GDOT PI #0011682 -SR 299 BRIDGE REPLACEMENT OVER I-24

Concept Traffic Study Technical Memorandum

GEORGIA DEPARTMENT OF TRANSPORATION

8.22.2013

PREPARED FOR

Georgia Department of Transportation

One Georgia Center 600 West Peachtree NW Atlanta, GA 30308 Phone: (404) 631-1757 Contact: Andrew Hoenig

PREPARED BY

HNTB Corporation

3715 Northside Parkway 200 Northcreek, Suite 800 Atlanta, GA 30327 Phone: (404) 946-5700 Contact: David Hannon



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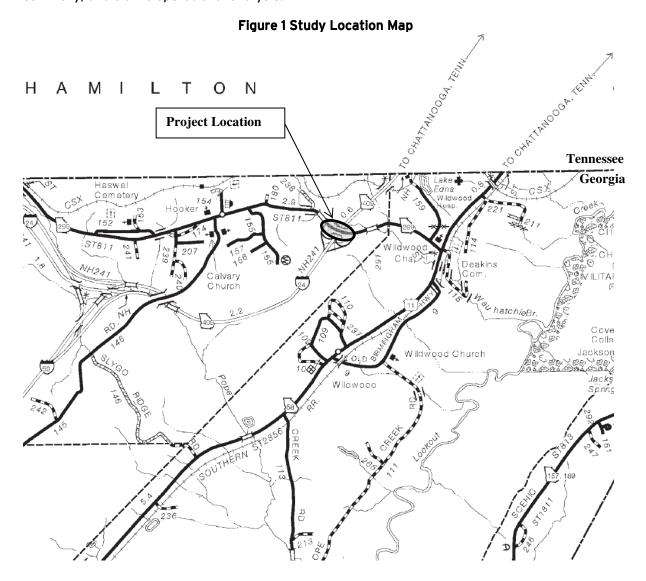
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INTRODUCTION

This project proposes to replace the State Route 299 bridge over I-24 located in Dade County, Georgia. The bridge is an overpass at the Interstate 24 Exit 169 interchange. This site is located approximately 0.6 miles south of the Georgia/Tennessee state line travelling along I-24. The approximate latitude and longitude for the midpoint of the bridge is North 34.977543 and West 85.41707 and it is in the unincorporated community of Wildwood, Georgia. Project length is approximately 0.16 miles along SR 299. The project limits extend along I-24 0.39 miles north of the bridge and 2,000 feet south of the bridge along I-24 for a total length of approximately 0.77 miles along I-24. This bridge replacement will be completed using Accelerated Bridge Construction (ABC) techniques. The project will be delivered using Design-Build (DB) to encourage innovation in determining the methods/procedures utilized to complete the ABC. A concept traffic study has been conducted to aid the project concept development for the above identified project. This study report summarizes the data collection, traffic forecast, accident summary, and traffic operational analysis.



EXISTING CONDITIONS

I-24 is a 4-lane (2 lanes in each direction) freeway with a posted speed limit of 65 mph within the study area. The SR 299 Interchange is a partial cloverleaf with all ramps to the south of SR 299. The ramps are all single lane. The EB on and WB off-ramps are loops. The ramps are stop controlled at the intersections with SR 299 which runs free. The only turn lane at either ramp intersection is a short right turn lane for SR 299 SB to I-24 WB on-ramp. SR 299 is a 2-lane road within the study area. The speed limit is posted as 45 mph west of I-24 and 55 mph east of I-24.

The main objectives of this traffic study are to:

- Examine existing traffic conditions for the study area.
- Forecasting future traffic for 2015 and 2035 Build Conditions, including developing Annual Average Daily Traffic (AADT) and AM/PM Design Hour Volumes (DHV).
- Summarizing historical accident data for the intersections and identifying accident patterns.
- Conducting traffic operational analysis including capacity analysis for the existing, opening, and design years to evaluate traffic operational conditions. Providing traffic analysis results for the project concept development.

TRAFFIC FORECAST

The Opening Year and Design Year for the projections are 2015 and 2035, respectively. See attached traffic memo for more information.

ACCIDENT SUMMARY

The 2010 to 2012 historical accident data was reviewed for SR 299 within the study area. All accidents were categorized into seven categories: Angle, Head On, Rear End, Sideswipe Same Direction, Sideswipe Opposite Direction, Not a Collision with a Motor Vehicle (Ped, Animal, backing, etc.), and Not Indicated. Accidents for SR 299 are summarized in **Table 1**. The most frequent accident type that occurred in the period reviewed were rear end collisions, which accounted for over half of all accidents recorded. There were no recorded fatalities and five recorded injuries.

Table 1 Historical Accident Frequency Summary

SR 299				
MANNER OF COLLISION	2010	2011	2012	TOTAL
ANGLE	2			2
HEAD ON	1		1	2
REAR END	8	1		9
SIDESWIPE SAME DIRECTION	1	1	1	3
SIDESWIPE OPPOSITE DIRECTION				
NOT A COLLISION WITH A MOTOR VEHICLE	1			1
NOT INDICATED				
TOTAL	13	2	2	17

Source: GDOT GeoTRAQS website

OPERATIONAL ANALYSIS

Existing and future traffic operational conditions were evaluated based on capacity analyses. Capacity analyses were conducted based on the procedures defined in the 2010 Highway Capacity Manual by using the HCS software. The following scenarios were analyzed.

- 2013 Existing Conditions
- 2015 and 2035 No Build Conditions
- 2015 and 2035 Build Concept Conditions

The following intersections were included in the capacity analysis:

- SR 299 at I-24 EB ramps
- SR 299 at I-24 WB ramps

Existing and Proposed Conditions

The existing and proposed lane configurations for this study area are shown in **Figure 2 and 3** below. Both intersections are two-way stop controlled.

Figure 2: Existing Lane Configuration, SR 299 at I-24 EB Ramps

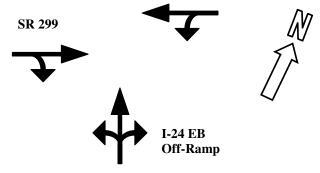
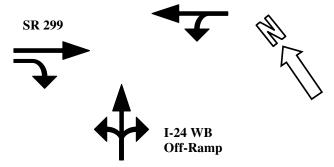


Figure 3: Existing Lane Configuration, SR 299 at I-24 WB Ramps



For the purposes of this report, SR 299 will be considered the East-West road and I-24 the North-South road at this location.

Intersection Operation Analysis

The two I-24 ramp intersections with SR 299 were analyzed for the existing year (2013), opening year (2015), and design year (2035). No-Build and Build options are the same. The results are shown in **Tables 2-4**.

Table 2 2013 Existing Two-way Stu		111161 360	LIVIT LOS allu Delay
Intersection	2013 Existing		
Intersection		LOS	DELAY (sec/veh)
SD 200 at L24 W/D Damps	AM	В	10.0
SR 299 at I-24 WB Ramps	PM	В	13.5
SR 299 at I-24 EB Ramps	AM	В	10.8
	PM	В	10.7

Table 2 2013 Existing Two-Way Stop Control Intersection LOS and Delay

Table 3 2015 No-Build/Build Two-Way Stop Control Intersection LOS and Delay

Intersection	2015 No-Build/Build		
Intersection		LOS	DELAY (sec/veh)
	AM	В	10.1
SR 299 at I-24 WB Ramps	PM	В	13.7
SR 299 at I-24 EB Ramps	AM	В	10.9
	PM	В	10.7

Table 4 2035 No-Build/Build Two-Way Stop Control Intersection LOS and Delay

Intersection	2035 No-Build/Build		
Intersection		LOS	DELAY (sec/veh)
CD 200 at L24 WD Damma	AM	В	10.9
SR 299 at I-24 WB Ramps	PM	С	20.0
SR 299 at I-24 EB Ramps	AM	В	13.6
	PM	В	13.0

Note: Level of Service shown is the approach level of service for the ramp. The SR 299 left turn movement level of service is shown in the HCS attachments.

As indicated in the above table, the LOS is C or better for all years and periods.

Two-lane Operation Analysis

SR 299 was analyzed for the existing year (2013), opening year (2015), and design year (2035). No-Build and Build options are the same. The results are shown in **Tables 5-7**.

Table 5 2013 Existing	Two-Lane Segment LOS and Other Performance Measures
	I WO LUNE Sequient LOS and Other I errormance measures

	2013 Existing		
Two-Lane Segment		LOS	Percent Time Spent
		LUS	Following (PTSF)
SR 299, West of I-24	AM	С	57.9%
3R 299, West 01 1-24	PM	С	69.1%
SR 299, Between I-24 Ramps	AM	С	61.6%
SR 299, Detween 1-24 Ramps	PM	D	70.7%
SR 299, East of I-24	AM	С	61.2%
	PM	D	72.9%

		2015 No-Build/Build		
Two-Lane Segment		LOS	Percent Time Spent Following (PTSF)	
SR 299, West of I-24	AM	С	57.9%	
	PM	С	70.0%	
SR 299, Between I-24 Ramps	AM	С	61.5%	
	PM	D	70.7%	
SR 299, East of I-24	AM	С	62.7%	
	PM	D	73.1%	

Table 6 2015 No-Build/Build Two-Lane Segment LOS and Other Performance Measures

Table 7 2035 No-Build/Build Two-Lane Segment LOS and Other Performance Measures

	2035 No-Build/Build		
Two-Lane Segment		LOS	Percent Time Spent Following (PTSF)
SD 200 West of 1-24	AM	С	61.2%
SR 299, West of I-24	PM	D	71.6%
SR 299, Between I-24 Ramps	AM	С	68.0%
	PM	D	77.4%
SR 299, East of I-24	AM	С	69.9%
	PM	D	81.4%

As indicated in the above tables, the LOS is D or better for all years and periods.

Freeway Operation Analysis Table 8 2013 Existing Freeway Segment LOS and Density

Segment		2013 Existing		
Segment		LOS	DENSITY (pc/mi/ln)	
1-24 EP North of SD 200	AM	С	18.7	
I-24 EB, North of SR 299	PM	С	19.4	
L24 WP North of SD 200	AM	В	11.7	
I-24 WB, North of SR 299	PM	D	30.2	
I-24 EB, Between On and Off Ramp to	AM	В	16.6	
SR 299	PM	С	18.1	
I-24 WB, Between On and Off Ramp to	AM	Α	10.9	
SR 299	PM	D	27.6	
I-24 EB, South of SR 299	AM	С	18.8	
	PM	С	20.0	
I-24 WB, South of SR 299	AM	В	11.7	
	PM	D	30.0	

ladie 9 2015 No-Build/Build Freeway Segment LOS and Density				
Segment		20	015 No-Build/Build	
Segment		LOS	DENSITY (pc/mi/ln)	
1-24 EP. North of SD 200	AM	С	19.1	
I-24 EB, North of SR 299	PM	С	19.9	
1.24 WP. North of SP 200	AM	В	12.0	
I-24 WB, North of SR 299	PM	D	31.3	
I-24 EB, Between On and Off Ramp to	AM	В	16.9	
SR 299	PM	С	18.5	
I-24 WB, Between On and Off Ramp to	AM	В	11.1	
SR 299	PM	D	28.5	
L 24 EB. South of SD 200	AM	С	19.2	
I-24 EB, South of SR 299	PM	С	20.4	
L-24 WP. South of SD 200	AM	В	11.9	
I-24 WB, South of SR 299	PM	D	31.0	

Table 9 2015 No-Build/Build Freeway Segment LOS and Density

Table 10 2035 No-Build/Build Freeway Segment LOS and Density

Segment		20	035 No-Build/Build
Segment		LOS	DENSITY (pc/mi/ln)
I-24 EB, North of SR 299	AM	С	24.6
1-24 LB, NOT IT OF SR 299	PM	С	25.8
I-24 WB, North of SR 299	AM	В	14.6
1-24 WD, NOTTI OF SR 299	PM	F	46.5
I-24 EB, Between On and Off Ramp to	AM	С	20.6
SR 299	PM	С	22.9
I-24 WB, Between On and Off Ramp to	AM	В	13.3
SR 299	PM	E	39.5
1-24 ER South of SD 200	AM	С	23.9
I-24 EB, South of SR 299	PM	С	25.8
1-24 WR South of SP 200	AM	В	14.5
I-24 WB, South of SR 299	PM	F	46.6

As indicated in the above tables, the LOS is D or better for all years and periods except I-24 WB in the PM period for the year 2035. I-24 WB is LOS E between the ramps and F upstream and downstream of the interchange. Freeway LOS is provided for information purposes only. No mitigation is considered as part of this project.

Merge Operation Analysis

Table 11 2013 Existing Merge LOS and Density

Domn			2013 Existing	
Ramp		LOS	DENSITY (pc/mi/ln)	
I-24 EB On-Ramp to SR 299	AM	В	17.3	
1-24 EB OII-Railip to SR 299	PM	В	18.1	
1-24 W/P On-Dome to SD 200	AM	В	14.4	
I-24 WB On-Ramp to SR 299	PM	D	31.1	

Damp		20	D15 No-Build/Build
Ramp		LOS	DENSITY (pc/mi/In)
1.24 FR On Damp to SD 200	AM	В	17.7
I-24 EB On-Ramp to SR 299	PM	В	18.5
I-24 WB On-Ramp to SR 299	AM	В	14.7
1-24 WB OII-Railip to SR 299	PM	D	31.7

Table 12 2015 No-Build/Build Merge LOS and Density

Table 13 2033 NO-Bullu/Bullu Merge LOS and Density				
Ramp		2035 No-Build/Build		
καπρ		LOS	DENSITY (pc/mi/ln)	
1-24 EP On-Damp to SD 200	AM	С	22.4	
I-24 EB On-Ramp to SR 299	PM	С	23.4	
1.24 WP. On Domn to SD 200	AM	В	17.7	
I-24 WB On-Ramp to SR 299	PM	F	38.6	

Table 13 2035 No-Ruild/Ruild Merge LOS and Density

As indicated in the above tables, the LOS is D or better for all years and periods except the onramp from SR 299 to I-24 WB in 2035 PM.

Diverge Operation Analysis

Table 14 2013 Existing Diverge LOS and Density				
Bamp		2013 Existing		
Ramp		LOS	DENSITY (pc/mi/ln)	
1 24 EB Off Damp to SD 200	AM	С	21.0	
I-24 EB Off-Ramp to SR 299	PM	С	22.3	
I-24 WB Off-Ramp to SR 299	AM	В	17.3	
1-24 WD 011-Kamp to SR 299	PM	E	35.8	

Table 15 2015 No-Build/Build Diverge LOS and Density 2015 No-Build/Build Damp

Ramp		LOS	DENSITY (pc/mi/ln)
1-24 ER Off-Damp to SD 200	AM	С	21.5
I-24 EB Off-Ramp to SR 299	PM	С	22.9
1.24 WR Off Dome to SD 200	AM	В	17.6
I-24 WB Off-Ramp to SR 299	PM	E	36.5

Table 16 2035 No-Build/Build Diverge LOS and Density

Damp		2035 No-Build/Build		
Ramp		LOS	DENSITY (pc/mi/ln)	
I-24 EB Off-Ramp to SR 299	AM	С	26.4	
1-24 LB OIT-Railip to SR 299	PM	D	28.1	
I-24 WB Off-Ramp to SR 299	AM	С	21.0	
1-24 WB OIT-Rallip to SR 299	PM	F	44.0	

As indicated in the above tables, the LOS is D or better for all years and periods except the SR 299 off-ramp diverge from I-24 WB in the PM period for 2013, 2015 the LOS is E and for 2035 the LOS is F. A factor in the poor LOS is the existing deceleration lane for I-24 WB to SR 299 is short.

SUMMARY

This concept traffic study has been conducted to evaluate the traffic conditions along SR 299 and I-24 in the study area. The analysis shows that most areas perform acceptability through the design year except I-24 WB and the SR 299 ramp diverge in 2035 PM.

APPENDICES

- Traffic Forecasting Memo
- Traffic Diagrams
- Highway Capacity Analysis Printouts

То	From	HNTE
Abby Ebodaghe	Keith Strickland, P.E.	
GDOT Office of Planning	Subject	
	Traffic Forecasting for SR 299 Bridge	
	Replacement overI-24	
	PI No. 0011682 Dade County	
	Date	
	August, 2013	
Technical		

Memorandum

1. INTRODUCTION

This memorandum summarizes the methodology and factors that were used to forecast the future traffic volumes for the SR 299 over I-24 bridge replacement project in Dade County, PI No. 0011682.

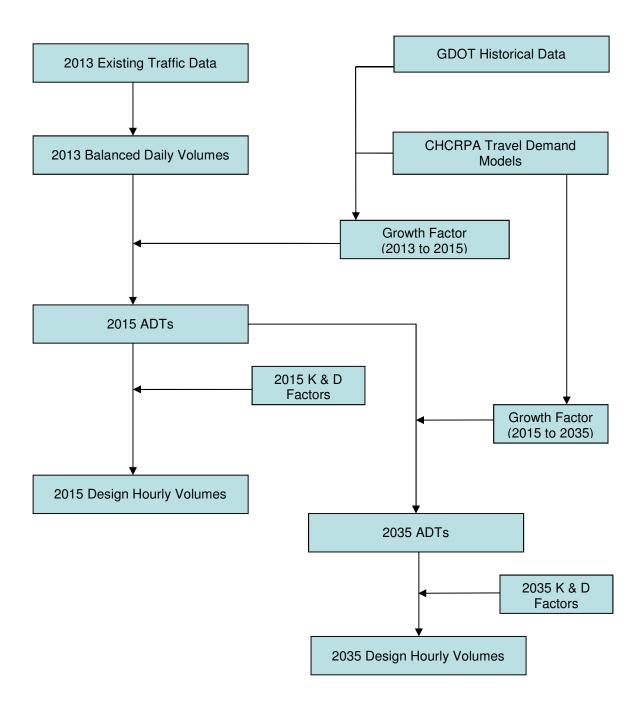
The Opening Year and Design Year for the project are 2015 and 2035, respectively. The forecasting process resulted in Average Daily Traffic (ADT) volumes and Design Hourly Volumes (DHVs) for 2015 and 2035.

2. METHODOLOGY

The traffic forecasting process consisted of the following steps:

- Collect weekday directional daily and hourly counts (classification) and hourly turning movement counts
- Compare collected volumes to GDOT historic counts
- Balance peak period traffic counts to adjust for weekly variations
- Review GDOT historical traffic counts to assess traffic growth trends
- Review Chattanooga-Hamilton County Regional Planning Agency (CHCRPA) regional travel demand models to estimate future growth rates
- Coordinate with GDOT to determine the future growth rates
- Apply growth factors to estimate ADTs for 2015
- Apply growth factors to convert 2015 ADTs to 2035 ADTs
- Convert ADTs to DHVs for 2015 and 2035 using K and D factors

The traffic forecasting steps taken for this project are illustrated in the following flow chart:



The following section describes the above steps in more detail including data collection and review of growth trends. **Section 3, Forecast Factors**, explains all the factors, including growth rates, K factor, etc. that were used to develop these traffic projections.

2.1 Existing Traffic Data Collection

Existing traffic data were collected in the winter of 2013. See the table below for types of counts

Quantity	Description
2	6-Hr Turning Movement Count
9	48-Hr Bidirectional Automatic Machine Count with Classification
1 1	

See the attached existing traffic counts for details.

2.2 GDOT Historical Traffic Data and Historical Traffic Growth Trends

Historical traffic data (1996-2011) were collected from the GDOT permanent count stations data base. Two stations have been identified on SR 299, and two stations on I-24 within or near the project area. Data from these stations were collected and analyzed. The historical trend was negative or flat.

2.3 Regional Travel Demand Model Review

The CHCRPA 2010 and 2040 travel demand models were reviewed to help determine future growth rates. Two way traffic volumes from along SR 299 and I-24 were collected and analyzed. Annual growth rates were calculated for several links. The future annual growth rates for the period 2010 to 2040 were approximately 1.0% for SR 299 west of the interchange, 4.3% for SR 299 east of the interchange and 1.2% for I-24.

3. FORECAST FACTORS

This section discusses the factors, including growth rates, roadway capacity constraints, and K factor that were used to estimate 2015 and 2035 DHV's and ADT's.

3.1 Annual Traffic Growth Rates

Based on the review of GDOT historical data and the CHCRPA 2010 and 2040 models, the following annual growth rates have been proposed for both the near term (2013 to 2015) and the long term (2015 to 2035).

	No-Build & Build		
	<u>2013-</u>	<u>2015-</u>	
Roadway	<u>2015</u>	<u>2035</u>	
SR 299, W of I-24	1.0	1.0	
SR 299, E of I-24	2.5	3.0	
I-24	1.0	1.2	

PROPOSED FUTURE ANNUAL GROWTH RATES

3.3 K & D Factors

The proposed K factors for the two roads in the study area were based on existing K factors, see first table on the following page. Future directional distribution for the two roads were based on existing directional distribution, see second table on the following page.

Roadway	<u>2015 & 2035 PM</u>	<u>2015 & 2035 AM</u>
SR 299, west of I-24 WB ramps	9.9%	4.6%
SR 299, east of I-24 EB ramps	8.5%	5.1%
I-24, south of SR 299	7.4%	4.9%
I-24, north of SR 299	7.4%	5.0%

PROPOSED K FACTORS

PROPOSED DIRECTIONAL DISTRIBUTION

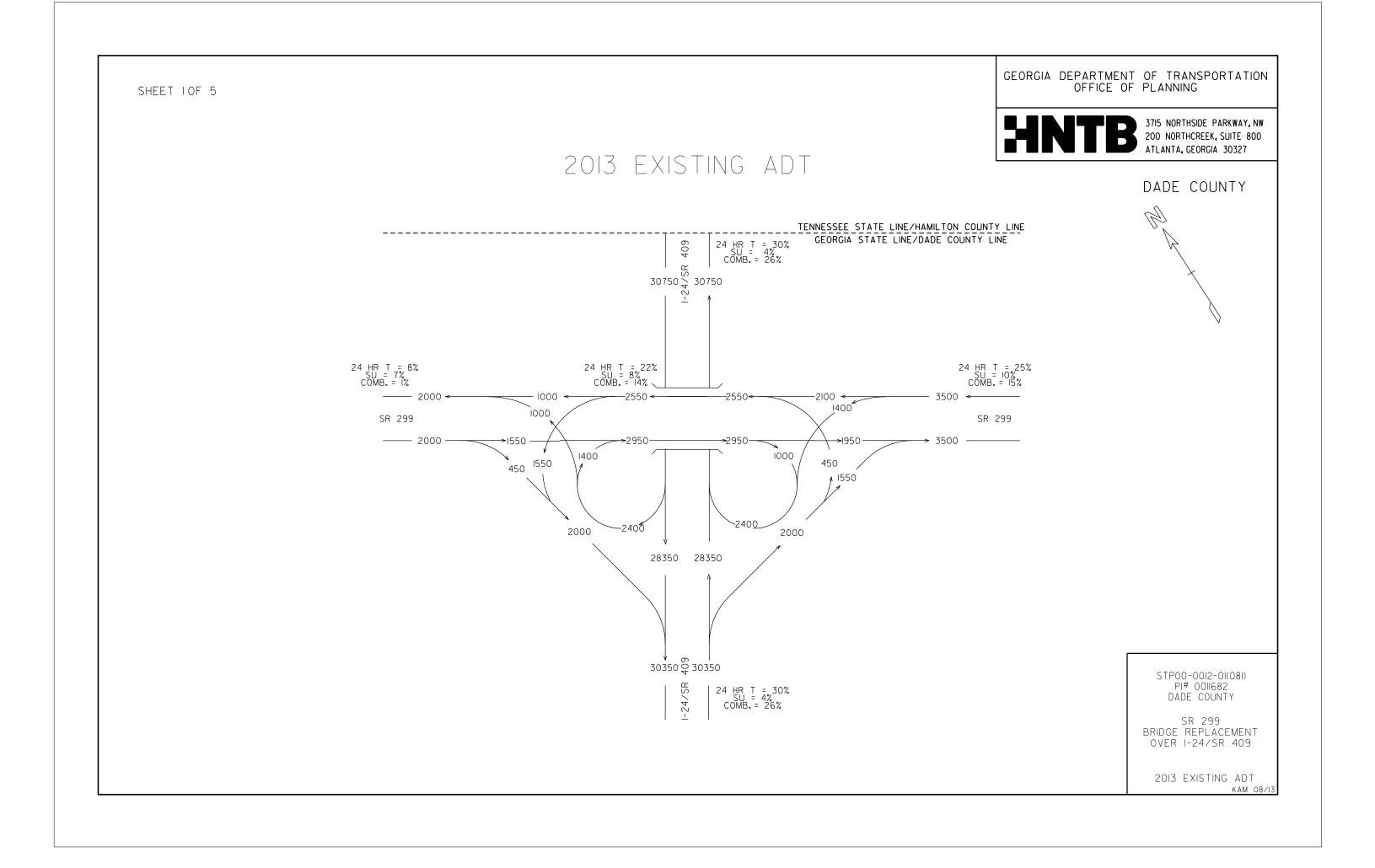
Roadway	<u>2015 & 2035</u>
SR 299, west of I-24 WB ramps	75%
SR 299, east of I-24 EB ramps	69%
I-24, south of SR 299	58%
I-24, north of SR 299	58%

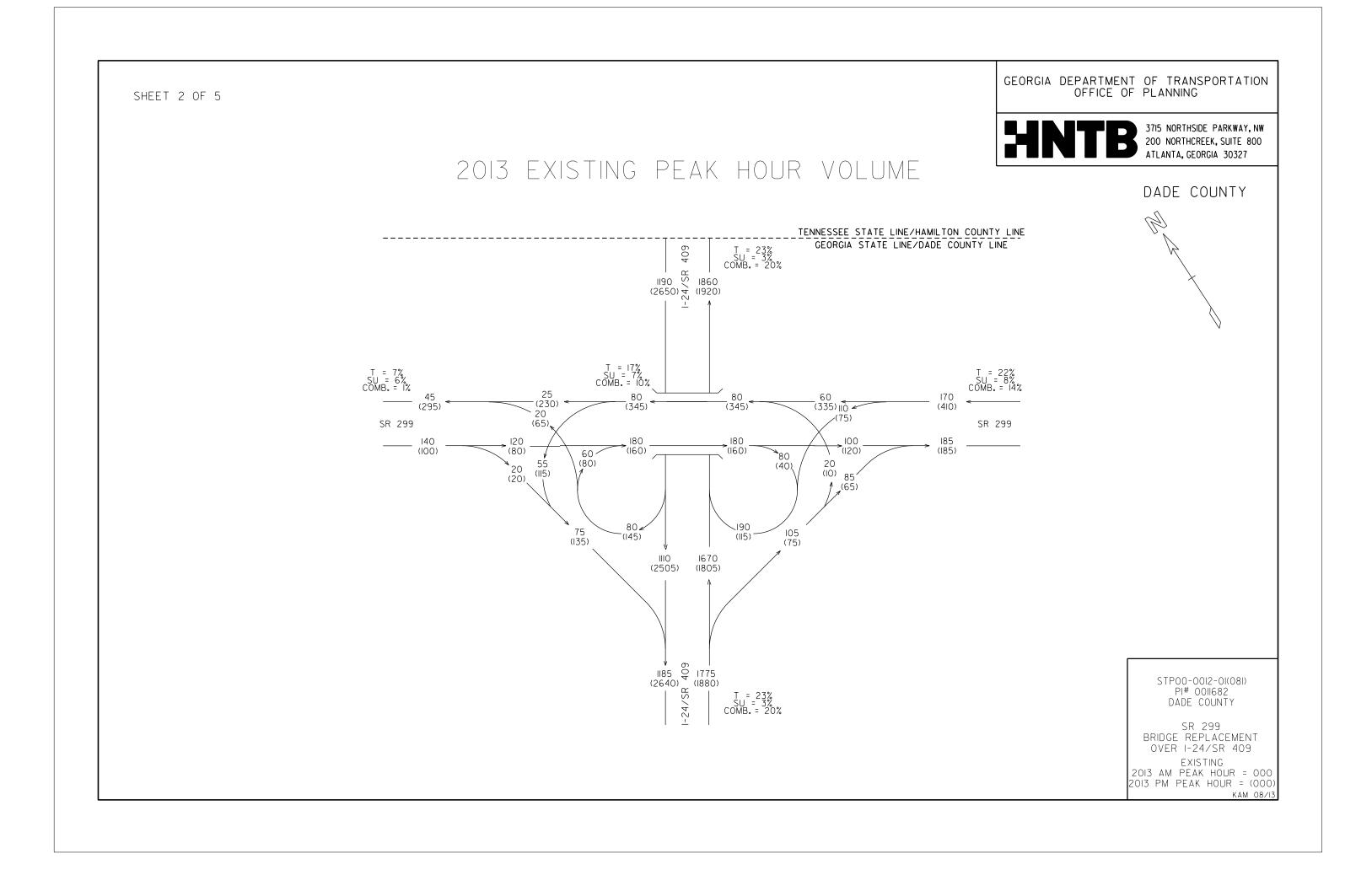
3.4 Truck Percentages

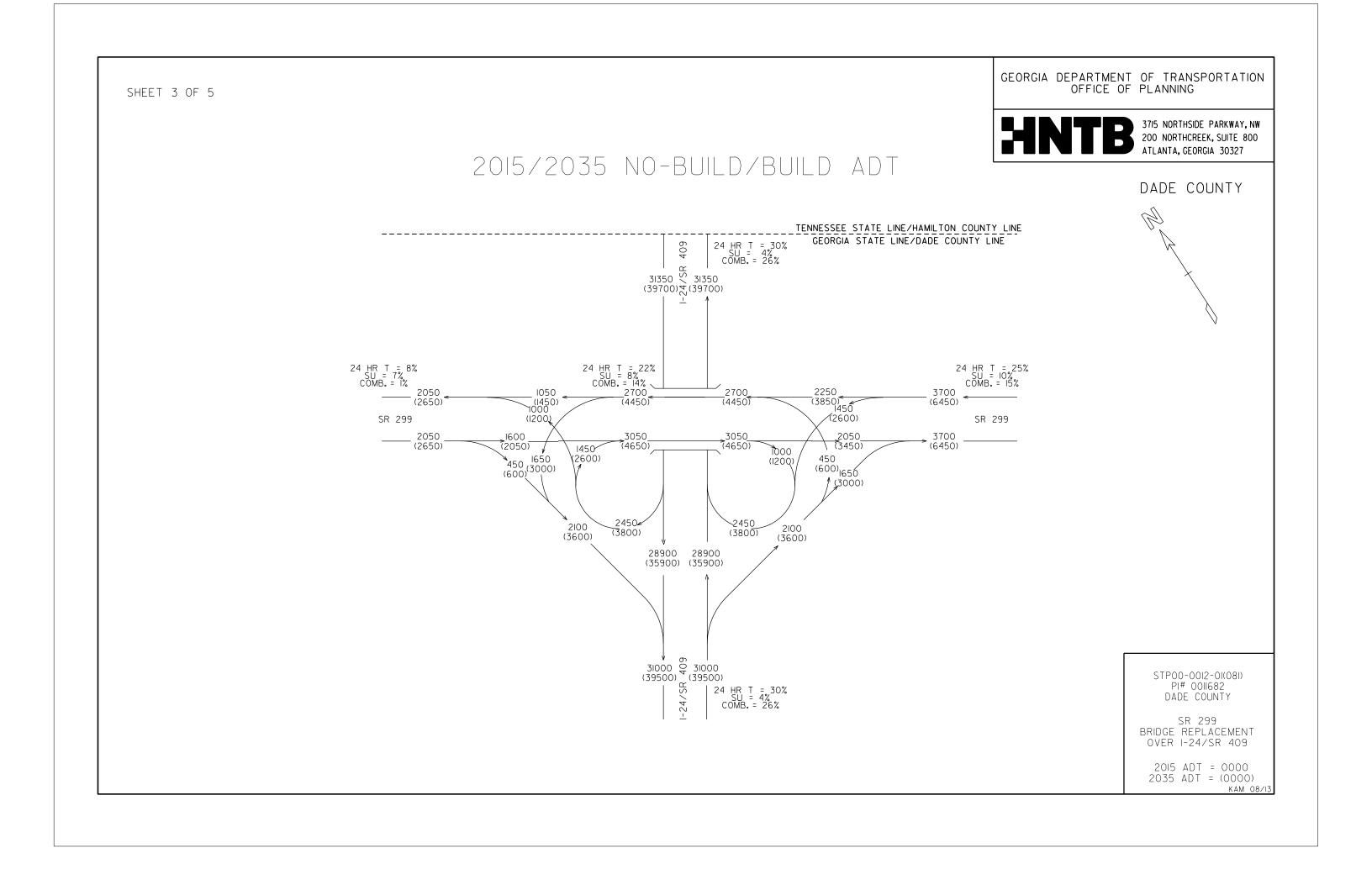
The existing truck percentages were calculated based on the classification counts taken at multiple locations and are summarized in the following table. It is assumed that truck percentages would not change significantly for the opening or design years.

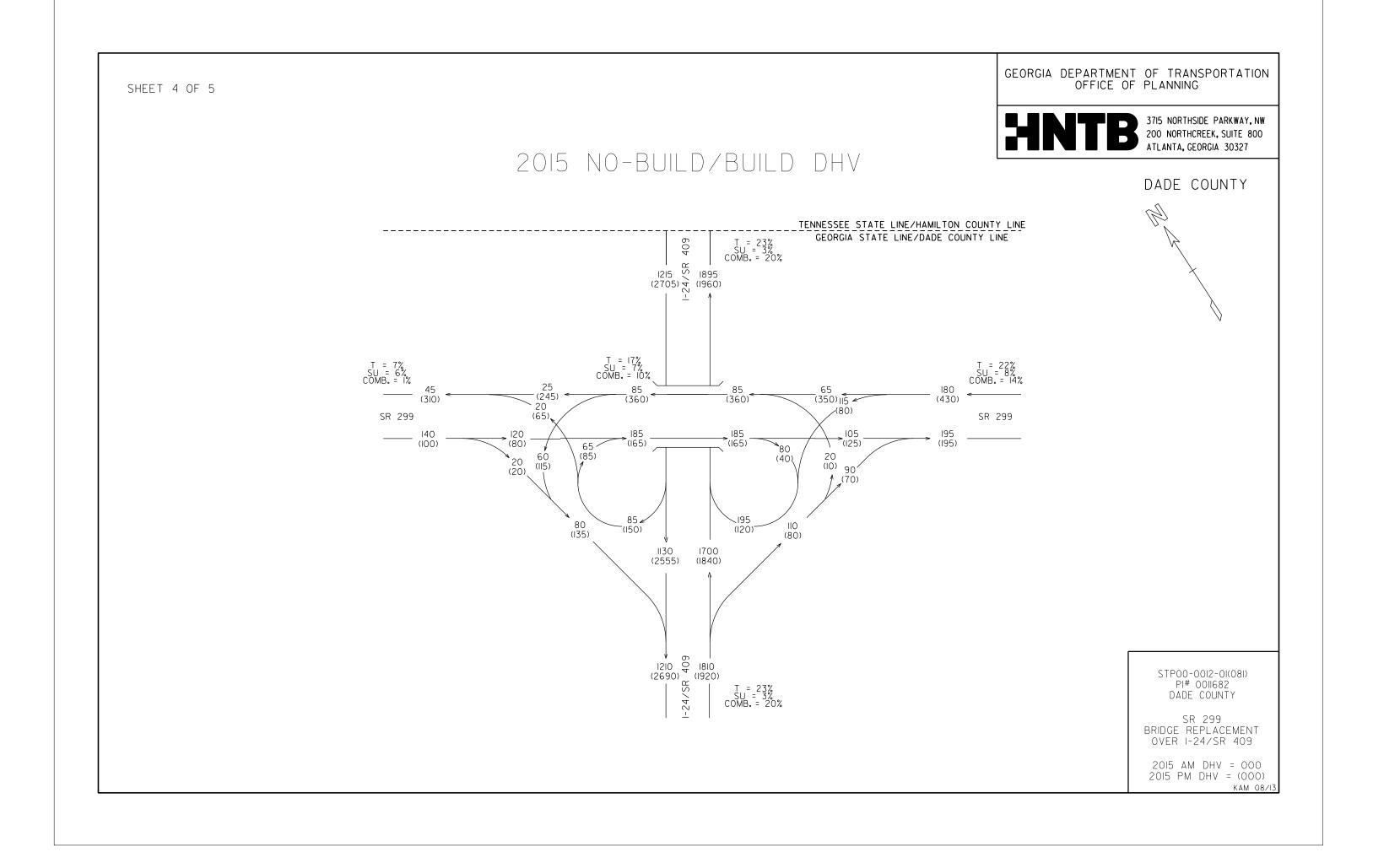
		Daily			Peak Hour	
Roadway	24hr T %	S.U. %	COMB. %	Т %	S.U. %	COMB. %
SR 299, west of I-24 WB ramps	8	7	1	7	6	1
SR 299, east of I-24 EB ramps	25	10	15	22	8	14
I-24, south of SR 299	30	4	26	23	3	20
I-24, north of SR 299	30	4	26	23	3	20

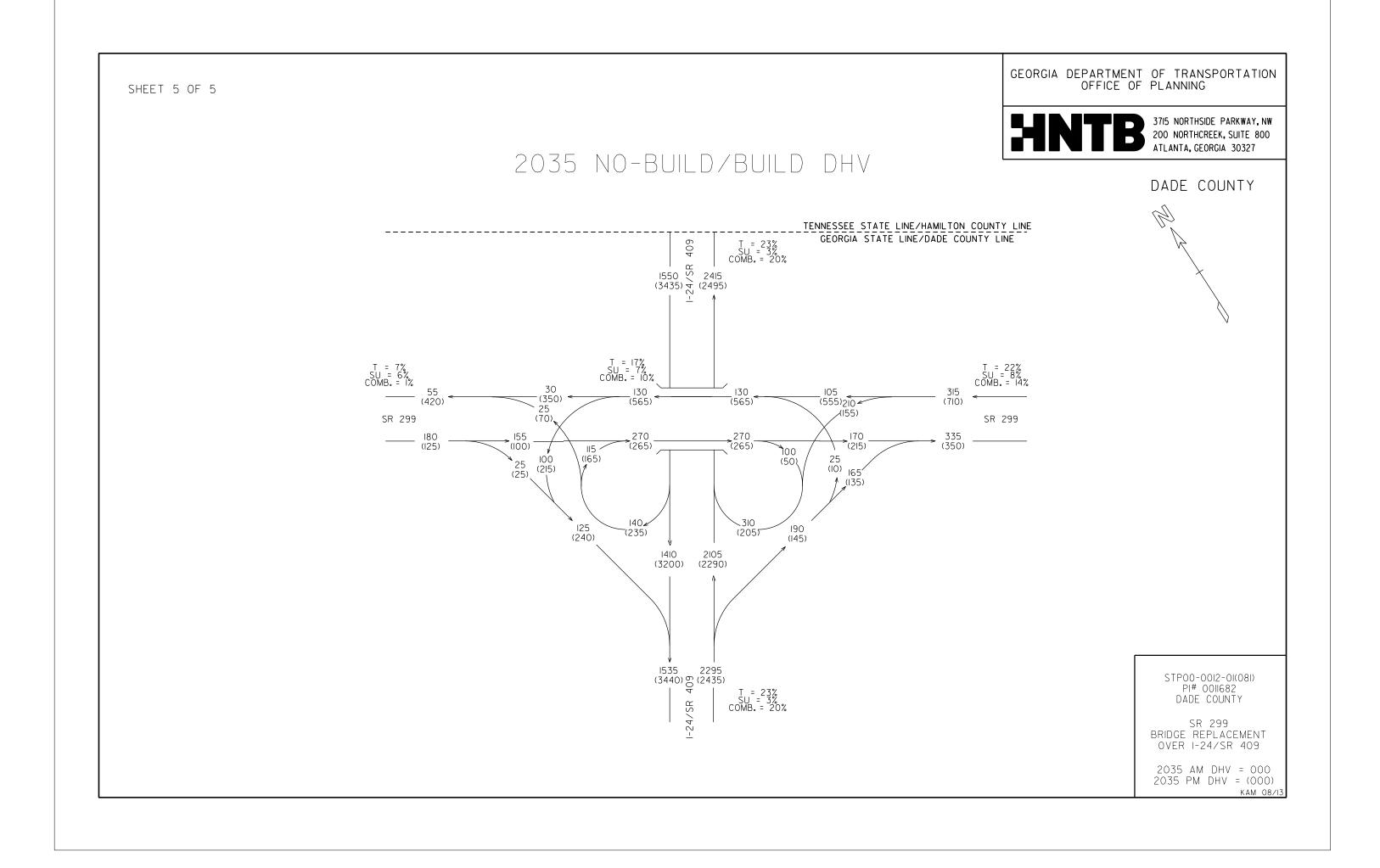
TRUCK PERCENTAGES











	TWO-W	AY STOP	CONTROL	SUMMAF	RY		
General Informa	tion		Site Info	ormation			
Analyst	Keith M	cCage	Intersection	on	SR 299 at Ramps	SR 299 at I-24 WB Bamps	
Agency/Co.	GDOT		Jurisdictio	on	Dade Cou	nty	
Date Performed	8/19/13		— Analysis `	Year	2013		
Analysis Time Perio	d AM						
Project Description	PI No. 00	11682					
East/West Street: 3	SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 WB On	and Off	
Intersection Orientat	ion: East-	West	Study Per	iod (hrs): 0	.25		
Vehicle Volumes	s and Adj	ustments					
Major Street		Eastbound			Westbound		
Movement	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume (veh/h)	ļ	120	20	55	25	ļ	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00	
Hourly Flow Rate, HFR (veh/h)	0	131	21	60	27	0	
Percent Heavy Vehicles	0			17			
Median Type		Undivided					
RT Channelized			0			0	
Lanes	0	1	1	0	1	0	
Configuration		Т	R	LT			
Upstream Signal		0			0		
Minor Street		Northbound			Southbound	1	
Movement	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume (veh/h)	20	0	60				
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	21	0	65	0	0	0	
Percent Heavy Vehicles	22	22	22	0	0	0	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage	1	0		<u> </u>	0		
RT Channelized	1		0	1		0	
Lanes	0	1	0	0	0	0	
Configuration		LTR					
Delay, Queue Leng	th and low	el of Servic	<u>.</u>		я.	P.	

Approach	Eastbound	Westbound	Northbound		Southbound 10 11 1		d	
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		60		86				
C (m) (veh/h)		1342		799				
v/c		0.04		0.11				
95% queue length		0.14		0.36				
Control Delay (s/veh)		7.8		10.0				
LOS		A		В				
Approach Delay (s/veh)				10.0				
Approach LOS				В				

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	TWO-W	AY STOP	CONTROL	SUMMAF	RY		
General Informa	tion		Site Info	ormation			
Analyst	Keith M	cCage	Intersection	on	SR 299 at Ramps	I-24 WB	
Agency/Co.	GDOT		Jurisdictio	on	Dade Cou	nty	
Date Performed	8/9/13		— Analysis `	Year	2013	2013	
Analysis Time Perio	d PM						
Project Description	PI No. 00	11682					
East/West Street: 3	SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 WB On .	and Off	
Intersection Orientat	ion: East	West	Study Per	iod (hrs): 0	.25		
Vehicle Volumes	s and Adj	ustments					
Major Street		Eastbound			Westbound		
Movement	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume (veh/h)		80	20	115	230		
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00	
Hourly Flow Rate, HFR (veh/h)	0	87	21	126	252	0	
Percent Heavy Vehicles	0			17			
Median Type		Undivided					
RT Channelized			0			0	
Lanes	0	1	1	0	1	0	
Configuration		T	R	LT			
Upstream Signal		0			0		
Minor Street		Northbound			Southbound		
Movement	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume (veh/h)	65	0	80				
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	71	0	87	0	0	0	
Percent Heavy Vehicles	22	22	22	0	0	0	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0	1	
RT Channelized	1	1	0	ĺ		0	
Lanes	0	1	0	0	0	0	
Configuration		LTR				†	
Delay, Queue Leng	th and low		·			H	

Approach	Eastbound	Westbound	N	orthboun	d	So	uthboun	d
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		126		158				
C (m) (veh/h)		1394		579				
v/c		0.09		0.27				
95% queue length		0.30		1.10				
Control Delay (s/veh)		7.8		13.5				
LOS		A		В				
Approach Delay (s/veh)				13.5				
Approach LOS				В				
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	TWO-W	AY STOP	CONTROL	SUMMAF	RY		
General Informa	tion		Site Info	ormation			
Analyst	Keith M	cCage	Intersection	on	SR 299 at Ramps	I-24 EB	
Agency/Co.	GDOT		Jurisdictio	on	Dade Cou	nty	
Date Performed	8/9/13 d AM		— Analysis `	Year	2013		
Analysis Time Perio	a paivi						
Project Description	PI No. 00	11682					
East/West Street: S	SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 EB On a	and Off	
ntersection Orientation: East-West			Study Per	iod (hrs): 0	.25		
Vehicle Volumes	and Adj	ustments					
Major Street	1	Eastbound			Westbound		
Movement	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume (veh/h)		100	80	110	60		
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00	
Hourly Flow Rate, HFR (veh/h)	0	109	87	120	65	0	
Percent Heavy Vehicles	0			22			
Median Type			Undi	ivided	•	•	
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Northbound Southbo			Southbound			
Movement	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume (veh/h)	20	0	85				
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	21	0	93	0	0	0	
Percent Heavy Vehicles	25	25	25	0	0	0	
Percent Grade (%)		0			0		
Flared Approach		N		1	N		
Storage		0		1	0		
RT Channelized		1	0		-	0	
Lanes	0	1	0	0	0	0	
Configuration		LTR			Ť		
Delay, Queue Leng	th and lo		<u> </u>		1	Į	

Approach	Eastbound	Westbound	N	orthboun	d	So	uthboun	d
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		120		114				
C (m) (veh/h)		1266		733				
v/c		0.09		0.16				
95% queue length		0.31		0.55				
Control Delay (s/veh)		8.1		10.8				
LOS		A		В				
Approach Delay (s/veh)				10.8	-			
Approach LOS				В				
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	TWO-W	AY STOP	CONTROL	SUMMAF	RY	
General Informa	tion		Site Info	ormation		
Analyst	Keith M	cCage	Intersection	on	SR 299 at Ramps	I-24 EB
Agency/Co.	GDOT		- Jurisdictio	on	Dade Cou	nty
Date Performed	<i>8/9/13</i> d <i>PM</i>		— Analysis `	Year	2013	
Analysis Time Perio	u <i> F1VI</i>					
Project Description	PI No. 00	11682				
East/West Street: 3	SR 299		North/Sou <i>Ramps</i>	th Street:	-24 EB On a	and Off
Intersection Orientation: East-West			Study Per	iod (hrs): 0	.25	
Vehicle Volumes	s and Adj	ustments				
Major Street		Eastbound			Westbound	
Movement	1	2	3	4	5	6
	L	Т	R	L	Т	R
Volume (veh/h)		120	40	75	335	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00
Hourly Flow Rate, HFR (veh/h)	0	131	43	82	368	0
Percent Heavy Vehicles	0			22		
Median Type			Undi	ivided		
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	
Minor Street	Northbound Southbound					
Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume (veh/h)	10	0	65			
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	10	0	71	0	0	0
Percent Heavy Vehicles	25	25	25	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage	ĺ	0	Ì	Î	0	
RT Channelized	ĺ		0	ĺ		0
Lanes	0	1	0	0	0	0
Configuration		LTR		1		-
Delay, Queue Leng	th and low	el of Servic	<u>.</u>	-	R	P.

Approach	Eastbound	Westbound	Northbound		d	Southbound 10 11 1		d
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		82		81				
C (m) (veh/h)		1290		718				
v/c		0.06		0.11				
95% queue length		0.20		0.38				
Control Delay (s/veh)		8.0		10.7				
LOS		A		В				
Approach Delay (s/veh)				10.7				
Approach LOS				В				

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	TWO-W	AY STOP	CONTROL	SUMMAF	RY	
General Informa	tion		Site Info	ormation		
Analyst	Keith M	cCage	Intersection	on	SR 299 at Ramps	I-24 WB
Agency/Co.	GDOT		Jurisdictio	on	Dade Cou	nty
Date Performed	8/19/13		— Analysis `	Year	2015	-
Analysis Time Perio	d <i>AM</i>					
Project Description	PI No. 00	11682	I			
East/West Street: S	SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 WB On	and Off
Intersection Orientat	ntersection Orientation: East-West			iod (hrs): 0	.25	
Vehicle Volumes	and Adj	ustments				
Major Street		Eastbound			Westbound	
Movement	1	2	3	4	5	6
	L	Т	R	L	Т	R
Volume (veh/h)		120	20	60	25	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.88	0.91	1.00
Hourly Flow Rate, HFR (veh/h)	0	131	21	68	27	0
Percent Heavy Vehicles	0			17		
Median Type		-	Undi	ivided		
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	
Minor Street		Northbound			Southbound	k
Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume (veh/h)	20	0	65			
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	21	0	71	0	0	0
Percent Heavy Vehicles	22	22	22	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0	1	1	0	1
RT Channelized			0	1		0
Lanes	0	1	0	0	0	0
Configuration	Ŭ Ŭ	LTR		l	, ř	
Delay, Queue Leng	th and lo		<u> </u>		1	<u>.</u>

Approach	Eastbound	Westbound	Ν	orthboun	d	So	uthboun	d
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		68		92				
C (m) (veh/h)		1342		797				
v/c		0.05		0.12				
95% queue length		0.16		0.39				
Control Delay (s/veh)		7.8		10.1				
LOS		A		В				
Approach Delay (s/veh)				10.1				
Approach LOS				В				

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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	ormation					
Analyst			Cage Intersection		SR 299 at I-24 WB Ramps				
Agency/Co.	GDOT		Jurisdiction		Dade County				
Date Performed 8/9/13		– Analysis Year		2015					
Analysis Time Perio	d <i>PM</i>								
Project Description	PI No. 00	11682							
East/West Street: SR 299			North/South Street: I-24 WB On and Off Ramps						
Intersection Orientation: East-West		West	Study Per	iod (hrs): 0	.25				
Vehicle Volumes	and Adj	ustments							
Major Street	_	Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		80	20	115	245				
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00			
Hourly Flow Rate, HFR (veh/h)	0	87	21	126	269	0			
Percent Heavy Vehicles	0			17					
Median Type	Undivided								
RT Channelized			0			0			
Lanes	0	1	1	0	1	0			
Configuration		T	R	LT					
Upstream Signal		0		0					
Minor Street		Northbound S				Southbound			
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	65	0	85						
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	71	0	93	0	0	0			
Percent Heavy Vehicles	22	22	22	0	0	0			
Percent Grade (%)	0 0								
Flared Approach	Î	N		Î	N				
Storage	ĺ	0		ĺ	0				
RT Channelized	1	1	0	1	1	0			
Lanes	0	1	0	0	0	0			
Configuration		LTR				Ť			
Delay, Queue Leng	th and low		<u>.</u>	8	A	R			

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		126		164				
C (m) (veh/h)		1394		578				
v/c		0.09		0.28				
95% queue length		0.30		1.16				
Control Delay (s/veh)		7.8		13.7				
LOS		A		В				
Approach Delay (s/veh)				13.7				
Approach LOS				В				
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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	ormation					
Analyst	Keith McCage		Intersection	on	SR 299 at I-24 EB Ramps				
Agency/Co.	GDOT		- Jurisdictio	on	Dade County				
Date Performed	8/19/13		— Analysis `	Year	2015				
Analysis Time Period AM									
Project Description	PI No. 00	11682							
East/West Street: SR 299			North/South Street: I-24 EB On and Off Ramps						
Intersection Orientation: East-West			Study Per	iod (hrs): 0	.25				
Vehicle Volumes	and Adj	ustments							
Major Street		Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		105	80	115	65				
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00			
Hourly Flow Rate, HFR (veh/h)	0	115	87	126	71	0			
Percent Heavy Vehicles	0			22					
Median Type	Undivided								
RT Channelized			0			0			
Lanes	0	1	0	0	1	0			
Configuration			TR	LT					
Upstream Signal		0		0					
Minor Street	Northbound Southbou				Southbound				
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	20	0	90						
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	21	0	98	0	0	0			
Percent Heavy Vehicles	25	25	25	0	0	0			
Percent Grade (%)	0 0								
Flared Approach		N			N				
Storage		0	Ì	ĺ	0	1			
RT Channelized	ĺ		0	1		0			
Lanes	0	1	0	0	0	0			
Configuration		LTR							
Delay, Queue Leng	th and low		<u>.</u>		P	R.			

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		126		119				
C (m) (veh/h)		1259		725				
v/c		0.10		0.16				
95% queue length		0.33		0.58				
Control Delay (s/veh)		8.2		10.9				
LOS		A		В				
Approach Delay (s/veh)				10.9	-			
Approach LOS				В				
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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	ormation					
Analyst Keith McC		cCage	Intersection	on	SR 299 at I-24 EB Ramps				
Agency/Co.	GDOT	Jurisdictio		on	Dade County				
Date Performed 8/9/13			Analysis Year		2015				
Analysis Time Perio	d <i>PM</i>								
Project Description	PI No. 00	11682							
East/West Street: SR 299			North/South Street: I-24 EB On and Off Ramps						
Intersection Orientation: East-West			Study Period (hrs): 0.25						
Vehicle Volumes	and Adj	ustments							
Major Street	,	Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		125	40	80	350				
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.91	0.91	1.00			
Hourly Flow Rate, HFR (veh/h)	0	137	43	87	384	0			
Percent Heavy Vehicles	0			22					
Median Type	Undivided								
RT Channelized			0			0			
Lanes	0	1	0	0	1	0			
Configuration			TR	LT					
Upstream Signal		0		0					
Minor Street		Northbound		Southbound					
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	10	0	70						
Peak-Hour Factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	10	0	76	0	0	0			
Percent Heavy Vehicles	25	25	25	0	0	0			
Percent Grade (%)		0	-		0	*			
Flared Approach		N			N				
Storage		0	1	ĺ	0				
RT Channelized			0			0			
Lanes	0	1	0	0	0	0			
Configuration			Ť		Ť	Ť			
Delay, Queue Leng	th and low		- <u> </u>		8	R.			

Approach	Eastbound	Westbound	Northbound			So	Southbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration		LT		LTR					
v (veh/h)		87		86					
C (m) (veh/h)		1284		712					
v/c		0.07		0.12					
95% queue length		0.22		0.41					
Control Delay (s/veh)		8.0		10.7					
LOS		A		В					
Approach Delay (s/veh)				10.7					
Approach LOS				В					

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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	Site Information					
Analyst	Keith Mo	cCage	Intersection	Intersection		I-24 WB			
Agency/Co.	GDOT		Jurisdictio	Jurisdiction		nty			
Date Performed	8/19/13		— Analysis `	Analysis Year					
Analysis Time Perio	d <i>AM</i>								
Project Description	PI No. 00	11682							
East/West Street: SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 WB On a	and Off				
Intersection Orientat	ion: <i>East</i> -	West	Study Per	iod (hrs): 0	.25				
Vehicle Volumes	and Adj	ustments							
Major Street		Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		155	25	100	30				
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.95	0.95	1.00			
Hourly Flow Rate, HFR (veh/h)	0	163	26	105	31	0			
Percent Heavy Vehicles	0			17					
Median Type		*	Undi	vided					
RT Channelized			0			0			
Lanes	0	1	1	0	1	0			
Configuration		Т	R	LT					
Upstream Signal	,	0			0				
Minor Street		Northbound			Southbound				
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	25	0	115						
Peak-Hour Factor, PHF	0.95	0.95	0.95	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	26	0	121	0	0	0			
Percent Heavy Vehicles	22	22	22	0	0	0			
Percent Grade (%)		0			0				
Flared Approach		N			N				
Storage		0	ĺ		0				
RT Channelized		1	0	<u> </u>	1	0			
Lanes	0	1	0	0	0	0			
Configuration		LTR							
Delay, Queue Leng	th and Lov		<u>,</u>			R.			

Approach	Eastbound	Westbound	Northbound			So	Southbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration		LT		LTR					
v (veh/h)		105		147					
C (m) (veh/h)		1300		752					
v/c		0.08		0.20					
95% queue length		0.26		0.72					
Control Delay (s/veh)		8.0		10.9					
LOS		A		В					
Approach Delay (s/veh)				10.9					
Approach LOS				В					

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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	Site Information					
Analyst	Keith M	cCage	Intersection	Intersection		I-24 WB			
Agency/Co.	GDOT		- Jurisdictic	Jurisdiction		nty			
Date Performed	8/9/13		— Analysis `	Analysis Year					
Analysis Time Perio	d PM								
Project Description	PI No. 00	11682							
East/West Street: SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 WB On a	and Off				
Intersection Orientat	ion: East-	West	Study Per	iod (hrs): 0	.25				
Vehicle Volumes	and Adj	ustments							
Major Street	_	Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		100	25	215	350				
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.95	0.95	1.00			
Hourly Flow Rate, HFR (veh/h)	0	105	26	226	368	0			
Percent Heavy Vehicles	0			17					
Median Type		*	Undi	vided	*	.			
RT Channelized			0			0			
Lanes	0	1	1	0	1	0			
Configuration		Т	R	LT					
Upstream Signal		0			0				
Minor Street		Northbound			Southbound				
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	70	0	165						
Peak-Hour Factor, PHF	0.95	0.95	0.95	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	73	0	173	0	0	0			
Percent Heavy Vehicles	22	22	22	0	0	0			
Percent Grade (%)		0			0				
Flared Approach		N			N				
Storage		0	1		0				
RT Channelized		1	0		-	0			
Lanes	0	1	0	0	0	0			
Configuration	Ŭ Ŭ		, ř		Ť				
Delay, Queue Leng	th and low			1	Л	1			

Approach	Eastbound	Westbound	Northbound			So	outhbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration		LT		LTR					
v (veh/h)		226		246					
C (m) (veh/h)		1367		482					
v/c	1	0.17		0.51					
95% queue length	1	0.59		2.85					
Control Delay (s/veh)		8.2		20.0					
LOS	1	A		С					
Approach Delay (s/veh)				20.0					
Approach LOS				С					
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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	Site Information					
Analyst	Keith Mo	cCage	Intersection	Intersection		SR 299 at I-24 EB Ramps			
Agency/Co.	GDOT		Jurisdictio	on	Dade Cou	ntv			
Date Performed	8/9/13		- Analysis		2013				
Analysis Time Perio	d <i>AM</i>								
Project Description	PI No. 00	11682							
East/West Street: S	SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 EB On a	and Off			
Intersection Orientat	ion: <i>East</i> -	West	Study Per	iod (hrs): 0	.25				
Vehicle Volumes	and Adj	ustments							
Major Street		Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		170	100	210	105				
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.95	0.95	1.00			
Hourly Flow Rate, HFR (veh/h)	0	178	105	221	110	0			
Percent Heavy Vehicles	0			22					
Median Type		•	Undi	ivided	,				
RT Channelized			0			0			
Lanes	0	1	0	0	1	0			
Configuration			TR	LT					
Upstream Signal		0			0				
Minor Street		Northbound			Southbound				
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	25	0	165						
Peak-Hour Factor, PHF	0.95	0.95	0.95	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	26	0	173	0	0	0			
Percent Heavy Vehicles	23	23	23	0	0	0			
Percent Grade (%)		0			0				
Flared Approach		N		ĺ	N				
Storage		0			0				
RT Channelized	Í		0		1	0			
Lanes	0	1	0	0	0	0			
Configuration	, ř	LTR	, ř	, ř	Ť	Ť			
Delay, Queue Leng	th and lo			8	й	R			

Approach	Eastbound	Westbound	N	orthboun	d	So	Southbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration		LT		LTR					
v (veh/h)		221		199					
C (m) (veh/h)		1173		616					
v/c		0.19		0.32					
95% queue length		0.69		1.39					
Control Delay (s/veh)		8.8		13.6					
LOS		A		В					
Approach Delay (s/veh)				13.6	-				
Approach LOS				В					
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	TWO-W	AY STOP	CONTROL	SUMMAF	RY				
General Informa	tion		Site Info	Site Information					
Analyst	Keith M	cCage	Intersection	Intersection		I-24 EB			
Agency/Co.	GDOT		- Jurisdictio	Jurisdiction		nty			
Date Performed	<i>8/9/13</i> d <i>PM</i>		– Analysis `	Year	2035	-			
Analysis Time Perio	<i>מ</i> ו <i>רו</i> או								
Project Description	PI No. 00	11682							
East/West Street: SR 299		North/Sou <i>Ramps</i>	th Street: I	-24 EB On a	nd Off				
Intersection Orientat	ion: East-	West	Study Per	iod (hrs): 0	.25				
Vehicle Volumes	s and Adj	ustments							
Major Street	,	Eastbound			Westbound				
Movement	1	2	3	4	5	6			
	L	Т	R	L	Т	R			
Volume (veh/h)		215	50	155	555				
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.95	0.95	1.00			
Hourly Flow Rate, HFR (veh/h)	0	226	52	163	584	0			
Percent Heavy Vehicles	0			22					
Median Type		-	Undi	ivided	-				
RT Channelized			0			0			
Lanes	0	1	0	0	1	0			
Configuration			TR	LT					
Upstream Signal		0			0				
Minor Street		Northbound			Southbound				
Movement	7	8	9	10	11	12			
	L	Т	R	L	Т	R			
Volume (veh/h)	10	0	135						
Peak-Hour Factor, PHF	0.95	0.95	0.95	1.00	1.00	1.00			
Hourly Flow Rate, HFR (veh/h)	10	0	142	0	0	0			
Percent Heavy Vehicles	25	25	25	0	0	0			
Percent Grade (%)		0			0				
Flared Approach		N			N				
Storage	ĺ	0			0				
RT Channelized	1	1	0			0			
Lanes	0	1	0	0	0	0			
Configuration		LTR							
Delay, Queue Leng	th, and Lev	el of Service	ر		*	P.			

Approach	Eastbound	Westbound	Northbound			So	Southbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration		LT		LTR					
v (veh/h)		163		152					
C (m) (veh/h)		1178		600					
v/c		0.14		0.25					
95% queue length		0.48		1.00					
Control Delay (s/veh)		8.5		13.0					
LOS		A		В					
Approach Delay (s/veh)				13.0					
Approach LOS				В					

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodAM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to Slygo Road Dade County 2013
Project Description: SR 299 Bridge over I-24		2010
Input Data		
Shoulder width tt Lane width tt Lane width tt Lane width tt Segment length, Lt mi Analysis direction vol., V _d 140veh/h Opposing direction vol., V _d 45veh/h Shoulder width ft 6.0 Lane Width ft 0.9	highway Terrain Grade Leng Peak-hour No-passing Show North Arrow % Trucks a	factor, PHF 0.91 Jone 100% Ind Buses , P _T 7 % onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_F(E_R-1))$	0.905	0.894
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.71	0.67
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	239	83
Free-Flow Speed from Field Measurement	Estimated Fr	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>2.6 mi/h</i>	Base free-flow speed ⁴ , BF Adj. for lane and shoulder (Exhibit 15-7) Adj. for access points ⁴ , f _A Free-flow speed, FFS (FS Average travel speed, ATS (V _{d,ATS} + V _{o,ATS}) - f _{np,ATS} Percent free flow speed, P	width, ⁴ f_{LS} 0.0 mi/l (Exhibit 15-8) 3.0 mi/l S=BFFS- f_{LS} - f_A) 52.0 mi/h S_d =FFS-0.00776 46.9 mi/h
Percent Time-Spent-Following		
· · · · · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.8	1.9

1		I 1		
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0		
19)	_			
Heavy-vehicle adjustment factor, $f_{HV} = 1/(1 + P_T(E_T - 1) + P_B(E_B - 1))$	0.947	0.941		
1))	0.047	0.041		
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.77	0.73		
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	211	72		
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b)	2	2.6		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	4	7.4		
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *				
(v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	5	7.9		
Level of Service and Other Performance Measures				
Level of service, LOS (Exhibit 15-3)	С			
Volume to capacity ratio, v/c	0.12			
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0			
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1167			
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	Q	0.2		
only)	5	0.2		
Bicycle Level of Service				
Directional demand flow rate in outside lane, v_{OI} (Eq. 15-24)	16	53.8		
veh/h		0.0		
Effective width, Wv (Eq. 15-29) ft	29	9.40		
Effective speed factor, S _t (Eq. 15-30)	4	.79		
Bicycle level of service score, BLOS (Eq. 15-31)	1.	.93		
Bicycle level of service (Exhibit 15-4)		В		
Notes				
 Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are 		conditions. For the		
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F.				
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.			

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General Information	Site Information	RKSHEET
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodPM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to Slygo Road Dade County 2013
Project Description: SR 299 Bridge over I-24		
Input Data Shoulder widtht Shoulder widtht Lane widtht Lane widtht Lane widtht Segment length, L ₁ mi Analysis direction vol., V _d 295veh/h Opposing direction vol., V _o 100veh/h Shoulder width ft 6.0 6.0 Lane Width ft 12.0 Segment Length mi 0.9	highway Terrain Grade Leng Peak-hour No-passing Show North Arrow % Trucks a	actor, PHF 0.91 zone 100% nd Buses , P _T 7 % onal vehicles, P _R 0%
Average Travel Speed		
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15- 12)	Analysis Direction (d)	Opposing Direction (o) 2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.929	0.894
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.85 0.68	
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	411	181
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.8 mi/h</i>	Base free-flow speed ⁴ , BFFS mi/h Adj. for lane and shoulder width, ⁴ f _{LS} 0.0 (Exhibit 15-7) Adj. for access points ⁴ , f _A (Exhibit 15-8) 3.0 Free-flow speed, FFS (FSS=BFFS-f _{LS} -f _A) $52.$ mi/h Average travel speed, ATS _d =FFS-0.00776 43. $(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ Percent free flow speed, PFFS 83.	
Percent Time-Spent-Following	<u>.</u>	FFS 83.9 %
· · · · · · · · · · · · · · · · · · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.6	1.8

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0	
19)			
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.960	0.947	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.86	0.74	
Directional flow rate ² , v_{i} (pc/h) $v_{i} = V_{i}$ (PHF*f _{HV,PTSF} * f _{g,PTSF})	393	157	
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1- $e^{av_d}^b$)	3.	7.4	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	44	4.4	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}^*$			
	6	9.1	
(V _{d,PTSF} / V _{d,PTSF} + V _{o,PTSF})			
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		С	
Volume to capacity ratio, <i>v/c</i>	0.23		
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0		
Capacity, C _{d.PTSF} (Equation 15-13) pc/h	1240		
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	83.9		
Bicycle Level of Service			
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h	32	24.2	
Effective width, Wv (Eq. 15-29) ft	24	l.00	
Effective speed factor, S_t (Eq. 15-30)	4.	79	
Bicycle level of service score, BLOS (Eq. 15-31)	3.	75	
Bicycle level of service (Exhibit 15-4)			
Notes			
 Note that the adjustment factor for level terrain is 1.00, as lev purpose of grade adjustment, specific downgrade segments are 		conditions. For the	
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.			
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.		

5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/9/13Analysis Time PeriodAM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to I-24 EE Ramps Dade County 2013
Project Description: SR 299 Bridge over I-24		
Input Data Shoulder width It Imput Data Shoulder width It Imput Data Imput Data Imput Data Shoulder width It Imput Data Imput Data Imput Data Imput Data Imput Data Imput Data Imput Data Imput Data Imput Data It Imput Data Imput Data Segment length Impu	highway Terrain Grade Leng Peak-hour f No-passing % Trucks a	actor, PHF 0.91 zone 100% nd Buses , P _T 17 % onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	2.3	2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.819	0.776
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.75	0.67
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	322	169
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.6 mi/h</i>	Average travel speed, $AIS_d = FFS-0.00776$ 44 $(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ <i>mi/h</i>	
Percent Time-Spent-Following		FFS 85.7 %
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.8	1.9

1		
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0
19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.880	0.867
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.80	0.73
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^*f_{g,PTSF})$	281	139
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b)	20	8.7
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	4	9.2
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	61.6	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)		С
Volume to capacity ratio, v/c	0.17	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1137	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	85.7	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24)	19)7.8
veh/h		1.00
Effective width, Wv (Eq. 15-29) ft		1.00
Effective speed factor, S_t (Eq. 15-30)	4.	.79
Bicycle level of service score, BLOS (Eq. 15-31)		.96
Bicycle level of service (Exhibit 15-4)		F
Notes		
1. Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 		rade

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General Information	Site Information	RKSHEET
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodPM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to I-24 EE Ramps Dade County 702013
Project Description: SR 299 Bridge over I-24	<u>,</u> ,	
Input Data	-	
Shoulder width It Lane width It Lane width It Lane width It Segment length, L ₁ mi Segment length, L ₁ mi Analysis direction vol., V _d 345veh/h Opposing direction vol., V _o 160veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 0.2	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	actor, PHF 0.91 zone 100% nd Buses , P _T 17 % onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	2.0	2.4
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.855	0.808
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.89 0.73	
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	498	298
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.4 mi/h</i>	Base free-flow speed ⁴ , BFFS $mi/$ Adj. for lane and shoulder width, ⁴ f _{LS} 0. (Exhibit 15-7) Adj. for access points ⁴ , f _A (Exhibit 15-8) 3. Free-flow speed, FFS (FSS=BFFS-f _{LS} -f _A) $mi/$ Average travel speed, ATS _d =FFS-0.00776 42 ($v_{d,ATS} + v_{o,ATS}$) - f _{np,ATS}	
Percent Time-Spent-Following	Percent free flow speed, P	FFS 81.5 %
Percent Time-Spent-Following	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.6	1.8

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0
19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.907	0.880
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.89	0.78
Directional flow rate ² , v_{i} (pc/h) $v_{i} = V_{i}$ (PHF*f _{HV,PTSF} * f _{g,PTSF})	469	256
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1- $e^{av_d^b}$)	4	4.2
Adj. for no-passing zone, f _{np.PTSF} (Exhibit 15-21)	4	0.9
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		
d ⁽¹⁰⁾ np,PTSF	7	0.7
(v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)		D
Volume to capacity ratio, <i>v/c</i>	0.28	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d.PTSF} (Equation 15-13) pc/h	1261	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	81.5	
Bicycle Level of Service		
Directional demand flow rate in outside lane, <i>v_{OL}</i> (Eq. 15-24) veh/h	37	79.1
Effective width, Wv (Eq. 15-29) ft	24	1.00
Effective speed factor, S_t (Eq. 15-30)	4.	79
Bicycle level of service score, BLOS (Eq. 15-31)	8.	.29
Sicycle level of service (Exhibit 15-4)		
Notes	<u>.</u>	
 Note that the adjustment factor for level terrain is 1.00, as lev purpose of grade adjustment, specific downgrade segments are 		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.	

5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information		AY SEGMENT WC	
Analyst Agency or Company Date Performed Analysis Time Period	Keith McCage GDOT/HNTB 8/19/13 AM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 EB Ramps to SR 58 Dade County 2013
Project Description: SR 299) Bridge over I-24	Allalysis Teal	2013
Input Data	2.1090 0101 1 2 1		
ا Analysis direction vol., V _d Opposing direction vol., V _o	Shoulder widthtt Lane widthtt Lane widthtt Shoulder widthtt gth, Ltmi 185veh/h 170veh/h 6.0	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	factor, PHF 0.91
Shoulder width ft Lane Width ft Segment Length mi	6.0 12.0 0.8	Access poin	
Average Travel Speed		1	-
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for 12)	or trucks, E _T (Exhibit 15-11 or 15-	2.3	2.4
Passenger-car equivalents fo 13)	or RVs, E _R (Exhibit 15-11 or 15-	1.1	1.1
Heavy-vehicle adjustment fa (E _R -1))	ctor, $f_{HV,ATS} = 1/(1 + P_T(E_T - 1) + P_R)$	0.778	0.765
Grade adjustment factor ¹ , f_g		0.75 0.74	
Demand flow rate ² , v_i (pc/h)	$v_{i} = V_{i} / (PHF^{*} f_{gATS}^{*} f_{HVATS})$	348	330
	rom Field Measurement	Estimated Fre	ee-Flow Speed
		Base free-flow speed ⁴ , BF	55.0 FS <i>mi/h</i>
Mean speed of sample ³ , S _{FA} Total demand flow rate, both Free-flow speed, FFS=S _{FM} + ¹ Adj. for no-passing zones, f _{nj}	directions, <i>v</i> 0.00776(<i>v</i> / f _{HV,ATS})	Adj. for lane and shoulder (Exhibit 15-7) Adj. for access points ⁴ , f _A Free-flow speed, FFS (FS Average travel speed, ATS $(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ Percent free flow speed, P	(Exhibit 15-8) 2.8 mi/. S=BFFS-f _{LS} -f _A) 52.3 mi/h S_d =FFS-0.00776 43.8 mi/h
Percent Time-Spent-Follow	vina	reident nee now speed, P	FFS 83.8 %
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents fo	or trucks, E _T (Exhibit 15-18 or 15-	1.7	1.8
	or RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0

19)	1	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.867	0.850
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.80	0.79
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^*f_{g,PTSF})$	293	278
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$		31.7
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		57.4
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		61.2
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		
Level of Service and Other Performance Measures	-	
Level of service, LOS (Exhibit 15-3)		С
Volume to capacity ratio, <i>v/c</i>		0.17
Capacity, C _{d,ATS} (Equation 15-12) pc/h	1108	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1237	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	83.8	
Bicycle Level of Service	I	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	2	203.3
Effective width, Wv (Eq. 15-29) ft	2	24.00
Effective speed factor, S_t (Eq. 15-30)		4.79
Bicycle level of service score, BLOS (Eq. 15-31)		10.98
Bicycle level of service (Exhibit 15-4)		F
Notes		
 Note that the adjustment factor for level terrain is 1.00, as le purpose of grade adjustment, specific downgrade segments a 		e conditions. For the
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15- Use alternative Exhibit 15-14 if some trucks operate at craw 		ngrade.
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DIRECTIONAL TWO-LANE HIGHV General Information		Site Information	
Analyst Agency or Company	Keith McCage GDOT/HNTB	Highway / Direction of Travel	SR 299
Date Performed Analysis Time Period	8/19/13 PM	From/To Jurisdiction Analysis Year	I-24 EB Ramps to SR 58 Dade County 2013
Project Description: SR 299	9 Bridge over I-24	1 .	
Input Data			
	T Shoulder width tt		
*	Lane width ft	Class I	highway 🛛 🗹 Class II
	Lane width ft	highway 🗌	Class III highway
	Shoulder widthft	Terrain	🗆 Level 🛛 🗹 Rolling
Segment len	gth, L _t mi ►	Grade Leng	gth mi Up/down factor, PHF <i>0.91</i>
Analysis direction vol., V _d	<i>410</i> veh/h	Show North Arrow	
Opposing direction vol., V	<i>185</i> veh/h	% Trucks a	nd Buses , P _T 22 %
Shoulder width ft	6.0	% Recreati	onal vehicles, P _R 0%
Lane Width ft	12.0	Access poi	nts <i>mi 11</i> /mi
Segment Length mi	0.8		
Average Travel Speed		1	1
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for 12)	or trucks, E _T (Exhibit 15-11 or 15-	1.9	2.3
Passenger-car equivalents for 13)	or RVs, E _R (Exhibit 15-11 or 15-	1.1	1.1
Heavy-vehicle adjustment fac (E _R -1))	ctor, $f_{HV,ATS} = 1/(1 + P_T(E_T - 1) + P_R)$	0.835	0.778
Grade adjustment factor ¹ , f _g		0.93 0.75	
Demand flow rate ² , <i>v_i</i> (pc/h)	$v_{i} = V_{i} / (PHF^{*} f_{a,ATS}^{*} f_{HV,ATS})$	580	348
	rom Field Measurement	Estimated Fr	ee-Flow Speed
		Base free-flow speed ⁴ , BF	FS 55.0 mi/h
Mean speed of sample ³ , S _{FN}	4	Adj. for lane and shoulder (Exhibit 15-7)	width, ⁴ f _{LS} 0.0 mi//
Total demand flow rate, both	directions, <i>v</i>	Adj. for access points ⁴ , f _A	(Exhibit 15-8) 2.8 mi/l
Free-flow speed, FFS=S _{FM} +6	y -	Free-flow speed, FFS (FS	FO 0
Adj. for no-passing zones, f _{nj}	_{p,ATS} (Exhibit 15-15) <i>3.1 mi/h</i>	Average travel speed, ATS _d =FFS-0.00776 42.0	
		$(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ Percent free flow speed, P	mi/h PFS 80.3 %
Percent Time-Spent-Follow	ving		
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents fo 19)	or trucks, E _T (Exhibit 15-18 or 15-	1.4	1.7
Passenger-car equivalents for		1.0	1.0

19)	1		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.919	0.867	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.93	0.80	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV,PTSF} * f _{g,PTSF})	527	293	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d}^b)$	50.0		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	35.7		
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *	72.9		
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$			
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		D	
Volume to capacity ratio, <i>v/c</i>		0.31	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0		
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1252		
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	80.3		
Bicycle Level of Service	l		
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h		450.5	
Effective width, Wv (Eq. 15-29) ft	24.00		
Effective speed factor, S_t (Eq. 15-30)		4.79	
Bicycle level of service score, BLOS (Eq. 15-31)	11.39		
Bicycle level of service (Exhibit 15-4)		F	
Notes	<u>^</u>		
 Note that the adjustment factor for level terrain is 1.00,as le purpose of grade adjustment, specific downgrade segments a 			
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F			
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15- Use alternative Exhibit 15-14 if some trucks operate at craw 	10.	lowngrade.	
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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodAM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to Slygo Road Dade County 2015
Project Description: SR 299 Bridge over I-24		2015
Input Data		
Shoulder width It Lane width It Lane width It Lane width It Segment length, L mi Analysis direction vol., V 140veh/h Opposing direction vol., V 45veh/h Shoulder width ft 6.0 Lane Width ft 0.9	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	factor, PHF 0.91 Jone 100% Ind Buses , P _T 7 % onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15- 12)		2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_F(E_R-1))$	0.905	0.894
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.71	0.67
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	239	83
Free-Flow Speed from Field Measurement	Estimated Fr	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>2.6 mi/h</i>	Base free-flow speed ⁴ , BF Adj. for lane and shoulder (Exhibit 15-7) Adj. for access points ⁴ , f_A Free-flow speed, FFS (FS Average travel speed, ATS ($v_{d,ATS} + v_{o,ATS}$) - $f_{np,ATS}$ Percent free flow speed, P	width, ⁴ f_{LS} 0.0 mi/l (Exhibit 15-8) 3.0 mi/l S=BFFS- f_{LS} - f_A) 52.0 mi/h S_d =FFS-0.00776 46.9 mi/h
Percent Time-Spent-Following		
· · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.8	1.9

Passenger-car equivalents for RVs, E _B (Exhibit 15-18 or 15-	1.0	1.0
19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1/(1 + P_T(E_T - 1) + P_B(E_B - 1))$	0.947	0.941
1))	0.947	0.941
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.77	0.73
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV,PTSF} * f _{g,PTSF})	211	72
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b)	22.6	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	4	7.4
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}^*$	_	
(V _{d,PTSF} / V _{d,PTSF} + V _{o,PTSF})	57.9	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	С	
Volume to capacity ratio, v/c	0.12	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1167	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	90.2	
only)		J.Z
Bicycle Level of Service		
Directional demand flow rate in outside lane, v _{OI} (Eq. 15-24)	15	53.8
veh/h		0.0
Effective width, Wv (Eq. 15-29) ft	29.40	
Effective speed factor, S _t (Eq. 15-30)	4.79	
Bicycle level of service score, BLOS (Eq. 15-31)	1.93	
Bicycle level of service (Exhibit 15-4)	В	
Notes		
 Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are 		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.	

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodPM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to Slygo Road Dade County 2015
Project Description: SR 299 Bridge over I-24		
Input Data Shoulder widthtt Imput Data Shoulder widthtt Imput Data Imput Data Imput Data Shoulder widthtt Imput Data Imput Data Imput Data Imput Data Imput Data <	highway Terrain Grade Leng Peak-hour No-passing Show North Arrow % Trucks a	actor, PHF 0.91 zone 100% nd Buses , P _T 7% onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (a)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15- 12)	Analysis Direction (d) 2.1	Opposing Direction (o) 2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.929	0.894
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.86	0.68
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	426	181
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.8 mi/h</i>	Base free-flow speed ⁴ , BF Adj. for lane and shoulder (Exhibit 15-7) Adj. for access points ⁴ , f _A (Free-flow speed, FFS (FS Average travel speed, ATS ($v_{d,ATS} + v_{o,ATS}$) - f _{np,ATS} Percent free flow speed, P	width, ⁴ f_{LS} 0.0 mi/ (Exhibit 15-8) 3.0 mi/ S=BFFS- f_{LS} - f_A) 52.0 mi/h S_d =FFS-0.00776 43.5 mi/h
Percent Time-Spent-Following	I. Steent nee new opeed, r	
· · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.6	1.8

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0
19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.960	0.947
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.87	0.74
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV,PTSF} * f _{g,PTSF})	408	157
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{avd^b})	36	8.5
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	43	3.6
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *	_	
(V _{d.PTSF} / V _{d.PTSF} + V _{o.PTSF})	70.0	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	С	
Volume to capacity ratio, <i>v/c</i>	0.24	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1240	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	8	3.7
only)		-
Bicycle Level of Service		
Directional demand flow rate in outside lane, <i>v_{OL}</i> (Eq. 15-24) veh/h	34	10.7
Effective width, Wv (Eq. 15-29) ft	24.00	
Effective speed factor, S _t (Eq. 15-30)	4.	.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.77	
Bicycle level of service (Exhibit 15-4)	D	
Notes		
 Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are 		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-10).	

5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodAM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to I-24 El Ramps Dade County 2015
Project Description: SR 299 Bridge over I-24 Input Data		
Shoulder width tt Lane width tt Lane width tt Segment length, L1 mi Segment length, L1 mi Analysis direction vol., V_d 185veh/h Opposing direction vol., V_o 85veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 0.2	highway Terrain Grade Leng Peak-hour f No-passing % Trucks a	actor, PHF 0.91 zone 100% nd Buses , P _T 17 % onal vehicles, P _R 0%
Average Travel Speed		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15- 12)	2.3	2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.819	0.776
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.75	0.67
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	331	180
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.7 mi/h</i>	Base free-flow speed ⁴ , BFI Adj. for lane and shoulder v (Exhibit 15-7) Adj. for access points ⁴ , f _A (Free-flow speed, FFS (FS Average travel speed, ATS ($v_{d,ATS} + v_{o,ATS}$) - f _{np,ATS} Percent free flow speed, P	width, ⁴ f_{LS} 0.0 mi/l Exhibit 15-8) 3.3 mi/l S=BFFS- f_{LS} - f_A) 51.8 mi/h f_d =FFS-0.00776 44.0 mi/h
Percent Time-Spent-Following		
· · · · · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.7	1.9

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0
19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.894	0.867
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.80	0.73
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	284	148
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av_db})	28.9	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	49.6	
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		
(v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	61.5	
Level of Service and Other Performance Measures	•	
Level of service, LOS (Exhibit 15-3)	С	
Volume to capacity ratio, <i>v/c</i>	0.17	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1137	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	85.1	
only)		
Bicycle Level of Service		
Directional demand flow rate in outside lane, <i>v_{OL}</i> (Eq. 15-24) veh/h	20	03.3
Effective width, Wv (Eq. 15-29) ft	24.00	
Effective speed factor, S_t (Eq. 15-30)	í	.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.98	
Bicycle level of service (Exhibit 15-4)	F	
Notes		
1. Note that the adjustment factor for level terrain is 1.00, as lev purpose of grade adjustment, specific downgrade segments are		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.	

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodPM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to I-24 EE Ramps Dade County 2015
Project Description: SR 299 Bridge over I-24		
Input Data Shoulder width It Imput Data Shoulder width It Imput Data Imput Data Imput Data Shoulder width It Imput Data Imput Data Imput Data Imput Data Imput Data	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	actor, PHF 0.91 zone 100% nd Buses , P _T 17 % onal vehicles, P _R 0%
Average Travel Speed		1
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	2.0	2.4
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.855	0.808
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.90	0.73
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	514	307
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.3 mi/h</i>	Base free-flow speed ⁴ , BF Adj. for lane and shoulder (Exhibit 15-7) Adj. for access points ⁴ , f_A (Free-flow speed, FFS (FS Average travel speed, ATS ($v_{d,ATS} + v_{o,ATS}$) - $f_{np,ATS}$ Percent free flow speed, P	width, ⁴ f_{LS} 0.0 mi/l (Exhibit 15-8) 3.3 mi/l S=BFFS- f_{LS} - f_A) 51.8 mi/h S_d =FFS-0.00776 42.0 mi/h
Percent Time-Spent-Following		
· · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.6	1.8

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0
19)		
Heavy-vehicle adjustment factor, $f_{HV} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.907	0.880
1))		
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.90	0.79
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^*f_{g,PTSF})$	484	261
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b)	45.0	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	39.6	
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *	_	
(v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	70.7	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	D	
Volume to capacity ratio, <i>v/c</i>	0.28	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1261	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	81.2	
only)	0	1.2
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OI} (Eq. 15-24)		5.0
veh/h	39	95.6
Effective width, Wv (Eq. 15-29) ft	24.00	
Effective speed factor, S _t (Eq. 15-30)	4.	79
Bicycle level of service score, BLOS (Eq. 15-31)	8.32	
Bicycle level of service (Exhibit 15-4)	F	
Notes		
1. Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.	

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General Information		AY SEGMENT WC	
Analyst Agency or Company Date Performed Analysis Time Period	Keith McCage GDOT/HNTB 8/19/13 AM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 EB Ramps to SR 58 Dade County 2015
Project Description: SR 299) Bridge over I-24	Allalysis Teal	2015
Input Data	2.1090 0101 1 2 1		
Analysis direction vol., V _d Opposing direction vol., V _o	Shoulder width It Lane width It Lane width It Shoulder width It gth, Lt mi 195veh/h 180veh/h 6.0	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	factor, PHF 0.91
Lane Width ft Segment Length mi	12.0 0.8	Access poi	
Average Travel Speed			-
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents fo 12)	or trucks, E _T (Exhibit 15-11 or 15-	2.3	2.3
Passenger-car equivalents fo 13)	or RVs, E _R (Exhibit 15-11 or 15-	1.1	1.1
Heavy-vehicle adjustment fac (E _R -1))	ctor, $f_{HV,ATS} = 1/(1 + P_T(E_T - 1) + P_R)$	0.778	0.778
Grade adjustment factor ¹ , f_g		0.76	0.75
Demand flow rate ² , v_i (pc/h)	$v_{i} = V_{i} / (PHF^{*} f_{gATS}^{*} f_{HVATS})$	362 339	
	rom Field Measurement	Estimated Fr	ee-Flow Speed
		Base free-flow speed ⁴ , BF	FS 55.0 <i>mi/h</i>
Mean speed of sample ³ , S _{FN} Total demand flow rate, both Free-flow speed, FFS=S _{FM} +I Adj. for no-passing zones, f _{nj}	directions, <i>v</i> 0.00776(<i>v</i> / f _{HV,ATS})	Adj. for lane and shoulder (Exhibit 15-7) Adj. for access points ⁴ , f_A Free-flow speed, FFS (FS Average travel speed, ATS ($v_{d,ATS} + v_{o,ATS}$) - $f_{np,ATS}$	(Exhibit 15-8) <i>2.8 mi/</i> SS=BFFS-f _{LS} -f _A) <i>52.3</i> <i>mi/h</i>
		Percent free flow speed, F	PFFS 83.6 %
Percent Time-Spent-Follow	ving	Analysis Direction (d)	Opposing Direction (-)
Passenger-car equivalents fo	or trucks, E _T (Exhibit 15-18 or 15-	Analysis Direction (d) 1.7	Opposing Direction (o) 1.8
	or RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0

19)	1		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.867	0.850	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.81	0.80	
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^*f_{g,PTSF})$	305	291	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$		33.8	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	56.5		
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		62.7	
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$			
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	ļ	С	
Volume to capacity ratio, <i>v/c</i>		0.18	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	1122		
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1252		
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	83.6		
Bicycle Level of Service	1		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h		214.3	
Effective width, Wv (Eq. 15-29) ft	24.00		
Effective speed factor, S_t (Eq. 15-30)	4.79		
Bicycle level of service score, BLOS (Eq. 15-31)	11.01		
Bicycle level of service (Exhibit 15-4)	F		
Notes			
 Note that the adjustment factor for level terrain is 1.00, as le purpose of grade adjustment, specific downgrade segments a 		se conditions. For the	
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F			
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15- Use alternative Exhibit 15-14 if some trucks operate at craw 		vngrade.	
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Conserval Information	AY SEGMENT WO	
General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodPM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 EB Ramps to SR 58 Dade County 2015
Project Description: SR 299 Bridge over I-24	/ maryolo roan	2010
Input Data		
Segment length, L _t mi	Class I highway Terrain Grade Leng Peak-hour f No-passing	Class III highway Level Rolling th mi Up/down factor, PHF 0.91
Analysis direction vol., V _d 430veh/h	Show North Arrow	nd Ruppon D 22.9/
Opposing direction vol., V195veh/hShoulder width ft6.0Lane Width ft12.0Segment Length mi0.8		nd Buses , P _T 22 % onal vehicles, P _R 0% nts <i>mi</i> 11/mi
Average Travel Speed	Analysis Direction (d)	Opposing Direction (c)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	Analysis Direction (d) 1.9	Opposing Direction (o) 2.3
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.835	0.778
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.94 0.76	
Demand flow rate ² , $v_i(pc/h) v_i = V_i / (PHF^* f_{g,ATS}^* f_{HV,ATS})$	602 362	
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
	Base free-flow speed ⁴ , BF	FS 55.0 mi/h
Mean speed of sample ³ , S _{<i>FM</i>} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV.ATS})	Adj. for lane and shoulder width, 4 f _{LS} 0.0 m(Exhibit 15-7)Adj. for access points 4 , f _A (Exhibit 15-8)2.8 mFree-flow speed, FFS (FSS=BFFS-f _{LS} -f _A)52.3mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.0 mi/h	Average travel speed, ATS _d =FFS-0.00776 41.8	
	(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} Percent free flow speed, P	mi/h
Percent Time-Spent-Following	· · · · ·	
-	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.4	1.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0

19)	1		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.919	0.867	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.94	0.81	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV,PTSF} * f _{g,PTSF})	547	305	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d}^b)$		50.6	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		35.0	
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		73.1	
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$			
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		D	
Volume to capacity ratio, v/c		0.32	
Capacity, C _{d,ATS} (Equation 15-12) pc/h		0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1277		
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	80.0		
Bicycle Level of Service			
Directional demand flow rate in outside lane, <i>v_{OL}</i> (Eq. 15-24) veh/h		472.5	
Effective width, Wv (Eq. 15-29) ft	24.00		
Effective speed factor, S _t (Eq. 15-30)		4.79	
Bicycle level of service score, BLOS (Eq. 15-31)	11.41		
Bicycle level of service (Exhibit 15-4)	F		
Notes			
 Note that the adjustment factor for level terrain is 1.00, as le purpose of grade adjustment, specific downgrade segments a 			
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F			
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15- Use alternative Exhibit 15-14 if some trucks operate at craw 		downgrade.	
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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodAM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to Slygo Road Dade County 2035
Project Description: SR 299 Bridge over I-24	1	
Input Data	-	
Shoulder width It Lane width It Lane width It Lane width It Segment length. It Shoulder width It Segment Length mi 0.9 Average Travel Speed	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	factor, PHF 0.95 zone 100% nd Buses , P _T 7% onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	2.3	2.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R)$ (E _R -1))	0.917	0.894
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.74	0.67
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	279 97	
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>2.6 mi/h</i>	Base free-flow speed4, BFFS55.0 mi/hAdj. for lane and shoulder width,4 f_{LS} 0.0(Exhibit 15-7)0.0Adj. for access points4, f_A (Exhibit 15-8)3.0Free-flow speed, FFS (FSS=BFFS- f_{LS} - f_A)52.0 mi/hAverage travel speed, ATS_d=FFS-0.0077646.2 mi/h(v_{d,ATS} + v_{o,ATS}) - $f_{np,ATS}$ mi/h	
Percent Time-Spent-Following	i oroont noo now speed, r	FFS 89.4 %
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.8	1.9

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0
19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.947	0.941
	0.70	0.70
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.79	0.73
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	253	84
Base percent time-spent-following ⁴ , $BPTSF_{d}(\%)=100(1-e^{av_{d}b})$	2	6.3
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	4	6.5
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	61.2	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)		С
Volume to capacity ratio, v/c	0.15	
Capacity, C _{d.ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1167	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	8	9.4
only)		0.1
Bicycle Level of Service		
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24)	4	00 E
veh/h		89.5
Effective width, Wv (Eq. 15-29) ft	24	4.00
Effective speed factor, S_t (Eq. 15-30)	4.79	
Bicycle level of service score, BLOS (Eq. 15-31)	3	.48
Bicycle level of service (Exhibit 15-4)	С	
Notes		
 Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are 		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.	

5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	Site Information	ORKSHEET
Analyst Keith McCage Agency or Company GDOT/HNTB Date Performed 8/19/13 Analysis Time Period PM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to Slygo Road Dade County 2035
Project Description: SR 299 Bridge over I-24	Allalysis Teal	2000
Input Data		
Shoulder width tt Lane width tt Lane width tt Lane width tt Segment length, Lt mi Segment length, Lt mi Analysis direction vol., V _d 420veh/h Opposing direction vol., V _o 125veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 0.9	highway Terrain Grade Leng Peak-hour No-passing Show North Arrow % Trucks a	factor, PHF 0.95 zone 100% nd Buses , P _T 7 % onal vehicles, P _R 0%
Average Travel Speed	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15- 12)	1.9	2.6
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.941	0.899
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.92	0.70
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	511	209
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>4.0 mi/h</i>	Base free-flow speed4, BFFS55.Adj. for lane and shoulder width,4 f_{LS} 0.0(Exhibit 15-7)0.0Adj. for access points4, f_A (Exhibit 15-8)3.0Free-flow speed, FFS (FSS=BFFS- f_{LS} - f_A)52.Average travel speed, ATS_d=FFS-0.0077642.(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}mi/hPercent free flow speed, PFFS81.	
Percent Time-Spent-Following		FFS 81.6 %
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.4	1.8

1			
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0	
19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_{T}(E_{T}-1)+P_{B}(E_{B}-1))$	0.973	0.947	
1))	0.975	0.947	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.93	0.75	
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	489	185	
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{avd^b})	4	4.0	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	30	8.1	
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *			
	7	1.6	
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$			
Level of Service and Other Performance Measures	r		
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.29		
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0		
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1272		
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III	81.6		
only)	0	1.0	
Bicycle Level of Service	°.		
Directional demand flow rate in outside lane, v_{OI} (Eq. 15-24)		10.4	
veh/h	44	12.1	
Effective width, Wv (Eq. 15-29) ft	24.00		
Effective speed factor, S _t (Eq. 15-30)	4.79		
Bicycle level of service score, BLOS (Eq. 15-31)	3.	.91	
Bicycle level of service (Exhibit 15-4)	D		
Notes	<u>^</u>		
 Note that the adjustment factor for level terrain is 1.00, as lev purpose of grade adjustment, specific downgrade segments are 		conditions. For the	
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F.			
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 	0.		

5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodAM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to I-24 EE Ramps Dade County 2035
Project Description: SR 299 Bridge over I-24		
Input Data Shoulder width	highway Terrain Grade Leng Peak-hour No-passing % Trucks a	actor, PHF 0.95 zone 100% nd Buses , P _T 17 % onal vehicles, P _R 0%
Average Travel Speed	Applyois Direction (d)	Opposing Direction (a)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15- 12)	Analysis Direction (d) 2.1	Opposing Direction (o) 2.6
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.842	0.786
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.82 0.70	
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS} * f_{HV,ATS}$)	412	249
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>3.7 mi/h</i>	Average travel speed, ATS _d =FFS-0.00776 42 ($v_{d,ATS} + v_{o,ATS}$) - f _{np,ATS} mi/	
Percent Time-Spent-Following	. storik noo now opood, r	FFS 82.9 %
· · · · · ·	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.7	1.8

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15- 19)	1.0	1.0
· · · · · · · · · · · · · · · · · · ·		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.894	0.880
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.84	0.76
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	379	205
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b)	3	6.2
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	4	9.0
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	6	8.0
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)		С
Volume to capacity ratio, v/c	0.22	
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1215	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	82.9	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24)	28	34.2
veh/h Effective width Wey (Eq. 15.20) ft	22	4.00
Effective width, Wv (Eq. 15-29) ft		
Effective speed factor, S_t (Eq. 15-30)		.79
Bicycle level of service score, BLOS (Eq. 15-31)		.15
Bicycle level of service (Exhibit 15-4)		F
Notes		
1. Note that the adjustment factor for level terrain is 1.00, as level purpose of grade adjustment, specific downgrade segments are		conditions. For the
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 		

6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	Site Information	
AnalystKeith McCageAgency or CompanyGDOT/HNTBDate Performed8/19/13Analysis Time PeriodPM	Highway / Direction of Travel From/To Jurisdiction Analysis Year	SR 299 I-24 WB Ramps to I-24 El Ramps Dade County 2035
Project Description: SR 299 Bridge over I-24		
Input Data Shoulder width	highway Terrain Grade Leng Peak-hour f No-passing % Trucks a	actor, PHF 0.95 zone 100% nd Buses , P _T 17 % onal vehicles, P _R 0%
Average Travel Speed		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.7	2.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15- 13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.894	0.842
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	0.97	0.81
Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	686	409
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, <i>v</i> Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) <i>2.7 mi/h</i>	Average travel speed, ATS _d =FFS-0.00776 $4(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	
Percent Time-Spent-Following		FFS 78.4 %
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15- 19)	1.2	1.7

Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-	1.0	1.0	
19)			
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.967	0.894	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.97	0.84	
Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	634	372	
Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b)	5	7.2	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	3	2.0	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}^*$			
	7	7.4	
(v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})			
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, <i>v/c</i>	0.37		
Capacity, C _{d.ATS} (Equation 15-12) pc/h	0		
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1373		
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	78.4		
Bicycle Level of Service			
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h	55	94.7	
Effective width, Wv (Eq. 15-29) ft	24	4.00	
Effective speed factor, S _t (Eq. 15-30)	4	.79	
Bicycle level of service score, BLOS (Eq. 15-31)	8	.52	
Bicycle level of service (Exhibit 15-4)	F		
Notes	•		
 Note that the adjustment factor for level terrain is 1.00, as lev purpose of grade adjustment, specific downgrade segments are 		conditions. For the	
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F.			
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15-1 			

5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	WO-LANE HIGHW	Site Informati			
Analyst Keit	h McCage DT/HNTB /13	Highway / Dire Travel From/To Jurisdiction Analysis Year		SR 299 I-24 EB Ramps Dade County 2035	to SR 58
Project Description: SR 299 Bridge	e over I-24	, indigolo i odi		2000	
Input Data					
Analysis direction vol., V _d C Opposing direction vol., V _o C Shoulder width ft ft	aulder width It	Show North Arrow	highway Terrain Grade Leng Peak-hour f No-passing % Trucks ar	ith mi Uj actor, PHF zone nd Buses , P _T pnal vehicles, P _F	ay ☑ Rolling o/down 0.95 100% 22 %
Average Travel Speed					
		Analysis Dir	rection (d)	Opposing Dir	ection (o)
Passenger-car equivalents for truck 12)	s, E _T (Exhibit 15-11 or 15-	5- 2.0 2.1			
Passenger-car equivalents for RVs, 13)	E _R (Exhibit 15-11 or 15-	1.1 1.1			
Heavy-vehicle adjustment factor, f _{H'} (E _R -1))	$V_{ATS} = 1/(1 + P_T(E_T - 1) + P_R)$	0.8	20	0.80	95
Grade adjustment factor ¹ , f _{g,ATS} (E		0.8	37	0.8	5
Demand flow rate ² , v_i (pc/h) $v_i = V_i / ($	PHF* f _{g ATS} * f _{HV ATS})	49	94	485	5
Free-Flow Speed from Fi		E	stimated Fre	e-Flow Speed	
		Base free-flow	speed ⁴ , BFI	FS	55.0 mi/h
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directic Free-flow speed, FFS=S _{FM} +0.0077 Adj. for no-passing zones, f _{np,ATS} (E	δ(<i>ν</i> / f _{HV,ATS})		s points ⁴ , f _A (ed, FFS (FS speed, ATS ₅) - f _{np,ATS}	Exhibit 15-8) S=BFFS-f _{LS} -f _A) 5 _d =FFS-0.00776	0.0 mi/ł 2.8 mi/ł 52.3 mi/h 42.3 mi/h 80.9 %
Percent Time-Spent-Following		·			
Passenger-car equivalents for truck	s, E _T (Exhibit 15-18 or 15-	Analysis Dir 1.6		Opposing Dir 1.6	
19) Passenger-car equivalents for RVs,	E (Exhibit 15 19 or 15	1.()	1.0	

19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.883	0.883
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.88	0.87
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV,PTSF} * f _{g,PTSF})	454	431
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d}^b)$		47.7
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		43.3
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		69.9
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		
Level of Service and Other Performance Measures	*	
Level of service, LOS (Exhibit 15-3)		С
Volume to capacity ratio, <i>v/c</i>		0.27
Capacity, C _{d,ATS} (Equation 15-12) pc/h	1306	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1438	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	80.9	
Bicycle Level of Service	Į	
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h		352.6
Effective width, Wv (Eq. 15-29) ft	24.00	
Effective speed factor, S_t (Eq. 15-30)		4.79
Bicycle level of service score, BLOS (Eq. 15-31)		11.26
Bicycle level of service (Exhibit 15-4)		F
Notes	<u>~</u>	
 Note that the adjustment factor for level terrain is 1.00, as lep purpose of grade adjustment, specific downgrade segments and 		e conditions. For the
2. If $v_i(v_d \text{ or } v_o) >=1,700 \text{ pc/h}$, terminate analysisthe LOS is F		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15- Use alternative Exhibit 15-14 if some trucks operate at craw 		ngrade.
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General Information		Site Information	
		Highway / Direction of	00.000
Analyst Agency or Company	Keith McCage GDOT/HNTB	Travel	SR 299
Date Performed	8/9/13	From/To	I-24 EB Ramps to SR 58
Analysis Time Period	PM	Jurisdiction	Dade County
Project Description: SR 299	Rridge over L24	Analysis Year	2035
Input Data			
	Shoulder width ft		I highway 🛛 🗹 Class II
	Lane widthft		• •
	Lane width It It It	· · ·	Class III highway
		Terrain	Level Rolling
Segment ler	gth, L _t mi	Grade Len Peak-hour No-passin	factor, PHF 0.95
Analysis direction vol., V _d	<i>710</i> veh/h	Show North Arrow	
ŭ	<i>350</i> veh/h	% Trucks a	and Buses , P _T 22 %
Opposing direction vol., V _o		% Recreat	ional vehicles, P _B 0%
Shoulder width ft Lane Width ft	6.0 12.0	Access po	11
Segment Length mi	0.8		
Average Travel Speed		J	
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for	or trucks, E_{T} (Exhibit 15-11 or 15-	1.5	2.0
12)			
· · ·	or RVs, E _B (Exhibit 15-11 or 15-		
13)	$R = R (E \times 100 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times $	1.1	1.1
1	eter f $1/(1 \cdot D (E \cdot 1) \cdot D$		
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1/(1 + P_T(E_T-1) + P_R)$		0.901	0.820
(E _R -1))			
Grade adjustment factor ¹ , f_g		0.98	0.88
Demand flow rate ² , v_i (pc/h)	$v = V_i / (PHF^* f_{qATS}^* f_{HVATS})$	846	511
	rom Field Measurement	Estimated Fi	ee-Flow Speed
		Base free-flow speed ⁴ , BF	FFS 55.0 mi/h
		Adj. for lane and shoulder	width. ⁴ f.
Mean speed of sample ³ , S _{FA}		(Exhibit 15-7)	width, ILS 0.0 mi/l
Total demand flow rate, both	•	Adj. for access points ⁴ , f_A	(Exhibit 15-8) 2.8 mi/i
			50.0
Free-flow speed, FFS=S _{FM} +	· · ·	Free-flow speed, FFS (FS	SS=BFFS-f _{LS} -f _A) 52.3 mi/h
Adj. for no-passing zones, f _n	_{p,ATS} (Exhibit 15-15) <i>2.3 mi/h</i>	Average travel speed, AT	S _d =FFS-0.00776 <i>39.4</i>
		$(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	mi/h
Percent Time-Spent-Follow	vina	Percent free flow speed, I	PFFS 75.5 %
		Analysis Direction (d)	Opposing Direction (o)
Desegnant out on which are for	artrucko E (Exhibit 15 10 ar 15		
	or trucks, E _T (Exhibit 15-18 or 15-	1.0	1.6
19)		l	4

19)	1	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000	0.883
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	0.99	0.88
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV,PTSF} * f _{g,PTSF})	755	474
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d}^b)$		64.4
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		27.6
Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *		81.4
$(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)		D
Volume to capacity ratio, <i>v/c</i>		0.44
Capacity, C _{d,ATS} (Equation 15-12) pc/h	0	
Capacity, C _{d,PTSF} (Equation 15-13) pc/h	1469	
Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only)	75.5	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h		747.4
Effective width, Wv (Eq. 15-29) ft	24.00	
Effective speed factor, S_t (Eq. 15-30)		4.79
Bicycle level of service score, BLOS (Eq. 15-31)		11.64
Bicycle level of service (Exhibit 15-4)	F	
Notes		
 Note that the adjustment factor for level terrain is 1.00, as le purpose of grade adjustment, specific downgrade segments a 		
2. If $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$, terminate analysisthe LOS is F		
 For the analysis direction only and for v>200 veh/h. For the analysis direction only Exhibit 15-20 provides coefficients a and b for Equation 15- Use alternative Exhibit 15-14 if some trucks operate at craw 	10.	lowngrade.
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	BASIC FRE	EEWAY SEC	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Keith McCag	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 AM		From/To Jurisdiction Analysis Year	SR 299 Dade Co 2013	to US 41/64 ounty
			eplacement over I-24		
Oper.(LOS)			es.(N)	Planı	ning Data
Flow Inputs				0.01	
Volume, V AADT	1860	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, I	<		%RVs, P _R	0	
Peak-Hr Direction Prop, [DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjust	stments				
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			-
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	ce Measure	S	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF :	x N x <i>1375</i>	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	< N x	
f _{HV} x f _p)		·	f _{HV} x f _p)		pc/h/ln
S	73.4	mph	S		mph
$D = v_p / S$	18.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	es, N	po/mi/m
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De FFS - Fi	nsity	E _T - Exhibits 11-10, 11-11	, 11-	f _{LC} - Exhibit 11-9
v _p - Flow rate speed	FF3 - FI		13 f _p - Page 11-18		TRD - Page 11-
LOS - Level of service speed	BFFS -	Base free-flow		11 11-2	-
DDHV - Directional design	n hour volume	9	LOS, S, FFS, v _p - Exhibits 11-3	, , , , ,	
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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	je	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTE 8/12/13 PM		From/To Jurisdiction Analysis Year	SR 299 to US 41/64 Dade County 2013	
Project Description PI#	0011682, SR	299 Bridge R	eplacement over I-24		
Oper.(LOS)			es.(N)	🗆 Planı	ning Data
Flow Inputs					
Volume, V AADT	1920	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, k		, ,	%RVs, P _R	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments		·		
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2			0.0	
Total Ramp Density, TRD	0.67	ramps/mi	f _{LC}		mph
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performance	e Measure	s	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF >	(NX 1419	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	(N x	
f _{HV} x f _p)	1415	pc/11/11	P		pc/h/ln
S	73.1	mph	f _{HV} x f _p)		
D = v _p / S	19.4	pc/mi/ln	S (C		mph
LOS	C	po/m/m	$D = v_p / S$		pc/mi/ln
200	U		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Dei		E _T - Exhibits 11-10, 11-11		
v _p - Flow rate	FFS - Fr	-	13	, -	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BEES I	Base free-flow	f _p - Page 11-18	11	TRD - Page 11-
speed	DFF3-1		LOS, S, FFS, v _p - Exhibits		
DDHV - Directional desigr	ו hour volume		р – – – – – – – – – – – – – – – – – – –	, i i 2 ,	
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	BASIC FR	EEWAY SEC	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WE	3
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 AM		From/To Jurisdiction Analysis Year	<i>SR 299 to US 41/64 Dade County 2013</i>	
	0011682, SR		eplacement over I-24	Dian	ning Data
✓ Oper.(LOS)			es.(N)	- Plan	ning Data
<i>Flow Inputs</i> Volume, V	1190	veh/h	Peak-Hour Factor, PHF	0.91	
AADT	1190	veh/day	%Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, I	<		%RVs, P _R	0	
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjust	stments		•		
fp	1.00		E _R	2.0	
Ε _Τ	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R <i>0.743</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured) Base free-flow Speed,	75 4	mph	FFS	73.1	mph
BFFS	75.4	mph			
LOS and Performand	ce Measure	S	Design (N)		
<u> Operational (LOS)</u>			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF :	x N x <i>879</i>	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хNх	
f _{HV} x f _p)		·	f _{HV} x f _p)		pc/h/ln
S	75.0	mph	S		mph
$D = v_p / S$	11.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		P Required Number of Lane	es, N	P 0, ,
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume v _n - Flow rate	D - De FFS - F	nsity	E _T - Exhibits 11-10, 11-1	1, 11-	f _{IC} - Exhibit 11-9
speed			13 f _p - Page 11-18		TRD - Page 11-
LOS - Level of service speed	BFFS -	Base free-flow	LOS, S, FFS, v _p - Exhibits	11 s 11-2,	
DDHV - Directional desig	n hour volume	9	11-3		
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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	je	Highway/Direction of Travel	I-24 WB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTE 8/12/13 PM		From/To Jurisdiction Analysis Year	SR 299 Dade Co 2013	to US 41/64 ounty
	0011682, SR		eplacement over I-24		·
Oper.(LOS)			es.(N)	Plani	ning Data
Flow Inputs	0050			0.01	
Volume, V AADT	2650	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, K	(%RVs, P _R	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments		1		
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	2.0 73.1	•
Base free-flow Speed, BFFS	75.4	mph		73.1	mph
LOS and Performand	e Measure	s	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF >	(N X 1059	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	(N x	
f _{HV} x f _p)	1958	pc/n/m			pc/h/ln
S	64.8	mph	f _{HV} x f _p)		
$D = v_p / S$	30.2	pc/mi/ln	S D v v (O		mph
	D	p 0, ,	$D = v_p / S$		pc/mi/ln
			Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Spe	eed	E _R - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Der	-	E _T - Exhibits 11-10, 11-11	, 11-	f _{I C} - Exhibit 11-9
v _p - Flow rate	FFS - Fr	ee-flow	13		
speed			f _p - Page 11-18		TRD - Page 11-
LOS - Level of service	BFFS - E	Base free-flow		11	
speed DDHV - Directional desigr	n haur valume		LOS, S, FFS, v _p - Exhibits	s II-∠,	
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	BASIC FRE	EWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Keith McCag	ie	Highway/Direction of Travel	I-24 EB	
Agency or Company	GDOT/HNTE	3	From/To	SR 299 c ramp	off to SR 299 on
Date Performed Analysis Time Period	8/12/13 AM		Jurisdiction Analysis Year	Dade Co 2013	unty
Project Description Pl#		299 Bridge R		2010	
✓ Oper.(LOS)			es.(N)	🗆 Plann	ing Data
Flow Inputs					0
Volume, V AADT	1670	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T		
	•	von/day	· · · · ·		
Peak-Hr Prop. of AADT, K			%RVs, P _R	0 De #/a a	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down 9		
Calculate Flow Adjus	stments		- F		
f _p	1.00		E _B	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^{(E} R <i>0.743</i>	
Encod Inputo			- 1)] Colo Speed Adi ope		
Speed Inputs	12.0	ft	Calc Speed Adj and	u FF3	
Lane Width Rt-Side Lat. Clearance	12.0 6.0	ft	ſ		
Number of Lanes, N	0.0 2	п	f _{LW}	0.0	mph
Total Ramp Density, TRD		ramps/mi	^f LC	0.0	mph
FFS (measured)	0.07	mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performance		8	Design (N)		
		5	Design (N)		
<u> Operational (LOS)</u>			Design LOS		
v _p = (V or DDHV) / (PHF >		··· • //• //·•	$v_p = (V \text{ or } DDHV) / (PHI)$	FxNx	
f _{HV} x f _p)	1234	pc/h/ln	$f_{HV} \times f_p$		pc/h/ln
S	74.4	mph	S p'		mph
D = v _p / S	16.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of La	nes N	pc/m/m
Glossary			Factor Location	100, 1	
			$E_{\rm p}$ - Exhibits 11-10, 11-	.12	f _{LW} - Exhibit 11-8
N - Number of lanes V - Hourly volume	S - Spe D - Der				'LW Exhibit 110
v_p - Flow rate	FFS - Fr	•	E _T - Exhibits 11-10, 11- 13	11, 11-	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS - E	Base free-flow		11	TRD - Page 11-
speed DDHV - Directional desigr	n hour volume		LOS, S, FFS, v _p - Exhib 11-3	oits 11-2,	
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	BASIC FRE	EWAY SE	GMENTS WORKSHEI	ET	
General Information			Site Information		
Analyst	Keith McCag	10	Highway/Direction of	I-24 EB	
Analyst	Kenin McCay	le	Travel		((L. O.D. 000
Agency or Company	GDOT/HNTE	3	From/To	SR 299 off to SR 299 on ramp	
Date Performed	<i>8/12/13</i>		Jurisdiction	Dade Co	ounty
Analysis Time Period	PM		Analysis Year	2013	-
Project Description PI#	0011682, SR		•		
Oper.(LOS)			es.(N)	Plann	ing Data
Flow Inputs	1805	veh/h	Pook Hour Footor, DHE	0.91	
Volume, V AADT	1805		Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
		veh/day	1		
Peak-Hr Prop. of AADT, K			%RVs, P _R	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length	Rolling mi	
		Ven/m	Up/Down %		
Calculate Flow Adjus	stments		-		
f _p	1.00		E _B	2.0	
			$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	-	
E _T	2.5		'HV = '/['+' T(=T ') + ' R(= - 1)]	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	 73.1	mph
Base free-flow Speed, BFFS	75.4	mph		70.1	mpn
LOS and Performanc	e Measure	s	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF >	(N X 1334	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	х N х	
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S	73.8	mph	HV p' S		mph
$D = v_p / S$	18.1	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lan	oc N	pc/m/m
Glossary			Factor Location	CS, IN	
			$E_{\rm B}$ - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
N - Number of lanes V - Hourly volume	S - Spe D - Der		1 ''		'LW Exhibit 110
v - Flow rate	FFS - Fr	•	E _T - Exhibits 11-10, 11-1	1, 11-	f _{LC} - Exhibit 11-9
speed	110 11		13		TRD - Page 11-
LOS - Level of service	BFFS - E	Base free-flow	f _p - Page 11-18	11	The rageri-
speed			LOS, S, FFS, v _p - Exhibit	ts 11-2,	
DDHV - Directional desigr	n hour volume		11-3		
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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WB	
Agency or Company	GDOT/HNT	В	From/To	SR 299 o ramp	off to SR 299 on
Date Performed Analysis Time Period	8/12/13 AM		Jurisdiction Analysis Year	Dade Co 2013	ounty
Project Description PI#		299 Bridge R		2010	
✓ Oper.(LOS)		0	es.(N)	🗆 Planr	ing Data
Flow Inputs					
Volume, V	1110	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P _T	23	
Peak-Hr Prop. of AADT, H	<i>.</i>		%RVs, P _R	0	
· · ·			General Terrain:		
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments			, 	
			E	0.0	
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi		2.3	•
FFS (measured)		mph	TRD Adjustment		mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	ce Measure	es	Design (N)		
			Design (N)		
Operational (LOS)	- NI		Design LOS		
v _p = (V or DDHV) / (PHF :	820 x N X	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хNх	
f _{HV} x f _p)	020	p0/11/11			pc/h/ln
s	75.0	mph	f _{HV} x f _p)		ing in the
$D = v_p / S$	10.9	pc/mi/ln			mph
LOS	A	·	$D = v_p / S$		pc/mi/ln
	71		Required Number of Lan	ies, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	•	ensity	E _T - Exhibits 11-10, 11-1	1, 11-	
v - Flow rate		ree-flow	13	,	f _{LC} - Exhibit 11-9
speed					TRD - Page 11-
LOS - Level of service	BFFS -	Base free-flow	f - Page 11-18 / ^p	11	
speed			LOS, S, FFS, v _p - Exhibi	ts 11-2,	
DDHV - Directional desigi	n hour volume	e	11-3		
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	BASIC FRE	EWAY SEC	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Keith McCag	ie	Highway/Direction of Travel	I-24 WB	
Agency or Company	GDOT/HNTE	3	From/To	SR 299 o ramp	off to SR 299 on
Date Performed Analysis Time Period	8/12/13 PM		Jurisdiction Analysis Year	Dade Co 2013	ounty
Project Description PI#		299 Bridge R			
Oper.(LOS)	,	Ū.	es.(N)	🗆 Plann	ing Data
Flow Inputs					
Volume, V	2505	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P _T	23	
Peak-Hr Prop. of AADT, K	(,	%RVs, P _R	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
$DDHV = AADT \times K \times D$,	veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	stments			, 	
			F	2.0	
f _p	1.00		E_{R} f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E	2.0	
E _T	2.5		- 1)]	^к 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2			0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			•
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performance	e Measure	S	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF >	KN X 1851	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	х N х	
f _{HV} x f _p)	1651	pc/n/m			pc/h/ln
S	67.0	mph	f _{HV} x f _p)		
$D = v_p / S$	27.6	pc/mi/ln	S ()		mph
LOS	D	p0/111/11	$D = v_p / S$		pc/mi/ln
200	D		Required Number of Lan	ies, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Dei		E _T - Exhibits 11-10, 11-1	1 11	
v _p - Flow rate	FFS - Fr	•	13		f _{LC} - Exhibit 11-9
speed	5550		f _p - Page 11-18		TRD - Page 11-
LOS - Level of service	BFFS - E	Base free-flow		11 to 11 0	
speed DDHV - Directional desigr	n haur valume		LOS, S, FFS, v _p - Exhibi	IS 11-2,	
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ET	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 AM	В	From/To Jurisdiction Analysis Year	I-59 to S Dade Co 2013	
Project Description PI#		299 Bridae R		2070	
✓ Oper.(LOS)			es.(N)	🗆 Planı	ning Data
Flow Inputs					
Volume, V	1775	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P _T	23	
Peak-Hr Prop. of AADT, I			%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D	D	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments				
f p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRE	0 1.00	ramps/mi	TRD Adjustment	3.2	mph
FFS (measured) Base free-flow Speed,	75.4	mph	FFS	72.2	mph
BFFS	-	mph			
LOS and Performan	ce Measure	es	Design (N)		
<u> Operational (LOS)</u>			<u>Design (N)</u> Design I OS		
$v_p = (V \text{ or } DDHV) / (PHF)$	x N x			v N v	
f _{HV} x f _p)	1312	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$		pc/h/ln
S	69.9	mph	f _{HV} x f _p)		
$D = v_p / S$	18.8	, pc/mi/ln	S D w / C		mph
LOS	С	F	$D = v_p / S$		pc/mi/ln
			Required Number of Lane	es, N	
Glossary			Factor Location	0	f Evhibit 11.0
N - Number of lanes	S - Sp		E _R - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
V - Hourly volume v _p - Flow rate	D - De FFS - F	ree-flow	E _T - Exhibits 11-10, 11-1 ⁻ 13	1, 11-	f _{LC} - Exhibit 11-9
speed	DEEQ	Roco froe flow	f - Page 11-18	11	TRD - Page 11-
LOS - Level of service speed	0643-	Base free-flow	LOS, S, FFS, v _n - Exhibits		
DDHV - Directional desig	n hour volume	Э	11-3	,	
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	BASIC FRE	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTI 8/12/13 PM	В	From/To Jurisdiction Analysis Year	I-59 to Si Dade Co 2013	
Project Description PI#	0011682, SR	299 Bridge R	eplacement over I-24		
Oper.(LOS)			es.(N)	🗆 Plann	ing Data
Flow Inputs					
Volume, V AADT	1880	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, I	ĸ		%RVs, P _R	0	
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments				
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	1.00	ramps/mi			•
FFS (measured)		mph	TRD Adjustment	3.2	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	72.2	mph
LOS and Performand	ce Measure	S	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF :	x N x		$v_p = (V \text{ or DDHV}) / (PHF)$	v N v	
f _{HV} x f _p)	1389	pc/h/ln	$f_{HV} \times f_p$		pc/h/ln
S	69.6	mph	HV p'		mph
D = v _p / S	20.0	pc/mi/ln			•
LOS	С	•	$D = v_p / S$		pc/mi/ln
Glassariy			Required Number of Lane	95, IN	
Glossary	0 0-		$E_{\rm B}$ - Exhibits 11-10, 11-12	>	f _{LW} - Exhibit 11-8
N - Number of lanes V - Hourly volume	S - Sp D - De		11	44	
v_p - Flow rate	FFS - Fi	•	E _T - Exhibits 11-10, 11-11 13	, 11-	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS - I	Base free-flow	f _p - Page 11-18	11	TRD - Page 11-
speed DDHV - Directional design			LOS, S, FFS, v _p - Exhibits	s 11-2,	
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ET	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WE	}
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 AM	В	From/To Jurisdiction Analysis Year	I-59 to S Dade C 2013	
Project Description PI#		299 Bridae R		2010	
✓ Oper.(LOS)			es.(N)	🗆 Plan	ning Data
Flow Inputs					
Volume, V	1185	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P_T	23	
Peak-Hr Prop. of AADT, I	K		%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D	D	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments		Op/2011170		
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R <i>0.743</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured) Base free-flow Speed,		mph	FFS	73.1	mph
BFFS	75.4	mph			
LOS and Performan	ce Measure	s	Design (N)		
<u> Operational (LOS)</u>			<u>Design (N)</u>		
$v_{p} = (V \text{ or } DDHV) / (PHF)$	хNх		Design LOS		
f _{HV} x f _p)	876	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	XINX	pc/h/ln
S	75.0	mph	f _{HV} x f _p)		
D = v _p / S	11.7	pc/mi/ln	S		mph
LOS	В	pc/m/m	$D = v_p / S$		pc/mi/ln
LU3	В		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	beed	E _R - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De	•	E _T - Exhibits 11-10, 11-1	1, 11-	f _{LC} - Exhibit 11-9
v _p - Flow rate speed	FFS - F	ree-flow	13		TRD - Page 11-
LOS - Level of service	BFFS -	Base free-flow	f Page 11-18 / ^p	11	ind hage in-
speed			LOS, S, FFS, v _p - Exhibit	s 11-2,	
DDHV - Directional desig	n hour volume	Э	11-3		
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	BAS	IC FRE	EWAY SEC	GMENTS WORKSHEE	T	
General Information				Site Information		
Analyst Keith McCag Agency or Company GDOT/HNTB Date Performed 8/12/13 Analysis Time Period PM			Highway/Direction of Travel From/To Jurisdiction Analysis Year eplacement over I-24	I-24 WB I-59 to SR 299 Dade County 2013		
Project Description PI# (50110	<i>562, 6112</i>		es.(N)	Planning Da	ata
Flow Inputs						
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D			veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.91 23 0 Rolling mi	
				Up/Down %		
Calculate Flow Adjus	stme	nts				
f _p	1.00)		E_{R} $f_{HV} = 1/[1+P_{T}(E_{T} - 1) + P_{R}(E_{F})]$	2.0	
Ε _Τ	2.5			- 1)]	^R 0.743	
Speed Inputs				Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	75.4		ft ft ramps/mi mph mph	f _{∟w} f _{LC} TRD Adjustment FFS	0.0 0.0 2.3 73.1	mph mph mph mph
LOS and Performanc	e Me	easures	;	Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x f _{HV} x f _p)	N x	1951	pc/h/ln	<u>Design (N)</u>		
S D = v _p / S LOS		65.0 30.0 D	mph pc/mi/In	Design LOS		

	BASIC FRE	EEWAY SEC	GMENTS WORKSHEE	ET	
General Information			Site Information		
Analyst	Keith McCag	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTI 8/12/13 AM		From/To Jurisdiction Analysis Year	SR 299 Dade Co 2015	to US 41/64 ounty
	0011682, SR		eplacement over I-24		ning Data
✓ Oper.(LOS)			es.(N)	- Plan	ning Data
<i>Flow Inputs</i> Volume, V	1895	veh/h	Peak-Hour Factor, PHF	0.91	
AADT	1095	veh/day	%Trucks and Buses, P _T	23	
Peak-Hr Prop. of AADT, k	< Comparison of the second sec		%RVs, P _R	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments		·		
fp	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R <i>0.743</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	73.1	mph
Base free-flow Speed, BFFS	75.4	mph		70.1	трп
LOS and Performance	e Measure	S	Design (N)		
Operational (LOS)	- NI		<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF › f _{HV} x f _p)	1400	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	x N x	pc/h/ln
S	73.2	mph	f _{HV} x f _p)		
$D = v_p / S$	19.1	pc/mi/ln	S D v v v O		mph
LOS	С	P e	$D = v_p / S$		pc/mi/ln
			Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp		E _R - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
V - Hourly volume v _n - Flow rate	D - De FFS - Fi	•	E _T - Exhibits 11-10, 11-1 ⁻ 13	1, 11-	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS - I	Base free-flow	f - Page 11-18	11	TRD - Page 11-
speed DDHV - Directional design			LOS, S, FFS, v _p - Exhibit		
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	BASIC FRE	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTI 8/12/13 PM		From/To Jurisdiction Analysis Year	SR 299 Dade C 2015	to US 41/64 ounty
Project Description PI#	0011682, SR	299 Bridge R	eplacement over I-24		
Oper.(LOS)			es.(N)	🗆 Plan	ning Data
Flow Inputs					
Volume, V AADT	1960	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, h		 ,	%RVs, P _R	0	
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjust	stments		·		
f p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2			0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	e Measure	S	Design (N)		
Operational (LOS)			Design (N)		
$v_p = (V \text{ or DDHV}) / (PHF)$	v N v		Design LOS		
1 P	1448	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	k N x	no/h/ln
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S	72.8	mph	S		mph
$D = v_p / S$	19.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	es, N	pc/m/m
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De		E _T - Exhibits 11-10, 11-11		
v _p - Flow rate	FFS - Fi	•	13	,	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS - I	Base free-flow	f - Page 11-18 / ^p	11	TRD - Page 11-
speed			LOS, S, FFS, v _p - Exhibits	s 11-2,	
DDHV - Directional desigi	n hour volume)	11-3		
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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	Ie	Highway/Direction of Travel	I-24 WB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTE 8/12/13 AM		From/To Jurisdiction Analysis Year	SR 299 : Dade Co 2015	to US 41/64 ounty
	0011682, SR		eplacement over I-24		
Oper.(LOS)			es.(N)	Planr	ning Data
Flow Inputs	1015			0.01	
Volume, V AADT	1215	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, H	< Comparison of the second sec		%RVs, P _R	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments		•		
f p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	2.3 73.1	•
Base free-flow Speed, BFFS	75.4	mph		73.1	mph
LOS and Performand	e Measure	S	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF :	(N x <i>898</i>	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	(N x	
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S D w / C	75.0	mph	S		mph
$D = v_p / S$	12.0	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lane	s, N	•
Glossary			Factor Location		
N - Number of lanes	S - Spe	ed	E _R - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
V - Hourly volume v _n - Flow rate	D - Der FFS - Fr	nsity	E _T - Exhibits 11-10, 11-11	, 11-	f _{LC} - Exhibit 11-9
speed			13 f _p - Page 11-18		TRD - Page 11-
LOS - Level of service speed		Base free-flow	LOS, S, FFS, v _p - Exhibits	11 s 11-2,	
DDHV - Directional desig	n hour volume		11-3		
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	BASIC FRE	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	<i>ge</i>	Highway/Direction of Travel	I-24 WB	,
Agency or Company Date Performed Analysis Time Period	GDOT/HNTE 8/12/13 PM		From/To Jurisdiction Analysis Year	SR 299 Dade Co 2015	to US 41/64 ounty
	0011682, SR		eplacement over I-24		
Oper.(LOS)			es.(N)	□ Planr	ning Data
Flow Inputs				0.01	
Volume, V AADT	2705	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, I	<		%RVs, P _R	0	
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments		·		
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft	i		
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	2.0 73.1	mph
Base free-flow Speed, BFFS	75.4	mph		70.1	трп
LOS and Performand	e Measure	S	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF :	x N x		$v_p = (V \text{ or DDHV}) / (PHF)$		
f _{HV} x f _p)	1999	pc/h/ln	1'		pc/h/ln
S	64.0	mph	f _{HV} x f _p)		mph
$D = v_p / S$	31.3	pc/mi/ln			mph
LOS	D		D = v _p / S Required Number of Lane	es. N	pc/mi/ln
Glossary			Factor Location	-,	
N - Number of lanes	S - Spe	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Der		E_{T} - Exhibits 11-10, 11-11		
v _p - Flow rate	FFS - Fr	-	13	, 11-	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS - I	Base free-flow	f _p - Page 11-18	11	TRD - Page 11-
speed DDHV - Directional desigi	n hour volume	•	LOS, S, FFS, v _p - Exhibits 11-3	s 11-2,	
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	BASIC FRE	EWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Keith McCag	ie	Highway/Direction of Travel	I-24 EB	
Agency or Company	GDOT/HNTE	3	From/To	SR 299 o ramp	off to SR 299 on
Date Performed Analysis Time Period	8/12/13 AM		Jurisdiction Analysis Year	Dade Co 2015	ounty
Project Description PI#		299 Bridae R		2070	
✓ Oper.(LOS)	····, ···		es.(N)	Plann	ing Data
Flow Inputs			()		
Volume, V AADT	1700	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P_{T}	0.91 23	
	·	von, dag		 0	
Peak-Hr Prop. of AADT, K			%RVs, P _R	-	
Peak-Hr Direction Prop, D DDHV = AADT x K x D	•	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments				
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			•
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	e Measure	S	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF >	(N X			v N v	
f _{HV} x f _p)	1256	pc/h/ln	v _p = (V or DDHV) / (PHF f _{HV} x f _p)	X IN X	pc/h/ln
S	74.3	mph	S		mph
$D = v_p / S$	16.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		P Required Number of Lan	es N	po/m/m
Glossary			Factor Location	00,11	
			E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
N - Number of lanes V - Hourly volume	S - Spe D - Der				LW EXHIBIT TO
v_p - Flow rate	FFS - Fr	•	E _T - Exhibits 11-10, 11-1 13	1, 11-	f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS - E	Base free-flow		11	TRD - Page 11-
speed DDHV - Directional desigr	n hour volume		LOS, S, FFS, v _p - Exhibit 11-3	ts 11-2,	
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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	ET	
General Information			Site Information		
Analyst	Keith McCag	10	Highway/Direction of	I-24 EB	
Analyst	Neilin McCay	e	Travel		
Agency or Company	GDOT/HNTE	3	From/To	SR 299 (ramp	off to SR 299 on
Date Performed	8/12/13		Jurisdiction	Dade Co	ounty
Analysis Time Period	PM		Analysis Year	2015	-
Project Description PI# (0011682, SR .	-	•		
✓ Oper.(LOS)			es.(N)	Planr	ning Data
<i>Flow Inputs</i> Volume, V	1840	veh/h	Peak-Hour Factor, PHF	0.91	
AADT	1040	veh/day	%Trucks and Buses, P _T	0.91 23	
	,	ven/day	1		
Peak-Hr Prop. of AADT, K			%RVs, P _R	0 Delline	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length	Rolling mi	
			Up/Down %		
Calculate Flow Adjus	stments		•		
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743	
			- 1)] Colo Speed Adi and	EEQ	
Speed Inputs Lane Width	12.0	ft	Calc Speed Adj and	ггэ	
Rt-Side Lat. Clearance	6.0	ft	f	0.0	mah
Number of Lanes, N	2		f _{LW}	0.0	mph
Total Ramp Density, TRD		ramps/mi	f _{LC}	0.0	mph
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performanc	e Measures	S	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF x	1360	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хΝх	
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S	73.6	mph	S		mph
$D = v_p / S$	18.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	es. N	, , , , , , , , , , , , , , , , , , ,
Glossary			Factor Location		
N - Number of lanes	S - Spe	ed.	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Der		E _T - Exhibits 11-10, 11-1		
v - Flow rate	FFS - Fr	•	13	.,	f _{LC} - Exhibit 11-9
speed					TRD - Page 11-
LOS - Level of service	BFFS - E	Base free-flow		11	5
speed	. .		LOS, S, FFS, v _p - Exhibit	s 11-2,	
DDHV - Directional desigr	nour volume		11-3 HCS 2010 TM Version 6.41		

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	BASIC FRE	EWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
	Kaith MaCaa		Highway/Direction of	I-24 WB	
Analyst	Keith McCag	e	Travel		<i>"</i>
Agency or Company	GDOT/HNTE	}	From/To	SR 299 ramp	off to SR 299 on
Date Performed	8/12/13		Jurisdiction	Dade Co	ounty
Analysis Time Period	AM		Analysis Year	2015	,
Project Description PI# (0011682, SR .		·		
Oper.(LOS)		□ D	es.(N)	🗆 Planr	ning Data
Flow Inputs					
Volume, V	1130	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, ${\rm P}_{\rm T}$	23	
Peak-Hr Prop. of AADT, K			%RVs, P _R	0	
Peak-Hr Direction Prop, D	1		General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %)	
Calculate Flow Adjus	stments				
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi		2.3	•
FFS (measured)		mph	TRD Adjustment		mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performanc	e Measures	S	Design (N)		
Operational (LOS)			Design (N)		
	/ NL v		Design LOS		
v _p = (V or DDHV) / (PHF x	835	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хΝх	
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S	75.0	mph	S		mph
$D = v_p / S$	11.1	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	В		Required Number of Lan	oc N	po/m/m
Glossary			Factor Location	65, 11	
				2	f Evhibit 11.9
N - Number of lanes	S - Spe		E _R - Exhibits 11-10, 11-1		f _{LW} - Exhibit 11-8
V - Hourly volume	D - Der	-	E _T - Exhibits 11-10, 11-1	1, 11-	f _{IC} - Exhibit 11-9
v _p - Flow rate	FFS - Fr	EE-IIOM	13		
speed LOS - Level of service	REEC E	Base free-flow	f _p - Page 11-18	11	TRD - Page 11-
speed	DFF3-E	ase 1166-110M	LOS, S, FFS, v _p - Exhibit		
DDHV - Directional design	n hour volume		11-3		
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	BASIC FRE	EEWAY SE	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Keith McCag	ge	Highway/Direction of Travel	I-24 WB	
Agency or Company	GDOT/HNT	3	From/To	SR 299 o ramp	off to SR 299 on
Date Performed Analysis Time Period	8/12/13 PM		Jurisdiction Analysis Year	Dade Co 2015	ounty
Project Description PI#		299 Bridge R			
Oper.(LOS)	,	0	es.(N)	🗆 Plann	ing Data
Flow Inputs					<u> </u>
Volume, V	2555	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P_T	23	
	/		%RVs, P _R	0	
Peak-Hr Prop. of AADT, h			••		
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	etmonte				
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			•
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	ce Measure	s	Design (N)		
			Design (N)		
Operational (LOS)	N 1		Design LOS		
v _p = (V or DDHV) / (PHF :	x N x 1888	pc/h/ln	$v_{p} = (V \text{ or } DDHV) / (PHF)$	х N х	
f _{HV} x f _p)	1000	po/11/11			pc/h/ln
S	66.3	mph	f _{HV} x f _p)		and b
$D = v_p / S$	28.5	pc/mi/ln	S D v v O		mph
	20.0 D	po,,	$D = v_p / S$		pc/mi/ln
200	D		Required Number of Land	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De		E _T - Exhibits 11-10, 11-1	1 11	
v - Flow rate	FFS - Fi	•		1, 11	f _{LC} - Exhibit 11-9
speed			13		TRD - Page 11-
LOS - Level of service	BFFS - I	Base free-flow	f _p - Page 11-18	11	The rugori
speed			LOS, S, FFS, v _p - Exhibit	s 11-2,	
DDHV - Directional desig	n hour volume		11-3	,	
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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCag	je	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNTE 8/12/13 AM		From/To Jurisdiction Analysis Year	I-59 to S Dade Co 2015	
	0011682, SR		eplacement over I-24		
			es.(N)	🗆 Plann	iing Data
Flow Inputs					
Volume, V AADT	1810	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, I	<		%RVs, P _R	0	
Peak-Hr Direction Prop, E DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	stments		·		
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	1.00	ramps/mi	TRD Adjustment	3.2	mph
FFS (measured)		mph	FFS	72.2	mph
Base free-flow Speed, BFFS	75.4	mph		12.2	mpn
LOS and Performand	e Measure:	S	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF :	x N x <i>1338</i>	pc/h/ln	v _p = (V or DDHV) / (PHF >	(N x	pc/h/ln
f _{HV} x f _p) S	69.8	mph	f _{HV} x f _p)		pc/n/m
D = v _p / S	19.2	pc/mi/ln	S		mph
1 ·	19.2 C	pc/m/m	$D = v_p / S$		pc/mi/ln
LOS	<u> </u>		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spe	eed	E _R - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume v Flow rate	D - Der FFS - Fr	-	E _T - Exhibits 11-10, 11-11	, 11-	f _{LC} - Exhibit 11-9
speed			13 f _p - Page 11-18		TRD - Page 11-
LOS - Level of service speed		Base free-flow	LOS, S, FFS, v _p - Exhibits	11 s 11-2,	
DDHV - Directional desig	n hour volume		11-3		
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	BASIC FR	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 PM	В	From/To Jurisdiction Analysis Year	I-59 to S Dade Co 2015	
Project Description PI#	0011682, SR	299 Bridge R	eplacement over I-24		
Coper.(LOS)		D	es.(N)	🗆 Planr	ning Data
Flow Inputs					
Volume, V	1920	veh/h	Peak-Hour Factor, PHF	0.91	
AADT		veh/day	%Trucks and Buses, P _T	23	
Peak-Hr Prop. of AADT, I	К		%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments		- p		
f p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	³ 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2			0.0	
Total Ramp Density, TRD) 1.00	ramps/mi			mph
FFS (measured)		mph	TRD Adjustment	3.2	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	72.2	mph
LOS and Performan	ce Measure	s	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF f _{HV} x f _p)	X N X 1419	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	(N x	pc/h/ln
Ην p [′] S	69.4	mph	f _{HV} x f _p)		·
		•	S		mph
$D = v_p / S$	20.4	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De	nsity	E _T - Exhibits 11-10, 11-11		f _{IC} - Exhibit 11-9
v _p - Flow rate	FFS - F	ree-flow	13		TRD - Page 11-
speed LOS - Level of service speed	BFFS -	Base free-flow	f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits	11 s 11-2.	The Taye IT
DDHV - Directional desig	n hour volume	9	11-3	, , , <i>,</i> ,	
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	BASIC FR	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 AM		From/To Jurisdiction Analysis Year	I-59 to S Dade Co 2015	
			eplacement over I-24		
☑ Oper.(LOS)			es.(N)	🗆 Planr	ning Data
Flow Inputs					
Volume, V AADT	1210	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.91 23	
Peak-Hr Prop. of AADT, I			%RVs, P _R	0	
Peak-Hr Direction Prop, [DDHV = AADT x K x D)	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjust	stments		I		
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			-
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	ce Measure	S	Design (N)		
<u>Operational (LOS)</u>			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF : f f)	x N x <i>894</i>	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	(N x	pc/h/ln
f _{HV} x f _p) S	75.0	mph	f _{HV} x f _p)		·
$D = v_p / S$	11.9	pc/mi/ln			mph
LOS	В	F	D = v _p / S Required Number of Lane	s N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De	nsity	E _T - Exhibits 11-10, 11-11		f _{LC} - Exhibit 11-9
v _p - Flow rate speed	FFS - F	ree-flow	13		TRD - Page 11-
LOS - Level of service speed	BFFS -	Base free-flow		11	
DDHV - Directional desig	n hour volume	9	LOS, S, FFS, v _p - Exhibits 11-3	S I I-∠,	
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	BASIC FR	EEWAY SE	GMENTS WORKSHE	ET	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WE	3
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 PM	В	From/To Jurisdiction Analysis Year	I-59 to 5 Dade C 2015	
	0011682, SF	299 Bridge R	eplacement over I-24		
Oper.(LOS)			es.(N)	🗆 Plan	ning Data
Flow Inputs					
Volume, V AADT	2690	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P_{T}	0.91 23	
Peak-Hr Prop. of AADT,	К		%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D	D	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments				
fp	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRE	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	2.0 73.1	mph
Base free-flow Speed, BFFS	75.4	mph		-	I ²
LOS and Performan	ce Measure	es	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or } DDHV) / (PHF)$	хNх		Design LOS		
	1988	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хΝх	pc/h/ln
f _{HV} x f _p)	64.0	mph	f _{HV} x f _p)		po/11/11
S D - v / S	64.2	mph	S		mph
$D = v_p / S$	31.0	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	D		Required Number of Land	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	beed	E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De		E _T - Exhibits 11-10, 11-1		
v _p - Flow rate	FFS - F	ree-flow	13		f _{LC} - Exhibit 11-9
speed LOS - Level of service	BFFS -	Base free-flow	f _p - Page 11-18	11	TRD - Page 11-
speed			LOS, S, FFS, v _n - Exhibit	s 11-2,	
DDHV - Directional desig	n hour volum	e	11-3		
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BASIC FREEWAY SEGMENTS WORKSHEET						
General Information			Site Information			
Analyst	Keith McCage		Highway/Direction of Travel	I-24 EB		
Agency or Company Date Performed Analysis Time Period	GDOT/HNTB 8/12/13		From/To Jurisdiction Analysis Year	SR 299 to US 41/64 Dade County 2035		
			eplacement over I-24			
Oper.(LOS)			es.(N)	🗆 Planı	ning Data	
Flow Inputs						
Volume, V AADT	2415	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.95 23		
Peak-Hr Prop. of AADT, I	<		%RVs, P _R	0		
Peak-Hr Direction Prop, I DDHV = AADT x K x D	D	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi		
Calculate Flow Adju	stments		·			
f _p	1.00		E _R	2.0		
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	R 0.743		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width	12.0	ft				
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph	
Number of Lanes, N	2		f _{LC}	0.0	mph	
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph	
FFS (measured)		mph	FFS	2.0 73.1	•	
Base free-flow Speed, BFFS	75.4	mph		73.1	mph	
LOS and Performan	ce Measure	S	Design (N)			
Operational (LOS)			<u>Design (N)</u> Design LOS			
v _p = (V or DDHV) / (PHF) f _{HV} x f _p)	x N x 1710	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	кNх	pc/h/ln	
S	69.4	mph	f _{HV} x f _p)			
D = v _p / S	24.6	pc/mi/ln	S		mph	
1 ·		pc/m/m	$D = v_p / S$		pc/mi/ln	
LOS	С		Required Number of Lane	es, N		
Glossary			Factor Location			
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8	
V - Hourly volume v Flow rate	D - De FFS - Fi	nsity	E _T - Exhibits 11-10, 11-11	, 11-	f _{LC} - Exhibit 11-9	
speed			13 f _p - Page 11-18		TRD - Page 11-	
LOS - Level of service speed		Base free-flow	LOS, S, FFS, v _p - Exhibits	11 s 11-2,		
DDHV - Directional design hour volume 11-3						
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BASIC FREEWAY SEGMENTS WORKSHEET						
General Information	1		Site Information			
Analyst			Highway/Direction of Travel	I-24 EB		
Agency or Company Date Performed Analysis Time Period	GDOT/HNTB 8/12/13		From/To Jurisdiction Analysis Year	SR 299 to US 41/64 Dade County 2035		
Project Description PI#	0011682, SR	299 Bridge R	eplacement over I-24			
🗹 Oper.(LOS)			es.(N)	🗆 Plan	ning Data	
Flow Inputs						
Volume, V AADT	2495	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.95 23		
Peak-Hr Prop. of AADT, I	к	i on a day	%RVs, P _R	0		
Peak-Hr Direction Prop, I DDHV = AADT x K x D	C	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi		
Calculate Flow Adju	stments		•			
f p	1.00		E _R	2.0		
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743		
Speed Inputs			Calc Speed Adj and	FFS		
Lane Width	12.0	ft				
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph	
Number of Lanes, N	2			0.0	-	
Total Ramp Density, TRD	0.67	ramps/mi	f _{LC}		mph	
FFS (measured)		mph	TRD Adjustment	2.3	mph	
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph	
LOS and Performan	ce Measure	es	Design (N)			
Operational (LOS)			<u>Design (N)</u> Design LOS			
v _p = (V or DDHV) / (PHF f v f)	x N x <i>1766</i>	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	хNх	pc/h/ln	
f _{HV} x f _p)	00 F		f _{HV} x f _p)		po/11/11	
S (C	68.5	mph	S		mph	
D = v _p / S	25.8	pc/mi/ln	$D = v_p / S$		pc/mi/ln	
LOS	С		Required Number of Lane	es, N	1-------------	
Glossary			Factor Location	,		
N - Number of lanes	S - Sp	beed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8	
V - Hourly volume	D - De	ensity	E _T - Exhibits 11-10, 11-1		f _{LC} - Exhibit 11-9	
v _p - Flow rate speed		ree-flow	13 f _p - Page 11-18		TRD - Page 11-	
LOS - Level of service speed	BFFS -	Base free-flow	LOS, S, FFS, v _n - Exhibit	11 s 11-2,		
DDHV - Directional design hour volume 11-3						
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V- Hourly volumeD- Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11 v_p - Flow rateFFS - Free-flow13TRD - Page 11speedf_p - Page 11-18TRD - Page 11LOS- Level of serviceBFFS - Base free-flow	BASIC FREEWAY SEGMENTS WORKSHEET						
ArlangsitAreality in MicCageTravelImage in MicCageAgency or CompanyGDOT/HNTBFrom/ToSR 299 to US 41/64Date PerformedAMAnalysis Year2035Project DescriptionPH 2011682, SR 299 Bridge Replacement over 1-24Planning DataFlow InputsImage in PropertiesImage in PropertiesPeak-Hour Factor, PHF0.95Volume, V1550veh/day%Trucks and Buses, PT23Peak-Hr Drop. of AADT, K%RVs, PR0General Terrain:RollingDDHV = AADT x K x Dveh/hGeneral Terrain:RollingUp/Down %Calculate Flow Adjustmentsft1.00ER2.0Fr2.5ft HV = 1/[1+PT(ET - 1) + PR(ER 0.743 - 11]11]Speed InputsCalc Speed Adj and FFSLane Width12.0ftftRt-Side Lat. Clearance6.0ftftRt-Side Lat. Clearance6.0ftftRt-Side Lat. Clearance75.4mphFFSBase free-flow Speed, 75.4mphSeign (N)Design (N)Operational (LOS)Vp = (V or DDHV) / (PHF x N xpc/hr/lnFt_V x fp)1097pc/hr/lnHy x fp)sS74.9mphSmphGlossaryFactor LocationFactor LocationFactor LocationN - Number of lanesS - SpeedFS - Base free-flowFage 11-18V - Hourly volumeD - DensityPage 11-18TRD - Page 11ClosBFFS - Base free-flow	General Information			Site Information			
Date Performed8/12/13JurisdictionDade CountyAnalysis Time PeriodAMAnalysis Year2035Project DescriptionPl# 0011682, SR 299 Bridge Replacement over I-24Flow InputsDes.(N)Planning DataVolume, V1550veh/day%Trucks and Buses, P_T 23Peak-Hr Drop. of AADT, K%RVs, P_R 0Peak-Hr Direction Prop, DGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGrade% Length f_p 1.00 E_R 2.0 E_T 2.5 $f_HV = 11(1+P_T(E_T-1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat. Clearance6.0Total Ramp Density, TRD 0.67ramps/miFFSmphBase free-flow Speed, 75.4mphBFFS1097pc/h/lnFux Y f_p)74.9Speed InputsDesign (N)Coperational (LOS) $Y_p = (V or DDHV) / (PHF x N x f_p)$ $Y_p < f_p$ 74.9Rty X f_p) P_r / S Al.6pc/mi/lnRequired Number of Lanes, NGlossaryFactor LocationN - Number of lanesS - SpeedV - Hourly volumeD - Density Y_p - Flow rateFFS - Free-flowSpeedLoS - Level of serviceBFFS - Base free-flow f_p - Page 11-18TRD - Page 11	Analyst				I-24 WB		
Flow InputsPlanning DataVolume, V1550veh/hPeak-Hour Factor, PHF0.95AADTveh/day%Trucks and Buses, P_T 23Peak-Hr Prop. of AADT, K%RVs, P_R 0Peak-Hr Direction Prop, DGeneral Terrain: <i>Bolling</i> DDHV = AADT x K x Dveh/hGrade %LengthLosfp1.00 E_R 2.0 E_T 2.5 $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat. Clearance6.0ftRt-Side Lat. Clearance6.0ftRt-Side Lat. Clearance6.0PFSmeasured)mphBase free-flow Speed, 75.4mphBFFS75.4mphFFS1097pc/h/ln $P_{\mu} \times f_p$ 74.9SolorBase free-flow Speed, 74.9LOSBPe_y / SILOSBBasestreeDesign (N)Design LOSPe_y / SPeactor LocationmphN - Number of lanesS - SpeedRequired Number of Lanes, NFFS - Free-flowN - Number of lanesS - SpeedP - Fow rateFFS - Free-flowN - Number of lanesS - SpeedCloss endEFS - Free-flowN - Number of lanesS - SpeedCloss endFFS - Free-flowN - Number of serviceBFFS - Base free-flowN - Number of serviceBFFS - Base free-flowN	Date Performed Analysis Time Period	GDOT/HNTB 8/12/13		Jurisdiction Analysis Year	Dade County		
Flow InputsVolume, V1550veh/hPeak-Hour Factor, PHF0.95AADTveh/day%Trucks and Buses, P_T 23Peak-Hr Prop. of AADT, K%RVs, P_R 0General Terrain: <i>Rolling</i> DDHV = AADT x K x Dveh/hGeneral Terrain: <i>Rolling</i> DDHV = AADT x K x Dveh/hGeneral Terrain: <i>Rolling</i> DDHV = AADT x K x Dveh/hGeneral Terrain: <i>Rolling</i> DDHV = AADT x K x Dveh/hGeneral Terrain: <i>Rolling</i> DDHV = AADT x K x Dveh/hGeneral Terrain: <i>Rolling</i> DEtr2.5f.ImplementationF2.5f.ImplementationF2.5f.ImplementationSpeed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat: Clearance6.0ftRt-Side Lat: Clearance6.0ftFFS (measured)mphBase free-flow Speed,75.4BFFS73.1Clos and Performance MeasuresDesign (N)Operational (LOS)Vp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xf _{HV} x f _p)S74.9mphD = vp / S14.6pc/mi/lnBRequired Number of Lanes, NmphD = vp / S14.6pc/mi/lnRequired Number of lanesS - SpeedN - Number of lanesS - SpeedV - Hourly volumeD - DensityVp - Flow rateFFS - Free-flow <td></td> <td>0011682, SR /</td> <td></td> <td></td> <td></td> <td></td>		0011682, SR /					
Volume, V1550veh/hPeak-Hour Factor, PHF0.95AADTveh/day%Trucks and Buses, P_T 23Peak-Hr Prop. of AADT, K%RVs, P_R 0General Terrain:RollingDDHV = AADT x K x Dveh/hGrade % Length miDHV = AADT x K x Dveh/hGrade % Length miUp/Down %Up/Down %Calculate Flow Adjustments f_p 1.00 E_R f_p 1.00 E_R T 2.5 $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2Total Ramp Density, TRD 0.67ramps/miFFS (measured)mphBFFS75.4BFFST5.4LOS and Performance MeasuresDesign (N)Operational (LOS) $\gamma_p = (V or DDHV) / (PHF x N x)$ $\gamma_p = (V or DDHV) / (PHF x N x)$ $f_{VX} f_p$)S74.9mphD = v_p / S 14.6D = v_p / S 2.5Fist Tree-flow $F_R - Exhibits 11-10, 11-12$ N - Number of IanesS - SpeedN - Number of IanesS - SpeedN - Number of IanesS - SpeedLoS - Level of serviceBFFS - Base	· · · · · · · · · · · · · · · · · · ·			es.(N)	Planr	ning Data	
AADTveh/day%Trucks and Buses, $P_T = 23$ Peak-Hr Prop. of AADT, K%RVs, $P_R = 0$ Peak-Hr Direction Prop, DGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGeneral Terrain:RollingDTVeh/hGrade% Length miUp/Down %Up/Down %Calculate Flow Adjustments f_p 1.00 E_R 2.0 E_T 2.5 $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftNumber of Lanes, N2ftTotal Ramp Density, TRD 0.67ramps/miFFS (measured)mphBase free-flow Speed,75.4BFFSDesign (N)Coperational (LOS)Design LOS $\gamma_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p$) $P_c/h/ln$ S74.9S74.9Design (N)Dogs BDesign LOSVp = (V or DDHV) / (PHF x N x) $f_{HV} x f_p$)S74.9S74.9MN - Number of lanesS- SpeedN - Number of lanesS - SpeedN - Number of lanesS - SpeedV - Hourly volumeD - Density γ_p - Flow rateFFS - Free-flowspeedLOS - Level of serviceDFFS - Base free-flowTRD - Page 11TRD - Page 11							
Peak-Hr Direction Prop, D DDHV = AADT x K x DGeneral Terrain: veh/hRolling Grade % Length mi Up/Down %Calculate Flow Adjustmentsf f p1.00E R R 		1550					
Peak-Hr Direction Prop, D DDHV = AADT x K x DGeneral Terrain: rain Up/Down %Rolling Grade % Length mi Up/Down %Calculate Flow Adjustmentsf f p1.00E R R 2.0E R R 111+P T(E T-1) + P R(E R 0.743General Terrain: Up/Down %Bolling Up/Down %Calculate Flow AdjustmentsE f HV = 1/[1+P T(E T-1) + P R(E R 0.743General Terrain: Up/Down %Bolling Up/Down %Calculate Flow AdjustmentsE R R R 0.743Speed InputsCalc Speed Adj and FFS f Lane Width12.0 ft f t f total Ramp Density, TRD 0.67 Total Ramp Density, TRD 0.67 Total Ramp Density, TRD 0.67 Total Ramp Density, TRD 0.67 Total Ramp Density, TRD 0.67 FFSCalculate Adjustment f total Ramp Density, TRD 0.67 TRD AdjustmentP R R R TRD AdjustmentP R R R TRD AdjustmentP R R R TRD AdjustmentP R R R TRD AdjustmentP R R R TRD AdjustmentP R R R TRD AdjustmentP R R R R TRD AdjustmentP R R R R R TRD AdjustmentP R R R R D S N N N N P = V_p / S R S S T A.9 S 	Peak-Hr Prop. of AADT, K	< label{eq:started_startes_started_started_startes		%RVs, P _B	0		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		1	veh/h	General Terrain: Grade % Length	0		
	Calculate Flow Adjus	stments		•			
-1))-1))Calc Speed Adj and FFSLane Width12.0ftLane Width12.0ftftNumber of Lanes, N2ftTotal Ramp Density, TRD0.67ramps/miFFS (measured)mphftBase free-flow Speed,75.4mphBFFS73.1mphDesign (N)Design (N) <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
Lane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2Total Ramp Density, TRD0.67FFS (measured)mphBase free-flow Speed,75.4BFFS73.1LOS and Performance MeasuresDesign (N)Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ 1097 $f_{HV} x f_p$) 1097 S74.9D = v_p / S 14.6DCS $v_p - (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p$)SS 74.9 N - Number of lanesS - SpeedV - Hourly volumeD - Density v_p - Flow rateFFS - Free-flowLOS - Level of serviceBFFS - Base free-flow f_p - Page 11-18TRD - Page 11	ET	2.5			8 0.743		
Rt-Side Lat. Clearance 6.0 ft f_{LW} 0.0 mphNumber of Lanes, N27 f_{LW} 0.0 mphTotal Ramp Density, TRD 0.67 ramps/min f_{LC} 0.0 mphBase free-flow Speed,mphmphFS 73.1 mphBFFS75.4mphFS 73.1 mphLOS and Performance MeasuresOperational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ 1097 pc/h/ln $f_{HV} \times f_p$ 1097 pc/h/ln $V_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} \times f_p$ 14.6 pc/mi/ln $V_p < V_p / S$ mphDos B 74.9 mph S mphLOS B B $Corr DDHV / PHF x N x$ $V_p = V_p / S$ mph $V_p = (V \text{ or DDHV}) / (PHF x N x)V_p = V_p / SmphV_p = V_p / SmphD = v_p / S14.6pc/mi/lnBBBBGlossaryBFactor LocationF_{LC} - Exhibit 11N - Number of lanesS - SpeedS - SpeedE_R - Exhibits 11-10, 11-12f_{LW} - Exhibit 11V - Hourly volumeD - DensityF_p - Page 11-18TRD - Page 11V_p - Flow rateFFS - Free-flowF_p - Page 11-18TRD - Page 11$	Speed Inputs			Calc Speed Adj and I	FFS		
Number of Lanes, N2 I_{LC} $O.67$ $I_{H,PI}$ Total Ramp Density, TRD 0.67 ramps/milFFS (measured)mphBase free-flow Speed, 75.4 mphBFFS 75.4 mphLOS and Performance MeasuresDesign (N) $V_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} \times f_p$) 1097 S 74.9 Design (N)Design $V_p < Y_S$ LOS 8 Bester P_p / S Design (N)Design LOSV_p = (V or DDHV) / (PHF x N x) $f_{HV} \times f_p$)S 74.9 Design (N)Design LOSV_p - V_p / SILOSBBBBBBBClossaryN - Number of lanesN - Number of lanesS - SpeedV - Hourly volumeD - DensityV_p - Flow rateSpeedLOS - Level of serviceBFFS - Base free-flow f_p - Page 11-18TRD - Page 11	Lane Width	12.0	ft				
Number of Lanes, N2Total Ramp Density, TRD0.67ramps/miFFS (measured)mphfLC0.0mphBase free-flow Speed,75.4mphFFS73.1mphLOS and Performance MeasuresDesign (LOS)Design (N) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p$ Design (N)S74.9mphDesign LOSV = v_p / S 14.6pc/mi/ln $f_{HV} x f_p$ S74.9mphD = v_p / S pc/h/lnLOSBFactor LocationNClossaryFactor LocationEN - Number of lanesS - SpeedE $E_R - Exhibits 11-10, 11-12$ $f_{LW} - Exhibit 11$ N - Number of lanesS - SpeedE $E_R - Exhibits 11-10, 11-11, 11-1$ $f_{LC} - Exhibit 11$ N - Number of lanesS - SpeedE $F - Page 11-18$ TRD - Page 11LOS - Level of serviceBFFS - Base free-flowTRD - Page 11TRD - Page 11	Rt-Side Lat. Clearance	6.0	ft	f _{I W}	0.0	mph	
Tamps/mi mphTamps/mi mphFFS (measured)mphBase free-flow Speed, BFFSTS.4mphBFSTRD Adjustment2.3mphGo and Performance MeasuresDesign (N)Design (N)SPop/Spop/SmphSSPop/SPop/SPop/SPop/SPop/SPop/SPop/SPop/SPop/SPop/SPop/SPop/S </td <td>Number of Lanes, N</td> <td>2</td> <td></td> <td></td> <td>0.0</td> <td>mph</td>	Number of Lanes, N	2			0.0	mph	
FFS (measured)mpnFFS73.1mphBase free-flow Speed, BFFS75.4mphFFS73.1mphLOS and Performance MeasuresDesign (N) $Operational (LOS)$ $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$)Design LOS $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$)Design LOS $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$)Design LOS $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$)Design LOS $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$)pc/h/ln S $D = v_p / S$ $D = v_p / S$ $P = (V or Duber of Lanes, N)$ mph $D = v_p / S$ $P = (V or Duber of Lanes, N)$ GlossaryFactor LocationN - Number of lanesS - Speed $V - Hourly volume$ $E_R - Exhibits 11-10, 11-12$ 13 $f_{LW} - Exhibit 11$ $f_{LC} - Exhibit 11$ 13 N - Number of lanesS - Speed $V - Hourly volume$ EFS - Free-flow $FFS - Free-flow$ $f_p - Page 11-18$ TRD - Page 11 11		0.67	•		2.3	-	
Dase free-now Speed, BFFS75.4mphLOS and Performance MeasuresDesign (N) $Operational (LOS)$ $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p)$ $Design (N)$ $Design LOSv_p = (V or DDHV) / (PHF x N x)f_{HV} x f_p)S74.9mphD = v_p / S14.6pc/mi/lnLOSBBGlossaryFactor LocationN - Number of lanesS - SpeedV - Hourly volumeD - DensityFFS - Free-flowV - Flow rateFFS - Free-flowLOSFFS - Base free-flowf_p - Page 11-18TRD - Page 11$			mph			•	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		75.4	mph		70.1	mpn	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	LOS and Performanc	e Measures	S	Design (N)			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	<u> Operational (LOS)</u>			<u>Design (N)</u>			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	v _p = (V or DDHV) / (PHF x	(N x		-			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						pc/h/ln	
LOSB B_p Required Number of Lanes, NGlossaryFactor LocationN - Number of lanesS - Speed E_R - Exhibits 11-10, 11-12 f_{LW} - Exhibit 11V - Hourly volumeD - Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11v_p - Flow rateFFS - Free-flow13TRD - Page 11-18LOS - Level of serviceBFFS - Base free-flow11			-	S		mph	
LOSBRequired Number of Lanes, NGlossaryFactor LocationN - Number of lanesS - Speed E_R - Exhibits 11-10, 11-12 f_{LW} - Exhibit 11V - Hourly volumeD - Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11v_p - Flow rateFFS - Free-flow13TRD - Page 11-18LOS - Level of serviceBFFS - Base free-flow11	1 ·		pc/mi/ln	$D = v_p / S$			
N- Number of lanesS- Speed E_R - Exhibits 11-10, 11-12 f_{LW} - Exhibit 11V- Hourly volumeD- Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11 v_p - Flow rateFFS - Free-flow13TRD - Page 11speedLOS- Level of serviceBFFS - Base free-flow f_p - Page 11-18TRD - Page 11	LOS	В		P P	s, N		
V- Hourly volumeD- Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11 v_p - Flow rateFFS - Free-flow13TRD - Page 11speedf_p - Page 11-18TRD - Page 11LOS- Level of serviceBFFS - Base free-flow11	Glossary			Factor Location			
V- Hourly volumeD- Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11 v_p - Flow rateFFS - Free-flow13TRD - Page 11speedf_p - Page 11-18TRD - Page 11LOS- Level of serviceBFFS - Base free-flow11	N - Number of lanes	S - Spe	ed	E _R - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8	
speed LOS - Level of service BFFS - Base free-flow p 13 TRD - Page 11-18 TRD - Page 11	V - Hourly volume	D - Der	nsity		, 11-		
LOS - Level of service BFFS - Base free-flow p 11 11	þ	FF9 - F(ee-now			TRD - Page 11-	
speed LOS, S, FFS, v _p - Exhibits 11-2,		BFFS - E	Base free-flow	1.		-	
DDHV - Directional design hour volume Copyright © 2012 University of Florida. All Rights Reserved $HCS 2010^{TM}$ Version 6.41 Generated: 8/20/13 8:58							

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	BASIC FR	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WB	}
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 PM		From/To Jurisdiction Analysis Year	SR 299 Dade Co 2035	to US 41/64 ounty
			eplacement over I-24		
Oper.(LOS)			es.(N)	Plan	ning Data
Flow Inputs			<u> </u>		
Volume, V AADT	3435	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.95 23	
Peak-Hr Prop. of AADT, I	<		%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments		•		
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_F - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	2.0 73.1	•
Base free-flow Speed, BFFS	75.4	mph		73.1	mph
LOS and Performan	ce Measure	es	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF f _{HV} x f _p)	2432 X N X	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	(N x	pc/h/ln
S	52.3	mph	f _{HV} x f _p)		-
$D = v_p / S$	46.5	pc/mi/ln	S		mph
LOS	40.5 F	pc/111/11	$D = v_p / S$		pc/mi/ln
LU3	Γ		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _R - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De	ensity	E _T - Exhibits 11-10, 11-11	, 11-	f _{LC} - Exhibit 11-9
v _p - Flow rate speed	FF2-F	ree-flow	13 f _ Page 11-18		TRD - Page 11-
LOS - Level of service speed	BFFS -	Base free-flow		11 11-2	Ŭ
DDHV - Directional desig	n hour volume	9	LOS, S, FFS, v _p - Exhibits 11-3	, , , , , , , , , , , , , , , , , , ,	
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	BASIC FRE	EWAY SE	GMENTS WORKSH	IEET	
General Information			Site Information		
	Kaith McCar		Highway/Direction of	I-24 EB	
Analyst	Keith McCag	le	Travel		(/ OB 000
Agency or Company	GDOT/HNTE	3	From/To	SR 299 01 ramp	ff to SR 299 on
Date Performed	8/12/13		Jurisdiction	Dade Cou	inty
Analysis Time Period	AM		Analysis Year	2035	-
Project Description PI#	0011682, SR				
Oper.(LOS)			es.(N)	🗆 Plannir	ng Data
Flow Inputs			<u> </u>		
Volume, V	2105	veh/h	Peak-Hour Factor, PH		
AADT		veh/day	%Trucks and Buses, I	Р _Т 23	
Peak-Hr Prop. of AADT, k	K		%RVs, P _R	0	
Peak-Hr Direction Prop, D)		General Terrain:	Rolling	
DDHV = AADT x K x D		veh/h	Grade % Lengt		
Coloulata Flow Adiw			Up/Dowr	1 %	
Calculate Flow Adjus					
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + F_T - 1)]$	° _R (E _R 0.743	
Speed Inputs			Calc Speed Adj a	nd FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	73.1	mph
Base free-flow Speed, BFFS	75.4	mph	110	70.1	трп
LOS and Performance	e Measure	S	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_{p} = (V \text{ or DDHV}) / (PHF)$	(N x		Design LOS		
P	1490	pc/h/ln	$v_p = (V \text{ or } DDHV) / (P)$	HF x N x	pc/h/ln
f _{HV} x f _p)			f _{HV} x f _p)		pc/n/m
S / C	72.3	mph	S		mph
$D = v_p / S$	20.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of L	anes N	1
Glossary			Factor Location		
N - Number of lanes	S - Sp	and	$E_{\rm p}$ - Exhibits 11-10, 1	1-12 f	_{LW} - Exhibit 11-8
V - Hourly volume	D - Dei		11		LW LXIII C
v - Flow rate	FFS - Fr	•	E _T - Exhibits 11-10, 1	f,	_{LC} - Exhibit 11-9
þ	110 11		13		 FRD - Page 11-
speed LOS - Level of service	BFFS - F	Base free-flow	f _p - Page 11-18	11	ind raye in-
speed			LOS, S, FFS, v _p - Exh		
DDHV - Directional desigr	n hour volume		11-3	,	
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	BASIC FRE	EWAY SE	GMENTS WORKSHE	EET	
General Information			Site Information		
	Kaith MaCar	×0	Highway/Direction of		
Analyst	Keith McCag	le	Travel	I-24 EB	
Agency or Company	GDOT/HNTE	3	From/To		ff to SR 299 on
Date Performed	8/12/13		Jurisdiction	ramp Dade Coι	intv
Analysis Time Period	PM		Analysis Year	2035	
Project Description PI#	0011682, SR	299 Bridge R	eplacement over I-24		
Coper.(LOS)			es.(N)	🗆 Plannii	ng Data
Flow Inputs					
Volume, V	2290	veh/h	Peak-Hour Factor, PHF		
AADT		veh/day	%Trucks and Buses, P ₁	г <i>23</i>	
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 ^c	%	
Calculate Flow Adjus	stments				
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R]$ - 1)]	^{(E} R <i>0.743</i>	
Speed Inputs			Calc Speed Adj and	d FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	•
FFS (measured)		mph	FFS	2.3 73.1	mph
Base free-flow Speed, BFFS	75.4	mph	FF5	73.1	mph
LOS and Performand	ce Measure	S	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_{p} = (V \text{ or DDHV}) / (PHF)$	x N x		Design LOS		
P	1621	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PH)$	FxNx	no/h/ln
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S	70.7	mph	S		mph
$D = v_p / S$	22.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		P Required Number of La	ines N	p0,111,111
Glossary			Factor Location		
	0 0 0		$E_{\rm p}$ - Exhibits 11-10, 11-	-12 f	LW - Exhibit 11-8
N - Number of lanes	S - Sp		1 11		LW - LXIIIbit 11-0
V - Hourly volume v Flow rate	D - Dei FFS - Fr	•	E _T - Exhibits 11-10, 11-	·11, 11- f	_{LC} - Exhibit 11-9
þ	1 F3 - FI		13		
speed LOS - Level of service	RFFS - I	Base free-flow	f _p - Page 11-18	11	FRD - Page 11-
speed			LOS, S, FFS, v _p - Exhit		
DDHV - Directional design	n hour volume		11-3	·- · -,	
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	BASIC FRE	EWAY SEC	GMENTS WORKSHE	ET	
General Information			Site Information		
Analyst	Keith McCag	ie	Highway/Direction of Travel	I-24 WB	
Agency or Company	GDOT/HNTE	3	From/To	SR 299 c ramp	off to SR 299 on
Date Performed Analysis Time Period	8/12/13 AM		Jurisdiction Analysis Year	Dade Co 2035	unty
Project Description PI#		299 Bridge R		2000	
✓ Oper.(LOS)		Ū.	es.(N)	🗆 Plann	ing Data
Flow Inputs			()		<u> </u>
Volume, V	1410	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P _T	23	
	,	von/day	i.		
Peak-Hr Prop. of AADT, K			%RVs, P _R	0 De#ier	
Peak-Hr Direction Prop, D DDHV = AADT x K x D	I	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adjus	etmonte			,	
			с	0.0	
f _p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi			•
FFS (measured)		mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performand	e Measure	S	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF >	998	pc/h/ln	$v_{p} = (V \text{ or } DDHV) / (PHF)$	хNх	
f _{HV} x f _p)		P e <i>i i i i i i i</i>	f _{HV} x f _p)		pc/h/ln
S	75.0	mph	'HV '`p'		mph
$D = v_p / S$	13.3	pc/mi/ln			mph
LOS	В		$D = v_p / S$		pc/mi/ln
			Required Number of Lan	les, N	
Glossary			Factor Location		
N - Number of lanes	S - Spe	eed	E _R - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Der	nsity	E _T - Exhibits 11-10, 11-1	1, 11-	
v _p - Flow rate	FFS - Fr	ee-flow	13		f _{LC} - Exhibit 11-9
speed			f - Page 11-18		TRD - Page 11-
LOS - Level of service	BFFS - E	Base free-flow		11	-
speed			LOS, S, FFS, v _p - Exhibi	ts 11-2,	
DDHV - Directional desigr	1 hour volume		11-3		
DDHV - Directional design			11-3 HCS 2010 [™] Version 6.4 [°]	Gonorato	d. 9/20/12 9.52

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	BASIC FRE	EWAY SE	GMENTS WORKSHEI	ET	
General Information			Site Information		
Analyst	Keith McCag	je	Highway/Direction of Travel	I-24 WB	
Agency or Company	GDOT/HNT	3	From/To	SR 299 of ramp	ff to SR 299 on
Date Performed Analysis Time Period	8/12/13 PM		Jurisdiction Analysis Year	Dade Cou 2035	inty
Project Description PI#		299 Bridge R			
Oper.(LOS)		D	es.(N)	🗆 Plannir	ng Data
Flow Inputs					
Volume, V	3200	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P_{T}	23	
Peak-Hr Prop. of AADT, k	<	-	%RVs, P _B	0	
Peak-Hr Direction Prop, D			General Terrain:	Rolling	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	stments				
f _p	1.00		E _B	2.0	
E _T	2.5		$F_{\text{HV}} = 1/[1+P_{\text{T}}(\text{E}_{\text{T}} - 1) + P_{\text{R}}(\text{E}_{\text{T}})$		
	2.0		- 1)]		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	mph
FFS (measured)		mph	FFS	73.1	mph
Base free-flow Speed, BFFS	75.4	mph		70.7	mpn
LOS and Performance	e Measure	s	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
v _p = (V or DDHV) / (PHF)	x N x		Design LOS		
P P	2265	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF)$	хΝх	no/h/ln
f _{HV} x f _p)			f _{HV} x f _p)		pc/h/ln
S	57.3	mph	S		mph
$D = v_p / S$	39.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	E		P Required Number of Lan	es N	po/m/m
Glossary			Factor Location	c3, IN	
			$E_{\rm B}$ - Exhibits 11-10, 11-1	2 f	LW - Exhibit 11-8
N - Number of lanes	S - Sp		1 ''		
V - Hourly volume v _p - Flow rate	D - Dei FFS - Fr	•	E _T - Exhibits 11-10, 11-1 13	1, 11- f	_{LC} - Exhibit 11-9
speed			f - Page 11-18		RD - Page 11-
LOS - Level of service	BFFS - I	Base free-flow	'l'	11	
speed DDHV - Directional desigr	n hour volume		LOS, S, FFS, v _p - Exhibit 11-3	s 11-2,	
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speed LOS - Level of service BFFS - Base free-flow f_p - Page 11-18 TRD - Page 11 speed DDLW - Directional design hour values		BASIC FR	EEWAY SEC	GMENTS WORKSHEE	T	
AldaystNet/INVC202Trivel $r24 \pm D$ Agency or CompanyGDOT/HNTBFrom/To $l-59$ to SR 299Date PerformedAMAnalysis Year2035Project DescriptionPH 0011682, SR 299 Bridge Replacement over l-24Planning DataFlow InputsPeak-Hour Factor, PHF0.95Volume, V2295veh/day%Trucks and Buses, PT23Peak-Hr Prop. of AADT, K%RVs, PR0Peak-Hr Direction Prop, DGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGrade %Length miLane Width1.00ER2.0ET2.5fHV = 1/[1+PT(ET-1) + PR(ER 0.743 - 1)]Speed InputsCalc Speed Adj and FFSLane Width12.0ftRFS (de Lat, Clearance 6.0ftNumber of Lanes, N2FFS (measured)mphBase free-flow Speed, 75.4mphFFS (measured)Design (N)Operational (LOS)CVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (Nor DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (V or DDHV) / (PHF x N xVp = (N or DDHV) / (PHF x N x <td< th=""><th>General Information</th><th>1</th><th></th><th>Site Information</th><th></th><th></th></td<>	General Information	1		Site Information		
Agency or Company Date Performed <i>GDDT/HNTB</i> 8/12/13From/To Jurisdiction <i>I-59</i> to SR 299 Dade County Analysis YearProject Description <i>Plif 0011682, SR 299 Bridge Replacement over I-24</i> IP Oper.(LOS)Des.(N)Planning Data <i>Flow Inputs</i> Des.(N)Planning DataVolume, V AADT2295veh/h veh/dayPeak-Hour Factor, PHF %Trucks and Buses, P T 	Analyst	Keith McCa	ge		I-24 EB	
Project Description <i>Plit 0011682, SR 299 Bridge Replacement over 1-24</i> P Oper (LOS)Des.(N)Planning DataVolume, V2295veh/hPeak-Hour Factor, PHF0.95AADTveh/hPeak-Hour Factor, PHF0.95AADTveh/hPeak-Hour Factor, PHF0.95AADTveh/hPeak-Hour Factor, PHF0.95Peak-Hr Direction Prop, DGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGrade % Length miUp/Down %Calculate Flow Adjustmentsfp1.00ER R2.0ER Total Ramp Density, TRD 1.00ramps/mi ftTRD Adjustment3.2mphDesign (N)Operational (LOS)vp = (V or DDHV) / (PHF x N x ft v X fp)fig. 67.9S ft v X fp)Grade S ft weight Mathematical Mat	Date Performed	<i>8/12/13</i>	В	From/To Jurisdiction	Dade County	
Flow InputsPlanning DataVolume, V2295veh/hPeak-Hour Factor, PHF0.95AADTveh/day%Trucks and Buses, P_T 23Peak-Hr Direction Prop, D%RVS, P_R 0DHV = AADT x K x Dveh/hGeneral Terrain:RollingDHV = AADT x K x Dveh/hGeneral Terrain:Rollingfp1.00 E_R 2.0 E_T 2.5 $f_{HV} = 1/(1+P_T(E_T-1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2Dotal Ramp Density, TRD1.00ramps/miFFS(Mapped)mphBase free-flow Speed, 75.4mphBFFS67.9mphLOS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS67.9mphS7.2mphS67.9mphS7.9mphS67.9mphS7.9mphS67.9mphS7.9mphS67.9mphS6mphS67.5			299 Bridge R			
Volume, V2295veh/hPeak-Hour Factor, PHF0.95AADTveh/day%Trucks and Buses, P_T 23Peak-Hr Prop. of AADT, K%RVs, P_R 0Peak-Hr Direction Prop, DGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGeneral Terrain:RollingDENV = AADT x K x Dveh/hGeneral Terrain:RollingTotal Ramp Density, TRD 1.00ramps/miftft.Nemsored Lanes, N2mphFFST2.2Design (N)FFST2.2mphGeneral (LOS)Design (N)Design (N)Operational (LOS)CRequired Number of Lanes, NYe (V or DDHV) / (PHF x N xft/y x fp)mphS67.9mphSD = v_p / S23.9pc/mi/lnRequired Number of Lanes, NGeneral Number of Lanes, NGlossaryFactor Locationft_W - Exhibits 11-10, 11-11, 11-11, 11-11, 11-11, 12V - Hourly				•	🗆 Planı	ning Data
Volume, V2295veh/hPeak-Hour Factor, PHF0.95AADTveh/day%Trucks and Buses, P_T 23Peak-Hr Prop. of AADT, K%RVs, P_R 0Peak-Hr Direction Prop, DGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGeneral Terrain:RollingDDHV = AADT x K x Dveh/hGeneral Terrain:RollingDENV = AADT x K x Dveh/hGeneral Terrain:RollingTotal Ramp Density, TRD 1.00ramps/miftft.Nemsored Lanes, N2mphFFST2.2Design (N)FFST2.2mphGeneral (LOS)Design (N)Design (N)Operational (LOS)CRequired Number of Lanes, NYe (V or DDHV) / (PHF x N xft/y x fp)mphS67.9mphSD = v_p / S23.9pc/mi/lnRequired Number of Lanes, NGeneral Number of Lanes, NGlossaryFactor Locationft_W - Exhibits 11-10, 11-11, 11-11, 11-11, 11-11, 12V - Hourly	Flow Inputs					-
Peak-Hr Prop. of AADT, K%RVs, P R0 General Terrain:Rolling Rolling 	Volume, V	2295				
DDHV = AADT x K x Dveh/hGradeLengthmi Up/Down %Calculate Flow Adjustments f_p 1.00 E_R 2.0 E_T 2.5 $f_{HV} = 1/(1+P_T(E_T-1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2ftTotal Ramp Density, TRD 1.00ramps/miFFS (measured)mphBase free-flow Speed, PFFS75.4Design (N)Design (N)Operational (LOS)Design LOS $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p)$ Design LOSS67.9mphS67.9mphLOSCRequired Number of Lanes, NGlossaryFactor LocationN - Number of lanesS - SpeedN - N	Peak-Hr Prop. of AADT, I	К	,	%RVs, P _R		
Calculate Flow Adjustments f_p 1.00 E_R 2.0 E_T 2.5 $f_{HV} = 1/(1+P_T(E_T-1) + P_R(E_R 0.743)$ Speed InputsCalc Speed Adj and FFSLane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2Total Ramp Density, TRD1.00ramps/miFFS (measured)mphBase free-flow Speed,75.4BFFS72.2LOS and Performance MeasuresDesign (N)Operational (LOS) $\gamma_p = (V \text{ or DDHV}) / (PHF x N x)$ $r_{HV} x f_p$)67.9S67.9S67.9MphSColssaryFactor LocationN - Number of lanesS - SpeedC - bensity $F_R - Exhibits 11-10, 11-12$ $r_p - Flow rate$ FFS - Free-flowspeedBFFS - Base free-flowLOS - Level of serviceBFFS - Base free-flow $r_p - PRU = 0$ BFFS - Base free-flow $r_p - PRU = 0$ BFFS - Base free-flow $r_p - PRU = 0$ D - Density $r_p - PRU = 0$ TRD - Page 11LOS - Level of serviceBFFS - Base free-flowSpeedDDU// Directionel design berry provideDDU// Directionel design berry provideBFFS - Base free-flowSpeedDDU// Directionel design berry provideDDU// Directionel design berry provideD - DensitySpeedDDU// Directionel design berry provideDDU// Directionel design berry provideD -		C	veh/h	Grade % Length	-	
	Calculate Flow Adju	stments		- F		
E_T 2.5 $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R 0.743)$ -1)]Speed InputsLane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2Total Ramp Density, TRD 1.00ramps/miFFS (measured)mphBase free-flow Speed, BFFS75.4Derivational (LOS)Design (N)Operational (LOS)Design (N) $V_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} \times f_p)$ Design (N)DogsDesign (N)Design LOSN $V_p = V_p / S$ 23.9CostFactor LocationN - Number of lanesS - SpeedN - Number of lanesS - SpeedN - Number of lanesS - SpeedV - Hourly volumeD - DensityV - Flow rateFFS - Free-flowSpeedBFFS - Base free-flowLOS - Level of serviceBFFS - Base free-flowDen U/Directional design how underge				E _R	2.0	
Lane Width12.0ftRt-Side Lat. Clearance6.0ftNumber of Lanes, N2Total Ramp Density, TRD1.00ramps/miFFS (measured)mphBase free-flow Speed,75.4BFFS72.2Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p$)S67.9Design (N)Design (N)N - Number of lanesN - Number of lanesN - Number of lanesN - Number of lanesN - Number of lanesS - SpeedLOS - Level of serviceBFFS - Base free-flowSpeedLOS - Level of serviceBFFS - Base free-flowSpeedDN LVDiscriptional design have values		2.5			^R 0.743	
Rt-Side Lat. Clearance6.0ftNumber of Lanes, N2Total Ramp Density, TRD1.00ramps/miFFS (measured)mphBase free-flow Speed,75.4BFFS72.2Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} \times f_p$)S67.9D = v_p / S 23.9LOSCGlossaryN - Number of lanesS - SpeedV - Hourly volumeD - DensityV - Hourly volumeD - DensityV - Flow rateFFS - Free-flowLOS - Level of serviceBFFS - Base free-flowSpeedDDL W. Diractioned design how underseDDL W. Diractioned design how underse	Speed Inputs			Calc Speed Adj and	FFS	
Number of Lanes, N 2 Total Ramp Density, TRD 1.00 ramps/mi FFS (measured) mph Base free-flow Speed, 75.4 mph ECV or DDHV / (PHF x N x $f_{HV} \times f_p$) for the function of the function o	Lane Width	12.0	ft			
Number of Lanes, N2Total Ramp Density, TRD1.00ramps/miFFS (measured)mphBase free-flow Speed,75.4mphBFFS75.4mphLOS and Performance MeasuresDerational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p$)1625S67.9B = v_p / S 23.9LOSCB = v_p / S 23.9LOSCB = v_p / S23.9LOSCB = v_p / S23.9LOSCB = v_p / S23.9LOSCB = v_p / S23.9LOSCB = v_p / SLOSCB = 0 - DensityV - Hourly volumeD - DensityV - Flow rateFFS - Free-flowSpeedDiractional design barrowLOS- Level of serviceB = FFS - Base free-flowSpeedDiractional design barrowD = V_p / Diractional d	Rt-Side Lat. Clearance	6.0	ft	f _{I W}	0.0	mph
Total Hamp Density, TRD 7.00ramps/mi mphTRD Adjustment3.2mphFFS (measured)mphmphFFS72.2mphBase free-flow Speed, BFFS75.4mphFFS72.2mphDesign (N)Design (N)Design (N)Design LOSVp = (V or DDHV) / (PHF x N xPesign (N) $f_{HV} \times f_p$)1625pc/h/lnDesign LOSVp = (V or DDHV) / (PHF x N xpc/h/ln $f_{HV} \times f_p$)67.9mphSmphD = v_p / S23.9pc/mi/lnSpc/mi/lnLOSCFactor LocationFactor LocationN - Number of lanesS - SpeedFactor LocationER - Exhibits 11-10, 11-12fLW - Exhibit 11V - Hourly volumeD - DensityFactor LocationFactor LocationTRD - Page 11LOS - Level of serviceBFFS - Base free-flowfp - Page 11-18TRD - Page 11LOS, S, FFS, v_p - Exhibits 11-2,Duivide page 11LOS, S, FFS, v_p - Exhibits 11-2,TRD - Page 11	,				0.0	mph
FFS (measured)mpnFFS72.2mphBase free-flow Speed, BFFS75.4mphFFS72.2mphLOS and Performance MeasuresDesign (N)Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p)$ Design (N)S67.9mphD = v_p / S 23.9pc/mi/lnLOSCFactor LocationMomber of lanesS- SpeedV - Hourly volumeD - Density $FFS - Free-flow$ SpeedLOS - Level of serviceBFFS - Base free-flowLOS - Level of serviceBFFS - Base free-flow $f_p - Page 11-18$ DDLIVDirectioned design how used upon f_1		0 1.00	•		32	-
Def rsDesign (N)LOS and Performance MeasuresDesign (N) $Operational (LOS)$ $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$) $Design (N)$ Design LOS $v_p = (V or DDHV) / (PHF x N x)$ $f_{HV} x f_p$)S67.9 mph S67.9 mph D = v_p / S P_p / S 23.9 pc/mi/ln CLOSC P_p / S C P_p / S Pequired Number of Lanes, NGlossaryFactor LocationN - Number of lanesS - Speed D - Density P - Flow rate FFS - Free-flow FFS - Free-flowN - Number of serviceBFFS - Base free-flow speed F_p - Page 11-18 LOS, S, FFS, v_p - Exhibits 11-2,DDUWDirectional design how underge11 LOS, S, FFS, v_p - Exhibits 11-2,	Base free-flow Speed,	75.4	•	· ·		•
Design (N)Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N x)$ $f_{HV} x f_p$)S67.9 mphD = v_p / S 23.9 pc/mi/lnLOSCFactor LocationN - Number of lanesS - SpeedV - Hourly volumeD - Density v_p - Flow rateFFS - Free-flowSpeedFFS - Free-flowLOSLOS - Level of serviceDENLIVDesign LOSV - Double of lanes hour volumeD - DensityFFS - Free-flowTRD - Page 11-18LOS - Level of serviceBFFS - Base free-flowSpeedLOS, S, FFS, v_p - Exhibits 11-2,DULVDirectional design hour volume		ce Measure	•	Design (N)		
$ \begin{array}{c} V_{p} = (V \text{ or } DDHV) / (PHF x N x \\ f_{HV} \times f_{p}) \\ S \\ D = v_{p} / S \\ LOS \\ C \\ \end{array} \begin{array}{c} 67.9 \\ 23.9 \\ C \\ \end{array} \begin{array}{c} 67.9 \\ pc/mi/ln \\ C \\ \end{array} \begin{array}{c} F_{HV} \times f_{p}) \\ S \\ D = v_{p} / S \\ C \\ \end{array} \begin{array}{c} 0 = v_{p} / S \\ P_{p} = (V \text{ or } DDHV) / (PHF x N x \\ f_{HV} \times f_{p}) \\ S \\ D = v_{p} / S \\ P_{p} $						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		v N v		Design LOS		
S 67.9 mph $HV p'$ p' mphD = v_p / S 23.9 pc/mi/ln $D = v_p / S$ $pc/mi/ln$ LOSCFactor LocationGlossaryFactor LocationN - Number of lanesS - Speed E_R - Exhibits 11-10, 11-12 f_{LW} - Exhibit 11V - Hourly volumeD - Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11V - Hourly volumeD - Density F_p - Page 11-18TRD - Page 11LOS - Level of serviceBFFS - Base free-flow f_p - Page 11-18TRD - Page 11DDI W. Directional design bour volumeDout volume11		1625	pc/h/ln	P	(N X	pc/h/ln
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		67.9	mph	'HV ^ 'p'		mah
LOSC $E = v_p + C$ pc/mi/mRequired Number of Lanes, NGlossaryN - Number of lanesS - SpeedV - Hourly volumeD - Density v_p - Flow rateFFS - Free-flowSpeed E_T - Exhibits 11-10, 11-11, 11-LOS - Level of serviceBFFS - Base free-flowSpeed11LOS - Level of serviceBFFS - Base free-flowSpeed11DDUWDirectioned basian bour volume	$D = v_n / S$	23.9	pc/mi/ln			•
GlossaryFactor LocationN - Number of lanesS - Speed E_R - Exhibits 11-10, 11-12 f_{LW} - Exhibit 11V - Hourly volumeD - Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11v_p - Flow rateFFS - Free-flow13TRD - Page 11-18SpeedLOS - Level of serviceBFFS - Base free-flow11LOS - Level of serviceBFFS - Base free-flow11		С	·		es N	pc/mi/in
N - Number of lanesS - Speed E_R - Exhibits 11-10, 11-12 f_{LW} - Exhibit 11V - Hourly volumeD - Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11 v_p - Flow rateFFS - Free-flow13TRD - Page 11speedTRD - Page 11-18TRD - Page 11LOS - Level of serviceBFFS - Base free-flow11SpeedLOS, S, FFS, v_p - Exhibits 11-2,	Glossarv					
V- Hourly volumeD- Density E_T - Exhibits 11-10, 11-11, 11- f_{LC} - Exhibit 11- v_p - Flow rateFFS - Free-flow13TRD - Page 11speedIf p - Page 11-1811I1LOS- Level of serviceBFFS - Base free-flow11speedI1LOS, S, FFS, v_p - Exhibits 11-2,		<u>S</u> - Sr	beed	ł	2	f., Exhibit 11-8
speed LOS - Level of service BFFS - Base free-flow f_p - Page 11-18 TRD - Page 11 LOS, S, FFS, v_p - Exhibits 11-2, DDLV/ Directional design hour volume	V - Hourly volume	D - De	ensity	E _T - Exhibits 11-10, 11-11		f _{LC} - Exhibit 11-9
speed DDUV Directional design hour volume	speed			f - Page 11-18		TRD - Page 11-
DDHV - Directional design hour volume	speed			· [·		
	DDHV - Directional desig	n hour volume	9	11-3		

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	BASIC FR	EEWAY SEC	GMENTS WORKSHEE	ET	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 EB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 PM	B	From/To Jurisdiction Analysis Year	I-59 to SR 299 Dade County 2035	
	0011682, SR	299 Bridge R	eplacement over I-24		
✓ Oper.(LOS)			es.(N)	🗆 Plan	ning Data
Flow Inputs					
Volume, V AADT	2435	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P_{T}	0.95 23	
Peak-Hr Prop. of AADT, I	К	,	%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D	D	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments		·		
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R <i>0.743</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0 1.00	ramps/mi	TRD Adjustment	3.2	mph
FFS (measured)		mph	FFS	72.2	mph
Base free-flow Speed, BFFS	75.4	mph		,	
LOS and Performan	ce Measure	es	Design (N)		
Operational (LOS)			Design (N)		
$v_p = (V \text{ or } DDHV) / (PHF)$	хNх		Design LOS		
	1724	pc/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хΝх	pc/h/ln
f _{HV} x f _p)	<u> </u>	ina ia la	f _{HV} x f _p)		pomm
S D y / S	66.8	mph	S		mph
$D = v_p / S$	25.8	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	əs, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	beed	E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De	ensity	E _T - Exhibits 11-10, 11-1		f _{LC} - Exhibit 11-9
v _p - Flow rate speed	FFS - F	ree-flow	13		TRD - Page 11-
LOS - Level of service	BFFS -	Base free-flow		11	•
speed			LOS, S, FFS, v _p - Exhibit	s 11-2,	
DDHV - Directional desig	n hour volume	9	11-3		
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	BASIC FR	EEWAY SEC	GMENTS WORKSHEE	Т	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WB	
Agency or Company Date Performed Analysis Time Period	GDOT/HNT 8/12/13 AM	В	From/To Jurisdiction Analysis Year	I-59 to Si Dade Co 2035	
		299 Bridge R	eplacement over I-24	2000	
✓ Oper.(LOS)			es.(N)	Plann	ing Data
Flow Inputs					
Volume, V	1535	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P _T	23	
Peak-Hr Prop. of AADT, I	K		%RVs, P _R	0	
Peak-Hr Direction Prop, [DDHV = AADT x K x D	C	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments		Ι		
f _p	1.00		E _R	2.0	
E _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	R 0.743	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2			0.0	-
Total Ramp Density, TRD	0.67	ramps/mi	f _{LC}		mph
FFS (measured)		, mph	TRD Adjustment	2.3	mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performan	ce Measure	s	Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF :	x N x 1087	pc/h/ln	$v_{p} = (V \text{ or } DDHV) / (PHF)$	< N x	
f _{HV} x f _p)	1007	pc/11/11	P		pc/h/ln
S	74.9	mph	f _{HV} x f _p)		
$D = v_p / S$	14.5	pc/mi/ln	S (a		mph
LOS	B	po/m/m	$D = v_p / S$		pc/mi/ln
LU3	В		Required Number of Lane	es, N	
Glossary			Factor Location		
N - Number of lanes	S - Sp	eed	E _B - Exhibits 11-10, 11-12	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De	ensity	E _T - Exhibits 11-10, 11-11	4.4	f _{LC} - Exhibit 11-9
v _p - Flow rate speed	rro-r	ree-flow	13 f Page 11 18		TRD - Page 11-
LOS - Level of service	BFFS -	Base free-flow	f - Page 11-18 / ^p	11	
speed			LOS, S, FFS, v _p - Exhibits	s 11-2,	
DDHV - Directional desig	n hour volume	e	р 11-3		
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ET	
General Information	1		Site Information		
Analyst	Keith McCa	ge	Highway/Direction of Travel	I-24 WE	}
Agency or Company Date Performed Analysis Time Period	GDOT/HN1 8/12/13 PM	В	From/To Jurisdiction Analysis Year	l-59 to 5 Dade C 2035	
		299 Bridae R	eplacement over I-24	2000	
Oper.(LOS)			es.(N)	🗆 Plan	ning Data
Flow Inputs					•
Volume, V AADT	3440	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.95 23	
Peak-Hr Prop. of AADT, I	K	von/day	%RVs, P _R	0	
Peak-Hr Direction Prop, I DDHV = AADT x K x D	D	veh/h	General Terrain: Grade % Length Up/Down %	Rolling mi	
Calculate Flow Adju	stments		·		
f p	1.00		E _R	2.0	
Ε _T	2.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_T - 1)]$	^R <i>0.743</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width	12.0	ft			
Rt-Side Lat. Clearance	6.0	ft	f _{LW}	0.0	mph
Number of Lanes, N	2		f _{LC}	0.0	mph
Total Ramp Density, TRD	0.67	ramps/mi	TRD Adjustment	2.3	•
FFS (measured)		mph	-		mph
Base free-flow Speed, BFFS	75.4	mph	FFS	73.1	mph
LOS and Performan	ce Measure	es	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
$v_p = (V \text{ or } DDHV) / (PHF)$	X N X	no/h/ln	$v_p = (V \text{ or } DDHV) / (PHF)$	хNх	
f _{HV} x f _p)	2435	pc/h/ln	$f_{HV} \times f_p$		pc/h/ln
S	52.2	mph	S		mph
$D = v_p / S$	46.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	F		Required Number of Land	es, N	pc/m/m
Glossary			Factor Location		
N - Number of lanes	S - Sp	beed	E _B - Exhibits 11-10, 11-1	2	f _{LW} - Exhibit 11-8
V - Hourly volume	D - De		E _T - Exhibits 11-10, 11-1		f _{LC} - Exhibit 11-9
speed			13 f _p - Page 11-18		TRD - Page 11-
LOS - Level of service speed		Base free-flow	LOS, S, FFS, v _p - Exhibit	11 s 11-2,	
DDHV - Directional desig	n hour volum	e	11-3		
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A			RAMP JUN							
General Inf	ormation	1		S	ite Info	rmatio	on			
Analyst Agency or Comp Date Performed Analysis Time Pe	any GDC 8/12	h McCage DT/HNTB /13	Ju Ju	eeway/Dir of Inction Irisdiction nalysis Year		I-24 EB SR 299 Dade Co 2013	ounty			
Project Description		Bridge Benla		lalysis teal		2013				
Inputs	511 0112331	Jiluge Hepid								
mpulo		Freeway N	umber of Lanes,	N 2						
Upstream Adj Ra	ımp		ber of Lanes, N	1						eam Adj
🗹 Yes 🛛 🗆 O	n	Acceleratio	n Lane Length, I	1500					Ramp	
□ No ☑ O	ff	Deceleratio	n Lane Length L	Ð					I Yes I No	□ On □ Off
L _{up} = 1200	ft	Freeway Vo	olume, V _F	1670						
105		Ramp Volu	me, V _R	190					L _{down} =	ft
V _u = 105 veh/	′h		ee-Flow Speed,	S _{EE} 70.0					V _D =	veh/h
			-Flow Speed, S _r							
Conversior	to no/h	<u> </u>	1	11						
Conversion	1				1					HF x f _{HV} x
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _H	v	f _p	f p	'' ^ 'HV ^
Freeway	1670	0.91	Rolling	23	0	0.74	3	1.00	2	468
Ramp	190	0.91	Rolling	19	0	0.77	8	1.00	2	268
UpStream	105	0.91	Rolling	25	0	0.72	7	1.00	1	159
DownStream					ļ					
F atimatian	N	lerge Areas					Dive	erge Areas		
Estimation	or v ₁₂				Estima		^{01 V} 12			
	$V_{12} = V_{F}$	(Equation 13-6 or 13-			$V_{12} = V_R + (V_F - (Equal))$			(Equat	ation 13-12 or 13-	
L _{EQ} =	7	•						/ -		
P _{FM}	7 1	•	g Equation)		P _{FD} =			using E 13-7)	Equation	(Exhibit
P _{FM}	7 1 (.000 usin						using E 13-7) pc/h		
P _{FM} = V ₁₂ =	7 1 (2 0	.000 usin Exhibit 13-6 468 pc/h pc/h (Ec			P _{FD} = V ₁₂ =	4		using E 13-7) pc/h pc/h (Ec	Equation quation 13-	
P _{FM} = V ₁₂ = V ₃ or V _{av34}	7 1 (2 0 0	.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17)) quation 13-14		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V	/ _{av34} > 2		using E 13-7) pc/h pc/h (Ec 17) ? □ Yes	quation 13-	
PFM = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} >	7 1 (2 0 0 2,700 pc/h? [.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17) Yes ☞ N) Juation 13-14 No		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V	/ _{av34} > 2		using E 13-7) pc/h pc/h (Ec 17)	quation 13-	
$L_{EQ} =$ P_{FM} $=$ $V_{12} =$ $V_3 \text{ or } V_{av34}$ $Is V_3 \text{ or } V_{av34} >$ $Is V_3 \text{ or } V_{av34} >$ $Is V_3 \text{ or } V_{av34} =$	7 1 (2 0 2,700 pc/h? [1.5 * V ₁₂ /2 [.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17) Yes ♥ ₪) quation 13-14 No No ation 13-16,		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V	/ _{av34} > 2 / _{av34} > 1		using E 13-7) pc/h pc/h (Ec 17) ? ☐ Yes ↓ 2 ☐ Yes ↓ pc/h (E	quation 13-	14 or 13-
$P_{FM} = V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} > If Yes, V_{12a} = V_3 + V_{12a} = V_3 + V$	7 1 (2 0 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1.5 * V ₁₂ /2 [.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17) Yes ☑↑ Yes ☑↑ pc/h (Equ) quation 13-14 No No ation 13-16,		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V Is V ₃ or V	/ _{av34} > 2 / _{av34} > 1 _a =	.5 * V ₁₂ /2	using E 13-7) pc/h pc/h (Ec 17) ? ☐ Yes ↓ 2 ☐ Yes ↓ pc/h (E	uation 13- No No quation	14 or 13-
$P_{FM} = V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} = V_3 \text{ or } V_{12a} = V_3 $	7 1 (2 0 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1.5 * V ₁₂ /2 [.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1) quation 13-14 No No ation 13-16,		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V Is V ₃ or V If Yes,V ₁₂	/ _{av34} > 2 / _{av34} > 1 _a = ity Ch	.5 * V ₁₂ /2	using E 13-7) pc/h pc/h (Ec 17) n? ☐ Yes ↓ pc/h (E 13-18, o	uation 13- No No quation	14 or 13-
$P_{FM} = V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} > Is V_3 \text{ or } V_{av34} > If Yes, V_{12a} = V_3 + V_{12a} = V_3 + V$	7 1 (2 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1 hecks	.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1) quation 13-14 No ation 13-16, 3-19)		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V Is V ₃ or V If Yes,V ₁₂	/ _{av34} > 2 / _{av34} > 1 _a = ity Ch	.5 * V ₁₂ /2 ecks	using E 13-7) pc/h pc/h (Ec 17) n? ☐ Yes ↓ pc/h (E 13-18, o	uation 13- No Quation r 13-19)	14 or 13- 13-16,
PFM = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	7 1 (2 0 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1 1.5 * V ₁₂ /2 [1	.000 usin Exhibit 13-6 468 pc/h pc/h (Ec r 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1) quation 13-14 No ation 13-16, 3-19)		$P_{FD} = V_{12} = V_3 \text{ or } V_{av3}$ Is $V_3 \text{ or } V_1$ Is $V_3 \text{ or } V_2$ If Yes, V_{12}	/ _{av34} > 2 / _{av34} > 1 a =	.5 * V ₁₂ /2 ecks	using E 13-7) pc/h pc/h (Ec 17) ? □ Yes pc/h (E 13-18, o Cap Exhibit 13	uation 13-	14 or 13- 13-16,

Flow	Enterin	ng Merg	e Influer	nce Area		Flow Entering Diverge Influence Area						
		Actual	Max I	Desirable	Violation?		Actual	Max Desirable V		Violation?		
V _F	312	2736	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8				
Level	of Ser	vice Det	erminat	ion (if not	F)	Level	of Service	Determir	nation (in	f not F)		
D _R = 5	$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$						_R = 4.252 + 0	.0086 V ₁₂ -	0.009 L _D			
D _R =							D _R = (pc/mi/ln)					
LOS =	B (Exhibit	13-2)				LOS = (Exhibit 13-2)						
Spee	d Deter	minatio	n			Speed Determination						
M _S =	0.291 (Exi	bit 13-11)				D _s =	(Exhibit 13-12)					
S _R =	61.8 mph	(Exhibit 13-	11)			S _R =	mph (Exhibit 13	-12)				
S ₀ =	N/A mph (Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	-12)				
S =	61.8 mph	(Exhibit 13-	13)			S =	mph (Exhibit 13	-13)				
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General Int			RAMP JUN		ite Infor				
Analyst		h McCage	Ξ,	eeway/Dir of		-24 EB			
Agency or Comp		DT/HNTB		inction		SR 299			
Date Performed	8/12			risdiction		Dade County			
Analysis Time Pe		., 10		nalysis Year		2013			
Project Descripti		Bridge Repla				2010			
Inputs									
•		Freeway N	umber of Lanes,	N 2					
Linatroom Adi Da			ber of Lanes, N	_				Downot	aam Adi
Upstream Adj Ra				1				Ramp	ream Adj
Yes □ 0	n	Acceleratio	n Lane Length, I	L _A 1500				T Yes	□ On
□No	ff	Deceleratio	n Lane Length L	D				I I I I I I I I I I I I I I I I I I I	□ Off
l – 1000	τι	Freeway Vo	olume, V _F	1805					
L _{up} = 1200	π	Ramp Volu	•	115				L _{down} =	ft
V _u = 75 v	eh/h		ee-Flow Speed,					V _D =	veh/h
u ror	011/11								
1		<u> </u>	-Flow Speed, S						
Conversio	n to pc/h	Under E	Base Condi	tions	a				
<i>(</i>	V		- .	a - 1		4	f	v = V/PH	HF x f _{HV} >
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	^t HV	fp	f	
Freeway	1805	0.91	Rolling	23	0	0.743	1.00	ip 2	668
Ramp	115	0.91	Rolling	19	0	0.778	1.00		162
UpStream	75	0.91	Rolling	25	0	0.727	1.00		113
DownStream	10	0.01	riolinig		, v	0.727	1.00		110
	N	lerge Areas	;				Diverge Areas	;	
Estimation	of V ₁₂				Estima	tion of v	12		
		(P)							
	V ₁₂ = V _F		12 6 or 12			V ₁₂ =	V _R + (V _F - \	·· · -	
L _{EQ} =	7		13-6 or 13-		L _{EQ} =		(Equat 13)	tion 13-12	2 or 13-
_			g Equation				Equation	(Exhibit	
Pen		Exhibit 13-6			P _{FD} =		Lquation		
P _{FM} =	(,		h.,		, no/h		
=		2668 pc/h			$V_{12} =$		pc/h		44 40
= V ₁₂ =	2	•	nuation 13-14		V ₁₂ =		•	quation 13-	-14 or 13-
= V ₁₂ =	2	•	quation 13-14		V ₃ or V _{av34}		pc/h (E 17)		-14 or 13-
= V ₁₂ = V ₃ or V _{av34}	2 0 c	pc/h (Ec or 13-17)	-		V ₃ or V _{av34}		pc/h (E		-14 or 13-
= V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} >	2 0 2,700 pc/h? ا	pc/h (Ec or 13-17) ■ Yes IVI	No		V ₃ or V _{av34} Is V ₃ or V ₂	_{av34} > 2,700 p	pc/h (E 17)	No	-14 or 13-
= V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	2 0 c 2,700 pc/h? f 1.5 * V ₁₂ /2 f	pc/h (Ec or 13-17) ■ Yes I I ■ Yes I I	No No		V ₃ or V _{av3} , Is V ₃ or V Is V ₃ or V	_{av34} > 2,700 p _{av34} > 1.5 * V	pc/h (E 17) pc/h? Yes 12 ^{/2} Yes pc/h (E	No No Equation	13-16,
= V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	2 0 c 2,700 pc/h? f 1.5 * V ₁₂ /2 f	pc/h (Ec or 13-17) ■ Yes I I ■ Yes I I	No No ation 13-16,		V ₃ or V _{av34} Is V ₃ or V ₂	_{av34} > 2,700 p _{av34} > 1.5 * V	pc/h (E 17) pc/h? Yes 12 ^{/2} Yes pc/h (E	□ No □ No	13-16,
= V ₁₂ = Is V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > If Yes,V _{12a} =	2 0 c 2,700 pc/h? [1.5 * V ₁₂ /2 [1	pc/h (Ec or 13-17) Yes ਯ↑ Yes ਯ↑ pc/h (Equ	No No ation 13-16,		V ₃ or V _{av34} Is V ₃ or V ₄ Is V ₃ or V ₄ If Yes,V _{12a}	_{av34} > 2,700 p _{av34} > 1.5 * V	pc/h (E 17) 0c/h? ☐ Yes 12 ^{/2} ☐ Yes pc/h (E 13-18, c	No No Equation	13-16,
= V ₁₂ = Is V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > f Yes,V _{12a} =	2 0 c 2,700 pc/h? [1.5 * V ₁₂ /2 [1	pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16,		V ₃ or V _{av34} Is V ₃ or V ₄ Is V ₃ or V ₄ If Yes,V _{12a}	_{av34} > 2,700 p _{av34} > 1.5 * V ₁ =	pc/h (E 17) 0c/h? ☐ Yes 12 ^{/2} ☐ Yes pc/h (E 13-18, c s	No No Equation	13-16,
= V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	2 0 2,700 pc/h? f 1.5 * V ₁₂ /2 f <u>1</u> 1 1 1	pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)		V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a}	av34 > 2,700 p av34 > 1.5 * V a t <u>y Check</u>	pc/h (E 17) 0c/h? ☐ Yes 12 ^{/2} ☐ Yes pc/h (E 13-18, c s 1 Ca Exhibit 13	No No Equation or 13-19)	13-16,
= V ₁₂ = Is V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > If Yes,V _{12a} =	2 0 2,700 pc/h? f 1.5 * V ₁₂ /2 f <u>1</u> 1 1 1	pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)		V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a} Capaci V _F	av34 > 2,700 p av34 > 1.5 * V a = ty Check Actua	pc/h (E 17) pc/h? □ Yes 12 ^{/2} □ Yes pc/h (E 13-18, c s l Ca	No No Equation or 13-19)	13-16,
= V_{12} = $V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} >$ Is $V_3 \text{ or } V_{av34} >$ If Yes, V_{12a} = Capacity C	2 0 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 2 hecks Actual	pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)	LOS F?	V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a}	av34 > 2,700 p av34 > 1.5 * V a = ty Check Actua	pc/h (E 17) 0c/h? ☐ Yes 12 ^{/2} ☐ Yes pc/h (E 13-18, c s 1 Ca Exhibit 13	No No Equation or 13-19) pacity 3-	13-16,
= V_{12} = $V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} >$ Is $V_3 \text{ or } V_{av34} >$ If Yes, V_{12a} =	2 0 2,700 pc/h? f 1.5 * V ₁₂ /2 f <u>1</u> 1 1 1	pc/h (Ec or 13-17) Yes ♥ M Yes ♥ M pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)		$V_{3} \text{ or } V_{av34}$ Is $V_{3} \text{ or } V_{4}$ Is $V_{3} \text{ or } V_{4}$ Is $V_{3} \text{ or } V_{4}$ If Yes, V_{12a} Capaci V_{F} $V_{FO} = V$	av34 > 2,700 p av34 > 1.5 * V a = ty Check Actua	pc/h (E 17) pc/h? ☐ Yes 12 ^{/2} ☐ Yes pc/h (E 13-18, c s al Ca Exhibit 13 8	No No Equation or 13-19) pacity 3-	13-16,
= V_{12} = $V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} >$ Is $V_3 \text{ or } V_{av34} >$ If Yes, V_{12a} = Capacity C	2 0 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 2 hecks Actual	pc/h (Ec or 13-17) Yes ♥ M Yes ♥ M pc/h (Equ 3-18, or 1 C Exhibit	No No ation 13-16, 3-19)	LOS F?	V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a} Capaci V _F	av34 > 2,700 p av34 > 1.5 * V a = ty Check Actua	pc/h (E 17) 0c/h? ☐ Yes 12 ^{/2} ☐ Yes pc/h (E 13-18, c 13-18, c 14-12, c 14	No No Equation or 13-19) pacity 3- 3-	13-16,

Flow	Enterir	ng Merg	e Influer	nce Area		Flow	Entering D	verge In	fluence	A <i>rea</i>
		Actual	Max [Desirable	Violation?		Actual	Max Des	irable	Violation?
V _F	312	2830	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level	of Ser	vice Det	erminat	ion (if not	<i>F</i>)	Level	of Service	Determir	nation (if	^r not F)
D _R = 5	6.475 + 0.0)0734 v _R + ().0078 V ₁₂ -	0.00627 L _A		D _F	_R = 4.252 + 0	.0086 V ₁₂ -	0.009 L _D	
D _R =	18.1 (pc/n	ni/ln)				D _R =	(pc/mi/ln)			
LOS =	B (Exhibit	: 13-2)				LOS =	(Exhibit 13-2)		
Spee	d Deter	rminatio	n			Speed	l Determin	ation		
M _s =	0.297 (Ex	ibit 13-11)				D _s =	(Exhibit 13-12)			
S _R =	61.7 mph	(Exhibit 13-	11)			S _R =	mph (Exhibit 13	-12)		
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ = 1	mph (Exhibit 13	-12)		
S =	61.7 mph	(Exhibit 13-	13)			S = 1	mph (Exhibit 13	-13)		
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General Int			RAMP JUN		ite Infor				
Analyst		h McCage	Er	reeway/Dir of		-24 WB			
Agency or Comp		DT/HNTB		inction		-24 WB SR 299			
Date Performed	8/12			risdiction		Dade County			
Analysis Time Pe		./ 10		nalysis Year		2013			
Project Descripti		Bridge Repl							
Inputs		- 51-							
		Freewav N	umber of Lanes,	N 2					
Linatroom Adi Da			ber of Lanes, N					Downot	oom Adi
Upstream Adj Ra				. 1				Ramp	eam Adj
⊻Yes □O	n	Acceleratio	n Lane Length, I	L _A 735				T Yes	□ On
□No	ff	Deceleratio	n Lane Length L	D					
I - 1005	τı	Freeway V	olume, V _F	1110				⊠ No	□ Off
L _{up} = 1685	π	Ramp Volu	•	75				L _{down} =	ft
V _u = 80 v	eh/h		ee-Flow Speed,					V _D =	veh/h
u co i	011/11								
			-Flow Speed, S	11					
Conversio	n to pc/h	<u>Under E</u>	Base Condi	tions		·		u	
(1)	v	DUE	- ·	or t 1		f	f	v = V/PH	HF x f _{HV} >
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	^f HV	fp	f	
Freeway	1110	0.91	Rolling	23	0	0.743	1.00	`р 1	641
Ramp	75	0.91	Rolling	18	0	0.740	1.00		05
UpStream	80	0.91	Rolling	22	0	0.752	1.00		17
DownStream		0.01	rioning		, v	0.702	1.00		
	N	lerge Areas	;		[Di	verge Areas		
Estimation	of V ₁₂				Estimat	tion of v ₁₂	2		
		(P)					_		
	V ₁₂ = V _F		12 6 or 12			V ₁₂ = V	′ _R + (V _F - V	· · · -	
L _{EQ} =	7		13-6 or 13-		L _{EQ} =			ion 13-12	2 or 13-
Priv		,	g Equation				13) Usina F	Equation	(Exhibit
rFM =		Exhibit 13-6			P _{FD} =		13-7)	-qualion	
V ₁₂ =	1	641 pc/h	,		V ₁₂ =		pc/h		
		•	quation 13-14				pc/h (Ec	quation 13-	14 or 13-
$V_3^{}$ or $V_{av34}^{}$		or 13-17)			V ₃ or V _{av34}		17)	-	
Is V _o or V _o >	2,700 pc/h?		No		Is V ₃ or V _a	_{v34} > 2,700 pc	/h? □ Yes	🗆 No	
3 21/34					Is V_3 or V_3	_{v34} > 1.5 * V ₁₂	/2	🗆 No	
•			ation 13-16,		If Yes,V _{12a}		pc/h (E	quation	13-16,
Is V_3 or V_{av34} >		3-18, or 1			12a		13-18, o	or 13-19)	
Is V_3 or V_{av34} >	1				Capacit	ty Checks			
Is V ₃ or V _{av34} > If Yes,V _{12a} =				LOS F?		Actual	Cap	pacity	LOS F?
Is V_3 or V_{av34} > If Yes, V_{12a} =		C	apacity		1		Exhibit 13		
•	hecks	<u>с</u>	apacity		V-			~	
Is V_3 or V_{av34} > If Yes, V_{12a} =	hecks	<u>с</u>	apacity		V _F		8		
Is V_3 or V_{av34} > If Yes, V_{12a} =	Actual	Exhibit	apacity		V _F V _{FO} = V	F ⁻			
Is V_3 or V_{av34} > If Yes, V_{12a} =	hecks		apacity	No	V _{FO} = V	F ⁻	8		
Is V_3 or V_{av34} > If Yes, V_{12a} =	Actual	Exhibit	apacity		· · · · ·	F ⁻	8 Exhibit 13	}-	

Flow E	Intering Merge	e Influer	nce Area		Flow E	ntering D	iverge Inf	fluence A	rea
	Actual	Max [Desirable	Violation?	Î	Actual	Max Des	irable V	iolation?
V _{R1}	2 1746	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of	of Service Det	erminat	ion (if not	F)	Level o	f Service	Determir	nation (if	not F)
D _R = 5.4	75 + 0.00734 v _R + 0).0078 V ₁₂ -	0.00627 L _A		D _R	= 4.252 + 0	.0086 V ₁₂ -	0.009 L _D	
D _R = 1	4.4 (pc/mi/ln)				D _R = (p	oc/mi/ln)			
LOS = B	(Exhibit 13-2)				LOS = (E	Exhibit 13-2)		
Speed	Determinatio	n			Speed	Determin	ation		
M _S = 0	.277 (Exibit 13-11)				D _s = (E	xhibit 13-12)			
S _R = 6	2.2 mph (Exhibit 13-	11)			S _R = m	ph (Exhibit 13	-12)		
S ₀ = N	/A mph (Exhibit 13-1	1)			S ₀ = m	ph (Exhibit 13	-12)		
S = 6	2.2 mph (Exhibit 13-	13)			S =	ph (Exhibit 13	-13)		
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	RAMP	<u>s and f</u>	RAMP JUN	CTIONS	NS WORKSHEET Site Information					
General Inf	ormation	1		S	ite Infol	rma	tion			
Analyst Agency or Comp Date Performed Analysis Time Pe	any GDC 8/12	n McCage DT/HNTB /13	Ju Ju	eeway/Dir of Inction Irisdiction nalysis Year		I-24 V SR 29 Dade 2013	99 County			
Project Description		Bridge Repla		, , , , , , , , , , , , , , , , , , ,						
Inputs										
Jpstream Adj Ra ☑ Yes □ O		Ramp Num	umber of Lanes, ber of Lanes, N n Lane Length, I	1					Downstr Ramp	eam Adj
■ No I O - _{up} = 1685			n Lane Length L	л					I Yes I No	☐ On ☐ Off
V _u = 145 veh/		Ramp Volu Freeway Fr Ramp Free	me, V _R ee-Flow Speed, -Flow Speed, S _F	-R 45.0					L _{down} = V _D =	ft veh/h
Conversior	<u>to pc/h</u>	<u>Under E</u>	Base Condi	tions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH f _p	IF x f _{HV} x
Freeway	2505	0.91	Rolling	23	0	0.	.743	1.00	3	702
Ramp	135	0.91	Rolling	18	0	0.	.787	1.00	1	88
UpStream	145	0.91	Rolling	22	0	0.	.752	1.00	2	212
DownStream					ļ					
Ectimation	N	erge Areas			Ectimo	tion		erge Areas		
Estimation	01 V ₁₂				EStilla		1 of v ₁₂			
L _{EQ} = P _{FM}	7	(Equation)	13-6 or 13- g Equation		L _{EQ} =		$V_{12} = V_F$	13)	R)P _{FD} on 13-12	
= V ₁₂ =	(Exhibit 13-6 702 pc/h			P _{FD} = V ₁₂ =			13-7) pc/h		
$V_3^{}$ or $V_{av34}^{}$	0	r 13-17)	quation 13-14		V ₃ or V _{av3}		> 2 700 nc/	pc/h (Eq 17) h?	uation 13-	14 or 13-
Is V_3 or V_{av34} > Is V_3 or V_{av34} >	1.5 * V ₁₂ /2 _∎	Yes 🗹	No		Is V ₃ or V	av34 >		2 🗆 Yes I	No	10.10
f Yes,V _{12a} =	1	pc/h (Equ 3-18, or 1	ation 13-16, 3-19)		If Yes,V ₁₂	~		pc/h (E 13-18, o	quation r 13-19)	13-16,
Capacity C	Ϋ́		on o ait :		lcapaci		Checks			
	Actual		apacity	LOS F?	V _F		Actual	Exhibit 13	acity -	LOS F?
V _{FO}	3890	Exhibit 13-8		No	V _{FO} = V V _R			Exhibit 13 8 Exhibit 13		
										4

Flow	Entering	g Merge	e Influer	nce Area		Flow	Entering D	Diverge In	fluence	Area
		Actual	Max I	Desirable	Violation?		Actual	Max De	sirable	Violation?
V _F	312	3890	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level	of Serv	ice Det	erminat	ion (if not	F)	Level	of Service	Determi	nation ((if not F)
D _R = 5	6.475 + 0.00 [°]	734 v _R + (0.0078 V ₁₂ -	0.00627 L _A		D	_R = 4.252 + 0).0086 V ₁₂ ·	• 0.009 L _[)
D _R =	31.1 (pc/mi/	/ln)				D _R =	(pc/mi/ln)			
LOS =	D (Exhibit 1	3-2)				LOS =	(Exhibit 13-2	2)		
Spee	d Deterr	ninatio	n			Speed	d Determir	nation		
M _S =	0.446 (Exib	it 13-11)				D _s =	(Exhibit 13-12)			
S _R =	57.5 mph (E	Exhibit 13-	11)			S _R =	mph (Exhibit 13	3-12)		
S ₀ =	N/A mph (E	xhibit 13-1	1)			S ₀ =	mph (Exhibit 13	3-12)		
S =	57.5 mph (E	Exhibit 13-	13)			S =	mph (Exhibit 13	3-13)		
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General Inf			RAMP JUN		ite Infor				
Analyst		h McCage	Fr	reeway/Dir of		-24 EB			
Agency or Comp		DT/HNTB		unction		SR 299			
Date Performed	8/12			irisdiction		Dade County			
nalysis Time Pe				nalysis Year		2015			
Project Description		Bridge Repla		,					
nputs									
		Freeway N	umber of Lanes,	N 2					
Jpstream Adj Ra	amp	Ramp Num	ber of Lanes, N	1				Downstr	eam Adj
⊻Yes □O	•			•				Ramp	can / aj
			n Lane Length, I	л				□ Yes	□ On
No ⊠O	Ħ	Deceleratio	n Lane Length L	D				⊠ No	□ Off
- _{up} = 1200	ft	Freeway Vo	olume, V _F	1700					
110		Ramp Volu	me, V _D	195				L _{down} =	ft
/ _u = 110 veh/	/h		ee-Flow Speed,					V _D =	veh/h
V GTI/									
		<u>l</u>	-Flow Speed, S						
Conversio	<u>n to pc/h</u>	Under E	Base Condi	tions	i a	1	1	1	
(m o /b)	V		Torroin	0/ Truck		f	f	v = V/Pł	HF x f _{HV} x
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	[†] HV	fp	f p	
Freeway	1700	0.91	Rolling	23	0	0.743	1.00	1	513
Ramp	195	0.91	Rolling	19	0	0.778	1.00		275
UpStream	110	0.91	Rolling	25	0	0.727	1.00		166
DownStream			og						
	N	lerge Areas					Viverge Areas	;	
Estimation	of v ₁₂				Estima	tion of v ₁	2		
	$V_{12} = V_{F}$	(P)					_		
	12 F		13-6 or 13-			v ₁₂ =	۷ _R + (۷ _F - ۱	·· · -	
EQ =	7				L _{EQ} =		(Equat 13)	ion 13-1	2 or 13-
)		•	g Equation					Equation	(Exhibit
EM		Exhibit 13-6			P _{FD} =		13-7)		(
FM					V ₁₂ =		pc/h		
:	2	513 pc/h						nuation 13-	14 or 13-
= / ₁₂ =		513 pc/h pc/h (Ec	uation 13-14					quantitier ite	
= / ₁₂ =	0	•	uation 13-14		V ₃ or V _{av34}		17)		
= / ₁₂ = / ₃ or V _{av34}	0 C	pc/h (Ec or 13-17)	-		V ₃ or V _{av34}				
= / ₁₂ = / ₃ or V _{av34} Is V ₃ or V _{av34} >	0 c 2,700 pc/h? [pc/h (Ec or 13-17) ■ Yes IV N	No		V ₃ or V _{av34} Is V ₃ or V ₂	_{av34} > 2,700 p	17)	No	
= / ₁₂ = / ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	0 c 2,700 pc/h? r 1.5 * V ₁₂ /2 r	pc/h (Ec or 13-17) ■ Yes I I ■ Yes I I	Vo Vo		V ₃ or V _{av3} , Is V ₃ or V Is V ₃ or V	_{av34} > 2,700 p _{av34} > 1.5 * V ₁	17) ^{c/h?}	No No Equation	13-16,
= / ₁₂ = / ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	0 c 2,700 pc/h? f 1.5 * V ₁₂ /2 f	pc/h (Ec or 13-17) ■ Yes I I ■ Yes I I	No No ation 13-16,		V ₃ or V _{av34} Is V ₃ or V ₂	_{av34} > 2,700 p _{av34} > 1.5 * V ₁	17) ^{c/h?}	□ No □ No	13-16,
4 V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > F Yes,V _{12a} =	0 c 2,700 pc/h? f 1.5 * V ₁₂ /2 f 1.5 * 1	pc/h (Ec or 13-17) Tes Ir N Yes Ir N pc/h (Equ	No No ation 13-16,		V ₃ or V _{av34} Is V ₃ or V ₄ Is V ₃ or V ₄ If Yes,V _{12a}	_{av34} > 2,700 p _{av34} > 1.5 * V ₁	17) ^{c/h?}	No No Equation	13-16,
4 V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > F Yes,V _{12a} =	0 c 2,700 pc/h? f 1.5 * V ₁₂ /2 f 1.5 * 1	pc/h (Ec r 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16,		V ₃ or V _{av34} Is V ₃ or V ₄ Is V ₃ or V ₄ If Yes,V _{12a}	_{av34} > 2,700 p _{av34} > 1.5 * V ₁ ₁ =	17) c/h?	No No Equation or 13-19)	
/ ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > f Yes,V _{12a} =	0 c 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 hecks	pc/h (Ec r 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)		V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a}	av34 > 2,700 p av34 > 1.5 * V a t y Check	17) c/h?	No No Equation or 13-19)	
- / ₁₂ = / ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > f Yes,V _{12a} =	0 c 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 hecks	pc/h (Ec r 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)		V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a} Capaci V _F	av34 > 2,700 p av34 > 1.5 * V t = ty Checks Actua	17) c/h?	No No Equation or 13-19)	
$V_{12} = V_{3} \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} > V_3 \text{ or } V_{av34} > V_3 \text{ or } V_{av34} > V_12a = Capacity C$	0 c 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 hecks Actual	pc/h (Ec or 13-17) Yes ♥ № Yes ♥ № pc/h (Equ <u>3-18, or 1</u> C	No No ation 13-16, 3-19)	LOS F?	V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a}	av34 > 2,700 p av34 > 1.5 * V t = ty Checks Actua	17) c/h?	No No Equation or 13-19) pacity 3-	
FM $V_{12} =$ $V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} >$ Is $V_3 \text{ or } V_{av34} >$ f Yes, $V_{12a} =$ Capacity C	0 c 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 hecks	pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ <u>3-18, or 1</u>	No No ation 13-16, 3-19)		V ₃ or V _{av3} , Is V ₃ or V ₂ Is V ₃ or V ₂ If Yes,V _{12a} Capaci V _F	av34 > 2,700 p av34 > 1.5 * V t = ty Checks Actua	17) c/h?	No No Equation or 13-19) pacity 3-	13-16, LOS F?
$V_{12} = V_{3} \text{ or } V_{av34}$ Is $V_{3} \text{ or } V_{av34} > V_{3} \text{ or } V_{av34} > V_{3} \text{ or } V_{av34} > V_{3} \text{ or } V_{12a} = Capacity C$	0 c 2,700 pc/h? r 1.5 * V ₁₂ /2 r 1 hecks Actual	pc/h (Ec or 13-17) Yes ♥ № Yes ♥ № pc/h (Equ <u>3-18, or 1</u> C	No No ation 13-16, 3-19)	LOS F?	$V_{3} \text{ or } V_{av34}$ Is $V_{3} \text{ or } V_{4}$ Is $V_{3} \text{ or } V_{4}$ Is $V_{3} \text{ or } V_{4}$ If Yes, V_{12a} Capaci V_{F} $V_{FO} = V$	av34 > 2,700 p av34 > 1.5 * V t = ty Checks Actua	17) c/h?	No No Equation or 13-19) pacity 3-	

Flow	Enteri	ng Merg	e Influer	nce Area		Flow	Entering D	verge Inf	fluence	Area
		Actual	Max I	Desirable	Violation?		Actual	Max Des	irable	Violation?
V,	R12	2788	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Leve	l of Se	rvice Det	erminat	ion (if not	F)	Level	of Service	Determir	nation (i	f not F)
D _R = 5	5.475 + 0.	00734 v _R + (0.0078 V ₁₂ -	0.00627 L _A		D	_R = 4.252 + 0	.0086 V ₁₂ -	0.009 L _D	
D _R =	17.7 (pc/	mi/ln)				D _R =	(pc/mi/ln)			
LOS =	B (Exhibi	it 13-2)				LOS =	(Exhibit 13-2)		
Spee	d Dete	rminatio	n			Speed	d Determin	ation		
M _s =	0.294 (Ex	xibit 13-11)				D _s =	(Exhibit 13-12)			
S _R =	61.8 mpł	n (Exhibit 13-	11)			S _R =	mph (Exhibit 13	-12)		
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	-12)		
S =	61.8 mpł	n (Exhibit 13-	13)			S =	mph (Exhibit 13	-13)		
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General Inf			RAMP JUN		ite Infor				
Analyst		h McCage	Fr	reeway/Dir of		1-24 EB			
Agency or Comp		DT/HNTB		unction		SR 299			
Date Performed	8/12			risdiction		Dade County			
Analysis Time Pe		, 10		nalysis Year		2015			
Project Descripti		Bridge Repl							
Inputs									
		Freeway N	umber of Lanes,	N 2					
Upstream Adj Ra	mn	Ramn Num	ber of Lanes, N	1				Downst	ream Adj
				•				Ramp	ean Auj
Yes □ 0	n	Acceleratio	n Lane Length, I	L _A 1500				□ Yes	□ On
□No	ff	Deceleratio	n Lane Length L	D				I No	□ Off
	<i>u</i>	Freeway V	olume, V _F	1840				IM INO	
L _{up} = 1200	π	Ramp Volu	•	120				L _{down} =	ft
V _u = 80 v	eh/h							V _D =	veh/h
u 00 V	CH/H		ee-Flow Speed,					D	VOII/II
		Ramp Free	-Flow Speed, S	-R 30.0					
Conversio	n to pc/h	Under E	Base Condi	tions					
	V		- .			4	ſ	v = V/Pł	HF x f _{HV} x
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	^f HV	f p	f	
Freeway	1840	0.91	Rolling	23	0	0.743	1.00	p 2	720
Ramp	120	0.91	Rolling	19	0	0.743	1.00		169
UpStream	80	0.91	Rolling	25	0	0.777	1.00	ł	121
DownStream	00	0.91	noming	23		0.727	1.00		121
Domioticali	N	lerge Areas	•		<u> </u>	D	iverge Areas		
Estimation	of V ₁₀	J			Estima	tion of v ₁	0		
	$V_{10} = V_{E}$	(P _{FM})				V ₁₂ = \	/ _R + (V _F - \	/ _R)P _{FD}	
		(Launtion	13-6 or 13-		L =			tion 13-1	2 or 13-
L _{FO} =									
L _{EQ} = P	7	<i>'</i>)	a Equation		L _{EQ} =		13)	Cauchian	(Eybibit
L _{EQ} = P _{FM}	7	') .000 usin	g Equation				using I	Equation	(Exhibit
P _{FM}	7 1 (′) .000 usin Exhibit 13-6			P _{FD} =		using I 13-7)	Equation	(Exhibit
P _{FM} = V ₁₂ =	7 1 (2	′) .000 usin Exhibit 13-6 720 pc/h			P _{FD} = V ₁₂ =		using I 13-7) pc/h	·	·
P _{FM} = V ₁₂ =	7 1 (2 0	⁷) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec			P _{FD} =	4	using I 13-7) pc/h	Equation quation 13 [.]	·
P _{FM} = V ₁₂ = V ₃ or V _{av34}	7 1 (2 0 0	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec or 13-17)) quation 13-14		P _{FD} = V ₁₂ = V ₃ or V _{av3} 2		using I 13-7) pc/h pc/h (Ed 17)	quation 13	·
P _{FM} = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} >	7 1 (2 0 0 2,700 pc/h? [7) .000 usin Exhibit 13-6 720 pc/h 720 pc/h (Eo r 13-17) ■ Yes ⊽ I) quation 13-14 No		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V ₂	_{av34} > 2,700 po	using I 13-7) pc/h pc/h (Ed 17) c/h? ☐ Yes	quation 13	·
P _{FM} = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	7 1 (2 0 0 2,700 pc/h? [1.5 * V ₁₂ /2 [7) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec or 13-17) Yes ⊽ I Yes ⊽ I) quation 13-14 No No		$P_{FD} =$ $V_{12} =$ $V_3 \text{ or } V_{av32}$ Is $V_3 \text{ or } V_2$ Is $V_3 \text{ or } V_2$	_{av34} > 2,700 po _{av34} > 1.5 * V ₁₂	using I 13-7) pc/h pc/h (Ed 17) C/h?	quation 13-	-14 or 13-
P _{FM} = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	7 1 (2 0 0 2,700 pc/h? [1.5 * V ₁₂ /2]	') .000 usin Exhibit 13-6 720 pc/h pc/h (Ec r 13-17) Yes ⊠ I Yes ⊠ I pc/h (Equ	n quation 13-14 No No ation 13-16,		P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V ₂	_{av34} > 2,700 po _{av34} > 1.5 * V ₁₂	using I 13-7) pc/h pc/h (Eo 17) c/h? ☐ Yes 2 ^{/2} ☐ Yes pc/h (E	quation 13	-14 or 13- 13-16,
PFM = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > If Yes,V _{12a} =	7 1 (2 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1.5 * 1	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec or 13-17) Yes ⊽ I Yes ⊽ I	n quation 13-14 No No ation 13-16,		$P_{FD} = V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_4$ Is $V_3 \text{ or } V_4$ If Yes, V_{12a}	_{av34} > 2,700 po _{av34} > 1.5 * V ₁₂ _a =	using I 13-7) pc/h pc/h (Eo 17) c/h? Yes 2 ^{/2} Yes pc/h (E 13-18, c	quation 13 No No Equation	-14 or 13- 13-16,
PFM = $V_{12} =$ $V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} >$ Is $V_3 \text{ or } V_{av34} >$ If Yes, $V_{12a} =$	7 1 (2 0 0 2,700 pc/h? r 1.5 * V ₁₂ /2 r <u>1</u> :hecks	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec r 13-17) Yes ♥ I Yes ♥ I pc/h (Equ 3-18, or 1) quation 13-14 No No ation 13-16, 3-19)		$P_{FD} = V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_4$ Is $V_3 \text{ or } V_4$ If Yes, V_{12a}	a _{v34} > 2,700 po a _{v34} > 1.5 * V ₁₃ a = ty Checks	using I 13-7) pc/h pc/h (Ed 17) c/h? ☐ Yes 2 ^{/2} ☐ Yes pc/h (E 13-18, c	quation 13 No No Equation or 13-19)	14 or 13- 13-16,
PFM = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > If Yes,V _{12a} =	7 1 (2 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1.5 * 1	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec r 13-17) Yes ♥ I Yes ♥ I pc/h (Equ 3-18, or 1	n quation 13-14 No No ation 13-16,		$P_{FD} =$ $V_{12} =$ $V_3 \text{ or } V_{av34}$ $Is V_3 \text{ or } V_4$ $Is V_3 \text{ or } V_4$ $If Yes, V_{12a}$ $Capaci$	_{av34} > 2,700 po _{av34} > 1.5 * V ₁₂ _a =	using I 13-7) pc/h pc/h (Ed 17) c/h?	quation 13 No Quation Squation or 13-19) pacity	14 or 13- 13-16,
P _{FM} = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	7 1 (2 0 0 2,700 pc/h? r 1.5 * V ₁₂ /2 r <u>1</u> :hecks	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Ec r 13-17) Yes ♥ I Yes ♥ I pc/h (Equ 3-18, or 1) quation 13-14 No No ation 13-16, 3-19)		$P_{FD} = V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_4$ Is $V_3 \text{ or } V_4$ If Yes, V_{12a}	a _{v34} > 2,700 po a _{v34} > 1.5 * V ₁₃ a = ty Checks	using I 13-7) pc/h pc/h (Ed 17) c/h? ☐ Yes 2 ^{/2} ☐ Yes pc/h (E 13-18, c	quation 13 No Quation Squation or 13-19) pacity	14 or 13- 13-16,
P_{FM} = V_{12} = $I_3 \text{ or } V_{av34}$ $I_5 V_3 \text{ or } V_{av34} >$ $I_5 V_3 \text{ or } V_{av34} >$ If Yes, V_{12a} = Capacity C	7 1 (2 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1 :hecks Actual	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Edu r 13-17) Yes ♥ I Yes ♥ I pc/h (Equ 3-18, or 1) quation 13-14 No No ation 13-16, 3-19)	LOS F?	$P_{FD} =$ $V_{12} =$ $V_3 \text{ or } V_{av34}$ $Is V_3 \text{ or } V_4$ $Is V_3 \text{ or } V_4$ $If Yes, V_{12a}$ $Capaci$ V_F	av ₃₄ > 2,700 po av ₃₄ > 1.5 * V ₁₂ a = <u>ty Checks</u> Actual	using I 13-7) pc/h pc/h (Ed 17) c/h?	quation 13 No Quation Sequation or 13-19) pacity 3-	14 or 13- 13-16,
P_{FM} = V_{12} = $I_3 \text{ or } V_{av34}$ $I_5 V_3 \text{ or } V_{av34} >$ $I_5 V_3 \text{ or } V_{av34} >$ If Yes, V_{12a} = Capacity C	7 1 (2 0 0 2,700 pc/h? r 1.5 * V ₁₂ /2 r <u>1</u> :hecks	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Eco r 13-17) Yes ♥ I Yes ♥ I pc/h (Equ 3-18, or 1 C Exhibit) quation 13-14 No No ation 13-16, 3-19)		$P_{FD} =$ $V_{12} =$ $V_3 \text{ or } V_{av34}$ $Is V_3 \text{ or } V_4$ $Is V_3 \text{ or } V_4$ $If Yes, V_{12a}$ $Capaci$ V_F $V_{FO} = V_{A}$	av ₃₄ > 2,700 po av ₃₄ > 1.5 * V ₁₂ a = <u>ty Checks</u> Actual	using I 13-7) pc/h pc/h (Ed 17) c/h?	quation 13 No Quation Sequation or 13-19) pacity 3-	-14 or 13- 13-16,
P _{FM} = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > If Yes,V _{12a} =	7 1 (2 0 2,700 pc/h? [1.5 * V ₁₂ /2 [1 :hecks Actual	7) .000 usin Exhibit 13-6 720 pc/h pc/h (Edu r 13-17) Yes ♥ I Yes ♥ I pc/h (Equ 3-18, or 1) quation 13-14 No No ation 13-16, 3-19)	LOS F?	$P_{FD} =$ $V_{12} =$ $V_3 \text{ or } V_{av34}$ $Is V_3 \text{ or } V_4$ $Is V_3 \text{ or } V_4$ $If Yes, V_{12a}$ $Capaci$ V_F	av ₃₄ > 2,700 po av ₃₄ > 1.5 * V ₁₂ a = <u>ty Checks</u> Actual	using I 13-7) pc/h pc/h (Ed 17) c/h?	quation 13 No Quation Quation pr 13-19) pacity 3- 3-	14 or 13- 13-16,

Flow	Enteri	ing Merg	e Influer	nce Area		Flow	Entering D	iverge Inf	fluence	A <i>rea</i>
		Actual	Max I	Desirable	Violation?		Actual	Max Des	irable	Violation?
V	R12	2889	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Leve	l of Se	rvice Det	erminat	ion (if not	F)	Level	of Service	Determir	nation (in	f not F)
D _R = 5	5.475 + 0.	00734 v _R + ().0078 V ₁₂ -	0.00627 L _A		D	_R = 4.252 + 0	.0086 V ₁₂ -	0.009 L _D	
D _R =	18.5 (pc/	/mi/ln)				D _R =	(pc/mi/ln)			
LOS =	B (Exhibi	it 13-2)				LOS =	(Exhibit 13-2)		
Spee	d Dete	rminatio	n			Speed	d Determin	ation		
M _s =	0.301 (E	xibit 13-11)				D _s =	(Exhibit 13-12)			
S _R =	61.6 mpł	n (Exhibit 13-	11)			S _R =	mph (Exhibit 13	-12)		
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	-12)		
S =	61.6 mpł	n (Exhibit 13-	13)			S =	mph (Exhibit 13	-13)		
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General Int			RAMP JUN		ite Infori				
Analyst		h McCage	E,	reeway/Dir of		24 WB			
Agency or Comp		DT/HNTB		inction		SR 299			
Date Performed	8/12			risdiction		ade County			
Analysis Time Pe		./ 10		nalysis Year		015			
Project Descripti		Bridge Repla							
Inputs									
		Freewav N	umber of Lanes,	N 2					
Linatroom Adi Da			ber of Lanes, N	_				Dournot	oom Adi
Upstream Adj Ra	•			. 1				Ramp	eam Adj
⊻Yes □O	n	Acceleratio	n Lane Length,	L _A 735				T Yes	□ On
□No	ff	Deceleratio	n Lane Length I	D					
I - 4005	6	Freeway V	olume, V _F	1130				Mo No	□ Off
L _{up} = 1685	π	Ramp Volu	•	80				L _{down} =	ft
V _u = 85 v	eh/h		ee-Flow Speed,					V _D =	veh/h
u co i	011/11								
		Ramp Free	-Flow Speed, S	- _R 45.0					
Conversio	<u>n to pc/h</u>	Under E	Base Condi	tions					
(1)	v	DUE	- ·	or t 1		f	f	v = V/PH	HF x f _{HV} >
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	^f HV	fp	f	
Freeway	1130	0.91	Rolling	23	0	0.743	1.00	'p 1	670
Ramp	80	0.91	Rolling	18	0	0.740	1.00		112
UpStream	85	0.91	Rolling	22	0	0.752	1.00	<u> </u>	124
DownStream		0.01	rioning		Ŭ	0.702	1.00		
	N	lerge Areas	;			Di	verge Areas	J	
Estimation	of v ₁₂				Estimat	ion of v ₁₂)		
		(P)							
	V ₁₂ = V _F		12 6 or 12			V ₁₂ = V	′ _R + (V _F - V	· · · -	
L _{EQ} =	7		13-6 or 13-		L _{EQ} =			ion 13-12	2 or 13-
Priv		,	g Equation				13) Usina F	Equation	(Exhibit
r _{FM}		Exhibit 13-6			P _{FD} =		13-7)	_qualion	
V ₁₂ =	1	670 pc/h	,		V ₁₂ =		pc/h		
		•	uation 13-14				pc/h (Ec	quation 13-	14 or 13-
$V_3^{}$ or $V_{av34}^{}$		or 13-17)			$V_3^{}$ or $V_{av34}^{}$		17)		
0 av0 1		,	No		Is V ₃ or V _{av}	_{v34} > 2,700 pc	/h? 🗖 Yes	🗆 No	
					Is V ₃ or V ₃	_{v34} > 1.5 * V ₁₂	/2 🗆 Yes	🗆 No	
Is V ₃ or V _{av34} >			ation 13-16,		If Yes,V _{12a}		pc/h (E	Equation	13-16,
Is V_3 or V_{av34} > Is V_3 or V_{av34} >					12a		13-18, o	or 13-19)	
Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >		3-18, or 1			Capacit	y Checks			
Is V_3 or $V_{av34} >$ Is V_3 or $V_{av34} >$ If Yes, $V_{12a} =$	1	3-18, or 1						11	LOS F?
Is V_3 or $V_{av34} >$ Is V_3 or $V_{av34} >$ If Yes, $V_{12a} =$	1		apacity	LOS F?		Actual	Cap	oacity	L031 :
Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	1 hecks		apacity	LOS F?	V _E	Actual	Exhibit 13		
Is V_3 or $V_{av34} >$ Is V_3 or $V_{av34} >$ If Yes, $V_{12a} =$	1 hecks		apacity	LOS F?	V _F				
Is V_3 or $V_{av34} >$ Is V_3 or $V_{av34} >$ If Yes, $V_{12a} =$ Capacity C	1 hecks	Exhibit	apacity		V _F V _{FO} = V		Exhibit 13	3-	
Is V_3 or $V_{av34} >$ Is V_3 or $V_{av34} >$ If Yes, $V_{12a} =$	1 hecks	C	apacity	LOS F?	V _{FO} = V		Exhibit 13 8	3-	
Is V_3 or $V_{av34} >$ Is V_3 or $V_{av34} >$ If Yes, $V_{12a} =$ Capacity C	1 hecks	Exhibit	apacity				Exhibit 13 8 Exhibit 13	3-	

Flow	Enterii	ng Merge	e Influer	nce Area		Flow	Entering D	Diverge In	fluence	Area
		Actual	Max [Desirable	Violation?		Actual	Max De	sirable	Violation?
V _F	312	1782	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level	of Ser	rvice Det	erminat	ion (if not	F)	Level	of Service	Determi	nation (if not F)
D _R = 5	5.475 + 0.0)0734 v _R + (0.0078 V ₁₂ -	0.00627 L _A		D	_R = 4.252 + 0	0.0086 V ₁₂ ·	0.009 L _C)
D _R =	14.7 (pc/r	mi/ln)				D _R =	(pc/mi/ln)			
LOS =	B (Exhibit	t 13-2)				LOS =	(Exhibit 13-2	2)		
Spee	d Dete	rminatio	n			Spee	d Determir	nation		
M _S =	0.278 (Ex	(ibit 13-11)				D _s =	(Exhibit 13-12)			
S _R =	62.2 mph	(Exhibit 13-	11)			S _R =	mph (Exhibit 13	3-12)		
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	3-12)		
S =	62.2 mph	(Exhibit 13-	13)			S =	mph (Exhibit 13	3-13)		
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O a a a a a 1 b a			RAMP JUN	CTIONS WORKSHEET Site Information						
General In	formation	1		S	ite Info	rmat	tion			
Analyst Agency or Comp Date Performed Analysis Time P	oany GDC 8/12	h McCage DT/HNTB 2/13	Ju Ju	eeway/Dir of Inction Irisdiction nalysis Year		I-24 V SR 29 Dade 2015				
Project Descripti		Bridge Repla		,						
Inputs										
Jpstream Adj Ra I Yes C No I C -up = 1685 V _u = ¹⁵⁰ veh	Dn Dff ft	Ramp Num Acceleratio Deceleratio Freeway Vo Ramp Volu Freeway Fr	1	1 -D 2555 135 S _{FF} 70.0					Downstr Ramp I Yes I No L _{down} = V _D =	eam Adj On Off ft veh/h
0	n to no/h	<u> </u>	1							
Conversion (pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH f _p	HF x f _{HV} x
Freeway	2555	0.91	Rolling	23	0	0.	743	1.00		776
Ramp	135	0.91	Rolling	18	0		787	1.00		88
UpStream	150	0.91	Rolling	22	0	0.	752	1.00	2	219
DownStream										
<u> </u>	N	lerge Areas					Div	erge Areas		
Estimation	of V ₁₂				Estima	ation	of v ₁₂			
-EQ =		(Equation ')	13-6 or 13- g Equation		L _{EQ} = P _{FD} =		V ₁₂ = V _F	13)	(_R)P _{FD} ion 13-1; Equation	
PFM = V ₁₂ = Is V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > If Yes,V _{12a} =	3 0 2,700 pc/h? f 1.5 * V ₁₂ /2 f	776 pc/h pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N	No ation 13-16,		V ₁₂ = V ₃ or V _{av3} Is V ₃ or V	′ _{av34} > ′ _{av34} >		17) ^{h?}	No No	
= V ₁₂ = Is V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > f Yes,V _{12a} =	3 0 2,700 pc/h? 1.5 * V ₁₂ /2 1	776 pc/h pc/h (Ec r 13-17) Yes ☞ N Yes ☞ N pc/h (Equ	No No ation 13-16,		V ₁₂ = V ₃ or V _{av3} Is V ₃ or V Is V ₃ or V If Yes,V ₁₂	' _{av34} > ' _{av34} > a =		pc/h (Ec 17) h? Yes ↓ 2 Yes ↓ pc/h (E	□ No □ No Equation	
= V ₁₂ = Is V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} > f Yes,V _{12a} =	3 0 2,700 pc/h? 1.5 * V ₁₂ /2 1	776 pc/h pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16,		V ₁₂ = V ₃ or V _{av3} Is V ₃ or V Is V ₃ or V If Yes,V ₁₂	' _{av34} > ' _{av34} > a =	• 1.5 * V ₁₂ /	pc/h (Ec 17) h? Yes ↓ 2 Yes ↓ pc/h (E 13-18, o	No No quation r 13-19)	
= V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > Is V ₃ or V _{av34} >	3 0 2,700 pc/h? f 1.5 * V ₁₂ /2 f <u>1</u> Checks	776 pc/h pc/h (Ec or 13-17) Yes ♥ N Yes ♥ N pc/h (Equ 3-18, or 1	No No ation 13-16, 3-19)		V ₁₂ = V ₃ or V _{av3} Is V ₃ or V Is V ₃ or V If Yes,V ₁₂	'av34 > 'av34 > a = ity C	1.5 * V ₁₂ /	pc/h (Ec 17) h? Yes ↓ 2 Yes ↓ pc/h (E 13-18, o	No No Equation or 13-19)	13-16,

Flow	Enteri	ng Merg	e Influer	nce Area		Flow	Entering D	Diverge In	fluence	Area		
		Actual	Max [Desirable	Violation?		Actual	Max De	sirable	Violation?		
V _F	R12	3964	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8				
Level	l of Sei	rvice Det	erminat	ion (if not	F)	Level	of Service	Determi	nation (if not F)		
D _R = 5	5.475 + 0.0	00734 v _R + ().0078 V ₁₂ -	0.00627 L _A		$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$						
D _R =	31.7 (pc/r	mi/ln)				D _R =	(pc/mi/ln)					
LOS =	D (Exhibi	t 13-2)				LOS =	(Exhibit 13-2	2)				
Spee	d Dete	rminatio	n			Speed Determination						
M _S =	0.460 (Ex	(ibit 13-11)				D _s =	(Exhibit 13-12)					
S _R =	57.1 mph	ı (Exhibit 13-	11)			S _R =	mph (Exhibit 13	3-12)				
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	3-12)				
S =	57.1 mph	(Exhibit 13-	13)			S =	mph (Exhibit 13	3-13)				
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	RAN	IPS AND	RAMP JU	NCTION	S WORK	SHEET		
General In					ormation			
Analyst		eith McCag	е	Freeway/Dir	of Travel	I-24 EB		
Agency or Com		DOT/HNTB	5	Junction		SR 299		
Date Performed	-	/9/13		Jurisdiction		Dade Cour	nty	
Analysis Time F		M D Dridge D	anlagament	Analysis Yea	ar	2035		
Project Descript	10n 5R 28	99 Bridge Re	eplacement					
Inputs		Freeway N	umber of Lanes,	N 2				
Upstream Adj R	amn	-	ber of Lanes, N	1				Downstream Adj
⊻Yes □C	•	-		1				Ramp
			n Lane Length, L	~				□ Yes □ On
□No C	חנ	Deceleratio	n Lane Length L	D				⊠ No □ Off
L _{up} = 1200) ft	Freeway Vo	olume, V _F	2105				
v _ 190		Ramp Volu	me, V _B	310				L _{down} = ft
V _u = 190 veł			ee-Flow Speed,	S _{EE} 70.0				V _D = veh/h
			-Flow Speed, S _F					
Conversio	n to pc/		r Base Con					
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f _{HV}	fp	v = V/PHF x f _{HV} x
(po/ii)	(Veh/hr)		Terrain	7011UCK	/0110	.HV	, p	f p
Freeway	2105	0.95	Rolling	23	0	0.743	1.00	2980
Ramp	310	0.95	Rolling	19	0	0.778	1.00	419
UpStream	190	0.95	Rolling	25	0	0.727	1.00	275
DownStream								
Fatimatian	f	Merge Are	as			tion of u	Diverge Are	eas
Estimatior	1 OT V ₁₂				Estima	tion of v	12	
L _{EQ} =	V ₁₂ =	V _F (P _{FM}) (Equati 7)	on 13-6 or 13	-				
P _{FM} =		1.000 us (Exhibit 1	sing Equation 3-6)			V ₁₀ =	V _D + (V _E	- V _B)P _{FD}
V ₁₂ =		2980 pc	:/h			Equation ⁻		
${ m V}_{ m 3}^{}$ or ${ m V}_{ m av34}^{}$		0 pc/h (or 13-17	(Equation 13- ⁻)	14	L _{EQ} = (P _{FD} =	Equation	10-12 01 1	0-10)
Is V ₃ or V _{av34} >	> 2,700 pc/ł	n? I Yes ∣	✓ No					
Is V ₃ or V _{av34} >	> 1.5 * V ₁₂ /2	2 □Yes	✓ No					
If Yes,V _{12a} =	12		quation 13-16	δ,				

	RAMP	S AND F	RAMP JUN	CTIONS	WORK	SHE	ET			
General Inf	formation	1		S	ite Infol	rmat	tion			
Analyst Agency or Comp Date Performed Analysis Time Pe	any GDC 8/12	h McCage DT/HNTB /13	յլ ၂լ	reeway/Dir of Inction Irisdiction nalysis Year		I-24 E SR 29 Dade 2035				
Project Description		Bridge Repla								
Inputs										
Upstream Adj Ra 🗹 Yes 🗖 O	•	Ramp Num	umber of Lanes, ber of Lanes, N n Lane Length, I	1					Downstr Ramp	eam Adj
□No □O	ff		n Lane Length L	л					I Yes I No	☐ On ☐ Off
V _u = 145 veh/	/h	Ramp Volu Freeway Fr Ramp Free	me, V _R ree-Flow Speed, -Flow Speed, S _r	205 S _{FF} 70.0 -R 30.0					L _{down} = V _D =	ft veh/h
Conversior	<u>n to pc/h</u>	<u>Under E</u>	Base Condi	tions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PF f _p	IF x f _{HV} x
Freeway	2290	0.95	Rolling	23	0	0.	743	1.00	3	242
Ramp	205	0.95	Rolling	19	0	0.	778	1.00	2	277
UpStream	145	0.95	Rolling	25	0	0.	727	1.00	2	210
DownStream					ļ					
Ectimation	N	lerge Areas			Ectimo	tion		erge Areas		
Estimation	12				Estima		12			
L _{EQ} = P _{FM}	7	(Equation)	13-6 or 13- g Equation		L _{EQ} = P _{FD} =		V ₁₂ = V _F	13)	(_R)P _{FD} ion 13-12 Equation	
= V ₁₂ =		Exhibit 13-6 242 pc/h)		' FD - V ₁₂ =			13-7) pc/h		
$V_3^{}$ or $V_{av34}^{}$	0	or 13-17)	quation 13-14		V ₃ or V _{av3} Is V ₂ or V		2,700 pc/	pc/h (Eq 17) h? I Yes I	Juation 13-	14 or 13-
Is V_3 or V_{av34} > Is V_3 or V_{av34} >	1.5 * V ₁₂ /2 『	Yes ⊠I			Is V ₃ or V	av34 >		2 🗆 Yes I	No	12 16
lf Yes,V _{12a} =		If Yes,V ₁₂	~	hooko	13-18, o	quation r 13-19)	10-10,			
Capacity C	Actual Capacity LOS F						hecks	0.00	o oitr	
	Actual		араспу	LOS F?	V _F		Actual	Exhibit 13	acity -	LOS F?
	3519	Exhibit 13-8		No	$V_{FO} = V_{R}$	V _F -		Exhibit 13 8	-	
V_{FO}					I			Exhibit 13		

Flow	Enteri	ng Merg	e Influer	nce Area		Flow Entering Diverge Influence Area							
		Actual	Max I	Desirable	Violation?		Actual	Max Des	irable	Violation?			
V	R12	3519	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8					
Leve	l of Se	rvice Det	erminat	ion (if not	F)	Level of Service Determination (if not F							
D _R = 5	5.475 + 0.0	00734 v _R + ().0078 V ₁₂ -	0.00627 L _A		D _R = 4.252 + 0.0086 V ₁₂ - 0.009 L _D							
D _R =	23.4 (pc/	mi/ln)				D _R =	(pc/mi/ln)						
LOS =	C (Exhibi	it 13-2)				LOS =	(Exhibit 13-2)					
Spee	d Dete	rminatio	n			Speed Determination							
M _s =	0.363 (E)	kibit 13-11)				D _s =	(Exhibit 13-12)						
S _R =	59.8 mpł	n (Exhibit 13-	11)			S _R =	mph (Exhibit 13	-12)					
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ = mph (Exhibit 13-12)							
S =	59.8 mph	n (Exhibit 13-	13)			S =	mph (Exhibit 13	-13)					
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General Inf			RAMP JUN		ite Infor				
Analyst		h McCage	Fr	reeway/Dir of		-24 WB			
Agency or Comp		DT/HNTB		unction		SR 299			
Date Performed	8/12			urisdiction		Dade County			
Analysis Time Pe		, 10		nalysis Year		2035			
Project Descripti		Bridge Repl		,					
Inputs									
-		Freeway N	umber of Lanes,	N 2					
Upstream Adj Ra	amp	Ramp Nurr	ber of Lanes, N	1				Downstr	eam Adj
⊻Yes □O								Ramp	can Auj
			n Lane Length,	Λ				□ Yes	□ On
□No ☑O	ff	Deceleratio	on Lane Length I	-D				I No	□ Off
L _{up} = 1685	ft	Freeway Vo	olume, V _F	1410					
140		Ramp Volu	me, V _D	125				L _{down} =	ft
V _u = 140 veh	/h		ree-Flow Speed,	S _{EE} 70.0				V _D =	veh/h
				••					
	- //	<u> </u>	-Flow Speed, S						
Conversio	<u>n to pc/h</u>	Under E	Base Condi	tions	r			. .	
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f	f _p	v = V/Pł	IF x f _{HV} x
(pc/n)	(Veh/hr)		Terrain	70 TTUCK	/0110	[†] HV	.b	f p	
Freeway	1410	0.95	Rolling	23	0	0.743	1.00	<u>í</u>	996
Ramp	125	0.95	Rolling	18	0	0.787	1.00	1	67
UpStream	140	0.95	Rolling	22	0	0.752	1.00	1	96
DownStream			Ŭ						
	Ν	lerge Areas	5			Di	verge Areas		
Estimation	of v ₁₂				Estima	tion of v ₁₂	2		
	$V_{12} = V_{F}$	(P _{EM})				V – V	/ _R + (V _F - V	/)P	
1	12 F		13-6 or 13-			1 2 v		· · · -	0 or 12
L _{EQ} =	7				L _{EQ} =		(⊑quai 13)	ion 13-12	2 01 13-
P _{FM}	1	.000 usin	g Equation				,	Equation	(Exhibit
=	(Exhibit 13-6	5)		P _{FD} =		13-7)		
V ₁₂ =	1	996 pc/h			V ₁₂ =		pc/h		
V ₃ or V _{av34}			quation 13-14		V ₃ or V _{av34}	I		quation 13-	14 or 13-
		or 13-17)					17) v/b2 = v		
Is V_3 or V_{av34} >	2,700 pc/h? [∎Yes 🗹 I	No		1	_{av34} > 2,700 pc			
	1.5 * V ₁₂ /2	🛛 Yes 🖂 I	No		Is V ₃ or V _a	₁₂ × 1.5 * V			
$15 v_{3} 01 v_{av34} >$			ation 13-16,		lf Yes,V _{12a}	=		quation	13-16,
0 U.O.								or 13-19)	
If Yes,V _{12a} =	Capacity Checks					ty Checks	í.		
If Yes,V _{12a} =	1	I C	apacity	LOS F?	 	Actual	·	bacity	LOS F?
If Yes,V _{12a} =	Actual	1			V _F		Exhibit 13 8) ⁻	
If Yes,V _{12a} =	1				1 ⁻ F				
If Yes,V _{12a} = <i>Capacity C</i>	1				· · ·	' _			-
If Yes,V _{12a} = <i>Capacity C</i>	1	Exhibit		No	V _{FO} = V	/F ⁻	Exhibit 13	}-	
If Yes,V _{12a} =	Actual	Exhibit 13-8		No	· · ·	′F ⁻	Exhibit 13 8		
If Yes,V _{12a} = <i>Capacity C</i>	Actual			No	V _{FO} = V	/F ⁻	Exhibit 13		

Flow	Enteri	ing Merg	e Influer	nce Area		Flow	Entering D	verge In	fluence	Area			
		Actual	Max [Desirable	Violation?		Actual	Max Des	sirable	Violation?			
V	R12	2163	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8					
Leve	l of Se	rvice Det	erminat	ion (if not	F)	Level of Service Determination (if not F							
D _R = 5	5.475 + 0.	00734 v _R + ().0078 V ₁₂ -	0.00627 L _A		D _R = 4.252 + 0.0086 V ₁₂ - 0.009 L _D							
D _R =	17.7 (pc/	/mi/ln)				D _R =	(pc/mi/ln)						
LOS =	B (Exhibi	it 13-2)				LOS =	(Exhibit 13-2)					
Spee	d Dete	erminatio	n			Speed Determination							
M _s =	0.289 (E	xibit 13-11)				D _s =	(Exhibit 13-12)						
S _R =	61.9 mpł	n (Exhibit 13-	11)			S _R =	mph (Exhibit 13	-12)					
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	-12)					
S =	61.9 mpł	n (Exhibit 13-	13)			S =	mph (Exhibit 13	-13)					
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			RAMP JUN							
General Inf	formation	1		S	ite Infol	rmat	tion			
Analyst Agency or Comp Date Performed Analysis Time Pe	any GDC 8/12	h McCage DT/HNTB /13	Ju Ju	eeway/Dir of Inction Irisdiction nalysis Year		I-24 V SR 29 Dade 2035				
Project Description		Bridge Repla		,						
Inputs										
Jpstream Adj Ra ☑ Yes □ O	n	Ramp Num	umber of Lanes, ber of Lanes, N n Lane Length, I	1					Downstr Ramp Yes	eam Adj ⊏ On
■ No		Deceleratic Freeway Ve Ramp Volu	1	-D 3200 240					I Yes I No L _{down} =	☐ Off ft
V _u = 235 veh/ <i>Conversior</i>		Ramp Free	ee-Flow Speed, -Flow Speed, S _r Base Condi	-R 45.0					V _D =	veh/h
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH f _p	IF x f _{HV} x
Freeway	3200	0.95	Rolling	23	0	0.	743	1.00	4	531
Ramp	240	0.95	Rolling	18	0	0.	787	1.00	3	321
UpStream	235	0.95	Rolling	22	0	0.	752	1.00	3	329
DownStream					ļ					
Estimation	N 	lerge Areas	;		Ectima	tion	1 of v ₁₂	erge Areas		
	12				LSUIIIA		12			
L _{EQ} = P _{FM}	7	(Equation)	13-6 or 13- g Equation		L _{EQ} =		V ₁₂ = V _F	13)	R)P _{FD} on 13-12	
= V ₁₂ =		Exhibit 13-6 531 pc/h)		P _{FD} = V ₁₂ =			13-7) pc/h		
$V_3^{}$ or $V_{av34}^{}$	C	or 13-17)	quation 13-14		V ₃ or V _{av3}		2 700 pc/	17)	uation 13-	14 or 13-
Is V_3 or V_{av34} > Is V_3 or V_{av34} >					-			h? Yes 2 Yes	No	
f Yes,V _{12a} =		lf Yes,V ₁₂	~	<u> </u>	pc/h (E 13-18, o	quation r 13-19)	13-16,			
Capacity C	Ŭ.	r		1	Capaci	ity C	Checks	1 -		1
	Actual	C	apacity	LOS F?	V _F		Actual	Cap Exhibit 13 8	acity -	LOS F?
	4852	Exhibit 13-8		Yes	V _{FO} = V V _R	V _F -		Exhibit 13		
V_{FO}								Exhibit 13	_	

Flow	Enteri	ng Merge	e Influer	nce Area		Flow	Entering D	Diverge In	fluence	Area			
		Actual	Max [Desirable	Violation?		Actual	Max Des	sirable	Violation?			
V	R12	4852	Exhibit 13-8	4600:All	Yes	V ₁₂		Exhibit 13-8					
Leve	l of Se	rvice Det	erminat	ion (if not	F)	Level of Service Determination (if not F							
D _R = 5	5.475 + 0.	00734 v _R + (0.0078 V ₁₂ -	0.00627 L _A		D _R = 4.252 + 0.0086 V ₁₂ - 0.009 L _D							
D _R =	38.6 (pc/	mi/ln)				D _R =	(pc/mi/ln)						
LOS =	F (Exhibi	t 13-2)				LOS =	(Exhibit 13-2)					
Spee	d Dete	rminatio	n			Speed Determination							
M _s =	0.754 (Ex	xibit 13-11)				D _s =	(Exhibit 13-12)						
S _R =	48.9 mpł	n (Exhibit 13-	11)			S _R =	mph (Exhibit 13	9-12)					
S ₀ =	N/A mph	(Exhibit 13-1	1)			S ₀ =	mph (Exhibit 13	9-12)					
S =	48.9 mpł	n (Exhibit 13-	13)			S =	mph (Exhibit 13	9-13)					
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		RAMPS		P JUNC		WOF	RKSHE	ET		
General Inf	ormation	ו		S	ite Info	rmat	tion			
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GDC 8/12 rriod AM		Ju Ju Ar	eeway/Dir of Inction Irisdiction nalysis Year	Travel	I-24 E SR 29 Dade 2013				
Inputs		1								
IF No 「 L _{up} = f	j Ramp On Off t eh/h	Ramp Num Acceleratio Deceleratic Freeway V Ramp Volu Freeway Fr	1	1 -A 645 1775 105 S _{FF} 70.0					■ No L _{down} = ·· V- =	am Adj On Off 1200 ft 190 veh/h
Conversion	to pc/h		I	11						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	^T n	v = V/PHF f _p	= x f _{HV} x
Freeway	1775	0.91	Rolling	23	0	0.	743	1.00	262	3
Ramp	105	0.91	Rolling	25	0	0.1	727	1.00	159)
UpStream										
DownStream	190	0.91	Rolling	19	0	0.	778	1.00	268	3
Estimation	N	lerge Areas	6		Eatima	tion		erge Areas		
Estimation	or v ₁₂				Estima	ation				
$L_{EQ} =$ $P_{FM} =$ $V_{12} =$ $V_{3} \text{ or } V_{av34}$ Is $V_{3} \text{ or } V_{av34} > 3$	ו 1 1 2,700 pc/h? ן	(Equation using Equ 3-6) pc/h pc/h (Equa 3-17) ■ Yes ■ I			-	/ _{av34} >	2,700 pc/	13) 1.000 usi (Exhibit 13 2623 pc/ 0 pc/h (I 13-17) h? □ Yes I	ing Equati B-7) h Equation 1	on
Is V_3 or V_{av34} >					is v ₃ or v	/ _{av34} >	· 1.5 ^ V ₁₂ /	2 🗆 Yes 🖡		10
If Yes,V _{12a} =	1	3-18, or 1	ation 13-16, 3-19)		If Yes,V ₁₂		No - 1	рс/h (Ес 13-18, о	quation 13 r 13-19)	-16,
Capacity C	1		a na a ilu i		Capac					
	Actual		apacity	LOS F?	V _F		Actual 2623	Exhibit 13	- 4800	LOS F? No
V _{FO}		Exhibit 13-8			V _{FO} = V _R		2464	Exhibit 13 8	- 4800	No
					V _R		159	Exhibit 13 10	- 2200	No

Flow	r Enteri	ng Merg	e Influe	nce Area		Flow	En	tering D	iverge Inf	luence	Area
		Actual	Мах	Desirable	Violation?			Actual	Max Desira	ıble	Violation?
V	, R12		Exhibit 13-8			V ₁₂	2	2623	Exhibit 13-8	4400:All	No
Leve	l of Se	rvice Det	ermina	tion (if not	F)	Leve	l of	^f Service	Determin	nation (i	if not F)
D _R =	= 5.475 (pc/mi/l (Exhibit	,		078 V ₁₂ -		D _R =	21.	4.252 + 0. 0 (pc/mi/ln) Exhibit 13-		0.009 L _D	
Spee	ed Dete	rminatio	n			Spee	ed E	Determin	ation		
M _S =	(Exibit [·]	13-11)				D _s =	0.1	82 (Exhibit	13-12)		
S _R =	mph (Ex	hibit 13-11)			S _R =	64.9	9 mph (Exhi	ibit 13-12)		
S ₀ =	mph (Ex	hibit 13-11)			S ₀ =	N/A	mph (Exhil	bit 13-12)		
S =	mph (Ex	hibit 13-13)			S =	64.	9 mph (Exhi	ibit 13-13)		
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		RAM	PS AND RA	MP JUN	CTIONS	WORKS	HEET	
General In	formati	on			Site Info	ormation		
Analyst	K	eith McCag	е	Freeway/Dir	of Travel	I-24 EB		
Agency or Com		DOT/HNTB	}	Junction		SR 299		
Date Performed		/12/13		Jurisdiction		Dade Cour	nty	
Analysis Time F		M		Analysis Yea	ar	2013		
Project Descrip	tion SR 29	99 Bridge Re	eplacement					
Inputs		<u> </u>						
		Freeway N	umber of Lanes,	N 2				
Upstream Ad	lj Ramp	Ramp Num	ber of Lanes, N	1				Downstream Adj
🗆 Yes 🛛	On	Acceleratio	n Lane Length, I	-^				Ramp
			on Lane Length L	7.				🗹 Yes 🛛 On
I No □	Off			0				No Off
L _{up} =	ft	Freeway V		1880				L _{down} = 1200 ft
		Ramp Volu	me, V _R	75				1 445
V _u = v	/eh/h	Freeway F	ree-Flow Speed,	S _{FF} 70.0				$V_{\rm D} = \frac{115}{\text{veh/h}}$
		Ramp Free	-Flow Speed, S _F	тр 55.0				
Conversio	n to nc		r Base Con					
0011761310								v = V/PHF x f _{HV} x
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	f _p
Freeway	1880	0.91	Rolling	23	0	0.743	1.00	2779
Ramp	75	0.91	Rolling	25	0	0.727	1.00	113
UpStream								
DownStream	115	0.91	Rolling	19	0	0.778	1.00	162
		Merge Are	as			[Diverge Are	eas
Estimatior	n of v ₁₂				Estima	ntion of v	12	
	V ₁₂ =	V _F (P _{FM})						
	12		on 13-6 or 13-	7)				
L _{EQ} = P		、 I		,				
FM		13-6)	quation (Exhil	oit				
- V =		pc/h						
V ₁₂ =		•	quation 13-14	or				
$V_3^{}$ or $V_{av34}^{}$		13-17)	qualion 13-14	01				
Is V ₃ or V _{av34} :	> 2,700 pc/ł	,	No					
Is V_3 or V_{av34}								
If Yes,V _{12a} =	12							
12a [–]					J			

		RAMPS		P JUNC		WOF	RKSHE	ET		
General Inf	ormation			S	ite Info	rmat	tion			
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GDC 8/12 rriod AM		Ju Ju Ar	eeway/Dir of Inction Irisdiction nalysis Year		I-24 V SR 29 Dade 2013				
Inputs										
Upstream Ad □ Yes □ ☑ No □ L _{up} = f	j Ramp On Off it eh/h	Ramp Num Acceleratio Deceleratio Freeway Volu Ramp Volu Freeway Fr	1	-A -D S _{FF} 70.0						eam Adj COn Off 1685 ft 75 veh/h
Conversion	to nc/h		I	11						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	I_	v = V/PH f _p	F x f _{HV} x
Freeway	1190	0.91	Rolling	23	0	0.	743	1.00	175	59
Ramp	80	0.91	Rolling	22	0		752	1.00	11	
UpStream										
DownStream	75	0.91	Rolling	18	0	0.	787	1.00	10	5
	N	lerge Areas	;				Div	verge Areas		
Estimation	of v ₁₂				Estima	ation	of v ₁₂			
$L_{EQ} = P_{FM}$ $= V_{12} = V_3 \text{ or } V_{av34}$ Is $V_3 \text{ or } V_{av34} > 2$ Is $V_3 \text{ or } V_{av34} > 2$	۱ 1 1 2,700 pc/h? ۲ 1.5 * V ₁₂ /2	(Equation using Equ 3-6) pc/h pc/h (Equa 3-17) Yes □ I Yes □ I			Is V ₃ or V	/ _{av34} > / _{av34} >	2,700 pc/	13) 1.000 us (Exhibit 13 1759 pc/ 0 pc/h (l 13-17) /h? ☐ Yes 1 /2 ☐ Yes 1	ing Equat 3-7) /h Equation	ion 13-14 or
If Yes,V _{12a} =		3-18, or 1	3-19)		lf Yes,V ₁₂			13-18, o		,
Capacity C	1	1 -			Capac	ity C		1		
	Actual		apacity	LOS F?	V _F		Actual 1759	Exhibit 13	pacity - 4800	LOS F? No
V _{FO}		Exhibit 13-8			V _{FO} = ' V _R		1642	Exhibit 13 8	- 4800	No
					V _R		117	Exhibit 13 10	2000	No

Flow	[,] Enteri	ng Merg	e Influe	nce Area		Flow	' En	tering D	iverge Inf	luence	Area
		Actual	Max	Desirable	Violation?			Actual	Max Desira	ıble	Violation?
V	, R12		Exhibit 13-8			V ₁	2	1759	Exhibit 13-8	4400:All	No
Leve	l of Se	rvice Det	termina	tion (if not	F)	Leve	el of	^f Service	Determin	nation (i	f not F)
D _R =	= 5.475 (pc/mi/l (Exhibit	,		078 V ₁₂ -		D _R =	17.	4.252 + 0. 3 (pc/mi/ln) Exhibit 13-		0.009 L _D	
Spee	ed Dete	rminatio	n			Spee	ed E	Determin	ation		
M _S =	(Exibit [·]	13-11)				D _s =	0.5	04 (Exhibit	13-12)		
S _R =	mph (Ex	hibit 13-11)			S _R =	55.9	9 mph (Exhi	ibit 13-12)		
S ₀ =	mph (Ex	hibit 13-11)			S ₀ =	N/A	mph (Exhil	bit 13-12)		
S =	mph (Ex	hibit 13-13	5)			S =	55.9	9 mph (Exhi	ibit 13-13)		
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			PS AND RA					
General In	formati	on			Site Info	ormation		
Analyst		eith McCag	e	Freeway/Dir	of Travel	I-24 WB		
Agency or Com		DOT/HNTB	i	Junction		SR 299		
Date Performed		/12/13		Jurisdiction		Dade Cour	nty	
Analysis Time F		M		Analysis Yea	r	2013		
Project Descrip	tion SR 29	99 Bridge Re	eplacement					
Inputs		<u> </u>						
		Freeway N	umber of Lanes,	N 2				
Upstream Ad	lj Ramp	Ramp Num	ber of Lanes, N	1				Downstream Adj
🗆 Yes 🛛	On	Acceleratio	n Lane Length, l	-0				Ramp
	Off		n Lane Length L	7.				🗹 Yes 🛛 On
I INO	Oli			0				No Off
L _{up} =	ft	Freeway V		2650				L _{down} = 1685 ft
		Ramp Volu	me, V _R	145				105
V _u = v	/eh/h	Freeway Fi	ee-Flow Speed,	S _{FF} 70.0				$V_{\rm D} = \frac{135}{\text{veh/h}}$
		Ramp Free	-Flow Speed, S _F	ар <u>30.0</u>				
Conversio	n to nc		r Base Con					
0011101310								v = V/PHF x f _{HV} x
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	f _p
Freeway	2650	0.91	Rolling	23	0	0.743	1.00	3917
Ramp	145	0.91	Rolling	22	0	0.752	1.00	212
UpStream							ļ	
DownStream	135	0.91	Rolling	18	0	0.787	1.00	188
		Merge Are	as				Diverge Are	as
Estimatior	n of v ₁₂				Estima	tion of v	12	
	V ₁₂ =	V _F (P _{FM})						
=	12		on 13-6 or 13-	.7)				
L _{EQ} = P		、 1		,				
FM		13-6)	quation (Exhil	DIT				
=		,						
V ₁₂ =		pc/h	nuction 10 14	or				
V ₃ or V _{av34}		pc/n (Ed 13-17)	quation 13-14	U				
Is V ₃ or V _{av34} :	> 2,700 pc/h	,	No					
Is V_3 or V_{av34}								
	12	_ 100 1						
lf Yes,V _{12a} =]			

		RAMPS		P JUNC		WOF	RKSHE	ET		
General Inf	ormation				ite Info					
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GDC 8/12 rriod AM		Ju Ju Ar	eeway/Dir of Inction Irisdiction nalysis Year	Travel	I-24 E SR 29 Dade 2015				
Inputs										
IF No 「 L _{up} = f	j Ramp On Off t eh/h	Ramp Num Acceleratio Deceleratic Freeway V Ramp Volu Freeway Fr	1	1 -A 645 1810 110 S _{FF} 70.0					■ No L _{down} = ·· V- =	am Adj On Off 1200 ft 195 veh/h
Conversion	to nc/h		I	11						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	^T p	v = V/PHF f _p	⁼ x f _{HV} x
Freeway	1810	0.91	Rolling	23	0	0.	743	1.00	267	5
Ramp	110	0.91	Rolling	25	0	_	727	1.00	166	
UpStream			•							
DownStream	195	0.91	Rolling	19	0	0.	778	1.00	275	5
	N	lerge Areas	;				Div	verge Areas		
Estimation	of v ₁₂				Estima	ation	of v ₁₂			
$L_{EQ} =$ $P_{FM} =$ $V_{12} =$ $V_3 \text{ or } V_{av34}$ $Is V_3 \text{ or } V_{av34} > 2$	ו 1 1 2,700 pc/h? ן	(Equation using Equ 3-6) pc/h pc/h (Equa 3-17) ■ Yes ■ I			-	/ _{av34} >	• 2,700 pc/	13) 1.000 usi (Exhibit 13 2675 pc/	ing Equati F7) A Equation 1	on
If Yes,V _{12a} =			ation 13-16,		lf Yes,V ₁₂		12		quation 13	-16,
Capacity C	hecks				Capac	ity C	Checks			
	Actual		apacity	LOS F?			Actual	Ca Exhibit 13	pacity	LOS F?
V _{FO}		Exhibit 13-8			V _F V _{FO} = V _R	V _F -	2675 2509	Exhibit 13	4800	No No
					V _R	l	166	Exhibit 13 10	- 2200	No

Flow	[,] Enteri	ng Merg	e Influe	nce Area		Flow	' En	tering D	iverge Inf	luence	Area
		Actual	Max	Desirable	Violation?			Actual	Max Desira	ıble	Violation?
V	, R12		Exhibit 13-8			V ₁₂	2	2675	Exhibit 13-8	4400:All	No
Leve	l of Se	rvice Det	termina	tion (if not	F)	Leve	el of	^f Service	Determin	nation (i	f not F)
D _R =	= 5.475 (pc/mi/l (Exhibit	,		078 V ₁₂ -		D _R =	21.	4.252 + 0. 5 (pc/mi/ln) Exhibit 13-		0.009 L _D	
Spee	ed Dete	rminatio	n			Spee	ed L	Determin	ation		
M _S =	(Exibit [·]	13-11)				D _s =	0.1	83 (Exhibit	13-12)		
S _R =	mph (Ex	hibit 13-11)			S _R =	64.	9 mph (Exhi	ibit 13-12)		
S ₀ =	mph (Ex	hibit 13-11)			S ₀ =	N/A	mph (Exhil	bit 13-12)		
S =	mph (Ex	hibit 13-13	5)			S =	64.	9 mph (Exhi	ibit 13-13)		
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		RAMPS		P JUNC	TIONS	WOF	RKSHE	ET		
General Inf	ormation				ite Info					
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GDC 8/12 eriod PM		Ju Ju Ar	eeway/Dir of Inction Irisdiction nalysis Year	Travel	I-24 E SR 29 Dade 2015				
Inputs										
Upstream Ad ☐ Yes ☑ No L _{up} = 1	j Ramp On Off ft reh/h	Ramp Num Acceleratio Deceleratic Freeway V Ramp Volu Freeway Fr	me, V _R ree-Flow Speed,	1 -A 645 1920 80 S _{FF} 70.0					□ No L _{down} = V- =	am Adj ☑ On ☑ Off 1200 ft 120 veh/h
			-Flow Speed, S _F	11						
Conversion	h to pc/h	Under E	Base Condi	tions	r		r			- ,
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHI f _p	- x t _{HV} x
Freeway	1920	0.91	Rolling	23	0	0.	743	1.00	283	8
Ramp	80	0.91	Rolling	25	0	0.	727	1.00	12 ⁻	1
UpStream										
DownStream	120	0.91	Rolling	19	0	0.	778	1.00	169	9
F atimatian	N	lerge Areas	5		F atima		Div	verge Areas		
Estimation	of V ₁₂				Estima	ation				
L _{EQ} = P _{FM} = V ₁₂ = V ₃ or V _{av34}	1 1 1	(Equation using Equ 3-6) pc/h	13-6 or 13-7) ation (Exhibit ation 13-14 or		L _{EQ} = P _{FD} = V ₁₂ = V ₃ or V _{av3}	34		13) 1.000 us (Exhibit 13 2838 pc/	ing Equati 3-7)	on
Is V ₃ or V _{av34} > $\frac{1}{2}$			No					′h? I Yes ⊺	✓ No	
Is V_3 or V_{av34} >								/2 □ Yes [
If Yes,V _{12a} =	1		ation 13-16,		If Yes,V ₁₂		12		quation 13	-16,
Capacity C	hecks				Capac	ity C	Checks		/	
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F?
					V _F		2838	Exhibit 13 8	- 4800	No
V _{FO}		Exhibit 13-8			V _{FO} = V _R		2717	Exhibit 13 8	4800	No
					V _R		121	Exhibit 13 10	- 2200	No

Flow	[,] Enteri	ng Merg	e Influe	nce Area		Flow	r En	tering D	iverge Inf	luence	Area
		Actual	Max	Desirable	Violation?			Actual	Max Desira	ıble	Violation?
V	, R12		Exhibit 13-8			V ₁	2	2838	Exhibit 13-8	4400:All	No
Leve	l of Se	rvice Det	termina	tion (if not	F)	Leve	el of	^f Service	Determin	nation (i	f not F)
D _R =	= 5.475 (pc/mi/l (Exhibit	,		078 V ₁₂ -		D _R =	22.	4.252 + 0. 9 (pc/mi/ln) Exhibit 13-		0.009 L _D	
Spee	ed Dete	rminatio	n			Spee	ed L	Determin	ation		
M _S =	(Exibit [·]	13-11)				D _s =	0.1	79 (Exhibit	13-12)		
S _R =	mph (Ex	hibit 13-11)			S _R =	65.	0 mph (Exhi	ibit 13-12)		
S ₀ =	mph (Ex	hibit 13-11)			S ₀ =	N/A	mph (Exhil	bit 13-12)		
S =	mph (Ex	hibit 13-13	5)			S =	65.	0 mph (Exhi	ibit 13-13)		
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		RAMPS	AND RAM	P JUNC		WOF	RKSHE	ET		
General Inf	ormatior			S	ite Info	rmat	tion			
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GD0 8/12 priod AM		Ju Ju Ar	eeway/Dir of Inction Irisdiction nalysis Year	Travel	I-24 V SR 29 Dade 2015				
Inputs										
Upstream Ad □ Yes □ ☑ No □ L _{up} = f	j Ramp On Off t eh/h	Ramp Num Acceleratio Deceleratio Freeway Volu Ramp Volu Freeway Fr	1	-A -D 235 1215 85 S _{FF} 70.0						eam Adj I On I Off 1685 ft 80 veh/h
Conversion	to pc/h		1	11						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	T_	v = V/PH f _p	F x f _{HV} x
Freeway	1215	0.91	Rolling	23	0	0.	743	1.00	179	96
Ramp	85	0.91	Rolling	22	0	0.	752	1.00	12	4
UpStream										
DownStream	80	0.91	Rolling	18	0	0.	787	1.00	11	2
	N	lerge Areas	5				Div	verge Areas		
Estimation	of v ₁₂				Estima	ation	1 of V ₁₂	2		
$L_{EQ} = P_{FM} = V_{12} = V_3 \text{ or } V_{av34} = V_3 \text{ or } V_3 \text{ or } V_{av34} = V_3 \text{ or } V_3 \text{ or }$	ا 1 2,700 pc/h? ן 1.5 * V ₁₂ /2	(Equation using Equ 3-6) pc/h pc/h (Equa 3-17) Yes □ I	No		-	/ _{av34} >	• 2,700 pc/	13) 1.000 us (Exhibit 13 1796 pc/ 0 pc/h (1 13-17) /h? ☐ Yes I /2 ☐ Yes I	ing Equat 3-7) h Equation No No	ion 13-14 or
If Yes,V _{12a} =	1	oc/h (Equa 3-18, or 1	ation 13-16, 3-19)		lf Yes,V ₁₂		<u> </u>	13-18, o	quation 13 r 13-19)	3-16,
Capacity Cl	Ú.				Capac	ity C	Checks	í.		
	Actual		apacity	LOS F?	V _F		Actual 1796	Exhibit 13	pacity - 4800	LOS F? No
V _{FO}		Exhibit 13-8			V _{FO} = V _R		1672	Exhibit 13 8	- 4800	No
					V _R		124	Exhibit 13 10	2000	No

Flow Enteri	ng Merge	e Influei	nce Area		Flow En	ntering D	iverge Inf	luence	Area
	Actual	Мах	Desirable	Violation?		Actual	Max Desira	ble	Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1796	Exhibit 13-8	4400:All	No
Level of Se	rvice Det	ermina	tion (if not	F)	Level of	f Service	Determin	ation (i	f not F)
D _R = 5.475	+ 0.00734	v _R + 0.0	078 V ₁₂ -						
	0.00627	′ L _A			D _R =	4.252 + 0	.0086 V ₁₂ -	0.009 L _D	
D _R = (pc/mi/l	n)				D _R = 17.	6 (pc/mi/ln)	1		
LOS = (Exhibit	: 13-2)								

		RAMPS	AND RAM	P JUNC	TIONS	WOF	RKSHE	ET		
General Inf	formation				ite Info					
Analyst Agency or Comp Date Performed Analysis Time Pe	any GD0 8/12 eriod PM		Ju Ju Ar	eeway/Dir of Inction Irisdiction nalysis Year	Travel	I-24 V SR 29 Dade 2015				
Project Description	on SR 299	Bridge Repla	acement							
Inputs										
		Freeway N	umber of Lanes,	N 2						
Upstream Ac	lj Ramp	Ramp Num	ber of Lanes, N	1					Downstre	eam Adj
□ Yes	On	Acceleratio	n Lane Length, I	A					Ramp I Yes	🗹 On
⊠ No	Off	Deceleratio	on Lane Length L	- _D 235					No	I Off
L _{up} =	ft	Freeway V	1	2705					L _{down} =	1685 ft
·	/eh/h	Ramp Volu Freeway Fi	me, V _R ree-Flow Speed,	150 S _{FF} 70.0					V _D =	135 veh/h
		Ramp Free	-Flow Speed, S _F	- _R 30.0						
Conversio	n to pc/h	Under E	Base Condi	tions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	fp	v = V/PH f _p	F x f _{HV} >
Freeway	2705	0.91	Rolling	23	0	0.	743	1.00	39	98
Ramp	150	0.91	Rolling	22	0	0.	752	1.00	21	9
UpStream										
DownStream	135	0.91	Rolling	18	0	0.	787	1.00	18	88
F - time - ti - m	<u> </u>	lerge Areas	5		F atima	- 41	Div	verge Areas		
Estimation	or v ₁₂				Estima	ation	n of v ₁₂			
	$V_{12} = V_{F}$						V ₁₂ = V	/ _R + (V _F - \ (Equation	–	or 12
EQ =			13-6 or 13-7)		L _{EQ} =			13)	on 13-12	
P _{FM}		using Equ ∣3-6)	ation (Exhibit		P _{FD} =			1.000 us (Exhibit 13	ing Equa [:] 3-7)	tion
V ₁₂ =		pc/h			V ₁₂ =			3998 pc/	'n	
$V_3^{}$ or $V_{av34}^{}$	1	pc/h (Equa I3-17)	ation 13-14 or		V ₃ or V _{av3}	34		0 pc/h (l 13-17)	Equation	13-14 or
Is V_3 or V_{av34} >	2,700 pc/h?	□Yes □I	No		Is V ₃ or V	/ _{av34} >	> 2,700 pc/	'n? ⊑ Yes ⊺	✓ No	
Is V_3 or V_{av34} >	1.5 * V ₁₂ /2	□Yes □I	No		-			⁄2 □Yes 『		
If Yes,V _{12a} =		pc/h (Equa I3-18, or 1	ation 13-16, 3-19)		If Yes,V ₁₂		12		quation 1	3-16,
Capacity C	hecks				Capac	ity C	Checks			
	Actual	C	apacity	LOS F?			Actual		pacity	LOS F
					V _F		3998	Exhibit 13 8	- 4800	No
V _{FO}		Exhibit 13-8			V _{FO} = V _R		3779	Exhibit 13 8	- 4800	No
					V _R		219	Exhibit 13 10	- 2000	No

Flow	r Enteri	ng Merg	e Influe	nce Area		Flow	r En	tering D	iverge Inf	luence	Area
		Actual	Max	Desirable	Violation?			Actual	Max Desira	ıble	Violation?
V	, R12		Exhibit 13-8			V ₁	2	3998	Exhibit 13-8	4400:All	No
Leve	l of Se	rvice Det	termina	tion (if not	F)	Leve	el of	^f Service	Determin	nation (i	if not F)
D _R =	= 5.475 (pc/mi/l (Exhibit	,		078 V ₁₂ -		D _R =	36.	4.252 + 0. 5 (pc/mi/ln) Exhibit 13-		0.009 L _D	
Spee	ed Dete	rminatio	n			Spee	ed L	Determin	ation		
M _S =	(Exibit [·]	13-11)				D _s =	0.5	13 (Exhibit	13-12)		
S _R =	mph (Ex	hibit 13-11)			S _R =	55.	6 mph (Exhi	ibit 13-12)		
S ₀ =	mph (Ex	hibit 13-11)			S ₀ =	N/A	mph (Exhil	bit 13-12)		
S =	mph (Ex	hibit 13-13	5)			S =	55.	6 mph (Exhi	ibit 13-13)		
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		RAMPS		P JUNC		WOF	RKSHEI	ET		
General Info	ormation	ו		S	ite Info	rmat	tion			
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptio	any GDC 8/12 riod AM		Ju Ju Ar	eeway/Dir of nction risdiction nalysis Year	Travel	I-24 E SR 29 Dade 2035				
Inputs										
⊠No L _{up} = f	On Off	Ramp Num Acceleratio Deceleratic Freeway V Ramp Volu Freeway Fr	me, V _R ree-Flow Speed,	1 -A 645 2295 190 S _{FF} 70.0					$\square No \qquad \\ L_{down} = 1 \\ V_{rs} = 3$	am Adj On Off 200 ft 10 veh/h
		Ramp Free	-Flow Speed, S _F	- _R 55.0						
Conversion	to pc/h	Under E	Base Condi	tions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	^T p	v = V/PHF f _p	x f _{HV} x
Freeway	2295	0.95	Rolling	23	0	0.	743	1.00	3249)
Ramp	190	0.95	Rolling	25	0	0.	727	1.00	275	
UpStream DownStream	310	0.95	Rolling	19	0	0.	778	1.00	419	
F atimatian	<u>N</u>	lerge Areas	6				Div	erge Areas		
Estimation	of V ₁₂				Estima	ation	of v ₁₂			
$L_{EQ} = P_{FM} = V_{12} = V_3 \text{ or } V_{av34} = I_3 \text{ or } V_{av34} > I_3 \text{ or } V_{av34} > I_3 \text{ or } V_{av34} > I_3 \text{ or } V_{av34} = I_3 \text{ or } V_{12a} = I_3 \text{ or } V_{av34} =$	ו 1 2,700 pc/h? ך 1.5 * V ₁₂ /2 1 1	(Equation using Equ 3-6) pc/h pc/h (Equa 3-17) Tes □ I	No ation 13-16,		ls V ₃ or V If Yes,V ₁₂	/ _{av34} > / _{av34} > / _a =	• 2,700 pc/ł • 1.5 * V ₁₂ /ź	13) 1.000 usi (Exhibit 13 3249 pc/ 0 pc/h (E 13-17) n? □ Yes F 2 □ Yes F	ing Equation (-7) h Equation 1 No No quation 13-	on 3-14 or
Capacity Cl	hecks				Capac	ity C	Checks	-		<i>,</i>
	Actual	C	apacity	LOS F?			Actual		pacity	LOS F?
					V _F		3249	Exhibit 13 8	4800	No
V _{FO}		Exhibit 13-8			V _{FO} - V _R		2974	Exhibit 13 8	4800	No
					V _R		275	Exhibit 13 10	2200	No

Flow	Enteri	ng Merg	e Influe	nce Area		Flow	En	tering D	iverge Inf	luence	Area
		Actual	Мах	Desirable	Violation?			Actual	Max Desira	ıble	Violation?
V	, R12		Exhibit 13-8			V ₁₂	2	3249	Exhibit 13-8	4400:All	No
Leve	l of Se	rvice Det	ermina	tion (if not	F)	Leve	l of	^f Service	Determin	nation (i	f not F)
D _R =	= 5.475 (pc/mi/l (Exhibit	,		078 V ₁₂ -		D _R =	26.4	4.252 + 0. 4 (pc/mi/ln) Exhibit 13-		0.009 L _D	
Spee	d Dete	rminatio	n			Spee	ed E	Determin	ation		
M _S =	(Exibit [·]	13-11)				D _s =	0.1	93 (Exhibit	13-12)		
S _R =	mph (Ex	hibit 13-11)			S _R =	64.	6 mph (Exhi	ibit 13-12)		
S ₀ =	mph (Ex	hibit 13-11)			S ₀ =	N/A	mph (Exhil	bit 13-12)		
S =	mph (Ex	hibit 13-13)			S =	64.	6 mph (Exhi	ibit 13-13)		
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		RAMPS		P JUNC		WOF	RKSHE	ET			
General Inf	ormation				ite Info						
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GDC 8/12 priod PM	th McCage Freeway/Dir c OT/HNTB Junction 2/13 Jurisdiction Analysis Year				I-24 E SR 29 Dade 2035					
Inputs											
Upstream Ad □ Yes □ □ No □ L _{up} = f	j Ramp On Off t eh/h	Freeway N Ramp Num Acceleratio Deceleratio Freeway V Ramp Volu Freeway Fr					■ No L _{down} = ·· V- = ²	am Adj On Off 1200 ft 205 veh/h			
			-Flow Speed, S _F	11							
Conversion	to pc/h	Under E	Base Condi	tions	1		î				
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	^T p	v = V/PHF f _p	- x f _{HV} x	
Freeway	2435	0.95	Rolling	23	0	0.	743	1.00	3447		
Ramp	145	0.95	Rolling	25	0	0.	727	1.00	21()	
UpStream											
DownStream	205	0.95	Rolling	19	0	0.	778	1.00	277	7	
	N	lerge Areas	5				Div	verge Areas			
Estimation	of V ₁₂				Estima	ation	1 of V ₁₂				
L _{EQ} = P _{FM} = V ₁₂ =	$V_{12} = V_F (P_{FM})$ $L_{EQ} = (Equation 13-6 \text{ or } 13-7)$ $P_{FM} \qquad using Equation (Exhibit = 13-6)$						V _R)P _{FD} on 13-12 or 13- sing Equation 3-7) //h				
V ₃ or V _{av34}	1	3-17)	ation 13-14 or		V ₃ or V _{av34} 0 pc/h (Equation 13-14 or 13-17)						
Is V_3 or $V_{av34} > 2$					Is V ₃ or V _{av34} > 2,700 pc/h? Yes No						
Is V_3 or $V_{av34} > 1$					Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Tes No						
If Yes,V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					lf Yes,V ₁₂			pc/h (Ec 13-18, o	quation 13 r 13-19)	-16,	
Capacity C	1				Capac	ity C					
	Actual	C	apacity	LOS F?	V _F		Actual 3447	Exhibit 13	pacity - 4800	LOS F? No	
V _{FO}		Exhibit 13-8			V _{FO} = V _R	V _F -	3237	Exhibit 13	- 4800	No	
					V _R		210	Exhibit 13 10	- 2200	No	

Flow Entering Merge Influence Area							Flow Entering Diverge Influence Area						
		Actual	Max Desirable Violation?					Actual	Max Desira	Violation?			
V	, R12		Exhibit 13-8			V ₁	2	3447	Exhibit 13-8	4400:All	No		
Leve	l of Se	rvice Det	ermina	tion (if not	F)	Leve	l of	^f Service	Determin	nation (i	f not F)		
$W_{\rm p} = ({\rm pc}/{\rm m})/{\rm ln}$							$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ $D_R = 28.1 (pc/mi/ln)$ LOS = D (Exhibit 13-2)						
Spee	d Dete	rminatio	n			Speed Determination							
M _S =	(Exibit [·]	13-11)				D _s =	0.1	87 (Exhibit	13-12)				
S _R =	S _B = mph (Exhibit 13-11)						S _R = 64.8 mph (Exhibit 13-12)						
S ₀ =	S ₀ = mph (Exhibit 13-11)						S ₀ = N/A mph (Exhibit 13-12)						
S = mph (Exhibit 13-13) S = 64.8 mph (Exhibit 13-13)													
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		RAMPS	AND RAM	P JUNC	TIONS	WOF	RKSHEI	ET			
General Inf	ormation				ite Info						
Analyst Agency or Compa Date Performed Analysis Time Pe	any GD0 8/12	th McCage Freeway/Dir OT/HNTB Junction 2/13 Jurisdiction			f Travel I-24 WB SR 299 Dade County						
Project Description	on SR 299 I	Bridge Repla	acement								
Inputs											
Upstream Ad	li Ramn		umber of Lanes, Iber of Lanes, N	N 2 1					Downstre	am Adi	
•	On		n Lane Length, I	•					Ramp	-	
🗹 No	Off		on Lane Length L	D						I On I Off	
L _{up} =	ft	Freeway V Ramp Volu		1550 140					L _{down} =	1685 ft	
V _u = v	/eh/h	Freeway F	ree-Flow Speed, -Flow Speed, S _r	S _{FF} 70.0						125 veh/h	
Conversion	to nc/h	1	I								
Conversion					1		1	,	v = V/PHF	- vf v	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	^T p	f p	^ 'HV ^	
Freeway	1550	0.95	Rolling	23	0	0.	743	1.00	219	4	
Ramp	140	0.95	Rolling	22	0	0.	752	1.00	196	6	
UpStream											
DownStream	125	0.95	Rolling	18	0	0.	787	1.00	167	7	
F . <i>1</i>	<u> </u>	lerge Areas	5				Div	erge Areas			
Estimation	of V ₁₂				Estima	ation	n of v ₁₂				
1 –	V ₁₂ = V _F		12.6 or 12.7		$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-						
L _{EQ} = P _{FM}	I	using Equ	13-6 or 13-7) ation (Exhibit		^L EQ - 13)						
= V ₁₂ =		3-6) pc/h			P _{FD} = V ₁₂ =		(Exhibit 13 2194 pc/	13-7)			
V ₃ or V _{av34}			ation 13-14 or		V ₂ or V ₂ 0 pc/h (Equation 13-14 c					3-14 or	
Is V ₃ or V _{av34} >	2,700 pc/h? [TYes □I			ls V ₃ or V _{av34} > 2,700 pc/h? □ Yes ☑ No						
Is V ₃ or V _{av34} >					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)					lf Yes,V ₁₂	2a =		рс/h (Ес 13-18, оі	uation 13 r 13-19)	-16,	
Capacity C	hecks				Capac	ity C	Checks				
	Actual	C	apacity	LOS F?			Actual		pacity	LOS F?	
					V _F	:	2194	Exhibit 13- 8	4800	No	
V _{FO}		Exhibit 13-8			V _{FO} =		1998	Exhibit 13- 8	4800	No	
					V _R	1	196	Exhibit 13- 10	2000	No	

Flow Entering Merge Influence Area							Flow Entering Diverge Influence Area						
		Actual	Max Desirable Violation					Actual	Max Desirable		Violation?		
V	, R12		Exhibit 13-8			V ₁	2	2194	Exhibit 13-8	4400:All	No		
Leve	l of Se	rvice Det	ermina	tion (if not	F)	Leve	el of	^f Service	Determin	nation (i	f not F)		
$V_{\rm p} = (\rm pc/mi/ln)$							$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ $D_R = 21.0 (pc/mi/ln)$ LOS = C (Exhibit 13-2)						
Spee	ed Dete	rminatio	n			Speed Determination							
M _S =	(Exibit [·]	13-11)				D _s =	0.5	11 (Exhibit	13-12)				
S _R =	S _B = mph (Exhibit 13-11)						S _R = 55.7 mph (Exhibit 13-12)						
S ₀ =	S ₀ = mph (Exhibit 13-11)						S ₀ = N/A mph (Exhibit 13-12)						
S = mph (Exhibit 13-13) S = 55.7 mph (Exhibit 13-13)									ibit 13-13)				
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		RAMPS		P JUNC		WOF	RKSHE	ET			
General Inf	ormatior				ite Info						
Analyst Agency or Compa Date Performed Analysis Time Pe Project Descriptic	any GD0 8/12 eriod PM	Analysis Year			Travel	I-24 V SR 29 Dade 2035					
Inputs											
Upstream Ad ☐ Yes ☑ No L _{up} = 1	j Ramp On Off ft reh/h	Freeway N Ramp Num Acceleratio Deceleratio Freeway V Ramp Volu Freeway Fr Ramp Free					■ No L _{down} =	am Adj I On Off 1685 ft 240 veh/h			
Conversion	to no/h		I								
Conversion			base conui						v = V/PHF	- vf v	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	^T p	f p	^ 'HV ^	
Freeway	3435	0.95	Rolling	23	0	0.	743	1.00	486	3	
Ramp	235	0.95	Rolling	22	0	0.	752	1.00	329		
UpStream											
DownStream	240	0.95	Rolling	18	0	0.	787	1.00	321		
F atimatian	N	lerge Areas	5				Div	verge Areas			
Estimation	of V ₁₂				Estima	ation	n of v ₁₂				
L _{EQ} = P _{FM} = V ₁₂ = V ₃ or V _{av34} Is V ₃ or V _{av34} > 2		L _{EQ} = P _{FD} = V ₁₂ = V ₃ or V _{av3} Is V ₃ or V		13) 1.000 usi (Exhibit 13 4863 pc/	on 13-12 or 13- sing Equation 3-7) /h Equation 13-14 or						
Is V_3 or V_{av34} >	1.5 * V ₁₂ /2 『	TYes □I	No		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ \square Yes \square No						
If Yes, $V_{12a} = \frac{pc/h}{13-18}$, or 13-19,					If Yes,V ₁₂		12		quation 13	-16,	
Capacity C	hecks				Capac	ity C	Checks		/		
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F?	
					V _F		4863	Exhibit 13 8	- 4800	Yes	
V _{FO}		Exhibit 13-8			V _{FO} = V _R		4534	Exhibit 13- 8	4800	No	
					V _R		329	Exhibit 13 10	2000	No	

Flow Entering Merge Influence Area							Flow Entering Diverge Influence Area						
		Actual	Max Desirable Violation?					Actual	Max Desirable		Violation?		
V	, R12		Exhibit 13-8			V ₁₂	2	4863	Exhibit 13-8	4400:All	Yes		
Leve	l of Se	rvice Det	termina	tion (if not	F)	Leve	l of	^f Service	Determin	nation (i	f not F)		
$W_{\rm p} = ({\rm pc}/{\rm m})/{\rm ln}$							$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ $D_R = 44.0 (pc/mi/ln)$ LOS = F (Exhibit 13-2)						
Spee	d Dete	rminatio	n			Speed Determination							
M _S =	(Exibit [·]	13-11)				D _s =	0.5	23 (Exhibit	13-12)				
S _R =	S _B = mph (Exhibit 13-11)						S _R = 55.4 mph (Exhibit 13-12)						
S ₀ =	S ₀ = mph (Exhibit 13-11)						S ₀ = N/A mph (Exhibit 13-12)						
S = mph (Exhibit 13-13) S = 55.4 mp									ibit 13-13)				
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