*50.9*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Between Rt 3 and Rt 17*
Jurisdiction	*Segment2&3*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5690*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2366*	pc/h/ln
S	*54.2*	mph
D = v_p / S	*43.6*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Between Rt 3 and Rt 17*
Jurisdiction	*Segment 2 & 3*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3970*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1610*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*23.7*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to US 17*
Jurisdiction	*Segment 3*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2790*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1230*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to US 17*
Jurisdiction	*Segment 3*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6150*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2526*	pc/h/ln
S	*49.6*	mph
D = v_p / S	*50.9*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5090*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2231*	pc/h/ln
S	*57.7*	mph
D = v_p / S	*38.7*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3310*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1385*	pc/h/ln
S	*69.6*	mph
D = v_p / S	*19.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2610*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1151*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*16.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2013 Existing Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5360*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2201*	pc/h/ln
S	*58.4*	mph
D = v_p / S	*37.7*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

Year 2013 Existing Condition CD Road Capacity Check

Ramps																				
Analysis Location			FFS	No. of Lanes	Time Period	Year 2013 Build Volume			PHF		Terrain	Truck %	E (T)	f (hv)	f (p)	Demand Flow Rate		HCM2010 Capacity	Capacity Check	
						Prior to Merge/ Diverge	Merge/ Diverge	After Merge/ Diverge	Prior to Merge/ Diverge	After Merge/ Diverge						Prior to Diverge	After Diverge		Prior to Merge/ Diverge	After Merge/ Diverge
D-3	I-95 NB CD Road	Off Ramp from CD Road to US 17 EB	50	1	AM	1620	120	1500	0.86	0.86	Rolling	14%	2.5	0.83	1.0	2270	2101	2000	OVER	OVER
					PM	1330	180	1150	0.95	0.95		12%	2.5	0.85	1.0	1647	1424	2000	under	under
M-2	I-95 NB CD Road	On Ramp to CD Road from US 17 WB	50	1	AM	610	410	1020	0.91	0.91	Rolling	14%	2.5	0.83	1.0	808	1350	2000	under	under
					PM	340	330	670	0.93	0.93		12%	2.5	0.85	1.0	430	848	2000	under	under

Note: HCM 2010 does not provide capacity for one-lane CD Road. One-lane CD Road Capacity assumed to be 1/2 of two-lane CD Road capacity.

Exhibit 13-9
Capacity of High-Speed Ramp Junctions on Multilane Highways and C-D Roadways (pc/h)

FFS (mi/h)	Capacity of Upstream/Downstream Highway or C-D Segment[a] No. of Lanes in One Direction 2	3	>3	Max. Desirable Flow Rate (v_{R12}) Entering Merge Influence Area[b]	Max. Desirable Flow Rate (v_{12}) Entering Diverge Influence Area[b]
≥60	4,400	6,600	2,200/ln	4,600	4,400
55	4,200	6,300	2,100/ln	4,600	4,400
50	4,000	6,000	2,000/ln	4,600	4,400
45	3,800	5,700	1,900/ln	4,600	4,400

Notes: [a] Demand in excess of these capacities results in LOS F.
[b] Demand in excess of these values alone does not result in LOS F; operations may be worse than predicted by this methodology.

Exhibit 13-10
Capacity of Ramp Roadways (pc/h)

Ramp FFS S_{FR} (mi/h)	Capacity of Ramp Roadway Single-Lane Ramps	Two-Lane Ramps
>50	2,200	4,400
>40–50	2,100	4,200
>30–40	2,000	4,000
≥20–30	1,900	3,800
<20	1,800	3,600

Note: Capacity of a ramp roadway does not ensure an equal capacity at its freeway or other high-speed junction. Junction capacity must be checked against criteria in Exhibit 13-8 and Exhibit 13-9.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 NB 95 to EB 3
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 1920 veh/h
	Freeway Volume, V_F: 3490	
	Ramp Volume, V_R: 270	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3490	0.94	Rolling	14	0	0.826	1.00	4492
Ramp	270	0.84	Rolling	14	0	0.826	1.00	389
UpStream								
DownStream	1920	0.98	Rolling	14	0	0.826	1.00	2371

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.630 using Equation (Exhibit 13-7)

V_{12} = 2973 pc/h

V_3 or V_{av34} 1519 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4492	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4103	Exhibit 13-8	7200	No
V_R	389	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2973	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.268 (Exhibit 13-12)

S_R= 62.5 mph (Exhibit 13-12)

S_0= 74.8 mph (Exhibit 13-12)

S = 66.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 95 NB to Rt 3 EB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	775
Freeway Volume, V_F	3310
Ramp Volume, V_R	240
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1000 ft
V_D = 900 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3310	0.98	Rolling	12	0	0.847	1.00	3986
Ramp	240	1.00	Rolling	12	0	0.847	1.00	283
UpStream								
DownStream	900	0.98	Rolling	12	0	0.847	1.00	1084

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.647 using Equation (Exhibit 13-7)
V_{12} = 2680 pc/h
V_3 or V_{av34} 1306 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3986	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3703	Exhibit 13-8	7200	No
V_R	283	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2680	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.3 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.258 (Exhibit 13-12)
S_R= 62.8 mph (Exhibit 13-12)
S_0= 75.6 mph (Exhibit 13-12)
S = 66.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-2 95 NB to 17 CD
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 1000	V_D = veh/h
	Freeway Volume, V_F: 5690	
	Ramp Volume, V_R: 1620	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5690	0.97	Rolling	14	0	0.826	1.00	7098
Ramp	1620	0.86	Rolling	14	0	0.826	1.00	2279
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.478 using Equation (Exhibit 13-7)

V_{12} = 4581 pc/h

V_3 or V_{av34} 2517 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7098	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4819	Exhibit 13-8	7200	No
V_R	2279	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4581	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 34.6 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.438 (Exhibit 13-12)

S_R = 57.7 mph (Exhibit 13-12)

S_0 = 70.9 mph (Exhibit 13-12)

S = 61.8 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-2 95 NB to 17 CD road
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition
Project Description	I-95 Interchange Modification Report		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 1000	V_D = veh/h
	Freeway Volume, V_F: 3970	
	Ramp Volume, V_R: 1330	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3970	0.97	Rolling	12	0	0.847	1.00	4829
Ramp	1330	0.95	Rolling	12	0	0.847	1.00	1652
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.563 using Equation (Exhibit 13-7)

V_{12} = 3442 pc/h

V_3 or V_{av34} 1387 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4829	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3177	Exhibit 13-8	7200	No
V_R	1652	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3442	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 24.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.382 (Exhibit 13-12)

S_R = 59.3 mph (Exhibit 13-12)

S_0 = 75.3 mph (Exhibit 13-12)

S = 63.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-4 95 SB to 17 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	960
Freeway Volume, V_F	2610
Ramp Volume, V_R	420
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1000 ft
V_D = 110 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2610	0.96	Rolling	18	0	0.787	1.00	3453
Ramp	420	0.88	Rolling	18	0	0.787	1.00	606
UpStream								
DownStream	110	0.92	Rolling	18	0	0.787	1.00	152

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.646 using Equation (Exhibit 13-7)
V_{12} = 2445 pc/h
V_3 or V_{av34} 1008 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3453	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2847	Exhibit 13-8	7200	No
V_R	606	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2445	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.6 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.288 (Exhibit 13-12)
S_R= 61.9 mph (Exhibit 13-12)
S_0= 76.8 mph (Exhibit 13-12)
S = 65.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-4 SB 95 to NB 17
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 960	V_D = 140 veh/h
	Freeway Volume, V_F: 5360	
	Ramp Volume, V_R: 470	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5360	0.97	Rolling	13	0	0.837	1.00	6603
Ramp	470	0.98	Rolling	13	0	0.837	1.00	573
UpStream								
DownStream	140	0.88	Rolling	13	0	0.837	1.00	190

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.569 using Equation (Exhibit 13-7)

V_{12} = 4001 pc/h

V_3 or V_{av34} 2602 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6603	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	6030	Exhibit 13-8	7200	No
V_R	573	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4001	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 30.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.285 (Exhibit 13-12)

S_R= 62.0 mph (Exhibit 13-12)

S_0= 70.5 mph (Exhibit 13-12)

S = 65.1 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-5 95 SB to Rest Area
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1100 ft
V_u = veh/h	Deceleration Lane Length L_D: 200	V_D = 90 veh/h
	Freeway Volume, V_F: 2790	
	Ramp Volume, V_R: 90	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2790	0.96	Rolling	18	0	0.787	1.00	3691
Ramp	90	0.96	Rolling	18	0	0.787	1.00	119
UpStream								
DownStream	90	0.96	Rolling	18	0	0.787	1.00	119

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.662 using Equation (Exhibit 13-7)

V_{12} = 2485 pc/h

V_3 or V_{av34} 1206 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3691	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3572	Exhibit 13-8	7200	No
V_R	119	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2485	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.439 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 76.0 mph (Exhibit 13-12)

S = 62.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-5 SB 95 to Rest Area
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1100 ft
V_u = veh/h	Deceleration Lane Length L_D: 200	V_D = 160 veh/h
	Freeway Volume, V_F: 6150	
	Ramp Volume, V_R: 160	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6150	0.97	Rolling	13	0	0.837	1.00	7577
Ramp	160	0.97	Rolling	13	0	0.837	1.00	197
UpStream								
DownStream	160	0.97	Rolling	13	0	0.837	1.00	197

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.562 using Equation (Exhibit 13-7)

V_{12} = 4341 pc/h

V_3 or V_{av34} 3236 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 4877 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7577	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	7380	Exhibit 13-8	7200	Yes
V_R	197	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4341	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 44.4 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.446 (Exhibit 13-12)

S_R= 57.5 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 61.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-6 95 SB to Rt 3 WB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	750
Freeway Volume, V_F	2790
Ramp Volume, V_R	610
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1000 ft
V_D = 140 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2790	0.96	Rolling	18	0	0.787	1.00	3691
Ramp	610	0.95	Rolling	18	0	0.787	1.00	815
UpStream								
DownStream	140	0.88	Rolling	18	0	0.787	1.00	202

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.630 using Equation (Exhibit 13-7)
V_{12} = 2628 pc/h
V_3 or V_{av34} 1063 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3691	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2876	Exhibit 13-8	7200	No
V_R	815	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2628	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.1 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.306 (Exhibit 13-12)
S_R= 61.4 mph (Exhibit 13-12)
S_0= 76.5 mph (Exhibit 13-12)
S = 65.1 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-6 SB 95 to WB 3
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 750	V_D = 270 veh/h
	Freeway Volume, V_F: 6150	
	Ramp Volume, V_R: 2250	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6150	0.97	Rolling	13	0	0.837	1.00	7577
Ramp	2250	0.95	Rolling	13	0	0.837	1.00	2830
UpStream								
DownStream	270	0.96	Rolling	13	0	0.837	1.00	336

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.440 using Equation (Exhibit 13-7)

V_{12} = 4921 pc/h

V_3 or V_{av34} 2656 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7577	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	4747	Exhibit 13-8	7200	No
V_R	2830	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4921	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 39.8 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.488 (Exhibit 13-12)

S_R= 56.3 mph (Exhibit 13-12)

S_0= 70.3 mph (Exhibit 13-12)

S = 60.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-1 Rt 3 WB to 95 NB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No ☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	280 veh/h	Freeway Volume, V_F	4860	V_D = veh/h
		Ramp Volume, V_R	830	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4860	0.97	Rolling	14	0	0.826	1.00	6062
Ramp	830	0.99	Rolling	14	0	0.826	1.00	1014
UpStream	280	0.88	Rolling	14	0	0.826	1.00	385
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2304.46 (Equation 13-6 or 13-7)

P_{FM} = 0.532 using Equation (Exhibit 13-6)

V_{12} = 3222 pc/h

V_3 or V_{av34} 2840 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3464 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7076	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4478	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 31.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.534 (Exibit 13-11)

S_R = 55.0 mph (Exhibit 13-11)

S_0 = 61.7 mph (Exhibit 13-11)

S = 57.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-1 Rt 3 WB to 95 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 490 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3480	
	Ramp Volume, V_R: 490	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3480	0.97	Rolling	12	0	0.847	1.00	4233
Ramp	490	0.94	Rolling	12	0	0.847	1.00	615
UpStream	490	0.88	Rolling	12	0	0.847	1.00	657
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1827.67 (Equation 13-6 or 13-7)

P_{FM} = 0.562 using Equation (Exhibit 13-6)

V_{12} = 2377 pc/h

V_3 or V_{av34} 1856 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2418 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4848	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3033	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.272 (Exibit 13-11)

S_R = 62.4 mph (Exhibit 13-11)

S_0 = 65.3 mph (Exhibit 13-11)

S = 63.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-3 17 CD to 95 NB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4070	
	Ramp Volume, V_R: 1020	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4070	0.92	Rolling	14	0	0.826	1.00	5353
Ramp	1020	0.91	Rolling	14	0	0.826	1.00	1356
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 3241 pc/h

V_3 or V_{av34} = 2112 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3241 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6709	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4597	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 34.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.608 (Exibit 13-11)

S_R = 53.0 mph (Exhibit 13-11)

S_0 = 64.2 mph (Exhibit 13-11)

S = 56.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-3 NB CD to 95 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2640	
	Ramp Volume, V_R: 670	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2640	0.94	Rolling	12	0	0.847	1.00	3314
Ramp	670	0.93	Rolling	12	0	0.847	1.00	850
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 2007 pc/h

V_3 or V_{av34} = 1307 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2007 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4164	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2857	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 21.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.289 (Exibit 13-11)

S_R = 61.9 mph (Exhibit 13-11)

S_0 = 67.1 mph (Exhibit 13-11)

S = 63.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-4 17 SB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 340 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1960	
	Ramp Volume, V_R: 830	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1960	0.96	Rolling	18	0	0.787	1.00	2593
Ramp	830	0.90	Rolling	18	0	0.787	1.00	1171
UpStream	340	0.85	Rolling	18	0	0.787	1.00	508
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1684.50 (Equation 13-6 or 13-7)

P_{FM} = 0.576 using Equation (Exhibit 13-6)

V_{12} = 1494 pc/h

V_3 or V_{av34} 1099 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1494 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3764	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2665	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.227 (Exibit 13-11)

S_R = 63.6 mph (Exhibit 13-11)

S_0 = 67.8 mph (Exhibit 13-11)

S = 64.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael baker Jr, Inc	Junction	
Date Performed	10/17/2013	Jurisdiction	M-4 17 SB to 95 SB
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 470 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4560	
	Ramp Volume, V_R: 1590	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4560	0.97	Rolling	13	0	0.837	1.00	5618
Ramp	1590	0.95	Rolling	13	0	0.837	1.00	2000
UpStream	470	0.98	Rolling	13	0	0.837	1.00	573
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.619 using Equation (Exhibit 13-6)

V_{12} = 3480 pc/h

V_3 or V_{av34} 2138 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3480 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7618	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5480	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 37.9 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.106 (Exibit 13-11)

S_R = 39.0 mph (Exhibit 13-11)

S_0 = 64.1 mph (Exhibit 13-11)

S = 43.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-5 Rest Area to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1100 ft	Acceleration Lane Length, L_A: 800	L_{down} = ft
V_u = 90 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2700	
	Ramp Volume, V_R: 90	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2700	0.96	Rolling	18	0	0.787	1.00	3572
Ramp	90	0.96	Rolling	18	0	0.787	1.00	119
UpStream	90	0.96	Rolling	18	0	0.787	1.00	119
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 573.27 (Equation 13-6 or 13-7)

P_{FM} = 0.600 using Equation (Exhibit 13-6)

V_{12} = 2143 pc/h

V_3 or V_{av34} 1429 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2143 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3691	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2262	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.302 (Exibit 13-11)

S_R = 61.5 mph (Exhibit 13-11)

S_0 = 66.7 mph (Exhibit 13-11)

S = 63.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael baker Jr, Inc	Junction	M-5
Date Performed	10/17/2013	Jurisdiction	17 SB to 95 SB
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1100 ft
V_u = 160 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	800
Deceleration Lane Length L_D	
Freeway Volume, V_F	5990
Ramp Volume, V_R	160
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5990	0.97	Rolling	13	0	0.837	1.00	7379
Ramp	160	0.97	Rolling	13	0	0.837	1.00	197
UpStream	160	0.97	Rolling	13	0	0.837	1.00	197
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2189.46 (Equation 13-6 or 13-7)
P_{FM} = 0.531 using Equation (Exhibit 13-6)
V_{12} = 3919 pc/h
V_3 or V_{av34} 3460 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 4679 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7576	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4876	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 38.4 (pc/mi/ln)
LOS = F (Exhibit 13-2)

Speed Determination

M_S = 0.752 (Exibit 13-11)
S_R = 48.9 mph (Exhibit 13-11)
S_0 = 61.1 mph (Exhibit 13-11)
S = 52.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = using Equation (Exhibit 13-7)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)
S_R = mph (Exhibit 13-12)
S_0 = mph (Exhibit 13-12)
S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 400 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1920	
	Ramp Volume, V_R: 320	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1920	0.93	Rolling	18	0	0.787	1.00	2622
Ramp	320	0.80	Rolling	18	0	0.787	1.00	508
UpStream	400	0.91	Rolling	18	0	0.787	1.00	558
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1460.02 (Equation 13-6 or 13-7)

P_{FM} = 0.585 using Equation (Exhibit 13-6)

V_{12} = 1533 pc/h

V_3 or V_{av34} 1089 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1533 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3130	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2041	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 13.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.221 (Exibit 13-11)

S_R = 63.8 mph (Exhibit 13-11)

S_0 = 67.9 mph (Exhibit 13-11)

S = 65.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 570 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3600	
	Ramp Volume, V_R: 630	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3600	0.97	Rolling	13	0	0.837	1.00	4435
Ramp	630	0.93	Rolling	13	0	0.837	1.00	810
UpStream	570	0.95	Rolling	13	0	0.837	1.00	717
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1912.63 (Equation 13-6 or 13-7)

P_{FM} = 0.556 using Equation (Exhibit 13-6)

V_{12} = 2467 pc/h

V_3 or V_{av34} 1968 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2534 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5245	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3344	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.301 (Exibit 13-11)

S_R = 61.6 mph (Exhibit 13-11)

S_0 = 65.0 mph (Exhibit 13-11)

S = 62.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	11/12/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-1 NB 95 at Rt 3 weave
Weaving Segment Location	
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	900ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2940	0.94	14	0	2.5	2.0	0.826	1.00	3784
V_{RF}	1920	0.98	14	0	2.5	2.0	0.826	1.00	2371
V_{FR}	280	0.88	14	0	2.5	2.0	0.826	1.00	385
V_{RR}	0	0.93	14	0	2.5	2.0	0.826	1.00	0
V_{NW}	3784							V =	5405
V_W	2756								
VR	0.421								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5405 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	4707 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.148	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	6922 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	W-1 Rt 3 NB weave
Weaving Segment Location	
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	900ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2580	0.98	12	0	2.5	2.0	0.847	1.00	3107
V_{RF}	900	0.98	12	0	2.5	2.0	0.847	1.00	1084
V_{FR}	490	0.88	12	0	2.5	2.0	0.847	1.00	657
V_{RR}	0	0.96	12	0	2.5	2.0	0.847	1.00	0
V_{NW}	3107							V =	4109
V_W	1741								
VR	0.359								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	0 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	153 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	357 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	510 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4109 veh/h	Weaving intensity factor, W	0.144
Weaving segment capacity, c_w	5664 veh/h	Weaving segment speed, S	63.8 mph
Weaving segment v/c ratio	0.725	Average weaving speed, S_W	63.1 mph
Weaving segment density, D	19.0 pc/mi/ln	Average non-weaving speed, S_{NW}	64.2 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	6227 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CRD
Agency/Company	Michael Baker Jr., Inc.
Date Performed	11/12/2013
Analysis Time Period	AM Peak Hour

Site Information

Freeway/Dir of Travel	I-95 NB CD Road
Weaving Segment Location	US 17 EB On/US 17 WB Off
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	C-D Roadway/ Multilane Highways
Weaving number of lanes, N	2		
Weaving segment length, L_S	400ft	Freeway minimum speed, S_{MIN}	15
Freeway free-flow speed, FFS	50 mph	Freeway maximum capacity, C_{IFL}	2250
		Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	0	0.94	14	0	2.5	2.0	0.826	1.00	0
V_{RF}	610	0.91	14	0	2.5	2.0	0.826	1.00	811
V_{FR}	1500	0.86	14	0	2.5	2.0	0.826	1.00	2110
V_{RR}	0	0.94	14	0	2.5	2.0	0.826	1.00	0
V_{NW}	0							V =	2415
V_W	2921								
VR	1.000								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2415 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	1970 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.225	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	14232 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CRD
Agency/Company	Michael Baker Jr., Inc.
Date Performed	11/1/2013
Analysis Time Period	PM Peak Hour

Site Information

Freeway/Dir of Travel	I-95 NB CD Road
Weaving Segment Location	US 17 EB On/US 17 WB Off
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	C-D Roadway/ Multilane Highways
Weaving number of lanes, N	2		
Weaving segment length, L_S	400ft	Freeway minimum speed, S_{MIN}	15
Freeway free-flow speed, FFS	50 mph	Freeway maximum capacity, C_{IFL}	2250
		Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	0	0.94	12	0	2.5	2.0	0.847	1.00	0
V_{RF}	340	0.93	12	0	2.5	2.0	0.847	1.00	431
V_{FR}	1150	0.95	12	0	2.5	2.0	0.847	1.00	1428
V_{RR}	0	0.94	12	0	2.5	2.0	0.847	1.00	0
V_{NW}	0							V =	1576
V_W	1859								
VR	1.000								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1859 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1875 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	0 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1875 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	1576 veh/h	Weaving intensity factor, W	0.765
Weaving segment capacity, c_w	2020 veh/h	Weaving segment speed, S	34.8 mph
Weaving segment v/c ratio	0.780	Average weaving speed, S_W	34.8 mph
Weaving segment density, D	26.7 pc/mi/ln	Average non-weaving speed, S_{NW}	32.2 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	14232 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-3 SB 95 at US 17
Weaving Segment Location	
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	600ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	1850	0.96	18	0	2.5	2.0	0.787	1.00	2447
V_{RF}	110	0.92	18	0	2.5	2.0	0.787	1.00	152
V_{FR}	340	0.85	18	0	2.5	2.0	0.787	1.00	508
V_{RR}	0	0.94	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	2447							V =	2447
V_W	660								
VR	0.212								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	0 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	108 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	59 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	167 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2447 veh/h	Weaving intensity factor, W	0.082
Weaving segment capacity, c_w	6580 veh/h	Weaving segment speed, S	66.2 mph
Weaving segment v/c ratio	0.372	Average weaving speed, S_W	65.8 mph
Weaving segment density, D	11.7 pc/mi/ln	Average non-weaving speed, S_{NW}	66.3 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	4664 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	W-3 SB 95 at 17 weave
Weaving Segment Location	
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	600ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	4420	0.97	13	0	2.5	2.0	0.837	1.00	5445
V_{RF}	140	0.88	13	0	2.5	2.0	0.837	1.00	190
V_{FR}	470	0.98	13	0	2.5	2.0	0.837	1.00	573
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	5445							V =	5195
V_W	763								
VR	0.123								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	0 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	108 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	676 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	784 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5195 veh/h	Weaving intensity factor, W	0.279
Weaving segment capacity, c_w	7223 veh/h	Weaving segment speed, S	62.0 mph
Weaving segment v/c ratio	0.719	Average weaving speed, S_W	58.0 mph
Weaving segment density, D	25.1 pc/mi/ln	Average non-weaving speed, S_{NW}	62.6 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	3763 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-4 SB weave at Rt 3
Weaving Segment Location	
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	1780	0.96	18	0	2.5	2.0	0.787	1.00	2355
V_{RF}	140	0.88	18	0	2.5	2.0	0.787	1.00	202
V_{FR}	400	0.91	18	0	2.5	2.0	0.787	1.00	558
V_{RR}	0	0.90	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	2355							V =	2453
V_W	760								
VR	0.244								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	0 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	159 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	230 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	389 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2453 veh/h	Weaving intensity factor, W	0.112
Weaving segment capacity, c_w	6586 veh/h	Weaving segment speed, S	65.8 mph
Weaving segment v/c ratio	0.372	Average weaving speed, S_W	64.5 mph
Weaving segment density, D	11.8 pc/mi/ln	Average non-weaving speed, S_{NW}	66.3 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	4991 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM

Site Information

Freeway/Dir of Travel	SB 95 at RT 3 weave
Weaving Segment Location	
Analysis Year	2013 Existing Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3330	0.97	13	0	2.5	2.0	0.837	1.00	4102
V_{RF}	270	0.96	13	0	2.5	2.0	0.837	1.00	336
V_{FR}	570	0.95	13	0	2.5	2.0	0.837	1.00	717
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	4102							V =	4314
V_W	1053								
VR	0.204								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	0 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	159 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	590 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	749 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4314 veh/h	Weaving intensity factor, W	0.187
Weaving segment capacity, c_w	7103 veh/h	Weaving segment speed, S	63.3 mph
Weaving segment v/c ratio	0.607	Average weaving speed, S_W	61.3 mph
Weaving segment density, D	20.4 pc/mi/ln	Average non-weaving speed, S_{NW}	63.8 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4580 ft

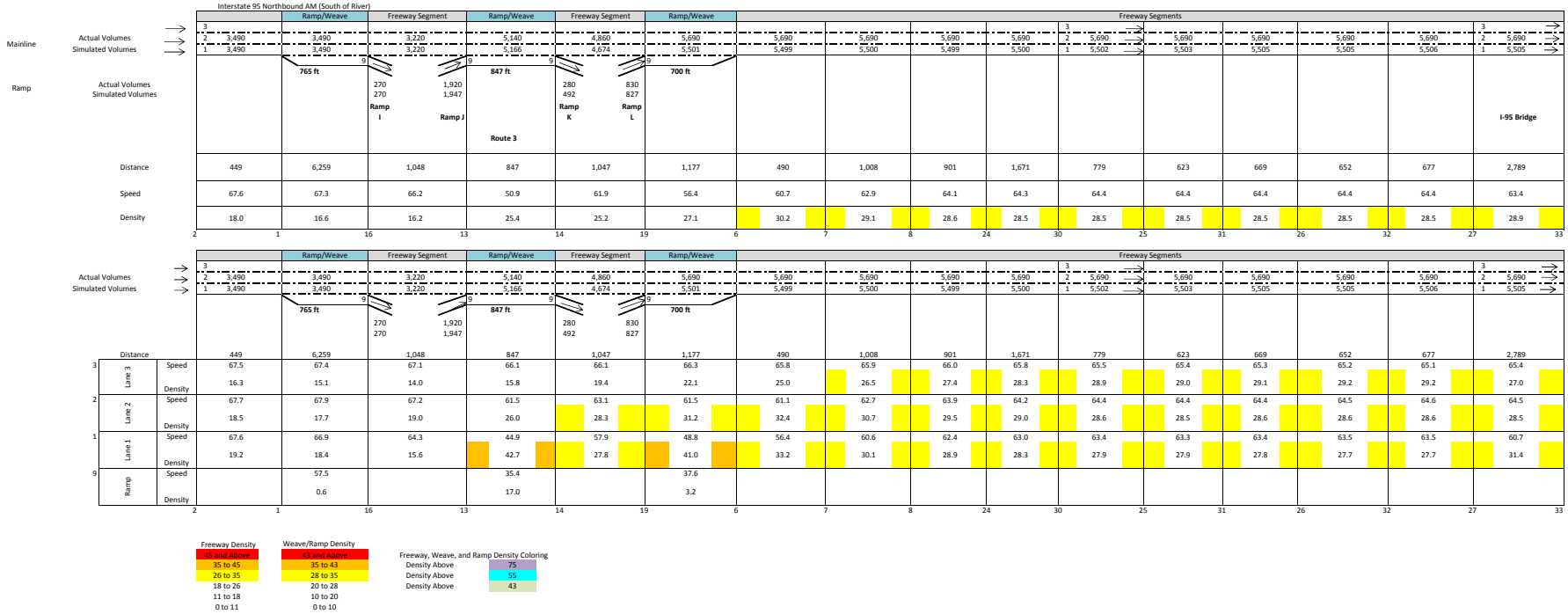
Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

2013 Existing Conditions CORSIM Analysis Summary

Northbound I-95 Mainline & Ramp Analysis			2013 Existing			
			AM Peak Hour		PM Peak Hour	
Roadway	**Location**	**Analysis ID**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**
I-95 NB Mainline	South of Route 3 Interchange	Mainline Segment 1	18.0	67.6	17.0	67.9
Route 3 Interchange Ramps	I-95 NB **Diverge** to Route 3 EB	D-1	16.6	67.3	15.6	67.6
	Route 3 EB Merge to I-95 NB diverge - **Weave**	W-1	25.4	50.9	17.7	56.0
	Route 3 WB **Merge** to I-95 NB	M-1	27.1	56.4	16.8	62.8
I-95 Mainline	Route 3 to Route 17	Mainline Segment 2	28.5	64.3	19.1	66.2
I-95 Mainline	Route 3 to Route 17	Mainline Segment 3	28.9	63.4	19.2	65.8
Route 17 Interchange Ramps	I-95 NB **diverge** to I-95 C/D Roadway	D-2	26.7	57.2	16.7	62.9
	I-95 C/D Roadway **diverge** to Route 17 Bus SB	D-3	19.4	46.3	13.7	47.1
	Route 17 SB Merge to I-95 NB diverge - **Weave**	W-2	36.8	30.6	19.0	47.1
	Route 17 Bus NB **merge** to I-95 C/D Roadway	M-2	19.8	43.6	8.8	47.1
	I-95 C/D Roadway **merge** to I-95 NB	M-3	22.7	60.2	13.2	65.0
I-95 Mainline	North of Route 17 Interchange	Mainline Segment 4	25.6	60.2	15.4	66.7

Southbound I-95 Mainline & Ramp Analysis			2013 Existing			
			AM Peak Hour		PM Peak Hour	
Roadway	**Location**	**Analysis Type**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**
I-95 SB Mainline	North of Route 17 Interchange	Mainline Segment 4	12.9	69.0	27.2	66.9
Route 17 Interchange Ramps	I-95 SB diverge to Route 17 NB	D-4	12.0	67.8	25.6	65.5
	Route 17 NB Merge to I-95 SB diverge - **Weave**	W-3	9.4	60.7	22.8	54.8
	Route 17 SB **merge** to I-95 SB	M-4	14.4	54.9	37.2	45.0
I-95 SB Mainline	Route 17 to Rest Area	Mainline Segment 3	14.1	66.9	37.2	55.8
Rest Area	Rest Area - Diverge	D-5	14.1	66.5	34.4	50.8
	Rest Area - Merge	M-5	13.4	66.1	48.2	43.3
I-95 SB Mainline	Rest Area to Route 3	Mainline Segment 2	14.2	66.2	52.4	38.5
Route 3 Interchange Ramps	I-95 SB **Diverge** to Route 3 WB	D-6	11.8	64.2	40.7	40.3
	Route 3 WB Merge to I-95 SB diverge - **Weave**	W-4	9.3	62.5	16.7	60.1
	Route 3 EB **Merge** to I-95 SB	M-6	9.3	66.2	18.0	63.6
I-95 SB Mainline	South of Route 3 Interchange	Mainline Segment 1	10.7	67.6	20.5	65.7



Distance		449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789	
Speed		67.6	67.3	66.2	50.9	61.9	56.4	60.7	62.9	64.1	64.3	64.4	64.4	64.4	64.4	64.4	63.4	
Density		18.0	16.6	16.2	25.4	25.2	27.1	30.2	29.1	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.9	
2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27	33		

Distance		449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789	
3	Lane 3	Speed	67.5	67.4	67.1	66.1	66.1	66.3	65.8	65.9	66.0	65.8	65.5	65.4	65.3	65.2	65.1	65.4
		Density	16.3	15.1	14.0	15.8	19.4	22.1	25.0	26.5	27.4	28.3	28.9	29.0	29.1	29.2	29.2	27.0
2	Lane 2	Speed	67.7	67.9	67.2	61.5	63.1	61.5	61.1	62.7	63.9	64.2	64.4	64.4	64.4	64.5	64.6	64.5
		Density	18.5	17.7	19.0	26.0	28.3	31.2	32.4	30.7	29.5	29.0	28.6	28.5	28.6	28.6	28.6	28.5
1	Lane 1	Speed	67.6	66.9	64.3	44.9	57.9	48.8	56.4	60.6	62.4	63.0	63.4	63.3	63.4	63.5	63.5	60.7
		Density	19.2	18.4	15.6	42.7	27.8	41.0	33.2	30.1	28.9	28.3	27.9	27.9	27.8	27.7	27.7	31.4
9	Ramp	Speed		57.5		35.4		37.6										
		Density		0.6		17.0		3.2										
2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27	33		

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

Interstate 95 Northbound AM (North of River)

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segments
Mainline	Actual Volumes	3					3
		2 5,690	5,690	4,070	4,070	5,090	2 5,090
	Simulated Volumes	1 5,505	5,504	3,707	3,707	4,932	1 4,934
Ramp			9 800 ft	1,620	See CD Lane	1,020 9	1,000 ft
	Actual Volumes			1,794		1,226	
	Simulated Volumes	I-95 Bridge		CD Road		CD Road	
Distance		2789	1320	1258	4879	1653	2319
Speed		63.4	57.2	65.7	66.2	60.2	64.3
Density		28.9	26.7	18.8	18.7	22.7	25.6
		27	33	28	34	37	51 52

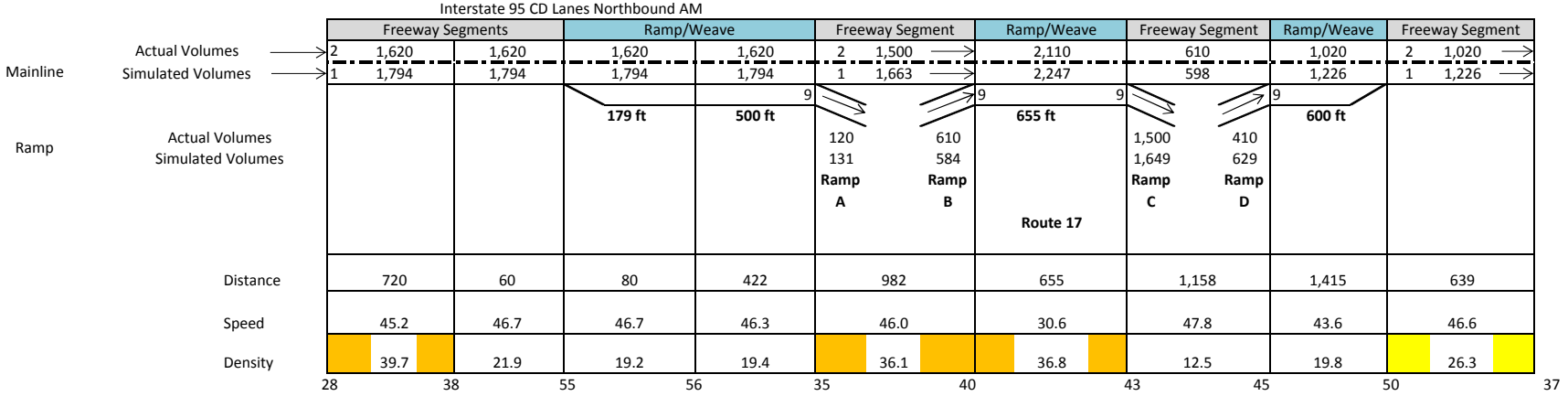
		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segments
Mainline	Actual Volumes	3					3
		2 5,690	5,690	4,070	4,070	5,090	2 5,090
	Simulated Volumes	1 5,505	5,504	3,707	3,707	4,932	1 4,934
Ramp			9 800 ft	1,620	See CD Lane	1,020 9	1,000 ft
	Actual Volumes			1,794		1,226	
	Simulated Volumes						
Distance		2,789	1,320	1,258	4,879	1,653	2,319
Lane 3	Speed	65.4	66.8	67.0	66.5	65.9	66.0
	Density	27.0	21.0	21.0	20.2	20.9	23.1
Lane 2	Speed	64.5	62.1	65.8	66.1	63.8	64.9
	Density	28.5	23.8	20.1	19.8	24.6	26.5
Lane 1	Speed	60.7	51.5	64.0	65.8	54.9	62.3
	Density	31.4	30.9	15.2	16.0	33.9	27.1
Ramp	Speed		50.3			49.2	
	Density		20.4			2.6	
		27	33	28	34	37	51 52

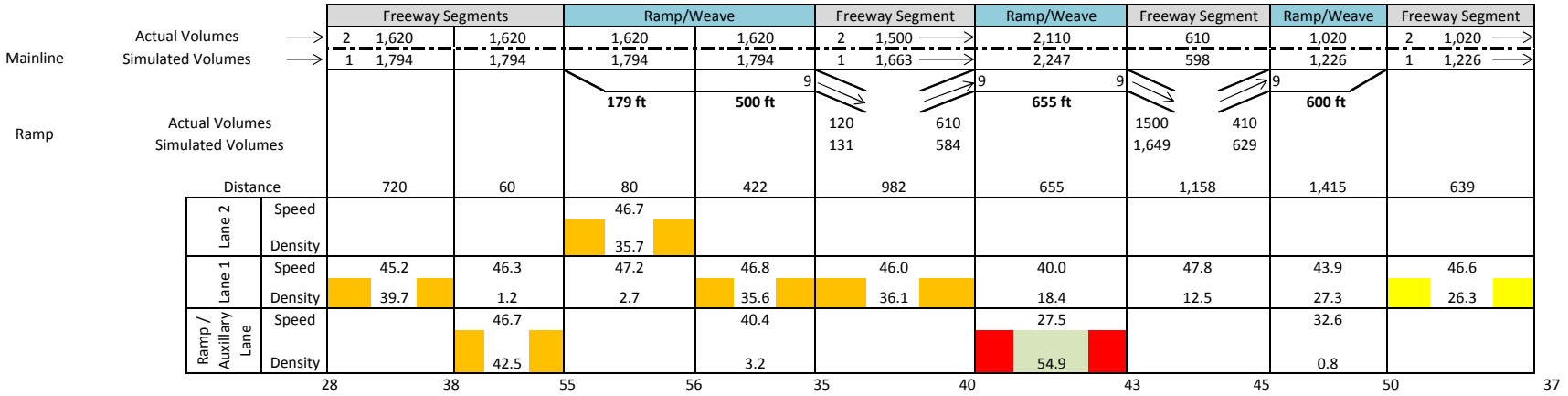
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

Interstate 95 CD Lanes Northbound AM



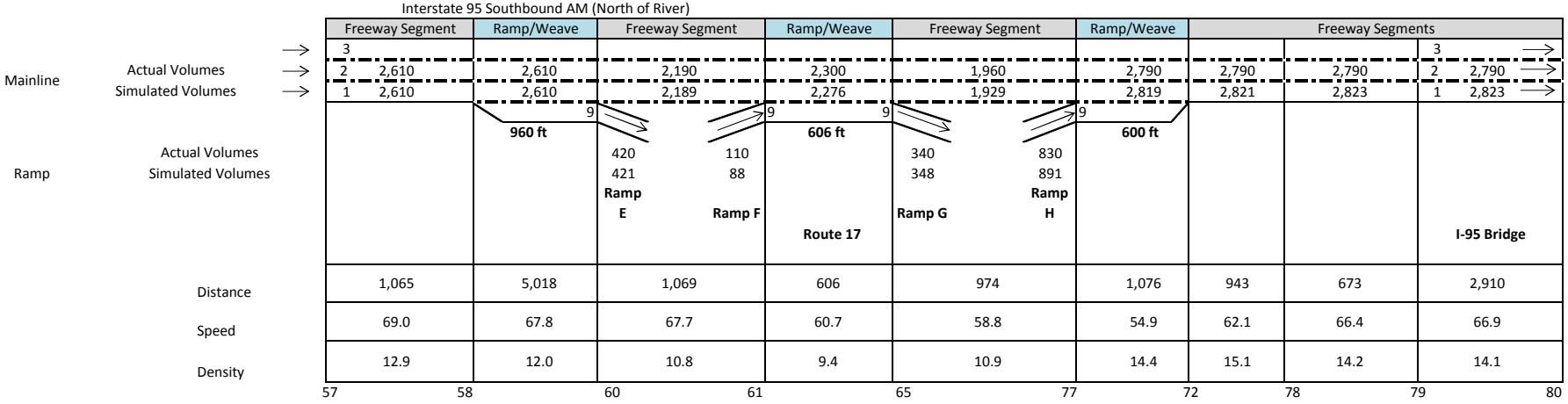


Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

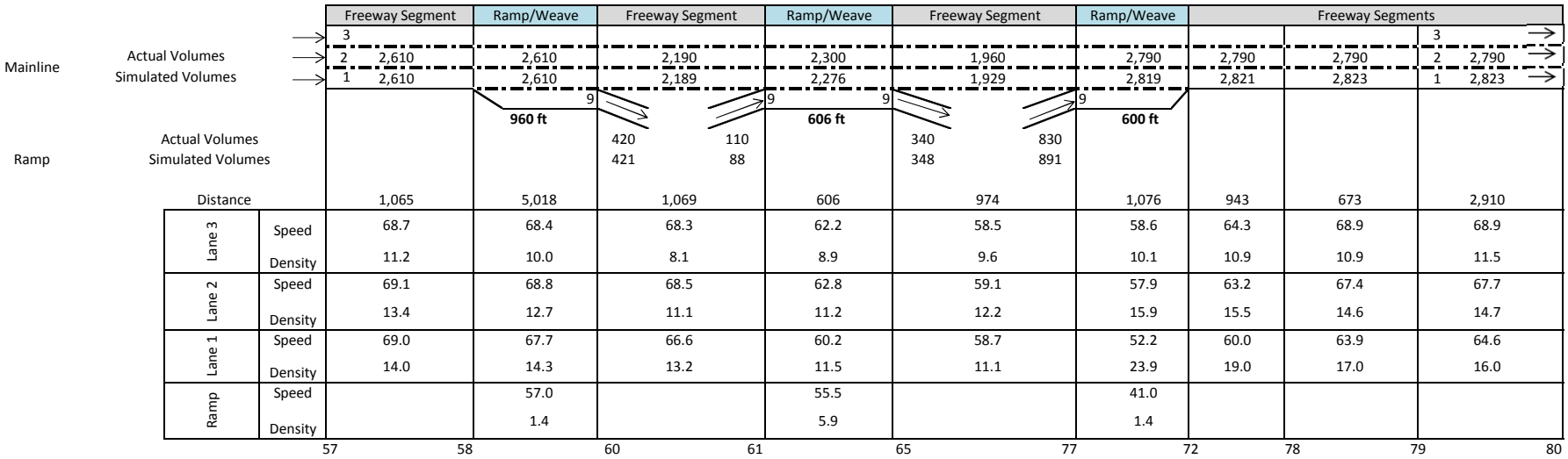
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

Interstate 95 Southbound AM (North of River)



Mainline	Actual Volumes	2,610	2,610	2,190	2,300	1,960	2,790	2,790	2,790	2,790	
	Simulated Volumes	2,610	2,610	2,189	2,276	1,929	2,819	2,821	2,823	2,823	
Ramp	Actual Volumes			420	110	340	830				
	Simulated Volumes			421	88	348	891				
Distance		1,065	5,018	1,069	606	974	1,076	943	673	2,910	
Speed		69.0	67.8	67.7	60.7	58.8	54.9	62.1	66.4	66.9	
Density		12.9	12.0	10.8	9.4	10.9	14.4	15.1	14.2	14.1	

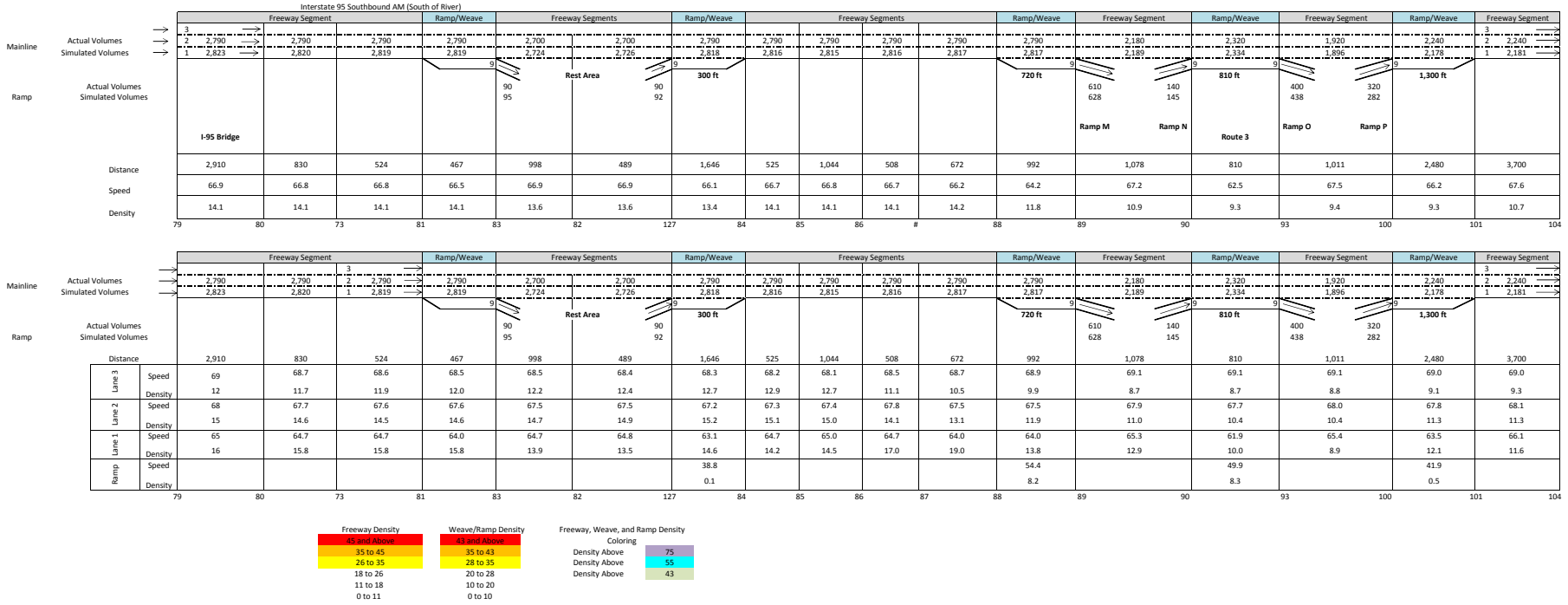


Mainline	Actual Volumes	2,610	2,610	2,190	2,300	1,960	2,790	2,790	2,790	2,790	
	Simulated Volumes	2,610	2,610	2,189	2,276	1,929	2,819	2,821	2,823	2,823	
Ramp	Actual Volumes			420	110	340	830				
	Simulated Volumes			421	88	348	891				
Distance		1,065	5,018	1,069	606	974	1,076	943	673	2,910	
Lane 3	Speed	68.7	68.4	68.3	62.2	58.5	58.6	64.3	68.9	68.9	
	Density	11.2	10.0	8.1	8.9	9.6	10.1	10.9	10.9	11.5	
Lane 2	Speed	69.1	68.8	68.5	62.8	59.1	57.9	63.2	67.4	67.7	
	Density	13.4	12.7	11.1	11.2	12.2	15.9	15.5	14.6	14.7	
Lane 1	Speed	69.0	67.7	66.6	60.2	58.7	52.2	60.0	63.9	64.6	
	Density	14.0	14.3	13.2	11.5	11.1	23.9	19.0	17.0	16.0	
Ramp	Speed		57.0		55.5		41.0				
	Density		1.4		5.9		1.4				

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43



Mainline	Actual Volumes		2,790	2,790	2,790	2,790	2,700	2,700	2,790	2,790	2,790	2,790	2,790	2,790	2,180	2,320	1,920	2,240	2,240	
	Simulated Volumes		2,823	2,820	2,819	2,819	2,724	2,726	2,818	2,816	2,815	2,816	2,817	2,817	2,189	2,334	1,896	2,178	2,181	
Ramp	Actual Volumes						90	90							610	140	400	320		
	Simulated Volumes						95	92							628	145	438	282		
	Distance		2,910	830	524	467	998	489	1,646	525	1,044	508	672	992	1,078	810	1,011	2,480	3,700	
	Speed		66.9	66.8	66.8	66.5	66.9	66.9	66.1	66.7	66.8	66.7	66.2	64.2	67.2	62.5	67.5	66.2	67.6	
	Density		14.1	14.1	14.1	14.1	13.6	13.6	13.4	14.1	14.1	14.1	14.2	11.8	10.9	9.3	9.4	9.3	10.7	
			79	80	73	81	83	82	127	84	85	86	#	88	89	90	93	100	101	104

Mainline	Actual Volumes		2,790	2,790	2,790	2,790	2,700	2,700	2,790	2,790	2,790	2,790	2,790	2,790	2,180	2,320	1,920	2,240	2,240	
	Simulated Volumes		2,823	2,820	2,819	2,819	2,724	2,726	2,818	2,816	2,815	2,816	2,817	2,817	2,189	2,334	1,896	2,178	2,181	
Ramp	Actual Volumes						90	90							610	140	400	320		
	Simulated Volumes						95	92							628	145	438	282		
	Distance		2,910	830	524	467	998	489	1,646	525	1,044	508	672	992	1,078	810	1,011	2,480	3,700	
Lane 3	Speed		69	68.7	68.6	68.5	68.5	68.4	68.3	68.2	68.1	68.5	68.7	68.9	69.1	69.1	69.1	69.0	69.0	
	Density		12	11.7	11.9	12.0	12.2	12.4	12.7	12.9	12.7	11.1	10.5	9.9	8.7	8.7	8.8	9.1	9.3	
Lane 2	Speed		68	67.7	67.6	67.6	67.5	67.5	67.2	67.3	67.4	67.8	67.5	67.5	67.9	67.7	68.0	67.8	68.1	
	Density		15	14.6	14.5	14.6	14.7	14.9	15.2	15.1	15.0	14.1	13.1	11.9	11.0	10.4	10.4	11.3	11.3	
Lane 1	Speed		65	64.7	64.7	64.0	64.7	64.8	63.1	64.7	65.0	64.7	64.0	64.0	65.3	61.9	65.4	63.5	66.1	
	Density		16	15.8	15.8	15.8	13.9	13.5	14.6	14.2	14.5	17.0	19.0	13.8	12.9	10.0	8.9	12.1	11.6	
Ramp	Speed								38.8					54.4		49.9		41.9		
	Density								0.1					8.2		8.3		0.5		
			79	80	73	81	83	82	127	84	85	86	87	88	89	90	93	100	101	104

Freeway Density	Weave/Ramp Density	Freeway, Weave, and Ramp Density Coloring	
45 and Above	43 and Above	Density Above	75
35 to 45	35 to 43	Density Above	55
26 to 35	28 to 35	Density Above	43
18 to 26	20 to 28		
11 to 18	10 to 20		
0 to 11	0 to 10		

Interstate 95 Northbound PM (South of River)

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments										
Mainline	Actual Volumes	3											3					
		2 3,310	3,310	3,070	3,970	3,480	3,970	3,970	3,970	3,970	3,970	2 3,970	3,970	3,970	3,970	3,970	3,970	
	Simulated Volumes	1 3,310	3,309	3,073	3,954	3,328	3,791	3,791	3,791	3,796	3,796	1 3,805	3,804	3,805	3,807	3,803	3,800	
Ramp	Actual Volumes		765 ft	240	900	847 ft	490	490	700 ft									
	Simulated Volumes			236	881		626	463										
				Ramp I	Ramp J	Route 3	Ramp K	Ramp L										I-95 Bridge
	Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789	
	Speed	67.9	67.6	66.7	56.0	65.5	62.8	65.4	66.1	66.2	66.2	66.1	66.1	66.1	66.1	66.0	65.8	
	Density	17.0	15.6	15.3	17.7	16.9	16.8	19.3	19.1	19.1	19.1	19.2	19.2	19.2	19.2	19.2	19.2	
		2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27	33

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments										
Mainline	Actual Volumes	3											3					
		2 3,310	3,310	3,070	3,970	3,480	3,970	3,970	3,970	3,970	3,970	2 3,970	3,970	3,970	3,970	3,970	3,970	
	Simulated Volumes	1 3,310	3,309	3,073	3,954	3,328	3,791	3,791	3,791	3,796	3,796	1 3,805	3,804	3,805	3,807	3,803	3,800	
Ramp	Actual Volumes		765 ft	240	900	847 ft	490	490	700 ft									
	Simulated Volumes			236	881		626	463										
	Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789	
Lane 3	Speed	67.8	67.7	67.5	67.2	67.2	67.4	67.4	67.4	67.4	67.3	67.1	67.0	67.0	66.9	66.8	67.0	
	Density	15.5	14.3	12.4	12.9	14.0	14.8	15.7	16.3	16.8	17.4	17.8	17.9	18.0	18.1	18.1	16.7	
Lane 2	Speed	67.9	68.1	67.6	65.3	66.5	66.1	66.3	66.7	66.7	66.6	66.5	66.5	66.5	66.5	66.4	66.6	
	Density	17.6	16.7	16.5	18.3	19.0	20.6	21.2	20.8	20.6	20.5	20.4	20.4	20.3	20.3	20.3	19.5	
Lane 1	Speed	67.9	67.3	65.4	53.5	63.0	58.3	63.0	64.3	64.6	64.7	64.8	64.8	64.8	64.8	64.8	64.1	
	Density	18.0	17.3	17.1	23.4	17.9	23.7	21.1	20.3	19.9	19.6	19.4	19.3	19.2	19.2	19.2	21.5	
Ramp	Speed		60.6		39.9		38.3											
	Density		0.5		16.0		1.2											
		2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27	33

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

Interstate 95 Northbound PM (North of River)

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segments
Mainline		3 →					3 →
	Actual Volumes →	2 3,970	3,970	2,640	2,640	3,310	2 3,310 →
	Simulated Volumes →	1 3,800	3,791	2,501	2,505	3,091	1 3,087 →
			9			9	
			800 ft	See CD Lane		1,000 ft	
Ramp	Actual Volumes			1,330	670		
	Simulated Volumes			1,292	578		
				Ramp A	Ramp D		
		I-95 Bridge		Route 17			
	Distance	2,789	1,320	1,258	4,879	1,653	2,319
	Speed	65.8	62.9	67.2	67.2	65.0	66.7
	Density	19.2	16.7	12.4	12.4	13.2	15.4
		27	33	28	34	37	51 52

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segments
Mainline		3 →					3 →
	Actual Volumes →	2 3,970	3,970	2,640	2,640	3,310	2 3,310 →
	Simulated Volumes →	1 3,800	3,791	2,501	2,505	3,091	1 3,087 →
			9			9	
			800 ft	See CD Lanes		1,000 ft	
Ramp	Actual Volumes			1,330	670		
	Simulated Volumes			1,292	578		
	Distance	2,789	1,320	1,258	4,879	1,653	2,319
Lane 3	Speed	67.0	68.2	68.0	67.7	67.6	67.7
	Density	16.7	12.5	12.4	12.2	12.5	13.1
Lane 2	Speed	66.6	66.3	67.5	67.4	66.9	67.5
	Density	19.5	14.9	13.9	13.7	15.3	16.2
Lane 1	Speed	64.1	61.2	65.8	66.3	62.2	65.1
	Density	21.5	19.6	11.0	11.5	18.9	17.0
Ramp	Speed		56.8			51.2	
	Density		13.2			0.8	
		27	33	28	34	37	51 52

Freeway Density	Weave/Ramp Density
45 and Above	43 and Above
35 to 45	35 to 43
26 to 35	28 to 35
18 to 26	20 to 28
11 to 18	10 to 20
0 to 11	0 to 10

Freeway, Weave, and Ramp Density Coloring

Density Above	75
Density Above	55
Density Above	43

Interstate 95 Northbound CD Lanes PM

		Freeway Segments		Ramp/Weave		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
Mainline	Actual Volumes →	2 1,330	1,330	1,330	1,330	2 1,150 →	1,490	340	670	2 670 →
	Simulated Volumes →	1 1,292	1,292	1,292	1,292	1 1,111 →	1,438	312	579	1 578 →
				179 ft	500 ft	9	9 655 ft 9		9 600 ft	
Ramp	Actual Volumes					180	340	1,150	330	
	Simulated Volumes					181 Ramp A	327 Ramp B	1,126 Ramp C	267 Ramp D	
							Route 17			
Distance		720	60	80	422	982	655	1,158	1,415	639
Speed		47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1	47.1
Density		27.5	13.6	13.5	13.7	23.6	19.0	6.4	8.8	12.1
		28	38	55	56	35	40	43	45	50 37

		Freeway Segments		Ramp/Weave		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
	Actual Volumes	2 1,330	1,330	1,330	1,330	2 1,150	1,760	340	750	2 750 →
	Simulated Volumes	1 1,292	1,292	1,292	1,292	1 1,111	1,438	312	579	1 578 →
				179 ft	500 ft	9	9 655 ft 9		9 600 ft	
						120	610	1,500	410	
						181	327	1,126	266.8	
Distance		720	60	80	422	982	655	1,158	1,415	639
Lane 2	Speed			47.8						
	Density			23.2						
Lane 1	Speed	47.1	47.8	48.9	47.6	47.1	46.5	49.0	46.7	47.8
	Density	27.5	2.7	3.7	23.3	23.6	8.0	6.4	12.2	12.1
Ramp/Auxillary Lane	Speed		47.6		45.2		35.4		31.9	
	Density		24.4		4.0		30.1		0.2	
		28	38	55	56	35	40	43	45	50 37

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

Interstate 95 Southbound PM (North of River)

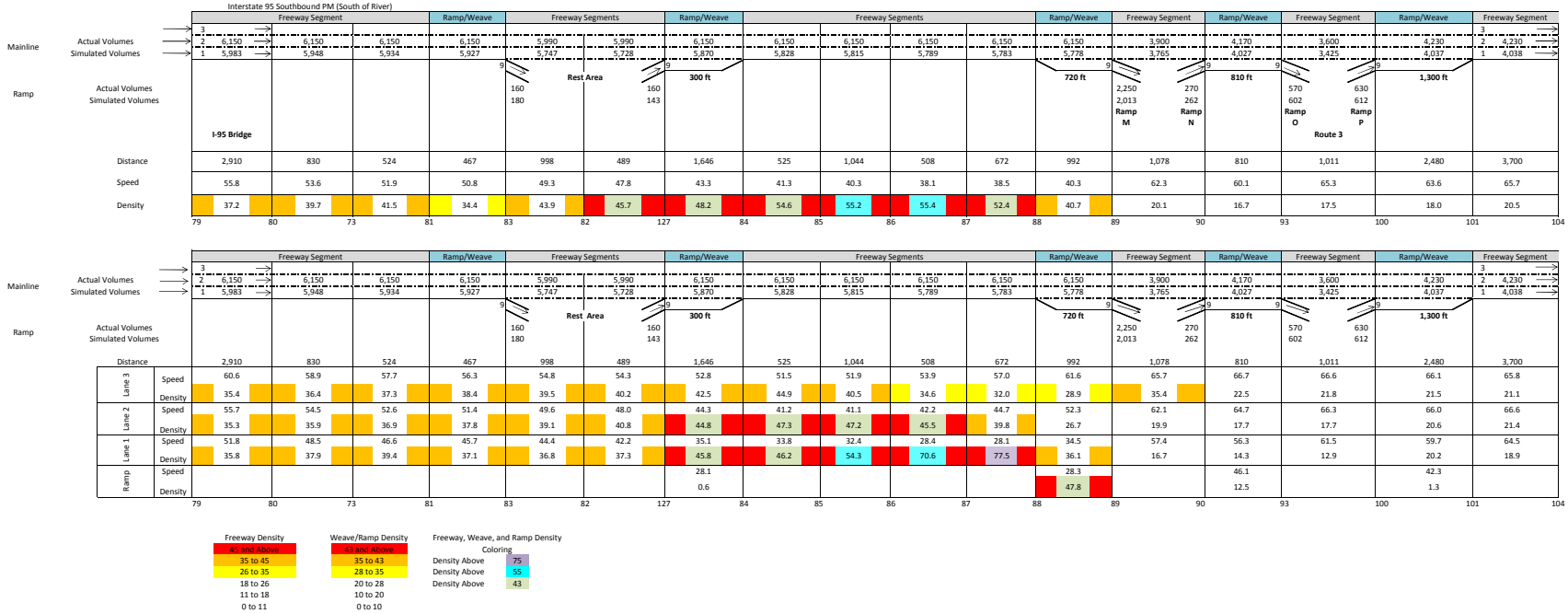
		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	3 →								3 →
		2 5,360	5,360	4,890	5,030	4,560	6,150	6,150	6,150	2 6,150 →
	Simulated Volumes	1 5,355 →	5,357	4,866	5,003	4,520	6,010	6,000	5,992	1 5,983 →
Ramp			9 960 ft	9	9 606 ft	9	9 600 ft			
	Actual Volumes			470	140	470	1,590			
	Simulated Volumes			491 Ramp E	137 Ramp F	483 Ramp G	1,489 Ramp H			
					Route 17					I-95 Bridge
	Distance	1,065	5,018	1,069	606	974	1,076	943	673	2,910
	Speed	66.9	65.5	57.9	54.8	55.9	45.0	52.6	56.0	55.8
	Density	27.2	25.6	28.0	22.8	27.0	37.2	38.2	36.2	37.2
		57	58	60 61	65	77	72	78	79	80

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	3 →								3 →
		2 5,360	5,360	4,890	5,030	4,560	6,150	6,150	6,150	2 6,150 →
	Simulated Volumes	1 5,355 →	5,357	4,866	5,003	4,520	6,010	6,000	5,992	1 5,983 →
Ramp			9 960 ft	9	9 606 ft	9	9 600 ft			
	Actual Volumes			470	140	470	1,590			
	Simulated Volumes			491	137	483	1,489			
	Distance	1,065	5,018	1,069	606	974	1,076	943	673	2,910
Lane 3	Speed	67.3	66.0	58.1	56.3	56.5	55.1	58.1	61.5	60.6
	Density	25.8	25.0	25.0	25.6	25.8	29.2	33.3	33.3	35.4
Lane 2	Speed	66.8	66.2	59.0	57.0	56.9	49.8	53.2	56.0	55.7
	Density	27.7	26.9	28.0	28.3	29.1	39.9	38.4	35.6	35.3
Lane 1	Speed	66.8	65.1	56.7	54.1	54.2	37.8	47.9	51.5	51.8
	Density	28.1	28.1	31.1	27.5	26.0	58.6	42.2	37.7	35.8
Ramp	Speed		54.9		46.8		33.4			
	Density		1.7		9.8		5.9			
		57	58	60 61	65	77	72	78	79	80

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43


Interstate 95 Southbound PM (South of River)
Freeway Segment
Ramp/Weave
Freeway Segments
Freeway Segment
Mainline
Actual Volumes
Simulated Volumes
Ramp
Actual Volumes
Simulated Volumes
I-95 Bridge
Rest Area
300 ft
720 ft
810 ft
1,300 ft
Ramp M
Ramp N
Ramp O
Ramp P
Route 3
Distance
Speed
Density
Lane 3
Lane 2
Lane 1
Ramp
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10
Freeway, Weave, and Ramp Density Coloring
Density Above 75
Density Above 55
Density Above 43

I-95 IMR

HCS Default Assumptions

HCS Mainline, Ramp Junction, and Weave Analysis

- Input values into HCS2010 software are shown on pages A-144 through A-148.

HCS Intersection Analysis

- Volumes from Figure 2-7A through 2-7B
- Lane configurations from field review
- Signal timing from VDOT
- Peak hour factor (PHF) – calculated by movement and shown in turn movement counts (page A-20). 0.80 is the lowest default value used.
- Truck percentages – calculated by movement and shown in turn movement counts (page A-19).
- Ideal Saturation Flow Rate – 1900 passenger cars per lane per hour of green time

No-Build and Build Conditions

Default values for 2020 and 2040 No-Build and Build analysis do not change from existing conditions except for volumes, signal timing (from Synchro optimization for 2040) or lane configurations (if part of long-range plan or recommended improvement).

I-95 Interchange Modification Report

Simulation Analysis – Methods and Assumptions

This memorandum sets the framework for the transportation simulation analysis for the development and evaluation of the I-95 Interchange Modification Report. It identifies the analysis years, the limits of the study, CORSIM models and operational parameters and methods. In coordination with VDOT and FHWA, it was decided that the 2008 traffic volumes used in the original I-95 Access Study are representative of the 2013 traffic conditions and will be used as the existing traffic volumes and as a base to project future traffic volumes in this IMR.

I. Scenario Years

- Existing Year – 2013
- Opening Year - 2020
- Design Year – 2040

II. Study Area Limits

The study area is defined as I-95 between US-17 (Warrenton Rd) and Route-3 (Plank Rd) interchanges, the corresponding ramp termini intersections and one or more intersections on each side of US-17 and Route-3 near the interchanges.

- **I-95** from south of Route-3 interchange to north of US-17interchange;
- **US-17 (Warrenton Rd)** between Sanford Rd and Short St;
- **Route-3 (Plank Rd)** between Carl D Silver Parkway and Gateway Blvd;
- **Rest Area** along I-95 SB

III. Base CORSIM Models

Base existing conditions CORSIM models were developed as part of the original I-95 Access Study (Approved by FHWA in April 2011). In coordination with VDOT and FHWA, it was decided that the 2008 traffic volumes used in the original I-95 Access Study are representative of the 2013 traffic conditions and will be used as the existing traffic volumes and as a base to project future traffic volumes in this IMR. To build the original representative simulation model, the consultant team observed field conditions for a variety of simulation input parameters, including posted roadway speeds, existing traffic control devices, and freeway ramp and weaving distances. As is the case with any simulation model, when compared to real world conditions, theoretical constraints inherent in the CORSIM model limit the model's ability to comprehensively represent some operational characteristics of complex roadway systems. In some cases, strategic adjustment of lane geometry setting may create visual simulation files which differ slightly from actual field conditions, but which are required to simulate realistic traffic operations instead of detailed visual replication. The following is a summary of some of the model's limitations and the assumptions applied to develop a reasonable simulation for this corridor:

- At Node 28 (I-95 northbound off-ramp to Route 17), an extra lane with zero volume input was added to the right of the northbound off-ramp and then subsequently dropped before Node 55 in the Build Alternatives 1 and 2. The extra coded lane was required to simulate the two-lane off-ramp configuration between I-95 northbound and the I-95 CD road segment in CORSIM.
- An extra through lane, with zero output volume, was coded at Node 50 (I-95 northbound on-ramp from I-95 CD Road) to maintain freeway segment continuity in CORSIM.

IV. Operational Analysis Methods/Parameters

Tables 1 and 2 present a list of the freeway and arterial / intersection assumptions and analysis parameters.

General Parameters

- Existing conditions (2013) assume volumes and signal timing under current field conditions as directed in the VDOT Traffic Operations Analysis Tool Guidebook.
- No Build Conditions (2020) assumes the same signal timing along arterial intersections as the 2013 Existing Conditions. The VDOT Traffic Operations Analysis Tool Guidebook states that future signal timings should be optimized, however when the future signal timings were optimized, conditions improved to the point in which they were better than the existing conditions.
- No Build Conditions (2040) assumes signal timing along arterial intersections would be optimized manually for future volumes as directed in the VDOT Traffic Operations Analysis Tool Guidebook. A manual adjustment will allow for signal timings that would be acceptable in "real life" conditions whereas a software optimization would basically distribute green time to the major movements to reduce the overall LOS of the intersection.
- Build Conditions (2020) assumes the same signal timing along arterial intersections as the 2013 Existing Conditions and the 2020 No Build Conditions. This will allow a direct comparison of the MOEs with the 2020 No Build Conditions. The VDOT Traffic Operations Analysis Tool Guidebook states that future signal timings should be optimized, however when the future signal timings were optimized, conditions improved to the point in which they were better than the existing conditions.
- Build Conditions (2040) assumes signal timing along arterial intersections would be optimized manually for future volumes as directed in the VDOT Traffic Operations Analysis Tool Guidebook. A manual adjustment will allow for signal timings that would be acceptable in "real life" conditions whereas a software optimization would basically distribute green time to the major movements to reduce the overall LOS of the intersection.
- CORSIM output analysis will be performed within the study area limits only. CORSIM networks will be updated to identify coding errors and to adopt simulation run parameters (e.g. number of repetitions, data collection time, etc.) to common acceptable standards for simulation analysis.
- Upstream and downstream impacts and adjacent intersections evaluated using HCS & CORSIM.

No-Build Improvements

- Add a second eastbound left turn lane at the intersection of Route 3 with Bragg Road. Add a second northbound departure lane from the intersection.

- Widen Route 17 in the westbound direction from two to three lanes from McLane Drive to west of Falls Run Drive. Widen eastbound from two to three lanes west of Falls Run Drive.

Freeway Parameters

Refer to Table 1 for the list of all freeway parameters/inputs that will be assumed on this project. All of the freeway analysis will be performed using Highway Capacity Software (HCS2010) Version 6.50 and CORSIM will be used to supplement HCS for determination of Level of Service (LOS) and other Measures of Effectiveness (MOE's) due to system impacts. It is assumed that these parameters will be consistently used across analysis scenarios.

TABLE 1

Freeway Operations Parameters / Assumptions by Scenario

	Scenarios		
Freeway Operations Parameters	**Existing**	**2040 No Build**	**2040 Build**
Free-flow Speed	70	70	70
Lane Restrictions	No trucks in leftmost lane	No trucks in leftmost lane	No trucks in leftmost lane
Simulation – Seeding Time	0-1800 sec		
Simulation – Recording Time	1800-5400 sec		
Simulation – Number of Repetitions	10 runs, default random seed file		
Simulation – MOEs	Speeds, Density, LOS, Volume (throughput serviced)		
LOS Criteria (Basic/Weave/Ramp Segments)	(Density) per HCM 2010	(Density) per HCM 2010	(Density) per HCM 2010

Arterial Intersection Parameters

Refer to Table 2 for the list of all arterial intersection parameters/inputs that will be assumed on this project. It is assumed that these parameters will not change between scenarios, unless otherwise specified.

TABLE 2

Arterial – Intersection Operations Parameters / Assumptions by Scenario

	Scenarios		
Arterial - Intersection Operations Parameters	**Existing**	**2020 & 2040 No Build**	**2020 & 2040 Build**
Lane Width	12’	12’	12’
Signal Timing – Phasing & Coordination	Existing Conditions	Optimized	Optimized
Signal Timing – Cycle Length	Maintained as per Existing Conditions		
Signal Timing – Yellow + All-red	Maintained as per Existing Conditions		
Right Turn on Red	Allowed		
Simulation – Seeding Time	0-1800 sec		
Simulation – Recording Time	1800-5400 sec		
Simulation – Number of Repetitions	10 runs, default random seed file		
Simulation – MOEs	Speeds, Density, LOS, Volume (throughput serviced)		
Intersection LOS Criteria	(average control delay) per HCM 2010	(average control delay) per HCM 2010	(average control delay) per HCM 2010

V. Additional Calibration Efforts

Based on the field visits by BAKER staff and observations of existing traffic conditions along I-95, Route-3 and US-17 corridors during the peak hours, adjustments were made to the CORSIM models to better represent conditions in the field for the existing condition models. Further inputs provided by FHWA and VDOT staff were considered during the calibration process. Also, the queues from the simulation at the intersections within the study area were compared with field observations. The link output flows were correct when compared to the link input flows for the base model at most locations. For any links where the input flows and output flows were not similar, it was determined that queuing and or blockages were preventing vehicles from accessing that particular link. It is important to note that all input vehicles were loaded onto the base CORSIM models during simulation however there were vehicles that were not loaded onto the network in the 2020 and 2040 No Build scenarios. This is due to a “bottleneck” on northbound I-95 north of the study area. The I-95 mainline at this location simply does not have the capacity for the projected volumes. This fact was brought up during the scoping process for this current IMR and it was decided that this issue was out of the scope of the current project and should not be studied as part of this IMR. Some of the parameters were adjusted during the calibration process that deviates from the

standard parameter values shown in the VDOT Traffic Operations Analysis Tool Guidebook. Parameters that were changed include the following:

- The percent of drivers who cooperate with a lane change on the arterials was changed from 50% to 20%. This prevents vehicles from slowing down too much to let someone lane change, actually improving the merging of vehicles at diverges to freeway on-ramps.
- The max turn speed for right turns was increased to 15 mph to match the left turn speed and improve right turn movements include the diverge movement onto the freeway on-ramps.
- Distance over which a driver makes a lane change was increased from 300 feet to 750 feet on the arterials to improve the merging of vehicles at diverges to freeway on-ramps.
- Mean discharge headway was increased from 1.8 seconds to 2.7 seconds for the westbound approach to the intersection of Route 3 and Carl D. Silver Parkway. The mean discharge headway was also increased to 2.3 for the northbound approach at the intersection of Route 17 and Route 670; the eastbound approach at the intersection of Route 17 and Route 670 was increased to 2.0; and the eastbound approach at the intersection of Route 17 and McLane Drive was increased to 2.3. This helped replicate field observed queuing on the arterial streets. Some locations were not increased to prevent excessive queuing. This is a slight change from the CORSIM model used in the parent IJR to this document.
- Mean startup delay was increased to 2.7 seconds for the westbound approach to the intersection of Route 3 and Carl D. Silver Parkway. This value for the southbound ramp to westbound Route 3 was entered as 0 seconds to allow vehicles from this ramp to merge with the westbound Route 3 traffic. Without this adjustment, traffic from the ramp would NOT merge with the Route 3 traffic. The mean startup delay was also increased to 2.6 for the northbound approach at the intersection of Route 17 and Route 670; the eastbound approach at the intersection of Route 17 and Route 670 was increased to 2.2; and the eastbound approach at the intersection of Route 17 and McLane Drive was increased to 2.5. This helped replicate field observed queuing on the arterial streets. Some locations were not increased to prevent excessive queuing. This is a slight change from the CORSIM model used in the parent IJR to this document.
- Lane distribution on the freeway were changed from an even split to 30% in the inner lane, 33% in the center lane, and 37% in the outer lane.
- The distance that a driver responds to an on-ramp merge and moves to the left was reduced to 1000 feet from 2500 feet to create friction in the merge movements as observed in the field.

The VDOT Sample Size Determination Tool was used to verify the number of CORSIM model runs needed for the analysis. The Sample Size Determination Toll was run for link 72-78 in the existing PM peak hour CORSIM model. This is the merge from southbound Route 17 to southbound I-95. Table 3 shows that 10 runs are sufficient.

The travel time outputs along I-95 from the CORSIM model (after making the above changes) were compared with the field observations to validate the models and are shown in Table 4. Field observations were collected using a stopwatch, documenting the time that had lapsed between the

start of the run and the passing of major bridge structures along the route. The CORSIM run used for comparison to the field results was the most representative single run (out of 10 runs). Note that the 10 model run results did not vary much (average speeds typically varied only tenths of a mph on links). Travel times listed in the table below for both the field and the CORSIM model are from the mainline center lane. The center lane was used to get the most representative conditions within the corridor. There were two instances in which no congestion was observed during the PM peak hour; these were thrown out as these runs do not represent typical conditions for SB I-95.

TABLE 3

VDOT Virginia Department of Transportation

User Inputs	Sample Size (N) = Number of Model Runs
Constants	Sample Mean (X_s) = (1/N) ($X_1 + X_2 + X_3 \ldots + X_N$)
Outputs	Sample Standard Deviation (S_s) = $\sqrt{[(\Sigma(X-X_s)^2)/(N-1)]}$
	95% Confidence Level = $X_s \pm Z\ (S_s/\sqrt{N})$
	10% of Sample Mean (E) = 0.10 * X_s
	Sample Size Needed = $[(Z)^2 * (S_s)^2] / (E)^2$

Model Iterations

Measure of Effectiveness (MOE):	Speed
Confidence Level:	95%
Tolerance Error:	10%
Number of Model Runs:	10

Run Number	*Speed*
1	47.403
2	55.504
3	55.227
4	54.875
5	54.626
6	55.079
7	46.368
8	55.247
9	54.364
10	34.733
11	
12	

Sample Size Outputs

N	=	10.0
X_s	=	51.3
S_s	=	6.8
E	=	5.1
Z	=	1.96

Sampling Error	=	4.18		
95% Confidence Level	=	51.3	±	4.18
Percentage of Mean	=	8.1%		Good
Sample Size Needed	=	7		

Z is the number of standard deviations away from the mean corresponding to the required confidence level in a normal distribution.

TABLE 4

Comparison in Travel Times

	Sample Travel Time Run AM Peak		Corsim Run AM Peak	
Northbound	Travel Time[1]	Speed[3]	Travel Time[2]	Speed[4]
@ Route 3 Cross Road	0 seconds	~60-65 mph	0 seconds	~62 mph
@ Fall Hill Bridge	65 seconds	~60-65 mph	70 seconds	~61 mph
@ River	115 seconds	~60-65 mph	111 seconds	~63 mph
@ US 17 Crossroad	180 seconds	~60-65 mph	184 seconds	~58 mph
	PM Peak Hour		PM Peak Hour	
Southbound	Travel Time[1]	Speed[3]	Travel Time[2]	Speed[4]
@ US 17 Crossroad	0 seconds	~45 mph	0 seconds	~34 mph
@ River	90 seconds	~45 mph	141 seconds	~34 mph
@ Rest Area	137 seconds	~55 mph	182 seconds	~56 mph
@ Cowan Blvd Bridge	155 seconds	~55 mph	308 seconds	~26 mph
@ Route 3 Crossroad	240 seconds	~55 mph	366 seconds	~40 mph

(1) Travel time in center lane (#2)
(2) Average travel time for all vehicles
(3) Observed speedometer speed
(4) Average speed for all vehicles

Note that it was difficult to compare congested conditions for the PM Peak hour as delays and speeds can quickly change as volumes approach roadway capacities. Delays start increasing exponentially once saturation is reached. Although the travel time in the PM peak hour for the model run is 50% longer than that observed in the field, it is only 2 minutes longer, well within the range of travel times that daily users of the corridor experience during the peak periods. Average vehicle speeds were also compared with historical data from Google Maps. Once the Existing Conditions models were validated, they were used to develop the future No-Build and future Build conditions models.

VI. Comparison with HCS

Although both HCS and CORSIM are based on methodologies from the Highway Capacity Manual, there is expected to be discrepancies in performance measures such as densities and speeds due to the differences of the functionality of the software. HCS is a static model, modeling traffic at a set location and point of time and does not account well for downstream queuing or upstream bottlenecks. While CORSIM is a dynamic model in which traffic operation problems in other parts of the network affect results. Delays and queues can build throughout the simulation period in the CORSIM model. The softwares should be used in conjunction to determine potential operation problems with any proposed improvements.

I-95 IMR

Performance Measures for Capacity and Level of Service (LOS) Analysis

Key definitions from the Highway Capacity Manual

Quality of Service –A measure of the utilization of the transportation system.

Level of Service – A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience.

Capacity – The maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of a lane or roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions; usually expressed as vehicles per hour, passenger cars per hour, or persons per hour.

Identification of Performance Measures for Level of Service Analysis

Each roadway facility is described below. Definitions of the facility and performance measure are given and the resulting Level of Service threshold tables are included.

Freeway (Mainline I-95)

Definition:

A multilane divided highway with a minimum of two lanes for the exclusive use of traffic in each direction and full control of access without traffic interruption. Note that I-95 has three lanes in each direction.

Performance Measure:

The LOS criteria are based on density (passenger cars per mile per lane). The resulting table criteria values are based on the typical speed-flow and density-flow relationships and shown in Exhibit 21-2 from HCM 2000.

Exhibit 23-2 LOS Criteria for Basic Freeway Segments

Criteria	LOS				
	A	B	C	D	E
FFS = 75 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum Speed (mi/h)	75.0	74.8	70.6	62.2	53.3
Maximum V/C	0.34	0.56	0.76	0.90	1.00
Maximum service flow rate (pc/h/ln)	820	1350	1830	2170	2400
FFS = 70 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum Speed (mi/h)	70.0	70.0	68.2	61.5	53.3
Maximum V/C	0.32	0.53	0.74	0.90	1.00
Maximum service flow rate (pc/h/ln)	770	1260	1770	2150	2400
FFS = 65 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum Speed (mi/h)	65.0	65.0	64.6	59.7	52.2
Maximum V/C	0.30	0.50	0.71	0.89	1.00
Maximum service flow rate (pc/h/ln)	710	1170	1680	2090	2350
FFS = 60 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum Speed (mi/h)	60.0	60.0	60.0	57.6	51.1
Maximum V/C	0.29	0.47	0.68	0.88	1.00
Maximum service flow rate (pc/h/ln)	660	1080	1560	2020	2300
FFS = 55 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum Speed (mi/h)	55.0	55.0	55.0	54.7	50.0
Maximum V/C	0.27	0.44	0.64	0.85	1.00
Maximum service flow rate (pc/h/ln)	600	990	1430	1910	2250

Weave Junctions

Definition:

The crossing of two or more traffic streams traveling in the same direction along a significant length of highway, without the aid of traffic control devices (except for guide signs).

Performance Measure:

The LOS criteria are based on density (passenger cars per mile per lane). The resulting tables are the LOS criteria values for weaving along different roadway types.

Exhibit 24-2 LOS Criteria for Weaving Segments

LOS	Density Range (pc/mi/ln)	
	Freeway Weaving Segment	**Multilane and Collector-Distributer Weaving Segments**
A	0 to 10	0 to 12
B	> 10 to 20	> 12 to 24
C	> 20 to 28	> 24 to 32
D	> 28 to 35	> 32 to 36
E	> 35	> 36
F	Demand Exceeds Capacity	

Ramps and Ramp Junctions

Definition:

A short segment of highway along which vehicles transfer from an entrance ramp to the main roadway (Merge) or from the main roadway to an exit ramp (Diverge).

Performance Measure:

The LOS criteria are based on density (passenger cars per mile per lane). The resulting table shows the LOS criteria values for ramp junctions.

LOS Criteria for Merge and Diverge Areas

LOS	Density Range (pc/mi/ln)
A	0 to 10
B	> 10 to 20
C	> 20 to 28
D	> 28 to 35
E	>35
F	Demand exceeds capacity

The approximate capacity of a ramp is based on the Free-Flow Speed of the ramp and is shown below.

Approximate Capacity of Ramp Roadways

Free-Flow Speed of Ramp (mi/h)	Capacity (pc/hr)	
	Single-Lane Ramps	Two-Lane Ramps
> 50	2200	4400
> 40 to 50	2100	4100
> 30 to 40	3000	3800
20 to 30	1900	3500
< 20	1800	3200

Intersections

Definition of Intersection Delay:

The total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross sections of the facility.

Performance Measure:

The LOS criteria are based on intersection control delay (seconds per vehicle). The resulting table shows the LOS criteria values for signalized and stop-controlled intersections.

LOS	Signalized Delay (sec)	Stop-Controlled Delay (sec)
A	0 - 10	0 - 10
B	> 10 to 20	> 10 to 15
C	> 20 to 35	> 15 to 25
D	> 35 to 55	> 25 to 35
E	> 55 to 80	> 35 to 50
F	> 80	> 50

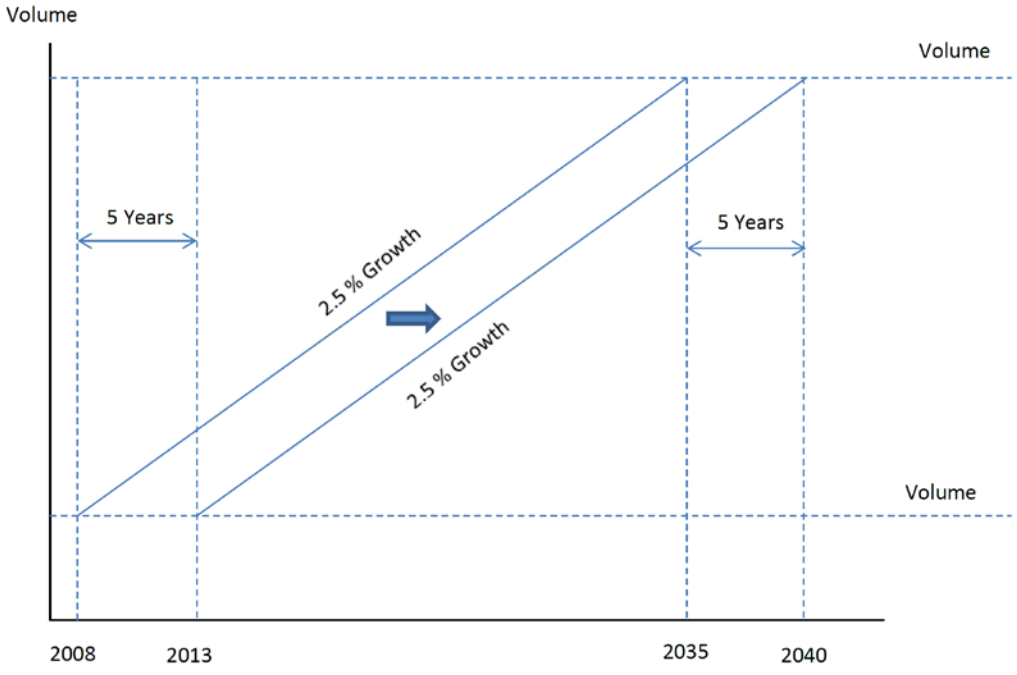
Appendix B - No-Build Conditions

I-95 Interstate Modification Study
Improvements to I-95 between Exit 133 and Exit 130
No-Build Volumes Methodology

As with the existing conditions volume methodology, the methodology to develop no-build volumes for this I-95 IMR is based on the methodologies used for the I-95 Access study. **In coordination with VDOT and FHWA, it was decided that the 2035 No-Build traffic volumes used in the I-95 Access Study will be used as the 2040 No-Build traffic volumes in this IMR.** That decision is based on the following information:

- 2008 counts are being represented as 2013 existing conditions in this IMR as there has been no overall growth in traffic volumes on I-95, Route 3 and Route 17 in the study area over the last five years.

- The most current travel demand model for the FAMPO region (the version 3.0 air quality conformity model) shows very similar annual growth rates as those from the model used in the I-95 Access Study methodology. Therefore, the annual growth rates agreed to be used for the I-95 Access Study are being used in this IMR as they still are relevant (see discussion under 2020 and 2040 forecasts). There is the same 27 year increase from 2013 to 2040 as from 2008 to 2035; resulting in the same volumes if the same growth rates are applied. See graph below showing this relationship.



- A similar step was taken in the approved I-95/Route 630 Interstate Justification Report. The volumes used in that IJR for year 2037 are the same as those used in the I-95 Access

Study for year 2035 for the segment of I-95 in common (north of Route 17). This took into account the lack of growth in the corridor.

The following methodology was used in the I-95 Access Study to develop the 2035 No-Build traffic volumes traffic volumes for I-95, Route 3, and Route 17. **As discussed above these volumes are considered representative of 2040 No-Build traffic volumes and used as such in this IMR.**

Growth Rate Determination and Validation

An acceptable method for generating future traffic volumes is to take existing counts and apply a growth rate to the counts. This method was used for this study. Growth rates were chosen for the I-95 mainline south of Route 3, for all ramps at Exits 130 and 133 and along Route 3 and US 17 east and west or I-95. Growth rates were chosen using professional judgment taking into account historic traffic growth rates and output from the November 2008 version of the 2035 FAMPO travel demand model.

Historic traffic volumes were collected from the VDOT website for the years 2001 to 2007. 2008 volumes were reviewed but volumes were consistently lower than 2007. Historic annual average growth rates were calculated based off the 2007 count number as a denominator.

Roadway	Location		VDOT AADT							2007 Pivot
		2000	2001	2002	2003	2004	2005	2006	2007	Pivot
I-95 Northbound	South of Exit 130 (Route 3)	51,000	51,000	48,000	49,000	49,000	57,000	59,000	59,000	**2.3%**
	Exit 130 (Route 3) to Exit 133 (Route 17)	69,000	69,000	70,000	74,000	74,000	82,000	84,000	85,000	**3.1%**
	North of Exit 133 (Route 17)	69,000	69,000	70,000	74,000	74,000	82,000	84,000	85,000	**3.1%**
I-95 Southbound	South of Exit 130 (Route 3)	53,000	53,000	50,000	52,000	55,000	61,000	62,000	63,000	**2.6%**
	Exit 130 (Route 3) to Exit 133 (Route 17)	88,000	68,000	70,000	66,000	69,000	78,000	80,000	74,000	**1.4%**
	North of Exit 133 (Route 17)	88,000	68,000	70,000	66,000	69,000	78,000	80,000	74,000	**1.4%**
Route 3 (Plank Rd)	East of I-95 Interchange	53,000	52,000	57,000	57,000	57,000	53,000	54,000	53,000	**0.3%**
	West of I-95 Interchange	78,000	77,000	79,000	79,000	80,000	80,000	80,000	79,000	**0.4%**
Route 17 (Warrenton Rd)	East of I-95 Interchange	29,000	29,000	30,000	30,000	30,000	30,000	31,000	31,000	**1.1%**
	West of I-95 Interchange	36,000	36,000	39,000	39,000	42,000	41,000	44,000	43,000	**2.7%**

Next, travel demand model data was collected for the base year model 2006 and the forecast year 2035. Model growth rates were then calculated with year 2006 as a denominator. The travel demand model includes all projects within the FAMPO 2035 Constrained Long Range Plan including the proposed I-95 express lanes.

For I-95, historic growth rates and model growth rates were very similar. A growth rate of 2.5 percent per year was chosen to apply to the mainline south of Route 3. Route 3 showed very little historic and model growth. Areas farther west of Route 3 are experiencing higher growth

rates, therefore a slightly higher growth rate than the historic growth rate was chosen for Route 3 west of I-95. The model appears to be over estimating traffic along the Route 17 corridor. The volumes forecast for the corridor, well exceed those for an arterial street and approach 4 percent growth for 25 plus years which would be extremely unusual for a corridor with already high traffic volumes. A growth rate more in line with historic growth rates and similar to the one chosen for I-95 was chosen for Route 17.

Ramp growth rates were chosen based on those chosen for Route 3 and Route 17. Growth rates chosen for ramps to and from the east of I-95 were the same as those chosen for the particular arterial street east of I-95. Likewise, growth rates chosen for ramps to and from the west of I-95 were the same as those chosen for the particular arterial street west of I-95.

The recommended growth rates are shown in the following table. The notes at the bottom of the table provide additional insight into calculations and reasons for choosing specific rates. The daily growth rate will also be used for the AM and PM peak hours as there was little overall difference in model growth shown between the daily and individual peak periods.

I-95 Rest Area Access Study

Post-Model Forecasting Methodology

(all volumes shown are ADTs)

	I-95 South of Route 3			Route 3		Route 3 Ramps	I-95 at River			US 17		US 17 Ramps	I-95 North of US 17		
	NB	SB	Total	E. of I-95	W. of I-95		NB	SB	Total	W. of I-95	E. of I-95		NB	SB	Total
2008 Counts[1]	58,000	57,100	115,100	56,200	83,100		76,800	75,800	152,600	78,500	39,800		68,300	66,400	134,700
Historic Growth Rates (2001-2007)[2]	2.3%	2.6%	2.4%	0.3%	0.4%		3.1%	1.4%	2.2%	2.7%	1.1%		3.1%	1.4%	2.3%
2006 Base Ver 3.0[3]	48,800	50,500	99,300	61,500	102,700		59,060	62,100	121,160	69,500	38,900		53,200	68,400	121,600
2035 No-Build CLRP Ver 3.0[3]	78,700	80,200	158,900	76,000	129,300		98,600	103,790	202,390	149,300	68,300		96,400	98,600	195,000
Average Annual Growth Rate (2006-2035)[4]	2.1%	2.0%	2.1%	0.8%	0.9%		2.3%	2.3%	2.3%	4.0%	2.6%		2.8%	1.5%	2.1%
RECOMMENDED GROWTH RATE	**2.5%**	**2.5%**	**2.5%**	**1.0%**	**1.5%[6]**	**1.5% & 1.0%[8]**	**2.3%[5]**	**2.1%[5]**	**2.2%[5]**	**2.5%[7]**	**1.5%[7]**	**2.5% & 1.5%[8]**	**2.1%[5]**	**2.1%[5]**	**2.1%[5]**
Post Processed Volumes	I-95 South of Route 3			Route 3			I-95 at River			US 17			I-95 North of US 17		
	NB	SB	Total	E. of I-95	W. of I-95		NB	SB	Total	W. of I-95	E. of I-95		NB	SB	Total
2008 Counts	58,000	57,100	115,100	56,200	83,100		76,800	75,800	152,600	78,500	39,800		68,300	66,400	134,700
Recommended Average Annual Growth Rate	2.5%	2.5%	2.5%	1.0%	1.5%		2.2%	2.2%	2.2%	2.5%	1.5%		2.1%	2.1%	2.1%
2035 NB Post Processed Volume	**97,200**	**95,600**	**192,800**	**71,400**	**116,800**		**122,900**	**121,400**	**244,300**	**131,500**	**55,900**		**107,800**	**104,500**	**212,300**

Notes

1. Arterial counts were derived from turning movement counts at nearby intersections and tube counts from adjacent segments on Route 3 and US 17. I-95 Counts were derived from adding/substracting average ramps volumes (Wed-Fri) counted in May 2007 from the automatic count data from the count station just north of Exit 118.

2. Growth Rates calculated using 2007 volumes as a denominator. growth rate has dropped off between 2005-2007.

3. Raw model volumes. The 2035 model includes the 2035 Constrained Long-Range Plan projects.

4. Growth Rates calculated using 2006 volumes as a denominator.

5. Growth rates are calculated by starting with a mainline volume at the edge of the study area (south of Route 3) and adding / substracting ramps volumes through the study area.

6. Very low historic growth and model projected growth. Areas farther to the west along Route 3 show higher growth so a slightly higher growth rate was chosen.

7. The model appears to be overestimating traffic along this corridor. Therefore growth rates closer to historic growth rates was chosen.

8. Growth rates chosen for ramps to and from the east of I-95 were the same as those chosen for the particular arterial street east of I-95. Likewise, growth rates chosen for ramps to and from the west of I-95 were the same as those chosen for the particular arterial street west of I-95.

8/12/2009

Express Lanes Traffic Volumes

Forecast express Lanes traffic volumes were taken from the November 2008 FAMPO travel demand model. Daily, AM and PM volumes were pulled from the model for the study area. The AM and PM FAMPO models contain 3-hour express lanes volumes that needed to be converted to 1-hour volumes. To do this, the 15-minute I-95 mainline volumes at the River, which were developed from the continuous count station, were summed to develop 1-hour and 3-hour volumes. For the AM peak hours, the northbound peak 1-hour volume was divided by the northbound peak 3-hour volume to develop a factor to apply to the AM 3-hour FAMPO model express lanes volume. For the PM peak hours, the southbound peak 1-hour volume was divided by the southbound peak 3-hour volume to develop a factor to apply to the PM 3-hour FAMPO model volume. The 1-hour and 3-hour existing I-95 volumes and resulting factors are shown below. The express lanes are reversible travel lanes so there is only travel in one direction during each peak period.

AM Peak	Northbound I-95 Peak Period Volume		1-Hour/3-Hour
	1-hour	3-hour	Factor
	5,689	15,502	0.37

PM Peak	Southbound I-95 Peak Period Volume		1-Hour/3-Hour
	1-hour	3-hour	Factor
	6,148	17,474	0.35

The factors were applied to the 3-Hour FAMPO model express lanes volumes and are shown below.

AM Peak	**Northbound I-95 Express Lanes Volume**	**Express Lanes - Location**	**3-hour (from Model)**	**1-Hour/3-Hour Factor**	**1-hour (Calculated)**
		Express Lanes - south of Exit 130	6,680	0.37	2460

PM Peak	**Southbound I-95 Express Lanes Volume**	**Express Lanes - Location**	**3-hour (from Model)**	**1-Hour/3-Hour Factor**	**1-hour (Calculated)**
		Express Lanes - @ River	7,034	0.35	2,480

The express lane volumes shown in the table above we also used in the approved I-95/ Route 630 Interstate Justification Study.

2035 No-Build I-95 Mainline Daily and Peak Hour Volumes

The following methodology was used in the I-95 Access Study to develop the 2035 No-Build traffic volumes traffic volumes for I-95, Route 3, and Route 17. **As discussed above these volumes are considered representative of 2040 No-Build traffic volumes and used as such in this IMR.**

The growth rates developed above were applied to the exiting traffic counts for the mainline sections of I-95, south of Route 3 and also to the existing ramp volumes at Exit 130 and Exit 133. The resulting ramp traffic volumes were added to and subtracted from the mainline volume south or Route 3 to develop northbound and southbound mainline volumes at locations between Exit 130 and 133, and north of Exit 133. The same process was used for AM and PM peak hours and is outlined below for both northbound and southbound directions. The same growth rates were used for determining the AM, PM, and daily volumes. Please see the attached spreadsheet for the northbound and southbound directions showing the addition and subtraction of ramp volumes.

Northbound:

NB Mainline Volume south of Route 3 Interchange (growth rate applied)
- Subtract NB to EB Off-Ramp at Exit 130 (growth rate applied)
- Add EB to NB On-Ramp at Exit 130 (growth rate applied)
- Subtract NB to WB Off-Ramp at Exit 130 (growth rate applied)
- Add WB to NB On-Ramp at Exit 130 (growth rate applied)

NB Mainline Volume between Route 3 & Route 17 Interchanges *(calculated)*
- Subtract CD Road Off-Ramp at Exit 133 (sum of NB to EB/SB Off-Ramp with growth rate applied and NB to WB/NB Off-Ramp with growth rate applied)
- Add CD Road On-Ramp at Exit 133 (sum of EB/SB to NB On-Ramp with growth rate applied and WB/NB to NB On-Ramp with growth rate applied)

NB Mainline Volume north of Route 17 Interchange *(calculated)*

Southbound:

SB Mainline Volume south of Route 3 Interchange (growth rate applied)
- Subtract EB to SB On-Ramp at Exit 130 (growth rate applied)
- Add SB to EB Off-Ramp at Exit 130 (growth rate applied)
- Subtract WB to SB On-Ramp at Exit 130 (growth rate applied)
- Add SB to WB Off-Ramp at Exit 130 (growth rate applied)

SB Mainline Volume between Route 3 & Route 17 Interchanges *(calculated)*
- Subtract EB to SB On-Ramp at Exit 133 (growth rate applied)
- Add SB to EB Off-Ramp at Exit 133 (growth rate applied)
- Subtract WB to SB On-Ramp at Exit 133 (growth rate applied)
- Add SB to WB Off-Ramp at Exit 133 (growth rate applied)

SB Mainline Volume north of Route 17 Interchange *(calculated)*

The express lane volumes calculated above were then subtracted out of the total volumes for each mainline link to determine the volume in the general purpose lanes.

Below are the 2035 No-Build Volumes (totals for both directions) for I-95.

I-95	2008			2035 Daily			2035 AM			2035 PM		
	Daily	AM	PM	Mainline	HOT Lanes	Total	Mainline	HOT Lanes	Total	Mainline	HOT Lanes	Total
South of Route 3	115,100	5,730	7,540	174,560	18,250	192,810	7,140	2,460	9,600	10,150	2,480	12,630
At River Crossing	152,700	8,480	10,120	226,030	18,250	244,280	10,900	2,460	13,360	13,690	2,480	16,170
North of US 17	134,800	7,700	8,670	194,020	18,250	212,270	9,460	2,460	11,920	11,130	2,480	13,610

Intersection Turning Movement Adjustment

The No-Build peak hour volumes for the arterial intersections were calculated using the same growth rates for calculating the ADTs on Route 3 and Route 17. The growth rate was applied to all movements. Balancing between intersections was done at the interchange areas where the same balancing technique that was used to balance the existing volumes will be used. Likewise ADTs for Route 3 and Route 17 under the no-build condition were calculated using the same peak hour factors and methodology used to calculate existing ADTs.

2035 Arterial ADT Calculations

Route 3 - West of Interchange

	Peak Hour Route 3 west of Interchange		K-Factor Route 3 west of Interchange		Calculated Daily Volume Route 3 west of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	4,030	1,750	0.0565	0.0565	71,327	30,973	**102,301**	(based on AM peaks)
PM Peak Hour	2,830	3,900	0.0701	0.0701	40,371	55,635	**96,006**	(based on PM peaks)
					55,800	43,300	**99,100**	AM & PM Average
	based on Carl D Silver Pkwy TMs		based on Exit 130 Ramps					

Route 3 - East of Interchange

	Peak Hour Route 3 east of Interchange		K-Factor Route 3 east of Interchange		Calculated Daily Volume Route 3 east of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	1,860	1,950	0.0565	0.0565	32,920	34,513	**67,434**	(based on AM peaks)
PM Peak Hour	2,260	2,110	0.0701	0.0701	32,240	30,100	**62,340**	(based on PM peaks)
					32,600	32,300	**64,900**	AM & PM Average
	based on Gateway Blvd TMs		based on Exit 130 Ramps					

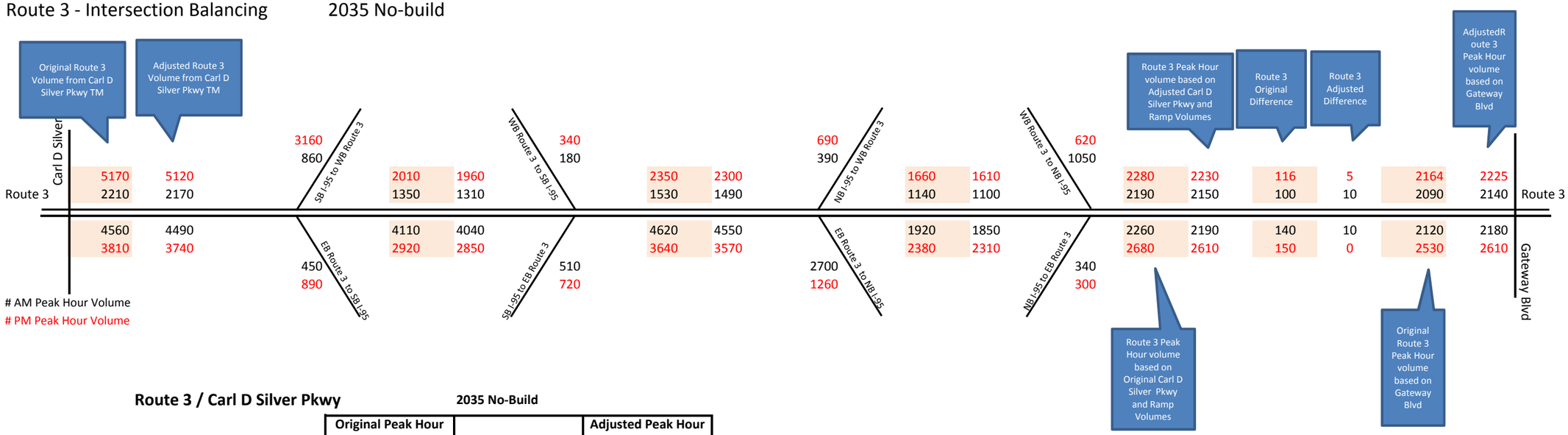
Route 17 - West of Interchange

	Peak Hour Route 17 west of Interchange		K-Factor Route 17 west of Interchange		Calculated Daily Volume Route 17 west of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	3,720	3,040	0.0616	0.0616	60,390	49,351	**109,740**	(based on AM peaks)
PM Peak Hour	3,160	3,940	0.0664	0.0664	47,590	59,337	**106,928**	(based on PM peaks)
					54,000	54,300	**108,300**	AM & PM Average
	based on Sanford Dr TMs		based on Exit 133 Ramps					

Route 17 - East of Interchange

	Peak Hour Route 17 east of Interchange		K-Factor Route 17 east of Interchange		Calculated Daily Volume Route 17 east of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	1,680	1,600	0.0616	0.0616	27,273	25,974	**53,247**	(based on AM peaks)
PM Peak Hour	1,480	2,720	0.0664	0.0664	22,289	40,964	**63,253**	(based on PM peaks)
					24,800	33,500	**58,300**	AM & PM Average
	based on Short St TMs		based on Exit 133 Ramps					

Route 3 - Intersection Balancing 2035 No-build



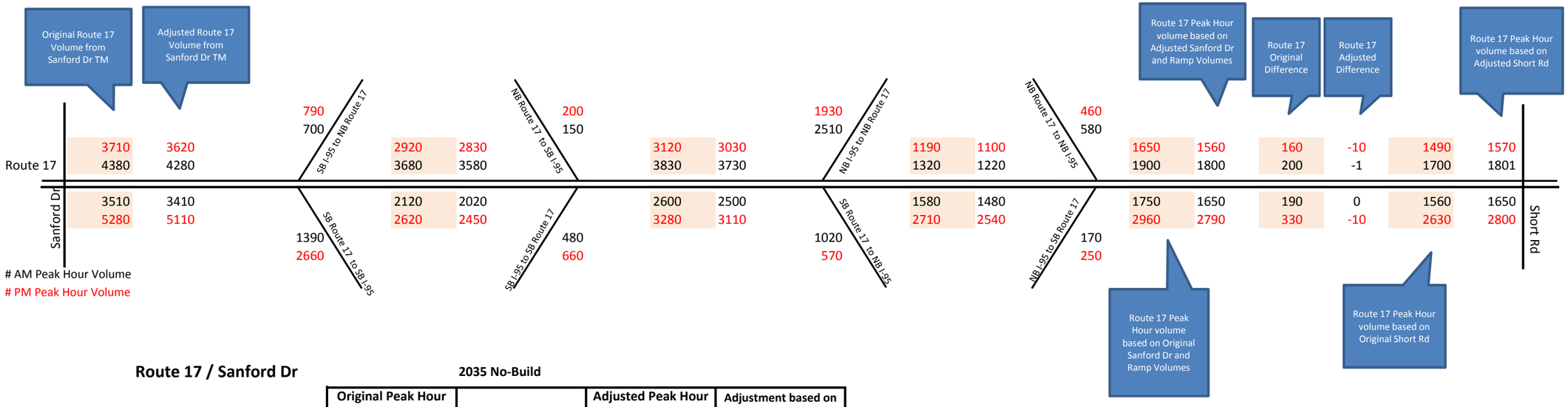
Route 3 / Carl D Silver Pkwy **2035 No-Build**

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	20	30			20	30
	Thru	10	10			10	10
	Right	30	40	-0.46	-0.79	30	40
Southbound	Left	490	1190	-7.52	-23.43	480	1170
	Thru	10	20			10	20
	Right	80	430			80	430
Eastbound	Left	200	380			200	380
	Thru	4040	2580	-62.02	-50.79	3980	2530
	Right	20	20			20	20
Westbound	Left	30	50	-0.68	-0.56	30	50
	Thru	1540	3810	-34.84	-42.74	1510	3770
	Right	640	1310	-14.48	-14.70	630	1300

Route 3 / Gateway Blvd **2035 No-Build**

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	300	390	7.18	10.45	310	400
	Thru	10	3			10	5
	Right	140	280			140	280
Southbound	Left	10	10			10	10
	Thru	4	1			5	5
	Right	30	4	0.72	0.11	30	5
Eastbound	Left	40	40	1.32	1.19	40	40
	Thru	1660	1910	54.81	56.62	1710	1970
	Right	420	580	13.87	17.19	430	600
Westbound	Left	140	290			140	290
	Thru	1760	1770	42.11	47.44	1800	1820
	Right	10	0			10	0

Route 17 - Intersection Balancing 2035 No-build



Route 17 / Sanford Dr

2035 No-Build

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM		Adjustment based on 07/31/2012 counts	
		AM	PM	AM	PM	AM	PM	AM	PM
Northbound	Left	320	380	-7.31	-8.19	310	370	310	370
	Thru	3700	3030	-84.47	-65.34	3620	2960	3620	2960
	Right	360	300	-8.22	-6.47	350	290	340	300
Southbound	Left	20	10			20	10	20	10
	Thru	3030	3780	-82.01	-118.13	2950	3660	2950	3660
	Right	30	70			30	70	30	70
Eastbound	Left	90	50			90	50	90	50
	Thru	10	10			10	10	10	10
	Right	240	970	-6.50	-30.31	230	940	230	950
Westbound	Left	240	530	-6.50	-16.56	230	510	230	510
	Thru	100	30			100	30	100	30
	Right	30	10			30	10	30	10

Route 17 / Short Rd

2035 No-Build

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	20	20			20	20
	Thru	1560	1380	91.76	74.09	1650	1450
	Right	1	1			1	1
Southbound	Left	10	10	0.61	0.63	10	10
	Thru	1480	2510	90.13	157.47	1570	2670
	Right	70	110	4.26	6.90	70	120
Eastbound	Left	120	100	7.06	5.37	130	110
	Thru	0	3			0	3
	Right	20	40			20	40
Westbound	Left	3	3			3	3
	Thru	0	1			0	1
	Right	20	10	1.18	0.54	21	10

2020 and 2040 No-Build Forecasts for I-95 IMR

As described previously in this methodology the 2035 no-build forecasts generated for the I-95 Access Study will represent the 2040 No-build conditions in this I-95 IMR and shown as 2040 No-Build Volumes.

The latest FAMPO regional travel demand model (Version 3.0 used for air quality conformity) was reviewed to see if the recommended growth rates from the I-95 Access Study should be modified. Travel demand model data was collected for the base year model 2009 and the forecast years 2025 and 2035 and shown in the table below. Model growth rates were then calculated with year 2009 as a denominator. The travel demand model includes all projects within the FAMPO 2035 Constrained Long Range Plan including the proposed I-95 Express lanes.

As can be seen in the table below, the annual growth rates do not change significantly between the FAMPO model used in the I-95 Access Study and the most recent version used for this IMR. Therefore it was recommended that the same growth rates be used in this IMR to develop 2040 forecasts as was used for the I-95 Access Study. Reviewing the growth rates between 2009 and 2025 indicate that they are not significantly different from those between 2009 and 2035. Therefore, it was recommended that a straight-line growth rate between 2009 and 2035 be used to develop 2020 No-Build forecast volumes.

		I-95 South of Route 3			Route 3		US 17	
		NB	SB	Total	W. of I-95	E. of I-95	W. of I-95	E. of I-95
Counts	2008 Counts	58,000	57,100	115,100	83,100	56,200	78,500	39,800
	Historic Growth Rates (2001-2007)	2.3%	2.6%	2.4%	0.4%	0.3%	2.7%	1.1%
I-95 Access Study Model Runs	2006 Base Ver 3.0	48,800	50,500	99,300	102,700	61,500	69,500	38,900
	2035 No-Build CLRP Ver 3.0	78,700	80,200	158,900	129,300	76,000	149,300	68,300
	Average Annual Growth Rate (2006-2035)	2.1%	2.0%	2.1%	0.9%	0.8%	4.0%	2.6%
I-95 Access Study Forecasts	**RECOMMENDED GROWTH RATE FROM I-95 ACCESS STUDY**	**2.5%**	**2.5%**	**2.5%**	**1.5%**	**1.0%**	**2.5%**	**1.5%**
	2035 No-Build Grown from 2008 Counts	97,200	95,600	192,800	116,800	71,400	131,500	55,900
I-95 IMR Model Runs DAILY	2009 Base Ver 3.0 Air Quality Conformity	53,700	58,500	112,200	110,200	69,200	85,500	56,800
	2025 No-Build CLRP Ver 3.0 Air Quality Conformity	71,600	77,100	148,700	120,000	71,900	134,500	70,800
	Average Annual Growth Rate (2009-2025)	2.1%	2.0%	2.0%	0.6%	0.2%	3.6%	1.5%
	2035 No-Build CLRP Ver 3.0 Air Quality Conformity	80,800	88,600	169,400	135,700	87,900	156,100	75,800
	Average Annual Growth Rate (2009-2035)	1.9%	2.0%	2.0%	0.9%	1.0%	3.2%	1.3%
I-95 IMR Forecasts	**RECOMMENDED GROWTH RATE FOR I-95 IJR UPDATE**	**2.5%**	**2.5%**	**2.5%**	**1.5%**	**1.0%**	**2.5%**	**1.5%**
	2013 Existing Conditions	58,000	57,100	115,100	83,100	56,200	78,500	39,800
	2020 No-Build Volume grown from 2013	68,200	67,100	135,200	91,800	60,100	92,200	44,000
	2040 No-Build Volume grown from 2013	97,200	95,600	192,800	116,800	71,400	131,500	55,900

The same methodology and growth rates used to generate the 2040 No-Build forecasts were used to generate the 2020 forecasts. However, the annual growth rates were applied to I-95, Route 3 and Route 17 for 7 years instead of 27 years. The express lanes are not planned to be built until between 2021 and 2025 and therefore volumes are not included with them as part of the 2020 forecasts. Intersection turn movements were balanced at the interchange areas using the same balancing technique that was used to balance the existing volumes. 2020 No-Build ADTs on Route 3 and Route 17 were calculated using the same peak hour factors and methodology used to calculate existing ADTs.

2020 No-Build ADT Calculations for Route 3 and Route 17

Route 3 - West of Interchange

	Peak Hour Route 3 west of Interchange		K-Factor Route 3 west of Interchange		Calculated Daily Volume Route 3 west of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	3,170	1,380	0.0565	0.0565	56,106	24,425	**80,531**	(based on AM peaks)
PM Peak Hour	2,230	3,070	0.0701	0.0701	31,812	43,795	**75,606**	(based on PM peaks)
					44,000	34,100	**78,100**	AM & PM Average
	based on Carl D Silver Pkwy TMs		based on Exit 130 Ramps					

Route 3 - East of Interchange

	Peak Hour Route 3 east of Interchange		K-Factor Route 3 east of Interchange		Calculated Daily Volume Route 3 east of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	1,560	1,620	0.0565	0.0565	27,611	28,673	**56,283**	(based on AM peaks)
PM Peak Hour	1,860	1,740	0.0701	0.0701	26,534	24,822	**51,355**	(based on PM peaks)
					27,100	26,700	**53,800**	AM & PM Average
	based on Gateway Blvd TMs		based on Exit 130 Ramps					

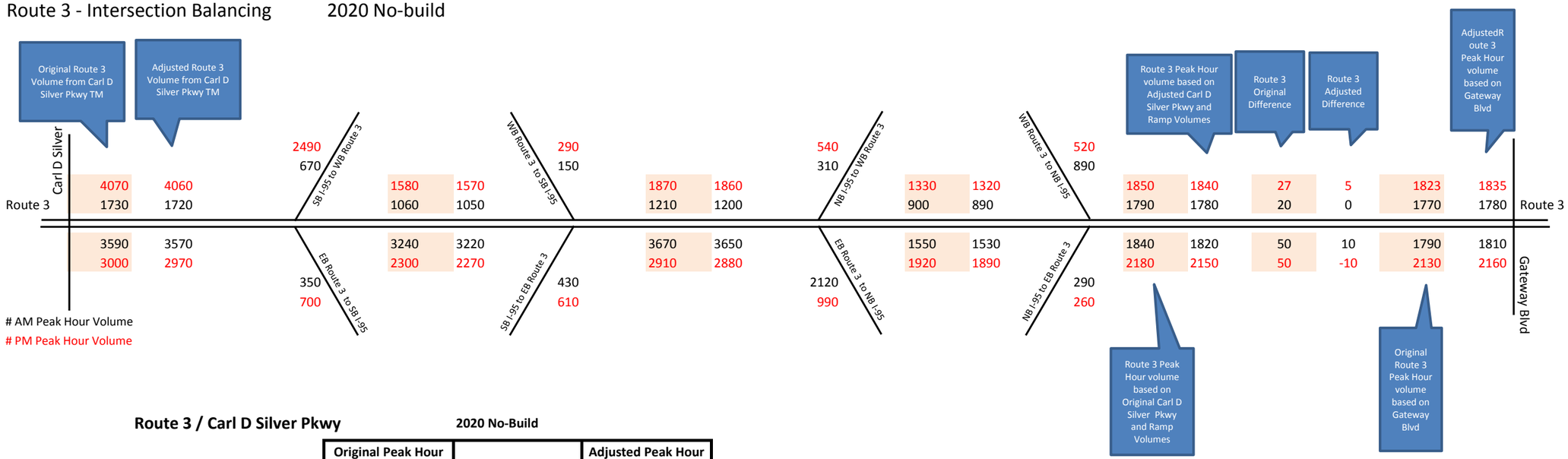
Route 17 - West of Interchange

	Peak Hour Route 17 west of Interchange		K-Factor Route 17 west of Interchange		Calculated Daily Volume Route 17 west of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	2,600	2,150	0.0616	0.0616	42,208	34,903	**77,110**	(based on AM peaks)
PM Peak Hour	2,210	2,760	0.0664	0.0664	33,283	41,566	**74,849**	(based on PM peaks)
					37,700	38,200	**75,900**	AM & PM Average
	based on Sanford Dr TMs		based on Exit 133 Ramps					

Route 17 - East of Interchange

	Peak Hour Route 17 east of Interchange		K-Factor Route 17 east of Interchange		Calculated Daily Volume Route 17 east of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	1,275	1,195	0.0616	0.0616	20,698	19,399	**40,097**	(based on AM peaks)
PM Peak Hour	1,115	2,055	0.0664	0.0664	16,792	30,949	**47,741**	(based on PM peaks)
					18,700	25,200	**43,900**	AM & PM Average
	based on Short St TMs		based on Exit 133 Ramps					

Route 3 - Intersection Balancing 2020 No-build



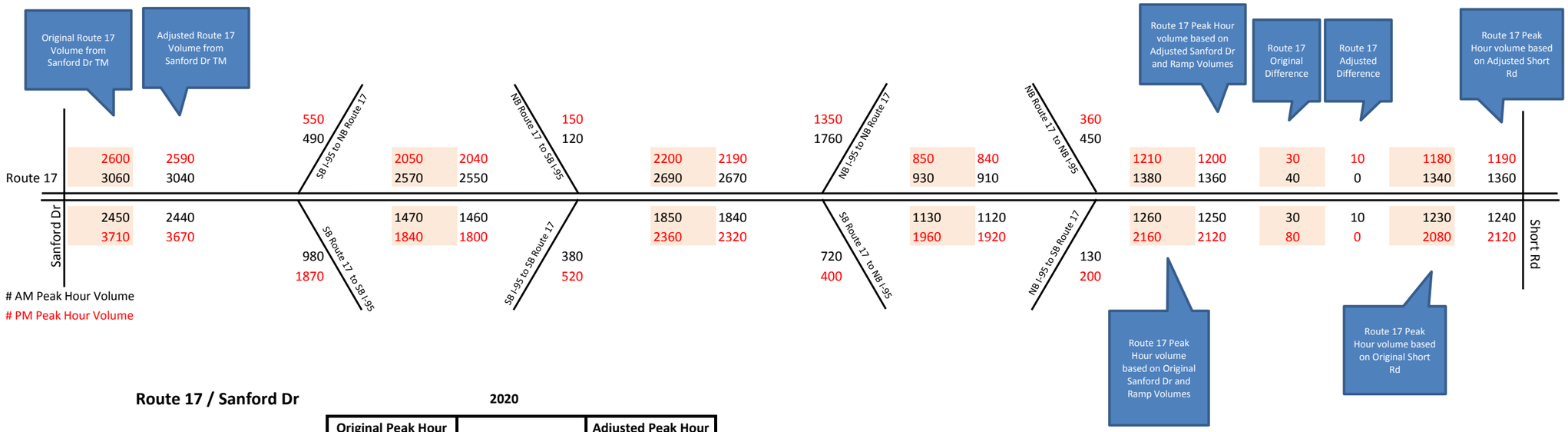
Route 3 / Carl D Silver Pkwy **2020 No-Build**

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	10	20			10	20
	Thru	10	10			10	10
	Right	20	30	-0.14	-0.25	20	30
Southbound	Left	390	940	-2.72	-7.83	390	930
	Thru	10	10			10	10
	Right	60	330			60	330
Eastbound	Left	160	300			160	300
	Thru	3180	2030	-22.14	-16.92	3160	2010
	Right	10	10			10	10
Westbound	Left	20	40	-0.12	-0.13	20	40
	Thru	1210	3000	-6.99	-9.95	1200	2990
	Right	500	1030	-2.89	-3.42	500	1030

Route 3 / Gateway Blvd **2020 No-Build**

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	260	330	1.47	2.44	260	330
	Thru	10	2			10	5
	Right	120	230			120	230
Southbound	Left	10	10			10	10
	Thru	3	1			5	5
	Right	20	3	0.11	0.02	20	5
Eastbound	Left	40	30	0.56	0.35	40	30
	Thru	1400	1610	19.55	18.90	1420	1630
	Right	350	490	4.89	5.75	350	500
Westbound	Left	110	240			110	240
	Thru	1490	1490	8.42	11.03	1500	1500
	Right	10	0			10	0

Route 17 - Intersection Balancing 2020 No-build



Route 17 / Sanford Dr **2020**

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	340	380	-2.22	-2.19	340	380
	Thru	2590	2120	-16.93	-12.23	2570	2110
	Right	130	100	-0.85	-0.58	130	100
Southbound	Left	10	10			10	10
	Thru	2120	2650	-12.98	-28.57	2110	2620
	Right	20	50			20	50
Eastbound	Left	60	40			60	40
	Thru	10	5			10	10
	Right	280	980	-1.71	-10.57	280	970
Westbound	Left	50	80	-0.31	-0.86	50	80
	Thru	70	20			70	20
	Right	20	10			20	10

Route 17 / Short Rd **2020**

		Original Peak Hour TM		Balance Adjustment		Adjusted Peak Hour TM	
		AM	PM	AM	PM	AM	PM
Northbound	Left	20	10			20	10
	Thru	1230	1090	18.36	13.86	1250	1100
	Right	1	1			1	1
Southbound	Left	10	10	0.12	0.19	10	10
	Thru	1160	1980	14.15	38.08	1170	2020
	Right	60	90	0.73	1.73	60	90
Eastbound	Left	100	80	1.49	1.02	100	80
	Thru	0	2			0	2
	Right	12	30			10	30
Westbound	Left	2	2			2	2
	Thru	0	1			0	1
	Right	10	10	0.15	0.13	10	10

I-95 Mainline Daily & Peak Hour Volume Table

2020 & 2040 No-Build

		BAKER Existing 2013 Daily			BAKER Existing 2013 AM Peak Hour			BAKER Existing 2013 PM Peak Hour			BAKER Growth Rate			BAKER Future 2020 NB Volume Daily			BAKER Future 2020 NB Volume AM Peak Hour			BAKER Future 2020 NB Volume PM Peak Hour		
		Mainline Vol	Ramp Vol	CD Road Vol	Mainline Vol	Ramp Vol	CD Road Vol	Mainline Vol	Ramp Vol	CD Road Vol	Mainline	Ramp	CD Road	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	General Purpose Mainline Vol	Ramp Vol	CD Road Vol
SOUTHBOUND I-95																						
	Entering Volume (N of US 17)	**66,430**			**2,610**			**5,360**						**76,280**			**3,000**			**6,130**		
	E) SB to WB Off Ramp		7,430			420			470			**2.5%**			8,730			490			550	
		59,000			**2,190**			**4,890**						**67,550**			**2,510**			**5,580**		
US 17 Interchange	F) WB to SB On Loop Ramp		2,070			110			140			**1.5%**			2,290			120			150	
		61,070			**2,300**			**5,030**						**69,840**			**2,630**			**5,730**		
	G) SB to EB Off Loop Ramp		6,360			340			470			**1.5%**			7,030			380			520	
		54,710			**1,960**			**4,560**						**62,810**			**2,250**			**5,210**		
	H) EB to SB On Ramp		21,130			830			1,590			**2.5%**			24,830			980			1,870	
	River Crossing	**75,840**			**2,790**			**6,150**						**87,640**			**3,230**			**7,080**		
	SB to WB Off Ramp		2,000			90			160			**2.5%**			2,350			110			190	
		73,840			**2,700**			**5,990**						**85,290**			**3,120**			**6,890**		
Rest Area	WB to SB On Ramp		2,000			90			160			**2.5%**			2,350			110			190	
	Cowan Boulevard Underpass	**75,840**			**2,790**			**6,150**						**87,640**			**3,230**			**7,080**		
	M) SB to WB Off Ramp		22,530			610			2,250			**1.5%**			24,900			670			2,490	
		53,310			**2,180**			**3,900**						**62,740**			**2,560**			**4,590**		
Route 3 Interchange	N) WB to SB On Loop Ramp		3,260			140			270			**1.0%**			3,490			150			290	
		56,570			**2,320**			**4,170**						**66,230**			**2,710**			**4,880**		
	O) SB to EB Off Loop Ramp		7,630			400			570			**1.0%**			8,160			430			610	
		48,940			**1,920**			**3,600**						**58,070**			**2,280**			**4,270**		
	P) EB to SB On Ramp		8,150			320			630			**1.5%**			9,010			350			700	
	South of Route 3	**57,090**			**2,240**			**4,230**			**2.5%**			**67,080**			**2,630**			**4,970**		
	SB Off Ramp		17,150			700			1,600													
		39,940			**1,540**			**2,630**														
US 1 Interchange	SB On Ramp		5,760			330			430													
	South of US 1	**45,700**			**1,870**			**3,060**														
NORTHBOUND I-95																						
	Entering Volume (S of Route1)	**47,060**			**2,340**			**2,860**														
	NB to EB Off Ramp		5,470			400			360													
		41,590			**1,940**			**2,500**														
US 1 Interchange	NB to WB Off Loop Ramp		1,950			120			140													
		39,640			**1,820**			**2,360**														
	EB/WB to NB On Ramp		18,380			1,670			950													
	Entering Volume (S of Route3)	**58,020**			**3,490**			**3,310**			**2.5%**			**68,170**			**4,100**			**3,890**		
	I) NB to EB Off Ramp		3,920			270			240			**1.0%**			4,190			290			260	
		54,100			**3,220**			**3,070**						**63,980**			**3,810**			**3,630**		
Route 3 Interchange	J) EB to NB On Loop Ramp		20,160			1,920			900			**1.5%**			22,280			2,120			990	
		74,260			**5,140**			**3,970**						**86,260**			**5,930**			**4,620**		
	K) NB to WB Off Loop Ramp		6,520			280			490			**1.5%**			7,200			310			540	
		67,740			**4,860**			**3,480**						**79,060**			**5,620**			**4,080**		
	L) WB to NB On Ramp		9,090			830			490			**1.0%**			9,730			890			520	
	Cowan Boulevard Underpass	**76,830**			**5,690**			**3,970**						**88,790**			**6,510**			**4,600**		
				21,180			1,620			1,330						24,680			1,890			1,550
	A) NB to EB Off Ramp		2,930			120			180			**1.5%**			3,240			130			200	
		55,650		18,250	**4,070**		1,500	**2,640**		1,150				**64,110**		21,440	**4,620**		1,760	**3,050**		1,350
	B) EB to NB On Loop Ramp		6,620			610			340			**2.5%**			7,780			720			400	
US 17 Interchange		**55,650**		24,870	**4,070**		2,110	**2,640**		1,490				**64,110**		29,220	**4,620**		2,480	**3,050**		1,750
	C) NB to WB Off Loop Ramp		18,250			1,500			1,150			**2.5%**			21,440			1,760			1,350	
		55,650		6,620	**4,070**		610	**2,640**		340				**64,110**		7,780	**4,620**		720	**3,050**		400
	D) WB to NB On Ramp		6,050			410			330			**1.5%**			6,690			450			360	
				12,670			1,020			670						14,470			1,170			760
	North of Route 17	**68,320**			**5,090**			**3,310**						**78,580**			**5,790**			**3,810**		

2013 Existing and 2040 No-Build Traffic Volumes

		BAKER Existing 2013 Daily			BAKER Existing 2013 AM Peak Hour			BAKER Existing 2013 PM Peak Hour			BAKER Growth Rate			BAKER Future 2040 NB Volume Daily					BAKER Future 2040 NB Volume AM Peak Hour					BAKER Future 2040 NB Volume PM Peak Hour				
		Mainline Vol	Ramp Vol	CD Road Vol	Mainline Vol	Ramp Vol	CD Road Vol	Mainline Vol	Ramp Vol	CD Road Vol	Mainline	Ramp	CD Road	Gen. Purpose + HOT	General Purpose Mainline Vol	Expresss Lane Daily Vol	Ramp Vol	CD Road Vol	Gen. Purpose + HOT	General Purpose Mainline Vol	Express Lane Peak Hour Vol	Ramp Vol	CD Road Vol	Gen. Purpose + HOT	General Purpose Mainline Vol	Express Lane Peak Hour Vol	Ramp Vol	CD Road Vol
SOUTHBOUND I-95																												
	Entering Volume (N of US 17)	**66,430**			**2,610**			**5,360**						**104,470**	92,920				**4,130**	4,130				**8,330**	5,850			
	E) SB to WB Off Ramp		7,430			420			470			**2.5%**					12,450					700					790	
US 17 Interchange		**59,000**			**2,190**			**4,890**						**92,020**	80,470				**3,430**	3,430				**7,540**	5,060			
	F) WB to SB On Loop Ramp		2,070			110			140			**1.5%**					2,910					150					200	
		61,070			**2,300**			**5,030**						**94,930**	83,380				**3,580**	3,580				**7,740**	5,260			
	G) SB to EB Off Loop Ramp		6,360			340			470			**1.5%**					8,940					480					660	
		54,710			**1,960**			**4,560**						**85,990**	74,440				**3,100**	3,100				**7,080**	4,600			
	H) EB to SB On Ramp		21,130			830			1,590			**2.5%**					35,390					1,390					2,660	
	River Crossing	**75,840**			**2,790**			**6,150**						**121,380**	109,830				**4,490**	4,490				**9,740**	7,260			
	SB to WB Off Ramp		2,000			90			160			**2.5%**					3,350					150					270	
Rest Area		**73,840**			**2,700**			**5,990**						**118,030**	106,480	11,550			**4,340**	4,340	0			**9,470**	6,990	2,480		
	WB to SB On Ramp		2,000			90			160			**2.5%**					3,350					150					270	
	Cowan Boulevard Underpass	**75,840**			**2,790**			**6,150**						**121,380**	109,830				**4,490**	4,490				**9,740**	7,260			
	M) SB to WB Off Ramp		22,530			610			2,250			**1.5%**					31,650					860					3,160	
		53,310			**2,180**			**3,900**						**89,730**	78,180				**3,630**	3,630				**6,580**	4,100			
	N) WB to SB On Loop Ramp		3,260			140			270			**1.0%**					4,140					180					340	
Route 3 Interchange		**56,570**			**2,320**			**4,170**						**93,870**	82,320				**3,810**	3,810				**6,920**	4,440			
	O) SB to EB Off Loop Ramp		7,630			400			570			**1.0%**					9,690					510					720	
		48,940			**1,920**			**3,600**						**84,180**	72,630				**3,300**	3,300				**6,200**	3,720			
	P) EB to SB On Ramp		8,150			320			630			**1.5%**					11,450					450					890	
	South of Route 3	**57,090**			**2,240**			**4,230**			**2.5%**			**95,630**	84,080				**3,750**	3,750				**7,090**	4,610			
	SB Off Ramp		17,150			700			1,600																			
US 1 Interchange		**39,940**			**1,540**			**2,630**																				
	SB On Ramp		5,760			330			430																			
	South of US 1	**45,700**			**1,870**			**3,060**																				
NORTHBOUND I-95																												
	Entering Volume (S of Route1)	**47,060**			**2,340**			**2,860**																				
	NB to EB Off Ramp		5,470			400			360																			
US 1 Interchange		**41,590**			**1,940**			**2,500**																				
	NB to WB Off Loop Ramp		1,950			120			140																			
		39,640			**1,820**			**2,360**																				
	EB/WB to NB On Ramp		18,380			1,670			950																			
	Entering Volume (S of Route3)	**58,020**			**3,490**			**3,310**			**2.5%**			**97,180**	90,480				**5,850**	3,390				**5,540**	5,540			
	I) NB to EB Off Ramp		3,920			270			240			**1.0%**					4,980					340					300	
		54,100			**3,220**			**3,070**						**92,200**	85,500				**5,510**	3,050				**5,240**	5,240			
Route 3 Interchange	J) EB to NB On Loop Ramp		20,160			1,920			900			**1.5%**					28,320					2,700					1,260	
		74,260			**5,140**			**3,970**						**120,520**	113,820				**8,210**	5,750				**6,500**	6,500			
	K) NB to WB Off Loop Ramp		6,520			280			490			**1.5%**					9,160					390					690	
		67,740			**4,860**			**3,480**						**111,360**	104,660				**7,820**	5,360				**5,810**	5,810			
	L) WB to NB On Ramp		9,090			830			490			**1.0%**					11,540					1,050					620	
	Cowan Boulevard Underpass	**76,830**			**5,690**			**3,970**						**122,900**	116,200	6,700			**8,870**	6,410	2,460			**6,430**	6,430	0		
	A) NB to EB Off Ramp		2,930	21,180		120	1,620		180	1,330		**1.5%**					4,120	34,690				170	2,680				250	2,180
		55,650			**4,070**			**2,640**						**88,210**	81,510				**6,190**	3,730				**4,250**	4,250			
US 17 Interchange	B) EB to NB On Loop Ramp		6,620	18,250		610	1,500		340	1,150		**2.5%**					11,090	30,570				1,020	2,510				570	1,930
		55,650			**4,070**			**2,640**						**88,210**	81,510				**6,190**	3,730				**4,250**	4,250			
	C) NB to WB Off Loop Ramp		18,250	24,870		1,500	2,110		1,150	1,490		**2.5%**					30,570	41,660				2,510	3,530				1,930	2,500
		55,650			**4,070**			**2,640**						**88,210**	81,510				**6,190**	3,730				**4,250**	4,250			
	D) WB to NB On Ramp		6,050	6,620		410	610		330	340		**1.5%**					8,500	11,090				580	1,020				460	570
				12,670			1,020			670								19,590					1,600					1,030
	North of Route 17	**68,320**			**5,090**			**3,310**						**107,800**	101,100				**7,790**	5,330				**5,280**	5,280			

Intersection Turn Movements Forecasts

2020 & 2040 No-Build

Intersection: Route 3 / Central Park Blvd

Start Date 5/13/2008
Start Time 6:30

	Street Name	Central Park Blvd--Southbound			Route 3--Westbound			Central Park Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	7	0	4	3	174	11	30	5	2	10	644	53	943
Trucks	6:30 AM	0	0	0	0	13	0	1	0	0	1	12	0	27
Total	**6:30 AM**	**7**	**0**	**4**	**3**	**187**	**11**	**31**	**5**	**2**	**11**	**656**	**53**	**970**
Cars	6:45 AM	10	2	2	7	191	27	37	2	2	6	720	59	1065
Trucks	6:45 AM	0	0	0	1	8	0	2	0	0	0	8	0	19
Total	**6:45 AM**	**10**	**2**	**2**	**8**	**199**	**27**	**39**	**2**	**2**	**6**	**728**	**59**	**1084**
Cars	7:00 AM	28	1	9	3	216	11	36	2	0	9	694	58	1067
Trucks	7:00 AM	1	0	0	0	7	0	2	0	0	0	17	0	27
Total	**7:00 AM**	**29**	**1**	**9**	**3**	**223**	**11**	**38**	**2**	**0**	**9**	**711**	**58**	**1094**
Cars	7:15 AM	27	1	10	3	228	10	35	2	1	5	642	35	999
Trucks	7:15 AM	0	0	0	0	6	2	1	0	0	0	15	0	24
Total	**7:15 AM**	**27**	**1**	**10**	**3**	**234**	**12**	**36**	**2**	**1**	**5**	**657**	**35**	**1023**
Cars	7:30 AM	14	1	1	6	238	13	38	7	1	14	708	45	1086
Trucks	7:30 AM	1	0	0	0	6	3	1	0	0	0	10	1	22
Total	**7:30 AM**	**15**	**1**	**1**	**6**	**244**	**16**	**39**	**7**	**1**	**14**	**718**	**46**	**1108**
Cars	7:45 AM	18	2	3	9	301	29	46	7	1	12	611	63	1102
Trucks	7:45 AM	1	0	1	1	15	0	0	0	0	0	8	0	26
Total	**7:45 AM**	**19**	**2**	**4**	**10**	**316**	**29**	**46**	**7**	**1**	**12**	**619**	**63**	**1128**
Cars	8:00 AM	20	3	1	6	269	21	39	4	1	11	631	77	1083
Trucks	8:00 AM	1	1	0	0	19	3	1	0	0	0	14	1	40
Total	**8:00 AM**	**21**	**4**	**1**	**6**	**288**	**24**	**40**	**4**	**1**	**11**	**645**	**78**	**1123**
Cars	8:15 AM	20	5	1	7	288	22	32	6	1	15	571	67	1035
Trucks	8:15 AM	2	1	0	0	23	1	0	1	0	0	12	2	42
Total	**8:15 AM**	**22**	**6**	**1**	**7**	**311**	**23**	**32**	**7**	**1**	**15**	**583**	**69**	**1077**
	Grand Total	**300**	**34**	**64**	**92**	**4004**	**306**	**602**	**72**	**18**	**166**	**10634**	**922**	**17214**
2008	**7:30-8:30**	**77**	**13**	**7**	**29**	**1159**	**92**	**157**	**25**	**4**	**52**	**2565**	**256**	**4436**
	Vehicles	144	15	31	44	1905	144	293	35	9	82	5221	457	8380
	Trucks	6	2	1	2	97	9	8	1	0	1	96	4	227
	% Trucks	**4.0%**	**11.8%**	**3.1%**	**4.3%**	**4.8%**	**5.9%**	**2.7%**	**2.8%**	**0.0%**	**1.2%**	**1.8%**	**0.9%**	**2.6%**
	PHF	0.88	0.54	0.44	0.73	0.92	0.79	0.85	0.89	1.00	0.87	0.89	0.82	0.98
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	77	13	7	29	1159	92	157	25	4	52	2565	256	**4436**
	There has been no growth in the corridor between 2008 and 2013.													
2020 No- Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	90	10	10	30	1280	100	170	30	0	60	2830	280	**4890**
2040 No-Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	110	20	10	40	1630	130	220	40	10	70	3600	360	**6240**

AM Total Intersection Peak Hour Volume
4436

AM Total Truck Percentage
2.6%

AM Intersection PHF
0.98

Start Date 5/13/2008
Start Time 16:00

	Street Name	Central Park Blvd--Southbound			Route 3--Westbound			Central Park Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	92	50	31	18	615	121	125	22	16	21	372	63	1546
Trucks	4:00 PM	2	0	0	0	8	0	0	0	0	1	14	1	26
Total	**4:00 PM**	**94**	**50**	**31**	**18**	**623**	**121**	**125**	**22**	**16**	**22**	**386**	**64**	**1572**
Cars	4:15 PM	88	44	27	13	541	117	82	28	23	27	386	80	1456
Trucks	4:15 PM	0	0	1	0	15	0	0	0	0	0	9	0	25
Total	**4:15 PM**	**88**	**44**	**28**	**13**	**556**	**117**	**82**	**28**	**23**	**27**	**395**	**80**	**1481**
Cars	4:30 PM	95	40	19	15	586	120	97	24	18	30	430	83	1557
Trucks	4:30 PM	0	0	1	0	7	0	2	0	0	0	18	0	28
Total	**4:30 PM**	**95**	**40**	**20**	**15**	**593**	**120**	**99**	**24**	**18**	**30**	**448**	**83**	**1585**
Cars	4:45 PM	85	46	18	20	553	127	88	25	23	24	364	86	1459
Trucks	4:45 PM	0	0	0	0	9	0	0	0	0	0	10	0	19
Total	**4:45 PM**	**85**	**46**	**18**	**20**	**562**	**127**	**88**	**25**	**23**	**24**	**374**	**86**	**1478**
Cars	5:00 PM	88	51	31	10	562	90	99	34	29	20	431	80	1525
Trucks	5:00 PM	1	0	0	0	8	0	0	0	0	0	8	1	18
Total	**5:00 PM**	**89**	**51**	**31**	**10**	**570**	**90**	**99**	**34**	**29**	**20**	**439**	**81**	**1543**
Cars	5:15 PM	98	47	32	12	546	117	88	17	19	20	402	76	1474
Trucks	5:15 PM	0	0	0	0	6	2	0	0	0	0	12	0	20
Total	**5:15 PM**	**98**	**47**	**32**	**12**	**552**	**119**	**88**	**17**	**19**	**20**	**414**	**76**	**1494**
Cars	5:30 PM	109	49	26	13	534	124	92	22	21	22	390	66	1468
Trucks	5:30 PM	0	0	0	0	8	2	0	0	0	0	7	0	17
Total	**5:30 PM**	**109**	**49**	**26**	**13**	**542**	**126**	**92**	**22**	**21**	**22**	**397**	**66**	**1485**
Cars	5:45 PM	87	39	22	13	563	99	82	30	18	24	378	86	1441
Trucks	5:45 PM	0	0	0	0	15	0	0	0	0	0	6	0	21
Total	**5:45 PM**	**87**	**39**	**22**	**13**	**578**	**99**	**82**	**30**	**18**	**24**	**384**	**86**	**1462**
	Grand Total	**1490**	**732**	**416**	**228**	**9152**	**1838**	**1510**	**404**	**334**	**378**	**6474**	**1244**	**24200**
2008	**4:00-5:00**	**362**	**180**	**97**	**66**	**2334**	**485**	**394**	**99**	**80**	**103**	**1603**	**313**	**6116**
	Vehicles	742	366	206	114	4500	915	753	202	167	188	3153	620	11926
	Trucks	3	0	2	0	76	4	2	0	0	1	84	2	174
	% Trucks	**0.4%**	**0.0%**	**1.0%**	**0.0%**	**1.7%**	**0.4%**	**0.3%**	**0.0%**	**0.0%**	**0.5%**	**2.6%**	**0.3%**	**1.4%**
	PHF	0.95	0.90	0.78	0.83	0.94	0.95	0.79	0.88	0.87	0.86	0.89	0.91	0.96
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	362	180	97	66	2334	485	394	99	80	103	1603	313	**6116**
	There has been no growth in the corridor between 2008 and 2013.													
2020 No- Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	400	200	110	70	2580	540	440	110	90	110	1770	350	**6770**
2040 No-Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	510	250	140	90	3280	680	550	140	110	140	2250	440	**8580**

PM Total Intersection Peak Hour Volume
6116

PM Total Truck Percentage
1.4%

PM Intersection PHF
0.96

Intersection: Route 3 / Carl D Silver

Start Date 5/13/2008
Start Time 6:30

	Street Name	Carl D Silver --Southbound			Route 3--Westbound			Carl D Silver--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	7	2	65	83	181	2	5	1	2	1	649	11	1009
Trucks	6:30 AM	0	0	0	1	7	0	1	0	0	0	13	0	22
Total	**6:30 AM**	**7**	**2**	**65**	**84**	**188**	**2**	**6**	**1**	**2**	**1**	**662**	**11**	**1031**
Cars	6:45 AM	9	2	65	75	214	6	2	3	2	4	731	19	1132
Trucks	6:45 AM	0	0	1	2	5	1	0	0	0	0	5	1	15
Total	**6:45 AM**	**9**	**2**	**66**	**77**	**219**	**7**	**2**	**3**	**2**	**4**	**736**	**20**	**1147**
Cars	7:00 AM	10	1	64	72	224	6	8	4	5	2	665	26	1087
Trucks	7:00 AM	0	0	0	0	6	0	0	0	0	0	13	0	19
Total	**7:00 AM**	**10**	**1**	**64**	**72**	**230**	**6**	**8**	**4**	**5**	**2**	**678**	**26**	**1106**
Cars	7:15 AM	4	3	93	71	248	7	8	4	3	1	697	22	1161
Trucks	7:15 AM	0	0	3	2	6	0	0	0	0	0	9	0	20
Total	**7:15 AM**	**4**	**3**	**96**	**73**	**254**	**7**	**8**	**4**	**3**	**1**	**706**	**22**	**1181**
Cars	7:30 AM	14	1	84	98	245	4	6	3	3	1	749	27	1235
Trucks	7:30 AM	0	0	7	1	6	0	1	0	0	1	9	0	25
Total	**7:30 AM**	**14**	**1**	**91**	**99**	**251**	**4**	**7**	**3**	**3**	**2**	**758**	**27**	**1260**
Cars	7:45 AM	9	4	77	123	311	9	3	1	4	3	656	42	1242
Trucks	7:45 AM	0	0	1	2	14	0	0	0	0	0	8	0	25
Total	**7:45 AM**	**9**	**4**	**78**	**125**	**325**	**9**	**3**	**1**	**4**	**3**	**664**	**42**	**1267**
Cars	8:00 AM	14	1	72	126	288	4	3	3	1	5	651	33	1201
Trucks	8:00 AM	0	0	0	2	20	0	1	0	0	0	12	0	35
Total	**8:00 AM**	**14**	**1**	**72**	**128**	**308**	**4**	**4**	**3**	**1**	**5**	**663**	**33**	**1236**
Cars	8:15 AM	18	1	83	143	304	6	2	0	4	2	565	42	1170
Trucks	8:15 AM	0	0	0	3	10	0	1	0	0	0	4	0	18
Total	**8:15 AM**	**18**	**1**	**83**	**146**	**314**	**6**	**3**	**0**	**4**	**2**	**569**	**42**	**1188**
	Grand Total	**170**	**30**	**1230**	**1608**	**4178**	**90**	**82**	**38**	**48**	**40**	**10872**	**446**	**18832**

AM Total Intersection Peak Hour Volume
4951

AM Total Truck Percentage
1.9%

AM Intersection PHF
0.98

2008	**7:30-8:30**	**55**	**7**	**324**	**498**	**1198**	**23**	**17**	**7**	**12**	**12**	**2654**	**144**	**4951**
	Vehicles	85	15	603	791	2015	44	37	19	24	19	5363	222	9237
	Trucks	0	0	12	13	74	1	4	0	0	1	73	1	179
	% Trucks	**0.0%**	**0.0%**	**2.0%**	**1.6%**	**3.5%**	**2.2%**	**9.8%**	**0.0%**	**0.0%**	**5.0%**	**1.3%**	**0.4%**	**1.9%**
	PHF	0.76	0.44	0.89	0.85	0.92	0.64	0.61	0.58	0.75	0.60	0.88	0.86	0.98
2008 Balanced*	7:30-8:30	55	7	351	455	1094	21	18	7	12	12	2875	144	**5051**

* Intersection volumes adjsuted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	55	7	351	455	1094	21	18	7	12	12	2875	144	**5051**

There has been no growth in the corridor between 2008 and 2013.

2020 No- Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	60	10	390	500	1210	20	20	10	10	10	3180	160	**5580**
2020 No-Build Balanced*	7:30-8:30	60	10	390	500	1200	20	20	10	10	10	3160	160	**5550**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2040 No-Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	80	10	490	640	1540	30	30	10	20	20	4040	200	**7110**
2040 No-Build Balanced*	7:30-8:30	80	10	480	630	1510	30	30	10	20	20	3980	200	**7000**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

Start Date 5/14/2008
Start Time 16:00

	Street Name	Carl D Silver --Southbound			Route 3--Westbound			Carl D Silver--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	77	3	242	208	680	12	8	5	6	6	452	61	1760
Trucks	4:00 PM	0	0	0	2	9	0	0	0	0	0	9	0	20
Total	**4:00 PM**	**77**	**3**	**242**	**210**	**689**	**12**	**8**	**5**	**6**	**6**	**461**	**61**	**1780**
Cars	4:15 PM	90	1	241	230	615	6	9	3	7	1	437	59	1699
Trucks	4:15 PM	0	0	0	0	8	0	0	0	0	0	5	0	13
Total	**4:15 PM**	**90**	**1**	**241**	**230**	**623**	**6**	**9**	**3**	**7**	**1**	**442**	**59**	**1712**
Cars	4:30 PM	75	2	177	226	678	10	3	1	4	2	446	59	1683
Trucks	4:30 PM	0	0	0	1	2	1	0	0	0	0	14	0	18
Total	**4:30 PM**	**75**	**2**	**177**	**227**	**680**	**11**	**3**	**1**	**4**	**2**	**460**	**59**	**1701**
Cars	4:45 PM	61	7	158	240	638	7	5	1	4	2	403	94	1620
Trucks	4:45 PM	0	0	0	1	8	0	0	0	0	0	9	0	18
Total	**4:45 PM**	**61**	**7**	**158**	**241**	**646**	**7**	**5**	**1**	**4**	**2**	**412**	**94**	**1638**
Cars	5:00 PM	75	7	237	202	601	5	6	4	4	1	476	59	1677
Trucks	5:00 PM	0	0	1	2	7	0	0	1	0	0	8	0	19
Total	**5:00 PM**	**75**	**7**	**238**	**204**	**608**	**5**	**6**	**5**	**4**	**1**	**484**	**59**	**1696**
Cars	5:15 PM	71	3	205	245	597	11	1	6	4	3	376	63	1585
Trucks	5:15 PM	0	0	0	1	3	0	1	0	0	0	7	0	12
Total	**5:15 PM**	**71**	**3**	**205**	**246**	**600**	**11**	**2**	**6**	**4**	**3**	**383**	**63**	**1597**
Cars	5:30 PM	88	0	193	260	568	11	7	3	8	1	415	63	1617
Trucks	5:30 PM	0	0	2	0	7	1	0	0	0	0	9	0	19
Total	**5:30 PM**	**88**	**0**	**195**	**260**	**575**	**12**	**7**	**3**	**8**	**1**	**424**	**63**	**1636**
Cars	5:45 PM	65	3	171	247	592	12	4	1	2	4	392	57	1550
Trucks	5:45 PM	0	0	1	0	8	2	0	0	0	0	7	0	18
Total	**5:45 PM**	**65**	**3**	**172**	**247**	**600**	**14**	**4**	**1**	**2**	**4**	**399**	**57**	**1568**
	Grand Total	**1204**	**52**	**3256**	**3730**	**10042**	**156**	**88**	**50**	**78**	**40**	**6930**	**1030**	**26656**

PM Total Intersection Peak Hour Volume
6831

PM Total Truck Percentage
1.0%

PM Intersection PHF
0.96

2008	**4:00-5:00**	**303**	**13**	**818**	**908**	**2638**	**36**	**25**	**10**	**21**	**11**	**1775**	**273**	**6831**
	Vehicles	602	26	1624	1858	4969	74	43	24	39	20	3397	515	13191
	Trucks	0	0	4	7	52	4	1	1	0	0	68	0	137
	% Trucks	**0.0%**	**0.0%**	**0.2%**	**0.4%**	**1.0%**	**5.1%**	**2.3%**	**4.0%**	**0.0%**	**0.0%**	**2.0%**	**0.0%**	**1.0%**
	PHF	0.84	0.46	0.85	0.94	0.96	0.75	0.69	0.50	0.75	0.46	0.96	0.73	0.96
2008 Balanced*	4:00-5:00	303	13	848	935	2715	37	26	10	21	11	1839	273	**7031**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	303	13	848	935	2715	37	26	10	21	11	1839	273	**7031**

There has been no growth in the corridor between 2008 and 2013.

2020 No- Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	330	10	940	1030	3000	40	30	10	20	10	2030	300	**7750**
2020 No-Build Balanced*	4:00-5:00	330	10	930	1030	2990	40	30	10	20	10	2010	300	**7710**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2040 No-Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	430	20	1190	1310	3810	50	40	10	30	20	2580	380	**9870**
2040 No-Build Balanced*	4:00-5:00	430	20	1170	1300	3770	50	40	10	30	20	2530	380	**9750**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

Intersection: Route 3 / Gateway Blvd

Start Date 5/13/2008
Start Time 6:30

	Street Name	Gateway Blvd--Southbound			Route 3--Westbound			Gateway Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM	19	1	0	0	255	20	24	9	47	41	239	27	682
Trucks	6:30 AM	0	0	0	0	15	0	0	0	1	2	9	0	27
Total	**6:30 AM**	**19**	**1**	**0**	**0**	**270**	**20**	**24**	**9**	**48**	**43**	**248**	**27**	**709**
Cars	6:45 AM	16	0	0	1	238	37	32	2	48	47	285	28	734
Trucks	6:45 AM	0	0	0	0	9	1	0	0	1	1	9	0	21
Total	**6:45 AM**	**16**	**0**	**0**	**1**	**247**	**38**	**32**	**2**	**49**	**48**	**294**	**28**	**755**
Cars	7:00 AM	18	0	3	2	242	21	27	6	78	48	249	24	718
Trucks	7:00 AM	0	0	1	0	8	0	2	0	0	1	10	0	22
Total	**7:00 AM**	**18**	**0**	**4**	**2**	**250**	**21**	**29**	**6**	**78**	**49**	**259**	**24**	**740**
Cars	7:15 AM	19	0	1	2	232	15	25	3	38	61	296	12	704
Trucks	7:15 AM	0	0	0	0	19	0	2	0	1	0	14	0	36
Total	**7:15 AM**	**19**	**0**	**1**	**2**	**251**	**15**	**27**	**3**	**39**	**61**	**310**	**12**	**740**
Cars	7:30 AM	9	1	2	4	268	35	19	4	53	70	338	15	818
Trucks	7:30 AM	0	0	0	0	25	0	0	0	0	3	5	0	33
Total	**7:30 AM**	**9**	**1**	**2**	**4**	**293**	**35**	**19**	**4**	**53**	**73**	**343**	**15**	**851**
Cars	7:45 AM	7	2	0	2	276	22	24	1	55	97	392	4	882
Trucks	7:45 AM	0	0	0	0	38	1	0	0	1	3	16	0	59
Total	**7:45 AM**	**7**	**2**	**0**	**2**	**314**	**23**	**24**	**1**	**56**	**100**	**408**	**4**	**941**
Cars	8:00 AM	1	0	3	1	284	22	20	4	51	101	353	10	850
Trucks	8:00 AM	0	0	0	0	35	2	1	0	1	6	14	0	59
Total	**8:00 AM**	**1**	**0**	**3**	**1**	**319**	**24**	**21**	**4**	**52**	**107**	**367**	**10**	**909**
Cars	8:15 AM	4	0	5	2	299	24	40	1	56	90	377	9	907
Trucks	8:15 AM	0	0	0	0	38	1	5	0	0	10	10	0	64
Total	**8:15 AM**	**4**	**0**	**5**	**2**	**337**	**25**	**45**	**1**	**56**	**100**	**387**	**9**	**971**
	Grand Total	**186**	**8**	**30**	**28**	**4562**	**402**	**442**	**60**	**862**	**1162**	**5232**	**258**	**13232**

2008	**7:30-8:30**	**21**	**3**	**10**	**9**	**1263**	**107**	**109**	**10**	**217**	**380**	**1505**	**38**	**3672**
	Vehicles	93	4	14	14	2094	196	211	30	426	555	2529	129	6295
	Trucks	0	0	1	0	187	5	10	0	5	26	87	0	321
	% Trucks	**0.0%**	**0.0%**	**6.7%**	**0.0%**	**8.2%**	**2.5%**	**4.5%**	**0.0%**	**1.2%**	**4.5%**	**3.3%**	**0.0%**	**4.9%**
	PHF	0.58	0.38	0.50	0.56	0.94	0.76	0.61	0.63	0.97	0.89	0.92	0.63	0.95
2008 Balanced*	7:30-8:30	23	3	10	9	1388	107	109	10	239	331	1310	33	**3572**

* Intersection volumes adjsuted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	23	3	10	9	1388	107	109	10	239	331	1310	33	3572

There has been no growth in the corridor between 2008 and 2013.

2020 No-Build	Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
	Vehicles	20	3	10	10	1490	110	120	10	260	350	1400	40	**3823**
2020 No-Build Balanced*	7:30-8:30	20	5	10	10	1500	110	120	10	260	350	1430	40	**3865**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet) **Rounded**

2040 No-Build	Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
	Vehicles	30	4	10	10	1760	140	140	10	300	420	1660	40	**4524**
2040 No-Build Balanced*	7:30-8:30	30	5	10	10	1800	140	140	10	310	430	1710	40	**4635**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

Rounded

AM Total Intersection Peak Hour Volume
3672

AM Total Truck Percentage
4.9%

AM Intersection PHF
0.95

Start Date 5/13/2008
Start Time 16:00

	Street Name	Gateway Blvd--Southbound			Route 3--Westbound			Gateway Blvd--Northbound			Route 3--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM	4	0	2	1	389	59	65	0	71	116	340	14	1061
Trucks	4:00 PM	0	0	0	0	15	0	0	0	0	0	4	0	19
Total	**4:00 PM**	**4**	**0**	**2**	**1**	**404**	**59**	**65**	**0**	**71**	**116**	**344**	**14**	**1080**
Cars	4:15 PM	1	2	3	0	387	60	48	0	110	160	390	17	1178
Trucks	4:15 PM	0	0	0	0	15	1	1	0	1	0	12	0	30
Total	**4:15 PM**	**1**	**2**	**3**	**0**	**402**	**61**	**49**	**0**	**111**	**160**	**402**	**17**	**1208**
Cars	4:30 PM	3	0	3	0	335	49	53	0	81	121	352	8	1005
Trucks	4:30 PM	0	0	0	1	13	1	1	0	0	0	16	0	32
Total	**4:30 PM**	**3**	**0**	**3**	**1**	**348**	**50**	**54**	**0**	**81**	**121**	**368**	**8**	**1037**
Cars	4:45 PM	4	0	2	0	307	68	42	0	84	97	347	15	966
Trucks	4:45 PM	0	0	0	0	5	3	1	0	2	1	10	0	22
Total	**4:45 PM**	**4**	**0**	**2**	**0**	**312**	**71**	**43**	**0**	**86**	**98**	**357**	**15**	**988**
Cars	5:00 PM	2	1	4	0	333	87	69	0	74	114	391	7	1082
Trucks	5:00 PM	0	0	0	0	10	0	1	0	2	0	11	0	24
Total	**5:00 PM**	**2**	**1**	**4**	**0**	**343**	**87**	**70**	**0**	**76**	**114**	**402**	**7**	**1106**
Cars	5:15 PM	0	0	4	0	400	52	51	1	95	130	385	9	1127
Trucks	5:15 PM	0	0	0	0	16	0	0	0	4	4	7	1	32
Total	**5:15 PM**	**0**	**0**	**4**	**0**	**416**	**52**	**51**	**1**	**99**	**134**	**392**	**10**	**1159**
Cars	5:30 PM	1	0	1	0	318	58	46	1	77	106	366	5	979
Trucks	5:30 PM	0	0	0	0	17	0	0	0	0	1	10	0	28
Total	**5:30 PM**	**1**	**0**	**1**	**0**	**335**	**58**	**46**	**1**	**77**	**107**	**376**	**5**	**1007**
Cars	5:45 PM	0	0	1	0	377	31	49	0	73	122	399	11	1063
Trucks	5:45 PM	0	0	0	0	11	0	1	0	2	0	9	0	23
Total	**5:45 PM**	**0**	**0**	**1**	**0**	**388**	**31**	**50**	**0**	**75**	**122**	**408**	**11**	**1086**
	Grand Total	**30**	**6**	**40**	**4**	**5896**	**938**	**856**	**4**	**1352**	**1944**	**6098**	**174**	**17342**

2008	**5:00-6:00**	**3**	**1**	**10**	**0**	**1482**	**228**	**217**	**2**	**327**	**477**	**1578**	**33**	**4358**
	Vehicles	15	3	20	1	2846	464	423	2	665	966	2970	86	8461
	Trucks	0	0	0	1	102	5	5	0	11	6	79	1	210
	% Trucks	**0.0%**	**0.0%**	**0.0%**	**50.0%**	**3.5%**	**1.1%**	**1.2%**	**0.0%**	**1.6%**	**0.6%**	**2.6%**	**1.1%**	**2.4%**
	PHF	0.38	0.25	0.63	-	0.89	0.66	0.78	0.50	0.83	0.89	0.97	0.75	0.94
2008 Balanced*	5:00-6:00	3	1	10	0	1396	228	217	2	308	455	1506	31	**4157**

* Intersection volumes adjsuted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	3	1	10	0	1396	228	217	2	308	455	1506	31	4157

There has been no growth in the corridor between 2008 and 2013.

2020 No-Build	Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
	Vehicles	3	1	10	0	1490	240	230	2	330	490	1610	30	**4436**
2020 No-Build Balanced*	7:30-8:30	5	5	10	0	1500	240	230	5	330	500	1630	30	**4485**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

Rounded

2040 No-Build	Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
	Vehicles	4	1	10	0	1770	290	280	3	390	580	1910	40	**5278**
2040 No-Build Balanced*	5:00-6:00	5	5	10	0	1820	290	280	5	400	600	1970	40	**5425**

* Intersection volumes adjusted to balance volumes across the Route 3 Interchange (See interchange balancing worksheet)

PM Total Intersection Peak Hour Volume
4358

PM Total Truck Percentage
2.4%

PM Intersection PHF
0.94

Intersection: Route 17 / McLane Drive

Start Date 7/17/2007
Start Time 7:00

	Street Name	Route 17--Southbound			McLane Dr--Westbound			Route 17--Northbound			Hardee's Access--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM													0
Trucks	6:30 AM													0
Total	**6:30 AM**													**0**
Cars	6:45 AM													0
Trucks	6:45 AM													0
Total	**6:45 AM**													**0**
Cars	7:00 AM													0
Trucks	7:00 AM													0
Total	**7:00 AM**	**9**	**582**	**5**	**3**	**0**	**11**	**8**	**317**	**2**	**0**	**0**	**0**	**937**
Cars	7:15 AM													0
Trucks	7:15 AM													0
Total	**7:15 AM**	**8**	**631**	**9**	**4**	**0**	**2**	**5**	**340**	**2**	**1**	**2**	**5**	**1009**
Cars	7:30 AM													0
Trucks	7:30 AM													0
Total	**7:30 AM**	**12**	**734**	**4**	**6**	**0**	**9**	**7**	**433**	**3**	**2**	**4**	**7**	**1221**
Cars	7:45 AM													0
Trucks	7:45 AM													0
Total	**7:45 AM**	**8**	**721**	**15**	**4**	**1**	**6**	**5**	**416**	**2**	**3**	**2**	**4**	**1187**
Cars	8:00 AM													0
Trucks	8:00 AM													0
Total	**8:00 AM**	**3**	**687**	**5**	**0**	**0**	**5**	**10**	**428**	**3**	**0**	**1**	**3**	**1145**
Cars	8:15 AM													0
Trucks	8:15 AM													0
Total	**8:15 AM**	**2**	**545**	**2**	**2**	**0**	**12**	**11**	**435**	**7**	**1**	**1**	**3**	**1021**
	Grand Total	**42**	**3900**	**40**	**19**	**1**	**45**	**46**	**2369**	**19**	**7**	**10**	**22**	**6520**
2008	**7:30-8:30**	**25**	**1770***	**26**	**12**	**1**	**32**	**33**	**2190***	**15**	**6**	**8**	**17**	**4135**
	*Adjusted to balance between adjacent intersections													
	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.52	0.92	0.43	0.50	0.25	0.67	0.75	0.98	0.54	0.50	0.50	0.61	0.85
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	**25**	**1770***	**26**	**12**	**1**	**32**	**33**	**2190***	**15**	**6**	**8**	**17**	**4135**
	There has been no growth in the corridor between 2008 and 2013.													
2020 No- Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	30	2090	30	10	5	40	40	2570	20	10	10	20	**4875**
2040 No-Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	40	2960	40	20	5	50	60	3670	30	10	10	30	**6925**

AM Total Intersection Peak Hour Volume
4135

AM Total Truck Percentage
#DIV/0!

AM Intersection PHF
0.85

Start Date 7/17/2007
Start Time 16:00

	Street Name	Route 17--Southbound			McLane Dr--Westbound			Route 17--Northbound			Hardee's Access--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM													0
Trucks	4:00 PM													0
Total	**4:00 PM**	4	554	5	3	0	7	2	424	0	2	0	3	**1004**
Cars	4:15 PM													0
Trucks	4:15 PM													0
Total	**4:15 PM**	2	451	3	0	0	6	2	642	2	0	0	1	**1109**
Cars	4:30 PM													0
Trucks	4:30 PM													0
Total	**4:30 PM**	3	521	5	3	0	18	5	685	2	0	0	1	**1243**
Cars	4:45 PM													0
Trucks	4:45 PM													0
Total	**4:45 PM**	3	448	3	1	0	3	3	560	2	2	1	3	**1029**
Cars	5:00 PM													0
Trucks	5:00 PM													0
Total	**5:00 PM**	3	513	3	7	2	11	6	581	2	0	0	5	**1133**
Cars	5:15 PM													0
Trucks	5:15 PM													0
Total	**5:15 PM**	2	535	4	6	1	15	5	565	3	1	0	0	**1137**
Cars	5:30 PM													0
Trucks	5:30 PM													0
Total	**5:30 PM**	10	671	1	2	0	8	1	521	2	6	0	1	**1223**
Cars	5:45 PM													0
Trucks	5:45 PM													0
Total	**5:45 PM**	5	602	2	2	1	4	3	539	2	0	1	3	**1164**
	Grand Total	**32**	**4295**	**26**	**24**	**4**	**72**	**27**	**4517**	**15**	**11**	**2**	**17**	**9042**
2008	**5:00-6:00**	**20**	**2321**	**10**	**17**	**4**	**38**	**15**	**2206**	**9**	**7**	**1**	**9**	**4657**
	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.50	0.86	0.63	0.61	0.50	0.63	0.63	0.95	0.75	0.29	0.25	0.45	0.95
2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	20	2321	10	17	4	38	15	1856	9	7	1	9	4657
	There has been no growth in the corridor between 2008 and 2013.								*Adjusted to balance between adjacent intersections					
2020 No- Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	20	2730	10	20	5	40	20	2180	10	10	5	10	**5060**
2040 No-Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	30	3890	20	30	10	60	30	3110	20	10	5	20	**7235**

PM Total Intersection Peak Hour Volume
4657

PM Total Truck Percentage
#DIV/0!

PM Intersection PHF
0.95

Intersection: Route 17 / Sanford Drive

Start Date 6/6/2007
Start Time 7:00

	Street Name	Route 17--Southbound			Sanford Dr--Westbound			Route 17--Northbound			Sanford Dr--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	6:30 AM													0
Trucks	6:30 AM													0
Total	**6:30 AM**													**0**
Cars	6:45 AM													0
Trucks	6:45 AM													0
Total	**6:45 AM**													**0**
Cars	7:00 AM													0
Trucks	7:00 AM													0
Total	**7:00 AM**	3	466	2	6	2	12	23	522	52	39	1	14	**1142**
Cars	7:15 AM													0
Trucks	7:15 AM													0
Total	**7:15 AM**	5	445	1	3	7	16	15	552	63	39	3	12	**1161**
Cars	7:30 AM													0
Trucks	7:30 AM													0
Total	**7:30 AM**	7	463	4	3	28	9	41	538	105	60	0	11	**1269**
Cars	7:45 AM													0
Trucks	7:45 AM													0
Total	**7:45 AM**	5	449	4	3	24	7	32	560	67	105	1	15	**1272**
Cars	8:00 AM													0
Trucks	8:00 AM													0
Total	**8:00 AM**	6	428	1	7	8	9	28	549	61	32	1	1	**1131**
Cars	8:15 AM													0
Trucks	8:15 AM													0
Total	**8:15 AM**	12	459	2	0	7	11	16	421	48	40	1	10	**1027**
	Grand Total	**38**	**2710**	**14**	**22**	**76**	**64**	**155**	**3142**	**396**	**315**	**7**	**63**	**7002**

2008	**7:00-8:00**	**20**	**1823**	**11**	**15**	**61**	**44**	**111**	**2172**	**287**	**243**	**5**	**52**	**4844**

	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.71	0.98	0.69	0.63	0.54	0.69	0.68	0.97	0.68	0.58	0.42	0.87	0.95

2008 Balanced*	7:00-8:00	20	1807	11	15	61	144	213	2208	192	141	5	52	**4869**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	20	1807	11	15	61	144	213	2208	192	141	5	52	**4869**

There has been no growth in the corridor between 2008 and 2013.

2020 No- Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	20	2120	10	20	70	170	250	2590	230	170	10	60	**5720**

2020 No-Build Balanced*	7:00-8:00	20	2110	10	20	70	160	240	2570	230	170	10	60	**5670**

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2040 No-Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	30	3030	20	30	100	240	360	3700	320	240	10	90	**8170**

2040 No-Build Balanced*	7:00-8:00	30	2950	20	30	100	230	340	3620	310	230	10	90	**7960**

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

AM Total Intersection Peak Hour Volume
4844

AM Total Truck Percentage
#DIV/0!

AM Intersection PHF
0.95

Start Date 6/6/2007
Start Time 16:00

	Street Name	Route 17--Southbound			Sanford Dr--Westbound			Route 17--Northbound			Sanford Dr--Eastbound			Total
	Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars	4:00 PM													0
Trucks	4:00 PM													0
Total	**4:00 PM**	6	603	1	4	5	28	16	498	29	81	5	25	**1301**
Cars	4:15 PM													0
Trucks	4:15 PM													0
Total	**4:15 PM**	7	621	1	0	3	12	21	445	20	141	0	11	**1282**
Cars	4:30 PM													0
Trucks	4:30 PM													0
Total	**4:30 PM**	6	589	0	2	3	12	13	476	43	161	2	7	**1314**
Cars	4:45 PM													0
Trucks	4:45 PM													0
Total	**4:45 PM**	7	593	3	1	2	21	14	454	66	319	1	1	**1482**
Cars	5:00 PM													0
Trucks	5:00 PM													0
Total	**5:00 PM**	7	639	1	0	5	10	26	424	84	184	2	13	**1395**
Cars	5:15 PM													0
Trucks	5:15 PM													0
Total	**5:15 PM**	17	579	1	3	6	26	22	449	58	147	0	6	**1314**
Cars	5:30 PM													0
Trucks	5:30 PM													0
Total	**5:30 PM**	13	558	1	2	6	13	18	452	111	222	1	12	**1409**
Cars	5:45 PM													0
Trucks	5:45 PM													0
Total	**5:45 PM**	7	491	0	0	7	13	29	429	49	99	0	6	**1130**
	Grand Total	**70**	**4673**	**8**	**12**	**37**	**135**	**159**	**3627**	**460**	**1354**	**11**	**81**	**10627**

2008	**4:45-5:45**	**44**	**2369**	**6**	**6**	**19**	**70**	**80**	**1779**	**319**	**872**	**4**	**32**	**5600**

	Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Trucks	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
	PHF	0.65	0.93	0.50	0.50	0.79	0.67	0.77	0.98	0.72	0.68	0.50	0.62	0.94

2008 Balanced*	4:45-5:45	44	2255	6	6	19	317	181	1807	224	580	4	32	**5475**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	44	2255	6	6	19	317	181	1807	224	580	4	32	**5475**

There has been no growth in the corridor between 2008 and 2013.

2020 No- Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	50	2650	10	10	20	370	210	2120	260	680	5	40	**6425**

2020 No-Build Balanced*	4:45-5:45	50	2620	10	10	20	370	220	2110	260	680	10	40	**6400**

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2040 No-Build	Growth Rate	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	
	Vehicles	70	3780	10	10	30	530	300	3030	380	970	10	50	**9170**

2040 No-Build Balanced*	4:45-5:45	70	3660	10	10	30	510	300	2960	370	950	10	50	**8930**

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

PM Total Intersection Peak Hour Volume
5600

PM Total Truck Percentage
#DIV/0!

PM Intersection PHF
0.94

Intersection: Route 17 / Short Road

Start Date 5/14/2008

Start Time	Changed from SB to WB			Changed from WB to NB			Changed from NB to EB			Changed from EB to SB			Total
Street Name	Short Road--Westbound			Route 17--Northbound			Short Road--Eastbound			Route 17--Southbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars 6:30 AM	1	0	1	0	268	1	4	0	25	10	169	1	480
Trucks 6:30 AM	0	0	0	0	2	0	0	0	1	0	6	0	9
Total 6:30 AM	**1**	**0**	**1**	**0**	**270**	**1**	**4**	**0**	**26**	**10**	**175**	**1**	**489**
Cars 6:45 AM	5	0	2	1	273	3	4	0	28	14	214	1	545
Trucks 6:45 AM	0	0	0	0	2	0	1	0	1	0	5	0	9
Total 6:45 AM	**5**	**0**	**2**	**1**	**275**	**3**	**5**	**0**	**29**	**14**	**219**	**1**	**554**
Cars 7:00 AM	2	0	0	2	255	3	3	0	28	14	177	1	485
Trucks 7:00 AM	0	0	0	0	7	0	0	0	1	0	7	0	15
Total 7:00 AM	**2**	**0**	**0**	**2**	**262**	**3**	**3**	**0**	**29**	**14**	**184**	**1**	**500**
Cars 7:15 AM	3	0	2	0	301	3	3	0	20	13	216	2	563
Trucks 7:15 AM	0	0	0	0	5	0	0	0	1	1	8	0	15
Total 7:15 AM	**3**	**0**	**2**	**0**	**306**	**3**	**3**	**0**	**21**	**14**	**224**	**2**	**578**
Cars 7:30 AM	4	0	0	1	307	3	5	0	24	10	254	3	611
Trucks 7:30 AM	0	0	0	0	4	0	0	0	2	0	8	1	15
Total 7:30 AM	**4**	**0**	**0**	**1**	**311**	**3**	**5**	**0**	**26**	**10**	**262**	**4**	**626**
Cars 7:45 AM	1	0	0	0	287	2	3	0	22	11	293	1	620
Trucks 7:45 AM	4	0	0	0	10	0	0	0	0	0	10	1	25
Total 7:45 AM	**5**	**0**	**0**	**0**	**297**	**2**	**3**	**0**	**22**	**11**	**303**	**2**	**645**
Cars 8:00 AM	0	0	0	0	227	6	0	0	21	15	240	0	509
Trucks 8:00 AM	0	0	0	0	11	0	0	0	1	1	6	0	19
Total 8:00 AM	**0**	**0**	**0**	**0**	**238**	**6**	**0**	**0**	**22**	**16**	**246**	**0**	**528**
Cars 8:15 AM	1	0	1	0	249	2	7	0	30	4	268	0	562
Trucks 8:15 AM	0	0	0	0	7	0	0	0	0	0	4	0	11
Total 8:15 AM	**1**	**0**	**1**	**0**	**256**	**2**	**7**	**0**	**30**	**4**	**272**	**0**	**573**
Grand Total	**42**	**0**	**12**	**8**	**4430**	**46**	**60**	**0**	**410**	**186**	**3770**	**22**	**8986**
2008 **7:15-8:15**	**12**	**0**	**2**	**1**	**1152**	**14**	**11**	**0**	**91**	**51**	**1035**	**8**	**2377**
Vehicles	17	0	6	4	2167	23	29	0	198	91	1831	9	4375
Trucks	4	0	0	0	48	0	1	0	7	2	54	2	118
% Trucks	**19.0%**	**#DIV/0!**	**0.0%**	**0.0%**	**2.2%**	**0.0%**	**3.3%**	**#DIV/0!**	**3.4%**	**2.2%**	**2.9%**	**18.2%**	**2.6%**
PHF	0.60	#DIV/0!	0.25	0.25	0.93	1.17	0.55	#DIV/0!	0.88	0.80	0.85	0.50	0.92
2008 Balanced*	7:15-8:15	12	0	2	1	1113	14	11	0	88	52	1052	8	**2353**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	12	0	2	1	1113	14	11	0	88	52	1052	8	**2353**

There has been no growth in the corridor between 2008 and 2013.

2020 No- Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	10	0	2	1	1230	20	12	0	100	60	1160	10	**2605**
2020 No-Build	7:15-8:15	10	0	5	5	1250	20	10	0	100	60	1180	10	**2650**
Balanced*												**Rounded**		

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2040 No-Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	20	0	3	1	1560	20	20	0	120	70	1480	10	**3304**
2040 No-Build	7:15-8:15	20	0	5	5	1650	20	20	0	130	70	1570	10	**3500**
Balanced*														

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

Rounded

AM Total Intersection Peak Hour Volume
2377

AM Total Truck Percentage
2.6%

AM Intersection PHF
0.92

Start Date 5/14/2008

Start Time	Changed from SB to WB			Changed from WB to NB			Changed from NB to EB			Changed from EB to SB			Total
Street Name	Short Road--Westbound			Route 17--Northbound			Short Road--Eastbound			Route 17--Southbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Cars 4:00 PM	0	0	2	0	255	3	4	1	27	20	406	2	720
Trucks 4:00 PM	0	0	0	0	9	0	0	0	1	0	8	0	18
Total 4:00 PM	**0**	**0**	**2**	**0**	**264**	**3**	**4**	**1**	**28**	**20**	**414**	**2**	**738**
Cars 4:15 PM	1	0	1	0	240	5	2	0	19	18	369	3	658
Trucks 4:15 PM	0	0	0	0	2	0	0	0	0	0	12	0	14
Total 4:15 PM	**1**	**0**	**1**	**0**	**242**	**5**	**2**	**0**	**19**	**18**	**381**	**3**	**672**
Cars 4:30 PM	1	0	0	0	257	4	6	0	17	25	362	1	673
Trucks 4:30 PM	0	0	0	0	3	0	0	0	2	0	10	0	15
Total 4:30 PM	**1**	**0**	**0**	**0**	**260**	**4**	**6**	**0**	**19**	**25**	**372**	**1**	**688**
Cars 4:45 PM	1	0	0	0	233	0	1	1	28	17	387	1	669
Trucks 4:45 PM	0	0	0	0	5	1	0	0	0	0	9	0	15
Total 4:45 PM	**1**	**0**	**0**	**0**	**238**	**1**	**1**	**1**	**28**	**17**	**396**	**1**	**684**
Cars 5:00 PM	1	1	1	1	240	4	9	0	13	22	429	2	723
Trucks 5:00 PM	0	0	0	0	4	0	0	0	0	2	11	0	17
Total 5:00 PM	**1**	**1**	**1**	**1**	**244**	**4**	**9**	**0**	**13**	**24**	**440**	**2**	**740**
Cars 5:15 PM	2	0	0	0	284	3	10	1	13	13	380	1	707
Trucks 5:15 PM	0	0	0	0	2	0	0	0	0	1	9	0	12
Total 5:15 PM	**2**	**0**	**0**	**0**	**286**	**3**	**10**	**1**	**13**	**14**	**389**	**1**	**719**
Cars 5:30 PM	3	0	1	0	247	3	6	0	20	15	403	1	699
Trucks 5:30 PM	0	0	0	0	1	0	0	0	0	0	8	0	9
Total 5:30 PM	**3**	**0**	**1**	**0**	**248**	**3**	**6**	**0**	**20**	**15**	**411**	**1**	**708**
Cars 5:45 PM	3	1	3	1	208	6	5	1	22	23	346	3	622
Trucks 5:45 PM	0	0	0	0	5	0	0	0	0	1	9	0	15
Total 5:45 PM	**3**	**1**	**3**	**1**	**213**	**6**	**5**	**1**	**22**	**24**	**355**	**3**	**637**
Grand Total	**24**	**4**	**16**	**4**	**3990**	**58**	**86**	**8**	**324**	**314**	**6316**	**28**	**11172**
2008 **4:45-5:45**	**7**	**1**	**2**	**1**	**1016**	**11**	**26**	**2**	**74**	**70**	**1636**	**5**	**2851**
Vehicles	12	2	8	2	1964	28	43	4	159	153	3082	14	5471
Trucks	0	0	0	0	31	1	0	0	3	4	76	0	115
% Trucks	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.6%**	**3.4%**	**0.0%**	**0.0%**	**1.9%**	**2.5%**	**2.4%**	**0.0%**	**2.1%**
PHF	0.58	0.25	0.50	0.25	0.89	0.69	0.65	0.50	0.66	0.73	0.93	0.63	0.96
2008 Balanced*	4:45-5:45	7	1	2	1	984	11	26	2	72	77	1789	5	**2977**

* Intersection volumes adjsuted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2013 Existing	Growth Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Vehicles	7	1	2	1	984	11	26	2	72	77	1789	5	2977

There has been no growth in the corridor between 2008 and 2013.

2020 No- Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	10	1	2	1	1090	10	30	2	80	90	1980	10	**3306**
2020 No-Build	7:15-8:15	10	5	5	5	1100	10	30	5	80	90	2020	10	**3370**
Balanced*														

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

2040 No-Build	Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	Vehicles	10	5	5	5	1380	20	40	5	100	110	2510	10	**4200**
2040 No-Build	4:45-5:45	10	5	5	5	1450	20	40	5	110	120	2670	10	**4450**
Balanced*														

* Intersection volumes adjusted to balance volumes across the Route 17 Interchange (See interchange balancing worksheet)

PM Total Intersection Peak Hour Volume
2851

PM Total Truck Percentage
2.1%

PM Intersection PHF
0.96

Capacity Analysis Output

Intersections

Mainline / Ramp Junctions

2020 No-Build Conditions

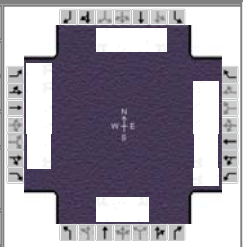
2040 No-Build Conditions

2020 No Build HCS Intersection Analysis Summary

				AM Peak Hour								PM Peak Hour							
				2013		2020 No Build						2013		2020 No Build					
				Intersection		Movement		Approach		Intersection		Intersection		Movement		Approach		Intersection	
	Intersection	Approach	Movement	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Route 3 / Mall Dr. / Central Park Blvd.	NB	Left	15.1	B	65.2	E	133.5	F	19.4	B	103.8	F	75.8	E	616.9	F	120.0	F
			Through			66.1	E							80.1	F				
			Right			151.0	F							885.6	F				
		SB	Left			69.0	E	87.1	F					72.3	E	326.4	F		
			Through			68.7	E							70.3	E				
			Right			91.5	F							544.0	F				
		EB	Left			63.3	E	13.7	B					69.3	E	67.6	E		
			Through			9.1	A							68.7	E				
			Right			0.1	A							43.4	D				
		WB	Left			66.8	E	11.5	B					60.5	E	19.3	B		
			Through			6.7	A							9.8	A				
			Right			8.8	A							14.1	B				
2	Route 3 / Carl D. Silver Pkwy	NB	Left	29.7	C	70.8	E	70.2	E	32.8	C	97.8	F	76.7	E	76.0	E	127.8	F
			Through			70.8	E							76.7	E				
			Right			69.6	E							75.2	E				
		SB	Left			59.1	E	58.3	E					160.0	F	139.9	F		
			Through			51.9	D							51.1	D				
			Right			53.6	D							80.3	F				
		EB	Left			63.0	E	27.2	C					63.6	E	14.9	B		
			Through			25.4	C							7.6	A				
			Right			24.4	C							5.7	A				
		WB	Left			69.5	E	36.0	D					75.9	E	189.4	F		
			Through			31.6	C							111.7	F				
			Right			45.3	D							419.3	F				
3	Route 3 / Gateway Blvd.	NB	Left	20.6	C	58.9	E	53.3	D	21.8	C	27.5	C	107.3	F	87.7	F	30.2	C
			Through			38.2	D							38.0	D				
			Right			41.3	D							59.3	E				
		SB	Left			48.7	D	49.7	D					48.7	D	48.9	D		
			Through			50.1	D							49.1	D				
			Right			50.1	D							49.1	D				
		EB	Left			47.4	D	26.5	C					47.1	D	29.5	C		
			Through			26.6	C							28.9	C				
			Right			23.8	C							30.3	C				
		WB	Left			46.1	D	8.6	A					54.4	D	12.6	B		
			Through			5.9	A							5.9	A				
			Right			3.1	A							0.0	A				
4	Route 17 / McLane Dr.	NB	Left	25.8	C	54.3	D	67.6	E	53.7	D	19.1	B	69.0	E	3.7	A	27.9	C
			Through			68.7	F							3.5	A				
			Right			1.2	A							0.0	A				
		SB	Left			53.8	D	37.5	D					68.0	E	46.6	D		
			Through			37.5	D							46.7	D				
			Right			17.7	B							14.2	B				
		EB	Left			32.5	C	32.5	C					46.7	D	46.7	D		
			Through			32.5	C							46.7	D				
			Right			32.5	C							46.7	D				
		WB	Left			33.3	C	33.3	C					48.1	D	48.1	D		
			Through			33.3	C							48.1	D				
			Right			33.3	C							48.1	D				
5	Route 17 /Sanford Dr.	NB	Left	36.4	D	65.2	E	105.9	F	53.2	D	291.7	F	115.2	F	3023.1	F	382.6	F
			Through			54.4	D							76.1	E				
			Right			126.2	F							3267.3	F				
		SB	Left			62.8	E	62.4	E					78.8	E	77.4	E		
			Through			62.6	E							59.7	E				
			Right			58.9	E							61.2	E				
		EB	Left			57.4	E	59.9	E					59.8	E	118.5	F		
			Through			60.2	F							120.4	F				
			Right			21.1	C							23.2	C				
		WB	Left			60.2	E	44.0	D					81.6	F	41.8	D		
			Through			45.0	D							38.8	D				
			Right			15.8	B							22.2	C				
6	Route 17 /Short St.	NB	Left	34.9	C	35.0	C	34.7	C	46.8	D	105.6	F	42.4	D	41.6	D	150.7	F
			Through			35.0	C							42.4	D				
			Right			31.4	C							39.2	D				
		SB	Left			40.9	D	40.9	D					44.9	D	44.9	D		
			Through			40.9	D							44.9	D				
			Right			40.9	D							44.9	D				
		EB	Left			77.5	F	73.1	E					243.5	F	228.5	F		
			Through			73.1	F							229.6	F				
			Right			22.3	C							20.1	C				
		WB	Left			20.5	C	22.3	C					21.7	C	16.3	B		
			Through			22.3	C							16.4	B				
			Right			22.4	C							16.1	B				

HCS 2010 Signalized Intersection Results Summary

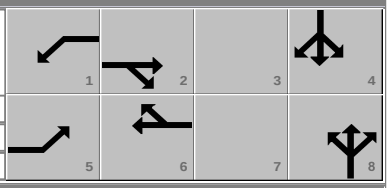
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{1_am} Rte 3 @ Central Pa	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2020NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	280	2830	60	100	1280	30	10	30	170	10	10	90

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.5	59.5	12.5	14.0	10.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



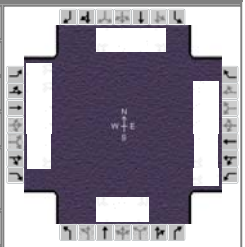
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	35.0	102.0	20.0	87.0		21.0		17.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	14.5		6.6			18.0		10.6
Green Extension Time (g_e), s	0.5	0.0	2.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.40			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	292	2948	57	104	1027	337	10	31	160	10	10	85
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1691	1594	1658	1810	1780	1810	1845	1563	1757	1696	1548
Queue Service Time (g_s), s	12.5	0.0	0.0	4.6	6.4	7.8	0.8	2.5	16.0	0.9	0.5	8.6
Cycle Queue Clearance Time (g_c), s	12.5	0.0	0.0	4.6	6.4	7.8	0.8	2.5	16.0	0.9	0.5	8.6
Green Ratio (*g/C*)	0.18	0.61	0.61	0.09	0.51	0.51	0.10	0.10	0.10	0.08	0.08	0.08
Capacity (*c*), veh/h	631	3076	967	290	2782	884	181	184	156	132	254	116
Volume-to-Capacity Ratio (*X*)	0.463	0.958	0.059	0.359	0.369	0.381	0.058	0.169	1.026	0.079	0.041	0.736
Available Capacity (c_a), veh/h	631	3076	967	290	2782	884	181	184	156	132	254	116
Back of Queue (*Q*), veh/ln (50th percentile)	5.8	2.6	0.0	2.0	2.1	2.8	0.4	1.2	9.9	0.4	0.2	4.1
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	63.1	0.0	0.0	66.5	6.3	7.7	65.2	65.9	72.0	68.9	68.7	72.4
Incremental Delay (d_2), s/veh	0.2	9.1	0.1	0.3	0.4	1.2	0.0	0.2	79.0	0.1	0.0	19.1
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	63.3	9.1	0.1	66.8	6.7	8.8	65.2	66.1	151.0	69.0	68.7	91.5
Level of Service (LOS)	E	A	A	E	A	A	E	E	F	E	E	F
Approach Delay, s/veh / LOS	13.7	B		11.5	B		133.5	F		87.1	F	
Intersection Delay, s/veh / LOS	19.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.3	B	1.1	A	0.8	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

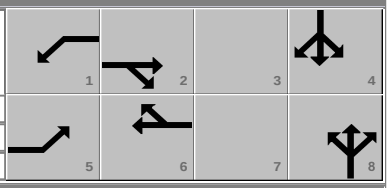
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{1_pm} Rte 3 @ Central Pa	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2020NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	350	1770	110	540	2580	70	90	110	440	110	200	400

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.5	42.5	33.5	14.0	18.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



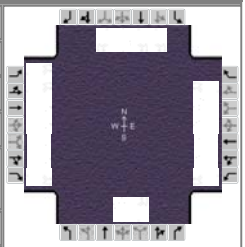
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	33.0	83.0	41.0	91.0		21.0		25.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	18.6		27.1			18.0		22.0
Green Extension Time (g_e), s	0.4	0.0	4.6	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.02		0.78			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	365	1844	104	563	2078	682	94	115	418	115	208	379
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1675	1594	1757	1863	1828	1810	1900	1610	1792	1900	1610
Queue Service Time (g_s), s	16.6	60.2	9.6	25.1	26.1	30.4	8.4	9.9	16.0	10.2	8.7	20.0
Cycle Queue Clearance Time (g_c), s	16.6	60.2	9.6	25.1	26.1	30.4	8.4	9.9	16.0	10.2	8.7	20.0
Green Ratio (*g*/*C*)	0.16	0.46	0.46	0.21	0.51	0.51	0.09	0.09	0.09	0.12	0.12	0.12
Capacity (*c*), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Volume-to-Capacity Ratio (*X*)	0.653	0.800	0.142	0.777	0.735	0.760	0.550	0.641	2.756	0.544	0.466	2.002
Available Capacity (c_a), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Back of Queue (*Q*), veh/ln (50th percentile)	7.7	28.0	4.2	11.1	5.3	8.4	4.0	5.2	40.7	4.8	4.3	33.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	67.1	65.6	43.0	58.1	8.9	11.1	73.6	74.2	77.0	70.7	70.0	75.0
Incremental Delay (d_2), s/veh	2.2	3.0	0.4	2.5	0.9	3.0	2.2	5.9	808.6	1.6	0.3	469.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	69.3	68.7	43.4	60.5	9.8	14.1	75.8	80.1	885.6	72.3	70.3	544.0
Level of Service (LOS)	E	E	D	E	A	B	E	F	F	E	E	F
Approach Delay, s/veh / LOS	67.6	E		19.3	B		616.9	F		326.4	F	
Intersection Delay, s/veh / LOS	120.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	1.8	A	1.9	A	1.5	A	1.1	A

HCS 2010 Signalized Intersection Results Summary

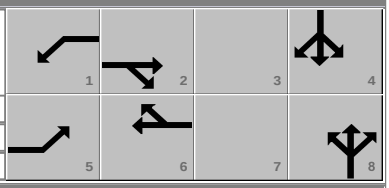
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{2_am} Rte 3 @ Carl D Silv	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2020NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	160	3160	10	20	1200	500	10	10	20	390	10	60

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.5	50.5	9.5	10.0	29.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



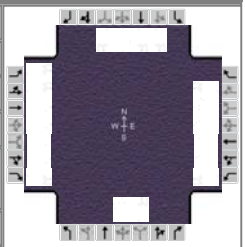
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	32.0	90.0	17.0	75.0		17.0		36.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	9.0		3.8			3.9		18.6
Green Extension Time (g_e), s	0.2	0.0	2.4	0.0		0.0		0.7
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.52			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	167	3292	9	21	1250	521		21	19	406	10	56
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1708	1533	1774	1827	1579		1854	1464	1774	1900	1610
Queue Service Time (g_s), s	7.0	62.9	0.6	1.8	18.6	44.3		1.7	1.9	16.6	0.7	4.7
Cycle Queue Clearance Time (g_c), s	7.0	62.9	0.6	1.8	18.6	44.3		1.7	1.9	16.6	0.7	4.7
Green Ratio (*g*/*C*)	0.16	0.53	0.53	0.08	0.44	0.44		0.08	0.08	0.20	0.20	0.20
Capacity (*c*), veh/h	571	3630	815	133	3197	691		139	110	699	374	317
Volume-to-Capacity Ratio (*X*)	0.292	0.907	0.012	0.157	0.391	0.754		0.150	0.171	0.582	0.028	0.177
Available Capacity (c_a), veh/h	571	3630	815	133	3197	691		116	110	699	374	317
Back of Queue (*Q*), veh/ln (50th percentile)	3.2	22.0	0.2	0.8	8.4	18.6		0.8	0.7	7.6	0.3	1.9
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	62.9	21.0	24.4	69.3	31.3	37.8		70.6	69.3	58.3	51.9	53.5
Incremental Delay (d_2), s/veh	0.1	4.4	0.0	0.2	0.4	7.5		0.2	0.3	0.8	0.0	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.0	25.4	24.4	69.5	31.6	45.3		70.8	69.6	59.1	51.9	53.6
Level of Service (LOS)	E	C	C	E	C	D		E	E	E	D	D
Approach Delay, s/veh / LOS	27.2	C		36.0	D		70.2	E		58.3	E	
Intersection Delay, s/veh / LOS	32.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.9	A	1.2	A	0.6	A	1.3	A

HCS 2010 Signalized Intersection Results Summary

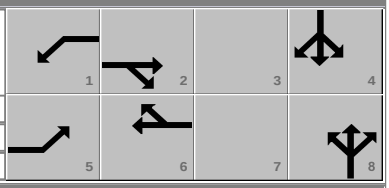
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{2_pm} Rte 3 @ Carl D Silv	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2020NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	300	2010	10	40	2990	1030	20	10	30	930	10	330

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	34.5	43.5	9.5	10.0	36.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



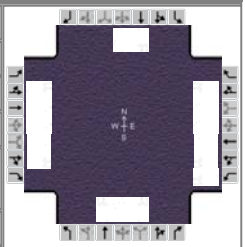
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	42.0	93.0	17.0	68.0		17.0		43.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.9
Queue Clearance Time (g_s), s	15.8		5.9			4.9		40.5
Green Extension Time (g_e), s	0.5	0.0	3.3	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.98			0.04		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	313	2094	9	42	3115	1073		31	28	969	10	313
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1691	1610	1723	1881	1610		1768	1579	1810	1900	1610
Queue Service Time (g_s), s	13.8	14.9	0.1	3.9	63.0	63.0		2.9	2.9	38.5	0.7	31.7
Cycle Queue Clearance Time (g_c), s	13.8	14.9	0.1	3.9	63.0	63.0		2.9	2.9	38.5	0.7	31.7
Green Ratio (*g*/*C*)	0.21	0.52	0.52	0.07	0.37	0.37		0.07	0.07	0.23	0.23	0.23
Capacity (*c*), veh/h	744	3502	833	122	2789	597		125	111	820	430	365
Volume-to-Capacity Ratio (*X*)	0.420	0.598	0.011	0.343	1.117	1.798		0.250	0.252	1.182	0.024	0.857
Available Capacity (c_a), veh/h	744	3502	833	122	2789	597		104	111	820	430	365
Back of Queue (*Q*), veh/ln (50th percentile)	6.4	3.4	0.1	1.8	41.0	86.1		1.3	1.2	28.5	0.4	14.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	63.5	6.9	5.6	75.2	53.5	53.5		76.3	74.8	65.8	51.1	63.1
Incremental Delay (d_2), s/veh	0.1	0.8	0.0	0.6	58.2	365.8		0.4	0.4	94.3	0.0	17.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.6	7.6	5.7	75.9	111.7	419.3		76.7	75.2	160.0	51.1	80.3
Level of Service (LOS)	E	A	A	E	F	F		E	E	F	D	F
Approach Delay, s/veh / LOS	14.9	B		189.4	F		76.0	E		139.9	F	
Intersection Delay, s/veh / LOS	127.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.5	A	2.2	B	0.6	A	2.6	B

HCS 2010 Signalized Intersection Results Summary

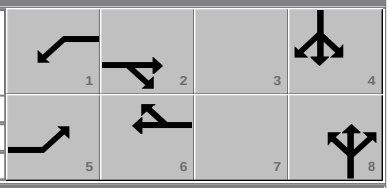
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2020NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	1430	350	110	1500	10	260	10	120	10	5	20

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0
Yellow	4.0	3.5	4.0	4.5	4.5	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



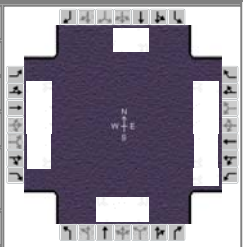
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, (Y+R_c), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.2
Queue Clearance Time (g_s), s	4.4		5.5			18.6		3.7
Green Extension Time (g_e), s	0.0	0.0	2.1	0.0		0.1		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.65			1.00		0.34

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	1490	330	115	1563	9	271	10	114	10	26	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1661	
Queue Service Time (g_s), s	2.4	26.1	17.0	3.5	10.3	0.1	16.6	0.5	7.4	0.7	1.7	
Cycle Queue Clearance Time (g_c), s	2.4	26.1	17.0	3.5	10.3	0.1	16.6	0.5	7.4	0.7	1.7	
Green Ratio (*g*/*C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	109	
Volume-to-Capacity Ratio (*X*)	0.228	0.650	0.472	0.333	0.722	0.013	0.821	0.030	0.402	0.078	0.238	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	109	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	10.4	6.5	1.5	1.8	0.0	8.6	0.2	2.8	0.3	0.7	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.2	25.1	21.5	45.9	3.8	3.0	44.7	38.1	41.0	48.7	49.7	
Incremental Delay (d_2), s/veh	0.2	1.4	2.3	0.2	2.1	0.0	14.2	0.0	0.3	0.1	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.4	26.6	23.8	46.1	5.9	3.1	58.9	38.2	41.3	48.7	50.1	
Level of Service (LOS)	D	C	C	D	A	A	E	D	D	D	D	
Approach Delay, s/veh / LOS	26.5	C		8.6	A		53.3	D		49.7	D	
Intersection Delay, s/veh / LOS	21.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.5	A	1.4	A	1.1	A	0.5	A

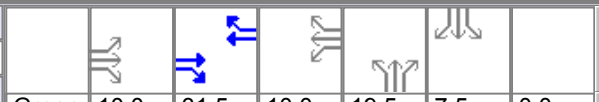
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2020NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				

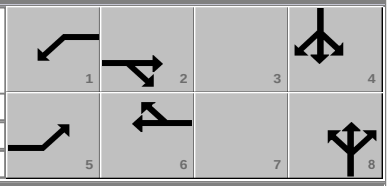


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	30	1630	500	240	1500	0	330	5	230	10	5	5

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	31.5	10.0	19.5	7.5	0.0						
Yellow	4.0	3.5	4.0	4.5	4.5	0.0						
Red	3.0	3.0	3.0	3.0	3.0	0.0						



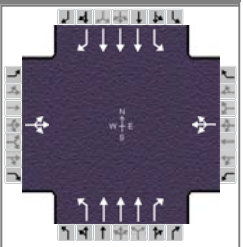
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, (Y+R_c), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.0
Queue Clearance Time (g_s), s	3.8		10.0			23.0		2.7
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	31	1698	486	250	1563	0	344	5	228	10	10	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1743	
Queue Service Time (g_s), s	1.8	31.6	28.8	8.0	10.3	0.0	21.0	0.3	16.3	0.7	0.6	
Cycle Queue Clearance Time (g_c), s	1.8	31.6	28.8	8.0	10.3	0.0	21.0	0.3	16.3	0.7	0.6	
Green Ratio (*g*/*C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Volume-to-Capacity Ratio (*X*)	0.171	0.741	0.695	0.726	0.722	0.000	1.042	0.015	0.808	0.078	0.091	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Back of Queue (*Q*), veh/ln (50th percentile)	0.8	12.7	11.3	3.6	1.8	0.0	14.8	0.1	7.3	0.3	0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	46.9	26.7	24.7	47.8	3.8	0.0	46.5	38.0	44.6	48.7	49.0	
Incremental Delay (d_2), s/veh	0.2	2.2	5.6	6.5	2.1	0.0	60.8	0.0	14.8	0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.1	28.9	30.3	54.4	5.9	0.0	107.3	38.0	59.3	48.7	49.1	
Level of Service (LOS)	D	C	C	D	A		F	D	E	D	D	
Approach Delay, s/veh / LOS	29.5	C		12.6	B		87.7	F		48.9	D	
Intersection Delay, s/veh / LOS	30.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.7	A	1.5	A	1.4	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

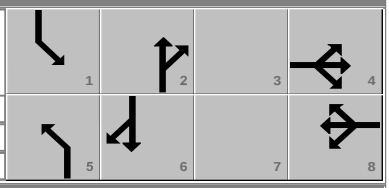
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{4_am} Rte 17 @ McLane I	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2020NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	10	10	40	5	10	20	2570	40	30	2080	30

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	60.5	38.5	0.0	0.0	0.0
Yellow	3.5	4.5	3.5	0.0	0.0	0.0
Red	3.0	3.0	3.0	0.0	0.0	0.0



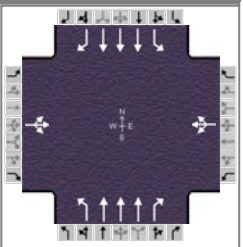
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	68.0	17.0	68.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		3.7		5.4	3.4		4.1	
Green Extension Time (g_e), s		0.2		0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		31			57		21	2677	39	31	2167	29
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1575			1440		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			1.7		1.4	63.0	0.1	2.1	51.7	1.3
Cycle Queue Clearance Time (g_c), s		1.7			3.4		1.4	63.0	0.1	2.1	51.7	1.3
Green Ratio (*g/C*)		0.32			0.32		0.09	0.48	0.48	0.10	0.48	0.48
Capacity (*c*), veh/h		503			474		161	2412	750	174	2412	750
Volume-to-Capacity Ratio (*X*)		0.062			0.121		0.130	1.110	0.051	0.180	0.898	0.039
Available Capacity (c_a), veh/h		503			474		161	2412	750	174	2412	750
Back of Queue (*Q*), veh/ln (50th percentile)		0.7			1.3		0.6	21.4	0.1	1.0	21.4	0.5
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		32.5			33.2		54.2	12.5	1.0	53.6	31.7	17.6
Incremental Delay (d_2), s/veh		0.0			0.0		0.1	56.2	0.1	0.2	5.9	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		32.5			33.3		54.3	68.7	1.2	53.8	37.5	17.7
Level of Service (LOS)		C			C		D	F	A	D	D	B
Approach Delay, s/veh / LOS	32.5	C		33.3	C		67.6	E		37.5	D	
Intersection Delay, s/veh / LOS	53.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.6	A	2.0	A	1.7	A

HCS 2010 Signalized Intersection Results Summary

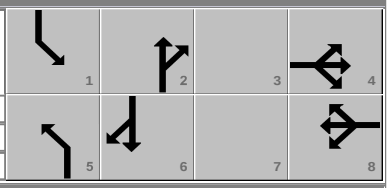
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{4_pm} Rte 17 @ McLane I	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2020NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	5	10	40	5	20	10	2180	20	10	2730	20

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	90.5	38.5	0.0	0.0	0.0
Yellow	3.5	4.5	3.5	0.0	0.0	0.0
Red	3.0	3.0	3.0	0.0	0.0	0.0



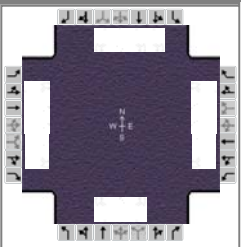
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	98.0	17.0	98.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		3.9		7.5	2.9		2.9	
Green Extension Time (g_e), s		0.2		0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		26			68		10	2271	18	10	2844	19
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1537			1461		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			3.7		0.9	9.5	0.0	0.9	89.3	0.8
Cycle Queue Clearance Time (g_c), s		1.9			5.5		0.9	9.5	0.0	0.9	89.3	0.8
Green Ratio (*g/C*)		0.26			0.26		0.08	0.58	0.58	0.08	0.58	0.58
Capacity (*c*), veh/h		401			388		130	2893	900	141	2893	900
Volume-to-Capacity Ratio (*X*)		0.065			0.175		0.080	0.785	0.020	0.074	0.983	0.021
Available Capacity (c_a), veh/h		401			388		130	2893	900	141	2893	900
Back of Queue (*Q*), veh/ln (50th percentile)		0.8			2.2		0.4	1.5	0.0	0.4	38.3	0.3
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		46.7			48.1		68.9	1.2	0.0	67.9	33.5	14.2
Incremental Delay (d_2), s/veh		0.0			0.1		0.1	2.2	0.0	0.1	13.2	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		46.7			48.1		69.0	3.5	0.0	68.0	46.7	14.2
Level of Service (LOS)		D			D		E	A	A	E	D	B
Approach Delay, s/veh / LOS	46.7	D		48.1	D		3.7	A		46.6	D	
Intersection Delay, s/veh / LOS	27.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.6	A	1.8	A	2.1	B

HCS 2010 Signalized Intersection Results Summary

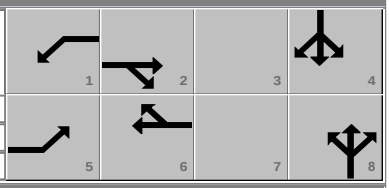
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{5_am} Rte 17 @ Sanford I	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2020NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2110	20	230	2570	240	60	10	170	160	70	20

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.5	39.5	9.5	11.0	10.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



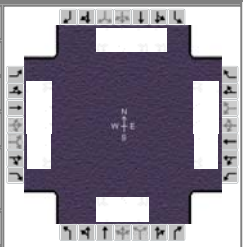
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	17.0	64.0	31.0	78.0		18.0		17.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.9
Queue Clearance Time (g_s), s	2.7		18.7			14.7		8.1
Green Extension Time (g_e), s	3.7	0.0	0.2	0.0		0.0		0.1
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.55		0.12			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	2198	19	240	2677	234	63	10	152	167	73	19
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1659	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.7	56.5	0.9	16.7	69.3	10.3	4.4	0.7	12.7	6.1	4.9	1.5
Cycle Queue Clearance Time (g_c), s	0.7	56.5	0.9	16.7	69.3	10.3	4.4	0.7	12.7	6.1	4.9	1.5
Green Ratio (*g*/*C*)	0.07	0.43	0.43	0.20	0.54	0.54	0.10	0.10	0.10	0.10	0.10	0.10
Capacity (*c*), veh/h	127	2163	673	341	2699	863	147	183	155	312	176	119
Volume-to-Capacity Ratio (*X*)	0.082	1.016	0.028	0.702	0.992	0.271	0.425	0.057	0.982	0.534	0.415	0.157
Available Capacity (c_a), veh/h	127	2163	673	341	2699	863	147	183	155	312	176	119
Back of Queue (*Q*), veh/ln (50th percentile)	0.4	27.1	0.3	8.3	30.2	3.8	2.3	0.3	7.9	2.9	2.6	0.7
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	56.2	36.8	21.0	48.7	29.5	15.0	56.5	53.9	58.4	56.3	55.5	56.1
Incremental Delay (d_2), s/veh	1.3	23.5	0.1	11.4	15.5	0.8	8.7	0.6	67.8	6.4	7.1	2.8
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	57.4	60.2	21.1	60.2	45.0	15.8	65.2	54.4	126.2	62.8	62.6	58.9
Level of Service (LOS)	E	F	C	E	D	B	E	D	F	E	E	E
Approach Delay, s/veh / LOS	59.9	E		44.0	D		105.9	F		62.4	E	
Intersection Delay, s/veh / LOS	53.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	2.6	B	3.4	C	3.4	C
Bicycle LOS Score / LOS	1.7	A	2.2	B	0.9	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

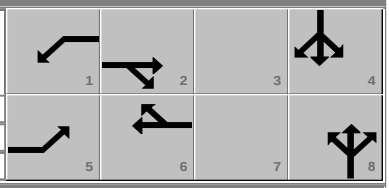
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{5_pm} Rte 17 @ Sanford I	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2020NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2620	50	260	2110	220	40	10	680	370	20	10

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	28.5	45.5	22.5	6.0	21.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



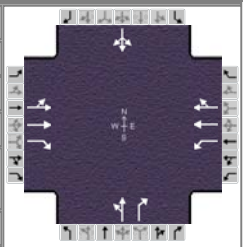
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	30.0	83.0	36.0	89.0		13.0		28.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.8
Queue Clearance Time (g_s), s	2.8		25.9			10.0		19.6
Green Extension Time (g_e), s	9.1	0.0	0.1	0.0		0.0		0.2
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.22		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	2729	48	271	2198	221	42	10	622	385	21	9
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1659	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.8	75.5	2.7	23.9	62.1	12.7	3.8	0.9	8.0	17.6	1.6	0.8
Cycle Queue Clearance Time (g_c), s	0.8	75.5	2.7	23.9	62.1	12.7	3.8	0.9	8.0	17.6	1.6	0.8
Green Ratio (*g*/*C*)	0.14	0.47	0.47	0.19	0.51	0.51	0.05	0.05	0.05	0.15	0.15	0.15
Capacity (*c*), veh/h	245	2348	731	332	2535	808	65	91	77	486	268	203
Volume-to-Capacity Ratio (*X*)	0.043	1.162	0.066	0.817	0.867	0.273	0.639	0.114	8.033	0.793	0.078	0.046
Available Capacity (c_a), veh/h	245	2348	731	332	2535	808	65	91	77	486	268	203
Back of Queue (*Q*), veh/ln (50th percentile)	0.4	47.5	1.1	12.4	25.8	4.9	2.4	0.5	71.8	8.5	0.8	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	59.4	42.3	23.0	62.1	34.5	21.3	75.9	73.6	76.0	66.2	59.1	60.7
Incremental Delay (d_2), s/veh	0.3	78.1	0.2	19.5	4.3	0.8	39.3	2.5	3191.3	12.5	0.6	0.4
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	59.8	120.4	23.2	81.6	38.8	22.2	115.2	76.1	3267.3	78.8	59.7	61.2
Level of Service (LOS)	E	F	C	F	D	C	F	E	F	E	E	E
Approach Delay, s/veh / LOS	118.5	F		41.8	D		3023.1	F		77.4	E	
Intersection Delay, s/veh / LOS	382.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	B	2.6	B	3.4	C	3.4	C
Bicycle LOS Score / LOS	2.0	B	2.0	A	1.6	A	1.2	A

HCS 2010 Signalized Intersection Results Summary

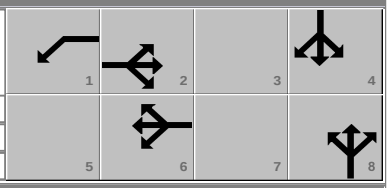
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{6_am} Rte 17 @ Short St	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2020NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	1180	60	20	1250	5	100	0	10	5	0	10

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	32.5	19.0	10.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



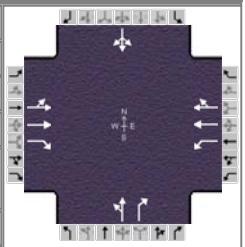
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		40.0	17.0	57.0		26.0		17.0
Change Period, (*Y*+*Rc*), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (*gs*), s			2.6			6.9		2.8
Green Extension Time (*ge*), s		0.0	0.0	0.0		0.1		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	644	596	57	21	654	653		104	9		16	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1809	1679	1579	1810	1863	1860		1810	1563		1672	
Queue Service Time (*gs*), s	11.9	35.0	2.4	0.6	26.0	26.0		4.9	0.5		0.8	
Cycle Queue Clearance Time (*gc*), s	32.5	35.0	2.4	0.6	26.0	26.0		4.9	0.5		0.8	
Green Ratio (*g/C*)	0.35	0.35	0.35	0.48	0.52	0.52		0.21	0.21		0.12	
Capacity (*c*), veh/h	625	588	553	280	969	921		380	328		201	
Volume-to-Capacity Ratio (*X*)	1.031	1.014	0.104	0.074	0.675	0.709		0.274	0.029		0.078	
Available Capacity (*ca*), veh/h	625	588	553	280	969	921		344	328		167	
Back of Queue (*Q*), veh/ln (50th percentile)	22.5	20.3	1.0	0.2	11.5	11.7		2.2	0.2		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (*d1*), s/veh	33.3	32.5	21.9	20.4	18.5	17.8		34.8	31.4		40.9	
Incremental Delay (*d2*), s/veh	44.2	40.6	0.4	0.0	3.8	4.6		0.1	0.0		0.1	
Initial Queue Delay (*d3*), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	77.5	73.1	22.3	20.5	22.3	22.4		35.0	31.4		40.9	
Level of Service (LOS)	F	F	C	C	C	C		C	C		D	
Approach Delay, s/veh / LOS	73.1	E		22.3	C		34.7	C		40.9	D	
Intersection Delay, s/veh / LOS	46.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.6	A	1.6	A	0.7	A	0.5	A

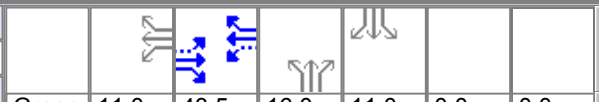
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{6_pm} Rte 17 @ Short St	Analysis Year	2020 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2020NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				

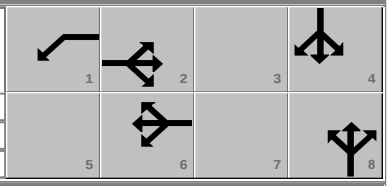


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2020	90	10	1100	5	80	5	30	5	5	10

Signal Information			
Cycle, s	110.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	11.0	43.5	16.0	11.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.0	18.0	69.0		23.0		18.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.3			6.8		3.2
Green Extension Time (g_e), s		0.0	0.0	0.0		0.1		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	1107	1007	85	10	576	575		89	28		21	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1845	1695	1548	1757	1863	1860		1815	1610		1723	
Queue Service Time (g_s), s	16.0	46.0	3.7	0.3	20.6	20.6		4.8	1.6		1.2	
Cycle Queue Clearance Time (g_c), s	43.5	46.0	3.7	0.3	20.6	20.6		4.8	1.6		1.2	
Green Ratio (*g*/*C*)	0.42	0.42	0.42	0.54	0.58	0.58		0.16	0.16		0.12	
Capacity (*c*), veh/h	763	709	647	265	1084	1040		297	263		204	
Volume-to-Capacity Ratio (*X*)	1.452	1.421	0.132	0.039	0.531	0.553		0.298	0.107		0.102	
Available Capacity (c_a), veh/h	763	709	647	265	1084	1040		264	263		172	
Back of Queue (*Q*), veh/ln (50th percentile)	64.5	57.1	1.4	0.1	8.8	8.8		2.2	0.7		0.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.8	32.0	19.7	21.7	14.5	13.9		42.2	39.2		44.9	
Incremental Delay (d_2), s/veh	210.7	197.6	0.4	0.0	1.9	2.1		0.2	0.1		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	243.5	229.6	20.1	21.7	16.4	16.1		42.4	39.2		44.9	
Level of Service (LOS)	F	F	C	C	B	B		D	D		D	
Approach Delay, s/veh / LOS	228.5	F		16.3	B		41.6	D		44.9	D	
Intersection Delay, s/veh / LOS	150.7						F					

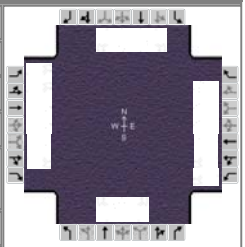
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.3	B	1.4	A	0.7	A	0.5	A

2040 No Build HCS Intersection Analysis Summary

				AM Peak Hour										PM Peak Hour									
				2013		2020 No Build		2040 No Build						2013		2020 No Build		2040 No Build					
				Intersection		Intersection		Movement		Approach		Intersection		Intersection		Intersection		Movement		Approach		Intersection	
	Intersection	Approach	Movement	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Route 3 / Mall Dr. / Central Park Blvd.	NB	Left	15.1	B	19.4	B	65.2	E	229.4	F	78.1	E	103.8	F	120.0	F	82.7	F	852.0	F	169.1	F
			Through					66.5	E									98.6	F				
			Right					269.4	F									1224.0	F				
		SB	Left					69.0	E	116.3	F							79.9	E	479.9	F		
			Through					68.9	E									72.3	E				
			Right					130.2	F									813.0	F				
		EB	Left					65.8	E	96.9	F							78.1	E	90.0	F		
			Through					101.7	F									95.0	F				
			Right					0.1	A									44.9	D				
		WB	Left					67.6	E	12.1	B							79.8	E	29.5	C		
			Through					7.1	A									15.8	B				
			Right					9.8	A									30.1	C				
2	Route 3 / Carl D. Silver Pkwy	NB	Left	29.7	C	32.8	C	71.5	E	70.9	E	72.9	B	97.8	F	127.8	F	77.5	E	76.7	E	224.9	F
			Through					71.5	E									77.5	E				
			Right					70.3	E									75.9	E				
		SB	Left					63.1	E	61.7	E							291.4	F	254.7	F		
			Through					51.9	D									51.4	D				
			Right					54.3	D									157.6	F				
		EB	Left					63.8	E	89.5	F							65.6	E	16.5	B		
			Through					91.1	F									9.2	A				
			Right					24.7	C									5.7	A				
		WB	Left					70.0	E	43.9	D							76.6	E	337.0	F		
			Through					33.6	C									239.4	F				
			Right					67.3	E									630.1	F				
3	Route 3 / Gateway Blvd.	NB	Left	20.6	C	21.8	C	86.7	F	74.9	E	26.9	C	27.5	C	30.2	C	186.7	F	150.0	F	43.8	D
			Through					38.2	D									38.0	D				
			Right					42.0	D									97.6	F				
		SB	Left					48.7	D	50.3	D							48.7	D	48.9	D		
			Through					50.7	D									49.1	D				
			Right					50.7	D									49.1	D				
		EB	Left					47.4	D	29.8	C							47.4	D	36.9	D		
			Through					30.1	C									36.0	D				
			Right					26.7	C									39.3	D				
		WB	Left					46.6	D	12.1	B							69.7	E	18.1	B		
			Through					9.4	A									9.1	A				
			Right					3.1	A									0.0	A				
4	Route 17 / McLane Dr.	NB	Left	25.8	C	53.7	D	54.8	D	271.8	F	218.0	F	19.1	B	27.9	C	69.5	E	61.3	E	144.1	F
			Through					277.8	F									61.8	F				
			Right					1.2	A									0.1	A				
		SB	Left					54.2	D	158.9	F							68.5	E	213.8	F		
			Through					162.2	F									216.0	F				
			Right					17.9	B									14.4	B				
		EB	Left					33.1	C	33.1	C							47.1	D	47.1	D		
			Through					33.1	C									47.1	D				
			Right					33.1	C									47.1	D				
		WB	Left					33.7	C	33.7	C							49.3	D	49.3	D		
			Through					33.7	C									49.3	D				
			Right					33.7	C									49.3	D				
5	Route 17 /Sanford Dr.	NB	Left	36.4	D	53.2	D	76.8	E	204.1	F	241.8	F	291.7	F	382.6	F	82.6	F	2690.1	F	486.7	F
			Through					54.4	D									69.7	E				
			Right					267.0	F									2870.7	F				
		SB	Left					74.1	E	72.1	E							121.2	F	116.8	F		
			Through					70.4	E									59.4	E				
			Right					61.3	E									60.3	E				
		EB	Left					44.6	D	96.1	F							64.4	E	318.8	F		
			Through					97.2	F									324.8	F				
			Right					14.0	B									23.6	C				
		WB	Left					574.8	F	361.5	F							288.6	F	152.1	F		
			Through					373.2	F									147.6	F				
			Right					27.6	C									24.7	C				
6	Route 17 /Short St.	NB	Left	34.9	C	46.8	D	35.7	D	35.2	D	128.4	F	105.6	F	150.7	F	43.3	D	42.4	D	276.0	F
			Through					35.7	D									43.3	D				
			Right					31.6	C									39.5	D				
		SB	Left					41.3	D	41.3	D							44.9	D	44.9	D		
			Through					41.3	D									44.9	D				
			Right					41.3	D									44.9	D				
		EB	Left					246.2	F	231.6	F							451.7	F	425.2	F		
			Through					234.3	F									431.6	F				
			Right					22.5	C									20.7	C				
		WB	Left					20.5	C	36.7	D							21.8	C	20.7	C		
			Through					34.6	C									20.7	C				
			Right					39.1	D									20.7	C				

HCS 2010 Signalized Intersection Results Summary

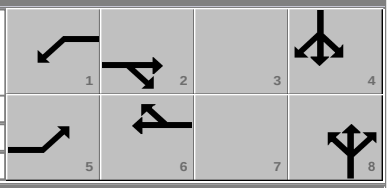
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{1_am} Rte 3 @ Central Pa	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2040NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	360	3600	70	130	1630	40	10	40	220	10	20	110

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.5	59.5	12.5	14.0	10.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



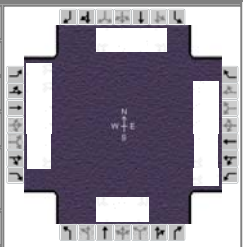
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	35.0	102.0	20.0	87.0		21.0		17.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	18.3		8.1			18.0		12.9
Green Extension Time (g_e), s	0.5	0.0	2.1	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.71			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	375	3750	68	135	1310	429	10	42	213	10	21	106
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1691	1594	1658	1810	1778	1810	1845	1563	1757	1696	1548
Queue Service Time (g_s), s	16.3	0.0	0.0	6.1	9.4	11.4	0.8	3.3	16.0	0.9	0.9	10.9
Cycle Queue Clearance Time (g_c), s	16.3	0.0	0.0	6.1	9.4	11.4	0.8	3.3	16.0	0.9	0.9	10.9
Green Ratio (*g/C*)	0.18	0.61	0.61	0.09	0.51	0.51	0.10	0.10	0.10	0.08	0.08	0.08
Capacity (*c*), veh/h	631	3076	967	290	2782	884	181	184	156	132	254	116
Volume-to-Capacity Ratio (*X*)	0.595	1.219	0.070	0.467	0.471	0.486	0.058	0.226	1.359	0.079	0.082	0.915
Available Capacity (c_a), veh/h	631	3076	967	290	2782	884	181	184	156	132	254	116
Back of Queue (*Q*), veh/ln (50th percentile)	7.6	29.0	0.0	2.6	2.8	3.7	0.4	1.6	15.0	0.4	0.4	6.2
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	64.8	0.0	0.0	67.2	6.6	8.1	65.2	66.3	72.0	68.9	68.9	73.5
Incremental Delay (d_2), s/veh	1.1	101.7	0.1	0.4	0.5	1.8	0.0	0.2	197.4	0.1	0.1	56.7
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	65.8	101.7	0.1	67.6	7.1	9.8	65.2	66.5	269.4	69.0	68.9	130.2
Level of Service (LOS)	E	F	A	E	A	A	E	E	F	E	E	F
Approach Delay, s/veh / LOS	96.9	F		12.1	B		229.4	F		116.3	F	
Intersection Delay, s/veh / LOS	78.1						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.8	C	1.3	A	0.9	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

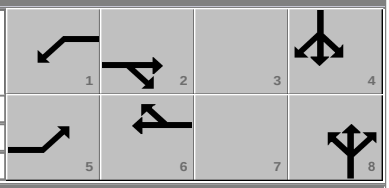
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{1_pm} Rte 3 @ Central Pa	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2040NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	440	2250	140	680	3280	90	110	140	550	140	250	510

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.5	42.5	33.5	14.0	18.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



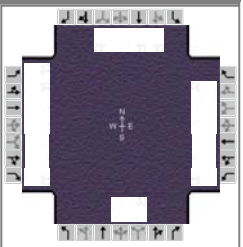
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	33.0	83.0	41.0	91.0		21.0		25.0
Change Period, (*Y*+*Rc*), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	23.4		36.0			18.0		22.0
Green Extension Time (g_e), s	0.2	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	458	2344	135	708	2637	873	115	146	532	146	260	494
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1675	1594	1757	1863	1827	1810	1900	1610	1792	1900	1610
Queue Service Time (g_s), s	21.4	78.0	12.6	34.0	59.0	66.1	10.4	12.8	16.0	13.3	11.0	20.0
Cycle Queue Clearance Time (g_c), s	21.4	78.0	12.6	34.0	59.0	66.1	10.4	12.8	16.0	13.3	11.0	20.0
Green Ratio (*g*/*C*)	0.16	0.46	0.46	0.21	0.51	0.51	0.09	0.09	0.09	0.12	0.12	0.12
Capacity (*c*), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Volume-to-Capacity Ratio (*X*)	0.821	1.017	0.185	0.979	0.933	0.973	0.673	0.816	3.512	0.692	0.583	2.606
Available Capacity (c_a), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Back of Queue (*Q*), veh/ln (50th percentile)	10.4	40.3	5.6	16.6	11.7	20.6	5.3	7.4	55.0	6.6	5.5	47.2
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	69.2	72.0	44.3	61.3	12.0	14.6	74.5	75.6	77.0	72.0	71.0	75.0
Incremental Delay (d_2), s/veh	8.9	23.0	0.6	18.5	3.8	15.5	8.2	23.0	1147.0	7.9	1.3	738.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	78.1	95.0	44.9	79.8	15.8	30.1	82.7	98.6	1224.0	79.9	72.3	813.0
Level of Service (LOS)	E	F	D	E	B	C	F	F	F	E	E	F
Approach Delay, s/veh / LOS	90.0	F		29.5	C		852.0	F		479.9	F	
Intersection Delay, s/veh / LOS	169.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.1	B	2.2	B	1.8	A	1.2	A

HCS 2010 Signalized Intersection Results Summary

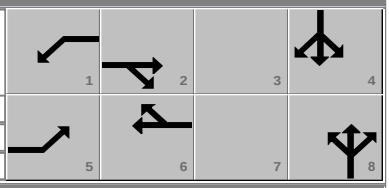
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{2_am} Rte 3 @ Carl D Silv	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2040NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	200	3980	20	30	1510	630	20	10	30	480	10	80

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.5	50.5	9.5	10.0	29.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



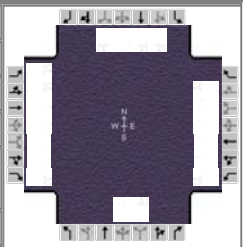
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	32.0	90.0	17.0	75.0		17.0		36.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	10.8		4.7			5.0		23.1
Green Extension Time (g_e), s	0.3	0.0	2.7	0.0		0.0		0.7
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.73			0.05		0.12

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	208	4146	20	31	1573	656		31	29	500	10	77
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1708	1533	1774	1827	1579		1839	1464	1774	1900	1610
Queue Service Time (g_s), s	8.8	85.0	1.3	2.7	24.7	64.0		2.6	3.0	21.1	0.7	6.5
Cycle Queue Clearance Time (g_c), s	8.8	85.0	1.3	2.7	24.7	64.0		2.6	3.0	21.1	0.7	6.5
Green Ratio (*g/C*)	0.16	0.53	0.53	0.08	0.44	0.44		0.08	0.08	0.20	0.20	0.20
Capacity (*c*), veh/h	571	3630	815	133	3197	691		138	110	699	374	317
Volume-to-Capacity Ratio (*X*)	0.365	1.142	0.024	0.235	0.492	0.950		0.227	0.266	0.716	0.028	0.243
Available Capacity (c_a), veh/h	571	3630	815	133	3197	691		115	110	699	374	317
Back of Queue (*Q*), veh/ln (50th percentile)	4.1	45.4	0.5	1.2	11.2	29.4		1.2	1.2	9.8	0.3	2.7
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	63.7	23.3	24.7	69.7	33.0	43.3		71.2	69.8	60.1	51.9	54.2
Incremental Delay (d_2), s/veh	0.1	67.7	0.1	0.3	0.5	24.0		0.3	0.5	3.0	0.0	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.8	91.1	24.7	70.0	33.6	67.3		71.5	70.3	63.1	51.9	54.3
Level of Service (LOS)	E	F	C	E	C	E		E	E	E	D	D
Approach Delay, s/veh / LOS	89.5	F		43.9	D		70.9	E		61.7	E	
Intersection Delay, s/veh / LOS	72.9						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	2.3	B	1.4	A	0.6	A	1.5	A

HCS 2010 Signalized Intersection Results Summary

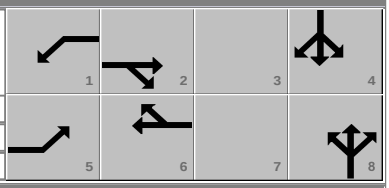
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{2_pm} Rte 3 @ Carl D Silv	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2040NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	380	2530	20	50	3770	1300	30	10	40	1170	20	430

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	34.5	43.5	9.5	10.0	36.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



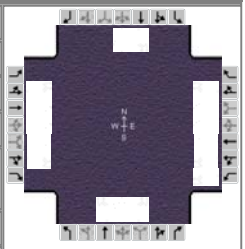
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	42.0	93.0	17.0	68.0		17.0		43.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.9
Queue Clearance Time (g_s), s	19.8		6.9			6.0		40.5
Green Extension Time (g_e), s	0.7	0.0	2.5	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			0.26		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	396	2635	20	52	3927	1354		42	39	1219	21	417
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1691	1610	1723	1881	1610		1761	1579	1810	1900	1610
Queue Service Time (g_s), s	17.8	25.9	0.3	4.9	63.0	63.0		3.9	4.0	38.5	1.5	38.5
Cycle Queue Clearance Time (g_c), s	17.8	25.9	0.3	4.9	63.0	63.0		3.9	4.0	38.5	1.5	38.5
Green Ratio (*g*/*C*)	0.21	0.52	0.52	0.07	0.37	0.37		0.07	0.07	0.23	0.23	0.23
Capacity (*c*), veh/h	744	3502	833	122	2789	597		124	111	820	430	365
Volume-to-Capacity Ratio (*X*)	0.532	0.753	0.024	0.428	1.408	2.269		0.335	0.346	1.487	0.048	1.143
Available Capacity (c_a), veh/h	744	3502	833	122	2789	597		104	111	820	430	365
Back of Queue (*Q*), veh/ln (50th percentile)	8.3	4.6	0.1	2.2	65.7	121.0		1.8	1.6	43.5	0.7	25.2
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	65.2	7.7	5.6	75.7	53.5	53.5		76.9	75.3	65.8	51.4	65.8
Incremental Delay (d_2), s/veh	0.4	1.5	0.1	0.9	185.9	576.6		0.6	0.7	225.7	0.0	91.8
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	65.6	9.2	5.7	76.6	239.4	630.1		77.5	75.9	291.4	51.4	157.6
Level of Service (LOS)	E	A	A	E	F	F		E	E	F	D	F
Approach Delay, s/veh / LOS	16.5	B		337.0	F		76.7	E		254.7	F	
Intersection Delay, s/veh / LOS	224.9						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.7	A	2.7	B	0.6	A	3.2	C

HCS 2010 Signalized Intersection Results Summary

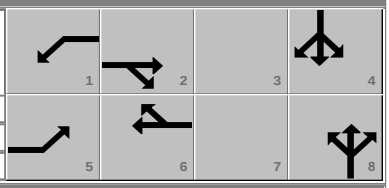
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2040NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	1710	430	140	1800	10	310	10	140	10	5	30

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



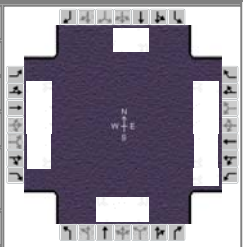
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, ($Y+R_c$), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.3
Queue Clearance Time (g_s), s	4.4		6.5			22.4		4.4
Green Extension Time (g_e), s	0.0	0.0	2.1	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.87			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	1781	414	146	1875	9	323	10	134	10	36	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1646	
Queue Service Time (g_s), s	2.4	34.0	22.9	4.5	19.8	0.1	20.4	0.5	8.9	0.7	2.4	
Cycle Queue Clearance Time (g_c), s	2.4	34.0	22.9	4.5	19.8	0.1	20.4	0.5	8.9	0.7	2.4	
Green Ratio (*g/C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	108	
Volume-to-Capacity Ratio (*X*)	0.228	0.777	0.591	0.424	0.866	0.013	0.978	0.030	0.476	0.078	0.337	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	108	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	13.7	8.8	1.9	2.7	0.0	13.0	0.2	3.4	0.3	1.0	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.2	27.5	23.1	46.3	4.5	3.0	46.3	38.1	41.6	48.7	50.1	
Incremental Delay (d_2), s/veh	0.2	2.7	3.6	0.3	5.0	0.0	43.4	0.0	0.5	0.1	0.7	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.4	30.1	26.7	46.6	9.4	3.1	89.7	38.2	42.0	48.7	50.7	
Level of Service (LOS)	D	C	C	D	A	A	F	D	D	D	D	
Approach Delay, s/veh / LOS	29.8	C		12.1	B		74.9	E		50.3	D	
Intersection Delay, s/veh / LOS	26.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.7	A	1.6	A	1.3	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

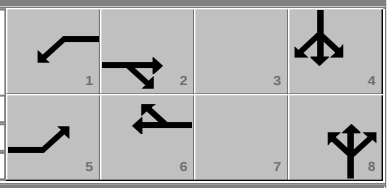
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2040NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	1970	600	290	1820	0	400	5	280	10	5	5

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



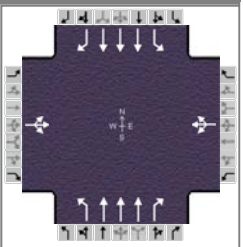
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, ($Y+R_c$), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.0
Queue Clearance Time (g_s), s	4.4		11.9			23.0		2.7
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	2052	591	302	1896	0	417	5	280	10	10	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1743	
Queue Service Time (g_s), s	2.4	42.8	38.8	9.9	20.8	0.0	21.0	0.3	20.8	0.7	0.6	
Cycle Queue Clearance Time (g_c), s	2.4	42.8	38.8	9.9	20.8	0.0	21.0	0.3	20.8	0.7	0.6	
Green Ratio (*g/C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Volume-to-Capacity Ratio (*X*)	0.228	0.895	0.844	0.878	0.876	0.000	1.263	0.015	0.992	0.078	0.091	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	17.8	16.1	5.1	2.8	0.0	22.1	0.1	11.9	0.3	0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.2	30.1	27.4	48.6	4.6	0.0	46.5	38.0	46.4	48.7	49.0	
Incremental Delay (d_2), s/veh	0.2	6.0	11.9	21.0	5.3	0.0	140.2	0.0	51.2	0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.4	36.0	39.3	69.7	9.9	0.0	186.7	38.0	97.6	48.7	49.1	
Level of Service (LOS)	D	D	D	E	A		F	D	F	D	D	
Approach Delay, s/veh / LOS	36.9	D		18.1	B		150.0	F		48.9	D	
Intersection Delay, s/veh / LOS	43.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	2.0	A	1.7	A	1.6	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

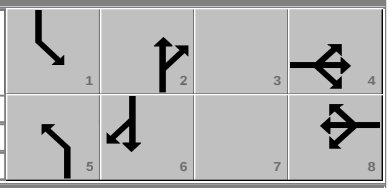
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{4_am} Rte 17 @ McLane I	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2040NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	30	10	10	50	5	20	30	3670	60	40	2960	40

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	60.5	38.5	0.0	0.0	0.0
Yellow	3.5	4.5	3.5	0.0	0.0	0.0
Red	3.0	3.0	3.0	0.0	0.0	0.0



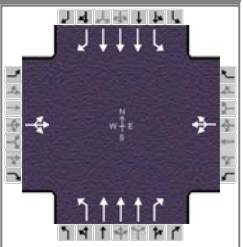
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	68.0	17.0	68.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		4.9		6.5	4.2		4.9	
Green Extension Time (g_e), s		0.2		0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		52			78		31	3823	59	42	3083	40
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1487			1458		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			1.6		2.2	63.0	0.2	2.9	63.0	1.8
Cycle Queue Clearance Time (g_c), s		2.9			4.5		2.2	63.0	0.2	2.9	63.0	1.8
Green Ratio (*g/C*)		0.32			0.32		0.09	0.48	0.48	0.10	0.48	0.48
Capacity (*c*), veh/h		485			478		161	2412	750	174	2412	750
Volume-to-Capacity Ratio (*X*)		0.107			0.163		0.195	1.585	0.079	0.239	1.278	0.053
Available Capacity (c_a), veh/h		485			478		161	2412	750	174	2412	750
Back of Queue (*Q*), veh/ln (50th percentile)		1.2			1.8		1.0	68.1	0.1	1.3	53.2	0.7
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		33.0			33.6		54.5	12.5	1.0	53.9	33.5	17.7
Incremental Delay (d_2), s/veh		0.0			0.1		0.2	265.3	0.2	0.3	128.7	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		33.1			33.7		54.8	277.8	1.2	54.2	162.2	17.9
Level of Service (LOS)		C			C		D	F	A	D	F	B
Approach Delay, s/veh / LOS	33.1	C		33.7	C		271.8	F		158.9	F	
Intersection Delay, s/veh / LOS	218.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.6	A	2.6	B	2.2	B

HCS 2010 Signalized Intersection Results Summary

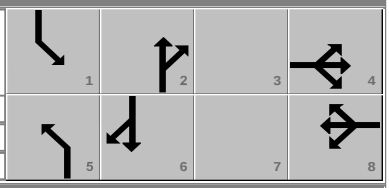
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{4_pm} Rte 17 @ McLane I	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2040NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	5	10	60	10	30	20	3110	30	20	3890	30

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	90.5	38.5	0.0	0.0	0.0
Yellow	3.5	4.5	3.5	0.0	0.0	0.0
Red	3.0	3.0	3.0	0.0	0.0	0.0



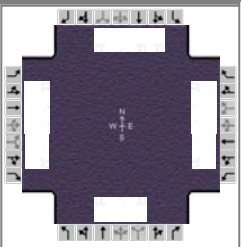
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	98.0	17.0	98.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		4.9		10.7	3.8		3.8	
Green Extension Time (g_e), s		0.3		0.3	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		36			104		21	3240	28	21	4052	29
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1442			1478		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			5.7		1.8	93.0	0.0	1.8	93.0	1.3
Cycle Queue Clearance Time (g_c), s		2.9			8.7		1.8	93.0	0.0	1.8	93.0	1.3
Green Ratio (*g/C*)		0.26			0.26		0.08	0.58	0.58	0.08	0.58	0.58
Capacity (*c*), veh/h		382			392		130	2893	900	141	2893	900
Volume-to-Capacity Ratio (*X*)		0.095			0.266		0.160	1.120	0.031	0.147	1.401	0.032
Available Capacity (c_a), veh/h		382			392		130	2893	900	141	2893	900
Back of Queue (*Q*), veh/ln (50th percentile)		1.2			3.4		0.8	17.1	0.0	0.8	85.1	0.5
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		47.0			49.2		69.3	2.5	0.0	68.3	33.5	14.3
Incremental Delay (d_2), s/veh		0.0			0.1		0.2	59.3	0.1	0.2	182.5	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		47.1			49.3		69.5	61.8	0.1	68.5	216.0	14.4
Level of Service (LOS)		D			D		E	F	A	E	F	B
Approach Delay, s/veh / LOS	47.1	D		49.3	D		61.3	E		213.8	F	
Intersection Delay, s/veh / LOS	144.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.7	A	2.3	B	2.7	B

HCS 2010 Signalized Intersection Results Summary

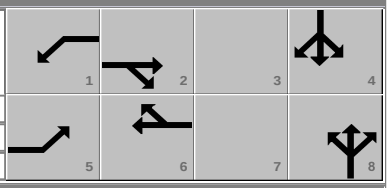
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{5_am} Rte 17 @ Sanford I	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2040NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	2950	30	310	3620	340	90	10	230	230	100	30

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.5	39.5	23.5	11.0	10.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



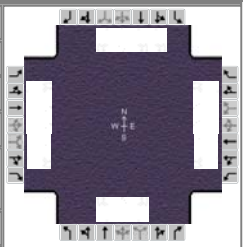
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	31.0	78.0	17.0	64.0		18.0		17.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.9
Queue Clearance Time (g_s), s	3.3		13.5			15.0		11.0
Green Extension Time (g_e), s	11.2	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.34		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	3073	29	323	3771	339	94	10	215	240	104	29
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1659	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	1.3	70.5	1.1	11.5	56.5	20.0	6.8	0.7	13.0	9.0	7.1	2.3
Cycle Queue Clearance Time (g_c), s	1.3	70.5	1.1	11.5	56.5	20.0	6.8	0.7	13.0	9.0	7.1	2.3
Green Ratio (*g*/*C*)	0.18	0.54	0.54	0.09	0.43	0.43	0.10	0.10	0.10	0.10	0.10	0.10
Capacity (*c*), veh/h	315	2699	840	154	2163	697	147	183	155	312	176	119
Volume-to-Capacity Ratio (*X*)	0.066	1.139	0.035	2.098	1.743	0.486	0.637	0.057	1.386	0.768	0.593	0.245
Available Capacity (c_a), veh/h	315	2699	840	154	2163	697	147	183	155	312	176	119
Back of Queue (*Q*), veh/ln (50th percentile)	0.6	43.6	0.4	27.1	89.7	7.8	3.8	0.3	14.1	4.6	4.0	1.1
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	44.2	29.8	13.9	59.3	36.8	25.2	57.6	53.9	58.5	57.6	56.5	56.4
Incremental Delay (d_2), s/veh	0.4	67.4	0.1	515.5	336.5	2.4	19.2	0.6	208.5	16.5	13.9	4.8
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	44.6	97.2	14.0	574.8	373.2	27.6	76.8	54.4	267.0	74.1	70.4	61.3
Level of Service (LOS)	D	F	B	F	F	C	E	D	F	E	E	E
Approach Delay, s/veh / LOS	96.1	F		361.5	F		204.1	F		72.1	E	
Intersection Delay, s/veh / LOS	241.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.6	B	3.4	C	3.4	C
Bicycle LOS Score / LOS	2.2	B	2.9	C	1.0	A	1.1	A

HCS 2010 Signalized Intersection Results Summary

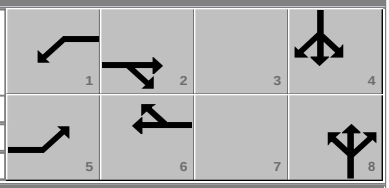
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{5_pm} Rte 17 @ Sanford I	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2040NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	3660	70	370	2960	300	50	10	950	510	30	10

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	22.5	50.5	17.5	11.0	22.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



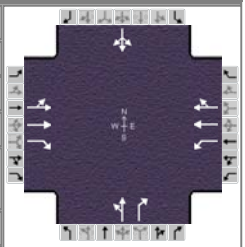
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	25.0	83.0	30.0	88.0		18.0		29.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.8
Queue Clearance Time (g_s), s	2.9		26.5			15.0		26.0
Green Extension Time (g_e), s	12.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.75		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	3813	69	385	3083	304	52	10	903	531	31	9
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1659	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.9	75.5	3.9	24.5	80.5	18.9	4.6	0.8	13.0	24.0	2.4	0.8
Cycle Queue Clearance Time (g_c), s	0.9	75.5	3.9	24.5	80.5	18.9	4.6	0.8	13.0	24.0	2.4	0.8
Green Ratio (*g/C*)	0.11	0.47	0.47	0.15	0.50	0.50	0.08	0.08	0.08	0.15	0.15	0.15
Capacity (*c*), veh/h	190	2348	731	266	2504	798	120	148	126	507	280	213
Volume-to-Capacity Ratio (*X*)	0.055	1.624	0.094	1.447	1.231	0.381	0.435	0.070	7.179	1.048	0.112	0.044
Available Capacity (c_a), veh/h	190	2348	731	266	2504	798	120	148	126	507	280	213
Back of Queue (*Q*), veh/ln (50th percentile)	0.4	91.9	1.5	27.3	57.2	7.4	2.4	0.4	102.9	14.1	1.2	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	63.8	42.3	23.4	67.8	39.8	23.4	71.5	68.8	73.5	68.0	58.6	59.9
Incremental Delay (d_2), s/veh	0.5	282.6	0.3	220.9	107.8	1.4	11.1	0.9	2797.2	53.2	0.8	0.4
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	64.4	324.8	23.6	288.6	147.6	24.7	82.6	69.7	2870.7	121.2	59.4	60.3
Level of Service (LOS)	E	F	C	F	F	C	F	E	F	F	E	E
Approach Delay, s/veh / LOS	318.8	F		152.1	F		2690.1	F		116.8	F	
Intersection Delay, s/veh / LOS	486.7						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	B	2.6	B	3.4	C	3.4	C
Bicycle LOS Score / LOS	2.6	B	2.6	B	2.1	B	1.4	A

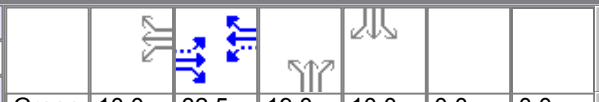
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{6_am} Rte 17 @ Short St	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2040NB_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				

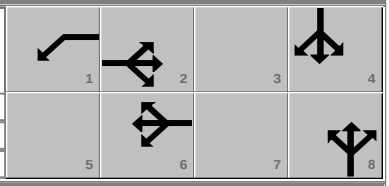


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	1570	70	20	1650	5	130	0	20	5	0	20

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	32.5	19.0	10.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



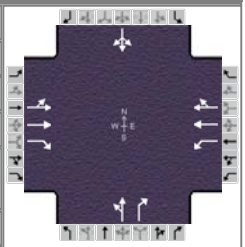
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		40.0	17.0	57.0		26.0		17.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.6			8.6		3.4
Green Extension Time (g_e), s		0.0	0.0	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	808	838	68	21	862	862		135	20		26	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1598	1679	1579	1810	1863	1861		1810	1563		1646	
Queue Service Time (g_s), s	8.1	35.0	2.9	0.6	41.4	41.4		6.6	1.0		1.4	
Cycle Queue Clearance Time (g_c), s	32.5	35.0	2.9	0.6	41.4	41.4		6.6	1.0		1.4	
Green Ratio (*g*/*C*)	0.35	0.35	0.35	0.48	0.52	0.52		0.21	0.21		0.12	
Capacity (*c*), veh/h	556	588	553	280	969	921		380	328		198	
Volume-to-Capacity Ratio (*X*)	1.453	1.427	0.123	0.074	0.890	0.936		0.356	0.060		0.132	
Available Capacity (c_a), veh/h	556	588	553	280	969	921		344	328		165	
Back of Queue (*Q*), veh/ln (50th percentile)	46.3	46.6	1.1	0.2	20.0	21.3		2.9	0.4		0.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.6	32.5	22.1	20.4	22.5	21.5		35.5	31.6		41.2	
Incremental Delay (d_2), s/veh	213.7	201.8	0.5	0.0	12.1	17.7		0.2	0.0		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	246.2	234.3	22.5	20.5	34.6	39.1		35.7	31.6		41.3	
Level of Service (LOS)	F	F	C	C	C	D		D	C		D	
Approach Delay, s/veh / LOS	231.6	F		36.7	D		35.2	D		41.3	D	
Intersection Delay, s/veh / LOS	128.4						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.9	A	1.9	A	0.7	A	0.5	A

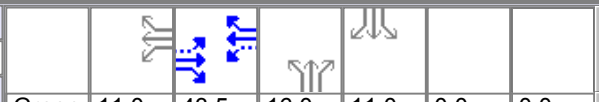
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{6_pm} Rte 17 @ Short St	Analysis Year	2040 No Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2040NB_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				

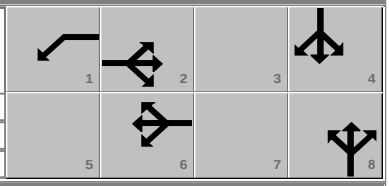


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2670	120	20	1450	5	110	5	40	5	5	10

Signal Information			
Cycle, s	110.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	11.0	43.5	16.0	11.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.0	18.0	69.0		23.0		18.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.6			8.6		3.2
Green Extension Time (g_e), s		0.0	0.0	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.01		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	1462	1330	117	21	758	757		120	39		21	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1842	1695	1548	1757	1863	1860		1813	1610		1723	
Queue Service Time (g_s), s	16.0	46.0	5.2	0.6	31.6	31.6		6.6	2.3		1.2	
Cycle Queue Clearance Time (g_c), s	43.5	46.0	5.2	0.6	31.6	31.6		6.6	2.3		1.2	
Green Ratio (*g*/*C*)	0.42	0.42	0.42	0.54	0.58	0.58		0.16	0.16		0.12	
Capacity (*c*), veh/h	761	709	647	265	1084	1040		297	263		204	
Volume-to-Capacity Ratio (*X*)	1.920	1.876	0.180	0.079	0.700	0.728		0.404	0.146		0.102	
Available Capacity (c_a), veh/h	761	709	647	265	1084	1040		264	263		172	
Back of Queue (*Q*), veh/ln (50th percentile)	108.5	96.8	2.0	0.2	13.8	13.9		3.0	0.9		0.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.8	32.0	20.1	21.8	16.9	16.2		43.0	39.4		44.9	
Incremental Delay (d_2), s/veh	418.9	399.6	0.6	0.0	3.8	4.5		0.3	0.1		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	451.7	431.6	20.7	21.8	20.7	20.7		43.3	39.5		44.9	
Level of Service (LOS)	F	F	C	C	C	C		D	D		D	
Approach Delay, s/veh / LOS	425.2	F		20.7	C		42.4	D		44.9	D	
Intersection Delay, s/veh / LOS	276.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.9	C	1.8	A	0.7	A	0.5	A

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4100*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1759*	pc/h/ln
S	*66.4*	mph
D = v_p / S	*26.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3890*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1561*	pc/h/ln
S	*68.5*	mph
D = v_p / S	*22.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2630*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1197*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4970*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2062*	pc/h/ln
S	*61.4*	mph
D = v_p / S	*33.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3230*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1424*	pc/h/ln
S	*69.4*	mph
D = v_p / S	*20.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7080*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2907*	pc/h/ln
S	*36.2*	mph
D = v_p / S	*80.3*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Between Rt 3 and Rt 17*
Jurisdiction	*Segment2&3*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6510*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2707*	pc/h/ln
S	*43.7*	mph
D = v_p / S	*62.0*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Route 3 to River*
Jurisdiction	*Segment 2 & 3*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4600*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1865*	pc/h/ln
S	*64.9*	mph
D = v_p / S	*28.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to US 17*
Jurisdiction	*Segment 3*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3230*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1424*	pc/h/ln
S	*69.4*	mph
D = v_p / S	*20.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to US 17*
Jurisdiction	*Segment 3*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7080*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2907*	pc/h/ln
S	*36.2*	mph
D = v_p / S	*80.3*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5790*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2538*	pc/h/ln
S	*49.2*	mph
D = v_p / S	*51.6*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3810*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1594*	pc/h/ln
S	*68.2*	mph
D = v_p / S	*23.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3000*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1323*	pc/h/ln
S	*69.8*	mph
D = v_p / S	*18.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6130*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2517*	pc/h/ln
S	*49.9*	mph
D = v_p / S	*50.5*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 NB 95 to EB 3
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 2120 veh/h
	Freeway Volume, V_F: 4100	
	Ramp Volume, V_R: 290	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4100	0.94	Rolling	14	0	0.826	1.00	5278
Ramp	290	0.84	Rolling	14	0	0.826	1.00	418
UpStream								
DownStream	2120	0.98	Rolling	14	0	0.826	1.00	2618

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.609 using Equation (Exhibit 13-7)

V_{12} = 3377 pc/h

V_3 or V_{av34} 1901 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5278	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4860	Exhibit 13-8	7200	No
V_R	418	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3377	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.271 (Exhibit 13-12)

S_R= 62.4 mph (Exhibit 13-12)

S_0= 73.3 mph (Exhibit 13-12)

S = 65.9 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 95 NB to Rt 3 EB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 990 veh/h
	Freeway Volume, V_F: 3890	
	Ramp Volume, V_R: 260	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3890	0.98	Rolling	12	0	0.847	1.00	4684
Ramp	260	1.00	Rolling	12	0	0.847	1.00	307
UpStream								
DownStream	990	0.98	Rolling	12	0	0.847	1.00	1192

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.629 using Equation (Exhibit 13-7)

V_{12} = 3059 pc/h

V_3 or V_{av34} 1625 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4684	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4377	Exhibit 13-8	7200	No
V_R	307	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3059	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.261 (Exhibit 13-12)

S_R= 62.7 mph (Exhibit 13-12)

S_0= 74.4 mph (Exhibit 13-12)

S = 66.3 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-2 95 NB to 17 CD
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 1000	V_D = veh/h
	Freeway Volume, V_F: 6510	
	Ramp Volume, V_R: 1890	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6510	0.97	Rolling	14	0	0.826	1.00	8121
Ramp	1890	0.86	Rolling	14	0	0.826	1.00	2659
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.435 using Equation (Exhibit 13-7)

V_{12} = 5033 pc/h

V_3 or V_{av34} 3088 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 5421 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8121	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	5462	Exhibit 13-8	7200	No
V_R	2659	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5033	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 41.9 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.472 (Exhibit 13-12)

S_R= 56.8 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 60.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-2 95 NB to 17 CD road
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 1000	V_D = veh/h
	Freeway Volume, V_F: 4600	
	Ramp Volume, V_R: 1550	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4600	0.97	Rolling	12	0	0.847	1.00	5596
Ramp	1550	0.95	Rolling	12	0	0.847	1.00	1925
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.532 using Equation (Exhibit 13-7)

V_{12} = 3876 pc/h

V_3 or V_{av34} 1720 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5596	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3671	Exhibit 13-8	7200	No
V_R	1925	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3876	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.406 (Exhibit 13-12)

S_R = 58.6 mph (Exhibit 13-12)

S_0 = 74.0 mph (Exhibit 13-12)

S = 62.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-1 Rt 3 WB to 95 NB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No ☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	310 veh/h	Freeway Volume, V_F	5620	V_D = veh/h
		Ramp Volume, V_R	890	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5620	0.97	Rolling	14	0	0.826	1.00	7011
Ramp	890	0.99	Rolling	14	0	0.826	1.00	1088
UpStream	310	0.88	Rolling	14	0	0.826	1.00	426
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2523.39 (Equation 13-6 or 13-7)

P_{FM} = 0.518 using Equation (Exhibit 13-6)

V_{12} = 3630 pc/h

V_3 or V_{av34} 3381 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 4311 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8099	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5399	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 38.9 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.054 (Exibit 13-11)

S_R = 40.5 mph (Exhibit 13-11)

S_0 = 61.1 mph (Exhibit 13-11)

S = 45.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-1 Rt 3 WB to 95 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 540 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4080	
	Ramp Volume, V_R: 520	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4080	0.97	Rolling	12	0	0.847	1.00	4963
Ramp	520	0.94	Rolling	12	0	0.847	1.00	653
UpStream	540	0.88	Rolling	12	0	0.847	1.00	724
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1992.02 (Equation 13-6 or 13-7)

P_{FM} = 0.551 using Equation (Exhibit 13-6)

V_{12} = 2736 pc/h

V_3 or V_{av34} 2227 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2836 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5616	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3489	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.319 (Exibit 13-11)

S_R = 61.1 mph (Exhibit 13-11)

S_0 = 64.1 mph (Exhibit 13-11)

S = 62.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-3 17 CD to 95 NB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4620	
	Ramp Volume, V_R: 1170	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4620	0.92	Rolling	14	0	0.826	1.00	6076
Ramp	1170	0.91	Rolling	14	0	0.826	1.00	1556
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 3679 pc/h

V_3 or V_{av34} = 2397 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3679 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7632	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5235	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 39.3 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 0.953 (Exibit 13-11)

S_R = 43.3 mph (Exhibit 13-11)

S_0 = 62.9 mph (Exhibit 13-11)

S = 48.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-3 NB CD to 95 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3050	
	Ramp Volume, V_R: 760	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3050	0.94	Rolling	12	0	0.847	1.00	3829
Ramp	760	0.93	Rolling	12	0	0.847	1.00	964
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 2318 pc/h

V_3 or V_{av34} = 1511 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2318 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4793	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3282	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 24.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.325 (Exibit 13-11)

S_R = 60.9 mph (Exhibit 13-11)

S_0 = 66.4 mph (Exhibit 13-11)

S = 62.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	11/12/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-1 NB 95 at Rt 3 weave
Weaving Segment Location	
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	900ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3500	0.94	14	0	2.5	2.0	0.826	1.00	4505
V_{RF}	2120	0.98	14	0	2.5	2.0	0.826	1.00	2618
V_{FR}	310	0.88	14	0	2.5	2.0	0.826	1.00	426
V_{RR}	0	0.93	14	0	2.5	2.0	0.826	1.00	0
V_{NW}	4505							V =	6239
V_W	3044								
VR	0.403								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	6239 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	4919 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.268	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	6717 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	W-1 Rt 3 NB weave
Weaving Segment Location	
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	900ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3090	0.98	12	0	2.5	2.0	0.847	1.00	3721
V_{RF}	990	0.98	12	0	2.5	2.0	0.847	1.00	1192
V_{FR}	540	0.88	12	0	2.5	2.0	0.847	1.00	724
V_{RR}	0	0.96	12	0	2.5	2.0	0.847	1.00	0
V_{NW}	3721							V =	4778
V_W	1916								
VR	0.340								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1916 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	2069 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	484 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2553 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4778 veh/h	Weaving intensity factor, W	0.514
Weaving segment capacity, c_w	5984 veh/h	Weaving segment speed, S	50.1 mph
Weaving segment v/c ratio	0.798	Average weaving speed, S_W	51.3 mph
Weaving segment density, D	28.1 pc/mi/ln	Average non-weaving speed, S_{NW}	49.4 mph
Level of Service, LOS	D	Maximum weaving length, L_{MAX}	6016 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CRD
Agency/Company	Michael Baker Jr., Inc.
Date Performed	11/12/2013
Analysis Time Period	AM Peak Hour

Site Information

Freeway/Dir of Travel	I-95 NB CD Road
Weaving Segment Location	US 17 EB On/US 17 WB Off
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	C-D Roadway/ Multilane Highways
Weaving number of lanes, N	2		
Weaving segment length, L_S	400ft	Freeway minimum speed, S_{MIN}	15
Freeway free-flow speed, FFS	50 mph	Freeway maximum capacity, C_{IFL}	2250
		Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	0	0.94	14	0	2.5	2.0	0.826	1.00	0
V_{RF}	720	0.91	14	0	2.5	2.0	0.826	1.00	957
V_{FR}	1760	0.86	14	0	2.5	2.0	0.826	1.00	2476
V_{RR}	0	0.94	14	0	2.5	2.0	0.826	1.00	0
V_{NW}	0							V =	2838
V_W	3433								
VR	1.000								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2838 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	1970 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.440	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	14232 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CRD
Agency/Company	Michael Baker Jr., Inc.
Date Performed	11/1/2013
Analysis Time Period	PM Peak Hour

Site Information

Freeway/Dir of Travel	I-95 NB CD Road
Weaving Segment Location	US 17 EB On/US 17 WB Off
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	C-D Roadway/ Multilane Highways
Weaving number of lanes, N	2		
Weaving segment length, L_S	400ft	Freeway minimum speed, S_{MIN}	15
Freeway free-flow speed, FFS	50 mph	Freeway maximum capacity, C_{IFL}	2250
		Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	0	0.94	12	0	2.5	2.0	0.847	1.00	0
V_{RF}	400	0.93	12	0	2.5	2.0	0.847	1.00	508
V_{FR}	1350	0.95	12	0	2.5	2.0	0.847	1.00	1677
V_{RR}	0	0.94	12	0	2.5	2.0	0.847	1.00	0
V_{NW}	0							V =	1852
V_W	2185								
VR	1.000								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	2185 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	2201 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	0 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2201 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	1852 veh/h	Weaving intensity factor, W	0.868
Weaving segment capacity, c_w	2020 veh/h	Weaving segment speed, S	33.7 mph
Weaving segment v/c ratio	0.917	Average weaving speed, S_W	33.7 mph
Weaving segment density, D	32.4 pc/mi/ln	Average non-weaving speed, S_{NW}	29.0 mph
Level of Service, LOS	D	Maximum weaving length, L_{MAX}	14232 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

Year 2020 No Build Condition CD Road Capacity Check

Ramps																				
Analysis Location			FFS	No. of Lanes	Time Period	Year 2020 Build Volume			PHF		Terrain	Truck %	E (T)	f (hv)	f (p)	Demand Flow Rate		HCM2010 Capacity	Capacity Check	
						Prior to Merge/ Diverge	Merge/ Diverge	After Merge/ Diverge	Prior to Merge/ Diverge	After Merge/ Diverge						Prior to Diverge	After Diverge		Prior to Merge/ Diverge	After Merge/ Diverge
D-3	I-95 NB CD Road	Off Ramp from CD Road to US 17 EB	50	1	AM	1890	130	1760	0.86	0.86	Rolling	14%	2.5	0.83	1.0	2648	2466	2000	OVER	OVER
					PM	1550	200	1350	0.95	0.95		12%	2.5	0.85	1.0	1920	1672	2000	under	under
M-2	I-95 NB CD Road	On Ramp to CD Road from US 17 WB	50	1	AM	720	450	1170	0.91	0.91	Rolling	14%	2.5	0.83	1.0	953	1549	2000	under	under
					PM	400	360	760	0.93	0.93		12%	2.5	0.85	1.0	506	961	2000	under	under

Note: HCM 2010 does not provide capacity for one-lane CD Road. One-lane CD Road Capacity assumed to be 1/2 of two-lane CD Road capacity.

Exhibit 13-9
Capacity of High-Speed Ramp Junctions on Multilane Highways and C-D Roadways (pc/h)

FFS (mi/h)	Capacity of Upstream/Downstream Highway or C-D Segment[a] No. of Lanes in One Direction 2	3	>3	Max. Desirable Flow Rate (v_{R12}) Entering Merge Influence Area[b]	Max. Desirable Flow Rate (v_{12}) Entering Diverge Influence Area[b]
≥60	4,400	6,600	2,200/ln	4,600	4,400
55	4,200	6,300	2,100/ln	4,600	4,400
50	4,000	6,000	2,000/ln	4,600	4,400
45	3,800	5,700	1,900/ln	4,600	4,400

Notes: [a] Demand in excess of these capacities results in LOS F.
[b] Demand in excess of these values alone does not result in LOS F; operations may be worse than predicted by this methodology.

Exhibit 13-10
Capacity of Ramp Roadways (pc/h)

Ramp FFS S_{FR} (mi/h)	Capacity of Ramp Roadway Single-Lane Ramps	Two-Lane Ramps
>50	2,200	4,400
>40–50	2,100	4,200
>30–40	2,000	4,000
≥20–30	1,900	3,800
<20	1,800	3,600

Note: Capacity of a ramp roadway does not ensure an equal capacity at its freeway or other high-speed junction. Junction capacity must be checked against criteria in Exhibit 13-8 and Exhibit 13-9.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-4 95 SB to 17 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	960	L_{down} =	1000 ft
V_u =	veh/h	Freeway Volume, V_F	3000	V_D =	120 veh/h
		Ramp Volume, V_R	490		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3000	0.96	Rolling	18	0	0.787	1.00	3969
Ramp	490	0.88	Rolling	18	0	0.787	1.00	707
UpStream								
DownStream	120	0.92	Rolling	18	0	0.787	1.00	166

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.628 using Equation (Exhibit 13-7)

V_{12} = 2756 pc/h

V_3 or V_{av34} 1213 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3969	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3262	Exhibit 13-8	7200	No
V_R	707	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2756	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 19.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.297 (Exhibit 13-12)

S_R= 61.7 mph (Exhibit 13-12)

S_0= 76.0 mph (Exhibit 13-12)

S = 65.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-4 SB 95 to NB 17
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	960	L_{down} =	1000 ft
V_u =	veh/h	Freeway Volume, V_F	6130	V_D =	150 veh/h
		Ramp Volume, V_R	550		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6130	0.97	Rolling	13	0	0.837	1.00	7552
Ramp	550	0.98	Rolling	13	0	0.837	1.00	671
UpStream								
DownStream	150	0.88	Rolling	13	0	0.837	1.00	204

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.540 using Equation (Exhibit 13-7)

V_{12} = 4389 pc/h

V_3 or V_{av34} 3163 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = 4852 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7552	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	6881	Exhibit 13-8	7200	No
V_R	671	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4389	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 37.3 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.293 (Exhibit 13-12)

S_R= 61.8 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 64.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-5 95 SB to Rest Area
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1100 ft
V_u = veh/h	Deceleration Lane Length L_D: 200	V_D = 110 veh/h
	Freeway Volume, V_F: 3230	
	Ramp Volume, V_R: 110	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3230	0.96	Rolling	18	0	0.787	1.00	4273
Ramp	110	0.96	Rolling	18	0	0.787	1.00	146
UpStream								
DownStream	110	0.96	Rolling	18	0	0.787	1.00	146

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.646 using Equation (Exhibit 13-7)

V_{12} = 2814 pc/h

V_3 or V_{av34} 1459 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4273	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4127	Exhibit 13-8	7200	No
V_R	146	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2814	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.441 (Exhibit 13-12)

S_R= 57.6 mph (Exhibit 13-12)

S_0= 75.0 mph (Exhibit 13-12)

S = 62.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-5 SB 95 to Rest Area
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	200	L_{down} =	1100 ft
V_u =	veh/h	Freeway Volume, V_F	7080	V_D =	190 veh/h
		Ramp Volume, V_R	190		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7080	0.97	Rolling	13	0	0.837	1.00	8722
Ramp	190	0.97	Rolling	13	0	0.837	1.00	234
UpStream								
DownStream	190	0.97	Rolling	13	0	0.837	1.00	234

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.531 using Equation (Exhibit 13-7)

V_{12} = 4743 pc/h

V_3 or V_{av34} 3979 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 6022 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8722	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	8488	Exhibit 13-8	7200	Yes
V_R	234	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4743	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 54.2 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.449 (Exhibit 13-12)

S_R= 57.4 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 60.8 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-6 95 SB to Rt 3 WB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	750
Freeway Volume, V_F	3230
Ramp Volume, V_R	670
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1000 ft
V_D = 150 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3230	0.96	Rolling	18	0	0.787	1.00	4273
Ramp	670	0.95	Rolling	18	0	0.787	1.00	896
UpStream								
DownStream	150	0.88	Rolling	18	0	0.787	1.00	216

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.612 using Equation (Exhibit 13-7)
V_{12} = 2963 pc/h
V_3 or V_{av34} 1310 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4273	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3377	Exhibit 13-8	7200	No
V_R	896	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2963	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.0 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.314 (Exhibit 13-12)
S_R= 61.2 mph (Exhibit 13-12)
S_0= 75.6 mph (Exhibit 13-12)
S = 65.0 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-6 SB 95 to WB 3
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 750	V_D = 290 veh/h
	Freeway Volume, V_F: 7080	
	Ramp Volume, V_R: 2490	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7080	0.97	Rolling	13	0	0.837	1.00	8722
Ramp	2490	0.95	Rolling	13	0	0.837	1.00	3132
UpStream								
DownStream	290	0.96	Rolling	13	0	0.837	1.00	361

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.398 using Equation (Exhibit 13-7)

V_{12} = 5356 pc/h

V_3 or V_{av34} 3366 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 6022 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8722	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	5590	Exhibit 13-8	7200	No
V_R	3132	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5356	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 49.3 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.515 (Exhibit 13-12)

S_R= 55.6 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 59.4 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-4 17 SB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☑ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☐ Off	Acceleration Lane Length, L_A	1500	☑ No	☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	380 veh/h	Freeway Volume, V_F	2250	V_D =	veh/h
		Ramp Volume, V_R	980		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2250	0.96	Rolling	18	0	0.787	1.00	2977
Ramp	980	0.90	Rolling	18	0	0.787	1.00	1383
UpStream	380	0.85	Rolling	18	0	0.787	1.00	568
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.619 using Equation (Exhibit 13-6)

V_{12} = 1844 pc/h

V_3 or V_{av34} 1133 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1844 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4360	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3227	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.269 (Exibit 13-11)

S_R = 62.5 mph (Exhibit 13-11)

S_0 = 67.7 mph (Exhibit 13-11)

S = 63.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael baker Jr, Inc	Junction	
Date Performed	10/17/2013	Jurisdiction	M-4 17 SB to 95 SB
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 520 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 5210	
	Ramp Volume, V_R: 1870	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5210	0.97	Rolling	13	0	0.837	1.00	6419
Ramp	1870	0.95	Rolling	13	0	0.837	1.00	2352
UpStream	520	0.98	Rolling	13	0	0.837	1.00	634
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.619 using Equation (Exhibit 13-6)

V_{12} = 3977 pc/h

V_3 or V_{av34} 2442 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3977 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8771	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6329	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 44.4 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 2.357 (Exibit 13-11)

S_R = 4.0 mph (Exhibit 13-11)

S_0 = 62.6 mph (Exhibit 13-11)

S = 5.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-5 Rest Area to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1100 ft	Acceleration Lane Length, L_A: 800	L_{down} = ft
V_u = 110 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3120	
	Ramp Volume, V_R: 110	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3120	0.96	Rolling	18	0	0.787	1.00	4128
Ramp	110	0.96	Rolling	18	0	0.787	1.00	146
UpStream	110	0.96	Rolling	18	0	0.787	1.00	146
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 698.04 (Equation 13-6 or 13-7)

P_{FM} = 0.600 using Equation (Exhibit 13-6)

V_{12} = 2476 pc/h

V_3 or V_{av34} 1652 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2476 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4274	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2622	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.319 (Exibit 13-11)

S_R = 61.1 mph (Exhibit 13-11)

S_0 = 65.9 mph (Exhibit 13-11)

S = 62.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael baker Jr, Inc	Junction	M-5
Date Performed	10/17/2013	Jurisdiction	Rest Area to 95 SB
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1100 ft	Acceleration Lane Length, L_A: 800	L_{down} = ft
V_u = 190 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 6890	
	Ramp Volume, V_R: 190	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6890	0.97	Rolling	13	0	0.837	1.00	8488
Ramp	190	0.97	Rolling	13	0	0.837	1.00	234
UpStream	190	0.97	Rolling	13	0	0.837	1.00	234
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1649.91 (Equation 13-6 or 13-7)

P_{FM} = 0.565 using Equation (Exhibit 13-6)

V_{12} = 4797 pc/h

V_3 or V_{av34} 3691 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 5788 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8722	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6022	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 47.3 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.873 (Exibit 13-11)

S_R = 17.5 mph (Exhibit 13-11)

S_0 = 61.1 mph (Exhibit 13-11)

S = 22.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 430 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2280	
	Ramp Volume, V_R: 350	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2280	0.93	Rolling	18	0	0.787	1.00	3114
Ramp	350	0.80	Rolling	18	0	0.787	1.00	556
UpStream	430	0.91	Rolling	18	0	0.787	1.00	600
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1575.58 (Equation 13-6 or 13-7)

P_{FM} = 0.578 using Equation (Exhibit 13-6)

V_{12} = 1799 pc/h

V_3 or V_{av34} 1315 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1799 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3670	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2355	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 15.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.232 (Exibit 13-11)

S_R = 63.5 mph (Exhibit 13-11)

S_0 = 67.1 mph (Exhibit 13-11)

S = 64.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No ☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	610 veh/h	Freeway Volume, V_F	4270	V_D = veh/h
		Ramp Volume, V_R	700	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4270	0.97	Rolling	13	0	0.837	1.00	5260
Ramp	700	0.93	Rolling	13	0	0.837	1.00	899
UpStream	610	0.95	Rolling	13	0	0.837	1.00	767
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2108.23 (Equation 13-6 or 13-7)

P_{FM} = 0.544 using Equation (Exhibit 13-6)

V_{12} = 2861 pc/h

V_3 or V_{av34} 2399 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3005 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6159	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3904	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 27.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.384 (Exibit 13-11)

S_R = 59.2 mph (Exhibit 13-11)

S_0 = 63.7 mph (Exhibit 13-11)

S = 60.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-3 SB 95 at US 17
Weaving Segment Location	
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	600ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2130	0.96	18	0	2.5	2.0	0.787	1.00	2818
V_{RF}	120	0.92	18	0	2.5	2.0	0.787	1.00	166
V_{FR}	380	0.85	18	0	2.5	2.0	0.787	1.00	568
V_{RR}	0	0.94	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	2818							V =	2797
V_W	734								
VR	0.207								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	734 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	842 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	135 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	977 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2797 veh/h	Weaving intensity factor, W	0.332
Weaving segment capacity, c_w	6595 veh/h	Weaving segment speed, S	59.5 mph
Weaving segment v/c ratio	0.424	Average weaving speed, S_W	56.3 mph
Weaving segment density, D	14.9 pc/mi/ln	Average non-weaving speed, S_{NW}	60.5 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	4604 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	W-3 SB 95 at 17 weave
Weaving Segment Location	
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	600ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	5060	0.97	13	0	2.5	2.0	0.837	1.00	6234
V_{RF}	150	0.88	13	0	2.5	2.0	0.837	1.00	204
V_{FR}	520	0.98	13	0	2.5	2.0	0.837	1.00	634
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	6234							V =	5918
V_W	838								
VR	0.118								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	838 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	946 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	839 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1785 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5918 veh/h	Weaving intensity factor, W	0.534
Weaving segment capacity, c_w	7233 veh/h	Weaving segment speed, S	54.9 mph
Weaving segment v/c ratio	0.818	Average weaving speed, S_W	50.8 mph
Weaving segment density, D	32.2 pc/mi/ln	Average non-weaving speed, S_{NW}	55.5 mph
Level of Service, LOS	D	Maximum weaving length, L_{MAX}	3720 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-4 SB weave at Rt 3
Weaving Segment Location	
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2130	0.96	18	0	2.5	2.0	0.787	1.00	2818
V_{RF}	150	0.88	18	0	2.5	2.0	0.787	1.00	216
V_{FR}	430	0.91	18	0	2.5	2.0	0.787	1.00	600
V_{RR}	0	0.90	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	2818							V =	2862
V_W	816								
VR	0.225								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	816 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	975 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	325 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1300 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2862 veh/h	Weaving intensity factor, W	0.289
Weaving segment capacity, c_w	6633 veh/h	Weaving segment speed, S	59.3 mph
Weaving segment v/c ratio	0.431	Average weaving speed, S_W	57.7 mph
Weaving segment density, D	15.3 pc/mi/ln	Average non-weaving speed, S_{NW}	59.8 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	4789 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM

Site Information

Freeway/Dir of Travel	W-4 SB 95 at RT 3 weave
Weaving Segment Location	
Analysis Year	2020 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3980	0.97	13	0	2.5	2.0	0.837	1.00	4903
V_{RF}	290	0.96	13	0	2.5	2.0	0.837	1.00	361
V_{FR}	610	0.95	13	0	2.5	2.0	0.837	1.00	767
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	4903							V =	5047
V_W	1128								
VR	0.187								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1128 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1287 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	755 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2042 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5047 veh/h	Weaving intensity factor, W	0.413
Weaving segment capacity, c_w	7150 veh/h	Weaving segment speed, S	54.5 mph
Weaving segment v/c ratio	0.706	Average weaving speed, S_W	53.9 mph
Weaving segment density, D	27.7 pc/mi/ln	Average non-weaving speed, S_{NW}	54.6 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4404 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3390*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1455*	pc/h/ln
S	*69.2*	mph
D = v_p / S	*21.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5540*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2224*	pc/h/ln
S	*57.8*	mph
D = v_p / S	*38.5*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3750*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1707*	pc/h/ln
S	*67.0*	mph
D = v_p / S	*25.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4610*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1913*	pc/h/ln
S	*64.1*	mph
D = v_p / S	*29.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4490*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1980*	pc/h/ln
S	*62.9*	mph
D = v_p / S	*31.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7260*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2981*	pc/h/ln
S	*33.2*	mph
D = v_p / S	*89.8*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Between Rt 3 and Rt 17*
Jurisdiction	*Segment2&3*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6410*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2665*	pc/h/ln
S	*45.1*	mph
D = v_p / S	*59.1*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Route 3 to River*
Jurisdiction	*Segment 2 & 3*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6430*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2607*	pc/h/ln
S	*47.0*	mph
D = v_p / S	*55.4*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to US 17*
Jurisdiction	*Segment 3*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4490*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1980*	pc/h/ln
S	*62.9*	mph
D = v_p / S	*31.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to US 17*
Jurisdiction	*Segment 3*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7260*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2981*	pc/h/ln
S	*33.2*	mph
D = v_p / S	*89.8*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5330*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2337*	pc/h/ln
S	*55.0*	mph
D = v_p / S	*42.5*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5280*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2209*	pc/h/ln
S	*58.2*	mph
D = v_p / S	*38.0*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4130*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1821*	pc/h/ln
S	*65.5*	mph
D = v_p / S	*27.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/17/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 No Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5850*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2402*	pc/h/ln
S	*53.2*	mph
D = v_p / S	*45.1*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 NB 95 to EB 3
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 2700 veh/h
	Freeway Volume, V_F: 3390	
	Ramp Volume, V_R: 340	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3390	0.94	Rolling	14	0	0.826	1.00	4364
Ramp	340	0.84	Rolling	14	0	0.826	1.00	490
UpStream								
DownStream	2700	0.98	Rolling	14	0	0.826	1.00	3334

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.628 using Equation (Exhibit 13-7)

V_{12} = 2924 pc/h

V_3 or V_{av34} 1440 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4364	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3874	Exhibit 13-8	7200	No
V_R	490	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2924	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.277 (Exhibit 13-12)

S_R= 62.2 mph (Exhibit 13-12)

S_0= 75.1 mph (Exhibit 13-12)

S = 66.0 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 95 NB to Rt 3 EB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 1260 veh/h
	Freeway Volume, V_F: 5540	
	Ramp Volume, V_R: 300	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5540	0.98	Rolling	12	0	0.847	1.00	6671
Ramp	300	1.00	Rolling	12	0	0.847	1.00	354
UpStream								
DownStream	1260	0.98	Rolling	12	0	0.847	1.00	1517

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.577 using Equation (Exhibit 13-7)

V_{12} = 3999 pc/h

V_3 or V_{av34} 2672 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6671	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	6317	Exhibit 13-8	7200	No
V_R	354	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3999	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 31.7 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.265 (Exhibit 13-12)

S_R= 62.6 mph (Exhibit 13-12)

S_0= 70.3 mph (Exhibit 13-12)

S = 65.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-2 95 NB to 17 CD
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 1000	V_D = veh/h
	Freeway Volume, V_F: 6410	
	Ramp Volume, V_R: 2680	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6410	0.97	Rolling	14	0	0.826	1.00	7996
Ramp	2680	0.86	Rolling	14	0	0.826	1.00	3771
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.387 using Equation (Exhibit 13-7)

V_{12} = 5405 pc/h

V_3 or V_{av34} 2591 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7996	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	4225	Exhibit 13-8	7200	No
V_R	3771	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5405	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 41.7 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.572 (Exhibit 13-12)

S_R = 54.0 mph (Exhibit 13-12)

S_0 = 70.6 mph (Exhibit 13-12)

S = 58.4 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-2 95 NB to 17 CD road
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 1000	V_D = veh/h
	Freeway Volume, V_F: 6430	
	Ramp Volume, V_R: 2180	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6430	0.97	Rolling	12	0	0.847	1.00	7822
Ramp	2180	0.95	Rolling	12	0	0.847	1.00	2708
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.440 using Equation (Exhibit 13-7)

V_{12} = 4958 pc/h

V_3 or V_{av34} 2864 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 5122 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7822	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	5114	Exhibit 13-8	7200	No
V_R	2708	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4958	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 39.3 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.477 (Exhibit 13-12)

S_R= 56.7 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 60.7 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-1 Rt 3 WB to 95 NB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 390 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 5360	
	Ramp Volume, V_R: 1050	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5360	0.97	Rolling	14	0	0.826	1.00	6686
Ramp	1050	0.99	Rolling	14	0	0.826	1.00	1283
UpStream	390	0.88	Rolling	14	0	0.826	1.00	536
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2495.57 (Equation 13-6 or 13-7)

P_{FM} = 0.520 using Equation (Exhibit 13-6)

V_{12} = 3474 pc/h

V_3 or V_{av34} 3212 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3986 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7969	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5269	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 37.8 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 0.948 (Exibit 13-11)

S_R = 43.4 mph (Exhibit 13-11)

S_0 = 61.1 mph (Exhibit 13-11)

S = 48.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-1 Rt 3 WB to 95 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No ☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	690 veh/h	Freeway Volume, V_F	5810	V_D = veh/h
		Ramp Volume, V_R	620	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5810	0.97	Rolling	12	0	0.847	1.00	7068
Ramp	620	0.94	Rolling	12	0	0.847	1.00	778
UpStream	690	0.88	Rolling	12	0	0.847	1.00	925
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2469.24 (Equation 13-6 or 13-7)

P_{FM} = 0.521 using Equation (Exhibit 13-6)

V_{12} = 3684 pc/h

V_3 or V_{av34} 3384 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 4368 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7846	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5146	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 37.1 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 0.861 (Exibit 13-11)

S_R = 45.9 mph (Exhibit 13-11)

S_0 = 61.1 mph (Exhibit 13-11)

S = 50.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-3 17 CD to 95 NB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3730	
	Ramp Volume, V_R: 1600	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3730	0.92	Rolling	14	0	0.826	1.00	4906
Ramp	1600	0.91	Rolling	14	0	0.826	1.00	2127
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 2971 pc/h

V_3 or V_{av34} = 1935 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2971 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7033	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5098	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 38.0 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.859 (Exibit 13-11)

S_R = 45.9 mph (Exhibit 13-11)

S_0 = 64.8 mph (Exhibit 13-11)

S = 49.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	M-3 NB CD to 95 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4250	
	Ramp Volume, V_R: 1030	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4250	0.94	Rolling	12	0	0.847	1.00	5335
Ramp	1030	0.93	Rolling	12	0	0.847	1.00	1307
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 3230 pc/h

V_3 or V_{av34} 2105 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 3230 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6642	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4537	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 34.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.585 (Exibit 13-11)

S_R = 53.6 mph (Exhibit 13-11)

S_0 = 64.2 mph (Exhibit 13-11)

S = 56.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	11/12/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-1 NB 95 at Rt 3 weave
Weaving Segment Location	
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	900ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2660	0.94	14	0	2.5	2.0	0.826	1.00	3424
V_{RF}	2700	0.98	14	0	2.5	2.0	0.826	1.00	3334
V_{FR}	390	0.88	14	0	2.5	2.0	0.826	1.00	536
V_{RR}	0	0.93	14	0	2.5	2.0	0.826	1.00	0
V_{NW}	3424							V =	6029
V_W	3870								
VR	0.531								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	6029 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	3738 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.613	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	8186 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	W-1 Rt 3 NB weave
Weaving Segment Location	
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	900ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	4550	0.98	12	0	2.5	2.0	0.847	1.00	5479
V_{RF}	1260	0.98	12	0	2.5	2.0	0.847	1.00	1517
V_{FR}	690	0.88	12	0	2.5	2.0	0.847	1.00	925
V_{RR}	0	0.96	12	0	2.5	2.0	0.847	1.00	0
V_{NW}	5479							V =	6713
V_W	2442								
VR	0.308								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	6713 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	6597 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.018	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	5673 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CRD
Agency/Company	Michael Baker Jr., Inc.
Date Performed	11/12/2013
Analysis Time Period	AM Peak Hour

Site Information

Freeway/Dir of Travel	I-95 NB CD Road
Weaving Segment Location	US 17 EB On/US 17 WB Off
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	C-D Roadway/ Multilane Highways
Weaving number of lanes, N	2		
Weaving segment length, L_S	400ft	Freeway minimum speed, S_{MIN}	15
Freeway free-flow speed, FFS	50 mph	Freeway maximum capacity, C_{IFL}	2250
		Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	0	0.94	14	0	2.5	2.0	0.826	1.00	0
V_{RF}	1020	0.91	14	0	2.5	2.0	0.826	1.00	1356
V_{FR}	2510	0.86	14	0	2.5	2.0	0.826	1.00	3532
V_{RR}	0	0.94	14	0	2.5	2.0	0.826	1.00	0
V_{NW}	0							V =	4040
V_W	4888								
VR	1.000								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4040 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	1970 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	2.051	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	14232 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CRD
Agency/Company	Michael Baker Jr., Inc.
Date Performed	11/1/2013
Analysis Time Period	PM Peak Hour

Site Information

Freeway/Dir of Travel	I-95 NB CD Road
Weaving Segment Location	US 17 EB On/US 17 WB Off
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	C-D Roadway/ Multilane Highways
Weaving number of lanes, N	2		
Weaving segment length, L_S	400ft	Freeway minimum speed, S_{MIN}	15
Freeway free-flow speed, FFS	50 mph	Freeway maximum capacity, C_{IFL}	2250
		Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	0	0.94	12	0	2.5	2.0	0.847	1.00	0
V_{RF}	570	0.93	12	0	2.5	2.0	0.847	1.00	723
V_{FR}	1930	0.95	12	0	2.5	2.0	0.847	1.00	2397
V_{RR}	0	0.94	12	0	2.5	2.0	0.847	1.00	0
V_{NW}	0							V =	2645
V_W	3120								
VR	1.000								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2645 veh/h	Weaving intensity factor, W	
Weaving segment capacity, c_w	2020 veh/h	Weaving segment speed, S	mph
Weaving segment v/c ratio	1.309	Average weaving speed, S_W	mph
Weaving segment density, D	pc/mi/ln	Average non-weaving speed, S_{NW}	mph
Level of Service, LOS	F	Maximum weaving length, L_{MAX}	14232 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

Year 2040 No Build Condition CD Road Capacity Check

Ramps																				
Analysis Location			FFS	No. of Lanes	Time Period	Year 2040 Build Volume			PHF		Terrain	Truck %	E (T)	f (hv)	f (p)	Demand Flow Rate		HCM2010 Capacity	Capacity Check	
						Prior to Merge/ Diverge	Merge/ Diverge	After Merge/ Diverge	Prior to Merge/ Diverge	After Merge/ Diverge						Prior to Diverge	After Diverge		Prior to Merge/ Diverge	After Merge/ Diverge
D-3	I-95 NB CD Road	Off Ramp from CD Road to US 17 EB	50	1	AM	2680	170	2510	0.86	0.86	Rolling	14%	2.5	0.83	1.0	3755	3516	2000	OVER	OVER
					PM	2180	250	1930	0.95	0.95		12%	2.5	0.85	1.0	2700	2390	2000	OVER	OVER
M-2	I-95 NB CD Road	On Ramp to CD Road from US 17 WB	50	1	AM	1020	580	1600	0.91	0.91	Rolling	14%	2.5	0.83	1.0	1350	2118	2000	under	OVER
					PM	570	460	1030	0.93	0.93		12%	2.5	0.85	1.0	721	1303	2000	under	under

Note: HCM 2010 does not provide capacity for one-lane CD Road. One-lane CD Road Capacity assumed to be 1/2 of two-lane CD Road capacity.

Exhibit 13-9
Capacity of High-Speed Ramp Junctions on Multilane Highways and C-D Roadways (pc/h)

FFS (mi/h)	Capacity of Upstream/Downstream Highway or C-D Segment[a] No. of Lanes in One Direction 2	3	>3	Max. Desirable Flow Rate (v_{R12}) Entering Merge Influence Area[b]	Max. Desirable Flow Rate (v_{12}) Entering Diverge Influence Area[b]
≥60	4,400	6,600	2,200/ln	4,600	4,400
55	4,200	6,300	2,100/ln	4,600	4,400
50	4,000	6,000	2,000/ln	4,600	4,400
45	3,800	5,700	1,900/ln	4,600	4,400

Notes: [a] Demand in excess of these capacities results in LOS F.
[b] Demand in excess of these values alone does not result in LOS F; operations may be worse than predicted by this methodology.

Exhibit 13-10
Capacity of Ramp Roadways (pc/h)

Ramp FFS S_{FR} (mi/h)	Capacity of Ramp Roadway Single-Lane Ramps	Two-Lane Ramps
>50	2,200	4,400
>40–50	2,100	4,200
>30–40	2,000	4,000
≥20–30	1,900	3,800
<20	1,800	3,600

Note: Capacity of a ramp roadway does not ensure an equal capacity at its freeway or other high-speed junction. Junction capacity must be checked against criteria in Exhibit 13-8 and Exhibit 13-9.

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-4 95 SB to 17 NB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	960	L_{down} =	1000 ft
V_u =	veh/h	Freeway Volume, V_F	4130	V_D =	150 veh/h
		Ramp Volume, V_R	700		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4130	0.96	Rolling	18	0	0.787	1.00	5464
Ramp	700	0.88	Rolling	18	0	0.787	1.00	1010
UpStream								
DownStream	150	0.92	Rolling	18	0	0.787	1.00	207

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.577 using Equation (Exhibit 13-7)

V_{12} = 3580 pc/h

V_3 or V_{av34} 1884 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5464	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4454	Exhibit 13-8	7200	No
V_R	1010	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3580	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.324 (Exhibit 13-12)

S_R= 60.9 mph (Exhibit 13-12)

S_0= 73.3 mph (Exhibit 13-12)

S = 64.7 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-4 SB 95 to NB 17
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	960	L_{down} =	1000 ft
V_u =	veh/h	Freeway Volume, V_F	5850	V_D =	200 veh/h
		Ramp Volume, V_R	790		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5850	0.97	Rolling	13	0	0.837	1.00	7207
Ramp	790	0.98	Rolling	13	0	0.837	1.00	963
UpStream								
DownStream	200	0.88	Rolling	13	0	0.837	1.00	272

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.536 using Equation (Exhibit 13-7)

V_{12} = 4307 pc/h

V_3 or V_{av34} 2900 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = 4507 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7207	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	6244	Exhibit 13-8	7200	No
V_R	963	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4307	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 34.4 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.320 (Exhibit 13-12)

S_R= 61.0 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 64.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-5 95 SB to Rest Area
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1100 ft
V_u = veh/h	Deceleration Lane Length L_D: 200	V_D = 150 veh/h
	Freeway Volume, V_F: 4490	
	Ramp Volume, V_R: 150	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4490	0.96	Rolling	18	0	0.787	1.00	5940
Ramp	150	0.96	Rolling	18	0	0.787	1.00	198
UpStream								
DownStream	150	0.96	Rolling	18	0	0.787	1.00	198

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.602 using Equation (Exhibit 13-7)

V_{12} = 3657 pc/h

V_3 or V_{av34} 2283 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5940	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	5742	Exhibit 13-8	7200	No
V_R	198	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3657	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 33.9 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.446 (Exhibit 13-12)

S_R= 57.5 mph (Exhibit 13-12)

S_0= 71.8 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-5 SB 95 to Rest Area
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	200	L_{down} =	1100 ft
V_u =	veh/h	Freeway Volume, V_F	7260	V_D =	270 veh/h
		Ramp Volume, V_R	270		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7260	0.97	Rolling	13	0	0.837	1.00	8944
Ramp	270	0.97	Rolling	13	0	0.837	1.00	333
UpStream								
DownStream	270	0.97	Rolling	13	0	0.837	1.00	333

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.521 using Equation (Exhibit 13-7)

V_{12} = 4820 pc/h

V_3 or V_{av34} 4124 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 6244 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8944	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	8611	Exhibit 13-8	7200	Yes
V_R	333	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4820	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 56.2 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.458 (Exhibit 13-12)

S_R= 57.2 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 60.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-6 95 SB to Rt 3 WB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 750	V_D = 180 veh/h
	Freeway Volume, V_F: 4490	
	Ramp Volume, V_R: 860	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4490	0.96	Rolling	18	0	0.787	1.00	5940
Ramp	860	0.95	Rolling	18	0	0.787	1.00	1150
UpStream								
DownStream	180	0.88	Rolling	18	0	0.787	1.00	260

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.559 using Equation (Exhibit 13-7)

V_{12} = 3826 pc/h

V_3 or V_{av34} 2114 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5940	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4790	Exhibit 13-8	7200	No
V_R	1150	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3826	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 30.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.337 (Exhibit 13-12)

S_R= 60.6 mph (Exhibit 13-12)

S_0= 72.4 mph (Exhibit 13-12)

S = 64.3 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	D-6 SB 95 to WB 3
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 750	V_D = 340 veh/h
	Freeway Volume, V_F: 7260	
	Ramp Volume, V_R: 3160	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7260	0.97	Rolling	13	0	0.837	1.00	8944
Ramp	3160	0.95	Rolling	13	0	0.837	1.00	3975
UpStream								
DownStream	340	0.96	Rolling	13	0	0.837	1.00	423

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.354 using Equation (Exhibit 13-7)

V_{12} = 5732 pc/h

V_3 or V_{av34} 3212 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 6244 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8944	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	4969	Exhibit 13-8	7200	No
V_R	3975	Exhibit 13-10	2100	Yes

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5732	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 51.2 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.591 (Exhibit 13-12)

S_R= 53.5 mph (Exhibit 13-12)

S_0= 70.2 mph (Exhibit 13-12)

S = 57.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-4 17 SB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 480 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3100	
	Ramp Volume, V_R: 1390	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3100	0.96	Rolling	18	0	0.787	1.00	4101
Ramp	1390	0.90	Rolling	18	0	0.787	1.00	1961
UpStream	480	0.85	Rolling	18	0	0.787	1.00	717
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.619 using Equation (Exhibit 13-6)

V_{12} = 2541 pc/h

V_3 or V_{av34} = 1560 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2541 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6062	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4502	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 30.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.523 (Exibit 13-11)

S_R = 55.4 mph (Exhibit 13-11)

S_0 = 66.2 mph (Exhibit 13-11)

S = 57.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael baker Jr, Inc	Junction	M-4 17 SB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 660 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4600	
	Ramp Volume, V_R: 2660	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4600	0.97	Rolling	13	0	0.837	1.00	5667
Ramp	2660	0.95	Rolling	13	0	0.837	1.00	3346
UpStream	660	0.98	Rolling	13	0	0.837	1.00	805
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.619 using Equation (Exhibit 13-6)

V_{12} = 3511 pc/h

V_3 or V_{av34} 2156 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3511 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9013	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6857	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 48.0 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 3.878 (Exibit 13-11)

S_R = -38.6 mph (Exhibit 13-11)

S_0 = 64.0 mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-5 Rest Area to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1100 ft	Acceleration Lane Length, L_A: 800	L_{down} = ft
V_u = 150 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4340	
	Ramp Volume, V_R: 150	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4340	0.96	Rolling	18	0	0.787	1.00	5741
Ramp	150	0.96	Rolling	18	0	0.787	1.00	198
UpStream	150	0.96	Rolling	18	0	0.787	1.00	198
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1054.35 (Equation 13-6 or 13-7)

P_{FM} = 0.600 using Equation (Exhibit 13-6)

V_{12} = 3444 pc/h

V_3 or V_{av34} 2297 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3444 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5939	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3642	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 28.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.414 (Exibit 13-11)

S_R = 58.4 mph (Exhibit 13-11)

S_0 = 63.5 mph (Exhibit 13-11)

S = 60.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael baker Jr, Inc	Junction	M-5
Date Performed	10/17/2013	Jurisdiction	Rest Area to 95 SB
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1100 ft	Acceleration Lane Length, L_A: 800	L_{down} = ft
V_u = 270 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 6990	
	Ramp Volume, V_R: 270	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6990	0.97	Rolling	13	0	0.837	1.00	8611
Ramp	270	0.97	Rolling	13	0	0.837	1.00	333
UpStream	270	0.97	Rolling	13	0	0.837	1.00	333
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1697.42 (Equation 13-6 or 13-7)

P_{FM} = 0.562 using Equation (Exhibit 13-6)

V_{12} = 4840 pc/h

V_3 or V_{av34} 3771 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 5911 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8944	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6244	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 49.0 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 2.273 (Exibit 13-11)

S_R = 6.4 mph (Exhibit 13-11)

S_0 = 61.1 mph (Exhibit 13-11)

S = 8.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 510 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3300	
	Ramp Volume, V_R: 450	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3300	0.93	Rolling	18	0	0.787	1.00	4506
Ramp	450	0.80	Rolling	18	0	0.787	1.00	714
UpStream	510	0.91	Rolling	18	0	0.787	1.00	712
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1907.28 (Equation 13-6 or 13-7)

P_{FM} = 0.557 using Equation (Exhibit 13-6)

V_{12} = 2508 pc/h

V_3 or V_{av34} 1998 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2574 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5220	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3288	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 22.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.295 (Exibit 13-11)

S_R = 61.7 mph (Exhibit 13-11)

S_0 = 64.8 mph (Exhibit 13-11)

S = 62.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/17/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No ☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	720 veh/h	Freeway Volume, V_F	3720	V_D = veh/h
		Ramp Volume, V_R	890	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3720	0.97	Rolling	13	0	0.837	1.00	4583
Ramp	890	0.93	Rolling	13	0	0.837	1.00	1144
UpStream	720	0.95	Rolling	13	0	0.837	1.00	906
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2015.78 (Equation 13-6 or 13-7)

P_{FM} = 0.550 using Equation (Exhibit 13-6)

V_{12} = 2520 pc/h

V_3 or V_{av34} 2063 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2618 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5727	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3762	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.359 (Exibit 13-11)

S_R = 60.0 mph (Exhibit 13-11)

S_0 = 64.7 mph (Exhibit 13-11)

S = 61.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-3 SB 95 at US 17
Weaving Segment Location	
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	600ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2950	0.96	18	0	2.5	2.0	0.787	1.00	3903
V_{RF}	150	0.92	18	0	2.5	2.0	0.787	1.00	207
V_{FR}	480	0.85	18	0	2.5	2.0	0.787	1.00	717
V_{RR}	0	0.94	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	3903							V =	3801
V_W	924								
VR	0.191								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	924 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1032 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	359 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1391 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	3801 veh/h	Weaving intensity factor, W	0.439
Weaving segment capacity, c_w	6633 veh/h	Weaving segment speed, S	56.7 mph
Weaving segment v/c ratio	0.573	Average weaving speed, S_W	53.2 mph
Weaving segment density, D	21.3 pc/mi/ln	Average non-weaving speed, S_{NW}	57.6 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4449 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	W-3 SB 95 at 17 weave
Weaving Segment Location	
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	600ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	4400	0.97	13	0	2.5	2.0	0.837	1.00	5421
V_{RF}	200	0.88	13	0	2.5	2.0	0.837	1.00	272
V_{FR}	660	0.98	13	0	2.5	2.0	0.837	1.00	805
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	5421							V =	5438
V_W	1077								
VR	0.166								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1077 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1185 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	672 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1857 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5438 veh/h	Weaving intensity factor, W	0.551
Weaving segment capacity, c_w	7113 veh/h	Weaving segment speed, S	53.7 mph
Weaving segment v/c ratio	0.764	Average weaving speed, S_W	50.5 mph
Weaving segment density, D	30.2 pc/mi/ln	Average non-weaving speed, S_{NW}	54.4 mph
Level of Service, LOS	D	Maximum weaving length, L_{MAX}	4189 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-4 SB weave at Rt 3
Weaving Segment Location	
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3120	0.96	18	0	2.5	2.0	0.787	1.00	4128
V_{RF}	180	0.88	18	0	2.5	2.0	0.787	1.00	260
V_{FR}	510	0.91	18	0	2.5	2.0	0.787	1.00	712
V_{RR}	0	0.90	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	4128							V =	4016
V_W	972								
VR	0.191								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	972 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1131 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	595 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1726 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4016 veh/h	Weaving intensity factor, W	0.362
Weaving segment capacity, c_w	6718 veh/h	Weaving segment speed, S	56.6 mph
Weaving segment v/c ratio	0.598	Average weaving speed, S_W	55.4 mph
Weaving segment density, D	22.5 pc/mi/ln	Average non-weaving speed, S_{NW}	56.9 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4440 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/17/2013
Analysis Time Period	PM

Site Information

Freeway/Dir of Travel	W-4 SB 95 at RT 3 weave
Weaving Segment Location	
Analysis Year	2040 No Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3380	0.97	13	0	2.5	2.0	0.837	1.00	4164
V_{RF}	340	0.96	13	0	2.5	2.0	0.837	1.00	423
V_{FR}	720	0.95	13	0	2.5	2.0	0.837	1.00	906
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	4164							V =	4597
V_W	1329								
VR	0.242								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1329 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1488 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	602 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2090 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4597 veh/h	Weaving intensity factor, W	0.421
Weaving segment capacity, c_w	7003 veh/h	Weaving segment speed, S	53.8 mph
Weaving segment v/c ratio	0.656	Average weaving speed, S_W	53.7 mph
Weaving segment density, D	25.5 pc/mi/ln	Average non-weaving speed, S_{NW}	53.8 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4970 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

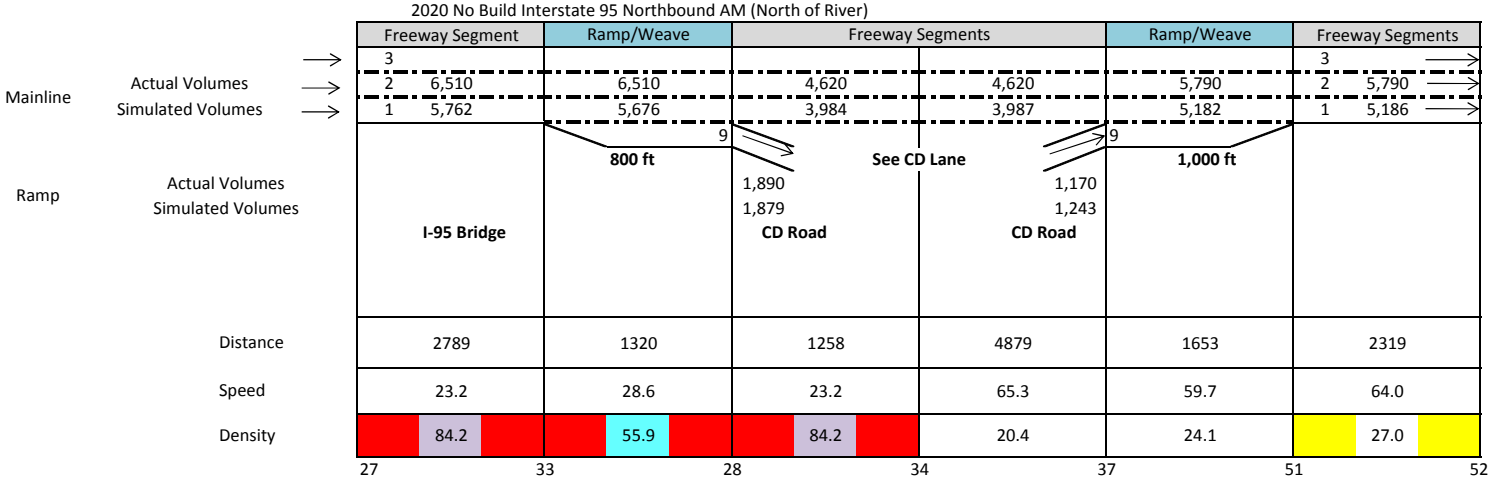
CORSIM Micro-simulation Results (Average of 10 Simulation Runs) 2020 & 2040 No-Build Conditions

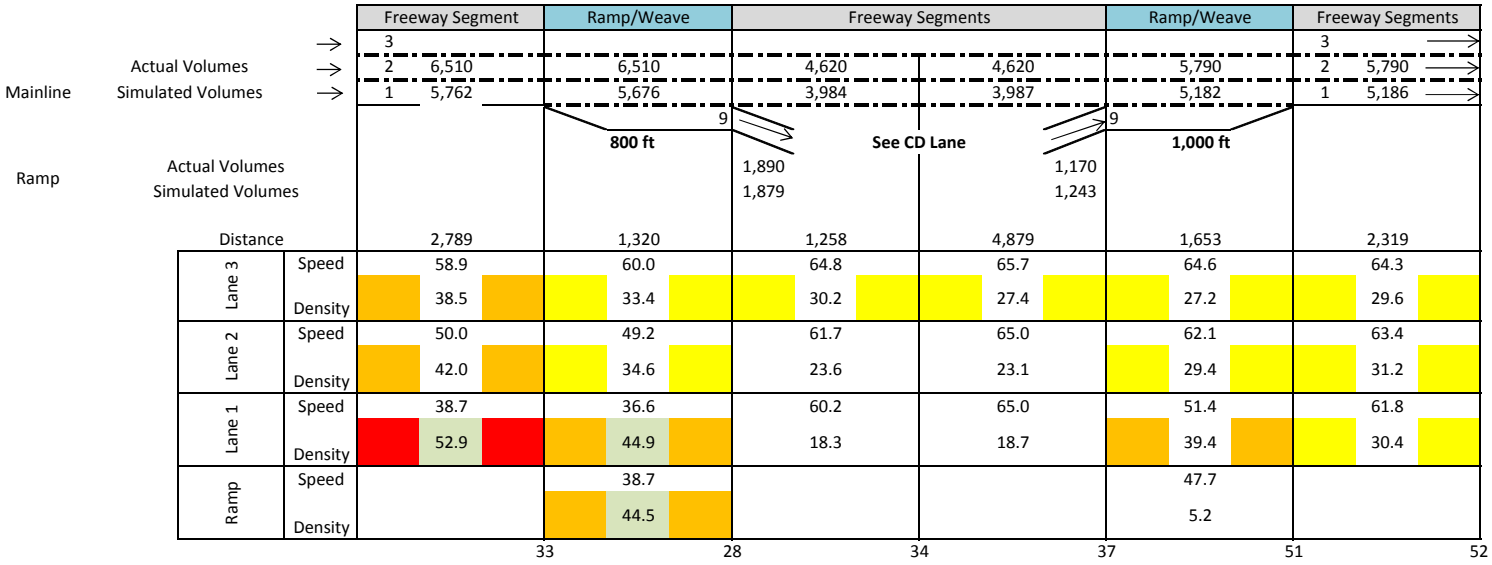
2020 No-Build CORSIM Analysis Output

Northbound I-95 Mainline & Ramp Analysis			2020 No-Build			
			AM Peak Hour		PM Peak Hour	
Roadway	**Location**	**Analysis ID**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**
I-95 NB Mainline	South of Route 3 Interchange	Mainline Segment 1	21.3	67.2	20.1	67.3
Route 3 Interchange Ramps	I-95 NB **Diverge** to Route 3 EB	D-1	21.3	67.2	18.6	67.1
	Route 3 EB Merge to I-95 NB diverge - **Weave**	W-1	32.6	44.7	20.1	56.4
	Route 3 WB **Merge** to I-95 NB	M-1	36.6	49.1	20.1	62.0
I-95 Mainline	Route 3 to Route 17	Mainline Segment 2	34.5	62.3	22.8	65.6
I-95 Mainline	Route 3 to Route 17	Mainline Segment 3	48.0	47.7	23.0	65.1
Route 17 Interchange Ramps	I-95 NB **diverge** to I-95 C/D Roadway	D-2	40.0	45.4	20.3	61.1
	I-95 C/D Roadway **diverge** to Route 17 Bus SB	D-3	29.0	36.7	4.4	45.0
	Route 17 SB Merge to I-95 NB diverge - **Weave**	W-2	66.5	20.4	36.7	35.3
	Route 17 Bus NB **merge** to I-95 C/D Roadway	M-2	20.3	43.0	0.8	32.1
	I-95 C/D Roadway **merge** to I-95 NB	M-3	27.5	58.1	16.0	64.0
I-95 Mainline	North of Route 17 Interchange	Mainline Segment 4	30.4	63.1	18.6	66.2

Southbound I-95 Mainline & Ramp Analysis			2020 No-Build			
			AM Peak Hour		PM Peak Hour	
Roadway	**Location**	**Analysis Type**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**	**Vehicle Density (pc/mi/ln)**	**Vehicle Speed (mph)**
I-95 SB Mainline	North of Route 17 Interchange	Mainline Segment 4	14.8	68.7	36.6	58.7
Route 17 Interchange Ramps	I-95 SB diverge to Route 17 NB	D-4	13.9	67.4	46.2	44.6
	Route 17 NB Merge to I-95 SB diverge - **Weave**	W-3	11.0	60.1	57.7	25.0
	Route 17 SB **merge** to I-95 SB	M-4	16.2	54.5	85.9	20.1
I-95 SB Mainline	Route 17 to Rest Area	Mainline Segment 3	15.8	66.4	104.4	19.2
Rest Area	Rest Area - Diverge	D-5	15.9	65.9	89.8	17.5
	Rest Area - Merge	M-5	15.0	65.4	107.2	17.1
I-95 SB Mainline	Rest Area to Route 3	Mainline Segment 2	15.8	65.7	67.1	28.9
Route 3 Interchange Ramps	I-95 SB **Diverge** to Route 3 WB	D-6	13.1	63.8	20.6	59.9
	Route 3 WB Merge to I-95 SB diverge - **Weave**	W-4	10.4	62.8	16.4	60.2
	Route 3 EB **Merge** to I-95 SB	M-6	11.5	65.1	18.4	63.5
I-95 SB Mainline	South of Route 3 Interchange	Mainline Segment 1	13.1	67.2	20.9	65.7

2020 No Build Interstate 95 Northbound AM (North of River)

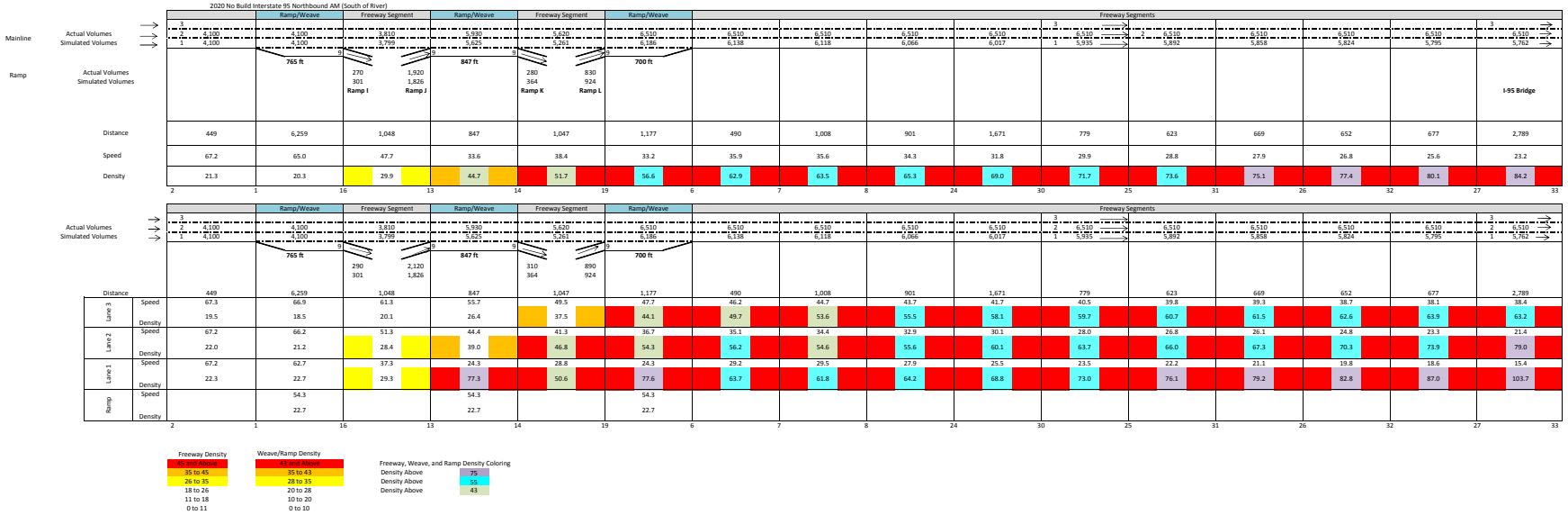




Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43



Freeway Density

45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

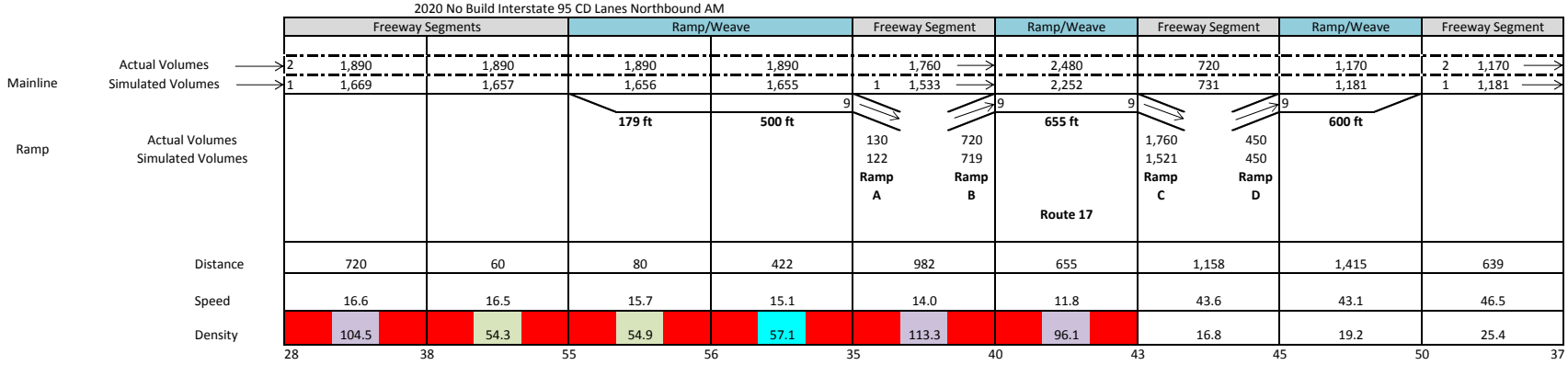
Weave/Ramp Density

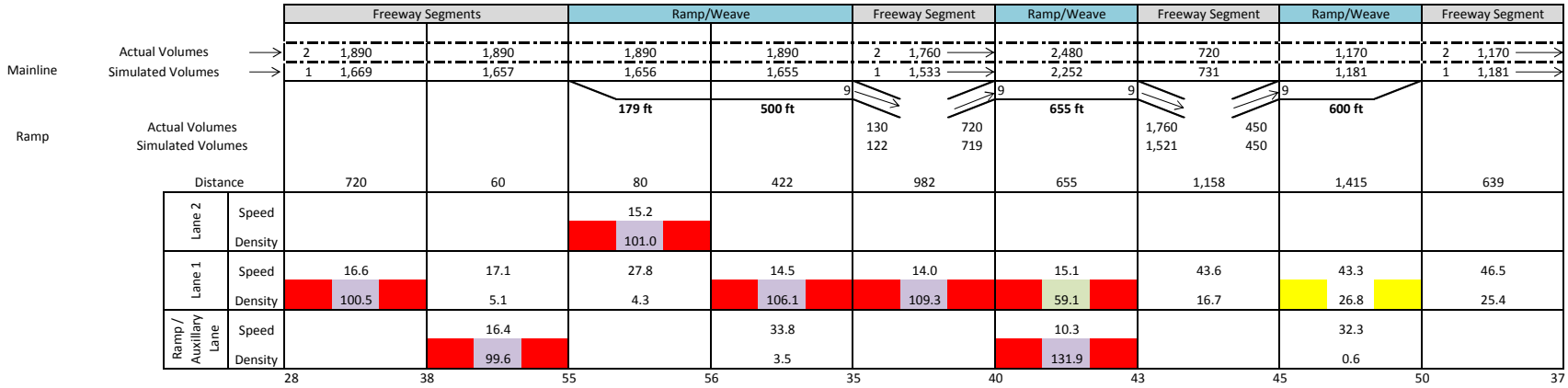
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring

Density Above	75
Density Above	55
Density Above	43

2020 No Build Interstate 95 CD Lanes Northbound AM





Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 No Build Interstate 95 Southbound AM (North of River)

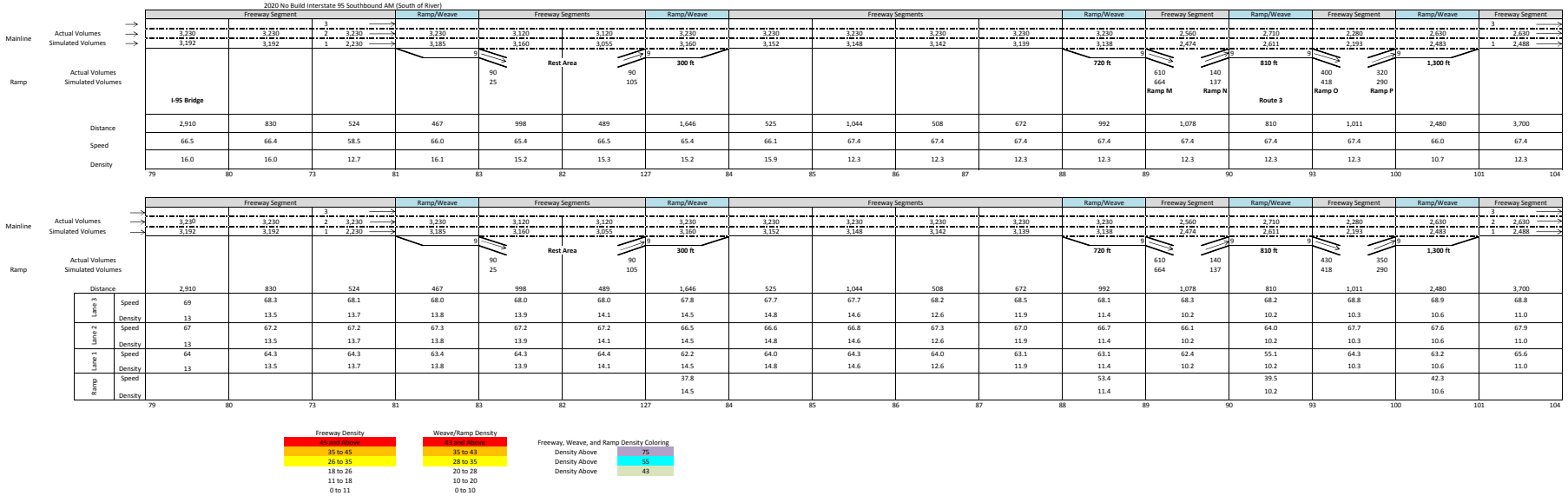
		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	3								3
		2 3,000	3,000	2,510	2,630	2,250	3,230	3,230	3,230	2 3,230
	Simulated Volumes	1 2,998	3,000	2,524	2,623	2,230	3,182	2,230	3,191	1 3,192
			9 960 ft	9	9 606 ft	9	9 600 ft			
Ramp	Actual Volumes			490	120	380	980			
	Simulated Volumes			477	124	397	894			
				Ramp E	Ramp F	Ramp G	Ramp H			
					Route 17					I-95 Bridge
	Distance	1,065	5,018	1,069	606	974	1,076	943	673	2,910
	Speed	68.7	67.4	67.3	60.6	58.5	54.4	58.5	65.9	66.5
	Density	14.8	13.9	12.5	10.8	12.7	16.5	12.7	16.1	16.0
		57	58	60	61	65	77	72	78	79 80

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	3								3
		2 3,000	3,000	2,510	2,630	2,250	3,230	3,230	3,230	2 3,230
	Simulated Volumes	1 2,998	3,000	2,524	2,623	2,230	3,182	2,230	3,191	1 3,192
			9 960 ft	9	9 606 ft	9	9 600 ft			
Ramp	Actual Volumes			490	120	380	980			
	Simulated Volumes			475	99	393	952			
	Distance	1,065	5,018	1,069	606	974	1,076	943	673	2,910
Lane 3	Speed	68.6	68.2	68.1	62.1	58.3	58.3	63.9	68.5	68.5
	Density	13.0	11.7	9.5	10.5	11.2	11.9	12.8	12.7	13.4
Lane 2	Speed	68.7	68.4	68.1	62.5	58.8	57.5	62.5	66.7	67.2
	Density	15.5	14.7	12.5	12.6	13.9	18.0	17.6	16.6	16.6
Lane 1	Speed	68.7	67.1	66.1	59.0	58.2	51.5	59.5	63.5	64.3
	Density	16.0	16.5	15.5	13.8	13.1	27.0	21.3	19.1	18.0
Ramp	Speed		56.1		58.1		40.8			
	Density		1.6		6.4		1.7			
		57	58	60	61	65	77	72	78	79 80

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43



Distance		2,910	830	524	467	998	489	1,646	525	1,044	508	672	992	1,078	810	1,011	2,480	3,700
Lane 3	Speed	69	68.3	68.1	68.0	68.0	68.0	67.8	67.7	67.7	68.2	68.5	68.1	68.3	68.2	68.8	68.9	68.8
	Density	13	13.5	13.7	13.8	13.9	14.1	14.5	14.8	14.6	12.6	11.9	11.4	10.2	10.2	10.3	10.6	11.0
Lane 2	Speed	67	67.2	67.2	67.3	67.2	67.2	66.5	66.6	66.8	67.3	67.0	66.7	66.1	64.0	67.7	67.6	67.9
	Density	13	13.5	13.7	13.8	13.9	14.1	14.5	14.8	14.6	12.6	11.9	11.4	10.2	10.2	10.3	10.6	11.0
Lane 1	Speed	64	64.3	64.3	63.4	64.3	64.4	62.2	64.0	64.3	64.0	63.1	63.1	62.4	55.1	64.3	63.2	65.6
	Density	13	13.5	13.7	13.8	13.9	14.1	14.5	14.8	14.6	12.6	11.9	11.4	10.2	10.2	10.3	10.6	11.0
Ramp	Speed							37.8					53.4		39.5		42.3	
	Density							14.5					11.4		10.2		10.6	

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 No Build Interstate 95 Northbound PM (North of River)

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segments
Mainline		3 →					3 →
	Actual Volumes →	2 4,600	4,600	3,050	3,050	3,810	2 3,810 →
	Simulated Volumes →	1 4,439	4,435	2,896	2,898	3,429	1 3,434 →
Ramp			9 → **800 ft**	1,550 **CD Road**	**See CD Lane**	760 **CD Road**	9 → **1,000 ft**
	Actual Volumes			1,550		760	
	Simulated Volumes			1,553		763	
		I-95 Bridge			**Route 17**		
	Distance	2,789	1,320	1,258	4,879	1,653	2,319
	Speed	64.0	57.9	66.4	67.0	64.9	66.5
	Density	23.2	22.2	14.5	14.4	14.7	17.2

27 33 28 34 37 51 52

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segments
Mainline		3 →					3 →
	Actual Volumes →	2 4,600	4,600	3,050	3,050	3,810	2 3,810 →
	Simulated Volumes →	1 4,439	4,435	2,896	2,898	3,429	1 3,434 →
Ramp			9 → **800 ft**	1,550	**See CD Lanes**	760	9 → **1,000 ft**
	Actual Volumes			1,550		760	
	Simulated Volumes			1,553		763	
	Distance	2,789	1,320	1,258	4,879	1,653	2,319
Lane 3	Speed	66.4	67.4	67.9	67.7	67.5	67.5
	Density	20.2	15.3	15.2	14.8	15.0	15.6
Lane 2	Speed	65.4	63.4	66.9	67.2	66.6	67.1
	Density	23.3	18.5	16.0	15.7	17.2	18.0
Lane 1	Speed	61.1	54.7	63.9	65.7	62.0	65.0
	Density	25.8	24.9	12.4	12.8	19.8	18.0
Ramp	Speed		50.5			51.0	
	Density		17.3			0.8	

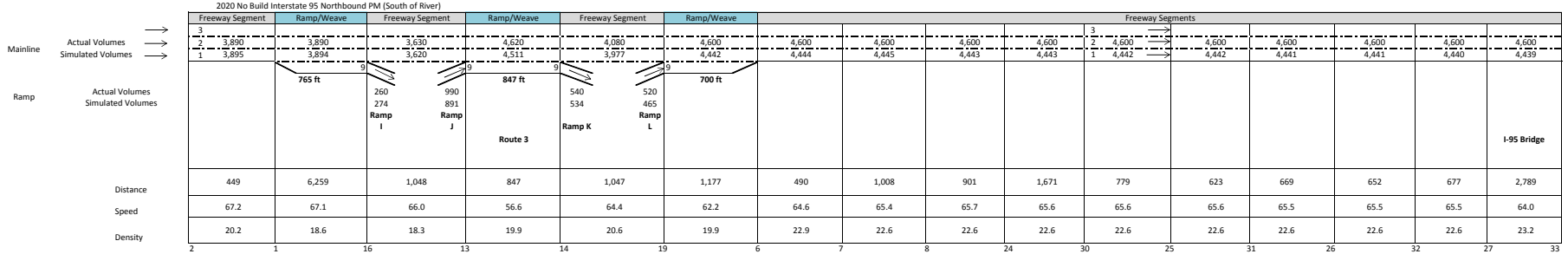
27 33 28 34 37 51 52

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 No Build Interstate 95 Northbound PM (South of River)



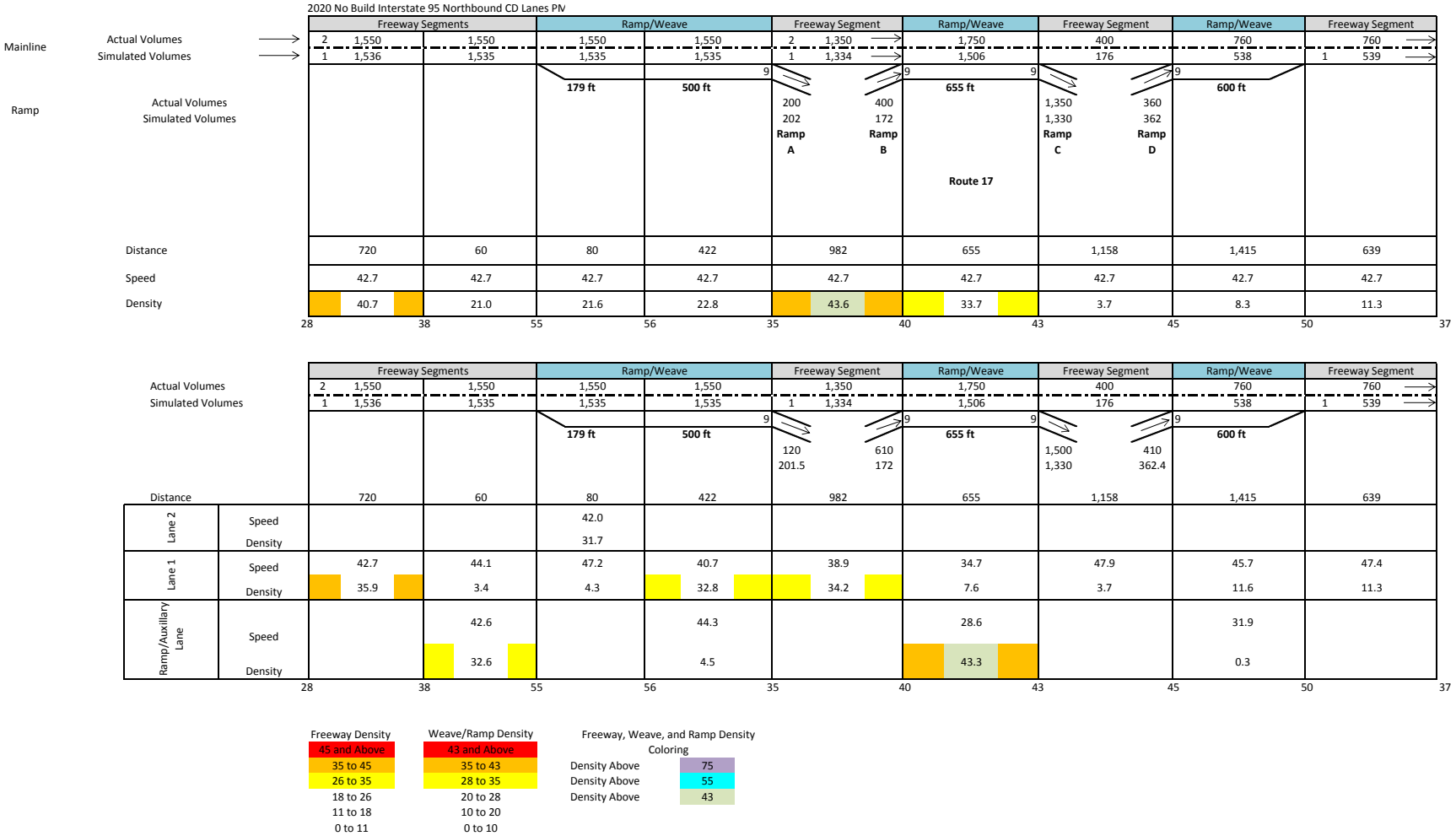
		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
Mainline	Actual Volumes	3										3					
		2 3,890	3,890	3,630	4,620	4,080	4,600	4,600	4,600	4,600	4,600	2 4,600	4,600	4,600	4,600	4,600	4,600
	Simulated Volumes	1 3,895	3,894	3,620	4,511	3,977	4,442	4,444	4,445	4,443	4,443	1 4,442	4,442	4,441	4,441	4,440	4,439
Ramp	Actual Volumes		765 ft	260	990	847 ft	540	520	700 ft								
	Simulated Volumes			274	891		534	465									
				Ramp I	Ramp J	Route 3	Ramp K	Ramp L									I-95 Bridge
	Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
	Speed	67.2	67.1	66.0	56.6	64.4	62.2	64.6	65.4	65.7	65.6	65.6	65.6	65.5	65.5	65.5	64.0
	Density	20.2	18.6	18.3	19.9	20.6	19.9	22.9	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	23.2
		2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27 33

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
Mainline	Actual Volumes	3										3					
		2 3,890	3,890	3,630	4,620	4,080	4,600	4,600	4,600	4,600	4,600	2 4,600	4,600	4,600	4,600	4,600	4,600
	Simulated Volumes	1 3,895	3,894	3,620	4,511	3,977	4,442	4,444	4,445	4,443	4,443	1 4,442	4,442	4,441	4,441	4,440	4,439
Ramp	Actual Volumes		765 ft	240	900	847 ft	490	490	700 ft								
	Simulated Volumes			274	891		534	465									
	Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
Lane 3	Speed	67.4	67.3	67.1	66.8	66.7	67.0	66.9	66.9	66.9	66.7	66.5	66.4	66.3	66.2	66.2	66.4
	Density	18.5	17.3	14.8	15.4	17.1	18.3	19.4	20.1	20.7	21.3	21.7	21.9	22.1	22.1	22.1	20.2
Lane 2	Speed	67.3	67.6	67.2	64.2	65.5	65.4	65.5	66.1	66.2	66.1	66.1	66.0	66.0	66.0	66.0	65.4
	Density	20.8	19.7	18.8	21.2	22.4	23.9	24.6	24.2	23.9	23.7	23.6	23.6	23.5	23.6	23.6	23.3
Lane 1	Speed	67.1	66.5	64.3	51.3	61.5	57.5	61.8	63.4	64.0	64.1	64.3	64.3	64.3	64.3	64.3	61.1
	Density	21.3	20.4	21.2	30.3	22.2	27.9	24.8	23.7	23.1	22.7	22.4	22.3	22.2	22.1	22.1	25.8
Ramp	Speed		59.5		44.4		38.6										
	Density		0.6		12.7		1.3										
		2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27 33

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43


2020 No Build Interstate 95 Northbound CD Lanes PM
Freeway Segments
Ramp/Weave
Freeway Segment
Ramp/Weave
Freeway Segment
Ramp/Weave
Freeway Segment
Mainline
Actual Volumes
Simulated Volumes
Ramp
Actual Volumes
Simulated Volumes
179 ft
500 ft
655 ft
600 ft
Ramp A
Ramp B
Ramp C
Ramp D
Route 17
Distance
Speed
Density
Lane 2
Lane 1
Ramp/Auxillary Lane
Speed
Density
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10
Freeway, Weave, and Ramp Density Coloring
Density Above 75
Density Above 55
Density Above 43

2020 No Build Interstate 95 Southbound PM (North of River)

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	6,130	6,130	5,580	5,730	5,210	7,080	7,080	7,080	7,080
	Simulated Volumes	4,613	4,416	3,810	3,915	3,478	3,928	3,920	3,909	3,904
Ramp	Actual Volumes		960 ft	550 / 150 Ramp E / Ramp F	606 ft Route 17	520 / 1,870 Ramp G / Ramp H	600 ft			I-95 Bridge
	Simulated Volumes			678 / 99		564 / 1,191				
Distance		1,065	5,018	1,069	606	974	1,076	943	673	2,910
Speed		16.0	15.9	15.0	13.5	11.2	9.9	10.1	10.1	10.5
Density		96.1	85.8	85.2	72.8	103.4	110.2	129.2	128.4	123.3

57 58 60 61 65 77 72 78 79 80

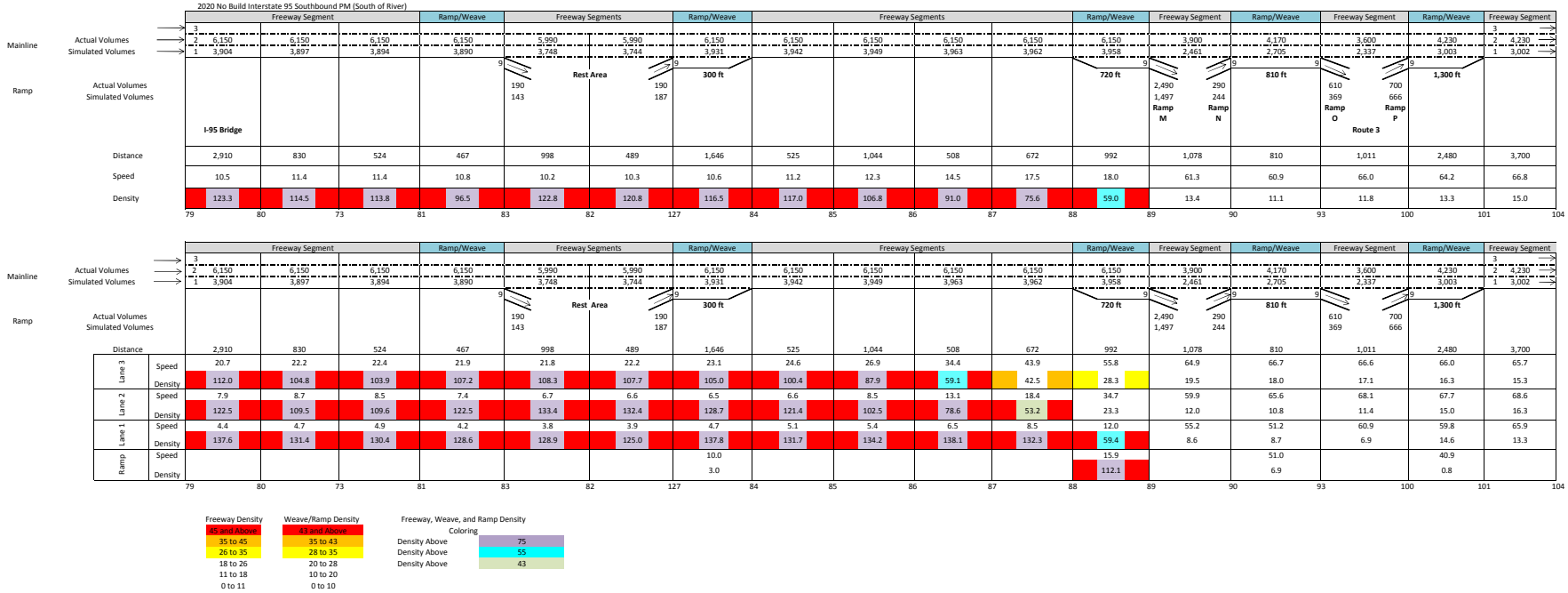
		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	6,130	6,130	5,580	5,730	5,210	7,080	7,080	7,080	7,080
	Simulated Volumes	4,613	4,416	3,810	3,915	3,478	3,928	3,920	3,909	3,904
Ramp	Actual Volumes		960 ft	550 / 150	606 ft	520 / 1,870	600 ft			
	Simulated Volumes			606 / 105		437 / 450				
Distance		1,065	5,018	1,069	606	974	1,076	943	673	2,910
Lane 3	Speed	26.2	26.2	24.5	21.8	20.3	20.0	20.1	20.0	20.7
	Density	82.5	85.7	89.3	100.0	108.7	112.6	113.8	114.7	112.0
Lane 2	Speed	14.6	13.1	12.7	11.4	8.7	8.0	7.8	7.7	7.9
	Density	93.9	87.0	80.0	90.3	123.5	130.6	130.2	129.1	122.5
Lane 1	Speed	9.4	8.7	6.9	3.6	2.4	3.7	4.2	4.3	4.4
	Density	106.8	96.3	86.6	76.0	79.5	135.3	145.2	143.0	137.6
Ramp	Speed		33.7		14.4		5.1			
	Density		1.9		29.2		22.9			

57 58 60 61 65 77 72 78 79 80

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43



Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 No-Build CORSIM Analysis Output

Northbound I-95 Mainline & Ramp Analysis			2040 No-Build			
			AM Peak Hour		PM Peak Hour	
Roadway	Location	Analysis ID	Vehicle Density (pc/mi/ln)	Vehicle Speed (mph)	Vehicle Density (pc/mi/ln)	Vehicle Speed (mph)
I-95 NB Mainline	South of Route 3 Interchange	Mainline Segment 1	23.6	39.5	36.5	46.0
Route 3 Interchange Ramps	I-95 NB **Diverge** to Route 3 EB	D-1	22.1	33.5	43.5	32.4
	Route 3 EB Merge to I-95 NB diverge - **Weave**	W-1	29.3	26.5	44.6	22.8
	Route 3 WB **Merge** to I-95 NB	M-1	42.8	13.8	62.9	18.6
I-95 Mainline	Route 3 to Route 17	Mainline Segment 2	61.0	11.2	78.8	16.2
I-95 Mainline	Route 3 to Route 17	Mainline Segment 3	45.2	14.7	66.3	18.4
Route 17 Interchange Ramps	I-95 NB **diverge** to I-95 C/D Roadway	D-2	46.2	11.6	50.6	17.5
	I-95 C/D Roadway **diverge** to Route 17 Bus SB	D-3	90.1	6.2	81.5	6.6
	Route 17 SB Merge to I-95 NB diverge - **Weave**	W-2	122.6	7.7	101.8	6.6
	Route 17 Bus NB **merge** to I-95 C/D Roadway	M-2	24.0	41.5	9.3	6.6
	I-95 C/D Roadway **merge** to I-95 NB	M-3	10.0	63.0	11.4	65.7
I-95 Mainline	North of Route 17 Interchange	Mainline Segment 4	11.1	67.9	13.5	67.5

Southbound I-95 Mainline & Ramp Analysis			2040 No-Build			
			AM Peak Hour		PM Peak Hour	
Roadway	Location	Analysis Type	Vehicle Density (pc/mi/ln)	Vehicle Speed (mph)	Vehicle Density (pc/mi/ln)	Vehicle Speed (mph)
I-95 SB Mainline	North of Route 17 Interchange	Mainline Segment 4	62.8	23.0	74.2	20.7
Route 17 Interchange Ramps	I-95 SB diverge to Route 17 NB	D-4	68.7	17.1	64.5	19.4
	Route 17 NB Merge to I-95 SB diverge - **Weave**	W-3	14.1	54.7	50.1	17.8
	Route 17 SB **merge** to I-95 SB	M-4	19.2	53.1	84.9	10.6
I-95 SB Mainline	Route 17 to Rest Area	Mainline Segment 3	18.4	63.1	98.1	11.2
Rest Area	Rest Area - Diverge	D-5	19.7	56.8	72.8	12.4
	Rest Area - Merge	M-5	19.5	54.6	116.7	8.9
I-95 SB Mainline	Rest Area to Route 3	Mainline Segment 2	19.5	53.7	78.4	14.2
Route 3 Interchange Ramps	I-95 SB **Diverge** to Route 3 WB	D-6	18.4	46.4	56.8	15.7
	Route 3 WB Merge to I-95 SB diverge - **Weave**	W-4	21.0	32.5	7.7	60.3
	Route 3 EB **Merge** to I-95 SB	M-6	10.5	65.4	10.0	63.8
I-95 SB Mainline	South of Route 3 Interchange	Mainline Segment 1	12.1	66.9	11.2	67.7

2040 No Build Interstate 95 Northbound AM (South of River)

		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
Nodes	2–1	1–16	16–13	13–14	14–19	19–6	6–7	7–8	8–24	24–30	30–25	25–31	31–26	26–32	32–27	27–33
Lanes	3 / 2 / 1	9	9	9 / 9	9	9					3 / 2 / 1					3 / 2 / 1
Mainline Actual Volumes	3,390	3,390	3,050	5,750	5,360	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410
Mainline Simulated Volumes	2,585	2,545	1,877	3,121	1,932	2,040	1,988	1,968	1,950	1,953	1,956	1,954	1,953	1,949	1,944	1,940
Weave length		765 ft		847 ft		700 ft										
Ramp Actual Volumes			Ramp I: 340; Ramp J: 2,700		Ramp K: 390; Ramp L: 1,050											
Ramp Simulated Volumes			Ramp I: 552; Ramp J: 956		Ramp K: 531; Ramp L: 475											
																I-95 Bridge
Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
Speed	39.5	33.5	27.4	26.5	19.8	13.8	12.3	11.7	11.3	11.2	11.5	11.7	11.9	12.4	12.9	14.7
Density	23.6	22.1	22.7	29.3	33.3	42.8	56.7	58.7	60.3	61.0	59.3	58.0	56.9	54.8	52.5	45.2

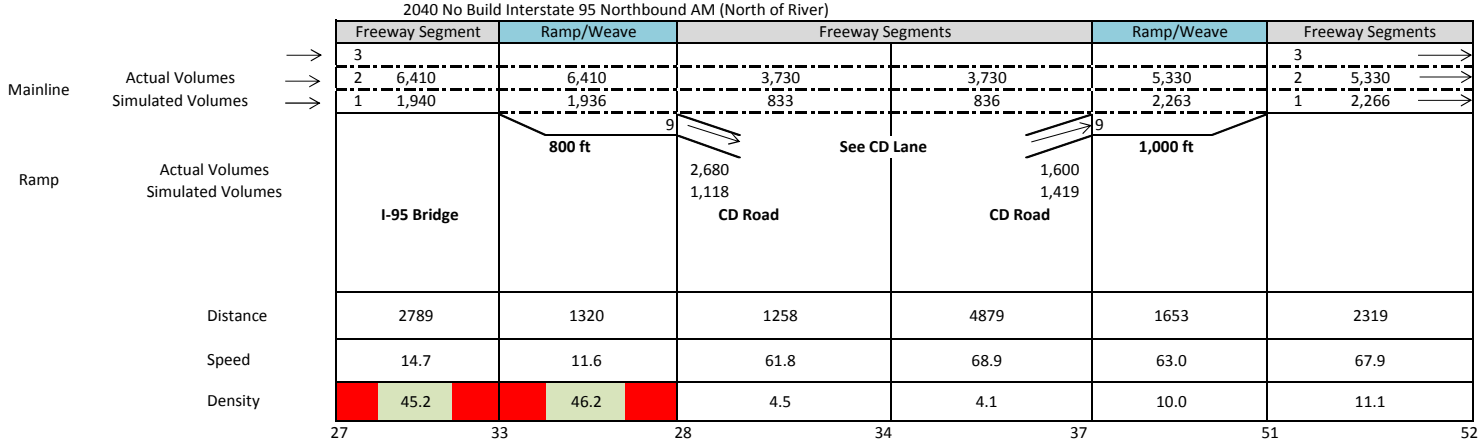
		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
Nodes	2–1	1–16	16–13	13–14	14–19	19–6	6–7	7–8	8–24	24–30	30–25	25–31	31–26	26–32	32–27	27–33
Lanes	3 / 2 / 1	9	9	9 / 9	9	9					3 / 2 / 1					3 / 2 / 1
Actual Volumes	3,390	3,390	3,050	5,750	5,360	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410
Simulated Volumes	2,585	2,545	1,877	3,121	1,932	2,040	1,988	1,968	1,950	1,953	1,956	1,954	1,953	1,949	1,944	1,940
Weave length		765 ft		847 ft		700 ft										
Ramp volumes (actual / simulated)			340 / 669; 2,700 / 1,245		390 / 1,189; 1,050 / 108											
Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
Lane 3 Speed	49.8	41.8	36.7	29.7	27.2	22.3	20.4	19.0	18.1	17.5	17.9	18.4	19.0	19.8	20.8	24.8
Lane 3 Density	27.4	31.6	35.6	44.3	49.5	66.4	76.8	84.7	91.5	97.2	96.3	93.9	91.4	88.0	84.0	68.1
Lane 2 Speed	35.5	29.6	21.4	18.1	12.4	8.4	6.7	5.6	4.6	4.0	3.6	3.4	3.3	3.2	3.2	4.5
Lane 2 Density	20.2	17.6	16.2	19.9	33.8	43.7	45.4	45.8	46.3	44.9	43.2	43.6	43.5	42.6	40.7	36.3
Lane 1 Speed	30.4	22.8	12.1	15.3	11.1	3.8	2.5	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3
Lane 1 Density	19.5	17.9	15.4	17.2	12.7	32.8	42.5	41.9	39.9	39.1	37.8	37.0	36.8	35.4	34.5	34.7
Ramp Speed		39.2		29.1		6.7										
Ramp Density		0.4		39.4		6.1										

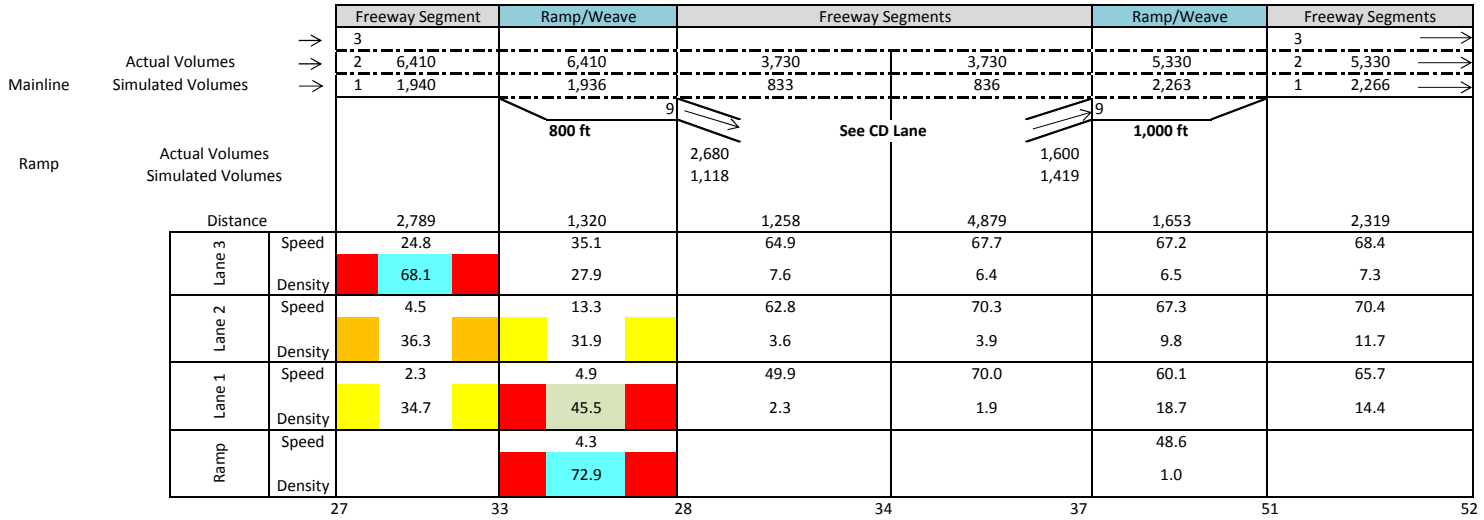
Freeway Density	Weave/Ramp Density
45 and Above	43 and Above
35 to 45	35 to 43
26 to 35	28 to 35
18 to 26	20 to 28
11 to 18	10 to 20
0 to 11	0 to 10

Freeway, Weave, and Ramp Density Coloring

Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 Northbound AM (North of River)



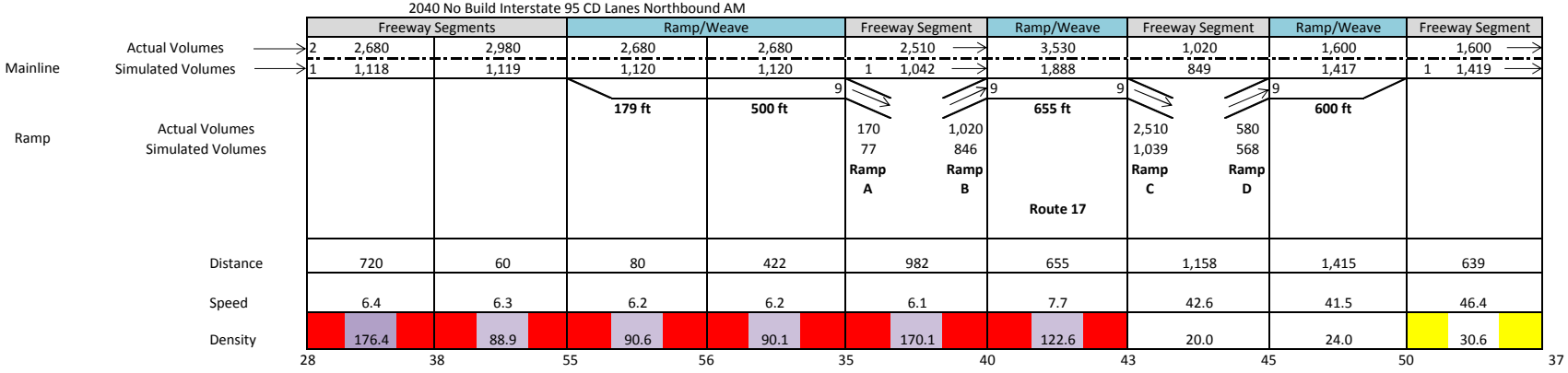


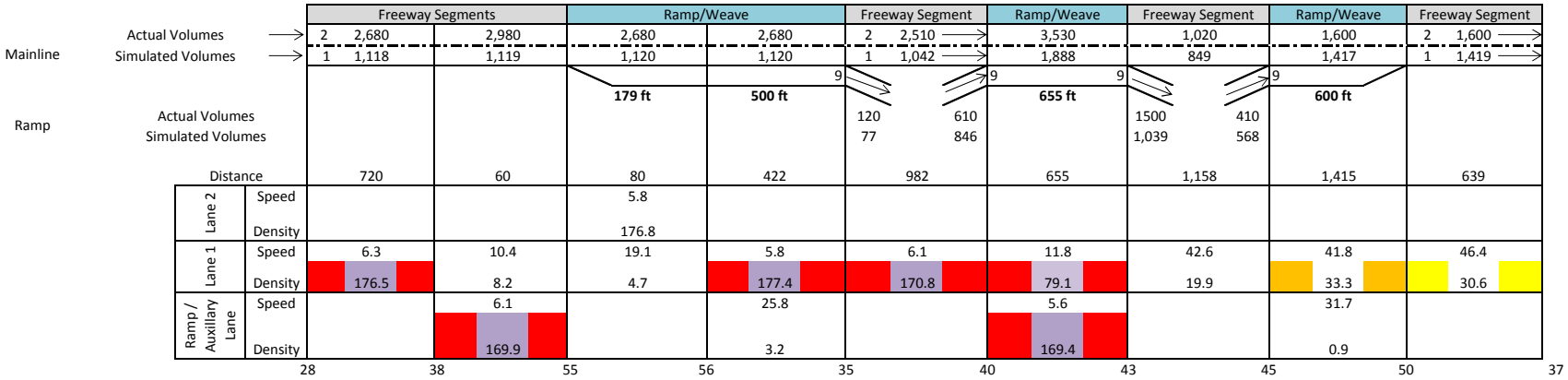
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 CD Lanes Northbound AM





Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 Southbound AM (North of River)

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	3								
		2 4,130	4,130	3,430	3,580	3,100	4,490	4,490	4,490	4,490
	Simulated Volumes	1 3,883	3,821	2,981	3,064	2,619	3,660	3,606	3,567	3,537
			9 960 ft	9	9 606 ft	9	9 600 ft			
Ramp	Actual Volumes			420	110	340	830			
	Simulated Volumes			841	83	445	1,040			
				Ramp E	Ramp F	Ramp G	Ramp H			
					Route 17					I-95 Bridge
Distance		1,065	5,018	1,069	606	974	1,076	943	673	2,910
Speed		23.0	17.1	57.0	54.7	56.5	53.1	59.4	63.5	63.1
Density		62.8	68.7	17.5	14.1	15.4	19.2	20.1	18.7	18.4
		57	58 60	61	65	77	72	78	79	80

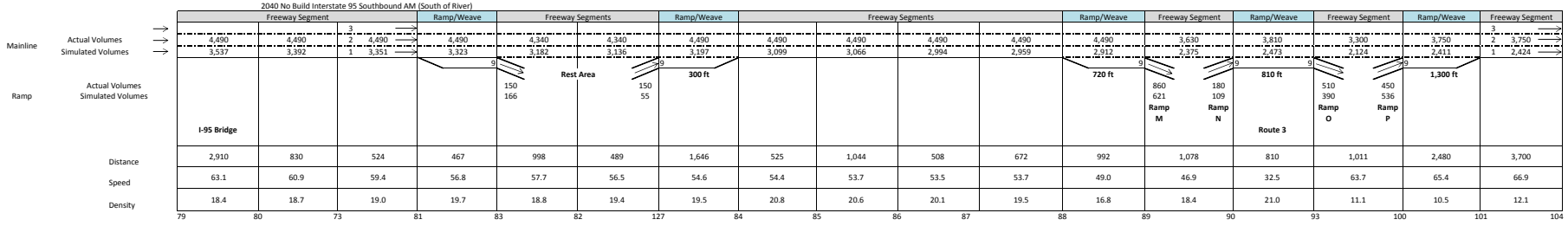
		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments		
Mainline	Actual Volumes	3								
		2 4,130	4,130	3,430	3,580	3,100	4,490	4,490	4,490	4,490
	Simulated Volumes	1 3,883	3,821	2,981	3,064	2,619	3,660	3,606	3,567	3,537
			9 960 ft	9	9 606 ft	9	9 600 ft			
Ramp	Actual Volumes			700	150	480	1,390			
	Simulated Volumes			841	83	445	1,040			
Distance		1,065	5,018	1,069	606	974	1,076	943	673	2,910
Lane 3	Speed	39.1	33.0	63.7	60.1	56.8	56.1	60.2	64.7	64.1
	Density	42.6	54.0	21.6	22.3	22.2	21.5	20.1	18.8	19.0
Lane 2	Speed	21.3	16.2	56.1	58.0	57.6	56.3	60.9	64.7	64.3
	Density	58.3	62.3	15.5	13.6	14.8	19.7	19.9	18.8	18.7
Lane 1	Speed	15.0	10.5	48.5	50.8	54.1	49.2	57.2	60.9	60.7
	Density	67.5	74.7	15.1	10.3	9.2	25.4	20.3	18.4	17.3
Ramp	Speed		3.6		43.8		37.1			
	Density		25.5		9.3		1.8			
		57	58 60	61	65	77	72	78	79	80

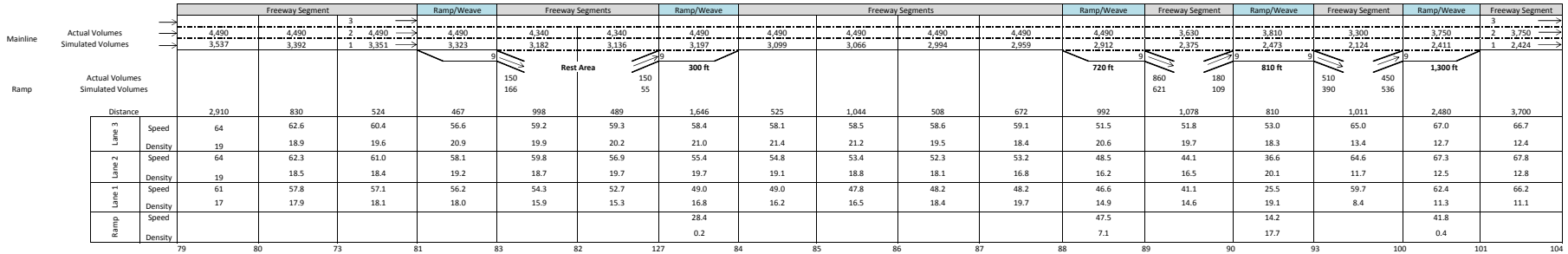
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 Southbound AM (South of River)

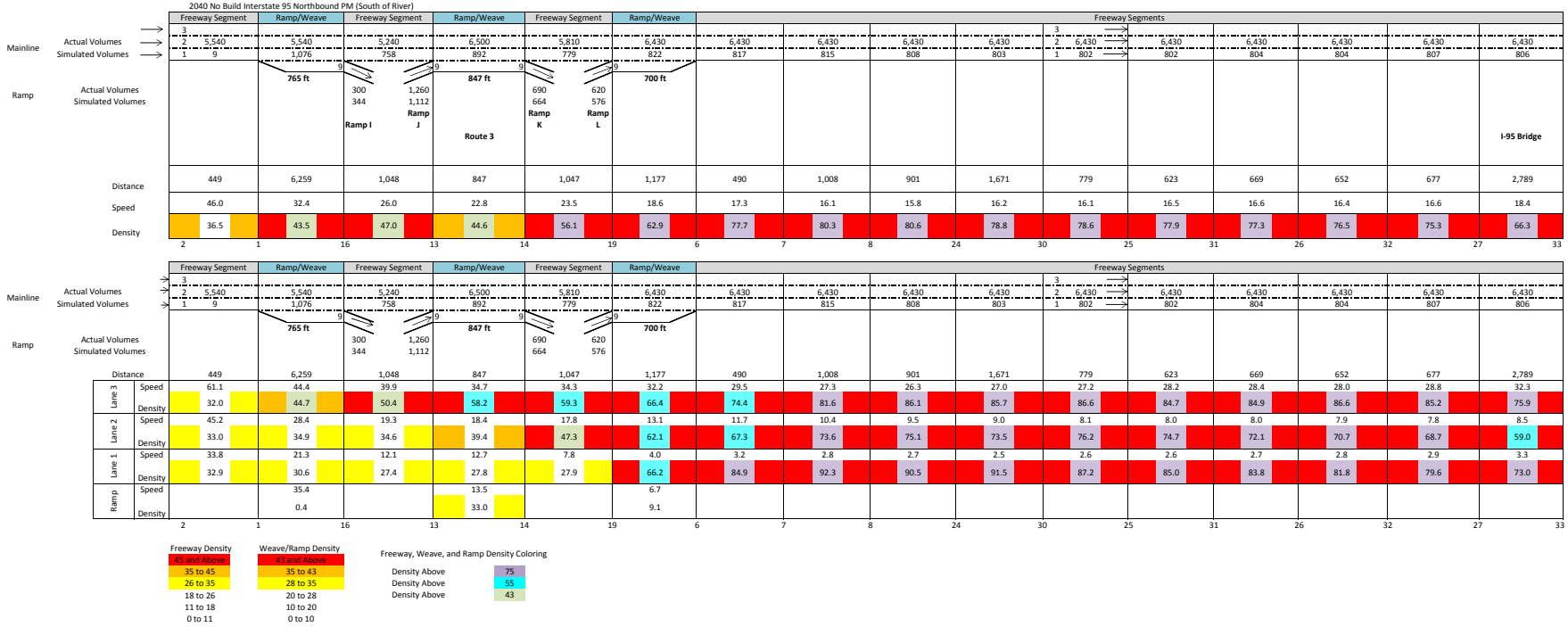




Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43



		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
Mainline	Actual Volumes	5,540	5,540	5,240	6,500	5,810	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430
	Simulated Volumes	9	1,076	758	892	779	822	817	815	808	803	802	802	804	804	807	806
Ramp	Actual Volumes		765 ft	300	1,260	847 ft	690	620	700 ft								I-95 Bridge
	Simulated Volumes			344	1,112		664	576									
				Ramp I	Ramp J	Route 3	Ramp K	Ramp L									
	Distance	449	6,259	1,048		847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
	Speed	46.0	32.4	26.0		22.8	23.5	18.6	17.3	16.1	15.8	16.2	16.1	16.5	16.6	16.4	16.6	18.4
	Density	36.5	43.5	47.0		44.6	56.1	62.9	77.7	80.3	80.6	78.8	78.6	77.9	77.3	76.5	75.3	66.3
		2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27	33

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
Mainline	Actual Volumes	5,540	5,540	5,240	6,500	5,810	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430	6,430
	Simulated Volumes	9	1,076	758	892	779	822	817	815	808	803	802	802	804	804	807	806
Ramp	Actual Volumes		765 ft	300	1,260	847 ft	690	620	700 ft								
	Simulated Volumes			344	1,112		664	576									
	Distance	449	6,259	1,048		847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
Lane 3	Speed	61.1	44.4	39.9		34.7	34.3	32.2	29.5	27.3	26.3	27.0	27.2	28.2	28.4	28.0	28.8	32.3
	Density	32.0	44.7	50.4		58.2	59.3	66.4	74.4	81.6	86.1	85.7	86.6	84.7	84.9	86.6	85.2	75.9
Lane 2	Speed	45.2	28.4	19.3		18.4	17.8	13.1	11.7	10.4	9.5	9.0	8.1	8.0	8.0	7.9	7.8	8.5
	Density	33.0	34.9	34.6		39.4	47.3	62.1	67.3	73.6	75.1	73.5	76.2	74.7	72.1	70.7	68.7	59.0
Lane 1	Speed	33.8	21.3	12.1		12.7	7.8	4.0	3.2	2.8	2.7	2.5	2.6	2.6	2.7	2.8	2.9	3.3
	Density	32.9	30.6	27.4		27.8	27.9	66.2	84.9	92.3	90.5	91.5	87.2	85.0	83.8	81.8	79.6	73.0
Ramp	Speed		35.4			13.5		6.7										
	Density		0.4			33.0		9.1										
		2	1	16	13	14	19	6	7	8	24	30	25	31	26	32	27	33

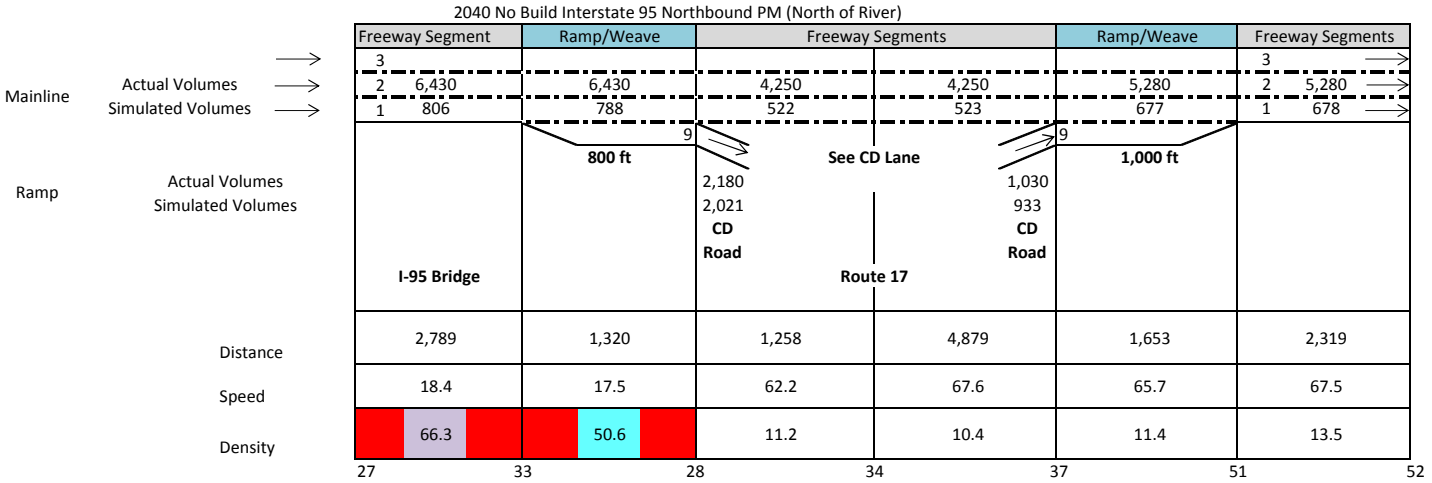
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

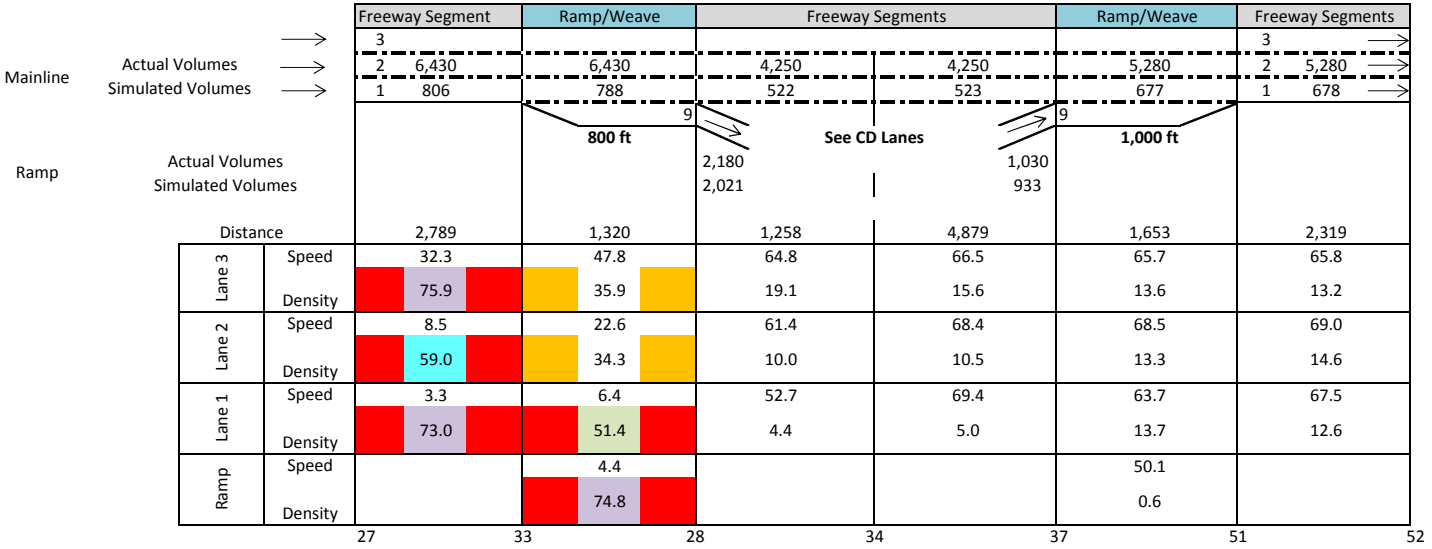
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring

Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 Northbound PM (North of River)





Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 Northbound CD Lanes PM

		Freeway Segments		Ramp/Weave		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
Mainline	Actual Volumes →	2 2,180	2,180	2,180	2,180	1,930 →	1,930	570	1,030	1,030 →
	Simulated Volumes →	1 263	261	261	261	1 226 →	266	40	152	1 148 →
Ramp				9 **179 ft**	9 **500 ft**	9 250 36 **Ramp A**	9 570 40 **Ramp B**	9 **655 ft** **Route 17**	1,930 226 **Ramp C**	9 460 112 **Ramp D**	9 **600 ft**	
	Distance	720	60	80	422	982	655	1,158	1,415	639
	Speed	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
	Density	159.7	82.2	82.9	81.5	147.6	101.8	3.4	9.3	12.5

28 38 55 56 35 40 43 45 50 37

		Freeway Segments		Ramp/Weave		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
	Actual Volumes →	2 1,330	1,330	1,330	1,330	2 1,150	1,760	340	750	2 750 →
	Simulated Volumes →	1 263	261	261	261	1 226	266	40	152	1 148 →
				9 **179 ft**	9 **500 ft**	9 120 35.9	9 610 40	9 **655 ft**	1,500 226	9 410 111.9	9 **600 ft**	
	Distance	720	60	80	422	982	655	1,158	1,415	639
Lane 2	Speed			5.6						
	Density			161.7						
Lane 1	Speed	6.6	15.2	30.7	5.7	6.1	7.7	45.5	45.3	47.2
	Density	159.5	9.4	4.7	159.5	148.5	36.1	3.4	13.0	12.5
Ramp/Auxillary Lane	Speed		5.8		34.7		4.6		31.4	
	Density		155.1		4.0		172.8		0.3	

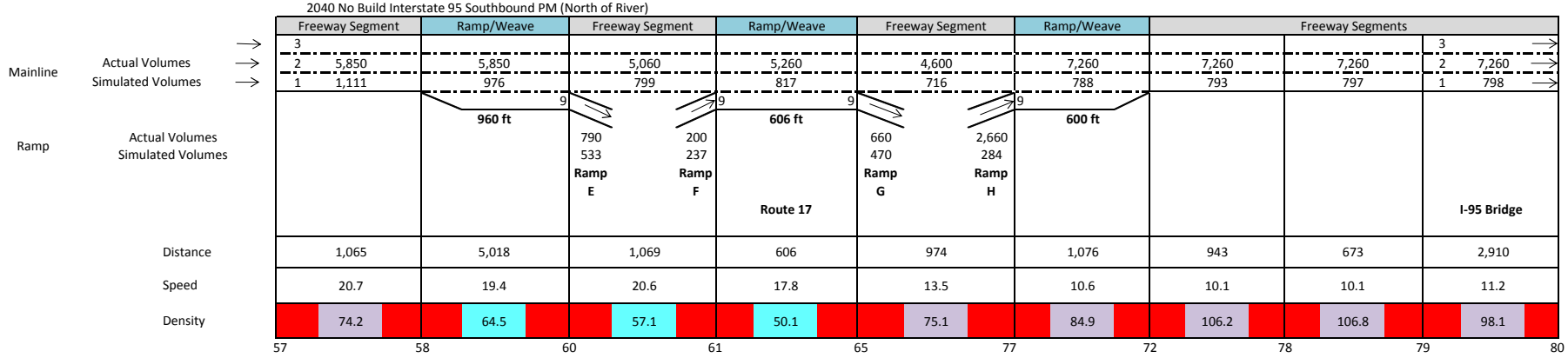
28 38 55 56 35 40 43 45 50 37

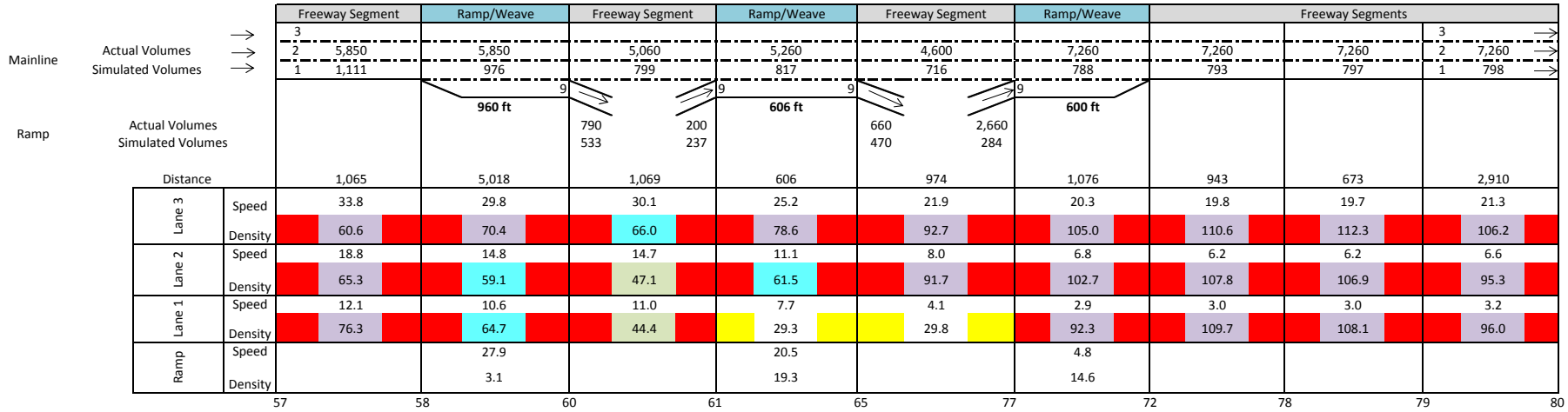
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 No Build Interstate 95 Southbound PM (North of River)

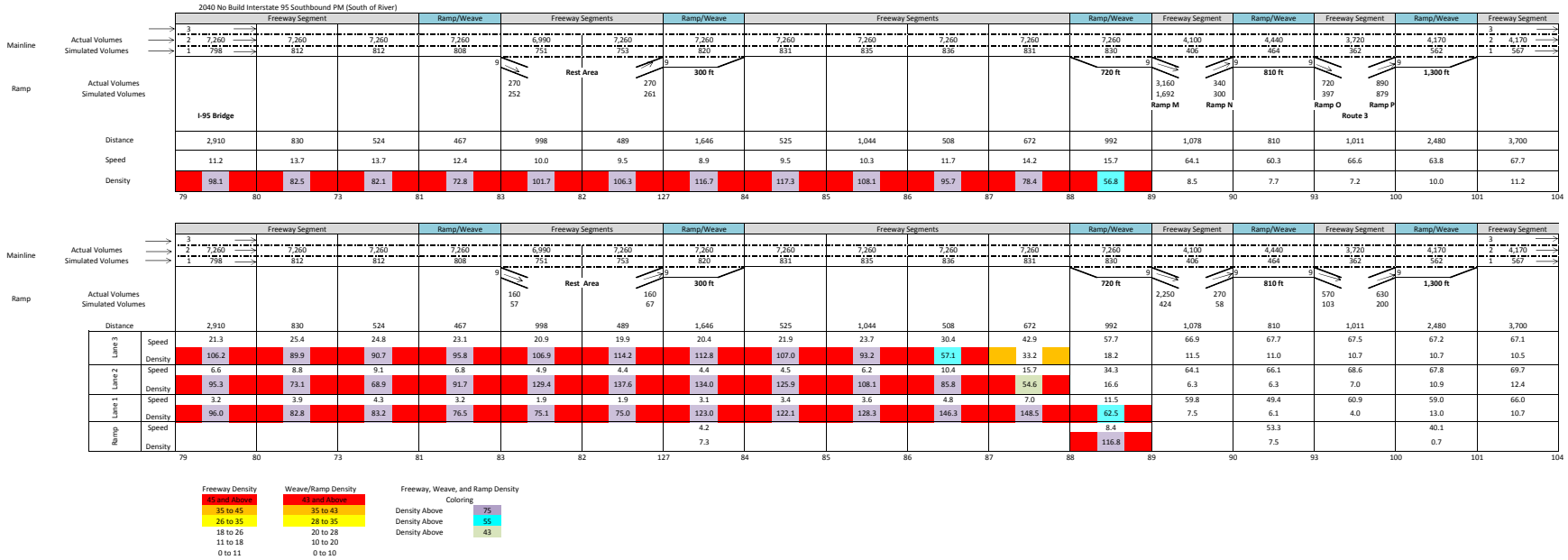




Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43



Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

Appendix C - Build Conditions/Preferred Alternative

Build Volume Methodology

I-95 Interstate Modification Study
Improvements to I-95 between Exit 133 and Exit 130
Build Volumes Methodology

The following methodology was used to develop the 2020 and 2040 Build traffic volumes traffic volumes for I-95, Route 3, and Route 17. The volumes for the 2020 and 2040 Build conditions were developed starting with the 2020 and 2040 No-Build volumes and diverting traffic to the proposed new infrastructure. Much of the diversion is associated with diverting traffic from the I-95 general purpose lanes to the parallel NB and SB Collector-Distributor (CD) lanes. However, with the increased capacity on I-95 it is expected that there will be some diversion of traffic from the local street network to the I-95 mainline and CD lanes increasing the overall traffic on I-95. This will also impact the build volumes at many of the interchange ramps at Route 3 and Route 17. The volumes shown here were developed for the Base Alternative – Alternative 1 (see Chapter 5 for description and graphic).

Travel Demand Model

The proposed Collector-Distributor (CD) lanes were added to the latest FAMPO regional travel demand model (Version 3.0 used for air quality conformity). They were coded as two lane freeways in each direction and braided with the appropriate Route 17 on- and off- ramps. The Express Lane ramps between Route 3 and Route 17 were removed from the model (in both the no-build and build scenarios) requiring access to the Express Lanes to happen north or south of our study area. No other improvements were made to the model.

The model was used to determine the amount of diversion to/from each of the arterial roads to I-95 due to the capacity improvements between Route 3 and Route 17 by comparing the 2035 No-Build model run to the 2035 Build model run.

Overall there are several major changes in traffic patterns:

- A portion of the traffic to and from north of the study area that previously utilized Route 1 will now use the I-95 mainline and CD roads.
- A portion of traffic to and from north of the study area that previously utilized the Route 17/I-95 Interchange and travelled east to Route 1 and then used either Fall Hill Avenue or Cowan Boulevard to access the retail areas will now use the I-95 mainline and CD roads and the Route 3 interchange.
- A portion of the traffic to and from west of the study area that previously travelled on on Route 17 to and from Route 1 and then used either Fall Hill Avenue or Cowan Boulevard will now use the I-95 mainline and CD roads and the Route 3 interchange.

The diversion shown in the tables below for the 2020 and 2040 Build conditions are based on applying engineering judgement, attempting to balance volumes across the network, looking at know capacity constraints, and taking into account the limitations of a regional model in providing accurate individual link volumes. The volumes shown in the tables below are the

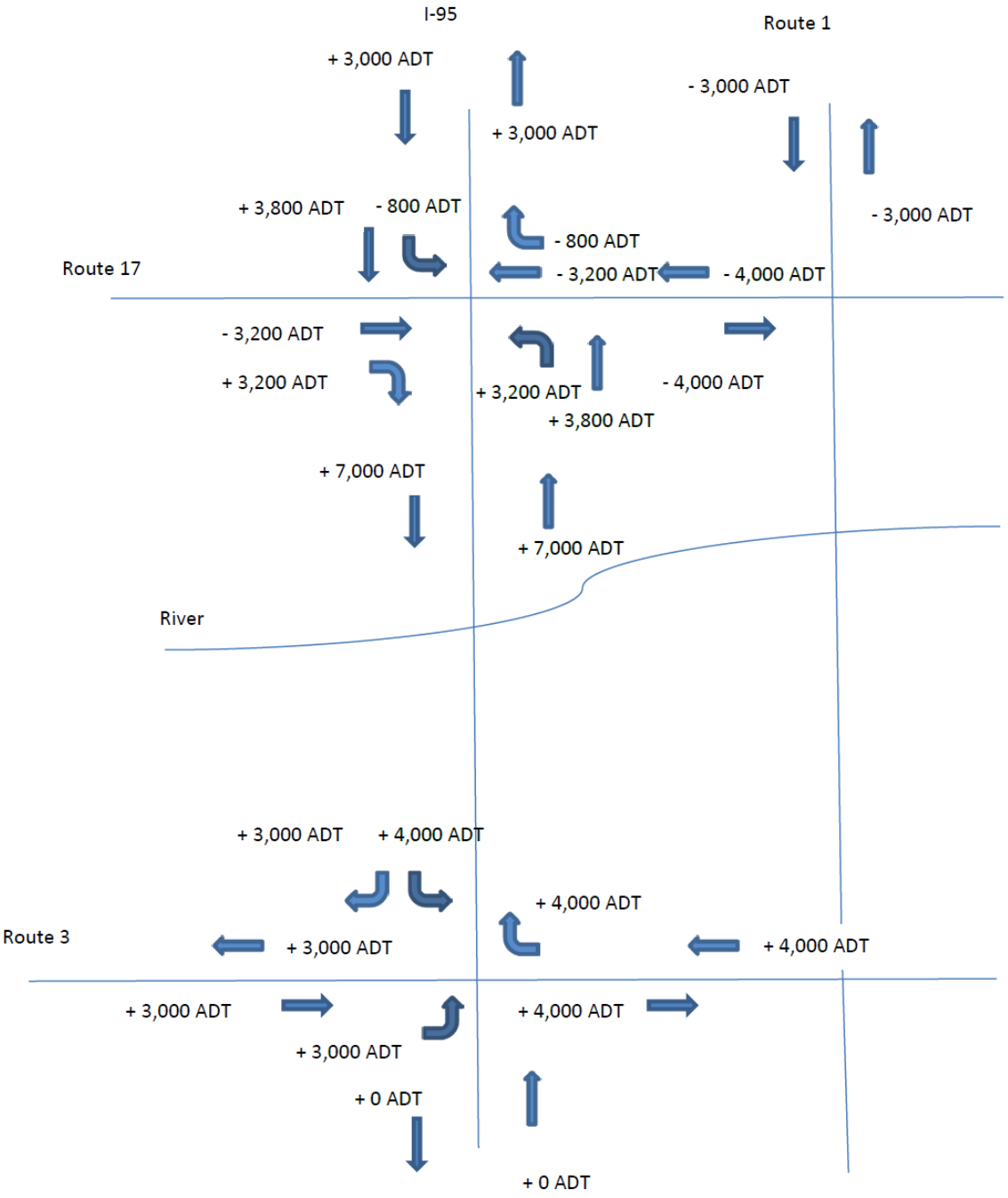
diversion at the key ramps at the Route 3 and Route 17 interchange. The 2020 diversion volumes were back-calculated by applying a 2.1 percent growth rate between (2020 and 2040), the same growth rate calculated for I-95 Route 17 interchange.

		Daily Volumes					
		2020 No-Build	Diversion	2020 Build	2040 No-Build	Diversion	2040 Build
Route 3 Interchange	I) NB to EB Off Ramp	4200	0	4200	5000	0	5000
	J) EB to NB On Loop Ramp	22300	2100	24400	28300	3000	31300
	K) NB to WB Off Loop Ramp	7200	0	7200	9200	0	9200
	L) WB to NB On Ramp	9700	2800	12500	11500	4000	15500
	M) SB to WB Off Ramp	24900	2100	27000	31700	3000	34700
	N) WB to SB On Loop Ramp	3500	0	3500	4100	0	4100
	O) SB to EB Off Loop Ramp	8200	2800	11000	9700	4000	13700
	P) EB to SB On Ramp	9000	0	-4700	11500	0	11500

		Daily Volumes					
		2020 No-Build	Diversion	2020 Build	2040 No-Build	Diversion	2040 Build
Route 17 Interchange	A) NB to EB Off Ramp	3200	0	3200	4100	0	4100
	B) EB to NB On Loop Ramp	7800	-600	7200	11100	-800	10300
	C) NB to WB Off Loop Ramp	21400	2300	23700	30600	3200	33800
	D) WB to NB On Ramp	6700	0	6700	8500	0	8500
	E) SB to WB Off Ramp	8700	0	8700	12500	0	12500
	F) WB to SB On Loop Ramp	2300	0	2300	2900	0	2900
	G) SB to EB Off Loop Ramp	7000	-600	6400	8900	-800	8100
	H) EB to SB On Ramp	24800	2300	27100	35400	3200	38600

These diversions are graphically shown in the figure on the next page.

I-95 IJR Diversion between 2040 No-Build and Build Conditions (Build minus No-Build)



Express Lanes Traffic Volumes

Express Lane volumes were not changed from the No-Build forecasts for the AM peak hour in the NB direction. The southbound I-95 mainline general purpose lanes are expected to operate under capacity for the 2040 Build condition during the PM peak hour reducing the advantage for the express lanes. Therefore for the 2040 PM peak hour Build conditions, 800 peak hour vehicles were diverted from the express lanes to the I-95 southbound general purpose lanes to bring them up to the LOS D/LOS E capacity threshold. It was assumed that the general purpose lanes would need to be congested before significant use of the Express Lanes would occur. The daily express lane northbound daily volumes were adjusted proportionally to the PM peak hour adjustment. The express lane volumes shown are consistent through the study area between the Route 3 interchange and the Route 17 interchange. The location of the entrance and exit lanes to the Express Lanes are also unknown but for this study it was assumed access to and from the Express Lanes would occur north of Route 17 or south of Route 3.

2020 and 2040 Build I-95 Mainline Daily Volumes

The diversion rates developed above were applied to the 2020 and 2040 No-Build ramp volumes at Exit 130 and Exit 133. The resulting ramp traffic volumes were added to and subtracted from the mainline volume south of Route 3 to develop northbound and southbound mainline volumes at locations between the interchanges, and north of Exit 133. The process is outlined below for both northbound and southbound directions. Please see the attached spreadsheet for the northbound and southbound directions showing the addition and subtraction of ramp volumes.

Northbound:

NB Mainline Volume south of Route 3 Interchange *(no change in volume)*

Subtract NB to EB Off-Ramp at Exit 130 *(no change in volume)*

Add EB to NB On-Ramp at Exit 130 *(diversion applied)*

Subtract NB to WB Off-Ramp at Exit 130 *(no change in volume)*

WB to NB On-Ramp at Exit 130 traffic added to NB CD-road (diversion applied)

NB Mainline Volume at River *(calculated)*

Subtract Route 17 interchange CD Road Off-Ramp at Exit 133 *(sum of NB to EB/SB Off-Ramp with diversion applied and NB to WB/NB Off-Ramp with diversion applied)*

Add NB CD road On-Ramp from Exit 130 *(WB to NB On-Ramp at Exit 130 traffic with diversion applied minus Route 3 to Route 17 traffic calculated)*

Add Route 17 interchange CD Road On-Ramp at Exit 133 *(sum of EB/SB to NB On-Ramp and WB/NB to NB On-Ramp with diversion applied)*

NB Mainline Volume north of Route 17 Interchange *(calculated)*

Southbound:

SB Mainline Volume south of Route 3 Interchange *(no change in volume)*

Subtract EB to SB On-Ramp at Exit 130 *(no change in volume)*

Add SB to EB Off-Ramp at Exit 130 *(diversion applied)*

Subtract WB to SB On-Ramp at Exit 130 *(no change in volume)*

SB CD road ends at SB to WB Off-Ramp at Exit 130 (diversion applied)

Subtract rest area On-Ramp *(no change in volume)*

SB Mainline Volume at River *(calculated)*

Subtract Route 17 interchange On-Ramp *(sum of EB/SB to SB On-ramp at Exit 133 with diversion applied plus WB/NB to SB On-ramp at Exist 133 minus the Route 17 to Route 3 traffic calculated)*

Add SB CD road Off-ramp to Exit 130 *(sum of SB to WB Off-Ramp at Exit 130 with diversion applied plus rest area Off-Ramp)*

Add Route 17 interchange Off-Ramp *(sum of SB to EB/SB Off-Ramp at Exit 133 with diversion applied plus SB to WB/NB Off-Ramp at Exit 133)*

SB Mainline Volume north of Route 17 Interchange *(calculated)*

Below are the 2020 & 2040 No-Build volumes and 2020 & 2040 Build volumes (totals for both directions) for I-95.

	Daily Volumes							
I-95	2020 No-Build			2020 Build				Difference
	GP Lanes	Express Lanes	Total	GP Lanes	Express Lanes	CD Lanes	Total	Total
South of Route 3	135,250	0	135,250	135,250	0	0	135,250	0
At River Crossing	176,430	0	176,430	144,350	0	41,880	186,230	9,800
North of US 17	154,860	0	154,860	158,860	0	0	158,860	4,000

	Daily Volumes							
I-95	2040 No-Build			2040 Build				Difference
	GP Lanes	Express Lanes	Total	GP Lanes	Express Lanes	CD Lanes	Total	Total
South of Route 3	174,560	18,250	192,810	178,310	14,500	0	192,810	0
At River Crossing	226,030	18,250	244,280	190,240	14,500	53,540	258,280	14,000
North of US 17	194,020	18,250	212,270	203,770	14,500	0	218,270	6,000

Peak Hour I-95 Mainline and Ramp Volumes

The build ramp volumes for the AM and PM peak hours were calculated by taking the ratio of the peak hour no-build ramp volume versus the daily ramp volume for each ramp and applying the ratio to the build ramp daily volumes. The same calculation was done for the mainline volume south of Route 3. The resulting ramp traffic volumes were added to and subtracted from the mainline volume south of Route 3 to develop northbound and southbound mainline volumes at locations between the interchanges, and north of Exit 133. The process is outlined above under the section *2020 and 2040 Build I-95 Mainline Daily Volumes* for both northbound and southbound directions. Below are the 2020 No-Build and Build daily and peak hour volumes (totals for both directions) for I-95 followed by the 2040 volumes.

		BAKER Existing 2013 Daily			BAKER Future 2020 NB Volume Daily			BAKER Future 2020 NB Volume AM Peak Hour			BAKER Future 2020 NB Volume PM Peak Hour			BAKER Diversion			BAKER Future 2020 Build Volume Daily				BAKER Future 2020 Build Volume AM Peak Hour				BAKER Future 2020 Build Volume PM Peak Hour			
		Mainline Vol	Ramp Vol	CD Road Vol	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	Mainline	Ramp	CD Road	Gen. Purpose + CD	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	Gen. Purpose + CD	General Purpose Mainline Vol	Ramp Vol	CD Road Vol	Gen. Purpose + CD	General Purpose Mainline Vol	Ramp Vol	CD Road Vol
SOUTHBOUND I-95																												
	Entering Volume (N of US 17)	**66,430**			**76,280**			**3,000**			**6,130**			**2000**			**78,280**	78,280			**3,090**	3,090			**6,340**	6,340		
																			15,160				840				1,030	
	E) SB to WB Off Ramp		7,430			8,730			490			550			**0**		**78,280**	63,120		15,160	**3,090**	2,250		840	**6,340**	5,310		1,030
		59,000			**67,550**			**2,510**			**5,580**						**69,550**	63,120	8,730	6,430	**2,600**	2,250	490	350	**5,790**	5,310	550	480
	F) WB to SB On Loop Ramp		2,070			2,290			120			150			**0**				2,290				120				150	
	(Now left turn onto EB/SB ramp	**61,070**			**69,840**			**2,630**			**5,730**																	
	G) SB to EB Off Loop Ramp		6,360			7,030			380			520			**-600**				6,430				350				480	
US 17 Interchange		**54,710**			**62,810**			**2,250**			**5,210**									0				0				0
	CD Road Off-Ramp for Exit 130																		23,450				690				2,280	
																	63,120	39,670		23,450	**2,250**	1,560		690	**5,310**	3,030		2,280
	Braided Ramp Volume														**0**			39,670	5,900			1,560	150			3,030	610	
	H) EB to SB On Ramp		21,130			24,830			980			1,870			**2300**				27,130				1,070				2,040	
																	69,020	39,670		29,350	**2,400**	1,560		840	**5,920**	3,030		2,890
	Combined F&H Ramp onto I-95 (minus braided volume)																		23,520				1,040				1,580	
	River Crossing	**75,840**			**87,640**			**3,230**			**7,080**						**92,540**	63,190		29,350	**3,440**	2,600		840	**7,500**	4,610		2,890
																	92,540	63,190		29,350	**3,440**	2,600		840	**7,500**	4,610		2,890
	Off Ramp from SB CD		2,000			2,350			110			190			**0**				2,350				110				190	
Rest Area		**73,840**			**85,290**			**3,120**			**6,890**						**90,190**	63,190		27,000	**3,330**	2,600		730	**7,310**	4,610		2,700
	On Ramp to SB CD		2,000			2,350			110			190			**0**				2,350				110				190	
	On-Ramp to I-95																			29,350				840				2,890
																			2,350				110				190	
	Cowan Boulevard Underpass	**75,840**			**87,640**			**3,230**			**7,080**						**92,540**	65,540		27,000	**3,440**	2,710		730	**7,500**	4,800		2,700
	M) SB to WB Off Ramp		22,530			24,900			670			2,490			**2100**				27,000				730				2,700	
		53,310			**62,740**			**2,560**			**4,590**						**65,540**	65,540		0	**2,710**	2,710		0	**4,800**	4,800		0
	N) WB to SB On Loop Ramp		3,260			3,490			150			290			**0**				3,490				150				290	
Route 3 Interchange		**56,570**			**66,230**			**2,710**			**4,880**						**69,030**	69,030			**2,860**	2,860			**5,090**	5,090		
	O) SB to EB Off Loop Ramp		7,630			8,160			430			610			**2800**				10,960				580				820	
		48,940			**58,070**			**2,280**			**4,270**						**58,070**	58,070			**2,280**	2,280			**4,270**	4,270		
	P) EB to SB On Ramp		8,150			9,010			350			700			**0**				9,010				350				700	
	South of Route 3	**57,090**			**67,080**			**2,630**			**4,970**			**0**			**67,080**	67,080			**2,630**	2,630			**4,970**	4,970		
	SB Off Ramp		17,150																									
US 1 Interchange		**39,940**																										
	SB On Ramp		5,760																									
	South of US 1	**45,700**																										
NORTHBOUND I-95																												
	Entering Volume (S of Route1)	**47,060**																										
	NB to EB Off Ramp		5,470																									
US 1 Interchange		**41,590**																										
	NB to WB Off Loop Ramp		1,950																									
		39,640																										
	EB/WB to NB On Ramp		18,380																									
	Entering Volume (S of Route3)	**58,020**			**68,170**			**4,100**			**3,890**			**0**			**68,170**	68,170			**4,100**	4,100			**3,890**	3,890		
	I) NB to EB Off Ramp		3,920			4,190			290			260			**0**				4,190				290				260	
		54,100			**63,980**			**3,810**			**3,630**						**63,980**	63,980			**3,810**	3,810			**3,630**	3,630		
Route 3 Interchange	J) EB to NB On Loop Ramp		20,160			22,280			2,120			990			**2100**				24,380				2,320				1,080	
		74,260			**86,260**			**5,930**			**4,620**						**88,360**	88,360			**6,130**	6,130			**4,710**	4,710		
	K) NB to WB Off Loop Ramp		6,520			7,200			310			540			**0**				7,200				310				540	
		67,740			**79,060**			**5,620**			**4,080**						**81,160**	81,160			**5,820**	5,820			**4,170**	4,170		
	L) WB to NB On Ramp onto CD Road		9,090			9,730			890			520			**2800**				12,530				1,150				670	
	Cowan Boulevard Underpass	**76,830**			**88,790**			**6,510**			**4,600**						**93,690**	81,160		12,530	**6,970**	5,820		1,150	**4,840**	4,170		670
	River Crossing	**76,830**															**93,690**	81,160		12,530	**6,970**	5,820		1,150	**4,840**	4,170		670
	US 17 CD Road Off Ramp			21,180			24,680			1,890			1,550						24,580				1,890				1,540	
	Braided Ramp Volume														**0**			56,580	2,400			3,930	190			2,630	150	
	New CD On-Ramp from Exit 130																		10,130				960				520	
																	93,690	66,710		26,980	**6,970**	4,890		2,080	**4,840**	3,150		1,690
	A) NB to EB Off Ramp		2,930			3,240			130			200			**0**				3,240				130				200	
		55,650		18,250	**64,110**		21,440	**4,620**		1,760	**3,050**		1,350				**90,450**	66,710		23,740	**6,840**	4,890		1,950	**4,640**	3,150		1,490
	C) NB to WB Off Loop Ramp		18,250			21,440			1,760			1,350			**2300**				23,740				1,950				1,490	
US 17 Interchange		**55,650**		0	**64,110**		0	**4,620**		0	**3,050**		0				**66,710**	66,710			**4,890**	4,890			**3,150**	3,150		
	B) EB to NB On Loop Ramp		6,620			7,780			720			400			**0**				7,780				720				400	
		55,650		6,620	**64,110**		7,780	**4,620**		720	**3,050**		400				**74,490**	66,710		7,780	**5,610**	4,890		720	**3,550**	3,150		400
	D) WB to NB On Ramp		6,050			6,690			450			360			**-600**				6,090				410				330	
				12,670			14,470			1,170			760							13,870				1,130				730
	North of Route 17	**68,320**			**78,580**			**5,790**			**3,810**			**2000**			**80,580**	80,580			**6,020**	6,020			**3,880**	3,880		

2040 Build Traffic Volumes

		BAKER Existing 2013 Daily			BAKER Future 2040 NB Volume Daily					BAKER Future 2040 NB Volume AM Peak Hour					BAKER Future 2040 NB Volume PM Peak Hour					BAKER Diversion			BAKER Future 2040 Build Volume Daily					BAKER Future 2040 Build Volume AM Peak Hour					BAKER Future 2040 Build Volume PM Peak Hour				
		Mainline Vol	Ramp Vol	CD Road Vol	Gen. Purpose + Express	General Purpose Mainline Vol	Express Lane Daily Vol	Ramp Vol	CD Road Vol	Gen. Purpose + Express	General Purpose Mainline Vol	Express Lane Peak Hour Vol	Ramp Vol	CD Road Vol	Gen. Purpose + Express	General Purpose Mainline Vol	Express Lane Peak Hour Vol	Ramp Vol	CD Road Vol	Mainline	Ramp	CD Road	Gen. Purpose + Express+CD	General Purpose Mainline Vol	Express Lane Daily Vol	Ramp Vol	CD Road Vol	Gen. Purpose + Express+CD	General Purpose Mainline Vol	Express Lane Peak Hour Vol	Ramp Vol	CD Road Vol	Gen. Purpose + Express+CD	General Purpose Mainline Vol	Express Lane Peak Hour Vol	Ramp Vol	CD Road Vol
SOUTHBOUND I-95																																					
	Entering Volume (N of US 17)	**66,430**			**104,470**	92,920				**4,130**	4,130				**8,330**	5,850				**3000**			**107,470**	99,670				**4,250**	4,250				**8,630**	6,950			
	US 17 CD Road Off-Ramp																									20,590				1,140				1,390	
	E) SB to WB Off Ramp		7,430					12,450					700					790			**0**		**107,470**	79,080		20,590	**4,250**	3,110		1,140	**8,630**	5,560		1,390	
	F) WB to SB On Loop Ramp (Now left turn onto EB/SB ramp	**59,000**	2,070		**92,020**	80,470		2,910		**3,430**	3,430		150		**7,540**	5,060		200		**0**			**95,020**	79,080		12,450	8,140	**3,550**	3,110		700	440	**7,840**	5,560		790	600
	G) SB to EB Off Loop Ramp	**61,070**	6,360		**94,930**	83,380		8,940		**3,580**	3,580		480		**7,740**	5,260		660		**-800**						2,910				150				200	
US 17 Interchange		**54,710**			**85,990**	74,440				**3,100**	3,100				**7,080**	4,600										8,140	0			440	0			600	0
	CD Road Off-Ramp for Exit 130 (plus rest area)																									30,500				810				3,130	
	Braided Ramp Volume H) EB to SB On Ramp		21,130					35,390					1,390					2,660			**3200**		**86,880**	48,580		30,500	**3,110**	2,300		810	**7,240**	2,430		3,130	
	Combined F&H Ramp onto I-95 (minus braided volume)																							48,580		7,500		2,300		280		2,430		600	
	River Crossing	**75,840**			**121,380**	109,830	11,550			**4,490**	4,490	0			**9,740**	7,260	2,480						**94,380**	48,580		38,590 34,000	38,000	**3,390**	2,300		1,520 1,390	1,090	**7,840**	2,430		2,900 2,500	3,730
	Off Ramp from SB CD		2,000					3,350					150					270			**0**		**128,380**	82,580	7,800		38,000	**4,780**	3,690	0		1,090	**10,340**	4,930	1,680		3,730
Rest Area	On Ramp to SB CD	**73,840**	2,000		**118,030**	106,480		3,350		**4,340**	4,340		150		**9,470**	6,990		270			**0**		**128,380**	82,580			38,000	**4,780**	3,690			1,090	**10,340**	4,930		270	3,730
	On-Ramp to I-95																						**125,030**	82,580		3,350	34,650	**4,630**	3,690		150	940	**10,070**	4,930		270	3,460
	Cowan Boulevard Underpass	**75,840**			**121,380**	109,830				**4,490**	4,490				**9,740**	7,260										3,350	38,000				150	1,090				270	3,730
	M) SB to WB Off Ramp		22,530					31,650					860					3,160			**3000**		**128,380**	85,930			34,650	**4,780**	3,840			940	**10,340**	5,200			3,460
	N) WB to SB On Loop Ramp	**53,310**	3,260		**89,730**	78,180		4,140		**3,630**	3,630		180		**6,580**	4,100		340		**0**			**93,730**	85,930		34,650 4,140	0	**3,840**	3,840		940 180	0	**6,880**	5,200		340	0
Route 3 Interchange	O) SB to EB Off Loop Ramp	**56,570**	7,630		**93,870**	82,320		9,690		**3,810**	3,810		510		**6,920**	4,440		720		**4000**			**97,870**	90,070		13,690		**4,020**	4,020		720		**7,220**	5,540		1,020	
	P) EB to SB On Ramp	**48,940**	8,150		**84,180**	72,630		11,450		**3,300**	3,300		450		**6,200**	3,720		890		**0**			**84,180**	76,380		11,450		**3,300**	3,300		450		**6,200**	4,520		890	
	South of Route 3	**57,090**			**95,630**	84,080				**3,750**	3,750				**7,090**	4,610				**0**			**95,630**	87,830				**3,750**	3,750				**7,090**	5,410			
US 1 Interchange	SB Off Ramp	**39,940**	17,150																																		
	SB On Ramp		5,760																																		
	South of US 1	**45,700**																																			
NORTHBOUND I-95																																					
	Entering Volume (S of Route1)	**47,060**																																			
	NB to EB Off Ramp		5,470																																		
US 1 Interchange	NB to WB Off Loop Ramp	**41,590**	1,950																																		
	EB/WB to NB On Ramp	**39,640**	18,380																																		
	Entering Volume (S of Route3)	**58,020**			**97,180**	90,480				**5,850**	3,390				**5,540**	5,540				**0**			**97,180**	90,480				**5,850**	3,390				**5,540**	5,540			
	I) NB to EB Off Ramp		3,920					4,980					340					300			**0**					4,980				340				300	
	J) EB to NB On Loop Ramp	**54,100**	20,160		**92,200**	85,500		28,320		**5,510**	3,050		2,700		**5,240**	5,240		1,260		**3000**			**92,200**	85,500		31,320		**5,510**	3,050		2,990		**5,240**	5,240		1,390	
Route 3 Interchange	K) NB to WB Off Loop Ramp	**74,260**	6,520		**120,520**	113,820		9,160		**8,210**	5,750		390		**6,500**	6,500		690		**0**			**123,520**	116,820		9,160		**8,500**	6,040		390		**6,630**	6,630		690	
	L) WB to NB On Ramp onto CD Road	**67,740**	9,090		**111,360**	104,660		11,540		**7,820**	5,360		1,050		**5,810**	5,810		620		**4000**			**114,360**	107,660		15,540		**8,110**	5,650		1,410		**5,940**	5,940		830	
	Cowan Boulevard Underpass	**76,830**			**122,900**	116,200				**8,870**	6,410				**6,430**	6,430							**129,900**	107,660			15,540	**9,520**	5,650			1,410	**6,770**	5,940			830
	River Crossing	**76,830**			**122,900**	116,200	6,700			**8,870**	6,410	2,460			**6,430**	6,430	0						**129,900**	107,660	6,700		15,540	**9,520**	5,650	2,460		1,410	**6,770**	5,940	0		830
	US 17 CD Road Off Ramp			21,180					34,690					2,680					2,180					72,070		35,590		2,910		2,740		3,690		2,250	
	Braided Ramp Volume New CD On-Ramp from Exit 130																									2,300 13,240				200 1,210				130 700	
	A) NB to EB Off Ramp	**55,650**	2,930	18,250	**88,210**	81,510		4,120 30,570	30,570	**6,190**	3,730		170 2,510	2,510	**4,250**	4,250		250 1,930	1,930		**0**		**129,900**	85,310		4,120 33,770	37,890	**9,520**	4,120		170 2,770	2,940	**6,770**	4,390		250 2,130	2,380
US 17 Interchange	C) NB to WB Off Loop Ramp	**55,650**	18,250	0	**88,210**	81,510			0	**6,190**	3,730			0	**4,250**	4,250			0		**3200**		**125,780**	85,310			33,770	**9,350**	4,120			2,770	**6,520**	4,390			2,130
	B) EB to NB On Loop Ramp	**55,650**	6,620	6,620	**88,210**	81,510		11,090	11,090	**6,190**	3,730		1,020	1,020	**4,250**	4,250		570	570		**0**		**92,010**	85,310		11,090		**6,580**	4,120		1,020		**4,390**	4,390		570	
	D) WB to NB On Ramp		6,050	12,670				8,500	19,590				580	1,600				460	1,030		**-800**		**103,100**	85,310		7,700	18,790	**7,600**	4,120		530	1,550	**4,960**	4,390		420	990
	North of Route 17	**68,320**			**107,800**	101,100				**7,790**	5,330				**5,280**	5,280				**3000**			**110,800**	104,100				**8,130**	5,670				**5,380**	5,380			

Travel between Route 3 and Route 17

Historically, there has been a large desire to travel from Route 3 to Route 17 and back. Using MioVision cameras, license plates were recorded and matched to determine the amount of travel between Route 3 and Route 17 ramps during the AM and PM peak hours. Data was collected on August 6, 2013 from the following on and off ramps:

- Route 3 EB to NB on-ramp (Ramp J)
- Route 3 WB to NB on-ramp (Ramp L)
- I-95 NB to WB/NB Route 17 off-ramp (Ramp C)
- I-95 NB to EB/SB Route 17 off-ramp (Ramp A)
- Route 17 WB/NB to SB on-ramp (Ramp F)
- Route 17 EB/SB to SB on-ramp (Ramp H)
- I-95 SB to WB Route 3 off-ramp (Ramp M)
- I-95 SB to EB Route 3 off-ramp (Ramp O)

The matching of license plates is summarized in the table below showing the movements between pairs of ramps.

Ramp From	Ramp To	AM Total (6:15-8:15)			PM Total (3:30-5:30)		
		Off Ramp	Total of Off Ramp from On Ramp	Percentage from On Ramp	Off Ramp	Total of Off Ramp from On Ramp	Percentage from On Ramp
J: Rt. 3 Plank Rd EB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	2,092	500	24%	1,835	431	23%
J: Rt. 3 Plank Rd EB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	39	3	8%	76	16	21%
L: Rt. 3 Plank Rd WB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	2,092	197	9%	1,835	173	9%
L: Rt. 3 Plank Rd WB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	39	2	5%	76	5	7%
F: Rt. 17 Warrenton Rd WB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	760	21	3%	2,892	53	2%
F: Rt. 17 Warrenton Rd WB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	563	7	1%	845	8	1%
H: Rt. 17 Warrenton Rd EB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	760	139	18%	2,892	597	21%
H: Rt. 17 Warrenton Rd EB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	563	114	20%	845	129	15%

The build alternative will result in the braiding of many of the Route 3 and Route 17 ramps. To provide access between Route 3 and Route 17, roadway links connecting the braided ramps are provided. The NB braided ramp connector allows the Route 3 WB to NB ramp to access Route 17. The SB braided ramp connector allows the Route 17 SB ramps to access WB Route 3. The following tables show the amount of traffic in each peak period that will use the braided ramp connectors. Volumes were calculated by multiplying the forecast ramp volumes by the percentage match between ramps collected with the MioVision cameras.

Ramp From	Ramp To	2020 AM Peak Hour			2020 PM Peak Hour			Comment
		Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	
J: Rt. 3 Plank Rd EB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	1950	24%	0	1490	23%	0	On-Ramp does not have access to NB CD Road
J: Rt. 3 Plank Rd EB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	130	8%	0	200	21%	0	On-Ramp does not have access to NB CD Road
L: Rt. 3 Plank Rd WB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	1950	9%	184	1490	9%	140	
L: Rt. 3 Plank Rd WB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	130	5%	7	200	7%	13	
Total NB CD Road Braided Ramp Connector				190			154	
F: Rt. 17 Warrenton Rd WB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	730	3%	20	2700	2%	49	
F: Rt. 17 Warrenton Rd WB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	580	1%	0	820	1%	0	Off-Ramp does not have access to SB CD Road
H: Rt. 17 Warrenton Rd EB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	730	18%	134	2700	21%	557	
H: Rt. 17 Warrenton Rd EB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	580	20%	0	820	15%	0	Off-Ramp does not have access to SB CD Road
Total SB CD Road Braided Ramp Connector				154			607	

Ramp From	Ramp To	2040 AM Peak Hour			2040 PM Peak Hour			Comment
		Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	
J: Rt. 3 Plank Rd EB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	2770	24%	0	2130	23%	0	On-Ramp does not have access to NB CD Road
J: Rt. 3 Plank Rd EB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	170	8%	0	250	21%	0	On-Ramp does not have access to NB CD Road
L: Rt. 3 Plank Rd WB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	2770	9%	261	2130	9%	201	
L: Rt. 3 Plank Rd WB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	170	5%	9	250	7%	16	
Total NB CD Road Braided Ramp Connector				270			217	
F: Rt. 17 Warrenton Rd WB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	940	3%	26	3460	2%	63	
F: Rt. 17 Warrenton Rd WB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	720	1%	0	1020	1%	0	Off-Ramp does not have access to SB CD Road
H: Rt. 17 Warrenton Rd EB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	940	18%	172	3460	21%	714	
H: Rt. 17 Warrenton Rd EB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	720	20%	0	1020	15%	0	Off-Ramp does not have access to SB CD Road
Total SB CD Road Braided Ramp Connector				198			778	

Intersection Turn Movement Volumes

Build turn movement volumes for the intersections along Route 3 and Route 17 were calculated by determining how much of the traffic diverted to/from the Route 3 and Route 17 passes through the intersections. The following diversion was assumed:

- Intersection 1: 50% of the traffic diverted to Ramp M (I-95 SB to WB Route 3 off-ramp) and Ramp L (Route 3 WB to NB on-ramp) passed through this intersection in both directions. This is traffic that would have used Fall Hill Avenue to Route 1 via the Route 3/Fall Hill intersection immediately to the west of Intersection 1.

- Intersection 2: 50% of the traffic diverted to Ramp M (I-95 SB to WB Route 3 off-ramp) and Ramp L (Route 3 WB to NB on-ramp) was diverted to and from the north leg of the

intersection. This is traffic that would have used Cowan Boulevard or Fall Hill and Route 1 to get to the commercial/retail areas.

- Intersection 3: 100% of the traffic diverted to Ramp J (Route 3 EB to NB on-ramp) and Ramp O (I-95 SB to EB Route 3 off-ramp) passed through this intersection in both directions. This is traffic that would have used Route 1 instead of I-95.

- Intersection 4: No diversion impact

- Intersection 5: No diversion impact

- Intersection 6: 100% of the traffic diverted to Ramp H (Route 17 EB/SB to SB on-ramp) and Ramp K (I-95 NB to WB/NB Route 17 off-ramp) are removed from the through movement at this intersection in both directions. This is traffic that would have used Route 17 to Route 1 but now uses I-95. 100% of the traffic removed from Ramp D (Route 17 WB/NB to NB on-ramp) and Ramp G (I-95 SB to EB/SB Route 17 off-ramp) are removed from the through movement at this intersection in both directions. This is traffic that would have used Route 17 to Route 1 but now uses I-95

As was done for the existing conditions and no-build conditions, the turn movement volumes at the intersections adjacent to the I-95 interchanges at Exit 130 (Route 3) and Exit 133 (Route 17), were adjusted to balance the intersection volumes with the ramp volumes through the interchange. Route 3 and Route 17 intersection balancing adjustment spreadsheets are included after the discussion for reference. Note that this was mainly a checking exercise since the No-build volumes were already balanced from which volumes were diverted to the proposed I-95 improvements.

Route 3 and Route 17 Volumes Average Daily Traffic Volumes (ADT)

As was done for the existing and no-build conditions, ADT volumes were developed on Route 3 and Route 17 to the immediate east and west of the I-95 interchange. The ramp tube counts at Exit 130 and Exit 133 were utilized to determine AM and PM peak hour K-Factors for both Eastbound and Westbound Route 3 and WB/NB Route 17 (shown as NB in tables below) and EB/SB Route 17 (shown as SB in tables below). The respective K-Factors were applied to the peak hour turn movements of the intersections adjacent to the interchange. The ADT volumes developed based on the AM peak hour turn movements and K-Factor were averaged with the ADT volumes developed based on the PM peak hour turn movements and K-Factor for each roadway direction. Detailed information for each location is shown below.

2020 Build ADT Calculations for Route 3 and Route 17

Route 3 - West of Interchange

	Peak Hour Route 3 west of Interchange		K-Factor Route 3 west of Interchange		Calculated Daily Volume Route 3 west of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	3,270	1,380	0.0565	0.0565	57,876	24,425	**82,301**	(based on AM peaks)
PM Peak Hour	2,280	3,070	0.0701	0.0701	32,525	43,795	**76,320**	(based on PM peaks)
					45,200	34,100	**79,300**	AM & PM Average
	based on Carl D Silver Pkwy TMs		based on Exit 130 Ramps					

Route 3 - East of Interchange

	Peak Hour Route 3 east of Interchange		K-Factor Route 3 east of Interchange		Calculated Daily Volume Route 3 east of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	1,710	1,880	0.0565	0.0565	30,265	33,274	**63,540**	(based on AM peaks)
PM Peak Hour	2,070	1,890	0.0701	0.0701	29,529	26,961	**56,491**	(based on PM peaks)
					29,900	30,100	**60,000**	AM & PM Average
	based on Gateway Blvd TMs		based on Exit 130 Ramps					

Route 17 - West of Interchange

	Peak Hour Route 17 west of Interchange		K-Factor Route 17 west of Interchange		Calculated Daily Volume Route 17 west of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	2,600	2,150	0.0616	0.0616	42,208	34,903	**77,110**	(based on AM peaks)
PM Peak Hour	2,210	2,760	0.0664	0.0664	33,283	41,566	**74,849**	(based on PM peaks)
					37,700	38,200	**76,000**	AM & PM Average
	based on Sanford Dr TMs		based on Exit 133 Ramps					

Route 17 - East of Interchange

	Peak Hour Route 17 east of Interchange		K-Factor Route 17 east of Interchange		Calculated Daily Volume Route 17 east of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	1,050	1,080	0.0616	0.0616	17,045	17,532	**34,578**	(based on AM peaks)
PM Peak Hour	960	1,850	0.0664	0.0664	14,458	27,861	**42,319**	(based on PM peaks)
					15,800	22,700	**38,400**	AM & PM Average
	based on Short St TMs		based on Exit 133 Ramps					

2040 Build ADT Calculations for Route 3 and Route 17

Route 3 - West of Interchange

	Peak Hour Route 3 west of Interchange		K-Factor Route 3 west of Interchange		Calculated Daily Volume Route 3 west of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	4,170	1,750	0.0565	0.0565	73,805	30,973	**104,779**	(based on AM peaks)
PM Peak Hour	2,890	3,900	0.0701	0.0701	41,227	55,635	**96,862**	(based on PM peaks)
					57,500	43,300	**100,800**	AM & PM Average
	based on Carl D Silver Pkwy TMs		based on Exit 130 Ramps					

Route 3 - East of Interchange

	Peak Hour Route 3 east of Interchange		K-Factor Route 3 east of Interchange		Calculated Daily Volume Route 3 east of Interchange			
	EB	WB	EB	WB	EB	WB	**Total**	
AM Peak Hour	2,080	2,310	0.0565	0.0565	36,814	40,885	**77,699**	(based on AM peaks)
PM Peak Hour	2,560	2,320	0.0701	0.0701	36,519	33,096	**69,615**	(based on PM peaks)
					36,700	37,000	**73,700**	AM & PM Average
	based on Gateway Blvd TMs		based on Exit 130 Ramps					

Route 17 - West of Interchange

	Peak Hour Route 17 west of Interchange		K-Factor Route 17 west of Interchange		Calculated Daily Volume Route 17 west of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	3,720	3,040	0.0616	0.0616	60,390	49,351	**109,740**	(based on AM peaks)
PM Peak Hour	3,160	3,940	0.0664	0.0664	47,590	59,337	**106,928**	(based on PM peaks)
					54,000	54,300	**108,300**	AM & PM Average
	based on Sanford Dr TMs		based on Exit 133 Ramps					

Route 17 - East of Interchange

	Peak Hour Route 17 east of Interchange		K-Factor Route 17 east of Interchange		Calculated Daily Volume Route 17 east of Interchange			
	NB	SB	NB	SB	NB	SB	**Total**	
AM Peak Hour	1,380	1,430	0.0616	0.0616	22,403	23,214	**45,617**	(based on AM peaks)
PM Peak Hour	1,240	2,420	0.0664	0.0664	18,675	36,446	**55,120**	(based on PM peaks)
					20,500	29,800	**50,400**	AM & PM Average
	based on Short St TMs		based on Exit 133 Ramps					

Build Volumes for Preferred Alternative

The build volumes shown in the above methodology represent the 2020 and 2040 volumes for the base alternative: Alternative 1 shown in Figure 5-1 in Volume II. The volumes were adjusted at several locations for the preferred alternative – Alternative 3A shown in Figure 6-1 in Volume II due to the differences in infrastructure proposed between the two alternatives. The resulting 2020 build volumes are shown in Figures 6-8A & B in Volume II while the resulting 2040 build volumes are shown in Figures 6-10A & B in Volume II. Key locations where the volumes change include:

- The NB C-D Road volumes increase in Alternative 3A as the volume from Ramp J (EB to NB on-ramp at Route 3) is removed from the I-95 mainline and added to the NB C-D Road.

- The above change results in higher volumes for the NB braided ramp connector. The new volumes are shown in the tables on the next page.

- New Intersection 9: This intersection is created when Ramp J (EB to NB on-ramp at Route 3) is removed and the movement becomes a triple left turn on EB Route 3.

- New Intersection 8: This intersection is created when the terminus of Ramp M (I-95 SB to WB off-ramp) is signalized at Route 3.

- Intersection 2: Some WB traffic that turned right at this location is now on the bypass right turn lane from Ramp M (I-95 SB to WB off-ramp at Route 3).

- Intersection 5: Traffic from Ramp C (I-95 NB to WB/NB Route 17) will pass over intersection 5 and be removed from the WB/NB approach.

- Intersection 4: Some WB/NB traffic that turned left or right at Intersection 5 is now on the flyover and will make a right turn or U-turn at this location.

Braided Ramps Connector Road Build Volumes for Preferred Alternative

Ramp From	Ramp To	2020 AM Peak Hour			2020 PM Peak Hour			Comment
		Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	
J: Rt. 3 Plank Rd EB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	1950	24%	466	1490	23%	350	
J: Rt. 3 Plank Rd EB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	130	8%	10	200	21%	42	
L: Rt. 3 Plank Rd WB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	1950	9%	184	1490	9%	140	
L: Rt. 3 Plank Rd WB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	130	5%	7	200	7%	13	
Total NB CD Road Braided Ramp Connector				666			546	
F: Rt. 17 Warrenton Rd WB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	730	3%	20	2700	2%	49	
F: Rt. 17 Warrenton Rd WB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	580	1%	0	820	1%	0	Off-Ramp does not have access to SB CD Road
H: Rt. 17 Warrenton Rd EB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	730	18%	134	2700	21%	557	
H: Rt. 17 Warrenton Rd EB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	580	20%	0	820	15%	0	Off-Ramp does not have access to SB CD Road
Total SB CD Road Braided Ramp Connector				154			607	

Ramp From	Ramp To	2040 AM Peak Hour			2040 PM Peak Hour			Comment
		Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	Off-Ramp Volumes	Percentage Using Braided Ramp	Volume to Use Braided Ramp Connector	
J: Rt. 3 Plank Rd EB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	2770	24%	662	2130	23%	500	
J: Rt. 3 Plank Rd EB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	170	8%	13	250	21%	53	
L: Rt. 3 Plank Rd WB to I-95 NB	C: I-95 NB to Rt 17 Warrenton Rd WB	2770	9%	261	2130	9%	201	
L: Rt. 3 Plank Rd WB to I-95 NB	A: I-95 NB to Rt 17 Warrenton Rd EB	170	5%	9	250	7%	16	
Total NB CD Road Braided Ramp Connector				945			770	
F: Rt. 17 Warrenton Rd WB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	940	3%	26	3460	2%	63	
F: Rt. 17 Warrenton Rd WB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	720	1%	0	1020	1%	0	Off-Ramp does not have access to SB CD Road
H: Rt. 17 Warrenton Rd EB to I-95 SB	M: I-95 to Rt. 3 Plank Road WB	940	18%	172	3460	21%	714	
H: Rt. 17 Warrenton Rd EB to I-95 SB	O: I-95 to Rt. 3 Plank Road EB	720	20%	0	1020	15%	0	Off-Ramp does not have access to SB CD Road
Total SB CD Road Braided Ramp Connector				198			778	

Capacity Analysis Output

Intersections

Mainline / Ramp Junctions

2020 Build Conditions

2040 Build Conditions

2020 Build HCS Intersection Analysis Summary (Sheet 1 of 2)

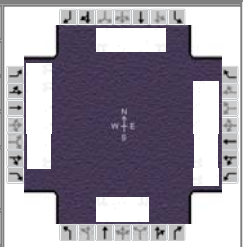
				AM Peak Hour														PM Peak Hour											
				2013		2020 No Build					2020 Build							2013		2020 No Build						2020 Build					
				Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection		Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection	
	Intersection	Approach	Movement	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Route 3 / Mall Dr. / Central Park Blvd.	NB	Left	15.1	B	65.2	E	133.5	F	19.4	B	65.2	E	133.5	F	19.5	B	103.8	F	75.8	E	616.9	F	120.0	F	75.8	E	616.9	F	120.0	F
			Through			66.1	E					66.1	E							80.1	F					80.1	F				
			Right			151.0	F					151.0	F							885.6	F					885.6	F				
		SB	Left			69.0	E	87.1	F			69.9	E	98.5	F					72.3	E	326.4	F			72.3	E	326.4	F		
			Through			68.7	E					69.6	E							70.3	E					70.3	E				
			Right			91.5	F					105.6	F							544.0	F					544.0	F				
		EB	Left			63.3	E	13.7	B			63.3	E	18.4	B					69.3	E	67.6	E			69.3	E	68.7	E		
			Through			9.1	A					9.4	A							68.7	E					69.9	E				
			Right			0.1	A					0.1	A							43.4	D					43.4	D				
		WB	Left			66.8	E	11.5	B			69.1	E	11.1	B					60.5	E	19.3	B			60.5	E	19.3	B		
			Through			6.7	A					6.1	A							9.8	A					9.8	A				
			Right			8.8	A					8.2	A							14.1	B					14.1	B				
2	Route 3 / Carl D. Silver Pkwy	NB	Left	29.7	C	70.8	E	70.2	E	32.8	C	70.8	E	70.2	E	34.5	C	97.8	F	76.7	E	76.0	E	127.8	F	76.7	E	76.0	E	126.7	F
			Through			70.8	E					70.8	E							76.7	E					76.7	E				
			Right			69.6	E					69.6	E							75.2	E					75.2	E				
		SB	Left			59.1	E	58.3	E			63.7	E	63.0	E					160.0	F	139.9	F			181.1	F	160.1	F		
			Through			51.9	D					51.9	D							51.1	D					51.1	D				
			Right			53.6	D					52.5	D							80.3	F					58.9	E				
		EB	Left			63.0	E	27.2	C			63.0	E	29.6	C					63.6	E	14.9	B			63.6	E	14.8	B		
			Through			25.4	C					27.9	C							7.6	A					7.7	A				
			Right			24.4	C					24.4	C							5.7	A					5.7	A				
		WB	Left			69.5	E	36.0	D			69.5	E	34.8	C					75.9	E	189.4	F			52.1	D	185.4	F		
			Through			31.6	C					32.6	C							111.7	F					180.6	F				
			Right			45.3	D					39.4	D							419.3	F					211.9	F				
8	New Signal Route 3 / Ramp from SB I-95	NB	Left													28.1	C													67.0	E
			Through																												
			Right																												
		SB	Left											65.3	E													72.2	E		
			Through																												
			Right									65.3	E													72.2	F				
		EB	Left																												
			Through																												
			Right																												
		WB	Left																												
			Through									6.2	A	6.2	A											63.5	F	63.5	E		
			Right																												
9	New Signal Route 3 / Ramp to NB I-95 (triple lefts)	NB	Left													25.6	C													19.5	B
			Through																												
			Right																												
		SB	Left																												
			Through																												
			Right																												
		EB	Left									37.6	D	22.0	C											62.0	E	21.5	C		
			Through									0.5	A													0.7	A				
			Right																												
		WB	Left																												
			Through									41.6	D	41.6	D											14.9	B	14.9	B		
			Right																												
3	Route 3 / Gateway Blvd.	NB	Left	20.6	C	58.9	E	53.3	D	21.8	C	58.9	E	53.3	D	22.8	C	27.5	C	107.3	F	87.7	F	30.2	C	107.3	F	87.7	F	31.1	C
			Through			38.2	D					38.2	D							38.0	D					38.0	D				
			Right			41.3	D					41.3	D							59.3	E					59.3	E				
		SB	Left			48.7	D	49.7	D			48.7	D	49.7	D					48.7	D	48.9	D			48.7	D	48.9	D		
			Through			50.1	D					50.1	D							49.1	D					49.1	D				
			Right			50.1	D					50.1	D							49.1	D					49.1	D				
		EB	Left			47.4	D	26.5	C			47.4	D	27.9	C					47.1	D	29.5	C			47.1	D	32.1	C		
			Through			26.6	C					28.3	C							28.9	C					32.3	C				
			Right			23.8	C					23.8	C							30.3	C					30.3	C				
		WB	Left			46.1	D	8.6	A			46.1	D	10.8	B					54.4	D	12.6	B			54.4	D	13.1	B		
			Through			5.9	A					8.6	A							5.9	A					7.1	A				
			Right			3.1	A					3.1	A							0.0	A					0.0	A				

2020 Build HCS Intersection Analysis Summary (Sheet 2 of 2)

				AM Peak Hour														PM Peak Hour											
				2013		2020 No Build						2020 Build						2013		2020 No Build						2020 Build			
				Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection		Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection	
	Intersection	Approach	Movement	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
4	Route 17 / McLane Dr.	NB	Left	25.8	C	54.3	D	67.6	E	53.7	D	55.2	E	67.0	E	53.6	D	19.1	B	69.0	E	3.7	A	27.9	C	70.1	E	4.3	A	28.0	C
			Through			68.7	F					68.7	F							3.5	A					3.5	A				
			Right			1.2	A					1.2	A							0.0	A					0.1	A				
		SB	Left			53.8	D	37.5	D			53.8	D	37.8	D					68.0	E	46.6	D			68.0	E	46.6	D		
			Through			37.5	D					37.9	D							46.7	D					46.7	D				
			Right			17.7	B					17.7	B							14.2	B					14.2	B				
		EB	Left			32.5	C	32.5	C			32.8	C	32.8	C					46.7	D	46.7	D			46.7	D	46.7	D		
			Through			32.5	C					32.8	C							46.7	D					46.7	D				
			Right			32.5	C					32.8	C							46.7	D					46.7	D				
		WB	Left			33.3	C	33.3	C			33.2	C	33.2	C					48.1	D	48.1	D			48.1	D	48.1	D		
			Through			33.3	C					33.2	C							48.1	D					48.1	D				
			Right			33.3	C					33.2	C							48.1	D					48.1	D				
5	Route 17 /Sanford Dr.	NB	Left	36.4	D	65.2	E	105.9	F	53.2	D	65.2	E	105.9	F	38.0	D	291.7	F	115.2	F	3023.1	F	382.6	F	50.6	D	377.2	F	170.9	F
			Through			54.4	D					54.4	D							76.1	E					48.4	D				
			Right			126.2	F					126.2	F							3267.3	F					404.6	F				
		SB	Left			62.8	E	62.4	E			76.1	E	74.6	E					78.8	E	77.4	E			327.6	F	309.0	F		
			Through			62.6	E					73.5	E							59.7	E					71.1	E				
			Right			58.9	E					65.1	E							61.2	E					72.7	E				
		EB	Left			57.4	E	59.9	E			65.4	E	30.1	C					59.8	E	118.5	F			78.4	E	105.0	F		
			Through			60.2	F					30.0	C							120.4	F					106.6	F				
			Right			21.1	C					15.0	B							23.2	C					22.1	C				
		WB	Left			60.2	E	44.0	D			106.6	F	31.4	C					81.6	F	41.8	D			637.6	F	159.8	F		
			Through			45.0	D					13.4	B							38.8	D					25.9	C				
			Right			15.8	B					11.6	B							22.2	C					22.9	C				
7	New Signal Route 17 / Ramp F to SB I-95	NB	Left													3.8	A													5.4	A
			Through																												
			Right																												
		SB	Left																												
			Through																												
			Right																												
		EB	Left																												
			Through									4.0	A	4.0	A											5.0	A	5.0	A		
			Right																												
		WB	Left									62.7	E													75.7	E				
			Through									1.0	A	3.7	A											0.6	A	5.7	A		
			Right																												
6	Route 17 /Short St.	NB	Left	34.9	C	35.0	C	34.7	C	46.8	D	35.0	C	34.7	C	35.7	D	105.6	F	42.4	D	41.6	D	150.7	F	42.4	D	41.6	D	112.0	F
			Through			35.0	C					35.0	C							42.4	D					42.4	D				
			Right			31.4	C					31.4	C							39.2	D					39.2	D				
		SB	Left			40.9	D	40.9	D			40.9	D	40.9	D					44.9	D	44.9	D			44.9	D	44.9	D		
			Through			40.9	D					40.9	D							44.9	D					44.9	D				
			Right			40.9	D					40.9	D							44.9	D					44.9	D				
		EB	Left			77.5	F	73.1	E			53.7	D	51.2	D					243.5	F	228.5	F			177.6	F	165.6	F		
			Through			73.1	F					51.6	D							229.6	F					166.1	F				
			Right			22.3	C					22.3	C							20.1	C					20.1	C				
		WB	Left			20.5	C	22.3	C			19.4	B	19.0	B					21.7	C	16.3	B			21.7	C	14.9	B		
			Through			22.3	C					19.1	B							16.4	B					15.0	B				
			Right			22.4	C					18.8	B							16.1	B					14.6	B				

HCS 2010 Signalized Intersection Results Summary

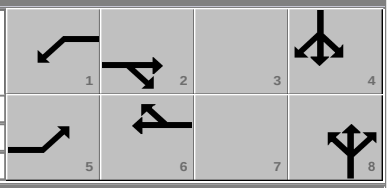
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{1_am} Rte 3 @ Central Pa	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2020B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	280	2930	60	100	1280	30	10	30	170	10	10	90

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.5	62.5	10.5	14.0	9.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



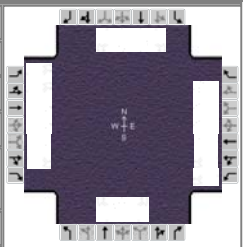
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	35.0	105.0	18.0	88.0		21.0		16.0
Change Period, *(Y+Rc)*, s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway *(MAH)*, s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	14.5		6.7			18.0		10.7
Green Extension Time (g_e), s	0.5	0.0	1.5	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.75			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	292	3052	57	104	1027	337	10	31	160	10	10	85
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1740	1691	1594	1658	1810	1780	1810	1845	1563	1757	1696	1548
Queue Service Time (g_s), s	12.5	0.0	0.0	4.7	6.0	7.4	0.8	2.5	16.0	0.9	0.5	8.7
Cycle Queue Clearance Time (g_c), s	12.5	0.0	0.0	4.7	6.0	7.4	0.8	2.5	16.0	0.9	0.5	8.7
Capacity *(c)*, veh/h	631	3171	996	249	2816	895	181	184	156	121	233	106
Volume-to-Capacity Ratio *(X)*	0.463	0.962	0.057	0.419	0.365	0.377	0.058	0.169	1.026	0.086	0.045	0.802
Available Capacity (c_a), veh/h	631	3171	996	249	2816	895	181	184	156	121	233	106
Back of Queue *(Q)*, veh/ln (50th percentile)	5.8	2.7	0.0	2.0	2.0	2.6	0.4	1.2	9.9	0.4	0.2	4.4
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	63.1	0.0	0.0	68.7	5.8	7.1	65.2	65.9	72.0	69.8	69.6	73.4
Incremental Delay (d_2), s/veh	0.2	9.4	0.1	0.4	0.3	1.1	0.0	0.2	79.0	0.1	0.0	32.1
Initial Queue Delay (d_3), 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
Control Delay *(d)*, s/veh	63.3	9.4	0.1	69.1	6.1	8.2	65.2	66.1	151.0	69.9	69.6	105.6
Level of Service (LOS)	E	A	A	E	A	A	E	E	F	E	E	F
Approach Delay, s/veh / LOS	13.8	B		11.1	B		133.5	F		98.5	F	
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.4	B	1.1	A	0.8	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

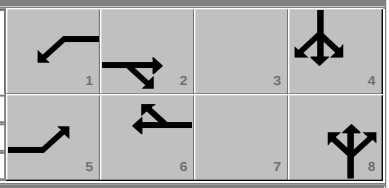
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{1_pm} Rte 3 @ Central Pa	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2020B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	350	1820	110	540	2580	70	90	110	440	110	200	400

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.5	42.5	33.5	14.0	18.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



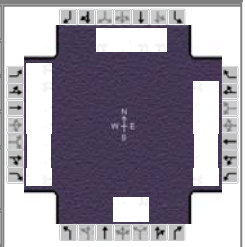
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	33.0	83.0	41.0	91.0		21.0		25.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	18.6		27.1			18.0		22.0
Green Extension Time (g_e), s	0.4	0.0	4.6	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.02		0.78			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	365	1896	104	563	2078	682	94	115	418	115	208	379
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1675	1594	1757	1863	1828	1810	1900	1610	1792	1900	1610
Queue Service Time (g_s), s	16.6	62.1	9.6	25.1	26.1	30.4	8.4	9.9	16.0	10.2	8.7	20.0
Cycle Queue Clearance Time (g_c), s	16.6	62.1	9.6	25.1	26.1	30.4	8.4	9.9	16.0	10.2	8.7	20.0
Green Ratio (*g/C*)	0.16	0.46	0.46	0.21	0.51	0.51	0.09	0.09	0.09	0.12	0.12	0.12
Capacity (*c*), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Volume-to-Capacity Ratio (*X*)	0.653	0.822	0.142	0.777	0.735	0.760	0.550	0.641	2.756	0.544	0.466	2.002
Available Capacity (c_a), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Back of Queue (*Q*), veh/ln (50th percentile)	7.7	29.0	4.2	11.1	5.3	8.4	4.0	5.2	40.7	4.8	4.3	33.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	67.1	66.5	43.0	58.1	8.9	11.1	73.6	74.2	77.0	70.7	70.0	75.0
Incremental Delay (d_2), s/veh	2.2	3.5	0.4	2.5	0.9	3.0	2.2	5.9	808.6	1.6	0.3	469.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	69.3	69.9	43.4	60.5	9.8	14.1	75.8	80.1	885.6	72.3	70.3	544.0
Level of Service (LOS)	E	E	D	E	A	B	E	F	F	E	E	F
Approach Delay, s/veh / LOS	68.7	E		19.3	B		616.9	F		326.4	F	
Intersection Delay, s/veh / LOS	120.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	1.8	A	1.9	A	1.5	A	1.1	A

HCS 2010 Signalized Intersection Results Summary

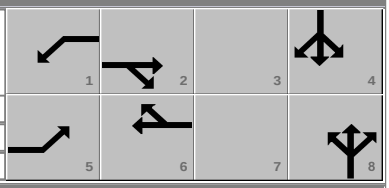
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{2_am} Rte 3 @ Carl D Silv	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2020B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	160	3260	10	20	1230	420	10	10	20	490	10	30

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.5	50.5	9.5	10.0	29.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



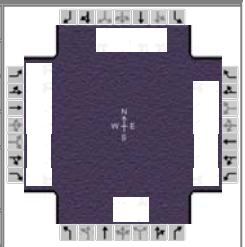
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		11.0		9.0
Phase Duration, s	32.0	90.0	17.0	75.0		17.0		36.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	9.0		3.8			3.9		23.6
Green Extension Time (g_e), s	0.2	0.0	2.4	0.0		0.0		0.6
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.50			0.00		0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	167	3396	9	21	1281	438		21	19	510	10	25
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1708	1533	1774	1659	1579		1854	1464	1774	1900	1610
Queue Service Time (g_s), s	7.0	68.8	0.6	1.8	21.5	34.5		1.7	1.9	21.6	0.7	2.0
Cycle Queue Clearance Time (g_c), s	7.0	68.8	0.6	1.8	21.5	34.5		1.7	1.9	21.6	0.7	2.0
Green Ratio (*g/C*)	0.16	0.53	0.53	0.08	0.44	0.44		0.08	0.08	0.20	0.20	0.20
Capacity (*c*), veh/h	571	3630	815	133	2903	691		139	110	699	374	317
Volume-to-Capacity Ratio (*X*)	0.292	0.936	0.012	0.157	0.441	0.633		0.150	0.171	0.731	0.028	0.079
Available Capacity (c_a), veh/h	571	3630	815	133	2903	691		116	110	699	374	317
Back of Queue (*Q*), veh/ln (50th percentile)	3.2	24.4	0.2	0.8	8.9	14.2		0.8	0.7	10.1	0.3	0.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	62.9	22.0	24.4	69.3	32.1	35.0		70.6	69.3	60.3	51.9	52.4
Incremental Delay (d_2), s/veh	0.1	6.0	0.0	0.2	0.5	4.4		0.2	0.3	3.4	0.0	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.0	27.9	24.4	69.5	32.6	39.4		70.8	69.6	63.7	51.9	52.5
Level of Service (LOS)	E	C	C	E	C	D		E	E	E	D	D
Approach Delay, s/veh / LOS	29.6	C		34.8	C		70.2	E		63.0	E	
Intersection Delay, s/veh / LOS	34.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	2.0	A	1.2	A	0.6	A	1.4	A

HCS 2010 Signalized Intersection Results Summary

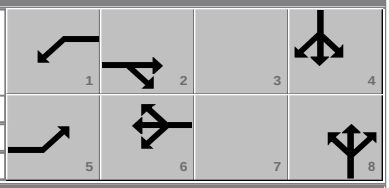
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{2_pm} Rte 3 @ Carl D Silv	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2020B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	300	2060	10	40	3100	760	20	10	30	970	10	220

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	34.5	43.5	9.5	10.0	36.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



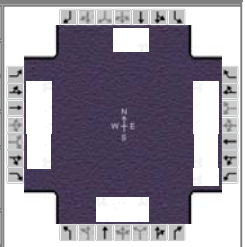
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	1.3	3.0		11.0		9.0
Phase Duration, s	42.0	93.0	17.0	68.0		17.0		43.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	15.8		2.0			4.9		40.5
Green Extension Time (g_e), s	0.5	0.0	6.4	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.87			0.04		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	313	2146	9	42	3229	792		31	28	1010	10	198
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1691	1610	1723	1708	1610		1768	1579	1810	1900	1610
Queue Service Time (g_s), s	13.8	15.7	0.1	0.0	63.0	63.0		2.9	2.9	38.5	0.7	18.4
Cycle Queue Clearance Time (g_c), s	13.8	15.7	0.1	0.0	63.0	63.0		2.9	2.9	38.5	0.7	18.4
Green Ratio (*g/C*)	0.21	0.52	0.52	0.31	0.37	0.37		0.07	0.07	0.23	0.23	0.23
Capacity (*c*), veh/h	744	3502	833	208	2532	597		125	111	820	430	365
Volume-to-Capacity Ratio (*X*)	0.420	0.613	0.011	0.200	1.275	1.327		0.250	0.252	1.233	0.024	0.543
Available Capacity (c_a), veh/h	744	3502	833	208	2532	597		104	111	820	430	365
Back of Queue (*Q*), veh/ln (50th percentile)	6.4	3.5	0.1	1.6	49.3	51.7		1.3	1.2	30.9	0.4	7.7
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	63.5	6.9	5.6	51.9	53.5	53.5		76.3	74.8	65.8	51.1	58.0
Incremental Delay (d_2), s/veh	0.1	0.8	0.0	0.2	127.1	158.4		0.4	0.4	115.3	0.0	0.9
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	63.6	7.7	5.7	52.1	180.6	211.9		76.7	75.2	181.1	51.1	58.9
Level of Service (LOS)	E	A	A	D	F	F		E	E	F	D	E
Approach Delay, s/veh / LOS	14.8	B		185.4	F		76.0	E		160.1	F	
Intersection Delay, s/veh / LOS	126.7						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.5	A	2.2	B	0.6	A	2.5	B

HCS 2010 Signalized Intersection Results Summary

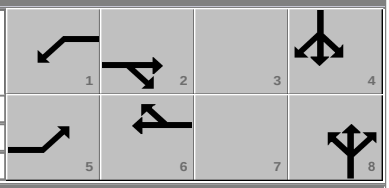
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2020B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	1580	350	110	1760	10	260	10	120	10	5	20

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



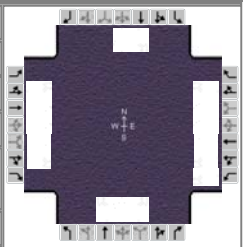
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, ($Y+R_c$), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.2
Queue Clearance Time (g_s), s	4.4		5.5			18.6		3.7
Green Extension Time (g_e), s	0.0	0.0	2.4	0.0		0.1		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.71			1.00		0.34

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	1646	330	115	1833	9	271	10	114	10	26	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1661	
Queue Service Time (g_s), s	2.4	30.2	17.0	3.5	17.9	0.1	16.6	0.5	7.4	0.7	1.7	
Cycle Queue Clearance Time (g_c), s	2.4	30.2	17.0	3.5	17.9	0.1	16.6	0.5	7.4	0.7	1.7	
Green Ratio (*g/C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	109	
Volume-to-Capacity Ratio (*X*)	0.228	0.718	0.472	0.333	0.847	0.013	0.821	0.030	0.402	0.078	0.238	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	109	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	12.1	6.5	1.5	2.5	0.0	8.6	0.2	2.8	0.3	0.7	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.2	26.3	21.5	45.9	4.3	3.0	44.7	38.1	41.0	48.7	49.7	
Incremental Delay (d_2), s/veh	0.2	2.0	2.3	0.2	4.3	0.0	14.2	0.0	0.3	0.1	0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.4	28.3	23.8	46.1	8.6	3.1	58.9	38.2	41.3	48.7	50.1	
Level of Service (LOS)	D	C	C	D	A	A	E	D	D	D	D	
Approach Delay, s/veh / LOS	27.9	C		10.8	B		53.3	D		49.7	D	
Intersection Delay, s/veh / LOS	22.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.6	A	1.6	A	1.1	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

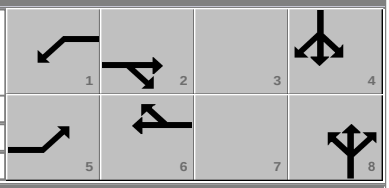
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{3_pm} Rte 3 @ Gateway E	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2020B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	30	1830	500	240	1650	0	330	5	230	10	5	5

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



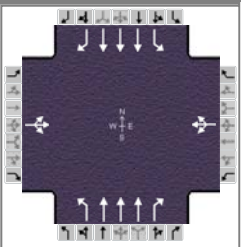
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, ($Y+R_c$), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.0
Queue Clearance Time (g_s), s	3.8		10.0			23.0		2.7
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	31	1906	486	250	1719	0	344	5	228	10	10	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1743	
Queue Service Time (g_s), s	1.8	37.9	28.8	8.0	14.0	0.0	21.0	0.3	16.3	0.7	0.6	
Cycle Queue Clearance Time (g_c), s	1.8	37.9	28.8	8.0	14.0	0.0	21.0	0.3	16.3	0.7	0.6	
Green Ratio (*g/C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Volume-to-Capacity Ratio (*X*)	0.171	0.832	0.695	0.726	0.794	0.000	1.042	0.015	0.808	0.078	0.091	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Back of Queue (*Q*), veh/ln (50th percentile)	0.8	15.5	11.3	3.6	2.2	0.0	14.8	0.1	7.3	0.3	0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	46.9	28.6	24.7	47.8	4.0	0.0	46.5	38.0	44.6	48.7	49.0	
Incremental Delay (d_2), s/veh	0.2	3.7	5.6	6.5	3.1	0.0	60.8	0.0	14.8	0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.1	32.3	30.3	54.4	7.1	0.0	107.3	38.0	59.3	48.7	49.1	
Level of Service (LOS)	D	C	C	D	A		F	D	E	D	D	
Approach Delay, s/veh / LOS	32.1	C		13.1	B		87.7	F		48.9	D	
Intersection Delay, s/veh / LOS	31.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.8	A	1.6	A	1.4	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

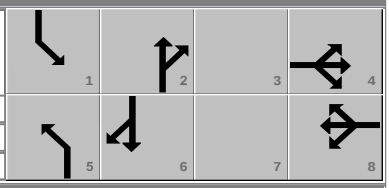
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{4_am} Rte 17 @ McLane I	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2020B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	10	10	40	5	10	40	2570	60	30	2090	30

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	60.5	38.5	0.0	0.0	0.0
Yellow	3.5	4.5	3.5	0.0	0.0	0.0
Red	3.0	3.0	3.0	0.0	0.0	0.0



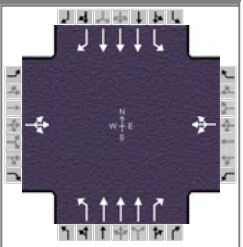
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	68.0	17.0	68.0
Change Period, ($Y+R_c$), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		4.2		5.2	4.9		4.1	
Green Extension Time (g_e), s		0.2		0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		42			57		42	2677	59	31	2177	29
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1528			1446		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			1.0		2.9	63.0	0.2	2.1	52.1	1.3
Cycle Queue Clearance Time (g_c), s		2.2			3.2		2.9	63.0	0.2	2.1	52.1	1.3
Green Ratio (*g/C*)		0.32			0.32		0.09	0.48	0.48	0.10	0.48	0.48
Capacity (*c*), veh/h		494			476		161	2412	750	174	2412	750
Volume-to-Capacity Ratio (*X*)		0.084			0.120		0.259	1.110	0.079	0.180	0.903	0.039
Available Capacity (c_a), veh/h		494			476		161	2412	750	174	2412	750
Back of Queue (*Q*), veh/ln (50th percentile)		1.0			1.3		1.3	21.4	0.1	1.0	21.6	0.5
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		32.8			33.2		54.9	12.5	1.0	53.6	31.8	17.6
Incremental Delay (d_2), s/veh		0.0			0.0		0.3	56.2	0.2	0.2	6.1	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		32.8			33.2		55.2	68.7	1.2	53.8	37.9	17.7
Level of Service (LOS)		C			C		E	F	A	D	D	B
Approach Delay, s/veh / LOS	32.8	C		33.2	C		67.0	E		37.8	D	
Intersection Delay, s/veh / LOS	53.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.6	A	2.0	B	1.7	A

HCS 2010 Signalized Intersection Results Summary

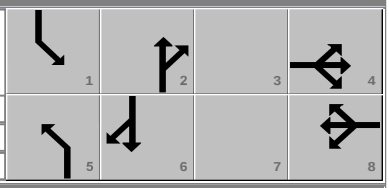
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{4_pm} Rte 17 @ McLane I	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2020B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	5	10	40	5	20	30	2180	40	10	2730	20

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	90.5	38.5	0.0	0.0	0.0	
Yellow	3.5	4.5	3.5	0.0	0.0	0.0	
Red	3.0	3.0	3.0	0.0	0.0	0.0	



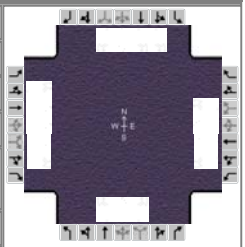
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	98.0	17.0	98.0
Change Period, (Y+R_c), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		3.9		7.5	4.7		2.9	
Green Extension Time (g_e), s		0.2		0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		26			68		31	2271	39	10	2844	19
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1537			1461		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			3.7		2.7	9.5	0.0	0.9	89.3	0.8
Cycle Queue Clearance Time (g_c), s		1.9			5.5		2.7	9.5	0.0	0.9	89.3	0.8
Green Ratio (*g*/*C*)		0.26			0.26		0.08	0.58	0.58	0.08	0.58	0.58
Capacity (*c*), veh/h		401			388		130	2893	900	141	2893	900
Volume-to-Capacity Ratio (*X*)		0.065			0.175		0.239	0.785	0.043	0.074	0.983	0.021
Available Capacity (c_a), veh/h		401			388		130	2893	900	141	2893	900
Back of Queue (*Q*), veh/ln (50th percentile)		0.8			2.2		1.2	1.5	0.0	0.4	38.3	0.3
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		46.7			48.1		69.7	1.2	0.0	67.9	33.5	14.2
Incremental Delay (d_2), s/veh		0.0			0.1		0.3	2.2	0.1	0.1	13.2	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		46.7			48.1		70.1	3.5	0.1	68.0	46.7	14.2
Level of Service (LOS)		D			D		E	A	A	E	D	B
Approach Delay, s/veh / LOS	46.7	D		48.1	D		4.3	A		46.6	D	
Intersection Delay, s/veh / LOS	28.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.6	A	1.8	A	2.1	B

HCS 2010 Signalized Intersection Results Summary

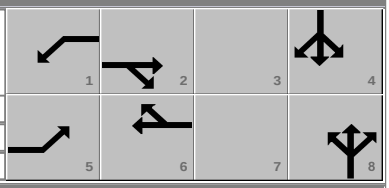
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{5_am} Rte 17 @ Sanford I	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2020B_AM_Optimized MajorChange.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2110	20	210	660	210	60	10	170	160	70	20

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	55.5	5.0	11.0	7.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



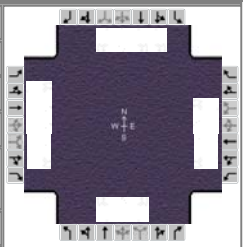
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	12.5	75.5	22.5	85.5		18.0		14.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.9
Queue Clearance Time (g_s), s	2.8		18.2			14.7		8.3
Green Extension Time (g_e), s	1.5	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	2198	19	219	688	203	63	10	152	167	73	19
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1739	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.8	49.0	0.8	16.2	12.8	7.6	4.4	0.7	12.7	6.3	5.0	1.5
Cycle Queue Clearance Time (g_c), s	0.8	49.0	0.8	16.2	12.8	7.6	4.4	0.7	12.7	6.3	5.0	1.5
Green Ratio (*g/C*)	0.04	0.52	0.52	0.13	0.60	0.60	0.10	0.10	0.10	0.07	0.07	0.07
Capacity (*c*), veh/h	67	2603	810	228	2087	953	147	183	155	234	134	83
Volume-to-Capacity Ratio (*X*)	0.156	0.844	0.023	0.961	0.329	0.213	0.425	0.057	0.982	0.712	0.546	0.225
Available Capacity (c_a), veh/h	67	2603	810	228	2087	953	147	183	155	234	134	83
Back of Queue (*Q*), veh/ln (50th percentile)	0.4	19.7	0.3	10.3	5.1	2.7	2.3	0.3	7.9	3.2	2.9	0.7
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	60.5	26.5	15.0	56.2	13.0	11.1	56.5	53.9	58.4	59.2	58.4	58.9
Incremental Delay (d_2), s/veh	4.9	3.6	0.1	50.5	0.4	0.5	8.7	0.6	67.8	16.9	15.1	6.2
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	65.4	30.0	15.0	106.6	13.4	11.6	65.2	54.4	126.2	76.1	73.5	65.1
Level of Service (LOS)	E	C	B	F	B	B	E	D	F	E	E	E
Approach Delay, s/veh / LOS	30.1	C		31.4	C		105.9	F		74.6	E	
Intersection Delay, s/veh / LOS	38.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	2.6	B	3.3	C	3.1	C
Bicycle LOS Score / LOS	1.7	A	1.4	A	0.9	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

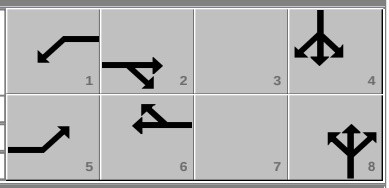
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{5_pm} Rte 17 @ Sanford I	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2020B_PM_Optimized MajorChange.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2620	50	240	660	200	40	10	680	370	20	10

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.5	63.5	6.5	35.0	10.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



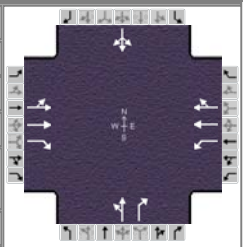
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	14.0	85.0	16.0	87.0		42.0		17.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.8
Queue Clearance Time (g_s), s	2.9		12.5			39.0		14.0
Green Extension Time (g_e), s	2.7	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.93		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	2729	48	250	688	200	42	10	622	385	21	9
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1739	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.9	77.5	2.6	10.5	19.8	11.6	3.1	0.7	37.0	12.0	1.7	0.9
Cycle Queue Clearance Time (g_c), s	0.9	77.5	2.6	10.5	19.8	11.6	3.1	0.7	37.0	12.0	1.7	0.9
Green Ratio (*g/C*)	0.04	0.48	0.48	0.07	0.50	0.50	0.23	0.23	0.23	0.08	0.08	0.08
Capacity (*c*), veh/h	71	2411	750	114	1728	789	381	422	358	253	143	97
Volume-to-Capacity Ratio (*X*)	0.147	1.132	0.064	2.189	0.398	0.254	0.109	0.025	1.737	1.521	0.146	0.097
Available Capacity (c_a), veh/h	71	2411	750	114	1728	789	381	422	358	253	143	97
Back of Queue (*Q*), veh/ln (50th percentile)	0.5	45.8	1.0	22.6	8.5	4.5	1.4	0.3	48.7	14.2	0.9	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	74.1	41.3	21.9	74.8	25.2	22.1	50.0	48.3	61.5	74.0	69.0	70.7
Incremental Delay (d_2), s/veh	4.4	65.3	0.2	562.9	0.7	0.8	0.6	0.1	343.1	253.6	2.1	2.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	78.4	106.6	22.1	637.6	25.9	22.9	50.6	48.4	404.6	327.6	71.1	72.7
Level of Service (LOS)	E	F	C	F	C	C	D	D	F	F	E	E
Approach Delay, s/veh / LOS	105.0	F		159.8	F		377.2	F		309.0	F	
Intersection Delay, s/veh / LOS	170.9						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.6	B	2.6	B	3.3	C	3.1	C
Bicycle LOS Score / LOS	2.0	B	1.4	A	1.6	A	1.2	A

HCS 2010 Signalized Intersection Results Summary

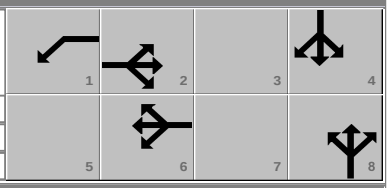
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{6_am} Rte 17 @ Short St	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2020B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	1060	60	20	1020	5	100	0	10	5	0	10

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	32.5	19.0	10.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



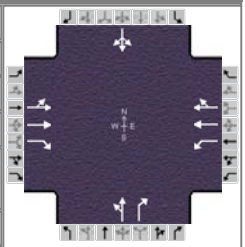
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		40.0	17.0	57.0		26.0		17.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.6			6.9		2.8
Green Extension Time (g_e), s		0.0	0.0	0.0		0.1		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	580	535	57	21	534	533		104	9		16	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1815	1679	1579	1810	1863	1859		1810	1563		1672	
Queue Service Time (g_s), s	11.0	30.4	2.4	0.6	19.3	19.3		4.9	0.5		0.8	
Cycle Queue Clearance Time (g_c), s	31.6	30.4	2.4	0.6	19.3	19.3		4.9	0.5		0.8	
Green Ratio (*g*/*C*)	0.35	0.35	0.35	0.48	0.52	0.52		0.21	0.21		0.12	
Capacity (*c*), veh/h	627	588	553	299	969	920		380	328		201	
Volume-to-Capacity Ratio (*X*)	0.925	0.911	0.104	0.070	0.552	0.579		0.274	0.029		0.078	
Available Capacity (c_a), veh/h	627	588	553	299	969	920		344	328		167	
Back of Queue (*Q*), veh/ln (50th percentile)	16.9	15.3	1.0	0.2	8.4	8.5		2.2	0.2		0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.1	31.0	21.9	19.4	16.8	16.2		34.8	31.4		40.9	
Incremental Delay (d_2), s/veh	21.6	20.6	0.4	0.0	2.3	2.7		0.1	0.0		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	53.7	51.6	22.3	19.4	19.1	18.8		35.0	31.4		40.9	
Level of Service (LOS)	D	D	C	B	B	B		C	C		D	
Approach Delay, s/veh / LOS	51.2	D		19.0	B		34.7	C		40.9	D	
Intersection Delay, s/veh / LOS	35.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.5	A	1.4	A	0.7	A	0.5	A

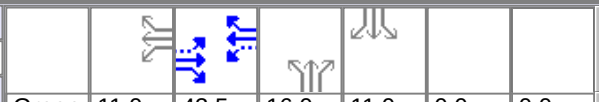
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{6_pm} Rte 17 @ Short St	Analysis Year	2020 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2020B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				

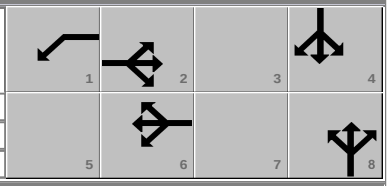


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	1810	90	10	940	5	80	5	30	5	5	10

Signal Information			
Cycle, s	110.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	11.0	43.5	16.0	11.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



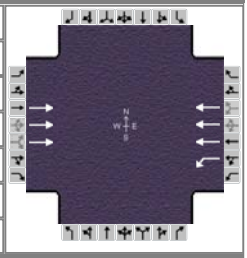
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.0	18.0	69.0		23.0		18.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.3			6.8		3.2
Green Extension Time (g_e), s		0.0	0.0	0.0		0.1		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	993	903	85	10	493	492		89	28		21	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1847	1695	1548	1757	1863	1859		1815	1610		1723	
Queue Service Time (g_s), s	16.0	46.0	3.7	0.3	16.5	16.5		4.8	1.6		1.2	
Cycle Queue Clearance Time (g_c), s	43.5	46.0	3.7	0.3	16.5	16.5		4.8	1.6		1.2	
Green Ratio (*g*/*C*)	0.42	0.42	0.42	0.54	0.58	0.58		0.16	0.16		0.12	
Capacity (*c*), veh/h	763	709	647	265	1084	1039		297	263		204	
Volume-to-Capacity Ratio (*X*)	1.301	1.274	0.132	0.039	0.455	0.473		0.298	0.107		0.102	
Available Capacity (c_a), veh/h	763	709	647	265	1084	1039		264	263		172	
Back of Queue (*Q*), veh/ln (50th percentile)	50.6	44.5	1.4	0.1	7.0	7.1		2.2	0.7		0.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.8	32.0	19.7	21.7	13.7	13.1		42.2	39.2		44.9	
Incremental Delay (d_2), s/veh	144.8	134.1	0.4	0.0	1.4	1.5		0.2	0.1		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	177.6	166.1	20.1	21.7	15.0	14.6		42.4	39.2		44.9	
Level of Service (LOS)	F	F	C	C	B	B		D	D		D	
Approach Delay, s/veh / LOS	165.6	F		14.9	B		41.6	D		44.9	D	
Intersection Delay, s/veh / LOS	112.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.1	B	1.3	A	0.7	A	0.5	A

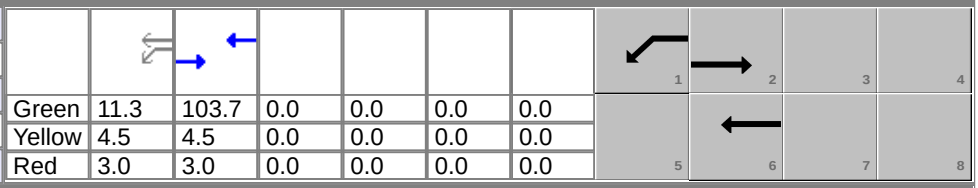
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.92
Intersection	7-AM-Ramp F	Analysis Year	2020 Build	Analysis Period	1> 7:00
File Name	7_2020B_AM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1370		120	2550							

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	11.3	103.7	0.0	0.0	0.0	0.0						
Yellow	4.5	4.5	0.0	0.0	0.0	0.0						
Red	3.0	3.0	0.0	0.0	0.0	0.0						

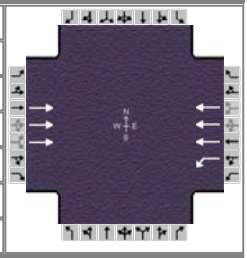
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				
Case Number		8.3	2.0	4.0				
Phase Duration, s		111.2	18.8	130.0				
Change Period, ($Y+R_c$), s		7.5	7.5	7.5				
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				
Queue Clearance Time (g_s), s			11.2					
Green Extension Time (g_e), s		0.0	0.2	0.0				
Phase Call Probability			0.99					
Max Out Probability			0.00					

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2		1	6							
Adjusted Flow Rate (*v*), veh/h		1489		130	2772							
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1725		1810	1725							
Queue Service Time (g_s), s		10.6		9.2	8.6							
Cycle Queue Clearance Time (g_c), s		10.6		9.2	8.6							
Green Ratio (*g/C*)		0.80		0.09	0.94							
Capacity (*c*), veh/h		4129		157	4877							
Volume-to-Capacity Ratio (*X*)		0.361		0.831	0.568							
Available Capacity (c_a), veh/h		4129		327	4877							
Back of Queue (*Q*), veh/ln (50th percentile)		3.0		4.4	0.2							
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00	0.00							
Uniform Delay (d_1), s/veh		3.7		58.4	0.5							
Incremental Delay (d_2), s/veh		0.2		4.3	0.5							
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0							
Control Delay (*d*), s/veh		4.0		62.7	1.0							
Level of Service (LOS)		A		E	A							
Approach Delay, s/veh / LOS	4.0	A		3.7	A		0.0			0.0		
Intersection Delay, s/veh / LOS	3.8						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.8	A	0.5	A	3.3	C	3.2	C
Bicycle LOS Score / LOS	1.3	A	2.1	B				

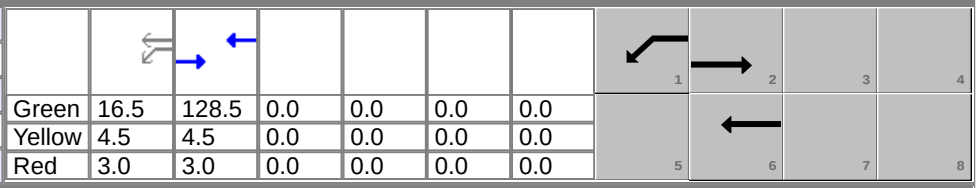
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.92
Intersection	7-PM-Ramp F	Analysis Year	2020 Build	Analysis Period	1> 7:00
File Name	7_2020B_PM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1630		150	2040							

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	16.5	128.5	0.0	0.0	0.0	0.0						
Yellow	4.5	4.5	0.0	0.0	0.0	0.0						
Red	3.0	3.0	0.0	0.0	0.0	0.0						

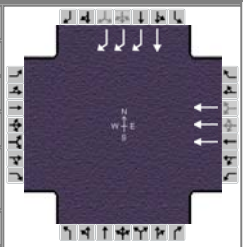
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				
Case Number		8.3	2.0	4.0				
Phase Duration, s		136.0	24.0	160.0				
Change Period, ($Y+R_c$), s		7.5	7.5	7.5				
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				
Queue Clearance Time (g_s), s			16.2					
Green Extension Time (g_e), s		0.0	0.3	0.0				
Phase Call Probability			1.00					
Max Out Probability			0.00					

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2		1	6							
Adjusted Flow Rate (*v*), veh/h		1772		163	2217							
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1725		1810	1725							
Queue Service Time (g_s), s		16.4		14.2	5.6							
Cycle Queue Clearance Time (g_c), s		16.4		14.2	5.6							
Green Ratio (*g/C*)		0.80		0.10	0.95							
Capacity (*c*), veh/h		4157		186	4933							
Volume-to-Capacity Ratio (*X*)		0.426		0.875	0.450							
Available Capacity (c_a), veh/h		4157		492	4933							
Back of Queue (*Q*), veh/ln (50th percentile)		5.2		6.8	0.1							
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00	0.00							
Uniform Delay (d_1), s/veh		4.7		70.7	0.3							
Incremental Delay (d_2), s/veh		0.3		5.0	0.3							
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0							
Control Delay (*d*), s/veh		5.0		75.7	0.6							
Level of Service (LOS)		A		E	A							
Approach Delay, s/veh / LOS	5.0	A		5.7	A		0.0			0.0		
Intersection Delay, s/veh / LOS	5.4						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.8	A	0.5	A	3.3	C	3.2	C
Bicycle LOS Score / LOS	1.5	A	1.8	A				

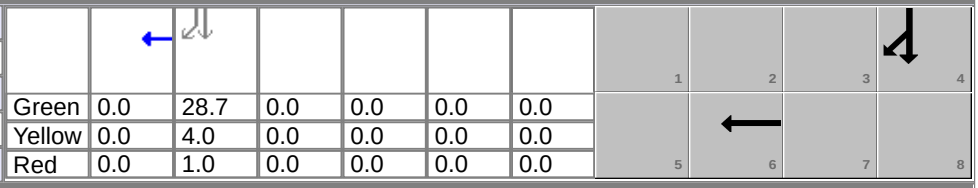
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.92
Intersection	SB ramp and WB Rt 3 Alt 1	Analysis Year	2020 Build_not Opt	Analysis Period	1> 7:00
File Name	8_2020B_AM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h					1050						0	620

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	0.0	28.7	0.0	0.0	0.0	0.0
Yellow	0.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	1.0	0.0	0.0	0.0	0.0

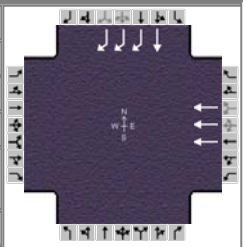
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				6				4
Case Number				8.0				11.0
Phase Duration, s				126.3				33.7
Change Period, ($Y+R_c$), s				5.0				5.0
Max Allow Headway (*MAH*), s				0.0				3.4
Queue Clearance Time (g_s), s								26.6
Green Extension Time (g_e), s				0.0				2.2
Phase Call Probability								1.00
Max Out Probability								0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					6						4	14
Adjusted Flow Rate (*v*), veh/h					1141						0	674
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1725						1900	1425
Queue Service Time (g_s), s					11.0						0.0	24.6
Cycle Queue Clearance Time (g_c), s					11.0						0.0	24.6
Green Ratio (*g/C*)					0.76						0.18	0.18
Capacity (*c*), veh/h					3923						341	767
Volume-to-Capacity Ratio (*X*)					0.291						0.000	0.878
Available Capacity (c_a), veh/h					3923						1663	3741
Back of Queue (*Q*), veh/ln (50th percentile)					3.8						0.0	9.0
Queue Storage Ratio (*RQ*) (50th percentile)					0.00						0.00	0.00
Uniform Delay (d_1), s/veh					6.0						0.0	63.9
Incremental Delay (d_2), s/veh					0.2						0.0	1.3
Initial Queue Delay (d_3), s/veh					0.0						0.0	0.0
Control Delay (*d*), s/veh					6.2						0.0	65.3
Level of Service (LOS)					A							E
Approach Delay, s/veh / LOS	0.0			6.2		A	0.0			65.3		E
Intersection Delay, s/veh / LOS	28.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	A	2.1	B	2.0	A	2.9	C
Bicycle LOS Score / LOS			1.1	A			1.6	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.92
Intersection	SB Ramp and WB Rt 3 Alt	Analysis Year	2020 Build_not opt	Analysis Period	1> 7:00
File Name	8_2020B_PM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h					2330						0	1570

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	0.0	71.0	0.0	0.0	0.0	0.0	5	6	7	8
Yellow	0.0	4.5	0.0	0.0	0.0	0.0				
Red	0.0	3.0	0.0	0.0	0.0	0.0				

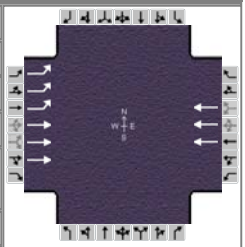
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				6				4
Case Number				8.0				11.0
Phase Duration, s				91.5				78.5
Change Period, ($Y+R_c$), s				7.5				7.5
Max Allow Headway (*MAH*), s				0.0				3.4
Queue Clearance Time (g_s), s								73.0
Green Extension Time (g_e), s				0.0				0.0
Phase Call Probability								1.00
Max Out Probability								1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					6						4	14
Adjusted Flow Rate (*v*), veh/h					2533						0	1707
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1691						1900	1357
Queue Service Time (g_s), s					84.0						0.0	71.0
Cycle Queue Clearance Time (g_c), s					84.0						0.0	71.0
Green Ratio (*g/C*)					0.49						0.42	0.42
Capacity (*c*), veh/h					2507						794	1700
Volume-to-Capacity Ratio (*X*)					1.010						0.000	1.004
Available Capacity (c_a), veh/h					2507						794	1700
Back of Queue (*Q*), veh/ln (50th percentile)					39.1						0.0	27.3
Queue Storage Ratio (*RQ*) (50th percentile)					0.00						0.00	0.00
Uniform Delay (d_1), s/veh					43.0						0.0	49.5
Incremental Delay (d_2), s/veh					20.5						0.0	22.7
Initial Queue Delay (d_3), s/veh					0.0						0.0	0.0
Control Delay (*d*), s/veh					63.5						0.0	72.2
Level of Service (LOS)					F							F
Approach Delay, s/veh / LOS	0.0			63.5		E	0.0			72.2		E
Intersection Delay, s/veh / LOS	67.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	A	2.1	B	2.0	A	2.9	C
Bicycle LOS Score / LOS			1.9	A			3.3	C

HCS 2010 Signalized Intersection Results Summary

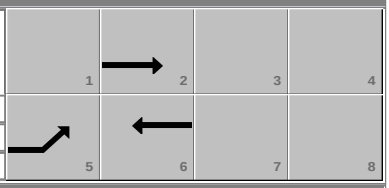
General Information				Intersection Information	
Agency	Michael Baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.92
Intersection	9-AM	Analysis Year	2020 Build not Opt	Analysis Period	1> 7:00
File Name	9_2020B_AM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	2320	1680			890							

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	87.0	58.0	0.0	0.0	0.0	0.0	
Yellow	4.5	4.5	0.0	0.0	0.0	0.0	
Red	3.0	3.0	0.0	0.0	0.0	0.0	



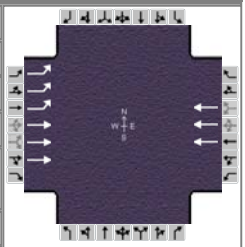
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				
Case Number	2.0	4.0		8.3				
Phase Duration, s	94.5	160.0		65.5				
Change Period, ($Y+R_c$), s	7.5	7.5		7.5				
Max Allow Headway (*MAH*), s	3.1	0.0		0.0				
Queue Clearance Time (g_s), s	75.7							
Green Extension Time (g_e), s	11.2	0.0		0.0				
Phase Call Probability	1.00							
Max Out Probability	0.12							

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6							
Adjusted Flow Rate (*v*), veh/h	2522	1826			967							
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1673	1643			1643							
Queue Service Time (g_s), s	73.7	4.4			24.9							
Cycle Queue Clearance Time (g_c), s	73.7	4.4			24.9							
Green Ratio (*g/C*)	0.54	0.95			0.36							
Capacity (*c*), veh/h	2729	4698			1788							
Volume-to-Capacity Ratio (*X*)	0.924	0.389			0.541							
Available Capacity (c_a), veh/h	3279	4698			1788							
Back of Queue (*Q*), veh/ln (50th percentile)	30.1	0.1			10.3							
Queue Storage Ratio (*RQ*) (50th percentile)	1.95	0.00			0.00							
Uniform Delay (d_1), s/veh	33.5	0.3			40.4							
Incremental Delay (d_2), s/veh	4.1	0.2			1.2							
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0							
Control Delay (*d*), s/veh	37.6	0.5			41.6							
Level of Service (LOS)	D	A			D							
Approach Delay, s/veh / LOS	22.0	C		41.6	D		0.0			0.0		
Intersection Delay, s/veh / LOS	25.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.5	A	2.8	C	3.2	C	3.5	D
Bicycle LOS Score / LOS	2.9	C	1.0	A				

HCS 2010 Signalized Intersection Results Summary

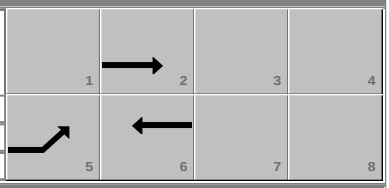
General Information				Intersection Information	
Agency	Michael baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.92
Intersection	9-PM	Analysis Year	2020 Build not Opt	Analysis Period	1> 7:00
File Name	9_2020B_PM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1080	2100			1315							

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	44.0	111.0	0.0	0.0	0.0	0.0	
Yellow	4.5	4.5	0.0	0.0	0.0	0.0	
Red	3.0	3.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				
Case Number	2.0	4.0		8.3				
Phase Duration, s	51.5	170.0		118.5				
Change Period, ($Y+R_c$), s	7.5	7.5		7.5				
Max Allow Headway (*MAH*), s	3.1	0.0		0.0				
Queue Clearance Time (g_s), s	40.5							
Green Extension Time (g_e), s	3.5	0.0		0.0				
Phase Call Probability	1.00							
Max Out Probability	0.00							

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6							
Adjusted Flow Rate (*v*), veh/h	1174	2283			1429							
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1673	1643			1643							
Queue Service Time (g_s), s	38.5	6.5			24.1							
Cycle Queue Clearance Time (g_c), s	38.5	6.5			24.1							
Green Ratio (*g/C*)	0.26	0.96			0.65							
Capacity (*c*), veh/h	1299	4712			3219							
Volume-to-Capacity Ratio (*X*)	0.904	0.484			0.444							
Available Capacity (c_a), veh/h	4385	4712			3219							
Back of Queue (*Q*), veh/ln (50th percentile)	16.4	0.2			9.0							
Queue Storage Ratio (*RQ*) (50th percentile)	1.07	0.00			0.00							
Uniform Delay (d_1), s/veh	61.0	0.3			14.4							
Incremental Delay (d_2), s/veh	1.0	0.4			0.4							
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0							
Control Delay (*d*), s/veh	62.0	0.7			14.9							
Level of Service (LOS)	E	A			B							
Approach Delay, s/veh / LOS	21.5	C		14.9	B		0.0			0.0		
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.5	A	2.8	C	3.2	C	3.5	D
Bicycle LOS Score / LOS	2.4	B	1.3	A				

2040 Build HCS Intersection Analysis Summary (Sheet 1 of 2)

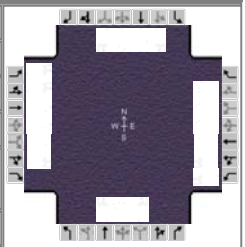
				AM Peak Hour														PM Peak Hour													
				2013		2020 No Build		2040 No Build						2040 Build						2013		2020 No Build		2040 No Build						2040 Build			
				Intersection		Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection		Intersection		Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection	
	Intersection	Approach	Movement	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1	Route 3 / Mall Dr. / Central Park Blvd.	NB	Left	15.1	B	19.4	B	65.2	E	229.4	F	78.1	E	65.2	E	229.4	F	78.7	E	103.8	F	120.0	F	82.7	F	852.0	F	169.1	F	82.7	F	852.0	F	170.8	F
			Through					66.5	E					66.5	E									98.6	F					98.6	F				
			Right					269.4	F					269.4	F									1224.0	F					1224.0	F				
		SB	Left					69.0	E	116.3	F			70.9	E	167.1	F							79.9	E	479.9	F			79.9	E	479.9	F		
			Through					68.9	E					70.8	E									72.3	E					72.3	E				
			Right					130.2	F					195.4	F									813.0	F					813.0	F				
		EB	Left					65.8	E	96.9	F			65.8	E	95.8	F							78.1	E	90.0	F			78.1	E	96.9	F		
			Through					101.7	F					100.4	F									95.0	F					103.4	F				
			Right					0.1	A					0.1	A									44.9	D					44.9	D				
		WB	Left					67.6	E	12.1	B			70.7	E	11.2	B							79.8	E	29.5	C			79.8	E	29.5	C		
			Through					7.1	A					5.9	A									15.8	B					15.8	B				
			Right					9.8	A					8.6	A									30.1	C					30.1	C				
2	Route 3 / Carl D. Silver Pkwy	NB	Left	29.7	C	32.8	C	71.5	E	70.9	E	72.9	E	77.0	E	76.7	E	73.0	E	97.8	F	127.8	F	77.5	E	76.7	E	224.9	F	77.5	E	76.7	E	225.5	F
			Through					71.5	E					77.0	E									77.5	E					77.5	E				
			Right					70.3	E					76.3	E									75.9	E					75.9	E				
		SB	Left					63.1	E	61.7	E			70.7	F	69.4	E							291.4	F	254.7	F			330.8	F	283.3	F		
			Through					51.9	D					50.4	D									51.4	D					51.4	D				
			Right					54.3	D					51.0	D									157.6	F					66.3	E				
		EB	Left					63.8	E	89.5	F			61.8	E	98.7	F							65.6	E	16.5	B			65.6	E	16.6	B		
			Through					91.1	F					91.4	F									9.2	A					9.5	A				
			Right					24.7	C					23.5	C									5.7	A					5.7	A				
		WB	Left					70.0	E	43.9	D			68.6	E	40.0	D							76.6	E	337.0	F			63.6	E	336.5	F		
			Through					33.6	C					35.0	D									239.4	F					331.1	F				
			Right					67.3	E					52.2	D									630.1	F					372.7	F				
8	New Signal Route 3 / Ramp from SB I-95	NB	Left															29.8	C													206.9	F
			Through																														
			Right																														
		SB	Left													60.3	E													214.6	F		
			Through																														
			Right											60.3	E									214.6	F								
		EB	Left																														
			Through																														
			Right																														
		WB	Left																														
			Through											10.2	B	10.2	B													194.7	F	194.7	F		
			Right																														
9	New Signal Route 3 / Ramp to NB I-95 (triple lefts)	NB	Left															33.5	C													21.1	C
			Through																														
			Right																														
		SB	Left																														
			Through																														
			Right																														
		EB	Left											41.1	D															55.5	E		
			Through											0.7	A	24.6	C													1.0	A	19.9	B		
			Right																														
		WB	Left																														
			Through											74.6	E	74.6	E													24.0	C	24.0	C		
			Right																														
3	Route 3 / Gateway Blvd.	NB	Left	20.6	C	21.8	C	86.7	F	74.9	E	26.9	C	89.7	F	74.9	E	38.6	D	27.5	C	30.2	C	186.7	F	150.0	F	43.8	D	186.7	F	150.0	F	54.3	D
			Through					38.2	D					38.2	D									38.0	D					38.0	D				
			Right					42.0	D					42.0	D									97.6	F					97.6	F				
		SB	Left					48.7	D	50.3	D			48.7	D	50.3	D							48.7	D	48.9	D			48.7	D	48.9	D		
			Through					50.7	D					50.7	D									49.1	D					49.1	D				
			Right					50.7	D					50.7	D									49.1	D					49.1	D				
		EB	Left					47.4	D	29.8	C			47.4	D	33.6	C							47.4	D	36.9	D			47.4	D	54.6	D		
			Through					30.1	C					34.8	C									36.0	D					58.5	F				
			Right					26.7	C					26.7	C									39.3	D					39.3	D				
		WB	Left					46.6	D	12.1	B			46.6	D	36.5	D							69.7	E	18.1	B			69.7	E	26.3	C		
			Through					9.4	A					36.0	F									9.1	A					20.1	C				
			Right					3.1	A					3.1	A									0.0	A					0.0	A				

2040 Build HCS Intersection Analysis Summary (Sheet 2 of 2)

				AM Peak Hour														PM Peak Hour													
				2013		2020 No Build		2040 No Build						2040 Build						2013		2020 No Build		2040 No Build						2040 Build			
				Intersection		Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection		Intersection		Intersection		Movement		Approach		Intersection		Movement		Approach		Intersection	
	Intersection	Approach	Movement	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
4	Route 17 / McLane Dr.	NB	Left	25.8	C	53.7	D	54.8	D	271.8	F	218.0	F	56.1	E	268.0	F	216.3	F	19.1	B	27.9	C	69.5	E	61.3	E	144.1	F	71.3	E	60.8	E	143.3	F
			Through					277.8	F					277.8	F									61.8	F					61.8	F				
			Right					1.2	A					1.4	A									0.1	A					0.1	A				
		SB	Left					54.2	D	158.9	F			54.2	D	158.9	F							68.5	E	213.8	F			68.5	E	213.8	F		
			Through					162.2	F					162.2	F									216.0	F					216.0	F		
			Right					17.9	B					17.9	B									14.4	B					14.4	B		
		EB	Left					33.1	C	33.1	C			33.1	C	33.1	C							47.1	D	47.1	D			47.1	D	47.1	D		
			Through					33.1	C					33.1	C									47.1	D					47.1	D		
			Right					33.1	C					33.1	C									47.1	D					47.1	D		
		WB	Left					33.7	C	33.7	C			33.7	C	33.7	C							49.3	D	49.3	D			49.3	D	49.3	D		
			Through					33.7	C					33.7	C									49.3	D					49.3	D		
			Right					33.7	C					33.7	C									49.3	D					49.3	D		
5	Route 17 /Sanford Dr.	NB	Left	36.4	D	53.2	D	76.8	E	204.1	F	241.8	F	97.5	F	285.2	F	91.3	F	291.7	F	382.6	F	82.6	F	2690.1	F	486.7	F	92.6	F	741.8	F	272.5	F
			Through					54.4	D					56.5	E									69.7	E					72.0	E				
			Right					267.0	F					378.4	F									2870.7	F					787.0	F				
		SB	Left					74.1	E	72.1	E			237.4	F	200.1	F							121.2	F	116.8	F			444.8	F	418.2	F		
			Through					70.4	E					145.8	F									59.4	E					70.0	E				
			Right					61.3	E					87.3	F									60.3	E					70.2	E				
		EB	Left					44.6	D	96.1	F			72.5	E	50.3	D							64.4	E	318.8	F			83.2	F	218.8	F		
			Through					97.2	F					50.5	F									324.8	F					222.8	F				
			Right					14.0	B					10.7	B									23.6	C					17.6	B				
		WB	Left					574.8	F	361.5	F			524.4	F	107.9	F							288.6	F	152.1	F			227.9	F	61.9	E		
			Through					373.2	F					11.2	B									147.6	F					13.4	B				
			Right					27.6	C					10.9	B									24.7	C					11.3	B				
7	New Signal Route 17 / Ramp F to SB I-95	NB	Left															8.8	A													6.8	A
			Through																														
			Right																														
		SB	Left																														
			Through																														
			Right																														
		EB	Left																														
			Through											5.7	A	5.7	A													8.4	A	8.4	A		
			Right																														
		WB	Left											61.5	E															73.3	E				
			Through											8.3	A	10.1	B													2.2	A	5.9	A		
			Right																														
6	Route 17 /Short St.	NB	Left	34.9	C	46.8	D	35.7	D	35.2	D	128.4	F	35.7	D	35.2	D	80.2	F	105.6	F	150.7	F	43.3	D	42.4	D	276.0	F	43.3	D	42.4	D	219.5	F
			Through					35.7	D					35.7	D									43.3	D					43.3	D				
			Right					31.6	C					31.6	C									39.5	D					39.5	D				
		SB	Left					41.3	D	41.3	D			41.3	D	41.3	D							44.9	D	44.9	D			44.9	D	44.9	D		
			Through					41.3	D					41.3	D									44.9	D					44.9	D				
			Right					41.3	D					41.3	D									44.9	D					44.9	D				
		EB	Left					246.2	F	231.6	F			147.8	F	137.5	F							451.7	F	425.2	F			354.4	F	331.9	F		
			Through					234.3	F					137.5	F									431.6	F					337.9	F				
			Right					22.5	C					22.5	C									20.7	C					20.7	C				
		WB	Left					20.5	C	36.7	D			20.5	C	24.3	C							21.8	C	20.7	C			21.8	C	17.4	B		
			Through					34.6	C					24.2	C									20.7	C					17.5	B				
			Right					39.1	D					24.6	C									20.7	C					17.2	B				

HCS 2010 Signalized Intersection Results Summary

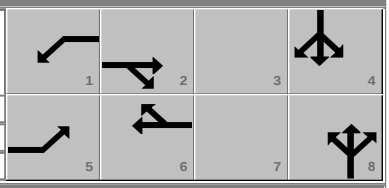
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{1_am} Rte 3 @ Central Pa	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2040B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	360	3740	70	130	1630	40	10	40	220	10	20	110

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.5	63.5	10.5	14.0	8.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



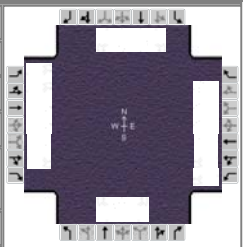
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	35.0	106.0	18.0	89.0		21.0		15.0
Change Period, *(Y+Rc)*, s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway *(MAH)*, s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	18.3		8.2			18.0		12.0
Green Extension Time (g_e), s	0.5	0.0	1.3	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	375	3896	68	135	1310	429	10	42	213	10	21	106
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1740	1691	1594	1658	1810	1778	1810	1845	1563	1757	1696	1548
Queue Service Time (g_s), s	16.3	0.0	0.0	6.2	8.1	10.1	0.8	3.3	16.0	0.9	0.9	10.0
Cycle Queue Clearance Time (g_c), s	16.3	0.0	0.0	6.2	8.1	10.1	0.8	3.3	16.0	0.9	0.9	10.0
Capacity *(c)*, veh/h	631	3203	1006	249	2850	906	181	184	156	110	212	97
Volume-to-Capacity Ratio *(X)*	0.595	1.216	0.067	0.545	0.460	0.474	0.058	0.226	1.359	0.095	0.098	1.098
Available Capacity (c_a), veh/h	631	3203	1006	249	2850	906	181	184	156	110	212	97
Back of Queue *(Q)*, veh/ln (50th percentile)	7.6	29.8	0.0	2.7	2.4	3.3	0.4	1.6	15.0	0.4	0.4	7.2
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	64.8	0.0	0.0	69.4	5.4	6.9	65.2	66.3	72.0	70.7	70.7	75.0
Incremental Delay (d_2), s/veh	1.1	100.4	0.1	1.3	0.5	1.7	0.0	0.2	197.4	0.1	0.1	120.4
Initial Queue Delay (d_3), 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
Control Delay *(d)*, s/veh	65.8	100.4	0.1	70.7	5.9	8.6	65.2	66.5	269.4	70.9	70.8	195.4
Level of Service (LOS)	E	F	A	E	A	A	E	E	F	E	E	F
Approach Delay, s/veh / LOS	95.8	F		11.2	B		229.4	F		167.1	F	
Intersection Delay, s/veh / LOS	78.7						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.9	C	1.3	A	0.9	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

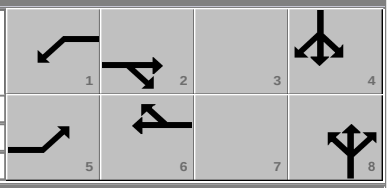
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{1_pm} Rte 3 @ Central Pa	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	1_2040B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	440	2310	140	680	3280	90	110	140	550	140	250	510

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.5	42.5	33.5	14.0	18.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



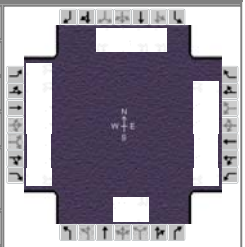
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	4.0		9.0		9.0
Phase Duration, s	33.0	83.0	41.0	91.0		21.0		25.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		3.0
Queue Clearance Time (g_s), s	23.4		36.0			18.0		22.0
Green Extension Time (g_e), s	0.2	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	458	2406	135	708	2637	873	115	146	532	146	260	494
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1675	1594	1757	1863	1827	1810	1900	1610	1792	1900	1610
Queue Service Time (g_s), s	21.4	78.0	12.6	34.0	59.0	66.1	10.4	12.8	16.0	13.3	11.0	20.0
Cycle Queue Clearance Time (g_c), s	21.4	78.0	12.6	34.0	59.0	66.1	10.4	12.8	16.0	13.3	11.0	20.0
Green Ratio (*g/C*)	0.16	0.46	0.46	0.21	0.51	0.51	0.09	0.09	0.09	0.12	0.12	0.12
Capacity (*c*), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Volume-to-Capacity Ratio (*X*)	0.821	1.044	0.185	0.979	0.933	0.973	0.673	0.816	3.512	0.692	0.583	2.606
Available Capacity (c_a), veh/h	558	2306	731	723	2827	898	170	179	152	211	447	189
Back of Queue (*Q*), veh/ln (50th percentile)	10.4	42.1	5.6	16.6	11.7	20.6	5.3	7.4	55.0	6.6	5.5	47.2
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	69.2	72.0	44.3	61.3	12.0	14.6	74.5	75.6	77.0	72.0	71.0	75.0
Incremental Delay (d_2), s/veh	8.9	31.4	0.6	18.5	3.8	15.5	8.2	23.0	1147.0	7.9	1.3	738.0
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	78.1	103.4	44.9	79.8	15.8	30.1	82.7	98.6	1224.0	79.9	72.3	813.0
Level of Service (LOS)	E	F	D	E	B	C	F	F	F	E	E	F
Approach Delay, s/veh / LOS	96.9	F		29.5	C		852.0	F		479.9	F	
Intersection Delay, s/veh / LOS	170.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.0	C	3.5	D	3.8	D
Bicycle LOS Score / LOS	2.1	B	2.2	B	1.8	A	1.2	A

HCS 2010 Signalized Intersection Results Summary

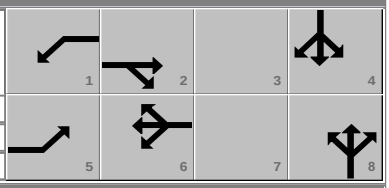
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{2_am} Rte 3 @ Carl D Silv	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2040B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	200	4120	20	30	1550	560	20	10	30	630	10	40

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	27.1	50.5	9.5	5.1	31.3	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



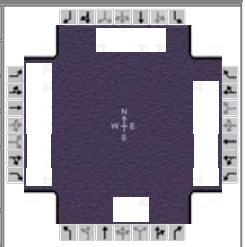
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	1.3	3.0		11.0		9.0
Phase Duration, s	34.6	92.6	17.0	75.0		12.1		38.3
Change Period, *(Y+Rc)*, s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway *(MAH)*, s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	10.7		2.0			5.1		30.6
Green Extension Time (g_e), s	0.3	0.0	3.6	0.0		0.0		0.6
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.48			0.06		0.78

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	208	4292	20	31	1615	583		31	29	656	10	35
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1757	1708	1533	1774	1659	1579		1839	1464	1774	1900	1610
Queue Service Time (g_s), s	8.7	87.6	1.3	0.0	28.9	52.7		2.7	3.1	28.6	0.7	2.8
Cycle Queue Clearance Time (g_c), s	8.7	87.6	1.3	0.0	28.9	52.7		2.7	3.1	28.6	0.7	2.8
Capacity *(c)*, veh/h	628	3741	840	178	2903	691		82	65	749	401	340
Volume-to-Capacity Ratio *(X)*	0.332	1.147	0.024	0.176	0.556	0.845		0.381	0.447	0.877	0.026	0.104
Available Capacity (c_a), veh/h	628	3741	840	178	2903	691		115	110	806	432	366
Back of Queue *(Q)*, veh/ln (50th percentile)	4.0	46.3	0.5	1.2	11.9	22.8		1.3	1.2	14.0	0.3	1.2
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	61.7	21.6	23.4	68.5	34.3	40.1		75.9	74.5	61.1	50.1	50.9
Incremental Delay (d_2), s/veh	0.1	69.8	0.1	0.2	0.8	12.1		1.1	1.8	9.6	0.0	0.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay *(d)*, s/veh	61.8	91.4	23.5	68.6	35.0	52.2		77.0	76.3	70.7	50.1	51.0
Level of Service (LOS)	E	F	C	E	D	D		E	E	E	D	D
Approach Delay, s/veh / LOS	89.7	F		40.0	D		76.7	E		69.4	E	
Intersection Delay, s/veh / LOS	73.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	2.4	B	1.4	A	0.6	A	1.6	A

HCS 2010 Signalized Intersection Results Summary

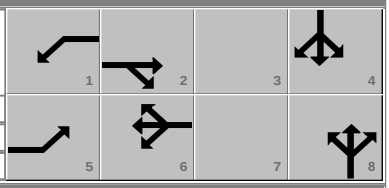
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{2_pm} Rte 3 @ Carl D Silv	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	2_2040B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	380	2590	20	50	3920	970	30	10	40	1240	20	280

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	34.5	43.5	9.5	10.0	36.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



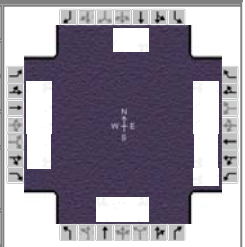
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	1.3	3.0		11.0		9.0
Phase Duration, s	42.0	93.0	17.0	68.0		17.0		43.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.1		2.8
Queue Clearance Time (g_s), s	19.8		2.0			6.0		40.5
Green Extension Time (g_e), s	0.7	0.0	7.2	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.97			0.26		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	396	2698	20	52	4083	1010		42	39	1292	21	260
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1691	1610	1723	1708	1610		1761	1579	1810	1900	1610
Queue Service Time (g_s), s	17.8	27.7	0.3	0.0	63.0	63.0		3.9	4.0	38.5	1.5	25.4
Cycle Queue Clearance Time (g_c), s	17.8	27.7	0.3	0.0	63.0	63.0		3.9	4.0	38.5	1.5	25.4
Green Ratio (*g/C*)	0.21	0.52	0.52	0.31	0.37	0.37		0.07	0.07	0.23	0.23	0.23
Capacity (*c*), veh/h	744	3502	833	189	2532	597		124	111	820	430	365
Volume-to-Capacity Ratio (*X*)	0.532	0.770	0.024	0.275	1.613	1.693		0.335	0.346	1.576	0.048	0.714
Available Capacity (c_a), veh/h	744	3502	833	189	2532	597		104	111	820	430	365
Back of Queue (*Q*), veh/ln (50th percentile)	8.3	4.7	0.1	2.2	75.8	78.3		1.8	1.6	48.0	0.7	11.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	65.2	7.8	5.6	63.3	53.5	53.5		76.9	75.3	65.8	51.4	60.7
Incremental Delay (d_2), s/veh	0.4	1.7	0.1	0.3	277.6	319.2		0.6	0.7	265.1	0.0	5.6
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	65.6	9.5	5.7	63.6	331.1	372.7		77.5	75.9	330.8	51.4	66.3
Level of Service (LOS)	E	A	A	E	F	F		E	E	F	D	E
Approach Delay, s/veh / LOS	16.6	B		336.5	F		76.7	E		283.3	F	
Intersection Delay, s/veh / LOS	225.5						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	3.0	C	3.8	D	3.9	D
Bicycle LOS Score / LOS	1.8	A	2.6	B	0.6	A	3.1	C

HCS 2010 Signalized Intersection Results Summary

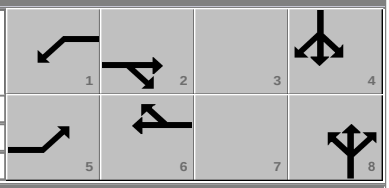
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{3_am} Rte 3 @ Gateway E	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2040B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	1930	430	140	2160	10	310	10	140	10	5	30

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



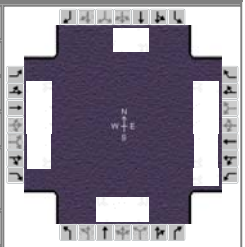
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, ($Y+R_c$), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.3
Queue Clearance Time (g_s), s	4.4		6.5			22.4		4.4
Green Extension Time (g_e), s	0.0	0.0	2.4	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.91			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	2010	414	146	2250	9	323	10	134	10	36	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1646	
Queue Service Time (g_s), s	2.4	41.3	22.9	4.5	51.5	0.1	20.4	0.5	8.9	0.7	2.4	
Cycle Queue Clearance Time (g_c), s	2.4	41.3	22.9	4.5	51.5	0.1	20.4	0.5	8.9	0.7	2.4	
Green Ratio (*g/C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	108	
Volume-to-Capacity Ratio (*X*)	0.228	0.877	0.591	0.424	1.039	0.013	0.978	0.030	0.476	0.078	0.337	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	108	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	17.1	8.8	1.9	8.1	0.0	13.0	0.2	3.4	0.3	1.0	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.2	29.6	23.1	46.3	5.5	3.0	46.3	38.1	41.6	48.7	50.1	
Incremental Delay (d_2), s/veh	0.2	5.1	3.6	0.3	30.5	0.0	43.4	0.0	0.5	0.1	0.7	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.4	34.8	26.7	46.6	36.0	3.1	89.7	38.2	42.0	48.7	50.7	
Level of Service (LOS)	D	C	C	D	F	A	F	D	D	D	D	
Approach Delay, s/veh / LOS	33.6	C		36.5	D		74.9	E		50.3	D	
Intersection Delay, s/veh / LOS	38.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	1.8	A	1.8	A	1.3	A	0.6	A

HCS 2010 Signalized Intersection Results Summary

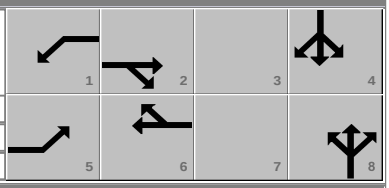
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{3_pm} Rte 3 @ Gateway E	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	3_2040B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	40	2270	600	290	2030	0	400	5	280	10	5	5

Signal Information			
Cycle, s	114.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	31.5	10.0	19.5	7.5	0.0	
Yellow	4.0	3.5	4.0	4.5	4.5	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



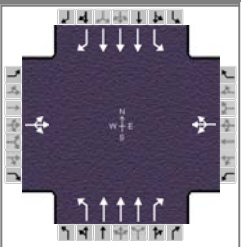
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		10.0
Phase Duration, s	17.0	55.0	17.0	55.0		27.0		15.0
Change Period, (Y+R_c), s	7.0	6.5	7.0	7.0		7.5		7.5
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		2.9		3.0
Queue Clearance Time (g_s), s	4.4		11.9			23.0		2.7
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	42	2365	591	302	2115	0	417	5	280	10	10	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810	1675	1533	1706	1597	1610	1792	1900	1533	1691	1743	
Queue Service Time (g_s), s	2.4	52.0	38.8	9.9	41.3	0.0	21.0	0.3	20.8	0.7	0.6	
Cycle Queue Clearance Time (g_c), s	2.4	52.0	38.8	9.9	41.3	0.0	21.0	0.3	20.8	0.7	0.6	
Green Ratio (*g*/*C*)	0.10	0.46	0.46	0.10	0.45	0.45	0.18	0.18	0.18	0.08	0.08	
Capacity (*c*), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Volume-to-Capacity Ratio (*X*)	0.228	1.032	0.844	0.878	0.977	0.000	1.263	0.015	0.992	0.078	0.091	
Available Capacity (c_a), veh/h	183	2292	699	344	2165	727	330	350	282	134	115	
Back of Queue (*Q*), veh/ln (50th percentile)	1.1	26.0	16.1	5.1	4.9	0.0	22.1	0.1	11.9	0.3	0.3	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh	47.2	31.0	27.4	48.6	5.5	0.0	46.5	38.0	46.4	48.7	49.0	
Incremental Delay (d_2), s/veh	0.2	27.5	11.9	21.0	14.6	0.0	140.2	0.0	51.2	0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	47.4	58.5	39.3	69.7	20.1	0.0	186.7	38.0	97.6	48.7	49.1	
Level of Service (LOS)	D	F	D	E	C		F	D	F	D	D	
Approach Delay, s/veh / LOS	54.6	D		26.3	C		150.0	F		48.9	D	
Intersection Delay, s/veh / LOS	54.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.3	B	3.5	D	3.4	C
Bicycle LOS Score / LOS	2.1	B	1.8	A	1.6	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

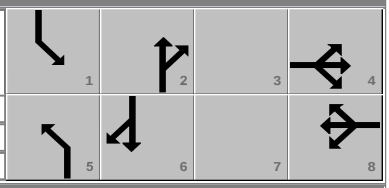
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{4_am} Rte 17 @ McLane I	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2040B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	30	10	10	50	5	20	60	3670	90	40	2960	40

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	60.5	38.5	0.0	0.0	0.0	
Yellow	3.5	4.5	3.5	0.0	0.0	0.0	
Red	3.0	3.0	3.0	0.0	0.0	0.0	



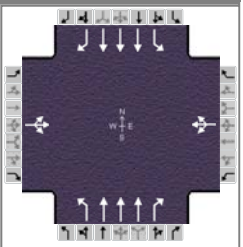
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	68.0	17.0	68.0
Change Period, (Y+R_c), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		4.9		6.5	6.4		4.9	
Green Extension Time (g_e), s		0.2		0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.10		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		52			78		63	3823	91	42	3083	40
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1487			1458		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			1.6		4.4	63.0	0.3	2.9	63.0	1.8
Cycle Queue Clearance Time (g_c), s		2.9			4.5		4.4	63.0	0.3	2.9	63.0	1.8
Green Ratio (*g*/*C*)		0.32			0.32		0.09	0.48	0.48	0.10	0.48	0.48
Capacity (*c*), veh/h		485			478		161	2412	750	174	2412	750
Volume-to-Capacity Ratio (*X*)		0.107			0.163		0.389	1.585	0.121	0.239	1.278	0.053
Available Capacity (c_a), veh/h		485			478		161	2412	750	174	2412	750
Back of Queue (*Q*), veh/ln (50th percentile)		1.2			1.8		2.0	68.1	0.2	1.3	53.2	0.7
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		33.0			33.6		55.5	12.5	1.0	53.9	33.5	17.7
Incremental Delay (d_2), s/veh		0.0			0.1		0.6	265.3	0.3	0.3	128.7	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		33.1			33.7		56.1	277.8	1.4	54.2	162.2	17.9
Level of Service (LOS)		C			C		E	F	A	D	F	B
Approach Delay, s/veh / LOS	33.1	C		33.7	C		268.0	F		158.9	F	
Intersection Delay, s/veh / LOS	216.3						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.6	A	0.6	A	2.7	B	2.2	B

HCS 2010 Signalized Intersection Results Summary

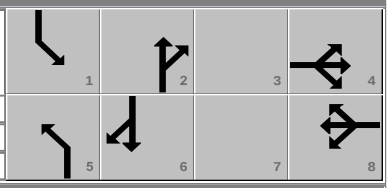
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{4_pm} Rte 17 @ McLane I	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	4_2040B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	5	10	60	10	30	50	3110	60	20	3890	30

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.5	90.5	38.5	0.0	0.0	0.0	
Yellow	3.5	4.5	3.5	0.0	0.0	0.0	
Red	3.0	3.0	3.0	0.0	0.0	0.0	



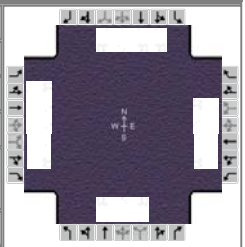
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		8.0		8.0	2.0	3.0	2.0	3.0
Phase Duration, s		45.0		45.0	17.0	98.0	17.0	98.0
Change Period, (Y+R_c), s		6.5		6.5	6.5	7.5	6.5	7.5
Max Allow Headway (*MAH*), s		3.2		3.2	2.8	0.0	2.8	0.0
Queue Clearance Time (g_s), s		4.9		10.7	6.6		3.8	
Green Extension Time (g_e), s		0.3		0.3	0.0	0.0	0.0	0.0
Phase Call Probability		1.00		1.00	1.00		1.00	
Max Out Probability		0.00		0.00	0.12		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		36			104		52	3240	59	21	4052	29
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1442			1478		1740	1659	1548	1740	1659	1548
Queue Service Time (g_s), s		0.0			5.7		4.6	93.0	0.0	1.8	93.0	1.3
Cycle Queue Clearance Time (g_c), s		2.9			8.7		4.6	93.0	0.0	1.8	93.0	1.3
Green Ratio (*g*/*C*)		0.26			0.26		0.08	0.58	0.58	0.08	0.58	0.58
Capacity (*c*), veh/h		382			392		130	2893	900	141	2893	900
Volume-to-Capacity Ratio (*X*)		0.095			0.266		0.399	1.120	0.066	0.147	1.401	0.032
Available Capacity (c_a), veh/h		382			392		130	2893	900	141	2893	900
Back of Queue (*Q*), veh/ln (50th percentile)		1.2			3.4		2.1	17.1	0.0	0.8	85.1	0.5
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		47.0			49.2		70.6	2.5	0.0	68.3	33.5	14.3
Incremental Delay (d_2), s/veh		0.0			0.1		0.7	59.3	0.1	0.2	182.5	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		47.1			49.3		71.3	61.8	0.1	68.5	216.0	14.4
Level of Service (LOS)		D			D		E	F	A	E	F	B
Approach Delay, s/veh / LOS	47.1	D		49.3	D		60.8	E		213.8	F	
Intersection Delay, s/veh / LOS	143.3						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.4	C	3.4	C	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.5	A	0.7	A	2.3	B	2.7	B

HCS 2010 Signalized Intersection Results Summary

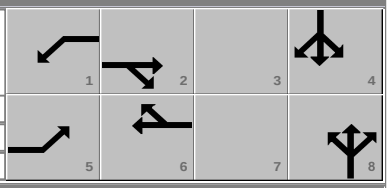
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{5_am} Rte 17 @ Sanford I	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2040B_AM_Optimized_MajorChange.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	2950	30	280	910	310	90	10	230	230	100	30

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	9.0	65.5	5.0	9.0	5.0	0.0	
Yellow	4.5	4.5	4.5	4.0	4.0	0.0	
Red	3.0	3.0	3.0	3.0	3.0	0.0	



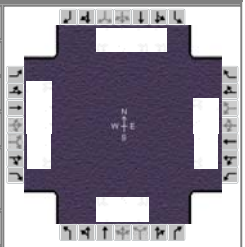
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	12.5	85.5	16.5	89.5		16.0		12.0
Change Period, (Y+R_c), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.9
Queue Clearance Time (g_s), s	3.5		13.0			13.0		9.4
Green Extension Time (g_e), s	1.3	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	21	3073	29	292	948	307	94	10	215	240	104	29
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1739	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	1.5	78.0	1.0	11.0	18.0	11.4	6.9	0.7	11.0	7.0	7.4	2.4
Cycle Queue Clearance Time (g_c), s	1.5	78.0	1.0	11.0	18.0	11.4	6.9	0.7	11.0	7.0	7.4	2.4
Green Ratio (*g*/*C*)	0.04	0.60	0.60	0.08	0.63	0.63	0.08	0.08	0.08	0.06	0.06	0.06
Capacity (*c*), veh/h	67	2986	929	147	2194	1000	120	155	131	182	105	60
Volume-to-Capacity Ratio (*X*)	0.311	1.029	0.031	1.981	0.432	0.307	0.778	0.067	1.638	1.317	0.988	0.490
Available Capacity (c_a), veh/h	67	2986	929	147	2194	1000	120	155	131	182	105	60
Back of Queue (*Q*), veh/ln (50th percentile)	0.9	35.5	0.4	23.9	7.0	4.0	4.3	0.4	15.9	7.5	5.9	1.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	60.8	26.0	10.6	59.5	12.2	10.2	59.5	55.7	59.5	61.5	61.3	61.3
Incremental Delay (d_2), s/veh	11.7	24.5	0.1	464.9	0.6	0.8	38.0	0.8	318.9	175.9	84.6	26.1
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	72.5	50.5	10.7	524.4	12.8	10.9	97.5	56.5	378.4	237.4	145.8	87.3
Level of Service (LOS)	E	F	B	F	B	B	F	E	F	F	F	F
Approach Delay, s/veh / LOS	50.3	D		108.9	F		285.2	F		200.1	F	
Intersection Delay, s/veh / LOS	91.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.6	B	3.3	C	3.1	C
Bicycle LOS Score / LOS	2.2	B	1.8	A	1.0	A	1.1	A

HCS 2010 Signalized Intersection Results Summary

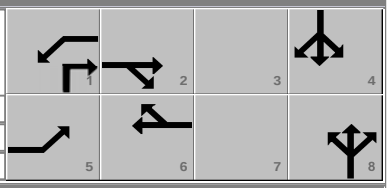
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{5_pm} Rte 17 @ Sanford I	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	5_2040B_PM_Optimized_MajorChange.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	3660	70	340	890	270	50	10	950	510	30	10

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.0	74.5	5.0	9.0	12.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	3.0	3.0	3.0	3.0	3.0	0.0



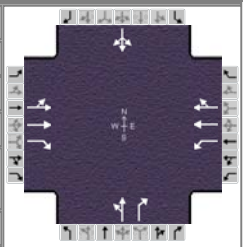
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		9.0		9.0
Phase Duration, s	12.5	94.5	30.5	112.5		16.0		19.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5		7.0		7.0
Max Allow Headway (*MAH*), s	2.8	0.0	2.8	0.0		3.0		2.8
Queue Clearance Time (g_s), s	2.9		27.0			13.0		16.0
Green Extension Time (g_e), s	2.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	1.00		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	3813	69	354	927	273	52	10	903	531	31	9
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1740	1659	1548	1740	1739	1548	1740	1827	1548	1689	1827	1548
Queue Service Time (g_s), s	0.9	87.0	3.4	25.0	20.0	11.3	4.7	0.9	11.0	14.0	2.5	0.9
Cycle Queue Clearance Time (g_c), s	0.9	87.0	3.4	25.0	20.0	11.3	4.7	0.9	11.0	14.0	2.5	0.9
Green Ratio (*g/C*)	0.03	0.54	0.54	0.16	0.66	0.66	0.07	0.07	0.23	0.09	0.09	0.09
Capacity (*c*), veh/h	54	2706	842	272	2283	1035	98	126	348	296	166	116
Volume-to-Capacity Ratio (*X*)	0.192	1.409	0.082	1.303	0.406	0.264	0.532	0.083	2.593	1.797	0.189	0.081
Available Capacity (c_a), veh/h	54	2706	842	272	2283	1035	98	126	348	296	166	116
Back of Queue (*Q*), veh/ln (50th percentile)	0.5	81.0	1.3	23.3	8.0	4.1	2.6	0.4	84.3	21.4	1.3	0.4
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	75.5	36.5	17.4	67.5	12.9	10.7	73.5	70.7	62.0	73.0	67.5	68.9
Incremental Delay (d_2), s/veh	7.7	186.3	0.2	160.4	0.5	0.6	19.2	1.3	725.0	371.8	2.5	1.4
Initial Queue Delay (d_3), 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
Control Delay (*d*), s/veh	83.2	222.8	17.6	227.9	13.4	11.3	92.6	72.0	787.0	444.8	70.0	70.2
Level of Service (LOS)	F	F	B	F	B	B	F	E	F	F	E	E
Approach Delay, s/veh / LOS	218.8	F		61.9	E		741.8	F		418.2	F	
Intersection Delay, s/veh / LOS	272.5						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	2.6	B	3.3	C	3.1	C
Bicycle LOS Score / LOS	2.6	B	1.8	A	2.1	B	1.4	A

HCS 2010 Signalized Intersection Results Summary

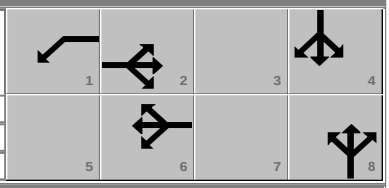
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	AM Peak Hour	PHF	0.96
Intersection	{6_am} Rte 17 @ Short St	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2040B_AM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	1400	70	20	1350	5	130	0	20	5	0	20

Signal Information			
Cycle, s	100.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	32.5	19.0	10.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



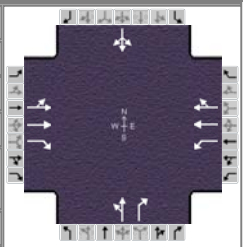
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		40.0	17.0	57.0		26.0		17.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.6			8.6		3.4
Green Extension Time (g_e), s		0.0	0.0	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	765	704	68	21	706	705		135	20		26	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1811	1679	1579	1810	1863	1860		1810	1563		1646	
Queue Service Time (g_s), s	11.9	35.0	2.9	0.6	29.3	29.3		6.6	1.0		1.4	
Cycle Queue Clearance Time (g_c), s	32.5	35.0	2.9	0.6	29.3	29.3		6.6	1.0		1.4	
Green Ratio (*g*/*C*)	0.35	0.35	0.35	0.48	0.52	0.52		0.21	0.21		0.12	
Capacity (*c*), veh/h	625	588	553	280	969	921		380	328		198	
Volume-to-Capacity Ratio (*X*)	1.224	1.198	0.123	0.074	0.729	0.766		0.356	0.060		0.132	
Available Capacity (c_a), veh/h	625	588	553	280	969	921		344	328		165	
Back of Queue (*Q*), veh/ln (50th percentile)	34.7	30.8	1.1	0.2	13.2	13.4		2.9	0.4		0.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	33.3	32.5	22.1	20.4	19.4	18.6		35.5	31.6		41.2	
Incremental Delay (d_2), s/veh	114.5	105.0	0.5	0.0	4.8	6.1		0.2	0.0		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	147.8	137.5	22.5	20.5	24.2	24.6		35.7	31.6		41.3	
Level of Service (LOS)	F	F	C	C	C	C		D	C		D	
Approach Delay, s/veh / LOS	137.5	F		24.3	C		35.2	D		41.3	D	
Intersection Delay, s/veh / LOS	80.2						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.8	A	1.7	A	0.7	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

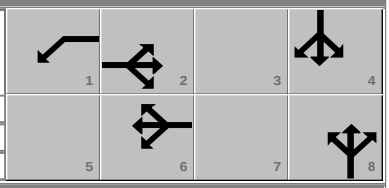
General Information				Intersection Information	
Agency	Baker			Duration, h	0.25
Analyst	ZPH, CRD update	Analysis Date	Nov 13, 2013	Area Type	Other
Jurisdiction		Time Period	PM Peak Hour	PHF	0.96
Intersection	{6_pm} Rte 17 @ Short St	Analysis Year	2040 Build w/ Exist Timings	Analysis Period	1> 7:00
File Name	6_2040B_PM_NotOpt.xus				
Project Description	I-95 Interchange Modification Report				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	2370	120	20	1210	5	110	5	40	5	5	10

Signal Information			
Cycle, s	110.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	11.0	43.5	16.0	11.0	0.0	0.0
Yellow	4.0	4.5	4.0	4.0	0.0	0.0
Red	3.0	3.0	3.0	3.0	0.0	0.0



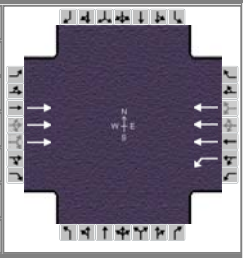
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.0	18.0	69.0		23.0		18.0
Change Period, (Y+R_c), s		7.5	7.0	7.5		7.0		7.0
Max Allow Headway (*MAH*), s		0.0	2.8	0.0		3.1		3.3
Queue Clearance Time (g_s), s			2.6			8.6		3.2
Green Extension Time (g_e), s		0.0	0.0	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.00			0.01		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	1298	1181	117	21	633	632		120	39		21	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1845	1695	1548	1757	1863	1860		1813	1610		1723	
Queue Service Time (g_s), s	16.0	46.0	5.2	0.6	23.7	23.7		6.6	2.3		1.2	
Cycle Queue Clearance Time (g_c), s	43.5	46.0	5.2	0.6	23.7	23.7		6.6	2.3		1.2	
Green Ratio (*g*/*C*)	0.42	0.42	0.42	0.54	0.58	0.58		0.16	0.16		0.12	
Capacity (*c*), veh/h	763	709	647	265	1084	1040		297	263		204	
Volume-to-Capacity Ratio (*X*)	1.702	1.666	0.180	0.079	0.584	0.608		0.404	0.146		0.102	
Available Capacity (c_a), veh/h	763	709	647	265	1084	1040		264	263		172	
Back of Queue (*Q*), veh/ln (50th percentile)	88.0	78.4	2.0	0.2	10.2	10.2		3.0	0.9		0.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	32.8	32.0	20.1	21.8	15.2	14.6		43.0	39.4		44.9	
Incremental Delay (d_2), s/veh	321.6	305.9	0.6	0.0	2.3	2.6		0.3	0.1		0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Control Delay (*d*), s/veh	354.4	337.9	20.7	21.8	17.5	17.2		43.3	39.5		44.9	
Level of Service (LOS)	F	F	C	C	B	B		D	D		D	
Approach Delay, s/veh / LOS	331.9	F		17.4	B		42.4	D		44.9	D	
Intersection Delay, s/veh / LOS	219.5						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.6	B	1.5	A	0.7	A	0.5	A

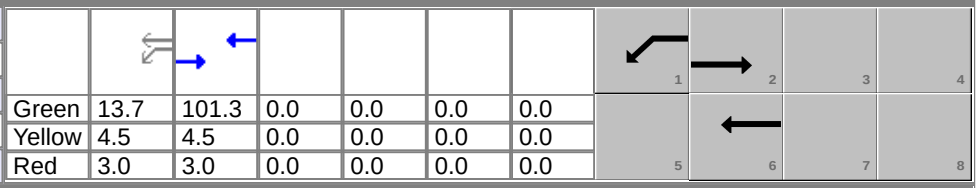
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.92
Intersection	7-AM-Ramp F	Analysis Year	2040 Build	Analysis Period	1> 7:00
File Name	7_2040B_AM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1890		150	4290							

Signal Information			
Cycle, s	130.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	13.7	101.3	0.0	0.0	0.0	0.0
Yellow	4.5	4.5	0.0	0.0	0.0	0.0
Red	3.0	3.0	0.0	0.0	0.0	0.0

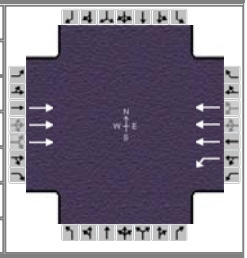
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				
Case Number		8.3	2.0	4.0				
Phase Duration, s		108.8	21.2	130.0				
Change Period, ($Y+R_c$), s		7.5	7.5	7.5				
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				
Queue Clearance Time (g_s), s			13.5					
Green Extension Time (g_e), s		0.0	0.2	0.0				
Phase Call Probability			1.00					
Max Out Probability			0.00					

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2		1	6							
Adjusted Flow Rate (*v*), veh/h		2054		163	4663							
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1725		1810	1725							
Queue Service Time (g_s), s		18.9		11.5	68.2							
Cycle Queue Clearance Time (g_c), s		18.9		11.5	68.2							
Green Ratio (*g/C*)		0.78		0.11	0.94							
Capacity (*c*), veh/h		4034		190	4877							
Volume-to-Capacity Ratio (*X*)		0.509		0.857	0.956							
Available Capacity (c_a), veh/h		4034		327	4877							
Back of Queue (*Q*), veh/ln (50th percentile)		5.7		5.5	2.8							
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00	0.00							
Uniform Delay (d_1), s/veh		5.2		57.2	2.2							
Incremental Delay (d_2), s/veh		0.5		4.3	6.1							
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0							
Control Delay (*d*), s/veh		5.7		61.5	8.3							
Level of Service (LOS)		A		E	A							
Approach Delay, s/veh / LOS	5.7	A		10.1	B		0.0			0.0		
Intersection Delay, s/veh / LOS	8.8						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.8	A	0.5	A	3.3	C	3.2	C
Bicycle LOS Score / LOS	1.6	A	3.1	C				

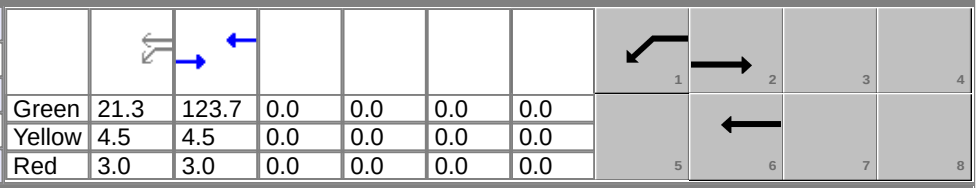
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.92
Intersection	7-PM-Ramp F	Analysis Year	2040 Build	Analysis Period	1> 7:00
File Name	7_2040B_PM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		2220		200	3630							

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	21.3	123.7	0.0	0.0	0.0	0.0		
Yellow	4.5	4.5	0.0	0.0	0.0	0.0		
Red	3.0	3.0	0.0	0.0	0.0	0.0		

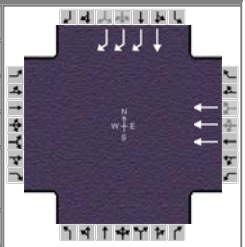
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				
Case Number		8.3	2.0	4.0				
Phase Duration, s		131.2	28.8	160.0				
Change Period, ($Y+R_c$), s		7.5	7.5	7.5				
Max Allow Headway (*MAH*), s		0.0	3.1	0.0				
Queue Clearance Time (g_s), s			20.9					
Green Extension Time (g_e), s		0.0	0.4	0.0				
Phase Call Probability			1.00					
Max Out Probability			0.00					

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2		1	6							
Adjusted Flow Rate (*v*), veh/h		2413		217	3946							
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1725		1810	1725							
Queue Service Time (g_s), s		31.7		18.9	24.1							
Cycle Queue Clearance Time (g_c), s		31.7		18.9	24.1							
Green Ratio (*g/C*)		0.77		0.13	0.95							
Capacity (*c*), veh/h		4001		241	4933							
Volume-to-Capacity Ratio (*X*)		0.603		0.902	0.800							
Available Capacity (c_a), veh/h		4001		492	4933							
Back of Queue (*Q*), veh/ln (50th percentile)		10.8		9.1	0.7							
Queue Storage Ratio (*RQ*) (50th percentile)		0.00		0.00	0.00							
Uniform Delay (d_1), s/veh		7.7		68.3	0.7							
Incremental Delay (d_2), s/veh		0.7		5.0	1.4							
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0							
Control Delay (*d*), s/veh		8.4		73.3	2.2							
Level of Service (LOS)		A		E	A							
Approach Delay, s/veh / LOS	8.4	A		5.9	A		0.0			0.0		
Intersection Delay, s/veh / LOS	6.8						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.9	A	0.5	A	3.3	C	3.2	C
Bicycle LOS Score / LOS	1.8	A	2.8	C				

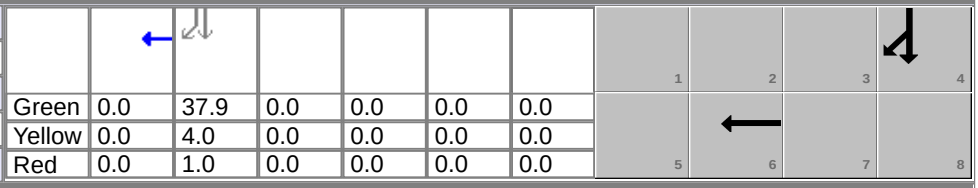
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.92
Intersection	SB ramp and WB Rt 3 Alt 1	Analysis Year	2040 Build_not Opt	Analysis Period	1> 7:00
File Name	8_2040B_AM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h					1300						0	835

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	0.0	37.9	0.0	0.0	0.0	0.0
Yellow	0.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	1.0	0.0	0.0	0.0	0.0

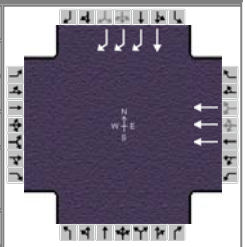
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				6				4
Case Number				8.0				11.0
Phase Duration, s				117.1				42.9
Change Period, ($Y+R_c$), s				5.0				5.0
Max Allow Headway (*MAH*), s				0.0				3.4
Queue Clearance Time (g_s), s								34.9
Green Extension Time (g_e), s				0.0				3.0
Phase Call Probability								1.00
Max Out Probability								0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					6						4	14
Adjusted Flow Rate (*v*), veh/h					1413						0	908
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1725						1900	1425
Queue Service Time (g_s), s					18.0						0.0	32.9
Cycle Queue Clearance Time (g_c), s					18.0						0.0	32.9
Green Ratio (*g/C*)					0.70						0.24	0.24
Capacity (*c*), veh/h					3625						450	1014
Volume-to-Capacity Ratio (*X*)					0.390						0.000	0.895
Available Capacity (c_a), veh/h					3625						1663	3741
Back of Queue (*Q*), veh/ln (50th percentile)					6.7						0.0	11.9
Queue Storage Ratio (*RQ*) (50th percentile)					0.00						0.00	0.00
Uniform Delay (d_1), s/veh					9.9						0.0	59.1
Incremental Delay (d_2), s/veh					0.3						0.0	1.2
Initial Queue Delay (d_3), s/veh					0.0						0.0	0.0
Control Delay (*d*), s/veh					10.2						0.0	60.3
Level of Service (LOS)					B							E
Approach Delay, s/veh / LOS	0.0			10.2		B	0.0			60.3		E
Intersection Delay, s/veh / LOS	29.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	A	2.1	B	2.0	A	2.9	C
Bicycle LOS Score / LOS			1.3	A			2.0	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Michael Baker Jr			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.92
Intersection	SB Ramp and WB Rt 3 Alt	Analysis Year	2040 Build_not opt	Analysis Period	1> 7:00
File Name	8_2040B_PM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h					1955						0	3070

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	0.0	100.0	0.0	0.0	0.0	0.0	5	6	7	8
Yellow	0.0	4.5	0.0	0.0	0.0	0.0				
Red	0.0	3.0	0.0	0.0	0.0	0.0				

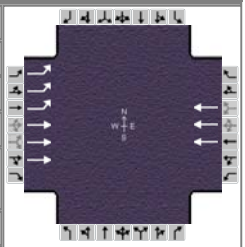
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				6				4
Case Number				8.0				11.0
Phase Duration, s				62.5				107.5
Change Period, ($Y+R_c$), s				7.5				7.5
Max Allow Headway (*MAH*), s				0.0				3.4
Queue Clearance Time (g_s), s								102.0
Green Extension Time (g_e), s				0.0				0.0
Phase Call Probability								1.00
Max Out Probability								1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					6						4	14
Adjusted Flow Rate (*v*), veh/h					2125						0	3337
Adjusted Saturation Flow Rate (*s*), veh/h/ln					1691						1900	1357
Queue Service Time (g_s), s					55.0						0.0	100.0
Cycle Queue Clearance Time (g_c), s					55.0						0.0	100.0
Green Ratio (*g/C*)					0.32						0.59	0.59
Capacity (*c*), veh/h					1642						1118	2395
Volume-to-Capacity Ratio (*X*)					1.294						0.000	1.393
Available Capacity (c_a), veh/h					1642						1118	2395
Back of Queue (*Q*), veh/ln (50th percentile)					44.2						0.0	71.5
Queue Storage Ratio (*RQ*) (50th percentile)					0.00						0.00	0.00
Uniform Delay (d_1), s/veh					57.5						0.0	35.0
Incremental Delay (d_2), s/veh					137.2						0.0	179.6
Initial Queue Delay (d_3), s/veh					0.0						0.0	0.0
Control Delay (*d*), s/veh					194.7						0.0	214.6
Level of Service (LOS)					F							F
Approach Delay, s/veh / LOS	0.0			194.7		F	0.0			214.6		F
Intersection Delay, s/veh / LOS	206.9						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.0	A	2.1	B	2.0	A	2.9	C
Bicycle LOS Score / LOS			1.7	A			6.0	F

HCS 2010 Signalized Intersection Results Summary

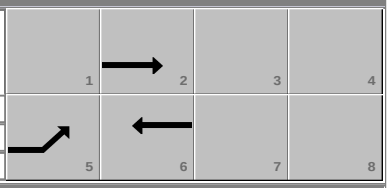
General Information				Intersection Information	
Agency	Michael Baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.92
Intersection	9-AM	Analysis Year	2040 Build not Opt	Analysis Period	1> 7:00
File Name	9_2040B_AM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	2990	2060			1090							

Signal Information			
Cycle, s	160.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	104.5	40.5	0.0	0.0	0.0	0.0	
Yellow	4.5	4.5	0.0	0.0	0.0	0.0	
Red	3.0	3.0	0.0	0.0	0.0	0.0	



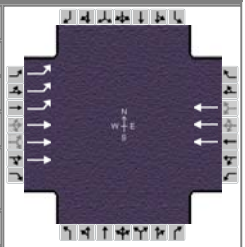
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				
Case Number	2.0	4.0		8.3				
Phase Duration, s	112.0	160.0		48.0				
Change Period, ($Y+R_c$), s	7.5	7.5		7.5				
Max Allow Headway (*MAH*), s	3.1	0.0		0.0				
Queue Clearance Time (g_s), s	104.0							
Green Extension Time (g_e), s	0.5	0.0		0.0				
Phase Call Probability	1.00							
Max Out Probability	1.00							

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6							
Adjusted Flow Rate (*v*), veh/h	3250	2239			1185							
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1673	1643			1643							
Queue Service Time (g_s), s	102.0	6.2			37.8							
Cycle Queue Clearance Time (g_c), s	102.0	6.2			37.8							
Green Ratio (*g/C*)	0.65	0.95			0.25							
Capacity (*c*), veh/h	3278	4698			1249							
Volume-to-Capacity Ratio (*X*)	0.992	0.477			0.949							
Available Capacity (c_a), veh/h	3279	4698			1249							
Back of Queue (*Q*), veh/ln (50th percentile)	42.1	0.2			17.5							
Queue Storage Ratio (*RQ*) (50th percentile)	2.73	0.00			0.00							
Uniform Delay (d_1), s/veh	27.3	0.3			58.7							
Incremental Delay (d_2), s/veh	13.7	0.3			15.8							
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0							
Control Delay (*d*), s/veh	41.1	0.7			74.6							
Level of Service (LOS)	D	A			E							
Approach Delay, s/veh / LOS	24.6	C		74.6	E		0.0			0.0		
Intersection Delay, s/veh / LOS	33.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.5	A	2.9	C	3.2	C	3.5	D
Bicycle LOS Score / LOS	3.5	D	1.1	A				

HCS 2010 Signalized Intersection Results Summary

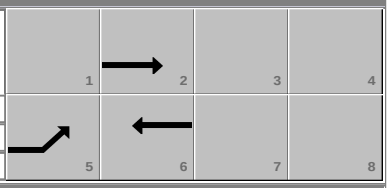
General Information				Intersection Information	
Agency	Michael baker Jr.			Duration, h	0.25
Analyst	ZPH	Analysis Date	Apr 29, 2014	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.92
Intersection	9-PM	Analysis Year	2040 Build not Opt	Analysis Period	1> 7:00
File Name	9_2040B_PM_NotOpt.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1390	2610			1605							

Signal Information			
Cycle, s	170.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	56.1	98.9	0.0	0.0	0.0	0.0	
Yellow	4.5	4.5	0.0	0.0	0.0	0.0	
Red	3.0	3.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				
Case Number	2.0	4.0		8.3				
Phase Duration, s	63.6	170.0		106.4				
Change Period, ($Y+R_c$), s	7.5	7.5		7.5				
Max Allow Headway (*MAH*), s	3.1	0.0		0.0				
Queue Clearance Time (g_s), s	51.1							
Green Extension Time (g_e), s	5.0	0.0		0.0				
Phase Call Probability	1.00							
Max Out Probability	0.00							

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6							
Adjusted Flow Rate (*v*), veh/h	1511	2837			1745							
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1673	1643			1643							
Queue Service Time (g_s), s	49.1	10.2			38.9							
Cycle Queue Clearance Time (g_c), s	49.1	10.2			38.9							
Green Ratio (*g/C*)	0.33	0.96			0.58							
Capacity (*c*), veh/h	1655	4712			2869							
Volume-to-Capacity Ratio (*X*)	0.913	0.602			0.608							
Available Capacity (c_a), veh/h	4385	4712			2869							
Back of Queue (*Q*), veh/ln (50th percentile)	20.7	0.3			15.2							
Queue Storage Ratio (*RQ*) (50th percentile)	1.35	0.00			0.00							
Uniform Delay (d_1), s/veh	54.6	0.4			23.0							
Incremental Delay (d_2), s/veh	0.9	0.6			1.0							
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0							
Control Delay (*d*), s/veh	55.5	1.0			24.0							
Level of Service (LOS)	E	A			C							
Approach Delay, s/veh / LOS	19.9	B		24.0	C		0.0			0.0		
Intersection Delay, s/veh / LOS	21.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.5	A	2.8	C	3.2	C	3.5	D
Bicycle LOS Score / LOS	2.9	C	1.4	A				

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4100*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1759*	pc/h/ln
S	*66.4*	mph
D = v_p / S	*26.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3890*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1561*	pc/h/ln
S	*68.5*	mph
D = v_p / S	*22.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2630*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1197*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4970*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2062*	pc/h/ln
S	*61.4*	mph
D = v_p / S	*33.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2710*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1195*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*ZPH, CRD update*	Highway/Direction of Travel	*I-95 SB*
Agency or Company	*BAKER*	From/To	*Rest Area to Route 3*
Date Performed	*06/2014*	Jurisdiction	*Segment 2*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4800*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*3*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*70.0*	mph	FFS	*70.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1971*	pc/h/ln	Design LOS		
S	*63.1*	mph	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
D = v_p / S	*31.2*	pc/mi/ln	S		mph
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

HCS 2010™ Version 6.50 Generated: 6/26/2014 10:51 AM

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Between Rt 3 and Rt 17*
Jurisdiction	*Segment2&3*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3500*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1455*	pc/h/ln
S	*69.2*	mph
D = v_p / S	*21.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Route 3 to River*
Jurisdiction	*Segment 2 & 3*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3090*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1253*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*06/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6020*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2639*	pc/h/ln
S	*46.0*	mph
D = v_p / S	*57.4*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3880*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1624*	pc/h/ln
S	*67.9*	mph
D = v_p / S	*23.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3090*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1363*	pc/h/ln
S	*69.7*	mph
D = v_p / S	*19.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2020 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6340*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2604*	pc/h/ln
S	*47.1*	mph
D = v_p / S	*55.2*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 NB 95 to EB 3
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 2320 veh/h
	Freeway Volume, V_F: 4100	
	Ramp Volume, V_R: 290	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4100	0.94	Rolling	14	0	0.826	1.00	5278
Ramp	290	0.84	Rolling	14	0	0.826	1.00	418
UpStream								
DownStream	2320	0.98	Rolling	14	0	0.826	1.00	2864

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.609 using Equation (Exhibit 13-7)

V_{12} = 3377 pc/h

V_3 or V_{av34} 1901 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5278	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4860	Exhibit 13-8	7200	No
V_R	418	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3377	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 26.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.271 (Exhibit 13-12)

S_R= 62.4 mph (Exhibit 13-12)

S_0= 73.3 mph (Exhibit 13-12)

S = 65.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 95 NB to Rt 3 EB
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1000 ft
V_u = veh/h	Deceleration Lane Length L_D: 775	V_D = 1080 veh/h
	Freeway Volume, V_F: 3890	
	Ramp Volume, V_R: 260	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3890	0.98	Rolling	12	0	0.847	1.00	4684
Ramp	260	1.00	Rolling	12	0	0.847	1.00	307
UpStream								
DownStream	1080	0.98	Rolling	12	0	0.847	1.00	1300

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.629 using Equation (Exhibit 13-7)

V_{12} = 3059 pc/h

V_3 or V_{av34} 1625 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4684	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4377	Exhibit 13-8	7200	No
V_R	307	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3059	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.261 (Exhibit 13-12)

S_R= 62.7 mph (Exhibit 13-12)

S_0= 74.4 mph (Exhibit 13-12)

S = 66.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-4 Off Ramp to US 17
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 530 veh/h
	Freeway Volume, V_F: 3090	
	Ramp Volume, V_R: 840	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3090	0.96	Rolling	18	0	0.787	1.00	4088
Ramp	840	0.88	Rolling	18	0	0.787	1.00	1212
UpStream								
DownStream	530	0.95	Rolling	18	0	0.787	1.00	709

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 2506 pc/h

V_3 or V_{av34} 1582 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4088	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2876	Exhibit 13-8	7200	No
V_R	1212	Exhibit 13-10	4200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2506	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 9.2 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.342 (Exhibit 13-12)

S_R= 60.4 mph (Exhibit 13-12)

S_0= 74.5 mph (Exhibit 13-12)

S = 65.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-4 Off Ramp to US 17
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 2280 veh/h
	Freeway Volume, V_F: 6340	
	Ramp Volume, V_R: 1030	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6340	0.97	Rolling	13	0	0.837	1.00	7811
Ramp	1030	0.98	Rolling	13	0	0.837	1.00	1256
UpStream								
DownStream	2280	0.95	Rolling	13	0	0.837	1.00	2868

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = 6582.14 (Equation 13-12 or 13-13)

P_{FD} = 0.594 using Equation (Exhibit 13-7)

V_{12} = 5151 pc/h

V_3 or V_{av34} 2660 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7811	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	6555	Exhibit 13-8	7200	No
V_R	1256	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5151	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 45.5 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.346 (Exhibit 13-12)

S_R= 60.3 mph (Exhibit 13-12)

S_0= 70.3 mph (Exhibit 13-12)

S = 63.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-7 Off Ramp to US 17
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1700 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 670 veh/h
	Freeway Volume, V_F: 3500	
	Ramp Volume, V_R: 1410	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3500	0.97	Grade	14	0	0.935	1.00	3861
Ramp	1410	0.86	Grade	14	0	0.935	1.00	1754
UpStream								
DownStream	670	0.99	Grade	14	0	0.935	1.00	724

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 2702 pc/h

V_3 or V_{av34} 1159 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3861	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2107	Exhibit 13-8	7200	No
V_R	1754	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2702	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.261 (Exhibit 13-12)

S_R= 62.7 mph (Exhibit 13-12)

S_0= 76.2 mph (Exhibit 13-12)

S = 66.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-7 Off Ramp to US 17
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1700 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 670 veh/h
	Freeway Volume, V_F: 3090	
	Ramp Volume, V_R: 1140	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3090	0.97	Grade	12	0	0.943	1.00	3377
Ramp	1140	0.95	Grade	12	0	0.943	1.00	1272
UpStream								
DownStream	670	0.94	Grade	12	0	0.943	1.00	756

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 2219 pc/h

V_3 or V_{av34} 1158 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3377	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2105	Exhibit 13-8	7200	No
V_R	1272	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2219	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 6.8 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.217 (Exhibit 13-12)

S_R= 63.9 mph (Exhibit 13-12)

S_0= 76.2 mph (Exhibit 13-12)

S = 67.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-9OffRamp to Rte 3CD/RestArea
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	2	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	340	L_{down} =	900 ft
V_u =	veh/h	Freeway Volume, V_F	2250	V_D =	1040 veh/h
		Ramp Volume, V_R	690		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2250	0.96	Level	18	0	0.917	1.00	2555
Ramp	690	0.95	Level	18	0	0.917	1.00	792
UpStream								
DownStream	1040	0.90	Level	18	0	0.917	1.00	1260

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 1585 pc/h

V_3 or V_{av34} 970 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2555	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	1763	Exhibit 13-8	7200	No
V_R	792	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1585	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 1.3 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.174 (Exhibit 13-12)

S_R= 65.1 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 69.1 mph (Exhibit 13-13)

HCS2010™ Version 6.50 Generated: 6/27/2014 2:18 PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-9OffRamp to Rte 3CD/RestArea
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	340
Freeway Volume, V_F	5310
Ramp Volume, V_R	2290
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	60.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 900 ft
V_D = 1590 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5310	0.97	Level	13	0	0.939	1.00	5830
Ramp	2290	0.95	Level	13	0	0.939	1.00	2567
UpStream								
DownStream	1590	0.95	Level	13	0	0.939	1.00	1782

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.450 using Equation (Exhibit 13-7)
V_{12} = 4035 pc/h
V_3 or V_{av34} 1795 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5830	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3263	Exhibit 13-8	7200	No
V_R	2567	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4035	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.4 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.334 (Exhibit 13-12)
S_R= 60.6 mph (Exhibit 13-12)
S_0= 73.7 mph (Exhibit 13-12)
S = 64.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr,, Inc.	Junction	M-10 On Ramp from Rest Area
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2600	
	Ramp Volume, V_R: 110	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2600	0.96	Level	18	0	0.917	1.00	2952
Ramp	110	0.96	Level	18	0	0.917	1.00	125
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.594 using Equation (Exhibit 13-6)

V_{12} = 1753 pc/h

V_3 or V_{av34} 1199 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1753 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3077	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1878	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.277 (Exibit 13-11)

S_R= 62.2 mph (Exhibit 13-11)

S_0= 67.5 mph (Exhibit 13-11)

S = 64.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr,, Inc.	Junction	M-10 On Ramp from Rest Area
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A	580	☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	4610	V_D =	veh/h
		Ramp Volume, V_R	190		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4610	0.97	Level	13	0	0.939	1.00	5061
Ramp	190	0.97	Level	13	0	0.939	1.00	209
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.594 using Equation (Exhibit 13-6)

V_{12} = 3005 pc/h

V_3 or V_{av34} = 2056 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 3005 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5270	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3214	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.348 (Exibit 13-11)

S_R = 60.2 mph (Exhibit 13-11)

S_0 = 64.4 mph (Exhibit 13-11)

S = 61.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-11 Off Ramp to US 17
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition
Project Description	I-95 Interchange Modification Report		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 500	V_D = veh/h
	Freeway Volume, V_F: 3470	
	Ramp Volume, V_R: 670	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3470	0.99	Grade	14	0	0.935	1.00	3750
Ramp	670	0.99	Grade	14	0	0.935	1.00	724
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 3750 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3750	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	3026	Exhibit 13-8	4700	No
V_R	724	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3750	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 32.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.168 (Exhibit 13-12)

S_R = 61.1 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 61.1 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-11 Off Ramp to US 17
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition
Project Description	I-95 Interchange Modification Report		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 500	V_D = veh/h
	Freeway Volume, V_F: 1750	
	Ramp Volume, V_R: 550	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1750	0.94	Grade	12	0	0.943	1.00	1973
Ramp	550	0.94	Grade	12	0	0.943	1.00	620
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 1973 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1973	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	1353	Exhibit 13-8	4700	No
V_R	620	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1973	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.159 (Exhibit 13-12)

S_R = 61.3 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 61.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-12 Off Ramp to US 17 EB
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☑ Yes	☑ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	400 ft	Deceleration Lane Length L_D	225	L_{down} =	ft
V_u =	900 veh/h	Freeway Volume, V_F	2080	V_D =	veh/h
		Ramp Volume, V_R	130		
		Freeway Free-Flow Speed, S_{FF}	60.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2080	0.86	Grade	14	0	0.935	1.00	2588
Ramp	130	0.86	Grade	14	0	0.935	1.00	162
UpStream	900	0.99	Grade	14	0	0.935	1.00	973
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 2588 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2588	Exhibit 13-8	4600	No
$V_{FO} = V_F - V_R$	2426	Exhibit 13-8	4600	No
V_R	162	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2588	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 24.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.118 (Exhibit 13-12)

S_R= 57.9 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 57.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-12 Off Ramp to US 17 EB
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☑ Yes	☑ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	400 ft	Deceleration Lane Length L_D	225	L_{down} =	ft
V_u =	600 veh/h	Freeway Volume, V_F	1690	V_D =	veh/h
		Ramp Volume, V_R	200		
		Freeway Free-Flow Speed, S_{FF}	60.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1690	0.95	Grade	12	0	0.943	1.00	1886
Ramp	200	0.95	Grade	12	0	0.943	1.00	223
UpStream	600	0.94	Grade	12	0	0.943	1.00	677
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 1886 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1886	Exhibit 13-8	4600	No
$V_{FO} = V_F - V_R$	1663	Exhibit 13-8	4600	No
V_R	223	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1886	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 18.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.123 (Exhibit 13-12)

S_R= 57.8 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 57.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-15 Off Ramp to Rest Area
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	500	L_{down} =	750 ft
V_u =	veh/h	Freeway Volume, V_F	840	V_D =	110 veh/h
		Ramp Volume, V_R	110		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	840	0.95	Level	18	0	0.917	1.00	964
Ramp	110	0.96	Level	18	0	0.917	1.00	125
UpStream								
DownStream	110	0.96	Level	18	0	0.917	1.00	125

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 964 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	964	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	839	Exhibit 13-8	4700	No
V_R	125	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	964	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 8.0 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.114 (Exhibit 13-12)

S_R= 62.4 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 62.4 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-15 Off Ramp to Rest Area
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 750 ft
V_u = veh/h	Deceleration Lane Length L_D: 500	V_D = 190 veh/h
	Freeway Volume, V_F: 2890	
	Ramp Volume, V_R: 190	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2890	0.95	Level	13	0	0.939	1.00	3240
Ramp	190	0.97	Level	13	0	0.939	1.00	209
UpStream								
DownStream	190	0.97	Level	13	0	0.939	1.00	209

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 3240 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3240	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	3031	Exhibit 13-8	4700	No
V_R	209	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3240	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 27.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.122 (Exhibit 13-12)

S_R= 62.2 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 62.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-16 Off Ramp to Rest Area
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☑ Yes	☑ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	1200 ft	Deceleration Lane Length L_D	225	L_{down} =	ft
V_u =	110 veh/h	Freeway Volume, V_F	840	V_D =	veh/h
		Ramp Volume, V_R	110		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	840	0.95	Level	18	0	0.917	1.00	964
Ramp	110	0.96	Level	18	0	0.917	1.00	125
UpStream	110	0.96	Level	18	0	0.917	1.00	125
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 964 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	964	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	839	Exhibit 13-8	4700	No
V_R	125	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	964	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.114 (Exhibit 13-12)

S_R= 62.4 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 62.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-16 Off Ramp to Rest Area
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1200 ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = 190 veh/h	Deceleration Lane Length L_D: 225	V_D = veh/h
	Freeway Volume, V_F: 2890	
	Ramp Volume, V_R: 190	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2890	0.95	Level	13	0	0.939	1.00	3240
Ramp	190	0.97	Level	13	0	0.939	1.00	209
UpStream	190	0.97	Level	13	0	0.939	1.00	209
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 3240 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3240	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	3031	Exhibit 13-8	4700	No
V_R	209	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3240	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 30.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.122 (Exhibit 13-12)

S_R = 62.2 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 62.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-17 NB 95 to WB 3
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1500 ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = 340 veh/h	Deceleration Lane Length L_D: 1200	V_D = veh/h
	Freeway Volume, V_F: 3810	
	Ramp Volume, V_R: 310	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3810	0.94	Rolling	14	0	0.826	1.00	4904
Ramp	310	0.84	Rolling	14	0	0.826	1.00	447
UpStream	340	0.98	Rolling	14	0	0.826	1.00	420
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.617 using Equation (Exhibit 13-7)

V_{12} = 3196 pc/h

V_3 or V_{av34} 1708 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4904	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4457	Exhibit 13-8	7200	No
V_R	447	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3196	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.143 (Exhibit 13-12)

S_R= 66.0 mph (Exhibit 13-12)

S_0= 74.0 mph (Exhibit 13-12)

S = 68.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-17 NB 95 to WB 3
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	1500 ft	Deceleration Lane Length L_D	1200	L_{down} =	ft
V_u =	300 veh/h	Freeway Volume, V_F	3630	V_D =	veh/h
		Ramp Volume, V_R	540		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3630	0.94	Rolling	14	0	0.826	1.00	4673
Ramp	540	0.84	Rolling	14	0	0.826	1.00	778
UpStream	300	0.98	Rolling	14	0	0.826	1.00	370
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.607 using Equation (Exhibit 13-7)

V_{12} = 3144 pc/h

V_3 or V_{av34} 1529 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4673	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3895	Exhibit 13-8	7200	No
V_R	778	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3144	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.173 (Exhibit 13-12)

S_R = 65.2 mph (Exhibit 13-12)

S_0 = 74.7 mph (Exhibit 13-12)

S = 68.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-3 On Ramp from US 17
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 3500 ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = 2570 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4890	
	Ramp Volume, V_R: 1130	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4890	0.92	Rolling	14	0	0.826	1.00	6431
Ramp	1130	0.91	Rolling	14	0	0.826	1.00	1503
UpStream	2570	0.99	Rolling	14	0	0.826	1.00	3141
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 3894 pc/h

V_3 or V_{av34} = 2537 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3894 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7934	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5397	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 40.6 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.082 (Exibit 13-11)

S_R = 39.7 mph (Exhibit 13-11)

S_0 = 62.0 mph (Exhibit 13-11)

S = 44.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-3 On Ramp from US 17
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 3500 ft	Acceleration Lane Length, L_A: 1000	L_{down} = ft
V_u = 1150 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3150	
	Ramp Volume, V_R: 730	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3150	0.94	Rolling	12	0	0.847	1.00	3954
Ramp	730	0.93	Rolling	12	0	0.847	1.00	926
UpStream	1150	0.94	Rolling	12	0	0.847	1.00	1444
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 2394 pc/h

V_3 or V_{av34} = 1560 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2394 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4880	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3320	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.329 (Exibit 13-11)

S_R = 60.8 mph (Exhibit 13-11)

S_0 = 66.2 mph (Exhibit 13-11)

S = 62.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-4 On Ramp from US 17
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 900 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 690 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1560	
	Ramp Volume, V_R: 1040	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1560	0.96	Level	18	0	0.917	1.00	1771
Ramp	1040	0.90	Level	18	0	0.917	1.00	1260
UpStream	690	0.95	Level	18	0	0.917	1.00	792
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 983 pc/h

V_3 or V_{av34} 788 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1012 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3031	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2272	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 6.4 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.049 (Exibit 13-11)

S_R = 68.6 mph (Exhibit 13-11)

S_0 = 69.1 mph (Exhibit 13-11)

S = 68.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-4 On Ramp from US 17
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 900 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 2290 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3020	
	Ramp Volume, V_R: 1590	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3020	0.97	Level	13	0	0.939	1.00	3316
Ramp	1590	0.95	Level	13	0	0.939	1.00	1782
UpStream	2290	0.95	Level	13	0	0.939	1.00	2567
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 1840 pc/h

V_3 or V_{av34} 1476 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1894 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5098	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3676	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.165 (Exibit 13-11)

S_R = 65.4 mph (Exhibit 13-11)

S_0 = 66.7 mph (Exhibit 13-11)

S = 65.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No	☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	580 veh/h	Freeway Volume, V_F	2390	V_D =	veh/h
		Ramp Volume, V_R	350		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2390	0.93	Rolling	18	0	0.787	1.00	3264
Ramp	350	0.80	Rolling	18	0	0.787	1.00	556
UpStream	580	0.91	Rolling	18	0	0.787	1.00	809
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1607.68 (Equation 13-6 or 13-7)

P_{FM} = 0.576 using Equation (Exhibit 13-6)

V_{12} = 1879 pc/h

V_3 or V_{av34} 1385 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1879 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3820	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2435	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.236 (Exibit 13-11)

S_R= 63.4 mph (Exhibit 13-11)

S_0= 66.8 mph (Exhibit 13-11)

S = 64.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 820 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4170	
	Ramp Volume, V_R: 700	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4170	0.97	Rolling	13	0	0.837	1.00	5137
Ramp	700	0.93	Rolling	13	0	0.837	1.00	899
UpStream	820	0.95	Rolling	13	0	0.837	1.00	1031
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2081.90 (Equation 13-6 or 13-7)

P_{FM} = 0.546 using Equation (Exhibit 13-6)

V_{12} = 2803 pc/h

V_3 or V_{av34} 2334 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2935 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6036	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3834	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.371 (Exibit 13-11)

S_R= 59.6 mph (Exhibit 13-11)

S_0= 63.9 mph (Exhibit 13-11)

S = 61.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-7 On Ramp from Rte 3 CD Road
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 1700 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 1410 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2090	
	Ramp Volume, V_R: 2800	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2090	0.97	Rolling	14	0	0.826	1.00	2607
Ramp	2800	0.99	Grade	14	0	0.935	1.00	3026
UpStream	1410	0.86	Rolling	14	0	0.826	1.00	1984
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 1447 pc/h

V_3 or V_{av34} 1160 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1489 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5633	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4515	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 23.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.368 (Exibit 13-11)

S_R= 59.7 mph (Exhibit 13-11)

S_0= 67.8 mph (Exhibit 13-11)

S = 61.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-7 On Ramp from Rte 3 CD Road
Date Performed	10/23/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 1700 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 1140 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1950	
	Ramp Volume, V_R: 1200	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1950	0.97	Rolling	12	0	0.847	1.00	2372
Ramp	1200	0.94	Grade	12	0	0.943	1.00	1353
UpStream	1140	0.95	Rolling	12	0	0.847	1.00	1416
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 1316 pc/h

V_3 or V_{av34} 1056 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1355 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3725	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2708	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 9.8 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.070 (Exibit 13-11)

S_R= 68.0 mph (Exhibit 13-11)

S_0= 68.1 mph (Exhibit 13-11)

S = 68.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-11 On Ramp to I-95 NB CD Rd
Date Performed	11/12/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A: 130	L_{down} = 400 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 130 veh/h
	Freeway Volume, V_F: 1410	
	Ramp Volume, V_R: 670	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1410	0.86	Grade	14	0	0.935	1.00	1754
Ramp	670	0.99	Grade	14	0	0.935	1.00	724
UpStream								
DownStream	130	0.86	Grade	14	0	0.935	1.00	162

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1754 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2478	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2478	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 23.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.352 (Exibit 13-11)

S_R= 53.7 mph (Exhibit 13-11)

S_0= N/A mph (Exhibit 13-11)

S = 53.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-11 On Ramp to I-95 NB CD Rd
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A: 130	L_{down} = 400 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 200 veh/h
	Freeway Volume, V_F: 1140	
	Ramp Volume, V_R: 550	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1140	0.95	Grade	12	0	0.943	1.00	1272
Ramp	550	0.94	Grade	12	0	0.943	1.00	620
UpStream								
DownStream	200	0.95	Grade	12	0	0.943	1.00	223

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1272 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1892	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1892	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 19.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.331 (Exibit 13-11)

S_R= 54.0 mph (Exhibit 13-11)

S_0= N/A mph (Exhibit 13-11)

S = 54.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-14 On Ramp from I-95 SB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 180 ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = 200 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 890	
	Ramp Volume, V_R: 200	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	890	0.95	Level	18	0	0.917	1.00	1021
Ramp	200	0.90	Level	18	0	0.917	1.00	242
UpStream	200	0.90	Level	18	0	0.917	1.00	242
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1021 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1263	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1385	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 12.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.277 (Exibit 13-11)

S_R = 55.0 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 55.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-14 On Ramp from I-95 SB
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 180 ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = 150 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2290	
	Ramp Volume, V_R: 600	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2290	0.95	Level	13	0	0.939	1.00	2567
Ramp	600	0.95	Level	13	0	0.939	1.00	673
UpStream	150	0.95	Level	13	0	0.939	1.00	168
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2567 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3240	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3548	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 27.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.397 (Exibit 13-11)

S_R = 52.9 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 52.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-15 On Ramp from Rest Area
Date Performed	11/1/2013	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 750 ft	Acceleration Lane Length, L_A: 1400	L_{down} = ft
V_u = 110 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 730	
	Ramp Volume, V_R: 110	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	730	0.95	Level	18	0	0.917	1.00	838
Ramp	110	0.96	Level	18	0	0.917	1.00	125
UpStream	110	0.96	Level	18	0	0.917	1.00	125
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 838 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	963	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	963	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 4.2 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.163 (Exibit 13-11)

S_R = 61.2 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 61.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-15 On Ramp from Rest Area
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 750 ft	Acceleration Lane Length, L_A: 1400	L_{down} = ft
V_u = 270 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3460	
	Ramp Volume, V_R: 270	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3460	0.95	Level	13	0	0.939	1.00	3879
Ramp	270	0.97	Level	13	0	0.939	1.00	296
UpStream	270	0.97	Level	13	0	0.939	1.00	296
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 3879 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4175	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4175	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 29.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.407 (Exibit 13-11)

S_R= 55.6 mph (Exhibit 13-11)

S_0= N/A mph (Exhibit 13-11)

S = 55.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/23/2013
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-4 SB weave at Rt 3
Weaving Segment Location	
Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2240	0.96	18	0	2.5	2.0	0.787	1.00	2963
V_{RF}	150	0.88	18	0	2.5	2.0	0.787	1.00	216
V_{FR}	580	0.91	18	0	2.5	2.0	0.787	1.00	809
V_{RR}	0	0.90	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	2963							V =	3141
V_W	1025								
VR	0.257								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1025 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1184 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	355 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1539 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	3141 veh/h	Weaving intensity factor, W	0.331
Weaving segment capacity, c_w	6551 veh/h	Weaving segment speed, S	57.4 mph
Weaving segment v/c ratio	0.479	Average weaving speed, S_W	56.3 mph
Weaving segment density, D	17.4 pc/mi/ln	Average non-weaving speed, S_{NW}	57.8 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	5127 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	10/23/2013
Analysis Time Period	PM

Site Information

Freeway/Dir of Travel	W-4 SB 95 at RT 3 weave
Weaving Segment Location	
Analysis Year	2020 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3980	0.97	13	0	2.5	2.0	0.837	1.00	4903
V_{RF}	290	0.96	13	0	2.5	2.0	0.837	1.00	361
V_{FR}	820	0.95	13	0	2.5	2.0	0.837	1.00	1031
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	4903							V =	5268
V_W	1392								
VR	0.221								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1392 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1551 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	755 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2306 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5268 veh/h	Weaving intensity factor, W	0.455
Weaving segment capacity, c_w	7059 veh/h	Weaving segment speed, S	52.5 mph
Weaving segment v/c ratio	0.746	Average weaving speed, S_W	52.8 mph
Weaving segment density, D	30.0 pc/mi/ln	Average non-weaving speed, S_{NW}	52.4 mph
Level of Service, LOS	D	Maximum weaving length, L_{MAX}	4753 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3390*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1455*	pc/h/ln
S	*69.2*	mph
D = v_p / S	*21.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5540*	veh/h	Peak-Hour Factor, PHF	*0.98*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2224*	pc/h/ln
S	*57.8*	mph
D = v_p / S	*38.5*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3750*	veh/h	Peak-Hour Factor, PHF	*0.93*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1707*	pc/h/ln
S	*67.0*	mph
D = v_p / S	*25.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*South of Route 3*
Jurisdiction	*Segment 1*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5410*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2245*	pc/h/ln
S	*57.3*	mph
D = v_p / S	*39.2*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*ZPH, CRD update*	Highway/Direction of Travel	*I-95 NB*
Agency or Company	*BAKER*	From/To	*Between Rt 3 and Rt 17*
Date Performed	*11/12/2013*	Jurisdiction	*Segment2&3*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2660*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*3*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*70.0*	mph	FFS	*70.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)		
Operational (LOS)			Design (N)		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1106*	pc/h/ln	Design LOS		
S	*70.0*	mph	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
D = v_p / S	*15.8*	pc/mi/ln	S		mph
LOS	*B*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*Route 3 to River*
Jurisdiction	*Segment 2 & 3*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4550*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1845*	pc/h/ln
S	*65.2*	mph
D = v_p / S	*28.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3690*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1627*	pc/h/ln
S	*67.9*	mph
D = v_p / S	*24.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*Rest Area to Route 3*
Jurisdiction	*Segment 2*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4930*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2025*	pc/h/ln
S	*62.1*	mph
D = v_p / S	*32.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*11/12/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5670*	veh/h	Peak-Hour Factor, PHF	*0.92*
AADT		veh/day	%Trucks and Buses, P_T	*14*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.826*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2486*	pc/h/ln
S	*50.8*	mph
D = v_p / S	*48.9*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 NB*
From/To	*North of US 17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5380*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.847*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2251*	pc/h/ln
S	*57.2*	mph
D = v_p / S	*39.4*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4250*	veh/h	Peak-Hour Factor, PHF	*0.96*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.787*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1874*	pc/h/ln
S	*64.7*	mph
D = v_p / S	*29.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*ZPH, CRD update*
Agency or Company	*BAKER*
Date Performed	*10/22/2013*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-95 SB*
From/To	*North of US17*
Jurisdiction	*Segment 4*
Analysis Year	*2040 Build Condition*

Project Description *I-95 Interchange Modification Report*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6950*	veh/h	Peak-Hour Factor, PHF	*0.97*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.837*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*70.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*70.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2854*	pc/h/ln
S	*38.3*	mph
D = v_p / S	*74.6*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 NB 95 to EB 3
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	775
Freeway Volume, V_F	3390
Ramp Volume, V_R	340
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1500 ft
V_D = 390 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3390	0.94	Rolling	14	0	0.826	1.00	4364
Ramp	340	0.84	Rolling	14	0	0.826	1.00	490
UpStream								
DownStream	390	0.98	Rolling	14	0	0.826	1.00	482

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = 581.38 (Equation 13-12 or 13-13)
P_{FD} = 0.628 using Equation (Exhibit 13-7)
V_{12} = 2924 pc/h
V_3 or V_{av34} 1440 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4364	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3874	Exhibit 13-8	7200	No
V_R	490	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2924	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.4 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.277 (Exhibit 13-12)
S_R= 62.2 mph (Exhibit 13-12)
S_0= 75.1 mph (Exhibit 13-12)
S = 66.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-1 95 NB to Rt 3 EB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	775
Freeway Volume, V_F	5540
Ramp Volume, V_R	300
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 1500 ft
V_D = 690 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5540	0.98	Rolling	12	0	0.847	1.00	6671
Ramp	300	1.00	Rolling	12	0	0.847	1.00	354
UpStream								
DownStream	690	0.98	Rolling	12	0	0.847	1.00	831

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = 1032.08 (Equation 13-12 or 13-13)
P_{FD} = 0.577 using Equation (Exhibit 13-7)
V_{12} = 3999 pc/h
V_3 or V_{av34} 2672 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6671	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	6317	Exhibit 13-8	7200	No
V_R	354	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3999	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 31.7 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.265 (Exhibit 13-12)
S_R= 62.6 mph (Exhibit 13-12)
S_0= 70.3 mph (Exhibit 13-12)
S = 65.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-4 Off Ramp to US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	340
Freeway Volume, V_F	4250
Ramp Volume, V_R	1140
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	50.0

Downstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{down} = 2500 ft
V_D = 890 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4250	0.96	Rolling	18	0	0.787	1.00	5622
Ramp	1140	0.88	Rolling	18	0	0.787	1.00	1645
UpStream								
DownStream	890	0.95	Rolling	18	0	0.787	1.00	1190

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.450 using Equation (Exhibit 13-7)
V_{12} = 3435 pc/h
V_3 or V_{av34} 2187 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5622	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3977	Exhibit 13-8	7200	No
V_R	1645	Exhibit 13-10	4200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3435	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 17.4 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.381 (Exhibit 13-12)
S_R= 59.3 mph (Exhibit 13-12)
S_0= 72.2 mph (Exhibit 13-12)
S = 63.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-4 Off Ramp to US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 2620 veh/h
	Freeway Volume, V_F: 6950	
	Ramp Volume, V_R: 1390	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6950	0.97	Rolling	13	0	0.837	1.00	8562
Ramp	1390	0.98	Rolling	13	0	0.837	1.00	1695
UpStream								
DownStream	2620	0.95	Rolling	13	0	0.837	1.00	3296

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 4785 pc/h

V_3 or V_{av34} 3777 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 5862 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8562	Exhibit 13-8	7200	Yes
$V_{FO} = V_F - V_R$	6867	Exhibit 13-8	7200	No
V_R	1695	Exhibit 13-10	4200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4785	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 38.1 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.386 (Exhibit 13-12)

S_R = 59.2 mph (Exhibit 13-12)

S_0 = 70.2 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-7 Off Ramp to US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition
Project Description	I-95 Interchange Modification Report		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1700 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 3450 veh/h
	Freeway Volume, V_F: 2660	
	Ramp Volume, V_R: 1990	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2660	0.97	Grade	14	0	0.935	1.00	2934
Ramp	1990	0.86	Grade	14	0	0.935	1.00	2476
UpStream								
DownStream	3450	0.99	Grade	14	0	0.935	1.00	3729

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 2682 pc/h

V_3 or V_{av34} 252 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2934	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	458	Exhibit 13-8	7200	No
V_R	2476	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2682	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.326 (Exhibit 13-12)

S_R= 60.9 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-7 Off Ramp to US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1700 ft
V_u = veh/h	Deceleration Lane Length L_D: 340	V_D = 1450 veh/h
	Freeway Volume, V_F: 4550	
	Ramp Volume, V_R: 1610	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4550	0.97	Grade	12	0	0.943	1.00	4972
Ramp	1610	0.95	Grade	12	0	0.943	1.00	1796
UpStream								
DownStream	1450	0.94	Grade	12	0	0.943	1.00	1635

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 3225 pc/h

V_3 or V_{av34} 1747 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4972	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3176	Exhibit 13-8	7200	No
V_R	1796	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3225	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 15.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.265 (Exhibit 13-12)

S_R = 62.6 mph (Exhibit 13-12)

S_0 = 73.9 mph (Exhibit 13-12)

S = 66.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-9OffRamp to Rte 3CD/RestArea
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	340
Freeway Volume, V_F	3110
Ramp Volume, V_R	890
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	60.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 900 ft
V_D = 1470 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3110	0.96	Level	18	0	0.917	1.00	3531
Ramp	890	0.95	Level	18	0	0.917	1.00	1021
UpStream								
DownStream	1470	0.90	Level	18	0	0.917	1.00	1780

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.450 using Equation (Exhibit 13-7)
V_{12} = 2150 pc/h
V_3 or V_{av34} 1381 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3531	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2510	Exhibit 13-8	7200	No
V_R	1021	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2150	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 6.2 (pc/mi/ln)
LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.195 (Exhibit 13-12)
S_R= 64.5 mph (Exhibit 13-12)
S_0= 75.3 mph (Exhibit 13-12)
S = 68.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	D-9OffRamp to Rte 3CD/RestArea
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	340
Freeway Volume, V_F	5560
Ramp Volume, V_R	2950
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	60.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 900 ft
V_D = 2620 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5560	0.97	Level	13	0	0.939	1.00	6105
Ramp	2950	0.95	Level	13	0	0.939	1.00	3307
UpStream								
DownStream	2620	0.95	Level	13	0	0.939	1.00	2937

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.450 using Equation (Exhibit 13-7)
V_{12} = 4566 pc/h
V_3 or V_{av34} 1539 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6105	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2798	Exhibit 13-8	7200	No
V_R	3307	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4566	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 27.0 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.401 (Exhibit 13-12)
S_R= 58.8 mph (Exhibit 13-12)
S_0= 74.7 mph (Exhibit 13-12)
S = 62.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-11 Off Ramp to US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition
Project Description	I-95 Interchange Modification Report		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 225	V_D = veh/h
	Freeway Volume, V_F: 4400	
	Ramp Volume, V_R: 950	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4400	0.99	Grade	14	0	0.935	1.00	4756
Ramp	950	0.99	Grade	14	0	0.935	1.00	1027
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 4756 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4756	Exhibit 13-8	4700	Yes
$V_{FO} = V_F - V_R$	3729	Exhibit 13-8	4700	No
V_R	1027	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4756	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 43.1 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

D_s = 0.195 (Exhibit 13-12)

S_R = 60.5 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 60.5 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-11 Off Ramp to US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition
Project Description	I-95 Interchange Modification Report		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 225	V_D = veh/h
	Freeway Volume, V_F: 2220	
	Ramp Volume, V_R: 770	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2220	0.94	Grade	12	0	0.943	1.00	2503
Ramp	770	0.94	Grade	12	0	0.943	1.00	868
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 2503 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2503	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	1635	Exhibit 13-8	4700	No
V_R	868	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2503	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.181 (Exhibit 13-12)

S_R = 60.8 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 60.8 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-12 Off Ramp to US 17 EB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 400 ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = 950 veh/h	Deceleration Lane Length L_D: 225	V_D = veh/h
	Freeway Volume, V_F: 2940	
	Ramp Volume, V_R: 170	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2940	0.86	Grade	14	0	0.935	1.00	3658
Ramp	170	0.86	Grade	14	0	0.935	1.00	212
UpStream	950	0.99	Grade	14	0	0.935	1.00	1027
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 3658 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3658	Exhibit 13-8	4600	No
$V_{FO} = V_F - V_R$	3446	Exhibit 13-8	4600	No
V_R	212	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3658	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 33.7 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.122 (Exhibit 13-12)

S_R= 57.8 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 57.8 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-12 Off Ramp to US 17 EB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 400 ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = 770 veh/h	Deceleration Lane Length L_D: 225	V_D = veh/h
	Freeway Volume, V_F: 2380	
	Ramp Volume, V_R: 250	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2380	0.95	Grade	12	0	0.943	1.00	2656
Ramp	250	0.95	Grade	12	0	0.943	1.00	279
UpStream	770	0.94	Grade	12	0	0.943	1.00	868
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 2656 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2656	Exhibit 13-8	4600	No
$V_{FO} = V_F - V_R$	2377	Exhibit 13-8	4600	No
V_R	279	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2656	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 25.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.128 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 57.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-15 Off Ramp to Rest Area
Date Performed	6/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 750 ft
V_u = veh/h	Deceleration Lane Length L_D: 500	V_D = 150 veh/h
	Freeway Volume, V_F: 1090	
	Ramp Volume, V_R: 150	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1090	0.95	Grade	18	0	0.917	1.00	1251
Ramp	150	0.96	Grade	18	0	0.917	1.00	170
UpStream								
DownStream	150	0.96	Level	18	0	0.917	1.00	170

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 1251 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1251	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	1081	Exhibit 13-8	4700	No
V_R	170	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1251	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.118 (Exhibit 13-12)

S_R= 62.3 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-15 Off Ramp to Rest Area
Date Performed	6/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 750 ft
V_u = veh/h	Deceleration Lane Length L_D: 500	V_D = 270 veh/h
	Freeway Volume, V_F: 3730	
	Ramp Volume, V_R: 270	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3730	0.97	Grade	13	0	0.939	1.00	4095
Ramp	270	0.97	Grade	13	0	0.939	1.00	296
UpStream								
DownStream	270	0.97	Level	13	0	0.939	1.00	296

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 4095 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4095	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	3799	Exhibit 13-8	4700	No
V_R	296	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4095	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 35.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.130 (Exhibit 13-12)

S_R= 62.0 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 62.0 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-16 Off Ramp to Rest Area
Date Performed	6/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1200 ft
V_u = 150 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	500
Freeway Volume, V_F	1090
Ramp Volume, V_R	150
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	60.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1090	0.95	Level	18	0	0.917	1.00	1251
Ramp	150	0.96	Level	18	0	0.917	1.00	170
UpStream	150	0.96	Level	18	0	0.917	1.00	170
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 1251 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1251	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	1081	Exhibit 13-8	4700	No
V_R	170	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1251	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 10.5 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.118 (Exhibit 13-12)
S_R= 62.3 mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-12)
S = 62.3 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr., Inc.	Junction	D-16 Off Ramp to Rest Area
Date Performed	6/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{up} = 1200 ft
V_u = 270 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	500
Freeway Volume, V_F	3730
Ramp Volume, V_R	270
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	60.0

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{down} = ft
V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3730	0.97	Level	12	0	0.943	1.00	4076
Ramp	270	0.97	Level	12	0	0.943	1.00	295
UpStream	270	0.97	Level	12	0	0.943	1.00	295
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 4076 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4076	Exhibit 13-8	4700	No
$V_{FO} = V_F - V_R$	3781	Exhibit 13-8	4700	No
V_R	295	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4076	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 34.8 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.130 (Exhibit 13-12)
S_R= 62.0 mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-12)
S = 62.0 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-17 NB 95 to WB 3
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1500 ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = 340 veh/h	Deceleration Lane Length L_D: 1200	V_D = veh/h
	Freeway Volume, V_F: 3050	
	Ramp Volume, V_R: 390	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3050	0.94	Rolling	14	0	0.826	1.00	3926
Ramp	390	0.84	Rolling	14	0	0.826	1.00	562
UpStream	340	0.98	Rolling	14	0	0.826	1.00	420
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.636 using Equation (Exhibit 13-7)

V_{12} = 2701 pc/h

V_3 or V_{av34} 1225 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3926	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3364	Exhibit 13-8	7200	No
V_R	562	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2701	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.154 (Exhibit 13-12)

S_R= 65.7 mph (Exhibit 13-12)

S_0= 75.9 mph (Exhibit 13-12)

S = 68.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	NB
Agency or Company	Michael Baker Jr, Inc	Junction	D-17 NB 95 to WB 3
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1500 ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = 300 veh/h	Deceleration Lane Length L_D: 1200	V_D = veh/h
	Freeway Volume, V_F: 5240	
	Ramp Volume, V_R: 690	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5240	0.94	Rolling	14	0	0.826	1.00	6745
Ramp	690	0.84	Rolling	14	0	0.826	1.00	994
UpStream	300	0.98	Rolling	14	0	0.826	1.00	370
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = 0.546 using Equation (Exhibit 13-7)

V_{12} = 4132 pc/h

V_3 or V_{av34} 2613 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6745	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	5751	Exhibit 13-8	7200	No
V_R	994	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4132	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 29.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.192 (Exhibit 13-12)

S_R= 64.6 mph (Exhibit 13-12)

S_0= 70.5 mph (Exhibit 13-12)

S = 66.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-3 On Ramp from US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☑ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☐ Off	Acceleration Lane Length, L_A	1000	☑ No	☐ Off
L_{up} =	3500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	3450 veh/h	Freeway Volume, V_F	4120	V_D =	veh/h
		Ramp Volume, V_R	1550		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4120	0.92	Rolling	14	0	0.826	1.00	5419
Ramp	1550	0.91	Rolling	14	0	0.826	1.00	2061
UpStream	3450	0.99	Rolling	14	0	0.826	1.00	4217
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 3281 pc/h

V_3 or V_{av34} 2138 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 3281 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7480	Exhibit 13-8		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5342	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 39.9 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = 1.036 (Exibit 13-11)

S_R= 41.0 mph (Exhibit 13-11)

S_0= 64.1 mph (Exhibit 13-11)

S = 45.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-3 On Ramp from US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☑ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☐ Off	Acceleration Lane Length, L_A	1000	☑ No ☐ Off
L_{up} =	3500 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	700 veh/h	Freeway Volume, V_F	4390	V_D = veh/h
		Ramp Volume, V_R	990	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4390	0.94	Rolling	12	0	0.847	1.00	5511
Ramp	990	0.93	Rolling	12	0	0.847	1.00	1256
UpStream	700	0.94	Rolling	12	0	0.847	1.00	879
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.605 using Equation (Exhibit 13-6)

V_{12} = 3337 pc/h

V_3 or V_{av34} = 2174 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3337 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6767	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4593	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 34.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.606 (Exibit 13-11)

S_R = 53.0 mph (Exhibit 13-11)

S_0 = 64.0 mph (Exhibit 13-11)

S = 56.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-4 On Ramp from US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 900 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 890 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2200	
	Ramp Volume, V_R: 1470	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2200	0.96	Level	18	0	0.917	1.00	2498
Ramp	1470	0.90	Level	18	0	0.917	1.00	1780
UpStream	890	0.95	Level	18	0	0.917	1.00	1021
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 1386 pc/h

V_3 or V_{av34} 1112 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1427 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4278	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3207	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 13.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.108 (Exibit 13-11)

S_R = 67.0 mph (Exhibit 13-11)

S_0 = 67.9 mph (Exhibit 13-11)

S = 67.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-4 On Ramp from US 17
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 900 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 2950 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2620	
	Ramp Volume, V_R: 2320	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2620	0.97	Level	13	0	0.939	1.00	2877
Ramp	2320	0.95	Level	13	0	0.939	1.00	2601
UpStream	2950	0.95	Level	13	0	0.939	1.00	3307
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 1597 pc/h

V_3 or V_{av34} 1280 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1644 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5478	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4245	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.283 (Exibit 13-11)

S_R= 62.1 mph (Exhibit 13-11)

S_0= 67.4 mph (Exhibit 13-11)

S = 63.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, Inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM peak	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1000 ft	Acceleration Lane Length, L_A: 1300	L_{down} = ft
V_u = 720 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3300	
	Ramp Volume, V_R: 450	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 50.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3300	0.93	Rolling	18	0	0.787	1.00	4506
Ramp	450	0.80	Rolling	18	0	0.787	1.00	714
UpStream	720	0.91	Rolling	18	0	0.787	1.00	1005
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 1907.28 (Equation 13-6 or 13-7)

P_{FM} = 0.557 using Equation (Exhibit 13-6)

V_{12} = 2508 pc/h

V_3 or V_{av34} 1998 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2574 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5220	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3288	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 22.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.295 (Exibit 13-11)

S_R = 61.7 mph (Exhibit 13-11)

S_0 = 64.8 mph (Exhibit 13-11)

S = 62.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	ZPH, CRD update	Freeway/Dir of Travel	SB
Agency or Company	Michael Baker Jr, inc	Junction	M-6 Rt 3 EB to 95 SB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM peak	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1300	☑ No	☐ Off
L_{up} =	1000 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	1020 veh/h	Freeway Volume, V_F	4520	V_D =	veh/h
		Ramp Volume, V_R	890		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	50.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4520	0.97	Rolling	13	0	0.837	1.00	5568
Ramp	890	0.93	Rolling	13	0	0.837	1.00	1144
UpStream	1020	0.95	Rolling	13	0	0.837	1.00	1283
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 2226.57 (Equation 13-6 or 13-7)

P_{FM} = 0.536 using Equation (Exhibit 13-6)

V_{12} = 2987 pc/h

V_3 or V_{av34} 2581 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 3181 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6712	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4325	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 30.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.486 (Exibit 13-11)

S_R= 56.4 mph (Exhibit 13-11)

S_0= 62.9 mph (Exhibit 13-11)

S = 58.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-7 On Ramp from Rte 3 CD Road
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 1700 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 2740 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 670	
	Ramp Volume, V_R: 3450	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	670	0.97	Rolling	14	0	0.826	1.00	836
Ramp	3450	0.99	Grade	14	0	0.935	1.00	3729
UpStream	2740	0.86	Rolling	14	0	0.826	1.00	3855
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 464 pc/h

V_3 or V_{av34} 372 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 477 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4565	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4206	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.273 (Exibit 13-11)

S_R= 62.4 mph (Exhibit 13-11)

S_0= 70.0 mph (Exhibit 13-11)

S = 62.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB
Agency or Company	Michael Baker Jr., Inc.	Junction	M-7 On Ramp from Rte 3 CD Road
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = 1700 ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = 1990 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2940	
	Ramp Volume, V_R: 1450	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2940	0.97	Rolling	12	0	0.847	1.00	3576
Ramp	1450	0.94	Grade	12	0	0.943	1.00	1635
UpStream	1990	0.95	Rolling	12	0	0.847	1.00	2472
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.555 using Equation (Exhibit 13-6)

V_{12} = 1985 pc/h

V_3 or V_{av34} 1591 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2043 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5211	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3678	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.166 (Exibit 13-11)

S_R= 65.4 mph (Exhibit 13-11)

S_0= 66.3 mph (Exhibit 13-11)

S = 65.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr,, Inc.	Junction	M-10 On Ramp from Rest Area
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3690	
	Ramp Volume, V_R: 150	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3690	0.96	Level	18	0	0.917	1.00	4190
Ramp	150	0.96	Level	18	0	0.917	1.00	170
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.594 using Equation (Exhibit 13-6)

V_{12} = 2488 pc/h

V_3 or V_{av34} 1702 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2488 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4360	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2658	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 22.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.307 (Exibit 13-11)

S_R= 61.4 mph (Exhibit 13-11)

S_0= 65.7 mph (Exhibit 13-11)

S = 63.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB
Agency or Company	Michael Baker Jr,, Inc.	Junction	M-10 On Ramp from Rest Area
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 580	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4930	
	Ramp Volume, V_R: 270	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4930	0.97	Level	13	0	0.939	1.00	5413
Ramp	270	0.97	Level	13	0	0.939	1.00	296
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 0.594 using Equation (Exhibit 13-6)

V_{12} = 3214 pc/h

V_3 or V_{av34} 2199 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 3214 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5709	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3510	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 29.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.382 (Exibit 13-11)

S_R= 59.3 mph (Exhibit 13-11)

S_0= 63.9 mph (Exhibit 13-11)

S = 61.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-11 On Ramp to I-95 NB CD Rd
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A: 130	L_{down} = 400 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 170 veh/h
	Freeway Volume, V_F: 1990	
	Ramp Volume, V_R: 950	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1990	0.86	Grade	14	0	0.935	1.00	2476
Ramp	950	0.99	Grade	14	0	0.935	1.00	1027
UpStream								
DownStream	170	0.86	Grade	14	0	0.935	1.00	212

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2476 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3503	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3503	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 31.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.435 (Exibit 13-11)

S_R = 52.2 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 52.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 NB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-11 On Ramp to I-95 NB CD Rd
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☑ Off
L_{up} = ft	Acceleration Lane Length, L_A: 130	L_{down} = 400 ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = 250 veh/h
	Freeway Volume, V_F: 1610	
	Ramp Volume, V_R: 770	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1610	0.95	Grade	12	0	0.943	1.00	1796
Ramp	770	0.94	Grade	12	0	0.943	1.00	868
UpStream								
DownStream	250	0.95	Grade	12	0	0.943	1.00	279

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1796 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2664	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2664	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 25.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.361 (Exibit 13-11)

S_R = 53.5 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 53.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-14 On Ramp from I-95 SB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 180 ft	Acceleration Lane Length, L_A: 300	L_{down} = ft
V_u = 200 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 890	
	Ramp Volume, V_R: 200	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	890	0.95	Level	18	0	0.917	1.00	1021
Ramp	200	0.90	Level	18	0	0.917	1.00	242
UpStream	200	0.90	Level	18	0	0.917	1.00	242
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1021 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1263	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1385	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 13.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.301 (Exibit 13-11)

S_R = 54.6 mph (Exhibit 13-11)

S_0 = N/A mph (Exhibit 13-11)

S = 54.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-14 On Ramp from I-95 SB
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☑ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 180 ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = 200 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2950	
	Ramp Volume, V_R: 780	
	Freeway Free-Flow Speed, S_{FF}: 60.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2950	0.96	Level	13	0	0.939	1.00	3273
Ramp	780	0.96	Level	13	0	0.939	1.00	865
UpStream	200	0.96	Level	13	0	0.939	1.00	222
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 3273 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4138	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4530	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 34.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.623 (Exibit 13-11)

S_R= 48.8 mph (Exhibit 13-11)

S_0= N/A mph (Exhibit 13-11)

S = 48.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-15 On Ramp from Rest Area
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	AM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	2	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	1400	☑ No	☐ Off
L_{up} =	750 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	150 veh/h	Freeway Volume, V_F	940	V_D =	veh/h
		Ramp Volume, V_R	150		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	60.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	940	0.95	Level	18	0	0.917	1.00	1079
Ramp	150	0.96	Level	18	0	0.917	1.00	170
UpStream	150	0.96	Level	18	0	0.917	1.00	170
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1079 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1249	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1249	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 6.4 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.167 (Exibit 13-11)

S_R= 61.2 mph (Exhibit 13-11)

S_0= N/A mph (Exhibit 13-11)

S = 61.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	CRD	Freeway/Dir of Travel	I-95 SB CD Road
Agency or Company	Michael Baker Jr,. Inc.	Junction	M-15 On Ramp from Rest Area
Date Performed	06/2014	Jurisdiction	
Analysis Time Period	PM Peak Hour	Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 750 ft	Acceleration Lane Length, L_A: 130	L_{down} = ft
V_u = 270 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3460	
	Ramp Volume, V_R: 270	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 60.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3460	0.95	Level	13	0	0.939	1.00	3879
Ramp	270	0.97	Level	13	0	0.939	1.00	296
UpStream	270	0.97	Level	13	0	0.939	1.00	296
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 3879 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4175	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4175	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = 37.1 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = 0.559 (Exibit 13-11)

S_R= 52.1 mph (Exhibit 13-11)

S_0= N/A mph (Exhibit 13-11)

S = 52.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

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

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	06/2014
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	W-4 SB weave at Rt 3
Weaving Segment Location	
Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3120	0.96	18	0	2.5	2.0	0.787	1.00	4128
V_{RF}	180	0.88	18	0	2.5	2.0	0.787	1.00	260
V_{FR}	720	0.91	18	0	2.5	2.0	0.787	1.00	1005
V_{RR}	0	0.90	18	0	2.5	2.0	0.787	1.00	0
V_{NW}	4128							V =	4247
V_W	1265								
VR	0.235								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1265 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1424 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	595 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2019 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4247 veh/h	Weaving intensity factor, W	0.410
Weaving segment capacity, c_w	6608 veh/h	Weaving segment speed, S	54.3 mph
Weaving segment v/c ratio	0.643	Average weaving speed, S_W	54.0 mph
Weaving segment density, D	24.8 pc/mi/ln	Average non-weaving speed, S_{NW}	54.4 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4893 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

FREEWAY WEAVING WORKSHEET

General Information

Analyst	ZPH, CRD update
Agency/Company	Michael Baker Jr, Inc
Date Performed	06/2014
Analysis Time Period	PM

Site Information

Freeway/Dir of Travel	W-4 SB 95 at RT 3 weave
Weaving Segment Location	
Analysis Year	2040 Build Condition

Project Description I-95 Interchange Modification Report

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	4	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	950ft	Freeway maximum capacity, C_{IFL}	2400
Freeway free-flow speed, FFS	70 mph	Terrain type	Rolling

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	4180	0.97	13	0	2.5	2.0	0.837	1.00	5150
V_{RF}	340	0.96	13	0	2.5	2.0	0.837	1.00	423
V_{FR}	1020	0.95	13	0	2.5	2.0	0.837	1.00	1283
V_{RR}	0	0.90	13	0	2.5	2.0	0.837	1.00	0
V_{NW}	5150							V =	5738
V_W	1706								
VR	0.249								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc	Minimum weaving lane changes, LC_{MIN}	1706 lc/h
Interchange density, ID	0.0 int/mi	Weaving lane changes, LC_W	1865 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	805 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2670 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	0

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5738 veh/h	Weaving intensity factor, W	0.511
Weaving segment capacity, c_w	6986 veh/h	Weaving segment speed, S	50.0 mph
Weaving segment v/c ratio	0.821	Average weaving speed, S_W	51.4 mph
Weaving segment density, D	34.3 pc/mi/ln	Average non-weaving speed, S_{NW}	49.5 mph
Level of Service, LOS	D	Maximum weaving length, L_{MAX}	5042 ft

Notes

a. 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".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

CORSIM Micro-simulation Results (Average of 10 Simulation Runs) 2020 & 2040 Build Conditions

2020 Build AM CORSIM Results

Interstate 95 Northbound AM

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
	→	3										3 →					
Mainline	Actual Volumes →	2 4,100	4,100	3,800	3,800	3,500	3,500	3,500	3,500	3,500	3,500	2 3,500 →	3,500	3,500	3,500	3,500	3,500
	Simulated Volumes →	1 4,103	4,103	3,806	3,807	3,491	3,493	3,492	3,493	3,492	3,493	1 3,496 →	3,497	3,497	3,500	3,498	3,497
Ramp	Actual Volumes / Simulated Volumes		765 ft 9	300 297 **Ramp I**	9 1,100 ft 9	310 316 **Ramp K**											**I-95 Bridge**
	Distance	449	6,345	398	1,312	1,175	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
	Speed	67.2	66.7	66.1	66.0	66.3	66.3	66.2	66.2	66.1	66.0	66.0	65.9	65.9	65.8	65.8	65.3
	Density	21.3	19.7	19.2	15.0	17.5	17.6	17.6	17.6	17.6	17.6	17.7	17.7	17.7	17.7	17.7	17.8

Nodes: 2, 1, 16, 13, 14, 19, 6, 7, 8, 24, 30, 25, 31, 26, 32, 27, 33

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segments									
	→	3										3 →					
	Actual Volumes →	2 4,100	4,100	3,800	3,800	3,500	3,500	3,500	3,500	3,500	3,500	2 3,500 →	3,500	3,500	3,500	3,500	3,500
	Simulated Volumes →	1 4,103	4,103	3,806	3,807	3,491	3,493	3,492	3,493	3,492	3,493	1 3,496 →	3,497	3,497	3,500	3,498	3,497
			765 ft 9	270 297	9 847 ft 9	280 316											**I-95 Bridge**
	Distance	449	6,345	398	1,312	1,175	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
3 Lane 3	Speed	67.2	66.9	66.5	66.5	66.4	66.3	66.3	66.2	66.2	66.1	66.0	65.9	65.9	65.9	65.8	66.1
	Density	19.5	18.3	16.8	16.6	16.6	16.6	16.6	16.6	16.7	16.6	16.6	16.7	16.6	16.6	16.6	14.9
2 Lane 2	Speed	67.2	67.3	66.9	66.7	66.7	66.7	66.6	66.5	66.5	66.4	66.3	66.3	66.2	66.2	66.2	66.3
	Density	21.9	20.8	20.0	19.3	19.1	19.0	19.0	19.1	19.0	19.1	19.1	19.0	19.1	19.1	19.1	18.3
1 Lane 1	Speed	67.2	66.3	65.0	65.4	65.9	65.9	65.8	65.7	65.7	65.6	65.6	65.5	65.5	65.4	65.4	63.9
	Density	22.5	21.7	20.9	17.5	16.9	17.0	17.1	17.1	17.1	17.2	17.3	17.4	17.4	17.5	17.5	20.4
9 Ramp	Speed		56.5		63.6												
	Density		0.6		4.1												

Nodes: 2, 1, 16, 13, 14, 19, 6, 7, 8, 24, 30, 25, 31, 26, 32, 27, 33

Freeway Density	Weave/Ramp Density
45 and Above	43 and Above
35 to 45	35 to 43
26 to 35	28 to 35
18 to 26	20 to 28
11 to 18	10 to 20
0 to 11	0 to 10
Freeway	Ramp

Freeway, Weave, and Ramp Density Coloring

Density Above	75
Density Above	55
Density Above	43

2020 Build AM CORSIM Results

Interstate 95 Northbound AM

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segment
Mainline	Actual Volumes	3,500	3,500	2,090	4,890	6,020	6,020
	Simulated Volumes	3,497	3,497	2,096	4,980	6,094	6,078
Ramp	Actual Volumes			1,410	2,800	1,130	
	Simulated Volumes			1,402	2,884	1,114	
		I-95 Bridge	**800 ft**	**To Route 17 Ramps**	**Ramps from CD Road**	**Ramps B and D**	
	Distance	2,789	1,320	1,258	4,879	1,653	2,319
	Speed	65.3	62.1	66.6	61.2	50.1	61.0
	Density	17.8	15.6	10.5	18.8	33.7	33.2
		27	33	28	34	37 51	52

		Freeway Segment	Ramp/Weave	Freeway Segments		Ramp/Weave	Freeway Segment
	Actual Volumes	3,500	3,500	2,090	4,890	6,020	6,020
	Simulated Volumes	3,497	3,497	2,096	4,980	6,094	6,078
				1,620		1,130	
				1,402		1,114	
		I-95 Bridge	**800 ft**	**To Route 17 Ramps**	**Ramps from CD Road**	**Ramps B and D**	
	Distance	2,789	1,320	1,258	4,879	1,653	2,319
3	Lane 3 Speed	66.1	67.4	67.7	67.2	65.6	64.4
	Lane 3 Density	14.9	10.6	10.8	16.2	25.4	32.5
2	Lane 2 Speed	66.3	65.2	67.3	64.6	57.0	60.4
	Lane 2 Density	18.3	13.8	12.7	24.2	36.2	33.8
1	Lane 1 Speed	63.9	58.8	64.2	56.7	39.3	58.2
	Lane 1 Density	20.4	26.1	7.9	35.5	54.7	33.4
9	Ramp Speed		60.4			40.1	
	Ramp Density		5.8			5.2	
		27	33	28	34	37 51	52

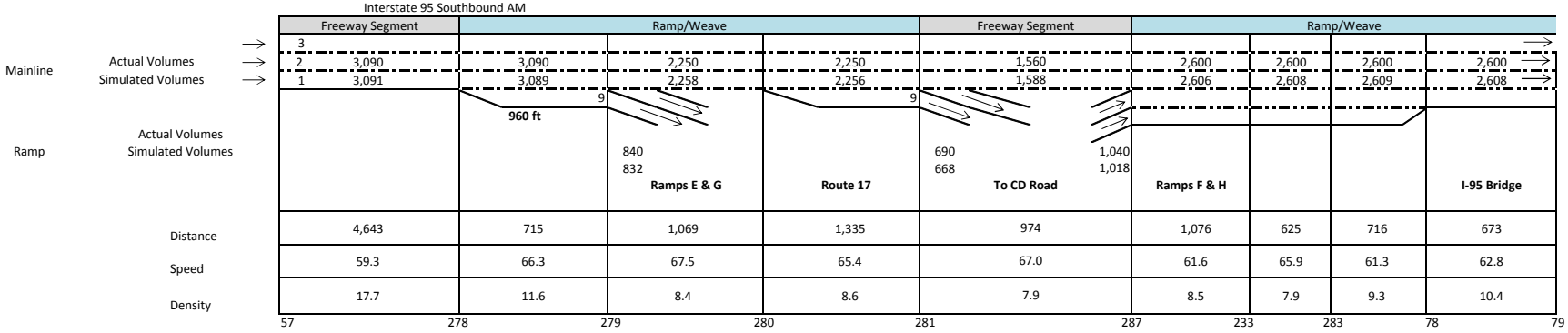
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

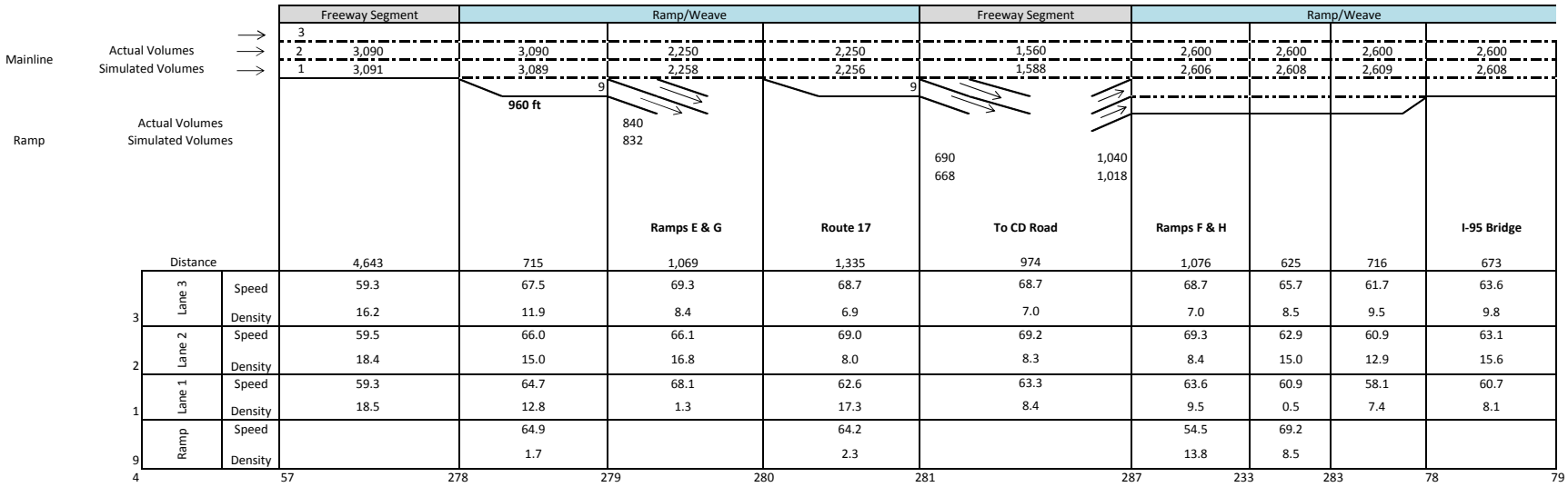
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build AM CORSIM Results

Interstate 95 Southbound AM



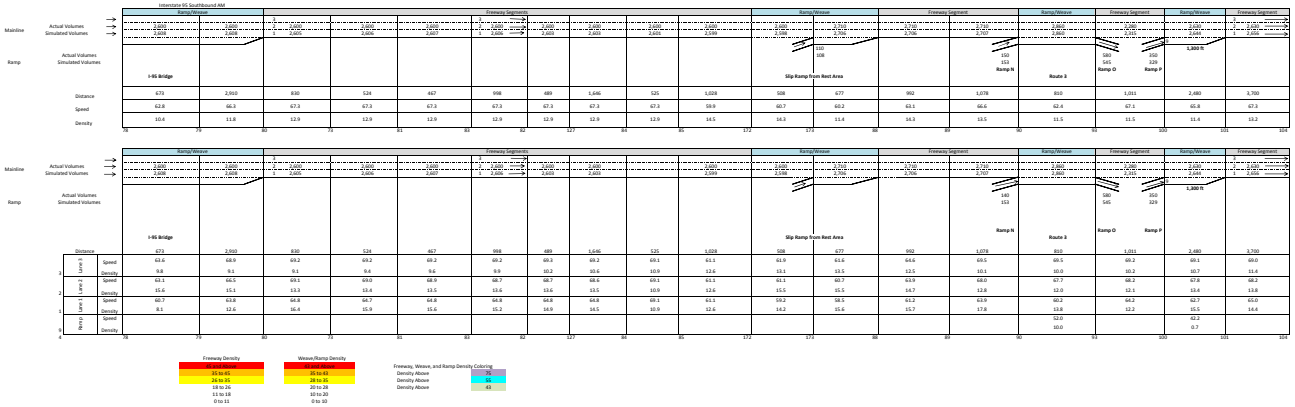


Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

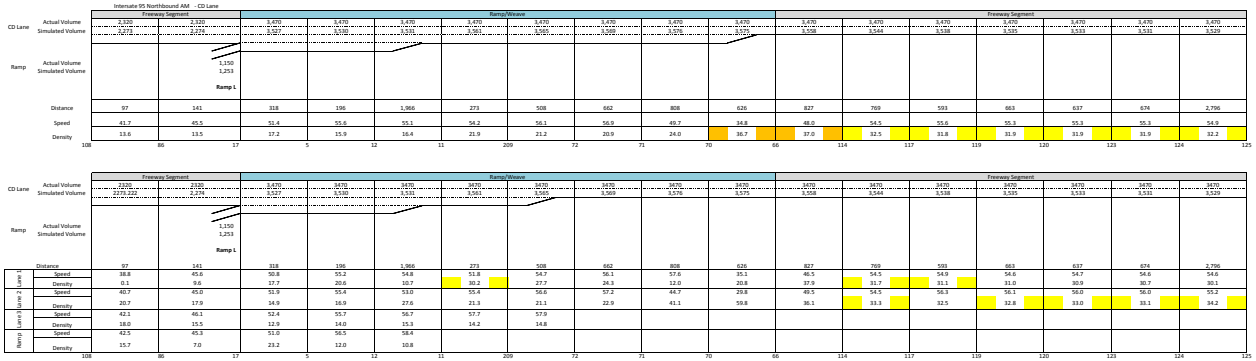
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build AM CORSIM Results



2020 Build AM CORSIM Results



2020 Build AM CORSIM Results

Intersate 95 Northbound AM - CD Lane

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	3,470	3,470	670	2,080	2,080	2,080	1,950
	Simulated Volume	3,529	3,539	678	2,078	2,078	2,078	1,898
Ramp	Actual Volume		2,800	1,410				130
	Simulated Volume		2,861	1,400				179
			To Mainline	**From Northbound I-95 Mainline (left entrance)**				**To Route 17 southbound**
	Distance	2,796	1,542	435	585	373	280	388
	Speed	54.9	53.1	56.8	55.4	57.7	54.2	50.2
	Density	32.2	33.4	11.9	12.5	12.0	12.8	18.9
		124	125	129	76	74	77	75	126

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	3470	3470	670	2080	2080	2080	1,950
	Simulated Volume	3,529	3,539	678	2,078	2,078	2,078	1,898
Ramp	Actual Volume		2800	1,410				130
	Simulated Volume		2,861	1,400				179
			To Mainline	**From Northbound I-95 Mainline (left entrance)**				**To Route 17 southbound**
	Distance	2,796	1,542	435	585	373	280	388
Lane 1	Speed	54.6	51.7	56.8	59.3	59.0	53.8	50.1
	Density	30.1	38.4	11.9	6.4	3.5	21.0	21.6
Lane 2	Speed	55.2	55.1		55.5	57.7	54.4	50.4
	Density	34.2	28.4		17.1	19.5	14.0	16.1
Lane 3	Speed				53.5	57.4		
	Density				13.9	13.0		
Ramp	Speed							
	Density							
		124	125	129	76	74	77	75	126

2020 Build AM CORSIM Results

Interstate 95 Southbound AM - Part 1

			Freeway Segment			Ramp/Weave	Freeway Segment
CD Lane	Actual Volume		840	840	840	840	350
	Simulated Volume		832	833	833	832	337
Ramp	Actual Volume						490
	Simulated Volume						495
							Ramp E **To Ramp G**
		Distance	729	94	294	134	266
		Speed	49.6	49.2	43.1	38.9	39.5
		Density	8.4	5.6	8.9	10.7	8.5
			279	199	222	216	210 200

			Freeway Segment			Ramp/Weave	Freeway Segment
CD Lane	Actual Volume		840	840	840	840	350
	Simulated Volume		832	833	833	832	337
Ramp	Actual Volume						490
	Simulated Volume						495
							Ramp E **To Ramp G**
		Distance	729	94	294	134	266
Lane 1		Speed	50.5	49.5	43.1	39.3	39.5
		Density	5.4	8.2	10.2	8.6	8.5
Lane 2		Speed	49.1	49.0	42.7	38.7	
		Density	11.4	8.7	8.3	12.8	
			279	199	222	216	210 200

2020 Build AM CORSIM Results

CD Road Southbound AM - Part 2

CD Lane			Freeway Segment			Ramp/Weave		Freeway Segment			
	Actual Volume		690	690	690	840	840	840	840	840	840
	Simulated Volume		667	667	667	809	809	810	809	809	809
	Actual Volume				150						
	Simulated Volume				142						
					From Rt 17						
	Distance		117	216	377	292	358	544	742	674	1,003
	Speed		49.7	49.7	49.1	47.4	54.7	58.3	58.8	58.9	59.1
	Density		4.5	6.0	6.8	5.7	6.1	6.9	6.9	6.9	6.8
			203	214	231	202	220	201	185	184	183	177

CD Lane			Freeway Segment			Ramp/Weave		Freeway Segment			
	Actual Volume		690	690	690	840	840	840	840	840	840
	Simulated Volume		667	667	667	809	809	810	809	809	809
					142						
					From Rt 17						
	Distance		117	216	377	292	358	544	742	674	1,003
Lane 1	Speed		51.4	52.0	50.3	36.7	56.5	58.3	58.7	58.8	59.0
	Density		2.3	1.1	0.8	0.2	6.2	8.0	7.2	6.5	6.0
Lane	Speed		51.4	49.5	49.0	50.4	54.2	58.3	59.0	59.1	59.1
	Density		2.3	10.3	12.8	11.9	6.9	5.9	6.6	7.2	7.7
Lane 3	Speed					40.5	50.0				
	Density					5.0	1.7				
Ramp	Speed										
	Density										
			203	214	231	202	220	201	185	184	183	177

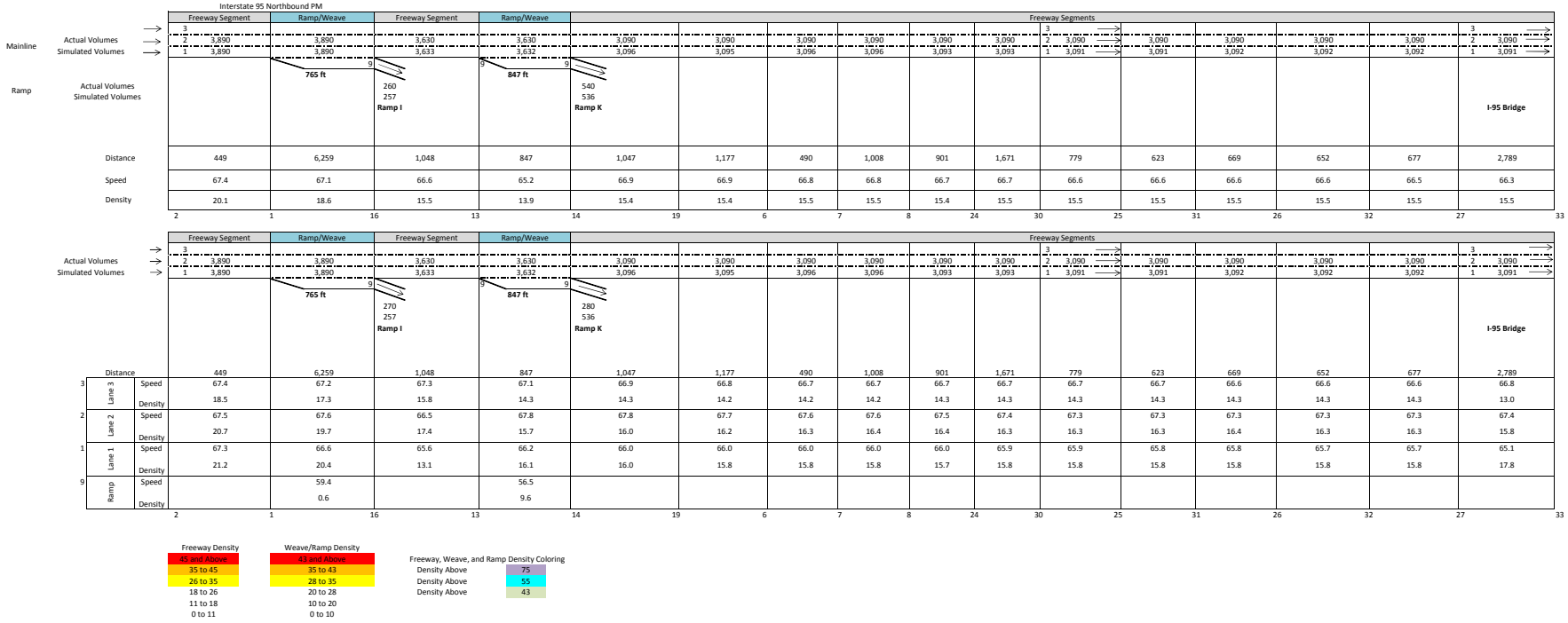
2020 Build AM CORSIM Results

Southbound CD Road - Part 2

CD Lane			Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
	Actual Volume		840	840	840	840	840	840	570	570	840	840	840	840	840	840	360
	Simulated Volume		808	808	808	808	807	807	704	703	813	813	814	704	704	703	672
	Actual Volume								270	270				270			480
	Simulated Volume								103	109				110			31
								To Rest Area			**From Rest Area**			**Slip Ramp to I-95**			**To Carl D Silver Pkwy**
		Distance	1,436	1,020	306	520	341	402	760	574	1,554	500	1,025	499	689	387	742
		Speed	59.1	59.2	59.1	59.1	59.1	58.7	59.2	59.3	59.4	59.2	59.2	59.3	59.4	56.2	54.5
		Density	6.8	6.8	6.8	6.8	6.8	5.0	5.9	5.9	4.9	6.9	6.9	5.9	5.9	4.2	6.2
			177	178	179	180	181	182	223	146	149	151	152	153	163	165	170	164

CD Lane			Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
	Actual Volume		840	840	840	840	840	840	570	570	840	840	840	840	840	840	360
	Simulated Volume		808	808	808	808	807	807	704	703	813	813	814	704	704	703	672
									103	109				110			480
								To Rest Area			**From Rest Area**			**Slip Ramp to I-95**			31 **To Carl D Silver Pkwy**
		Distance	1,436	1,020	306	520	341	402	760	574	1,554	500	1,025.0	499	689	387	742
Lane 1		Speed	59.3	59.4	59.4	59.5	59.6	59.9	60.2	60.3	60.5	60.3	60.1	60.1	60.1	57.0	55.2
		Density	5.5	5.8	5.9	5.9	5.8	4.3	4.2	4.4	5.9	5.8	6.0	6.1	6.1	6.0	6.3
Lane 2		Speed	59.1	59.0	58.9	58.9	58.8	58.8	58.7	58.6	58.5	58.4	58.4	58.5	58.6	55.3	53.7
		Density	8.2	7.8	7.7	7.8	7.8	19.1	7.7	7.5	7.6	8.0	7.8	5.8	5.8	6.0	6.1
Lane 3		Speed						54.8			65.0						
		Density						1.6			0.1						
Ramp		Speed															
		Density															
			177	178	179	180	181	182	223	146	149	151	152	153	163	165	170	164

2020 Build PM CORSIM Results



	Freeway Density
45 and Above	
35 to 45	
26 to 35	
18 to 26	
11 to 18	
0 to 11	

	Weave/Ramp Density
43 and Above	
35 to 43	
28 to 35	
20 to 28	
10 to 20	
0 to 10	

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results

Interstate 95 Northbound PM

	Freeway Segments	Ramp/Weave	Freeway Segments	Ramp/Weave		Freeway Segments
Mainline – Actual Volumes	3,090	3,090	2,000	3,150	3,880	3,880
Mainline – Simulated Volumes	3,091	3,090	2,097	3,249	3,904	3,906
Ramp – Actual Volumes			1,090	1,150	730	
Ramp – Simulated Volumes			993	1,151	656	
	I-95 Bridge	9 **800 ft**	**Ramps A & C**	**Ramps B & D From CD Road**	**Ramps B and D**	Lanes 3, 2, 1
Distance	2,789	1,320	1,258	4,879	1,653	2,319
Speed	66.3	64.4	66.7	65.4	63.2	65.7
Density	15.5	13.3	10.5	11.4	17.1	19.8
Nodes	27 – 33		28 – 34		37 – 51	52

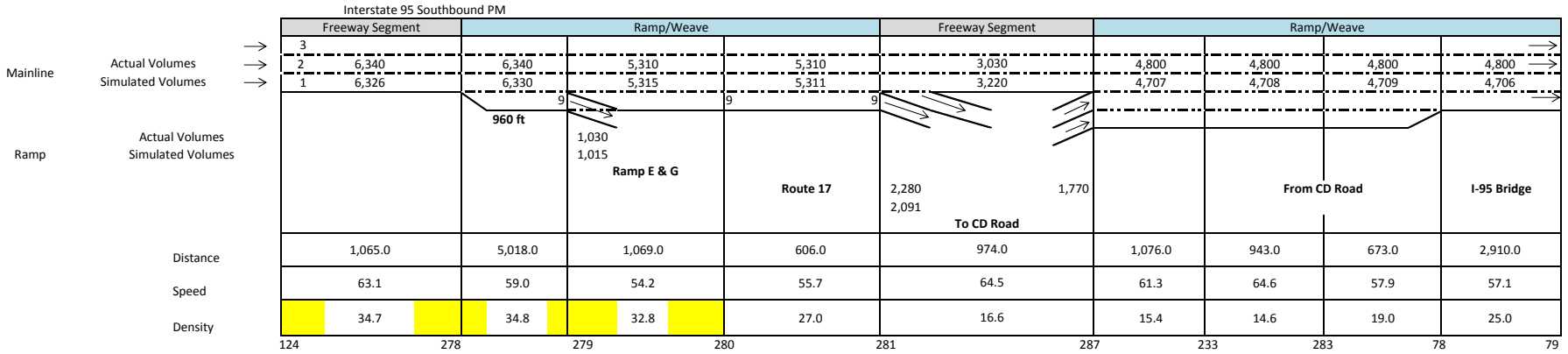
	Freeway Segments	Ramp/Weave	Freeway Segments	Ramp/Weave		Freeway Segments
Actual Volumes	3,090	3,090	2,000	3,150	3,880	3,880
Simulated Volumes	3,091	3,090	2,097	3,249	3,904	3,906
Ramp Actual Volumes			1,620	1,150	730	
Ramp Simulated Volumes			993	1,151	656	
	I-95 Bridge	9 **800 ft**	**Ramps A & C**	**Ramps B & D From CD Road**		Lanes 3, 2, 1
Distance	2,789	1,320	1,258	4,879	1,653	2,319
3 Lane 3 Speed	66.8	67.8	67.8	67.9	67.9	67.9
Lane 3 Density	13.0	9.8	10.0	11.3	13.7	15.9
2 Lane 2 Speed	67.4	66.8	67.9	67.4	66.3	66.8
Lane 2 Density	15.8	12.4	11.8	15.6	19.8	20.9
1 Lane 1 Speed	65.1	61.9	64.2	62.9	59.1	63.2
Lane 1 Density	17.8	21.5	9.6	20.7	27.1	22.7
9 Ramp Speed		62.6			50.8	
Ramp Density		4.3			1.3	
Nodes	33		28 – 34		37 – 51	52

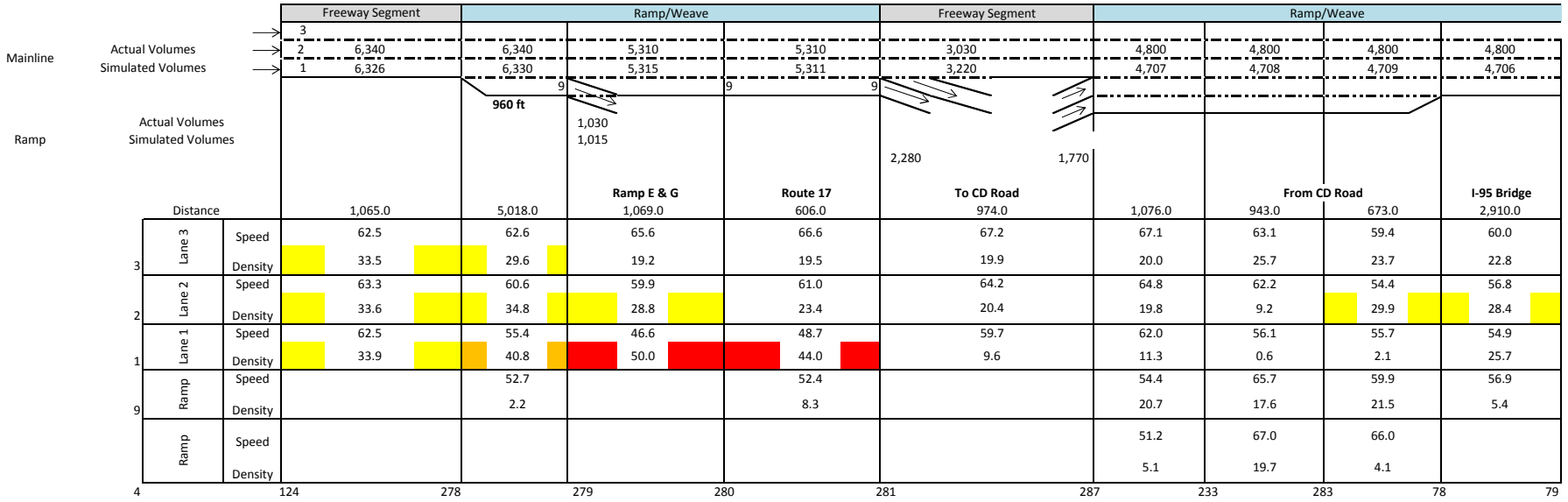
Freeway Density	Weave/Ramp Density
45 and Above	43 and Above
35 to 45	35 to 43
26 to 35	28 to 35
18 to 26	20 to 28
11 to 18	10 to 20
0 to 11	0 to 10

Freeway, Weave, and Ramp Density Coloring

Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results



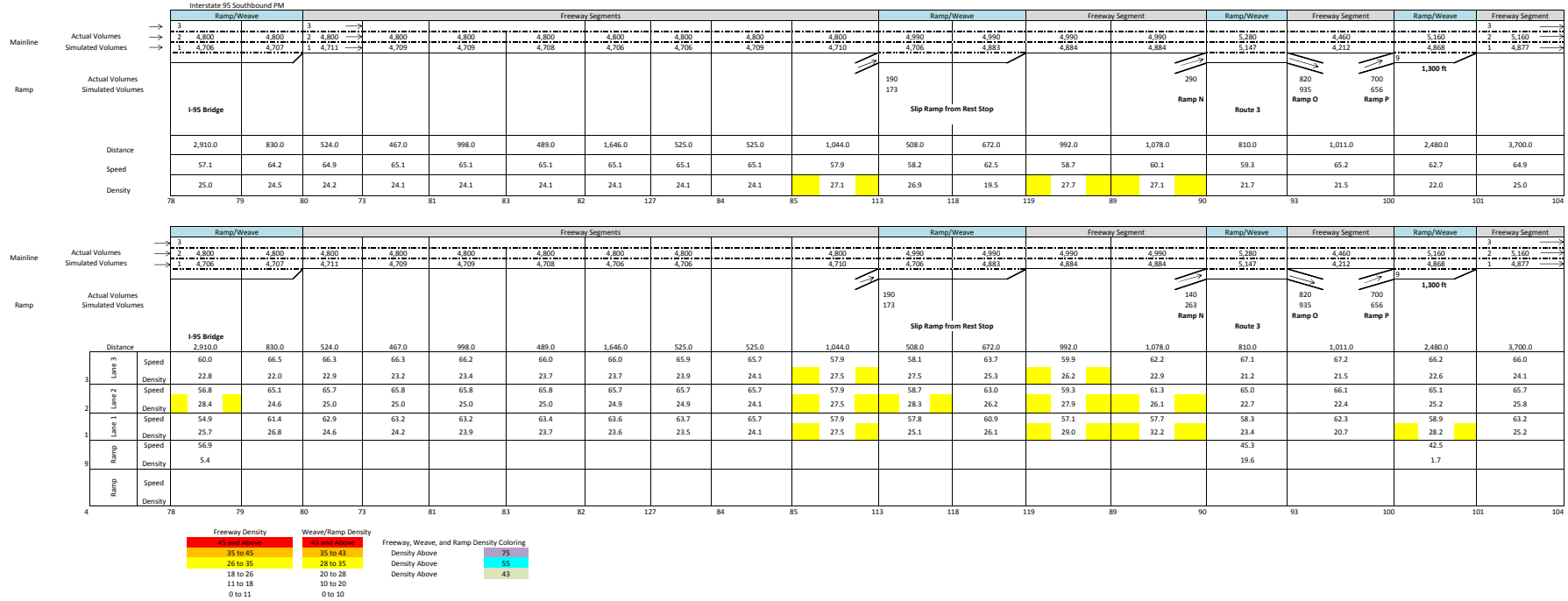


Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results



2020 Build PM CORSIM Results

CD Road Northbound PM

		Freeway Segment		Ramp/Weave			Ramp/Weave		Freeway Segment								Ramp/Weave	Freeway Segment
CD Lane	Actual Volume	1080	1080	1750	1080	1750	1080	1750	1080	1750	1080	1750	1080	1750	1080	1750	1750	550
	Simulated Volume	1,161	1,161	1,765	1,765	1,765	1,762	1,756	1,748	1,737	1,719	1,716	1,716	1,717	1,718	1,722	1,750	604
Ramp	Actual Volume		670															1200 1140
	Simulated Volume		604															1146 993
			Ramp L															To I-95 NB
	Distance	97.0	141.0	318.0	196.0	1,966.0	696.0	545.0	917.0	1,665.0	769.0	593.0	663.0	637.0	674.0	2,796.0	1,542.0	461.0
	Speed	37.3	41.8	49.9	55.0	56.7	52.8	50.3	55.2	56.5	56.3	56.3	56.3	56.2	56.2	55.8	55.2	57.1
	Density	7.8	7.5	8.8	8.0	7.9	11.1	13.7	15.8	15.3	15.2	15.3	15.3	15.3	15.3	15.6	15.9	10.6
		55	87	190	180	12	185	184	183	182	195	196	170	110	129	166	198	208	188

		Freeway Segment		Ramp/Weave			Ramp/Weave		Freeway Segment								Ramp/Weave	Freeway Segment
CD Lane	Actual Volume	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1690	1690
	Simulated Volume	1660?	1,161	1,765	1,765	1,765	1,762	1,756	1,748	1,737	1,719	1,716	1,716	1,717	1,718	1,722	1,750	604
Ramp	Actual Volume																1,146	993
	Simulated Volume		604															
			Ramp L															To I-95 NB
	Distance	97.0	141.0	318.0	196.0	1,966.0	696.0	545.0	917.0	1,665.0	769.0	593.0	663.0	637.0	674.0	2,796.0	1,542.0	461.0
Lane 1	Speed	28.9	43.1	49.4	56.1	56.9	56.1	49.9	54.6	55.8	55.6	55.5	55.5	55.5	55.3	55.8	54.4	57.1
	Density	0.0	4.8	8.5	10.6	3.7	2.9	11.1	18.2	16.7	16.1	16.0	15.8	15.7	15.6	14.3	19.6	10.6
Lane 2	Speed	37.2	41.7	48.6	55.2	56.2	50.9	49.4	56.1	57.3	57.2	57.2	57.1	57.1	57.1	55.8	56.5	
	Density	10.7	9.5	7.9	7.7	13.3	21.5	18.2	13.4	13.8	14.4	14.5	14.7	14.9	15.0	16.9	12.2	
Lane 3	Speed	37.4	41.9	48.6	53.9	56.9	56.2	54.3										
	Density	10.3	9.0	7.5	7.0	8.4	8.9	5.6										
Ramp	Speed	37.2	40.5	51.9	54.0	57.5												
	Density	10.3	4.4	11.5	6.7	5.7												
		55	87	190	180	12	185	184	183	182	195	196	170	110	129	166	198	208	188

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results

CD Road Northbound PM

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	1 1750 →	1750	550	1690	1690	1690	1 1490 →
	Simulated Volume	2 1,722 →	1,750	604	1,596	1,595	1,594	2 1,347 →
Ramp	Actual Volume			1200 1140				200
	Simulated Volume			1146 993				247
				To I-95 NB	**From Northbound I-95 Mainline (left entrance)**			**To Route 17 southbound**
	Distance	2,796.0	1,542.0	461.0	534.0	408.0	280.0	355.0
	Speed	55.8	55.2	57.1	58.8	58.4	54.8	51.3
	Density	15.6	15.9	10.6	9.0	9.1	9.7	13.1
		166	198	208	188	186	189	187 205

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	1 1080 →	1690	1690	1690	1690	1690	1 1490 →
	Simulated Volume	2 1,722 →	1,750	604	1,596	1,595	1,594	2 1,347 →
Ramp	Actual Volume			1200 1140				
	Simulated Volume		1,146	1146 993			200	
				To I-95 NB	**From Northbound I-95 Mainline (left entrance)**		247	**To Route 17 southbound**
	Distance	2,796.0	1,542.0	461.0	534.0	408.0	280.0	355.0
Lane 1	Speed	55.8	54.4	57.1	59.6	59.2	54.2	51.0
	Density	14.3	19.6	10.6	6.3	4.5	15.7	15.6
Lane 2	Speed	55.8	56.5		58.6	58.3	55.3	51.8
	Density	16.9	12.2		12.7	14.6	8.9	10.6
Lane 3	Speed				58.6	58.3		
	Density				8.1	8.2		
Ramp	Speed							
	Density							
		166	198	208	188	186	189	187 205

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results

CD Road Northbound PM - Part 1

			Freeway Segment			Ramp/Weave	Freeway Segment
CD Lane	Actual Volume		1030	1030	1030	1030	480
	Simulated Volume		1,028	1,033	1,033	1,033	487
Ramp	Actual Volume						550
	Simulated Volume						546
							To Ramp E
	Distance		729	94	294	134	266
	Speed		45.3	45.4	40.4	36.6	39.1
	Density		13.3	9.7	15.0	17.4	12.5
			279	199	222	216	210	200

Interstate 95 Southbound PM - CD Road: Part 1

			Freeway Segment			Ramp/Weave	Freeway Segment
CD Lane	Actual Volume		1030	1030	1030	1030	480
	Simulated Volume		1,028	1,033	1,033	1,033	487
Ramp	Actual Volume						550
	Simulated Volume						546
							To Ramp E
	Distance		729	94	294	134	266
Lane 1	Speed		45.8	45.2	39.3	37.8	39.1
	Density		12.3	12.1	12.3	12.8	12.5
Lane 2	Speed		44.7	45.5	41.1	36.0	
	Density		10.4	10.7	11.9	15.2	
			279	199	222	216	210	200

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results

CD Road Northbound PM - Part 2

		Freeway Segment			Ramp/Weave		Freeway Segment				
CD Lane	Actual Volume	1 2290 →	2290	2290	2890	2890	2890	2890	2890	2890	1 2890 →
	Simulated Volume	2 2,087 →	2,087	2,087	2,439	2,438	2,438	2,439	2,441	2,441	2 2,442 →
Ramps	Actual Volume			600							
	Simulated Volume			351							
				From Rt 17							
Distance		117	216	377	292	358	544	742	674	1003	1436
Speed		48.9	48.7	46.8	45.6	53.2	57.6	58.0	57.6	57.4	57.2
Density		14.2	19.2	22.3	17.8	18.9	21.2	21.0	21.2	21.3	21.4
		203	214	231	202	220	201	179	177	176	168	169

		Freeway Segment			Ramp/Weave		Freeway Segment				
CD Lane	Actual Volume	1 2290 →	2290	2290	2890	2890	2890	2890	2890	2890	1 2890 →
	Simulated Volume	2 2,087 →	2,087	2,087	2,439	2,438	2,438	2,439	2,441	2,441	2 2,442 →
Ramps	Actual Volume			600							
	Simulated Volume			351							
				From Rt 17							
Distance		117	216	377	292	358	544	742	674	1003	1436
Lane 1	Speed	49.4	50.7	49.7	37.1	54.5	57.2	57.6	57.2	57.2	57.3
	Density	12.8	6.7	4.2	1.0	18.3	23.6	21.8	20.6	19.8	19.2
Lane 2	Speed	49.4	48.3	46.5	47.7	53.0	58.0	58.4	58.0	57.6	57.1
	Density	12.8	30.7	40.4	37.1	22.0	18.8	20.3	21.8	22.7	23.6
Lane 3	Speed				41.2	49.9					
	Density				15.3	5.5					
Ramp	Speed										
	Density										
		203	214	231	202	220	201	179	177	176	168	169

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2020 Build PM CORSIM Results

CD Road Northbound PM - Part 2

		Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment			
CD Lane	Actual Volume	2890	2890	2890	2890	2890	2890	2700	2700	2890	2890	2890	2700	2700	2700	2330			
	Simulated Volume	2,442	2,440	2,441	2,440	2,441	2,439	2,273	2,274	2,464	2,463	2,463	2,283	2,281	2,281	1,941			
Ramps	Actual Volume							190	190				190		370				
	Simulated Volume							166	190				180		340				
								To Rest Area		From Rest Area			Slip Ramp to I-95		To Carl D Silver Pkwy				
	Distance	1436	1020	306	520	341	402	760	574	1554	500	1025	499	689	387	742			
	Speed	57.2	57.0	56.9	56.9	56.9	56.8	57.1	57.1	56.9	56.7	56.8	56.8	56.9	54.4	48.4			
	Density	21.4	21.4	21.4	21.4	21.4	15.6	19.9	19.9	15.6	21.7	21.7	20.1	20.0	14.0	21.2			
		203	168	169	171	173	174	175	223	57	58	60	61	62	68	70	91	69	

		Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment			
CD Lane	Actual Volume	2890	2890	2890	2890	2890	2890	2700	2700	2890	2890	2890	2700	2700	2700	2330			
	Simulated Volume	2,442	2,440	2,441	2,440	2,441	2,439	2,273	2,274	2,464	2,463	2,463	2,283	2,281	2,281	1,941			
Ramps	Actual Volume							190	190				190		370				
	Simulated Volume							166	190				180		340				
								To Rest Area		From Rest Area			Slip Ramp to I-95		To Carl D Silver Pkwy				
	Distance	1436	1020	306	520	341	402	760	574	1554	500	1025	499	689	387	742			
Lane 1	Speed	57.3	57.3	57.2	57.2	57.3	57.6	58.0	57.9	57.6	57.6	57.3	56.7	56.7	54.5	48.6			
	Density	19.2	19.5	20.0	20.0	19.9	17.6	17.6	18.3	21.3	21.1	22.3	23.1	22.7	18.1	20.3			
Lane 2	Speed	57.1	56.8	56.7	56.7	56.6	56.5	56.5	56.4	56.1	55.8	56.2	57.0	57.2	53.8	48.2			
	Density	23.6	23.2	22.9	22.9	23.0	19.1	22.2	21.5	21.6	22.3	21.1	17.1	17.3	18.5	19.8			
Lane 3	Speed						53.3			62.5									
	Density						2.6			0.4									
Ramp	Speed																		
	Density																		
		203	168	169	171	173	174	175	223	57	58	60	61	62	68	70	91	69	

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Interstate 95 Northbound AM

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment										
Mainline	Actual Volumes	3,390	3,390	3,050	3,050	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660
	Simulated Volumes	3,386	3,386	3,015	3,015	2,634	2,632	2,634	2,636	2,636	2,634	2,636	2,635	2,635	2,637	2,638	2,639
Ramp	Actual Volumes		765 ft	340	847 ft	390										I-95 Bridge
	Simulated Volumes			371 Ramp I		381 Ramp K										
Distance		449	6,345	398	1,312	1,175	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
Speed		67.7	67.3	67.0	66.8	67.3	67.2	67.2	67.1	67.0	67.0	66.9	66.9	66.9	66.8	66.8	66.1
Density		17.4	16.1	15.0	11.8	13.0	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.2	13.3

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment										
	Actual Volumes	3,390	3,390	3,050	3,050	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660	2,660
	Simulated Volumes	3,386	3,386	3,015	3,015	2,634	2,632	2,634	2,636	2,636	2,634	2,636	2,635	2,635	2,637	2,638	2,639
	Actual Volumes		765 ft	270	847 ft	280										I-95 Bridge
	Simulated Volumes			371		381										
Distance		449	6,345	398	1,312	1,175	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
3 Lane 3	Speed	67.8	67.8	67.6	67.6	67.5	67.4	67.3	67.3	67.2	67.3	67.1	67.1	67.1	67.1	67.0	67.4
	Density	15.7	14.4	12.2	12.2	12.1	12.0	12.0	12.0	12.0	11.9	12.0	11.9	11.9	11.9	11.9	9.2
2 Lane 2	Speed	67.8	68.0	67.8	67.6	67.6	67.6	67.5	67.4	67.3	67.3	67.2	67.1	67.1	67.1	67.1	67.6
	Density	18.0	16.9	15.6	14.9	14.7	14.8	14.8	14.8	14.8	14.8	14.7	14.7	14.7	14.8	14.7	13.6
1 Lane 1	Speed	67.7	66.9	65.8	66.3	66.7	66.7	66.7	66.6	66.6	66.5	66.5	66.5	66.5	66.4	66.4	64.2
	Density	18.6	18.2	17.1	13.1	12.3	12.4	12.4	12.5	12.5	12.6	12.7	12.7	12.8	12.8	12.8	17.2
9 Ramp	Speed		57.3		63.9												
	Density		0.8		5.0												

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Interstate 95 Northbound AM

			Ramp/Weave	Freeway Segments	Ramp/Weave		Freeway Segments
		3 →					3 →
Mainline	Actual Volumes	2 2,660 →	2,660	670	4,120	5,670	2 5,670 →
	Simulated Volumes	1 2,639 →	2,641	650	3,622	5,346	1 5,335 →
				9 ⇒			
			800 ft				
Ramp	Actual Volumes			1,990	3,450	1,550	
	Simulated Volumes			1,991	2,972	1,724	
			I-95 Bridge	To Route 17 Ramps	Ramps from CD Road	Ramps B and D	
	Distance		2,789	1,320	1,258	4,879	1,653	2,319
	Speed		66.1	59.8	67.9	64.4	48.3	63.9
	Density		13.3	12.2	3.2	13.0	30.7	27.8
			27	33	28	34	37	51	52

			Ramp/Weave	Freeway Segments	Ramp/Weave		Freeway Segments
		3 →					3 →
	Actual Volumes	2 2,660 →	2,660	670	4,120	5,670	2 5,670 →
	Simulated Volumes	1 2,639 →	2,641	650	3,622	5,346	1 5,335 →
				9 ⇒			
			800 ft				
				1,620	3,450	1,550	
				1,991	2,972	1,724	
			I-95 Bridge	To Route 17 Ramps	Ramps from CD Road	Ramps B and D	
	Distance		2,789	1,320	1,258	4,879	1,653	2,319
3	Lane 3	Speed	67.4	68.9	69.6	70.5	66.8	67.7
		Density	9.2	3.3	3.3	7.3	16.6	24.7
2	Lane 2	Speed	67.6	64.6	68.6	67.7	57.9	63.6
		Density	13.6	6.1	4.4	16.4	31.3	28.9
1	Lane 1	Speed	64.2	57.6	63.4	61.6	38.7	61.1
		Density	17.2	27.8	1.9	29.0	55.2	29.9
9	Ramp	Speed		59.9			38.0	
		Density		6.9			7.6	
			27	33	28	34	37	51	52

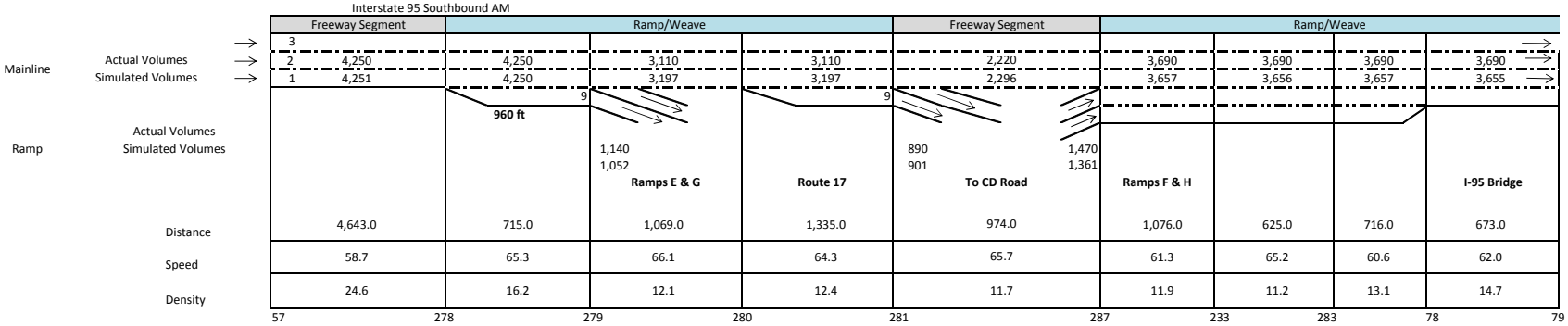
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

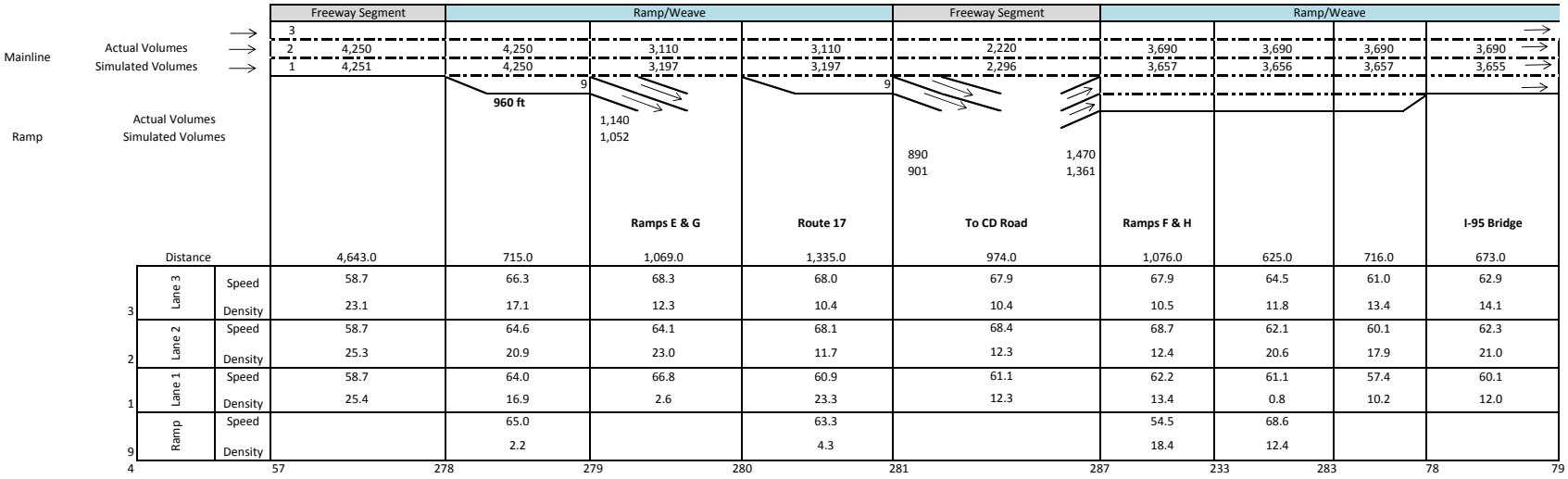
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Interstate 95 Southbound AM



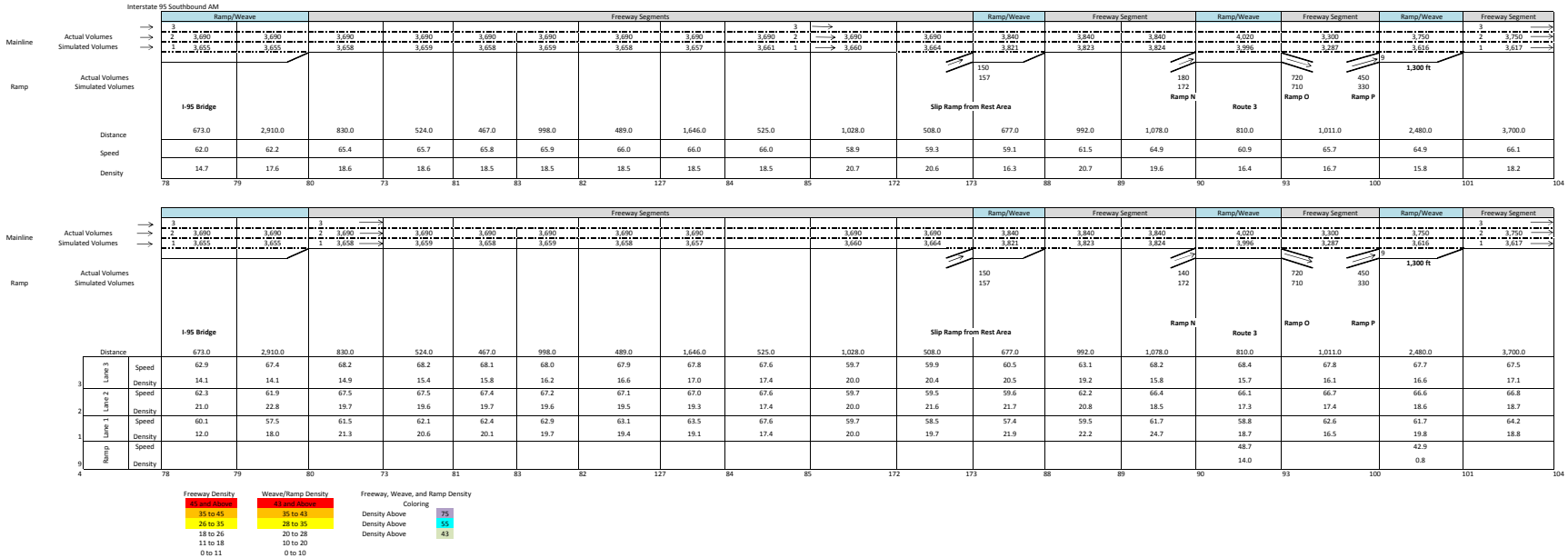


Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results



2040 Build AM CORSIM Results

Northbound AM - CD Lane

		Freeway Segment					Ramp/Weave								Freeway Segment						
CD Lane	Actual Volume	2,990	2,990	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400
	Simulated Volume	2,456	2,458	3,769	3,774	3,776	3,808	3,812	3,818	3,825	3,821	3,802	3,791	3,784	3,780	3,777	3,773	3,768			
Ramp	Actual Volume		1,410																		
	Simulated Volume		1,312																		
			Ramp L																		
	Distance	97.0	141.0	318.0	196.0	1,966.0	273.0	508.0	662.0	808.0	626.0	827.0	769.0	593.0	663.0	637.0	674.0	2,796.0			
	Speed	41.2	45.0	50.9	55.2	54.4	53.6	55.8	56.9	48.0	32.4	46.9	54.1	55.4	55.1	55.1	55.2	54.8			
	Density	14.9	14.7	18.5	17.1	17.8	23.7	22.8	22.4	26.6	42.1	40.5	35.0	34.1	34.3	34.3	34.2	34.4			
		108	86	17	5	12	11	209	72	71	70	66	114	117	119	120	123	124	125		

		Freeway Segment					Ramp/Weave								Freeway Segment						
CD Lane	Actual Volume	2,990	2,990	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400
	Simulated Volume	2,456	2,458	3,769	3,774	3,776	3,808	3,812	3,818	3,825	3,821	3,802	3,791	3,784	3,780	3,777					
Ramp	Actual Volume		1410																		
	Simulated Volume		1,312																		
			Ramp L																		
	Distance	97.0	141.0	318.0	196.0	1,966.0	273.0	508.0	662.0	808.0	626.0	827.0	769.0	593.0	663.0	637.0	674.0	2,796.0			
Lane 1	Speed	37.8	44.6	49.7	54.8	54.0	50.8	54.3	56.1	56.8	32.5	45.1	53.7	54.6	54.3	54.5	54.5	54.7			
	Density	0.1	10.4	19.0	22.0	11.7	31.8	28.7	25.3	13.4	24.2	40.7	33.6	32.8	32.9	32.7	32.7	32.0			
Lane 2	Speed	39.6	44.3	51.5	54.3	51.8	54.8	56.2	57.0	42.2	27.1	48.8	54.4	56.1	55.9	55.6	55.7	54.9			
	Density	22.8	19.7	16.4	18.1	29.4	23.3	23.1	24.7	45.1	68.3	40.2	36.4	35.4	35.7	35.9	35.7	36.8			
Lane 3	Speed	41.9	46.0	52.6	55.4	56.4	57.5	57.8													
	Density	19.7	16.9	14.0	15.2	16.7	15.9	16.6													
Ramp	Speed	42.6	45.4	50.5	56.7	58.4															
	Density	17.0	7.6	24.7	13.1	11.8															
		108	86	17	5	12	11	209	72	71	70	66	114	117	119	120	123	124	125		

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Northbound AM - CD road

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	4,400	4,400	950	2,940	2,940	2,940	2,770
	Simulated Volume	3,768	3,773	816	2,802	2,795	2,786	2,499
Ramp	Actual Volume		3,450	1990				170
	Simulated Volume		2,957	1,986				287
			To Northbound I-95 Mainline	**From Northbound I-95 Mainline (left entrance)**				**To Route 17 southbound**
	Distance	2,796.0	1,542.0	435.0	585.0	373.0	280.0	388.0
	Speed	54.8	52.7	56.3	49.0	42.2	33.8	26.1
	Density	34.4	35.9	14.5	19.8	27.1	34.8	60.2
		124	125	129	76	74	77	75 126

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	4,400	4,400	950	2,940	2,940	2,940	2,770
	Simulated Volume		3,773	816	2,802	2,795	2,786	2,499
Ramp	Actual Volume		3,450	1,990				170
	Simulated Volume		2,957	1,986				287
			To Northbound I-95 Mainline	**From Northbound I-95 Mainline (left entrance)**				**To Route 17 southbound**
	Distance	2,796.0	1,542.0	435.0	585.0	373.0	280.0	388.0
Lane 1	Speed	54.7	50.9	56.3	57.2	53.4	35.1	29.0
	Density	32.0	41.9	14.5	9.0	6.1	40.6	48.7
Lane 2	Speed	54.9	55.2		50.0	44.0	30.6	23.5
	Density	36.8	29.9		23.4	31.8	34.9	46.1
Lane 3	Speed				45.4	38.5		
	Density				24.5	27.7		
Ramp	Speed							
	Density							
		124	125	129	76	74	77	75 126

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Southbound AM - CD Road: Part 1

			Freeway Segment			Ramp/Weave	Freeway Segment
CD Lane	Actual Volume		1,140	1,140	1,140	1,140	440
	Simulated Volume		1,040	1,040	1,039	1,039	407
Ramp	Actual Volume						700
	Simulated Volume						631
							Ramp E **To Ramp G**
		Distance	729.0	94.0	294.0	134.0	266.0
		Speed	49.2	48.8	42.8	38.6	39.1
		Density	10.6	7.1	11.2	13.4	10.4
			279	199	222	216	210 200

			Freeway Segment			Ramp/Weave	Freeway Segment
CD Lane	Actual Volume		1,390	1,390	1,390	1,390	600
	Simulated Volume		1,040	1,040	1,039	1,039	407
Ramp	Actual Volume						700
	Simulated Volume						631
							Ramp E **To Ramp G**
		Distance	729.0	94.0	294.0	134.0	266.0
Lane 1		Speed	50.2	49.1	42.4	39.0	39.1
		Density	7.6	10.7	13.2	10.4	10.4
Lane 2		Speed	48.6	48.5	42.7	38.4	
		Density	13.6	10.6	10.0	16.5	
			279	199	222	216	210 200

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Southbound AM - CD Road: Part 2

CD Lane			Freeway Segment			Ramp/Weave		Freeway Segment				
	Actual Volume		890	890	890	1,090	1,090	1,090	1,090	1,090	1,090	1,090
	Simulated Volume		903	903	903	1,085	1,085	1,085	1,083	1,084	1,085	1,086
	Actual Volume				200							
	Simulated Volume				183							
					From Rt 17							
		Distance	117	216	377	292	358	544	742	674	1,003	1,436
		Speed	49.7	49.7	48.9	47.1	54.2	57.9	58.5	58.7	58.8	58.9
		Density	6.1	8.1	9.2	7.7	8.3	9.4	9.3	9.2	9.2	9.2
			203	214	231	202	220	201	185	184	183	177	178

CD Lane			Freeway Segment			Ramp/Weave		Freeway Segment				
	Actual Volume		890	890	890	1,090	1,090	1,090	1,090	1,090	1,090	1,090
	Simulated Volume		903	903	903	1,085	1,085	1,085	1,083	1,084	1,085	1,086
					183							
					From Rt 17							
		Distance	117	216	377	292	358	544	742	674	1,003	1,436
Lane 1		Speed	51.2	51.8	50.2	36.9	55.9	57.9	58.5	58.7	58.9	59.3
		Density	4.1	2.0	1.4	0.3	8.1	10.5	9.4	8.7	8.1	7.6
Lane 2		Speed	51.2	49.4	48.8	50.0	53.8	57.9	58.6	58.7	58.8	58.6
		Density	4.1	13.6	17.1	15.9	9.5	8.3	9.1	9.8	10.4	10.8
Lane 3		Speed				41	50					
		Density				7	2					
Ramp		Speed										
		Density										
			203	214	231	202	220	201	185	184	183	177	178

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build AM CORSIM Results

Southbound AM - CD Road: Part 2

		Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
CD Lane	Actual Volume	1,090	1,090	1,090	1,090	1,090	1090	940	940	1,090	1,090	1,090	940	940	940	840
	Simulated Volume	1,086	1,088	1,089	1,088	1,088	1,089	942	941	1,091	1,092	1,091	936	938	941	840
	Actual Volume							150	150				150		100	
	Simulated Volume							147	150				155		101	
							To Rest Area			**From Rest Area**			**Slip Ramp to I-95**		**To Carl D Silver Pkwy**	
	Distance	1,436	1,020	306	520	341	402	760	574	1,554	500	1025	499	689	387	742
	Speed	58.9	58.9	58.8	58.8	58.8	58.4	59.0	59.0	59.1	58.9	58.9	59.1	59.1	56.1	54.2
	Density	9.2	9.2	9.2	9.2	9.3	6.8	8.0	8.0	6.7	9.3	9.3	7.9	8.0	5.6	7.7
		177	178	179	180	181	182	223	146	149	151	152	153	163	165	170	164

		Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
CD Lane	Actual Volume	1,090	1,090	1,090	1,090	1,090	1,090	940	940	1,090	1,090	1,090	940	940	940	840
	Simulated Volume	1,086	1,088	1,089	1,088	1,088	1,089	942	941	1,091	1,092	1,091	936	938	941	840
								150	150				155		100	
								147	150				155		101	
							To Rest Area			**From Rest Area**			**Slip Ramp to I-95**		**To Carl D Silver Pkwy**	
	Distance	1,436	1,020	306	520	341	402	760	574	1,554	500	1025	499	689	387	742
Lane 1	Speed	59.3	59.3	59.2	59.3	59.3	59.6	60.0	60.1	60.2	60.0	59.7	59.7	59.6	56.7	54.9
	Density	7.6	8.2	8.4	8.4	8.3	6.3	6.1	6.3	8.4	8.2	8.7	8.9	8.8	7.7	8.0
Lane 2	Speed	58.6	58.6	58.5	58.5	58.4	58.4	58.4	58.3	58.1	58.0	58.1	58.3	58.4	55.2	53.5
	Density	10.8	10.3	10.1	10.1	10.2	19.1	9.9	9.7	9.9	10.4	9.9	7.0	7.1	7.5	7.5
Lane 3	Speed						54			65						
	Density						2			0						
Ramp	Speed															
	Density															
		177	178	179	180	181	182	223	146	149	151	152	153	163	165	170	164

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

Interstate 95 Northbound PM

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment											
Mainline	Actual Volumes	5,540	5,540	5,240	5,240	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550
	Simulated Volumes	5,537	5,536	5,234	5,234	4,544	4,543	4,546	4,545	4,543	4,543	4,539	4,539	4,538	4,539	4,540	4,541
Ramp	Actual Volumes		765 ft	300	847 ft	690											I-95 Bridge
	Simulated Volumes			302 Ramp I		689 Ramp K											
	Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
	Speed	66.0	65.7	65.1	64.2	65.7	65.7	65.6	65.5	65.5	65.4	65.3	65.3	65.3	65.3	65.2	64.7
	Density	29.3	27.0	22.8	20.4	23.1	23.1	23.1	23.1	23.1	23.1	23.2	23.2	23.2	23.2	23.2	23.4
		2 1	16 13	14 19	6 7	8 24	30 25	31 26	32 27	33							

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment											
	Actual Volumes	5,540	5,540	5,240	5,240	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550	4,550
	Simulated Volumes	5,537	5,536	5,234	5,234	4,544	4,543	4,546	4,545	4,543	4,543	4,539	4,539	4,538	4,539	4,540	4,541
			765 ft	270	847 ft	280											I-95 Bridge
				302 Ramp I		689 Ramp K											
	Distance	449	6,259	1,048	847	1,047	1,177	490	1,008	901	1,671	779	623	669	652	677	2,789
3	Lane 3 Speed	66.2	66.0	65.9	65.9	65.6	65.5	65.4	65.4	65.4	65.3	65.2	65.2	65.2	65.1	65.1	65.4
	Lane 3 Density	27.8	26.3	23.9	22.5	22.4	22.3	22.3	22.4	22.3	22.3	22.4	22.4	22.4	22.4	22.4	20.3
2	Lane 2 Speed	66.0	66.2	65.0	66.5	66.6	66.5	66.5	66.3	66.2	66.1	66.0	65.9	65.9	65.9	65.9	65.9
	Lane 2 Density	29.8	28.1	25.0	23.0	23.3	23.6	23.8	23.9	24.0	24.1	24.1	24.0	24.0	24.0	24.0	23.6
1	Lane 1 Speed	66.0	65.2	63.8	65.1	64.7	65.0	65.0	64.9	64.9	64.8	64.8	64.8	64.7	64.7	64.7	63.1
	Lane 1 Density	30.3	29.2	18.5	23.4	23.5	23.2	23.1	23.0	23.0	23.0	23.0	23.1	23.1	23.2	23.2	26.3
9	Ramp Speed		57.2		55.1												
	Ramp Density		0.7		12.7												
		2 1	16 13	14 19	6 7	8 24	30 25	31 26	32 27	33							

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

Interstate 95 Northbound PM

		Freeway Segment		Ramp/Weave	Freeway Segments	Ramp/Weave		Freeway Segments
Mainline	Actual Volumes	4,550	4,550	4,550	2,940	4,390	5,380	3 2 5,380
	Simulated Volumes	4,540	4,541	4,544	3,022	4,263	5,012	1 5,012
Ramp	Actual Volumes			9 800 ft	1,610	1,450	990	
	Simulated Volumes		I-95 Bridge		1,523 To Route 17 Ramps	1,241 Ramps from CD Road	749 Ramps B and D	
	Distance	677	2,789	1,320	1,258	4,879	1,653	2,319
	Speed	65.2	64.7	60.8	65.5	64.1	61.3	64.2
	Density	23.2	23.4	20.7	15.4	15.3	22.7	26.0
		33	27	33	28	34	37	51 52

			Ramp/Weave	Freeway Segments	Ramp/Weave		Freeway Segments
Actual Volumes		4,550	4,550	2,940	4,390	5,380	3 2 5,380
Simulated Volumes		4,540	4,544	3,022	4,263	5,012	1 5,012
			9 800 ft	1,620		990	
				1,523		749	
Distance		677	1,320	1,258	4,879	1,653	2,319
3 Lane 3	Speed	65.1	66.9	66.9	66.7	66.3	66.2
	Density	22.4	15.3	15.8	17.4	20.5	23.2
2 Lane 2	Speed	65.9	64.2	66.7	66.1	64.4	65.1
	Density	24.0	19.1	17.4	21.4	26.1	27.2
1 Lane 1	Speed	64.7	56.4	62.1	61.0	56.3	61.7
	Density	23.2	33.7	12.9	25.1	33.5	27.8
9 Ramp	Speed		59.5			50.2	
	Density		6.7			1.7	
		33	27 33	28	34	37	51 52

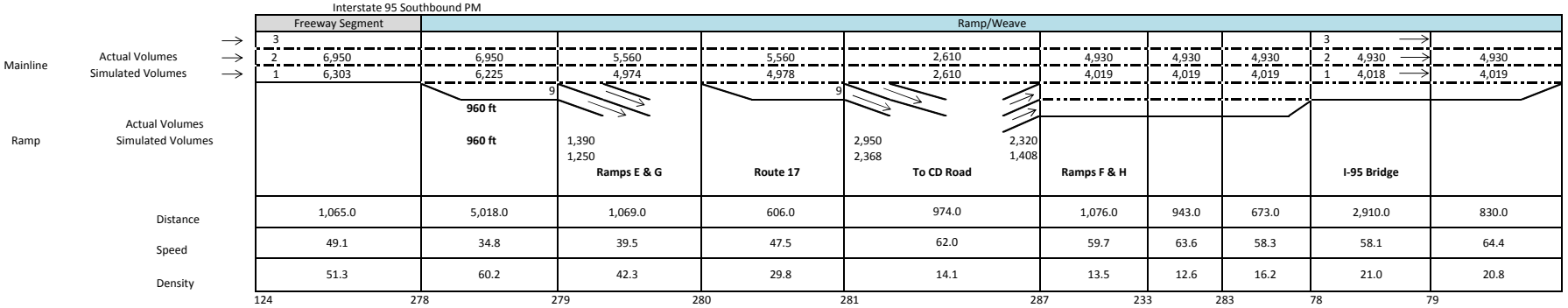
Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

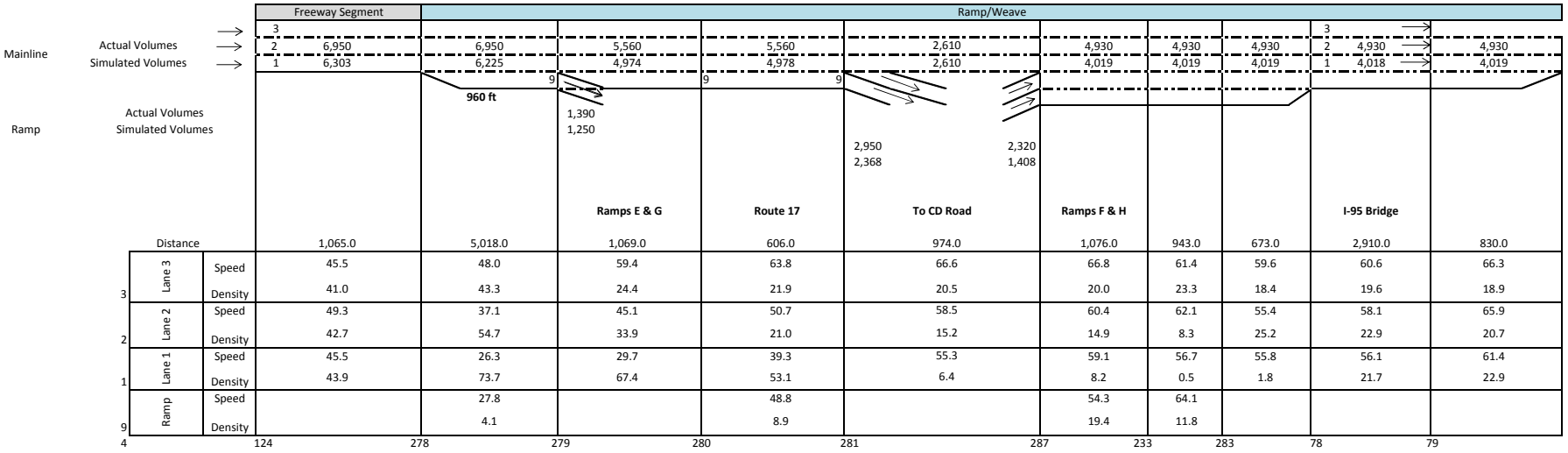
Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

Interstate 95 Southbound PM





Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

Interstate 95 Southbound PM

		Ramp/Weave		Freeway Segments									Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
Mainline	Actual Volumes			3															3
	Simulated Volumes	4,930	4,930	2 4,930	4,930	4,930	4,930	4,930	4,930	4,930	4,930	4,930	5,200	5,200	5,200	5,540	4,520	5,410	2 5,410
		4,018	4,019	1 4,029	4,030	4,034	4,035	4,035	4,036	4,038	4,040	4,036	4,213	4,213	4,212	4,502	3,607	4,307	1 4,322
Ramp	Actual Volumes												270		340		1,020	890	1,300 ft
	Simulated Volumes												177		290		896	701	
		I-95 Bridge										Slip Ramp from Rest Area			Ramp N	Route 3	Ramp O	Ramp P	
	Distance	2,910.0	830.0	524.0	467.0	998.0	489.0	1,646.0	525.0	525.0	1,044.0	508.0	672.0	992.0	1,078.0	810.0	1,011.0	2,480.0	3,700.0
	Speed	58.1	64.4	65.1	65.3	65.3	65.3	65.4	65.5	65.5	58.6	59.2	63.1	59.1	60.6	58.7	65.2	62.5	65.1
	Density	21.0	20.8	20.6	20.6	20.6	20.6	20.6	20.6	20.6	23.0	22.7	16.7	23.8	23.2	19.2	18.4	19.6	22.2
		78	79	80	73	81	83	82	127	84	85	113	118	119	89	90	93	100	101	104

		Ramp/Weave		Freeway Segments									Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
Mainline	Actual Volumes			3															3
	Simulated Volumes	4,930	4,930	2 4,930	4,930	4,930	4,930	4,930	4,930	4,930	4,930	4,930	5,200	5,200	5,200	5,540	4,520	5,410	2 5,410
		4,018	4,019	1 4,029	4,030	4,034	4,035	4,035	4,036		4,040	4,036	4,213	4,213	4,212	4,502	3,607	4,307	1 4,322
Ramp	Actual Volumes													610	140		1,020	890	1,300 ft
	Simulated Volumes													0	290		896	701	
		I-95 Bridge										Slip Ramp from Rest Area			Ramp N	Route 3	Ramp O	Ramp P	
	Distance	2,910.0	830.0	524.0	467.0	998.0	489.0	1,646.0	525.0		1,044.0	508.0	672.0	992.0	1,078.0	810.0	1,011.0	2,480.0	3,700.0
3	Lane 3 Speed	60.6	66.3	66.2	66.2	66.0	65.9	65.9	65.9	65.8	57.9	58.7	64.3	59.8	62.4	67.0	67.0	66.3	66.1
	Density	19.6	18.9	19.5	19.7	19.8	19.9	20.0	20.1	20.2	22.9	22.7	21.0	21.8	19.0	17.8	18.1	19.1	20.6
2	Lane 2 Speed	58.1	65.9	66.5	66.4	66.4	66.5	66.5	66.4	65.8	57.9	59.8	64.1	60.0	61.9	65.2	66.4	65.5	66.2
	Density	22.9	20.7	21.5	21.5	21.6	21.6	21.6	21.6	20.2	22.9	24.4	22.7	24.3	22.4	19.4	19.2	22.4	23.3
1	Lane 1 Speed	56.1	61.4	62.8	63.1	63.3	63.5	63.7	63.9	65.8	57.9	58.8	61.2	57.7	58.4	57.9	62.3	58.4	63.0
	Density	21.7	22.9	20.9	20.6	20.4	20.2	20.0	19.9	20.2	22.9	21.0	22.5	25.1	28.0	20.6	18.0	25.8	22.6
9	Ramp Speed															45.1		42.6	
	Density															18.9		1.7	
4		78	79	80	73	81	83	82	127	84	85	113	118	119	89	90	93	100	101	104

Freeway Density	Weave/Ramp Density	Freeway, Weave, and Ramp Density Coloring	
45 and Above	43 and Above	Density Above	75
35 to 45	35 to 43	Density Above	55
26 to 35	28 to 35	Density Above	43
18 to 26	20 to 28		
11 to 18	10 to 20		
0 to 11	0 to 10		

2040 Build PM CORSIM Results

CD Road Northbound PM

		Freeway Segment		Ramp/Weave			Ramp/Weave		Freeway Segment							
CD Lane	Actual Volume	1,390	1,390	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069	2,069
	Simulated Volume	1,225	1,225	1,905	1,905	1,905	1,903	1,896	1,887	1,875	1,858	1,858	1,860	1,862	1,865	1,872
Ramp	Actual Volume			679												
	Simulated Volume			679												
				Ramp L												
	Distance	97	141	318	196	1,966	696	545	917	1,665	769	593	663	637	674	2,796
	Speed	37.2	41.6	49.7	54.8	56.5	52.5	49.3	54.8	56.4	56.3	56.2	56.2	56.3	56.3	55.7
	Density	8.2	7.9	9.6	8.7	8.6	12.1	15.0	17.2	16.5	16.5	16.5	16.6	16.6	16.6	16.9
		55	87	190	180	12	185	184	183	182	195	196	170	110	129	166	198

		Freeway Segment		Ramp/Weave			Ramp/Weave		Freeway Segment							
CD Lane	Actual Volume	1390	1390	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4	2069.4
	Simulated Volume	1225.3	1225	1,905	1,905	1,905	1,903	1,896	1,887	1,875	1,858	1,858	1,860	1,862	1,865	1,872
Ramp	Actual Volume			679												
	Simulated Volume			679												
				Ramp L												
	Distance	97	141	318	196	1,966	696	545	917	1,665	769	593	663	637	674	2,796
Lane 1	Speed	28.8	42.7	49.1	55.9	56.5	55.6	48.7	54.0	55.7	55.5	55.4	55.4	55.4	55.5	55.8
	Density	0.0	5.2	9.2	11.7	4.1	3.3	12.2	19.7	18.0	17.4	17.2	17.1	17.0	16.9	15.5
Lane 2	Speed	36.9	41.5	48.5	55.0	55.9	50.6	48.3	55.7	57.3	57.1	57.1	57.1	57.1	57.1	55.6
	Density	11.5	10.1	8.3	8.5	14.6	23.3	20.1	14.7	15.1	15.7	15.9	16.0	16.1	16.3	18.4
Lane 3	Speed	37.3	41.8	48.7	53.7	56.7	56.0	54.3								
	Density	10.9	9.5	7.9	7.4	8.9	9.6	6.0								
Ramp	Speed	37.2	40.5	51.6	54.1	57.4										
	Density	10.6	4.6	12.9	7.1	6.0										
		55	87	190	180	12	185	184	183	182	195	196	170	110	129	166	198

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

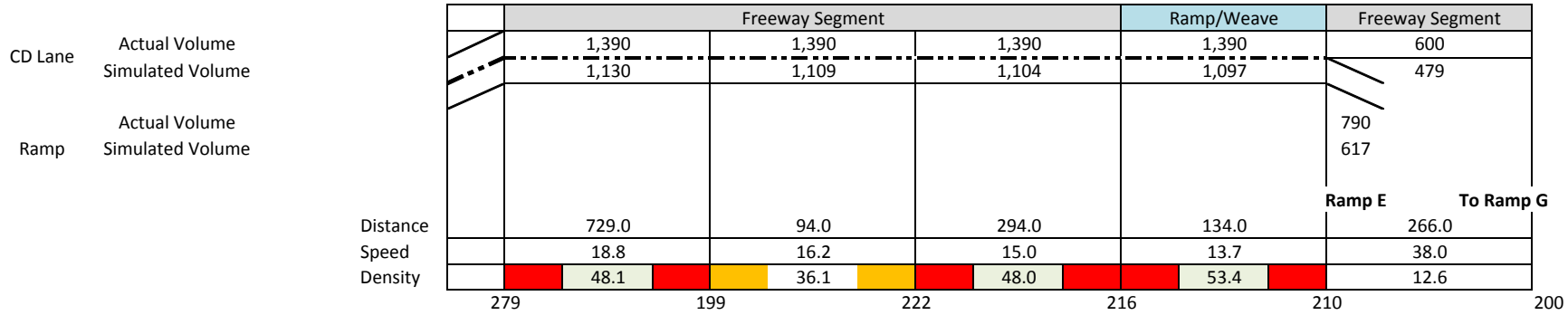
CD Road Northbound PM

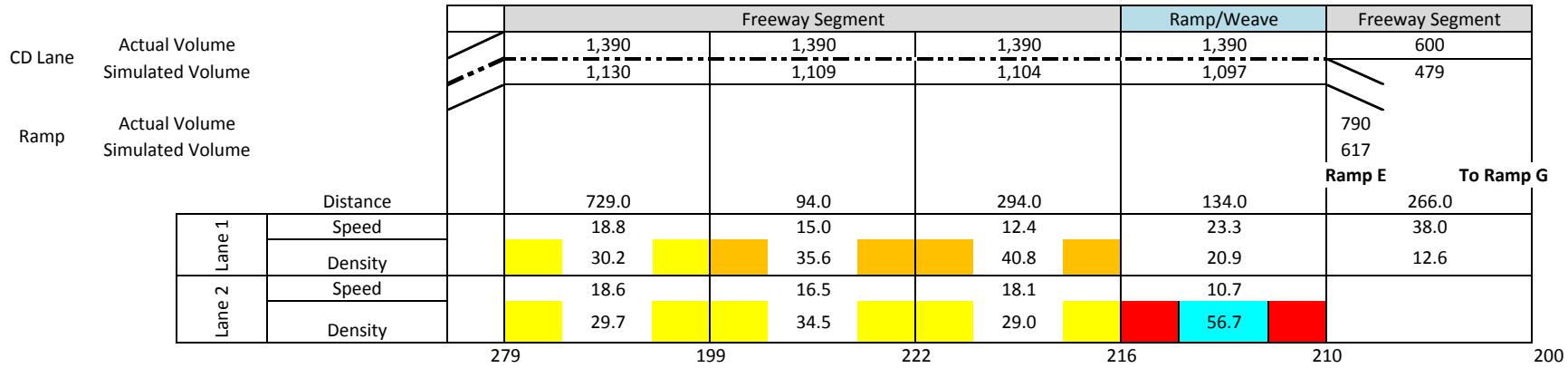
		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	2,069	2,069	619	2,380	2,380	2,380	2,130
	Simulated Volume	1,872	1,903	655	2,179	2,178	2,176	1,866
Ramp	Actual Volume			1450 1610				250
	Simulated Volume			1,249 1,525				311
				To I-95 NB	**From Northbound I-95 Mainline (left entrance)**			**To Route 17 southbound**
	Distance	2,796	1,542	461	534	408	280	355
	Speed	55.7	55.1	57.1	58.6	58.1	54.2	50.6
	Density	16.9	17.3	11.5	12.4	12.5	13.4	18.4
		166	198	208	188	186	189	187	205

		Freeway Segment	Ramp/Weave	Freeway Segment	Ramp/Weave			Freeway Segment
CD Lane	Actual Volume	2069.4	2069.4	619.4	2229.4	2229.4	2229.4	2130
	Simulated Volume	1,872	1,903	655	2,179	2,178	2,176	1,866
Ramp	Actual Volume			1450 1610				250
	Simulated Volume			1,249 1,525				311
				To I-95 NB	**From Northbound I-95 Mainline (left entrance)**			**To Route 17 southbound**
	Distance	2,796	1,542	461	534	408	280	355
Lane 1	Speed	55.8	54.3	57.1	59.4	59.0	53.3	49.9
	Density	15.5	21.2	11.5	7.7	5.8	20.6	20.9
Lane 2	Speed	55.6	56.5		58.1	57.6	55.1	51.4
	Density	18.4	13.3		16.6	18.9	13.8	15.9
Lane 3	Speed				58.7	58.3		
	Density				12.9	12.7		
Ramp	Speed							
	Density							
		166	198	208	188	186	189	187	205

2040 Build PM CORSIM Results

CD Road Southbound PM - Part 1





Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

CD Road Southbound PM - Part 2

CD Lane			Freeway Segment			Ramp/Weave		Freeway Segment			
	Actual Volume		2,950	2,950	2,950	3,409	3,409	3,409	3,409	3,730	3,730
	Simulated Volume		2,366	2,363	2,359	2,818	2,814	2,805	2,791	2,773	2,757
	Actual Volume				459						
	Simulated Volume				459						
					From Rt 17						
	Distance		117	216	377	292	358	544	742	674	1003
	Speed		47.5	47.2	44.3	42.1	46.6	49.0	47.3	45.3	43.5
	Density		16.6	22.5	26.7	22.5	25.8	30.4	32.5	35.1	38.3
			203	214	231	202	220	201	179	177	176	168

CD Lane			Freeway Segment			Ramp/Weave		Freeway Segment			
	Actual Volume		2,950	2,950	2,950	3,409	3,409	3,409	3,409	3,730	3,730
	Simulated Volume		2,366	2,363	2,359	2,818	2,814	2,805	2,791	2,773	2,757
					458.9						
					459						
					From Rt 17						
	Distance		117	216	377	292	358	544	742	674	1003
Lane 1		Speed	48.7	49.6	47.6	32.0	47.6	48.7	46.6	44.3	42.6
		Density	15.2	8.8	6.3	2.3	22.9	30.5	29.6	29.1	29.0
Lane 2		Speed	48.7	46.6	43.9	44.0	46.6	49.4	48.0	46.1	44.3
		Density	15.2	35.1	46.9	43.8	29.4	26.6	29.3	32.0	34.1
Lane 3		Speed				39.1	43.7				
		Density				20.8	8.0				
Ramp		Speed									
		Density									
			203	214	231	202	220	201	179	177	176	168

Freeway Density
45 and Above
35 to 45
26 to 35
18 to 26
11 to 18
0 to 11

Weave/Ramp Density
43 and Above
35 to 43
28 to 35
20 to 28
10 to 20
0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43

2040 Build PM CORSIM Results

CD Road Southbound PM - Part 2

CD Lane			Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
	Actual Volume		3,730	3,730	3,730	3,730	3,730	3,730	3,460	3,460	3,730	3,730	3,730	3,460	3,460	3,460	2,980
	Simulated Volume		2,735	2,700	2,673	2,665	2,651	2,643	2,440	2,410	2,657	2,584	2,561	2,330	2,305	2,269	1,926
	Actual Volume								270	270				270			480
	Simulated Volume								203	247				25			342
								To Rest Area			From Rest Area			Slip Ramp to I-95			To Carl D Silver Pkwy
	Distance		1436	1020	306	520	341	402	760	574	1554	500	1025	499	689	387	742
	Speed		41.8	40.0	38.6	36.1	33.8	32.1	29.6	28.0	25.4	19.2	16.8	14.6	13.2	11.9	8.1
	Density		42.1	45.5	47.9	51.3	55.6	43.8	65.3	70.6	59.9	97.6	107.5	118.0	131.9	99.7	159.2
			168	169	171	173	174	175	223	57	58	60	61	62	68	70	91	69

CD Lane			Freeway Segment					Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment		Ramp/Weave	Freeway Segment	Ramp/Weave	Freeway Segment
	Actual Volume		3,730	3,730	3,730	3,730	3,730	3,730	3,460	3,460	3,730	3,730	3,730	3,460	3,460	3,460	2,980
	Simulated Volume		2,735	2,700	2,673	2,665	2,651	2,643	2,440	2,410	2,657	2,584	2,561	2,330	2,305	2,269	1,926
									270	270				270			480
									203	247				25			342
								To Rest Area			From Rest Area			Slip Ramp to I-95			To Carl D Silver Pkwy
	Distance		1436	1020	306	520	341	402	760	574	1554	500	1025	499	689	387	742
Lane 1	Speed		41.1	39.2	38.2	35.7	34.1	32.4	30.9	29.1	25.2	18.6	16.1	15.1	14.0	11.0	7.5
	Density		29.2	31.0	32.3	34.7	36.5	34.3	35.4	37.9	49.3	67.0	77.9	84.6	90.8	85.7	121.9
Lane 2	Speed		42.4	40.6	39.0	36.5	33.6	31.6	28.8	27.3	25.1	19.8	17.5	14.1	12.4	11.3	8.6
	Density		35.8	36.2	36.8	38.9	41.7	19.1	46.2	47.4	51.3	66.9	73.4	73.8	81.8	89.6	115.4
Lane 3	Speed							45			37						
	Density							3			2						
Ramp	Speed																
	Density																
			168	169	171	173	174	175	223	57	58	60	61	62	68	70	91	69

Freeway Density
45 and Above
35 to 45
26 to 35
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0 to 11

Weave/Ramp Density
43 and Above
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0 to 10

Freeway, Weave, and Ramp Density Coloring	
Density Above	75
Density Above	55
Density Above	43