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

HNTB

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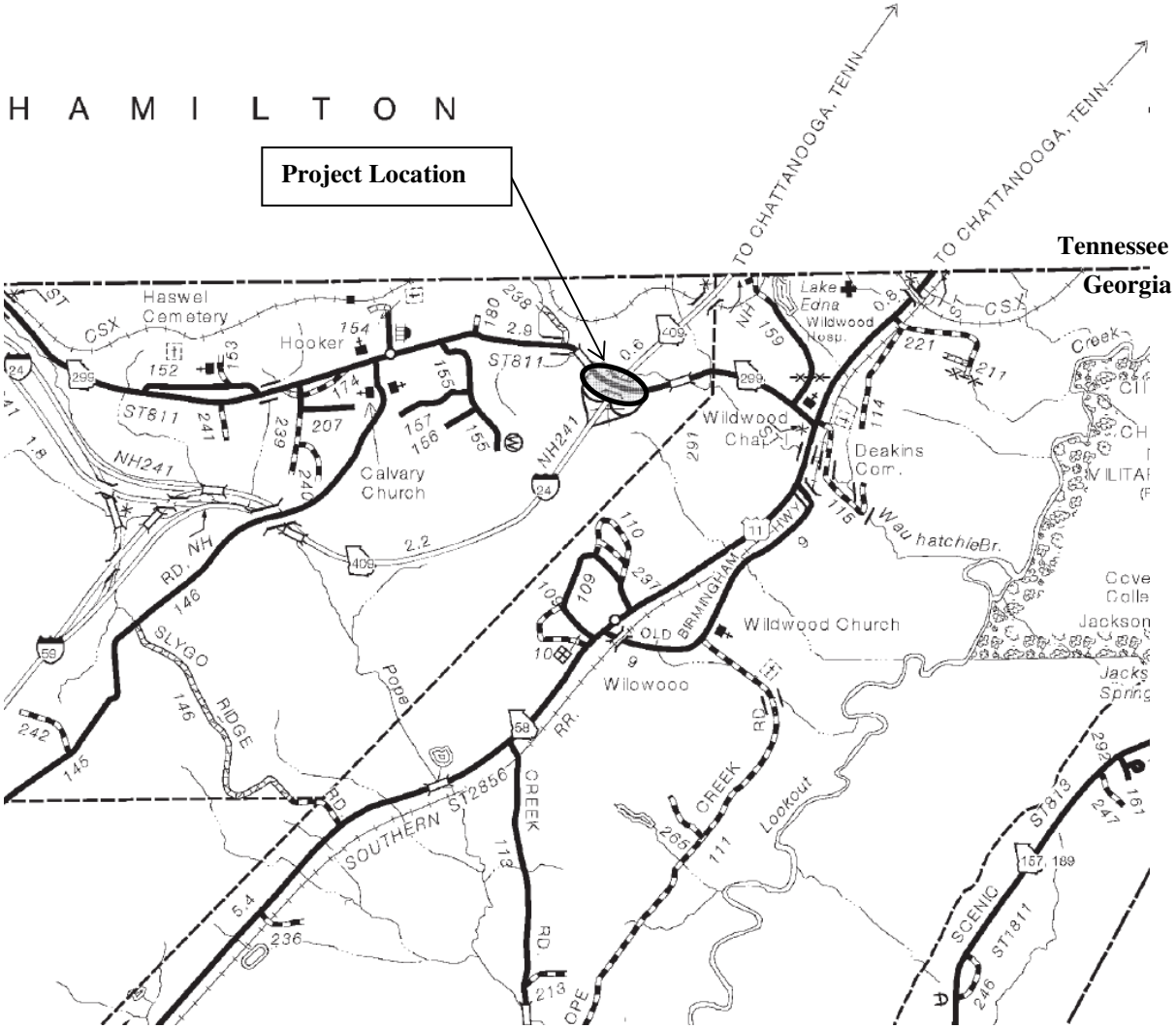
INTRODUCTION

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.

Figure 1 Study Location Map



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

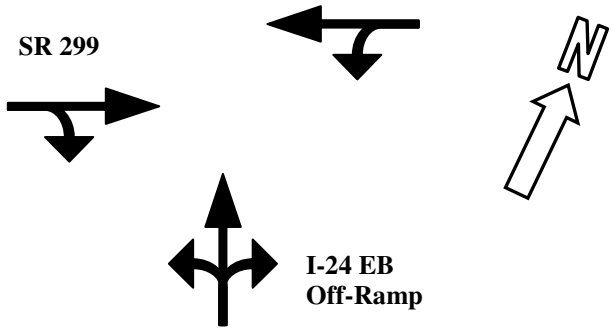
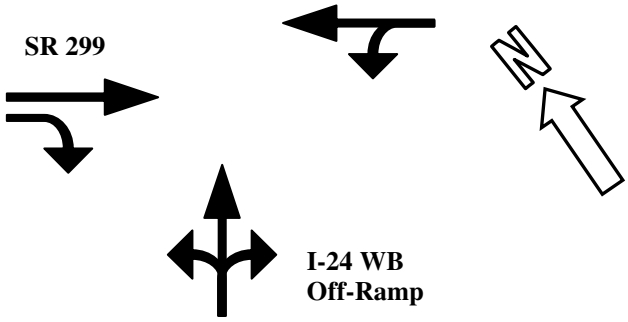


Figure 3: Existing Lane Configuration, SR 299 at I-24 WB Ramps



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 Stop Control Intersection LOS and Delay

Intersection	2013 Existing		
		LOS	DELAY (sec/veh)
SR 299 at I-24 WB Ramps	AM	B	10.0
	PM	B	13.5
SR 299 at I-24 EB Ramps	AM	B	10.8
	PM	B	10.7

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

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

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

Intersection	2035 No-Build/Build		
		LOS	DELAY (sec/veh)
SR 299 at I-24 WB Ramps	AM	B	10.9
	PM	C	20.0
SR 299 at I-24 EB Ramps	AM	B	13.6
	PM	B	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

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

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

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

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

Two-Lane Segment		2035 No-Build/Build	
		LOS	Percent Time Spent Following (PTSF)
SR 299, West of I-24	AM	C	61.2%
	PM	D	71.6%
SR 299, Between I-24 Ramps	AM	C	68.0%
	PM	D	77.4%
SR 299, East of I-24	AM	C	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	
		LOS	DENSITY (pc/mi/ln)
I-24 EB, North of SR 299	AM	C	18.7
	PM	C	19.4
I-24 WB, North of SR 299	AM	B	11.7
	PM	D	30.2
I-24 EB, Between On and Off Ramp to SR 299	AM	B	16.6
	PM	C	18.1
I-24 WB, Between On and Off Ramp to SR 299	AM	A	10.9
	PM	D	27.6
I-24 EB, South of SR 299	AM	C	18.8
	PM	C	20.0
I-24 WB, South of SR 299	AM	B	11.7
	PM	D	30.0

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

Segment		2015 No-Build/Build	
		LOS	DENSITY (pc/mi/ln)
I-24 EB, North of SR 299	AM	C	19.1
	PM	C	19.9
I-24 WB, North of SR 299	AM	B	12.0
	PM	D	31.3
I-24 EB, Between On and Off Ramp to SR 299	AM	B	16.9
	PM	C	18.5
I-24 WB, Between On and Off Ramp to SR 299	AM	B	11.1
	PM	D	28.5
I-24 EB, South of SR 299	AM	C	19.2
	PM	C	20.4
I-24 WB, South of SR 299	AM	B	11.9
	PM	D	31.0

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

Segment		2035 No-Build/Build	
		LOS	DENSITY (pc/mi/ln)
I-24 EB, North of SR 299	AM	C	24.6
	PM	C	25.8
I-24 WB, North of SR 299	AM	B	14.6
	PM	F	46.5
I-24 EB, Between On and Off Ramp to SR 299	AM	C	20.6
	PM	C	22.9
I-24 WB, Between On and Off Ramp to SR 299	AM	B	13.3
	PM	E	39.5
I-24 EB, South of SR 299	AM	C	23.9
	PM	C	25.8
I-24 WB, South of SR 299	AM	B	14.5
	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

Ramp		2013 Existing	
		LOS	DENSITY (pc/mi/ln)
I-24 EB On-Ramp to SR 299	AM	B	17.3
	PM	B	18.1
I-24 WB On-Ramp to SR 299	AM	B	14.4
	PM	D	31.1

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

Ramp		2015 No-Build/Build	
		LOS	DENSITY (pc/mi/ln)
I-24 EB On-Ramp to SR 299	AM	B	17.7
	PM	B	18.5
I-24 WB On-Ramp to SR 299	AM	B	14.7
	PM	D	31.7

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

Ramp		2035 No-Build/Build	
		LOS	DENSITY (pc/mi/ln)
I-24 EB On-Ramp to SR 299	AM	C	22.4
	PM	C	23.4
I-24 WB On-Ramp to SR 299	AM	B	17.7
	PM	F	38.6

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

Diverge Operation Analysis

Table 14 2013 Existing Diverge LOS and Density

Ramp		2013 Existing	
		LOS	DENSITY (pc/mi/ln)
I-24 EB Off-Ramp to SR 299	AM	C	21.0
	PM	C	22.3
I-24 WB Off-Ramp to SR 299	AM	B	17.3
	PM	E	35.8

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

Ramp		2015 No-Build/Build	
		LOS	DENSITY (pc/mi/ln)
I-24 EB Off-Ramp to SR 299	AM	C	21.5
	PM	C	22.9
I-24 WB Off-Ramp to SR 299	AM	B	17.6
	PM	E	36.5

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

Ramp		2035 No-Build/Build	
		LOS	DENSITY (pc/mi/ln)
I-24 EB Off-Ramp to SR 299	AM	C	26.4
	PM	D	28.1
I-24 WB Off-Ramp to SR 299	AM	C	21.0
	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

To	From
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.

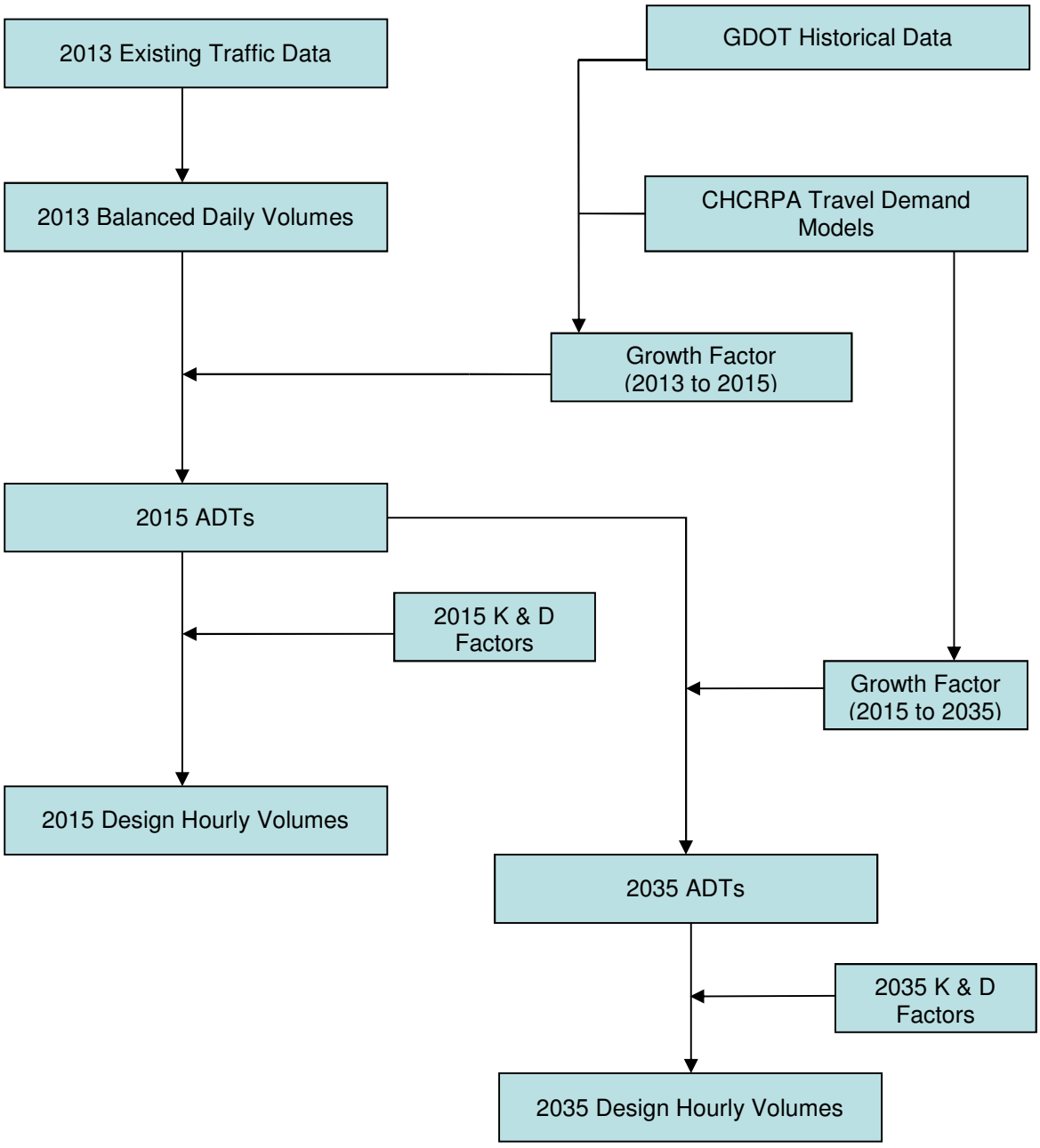
The Opening Year and Design Year for the project are 2015 and 2035, respectively. The forecasting process resulted in Average Daily Traffic (ADT) volumes and Design Hourly Volumes (DHVs) for 2015 and 2035.

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

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).

PROPOSED FUTURE ANNUAL GROWTH RATES

	No-Build & Build	
Roadway	**2013-2015**	**2015-2035**
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

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.

PROPOSED K FACTORS

Roadway	2015 & 2035 PM	2015 & 2035 AM
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 DIRECTIONAL DISTRIBUTION

Roadway	2015 & 2035
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.

TRUCK PERCENTAGES

	Daily			**Peak Hour**		
Roadway	**24hr T %**	**S.U. %**	**COMB. %**	**T %**	**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

SHEET 1 OF 5

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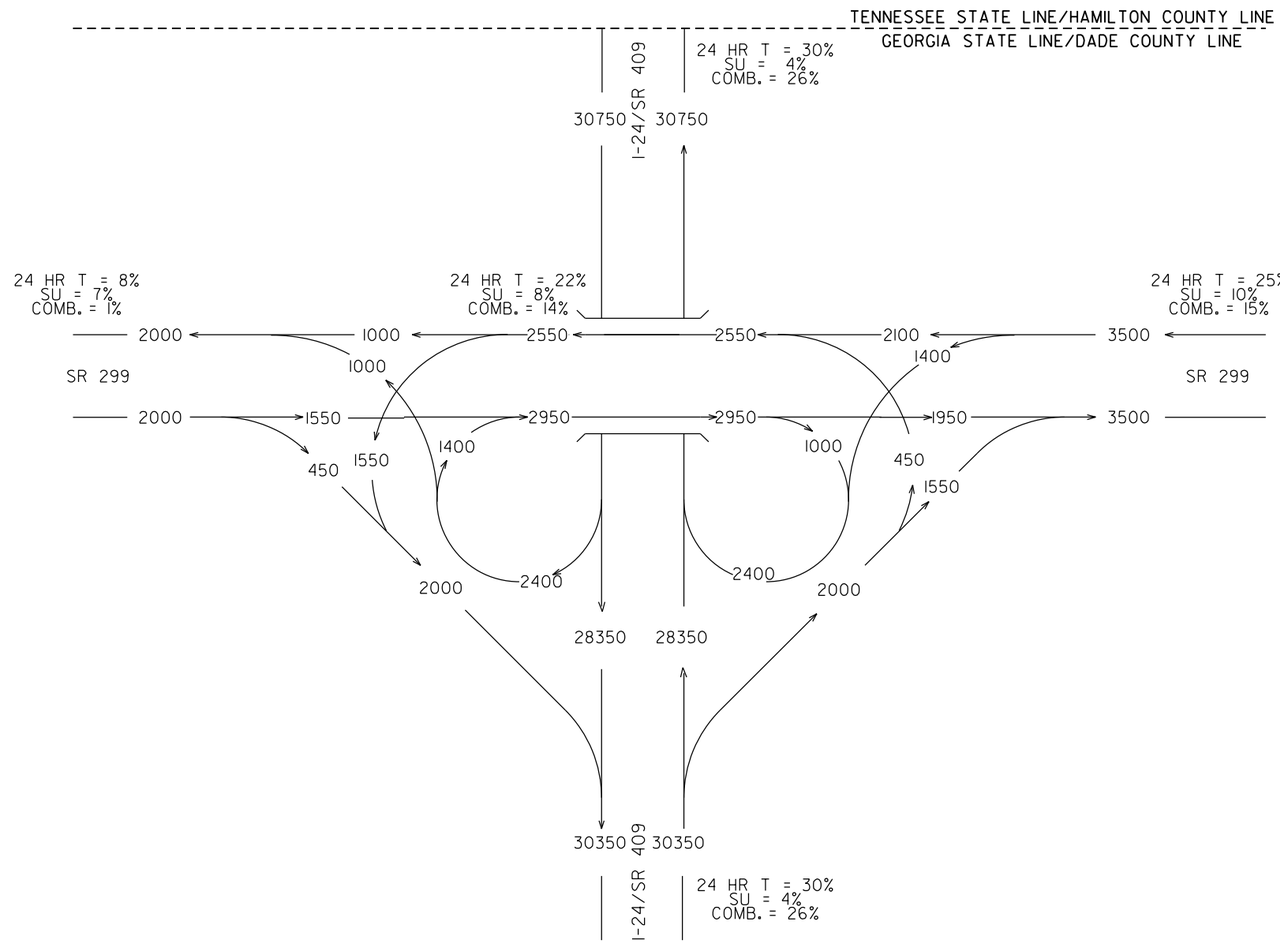
3715 NORTHSIDE PARKWAY, NW
200 NORTHCREEK, SUITE 800
ATLANTA, GEORGIA 30327

2013 EXISTING ADT

DADE COUNTY



STP00-0012-01(081)
PI# 0011682
DADE COUNTY

SR 299
BRIDGE REPLACEMENT
OVER I-24/SR 409

2013 EXISTING ADT
KAM 08/13

SHEET 2 OF 5

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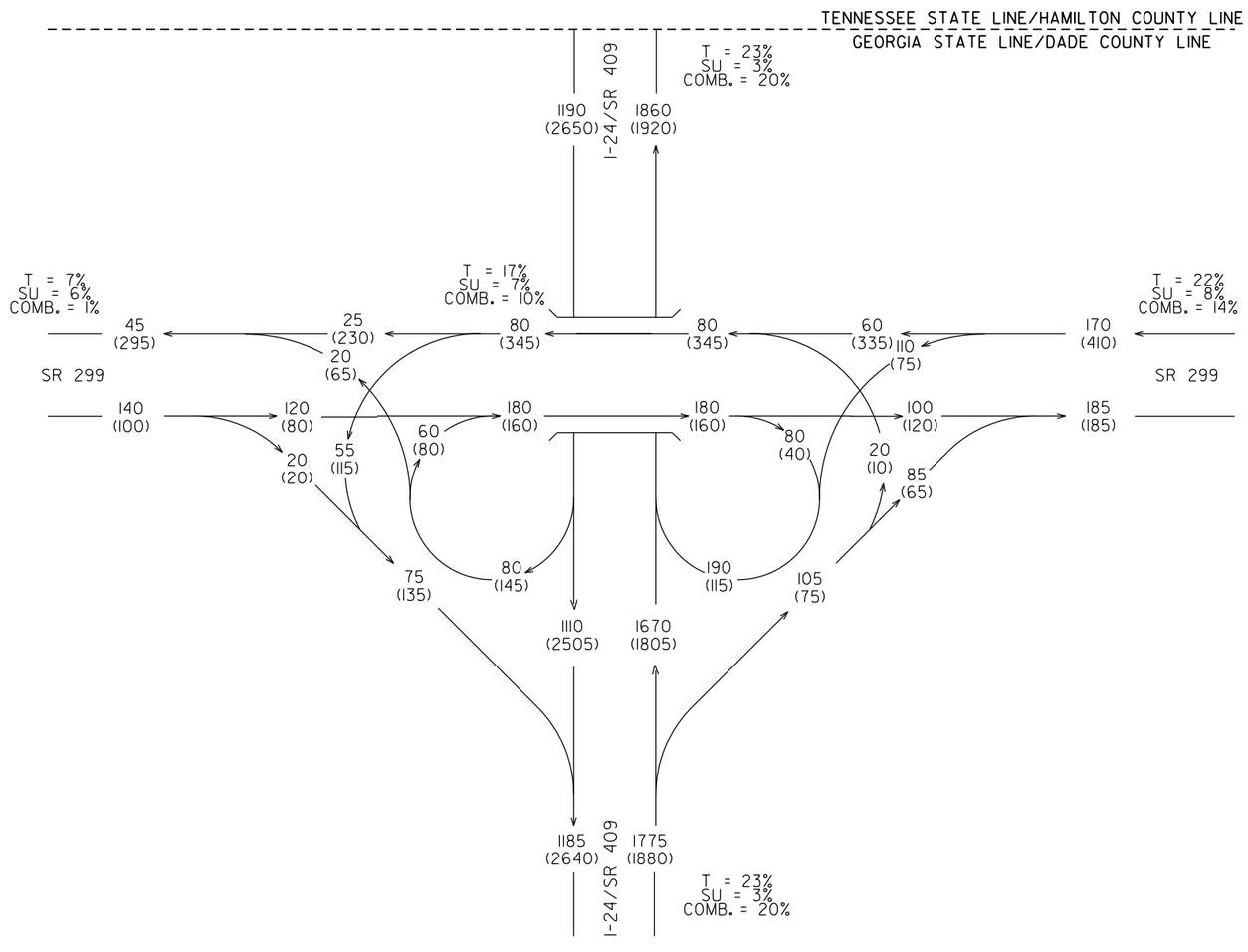
ATLANTA, GEORGIA 30327

2013 EXISTING PEAK HOUR VOLUME

DADE COUNTY



STP00-0012-01(081)
PI# 0011682
DADE COUNTY

SR 299
BRIDGE REPLACEMENT
OVER I-24/SR 409

EXISTING
2013 AM PEAK HOUR = 000
2013 PM PEAK HOUR = (000)

KAM 08/13

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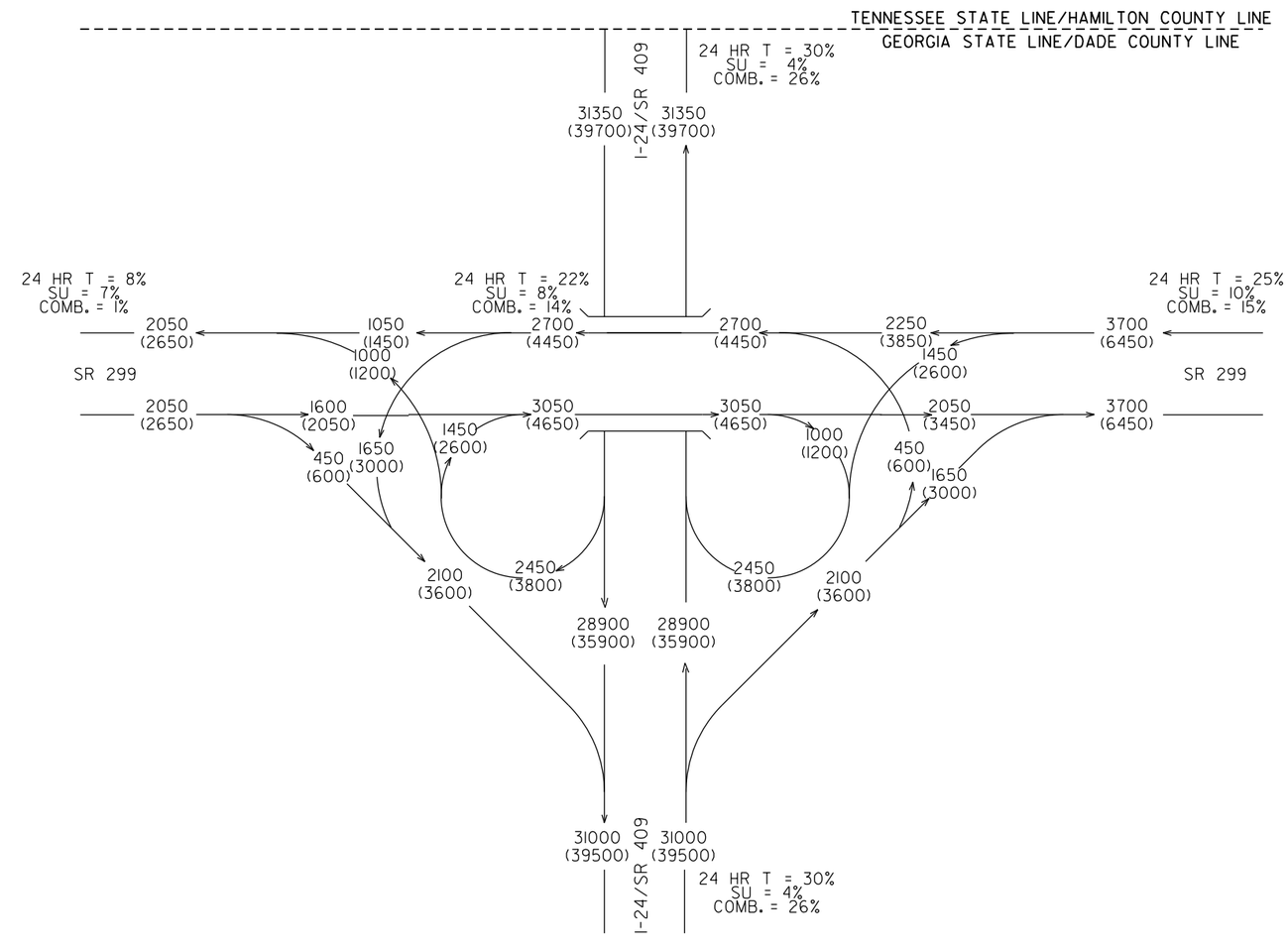
2015/2035 NO-BUILD/BUILD ADT

DADE COUNTY



STP00-0012-01(081)
PI# 0011682
DADE COUNTY

SR 299
BRIDGE REPLACEMENT
OVER I-24/SR 409

2015 ADT = 0000
2035 ADT = (0000)

KAM 08/13

SHEET 4 OF 5

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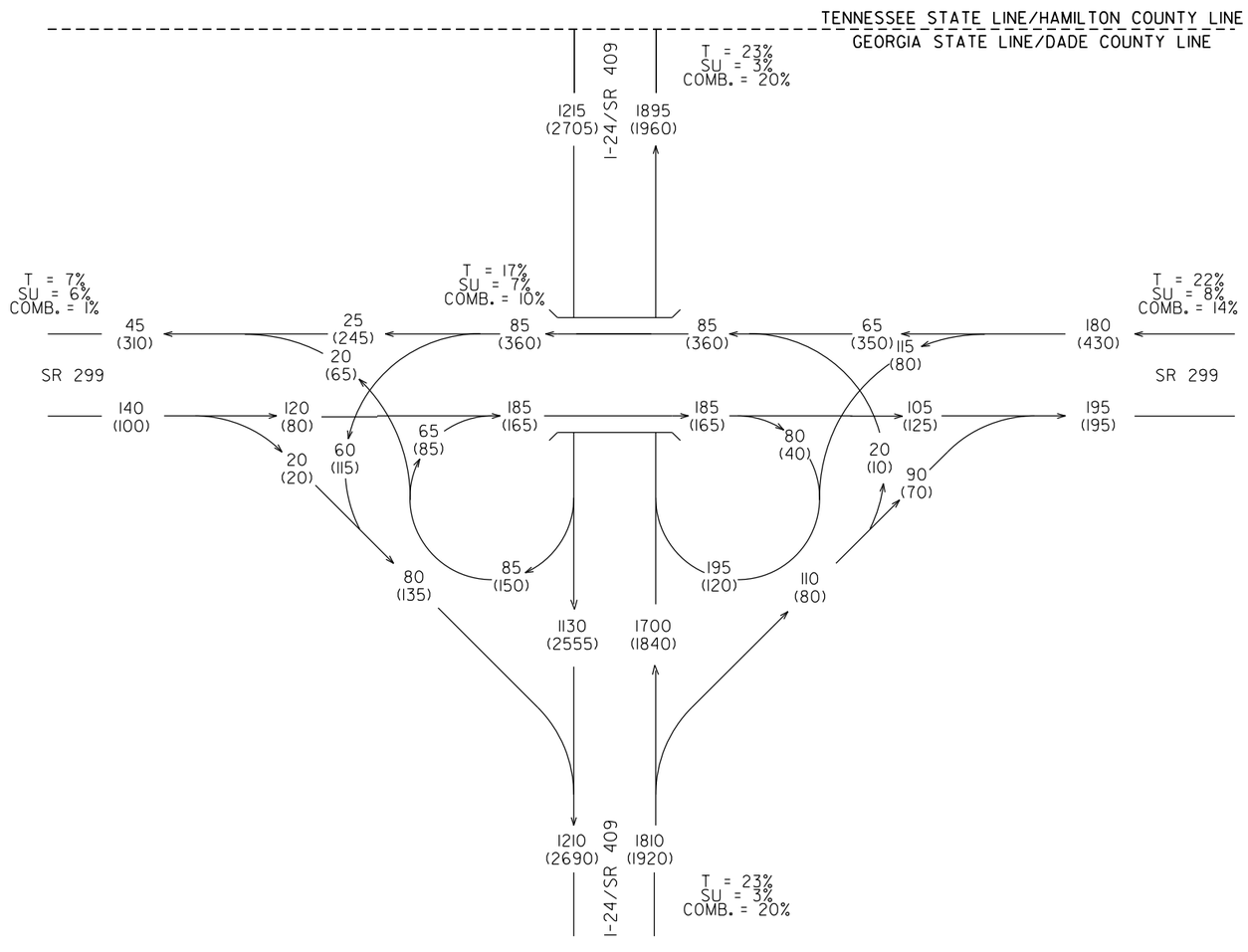
2015 NO-BUILD/BUILD DHV

DADE COUNTY



STP00-0012-01(081)
PI# 0011682
DADE COUNTY

SR 299
BRIDGE REPLACEMENT
OVER I-24/SR 409

2015 AM DHV = 000
2015 PM DHV = (000)

KAM 08/13

SHEET 5 OF 5

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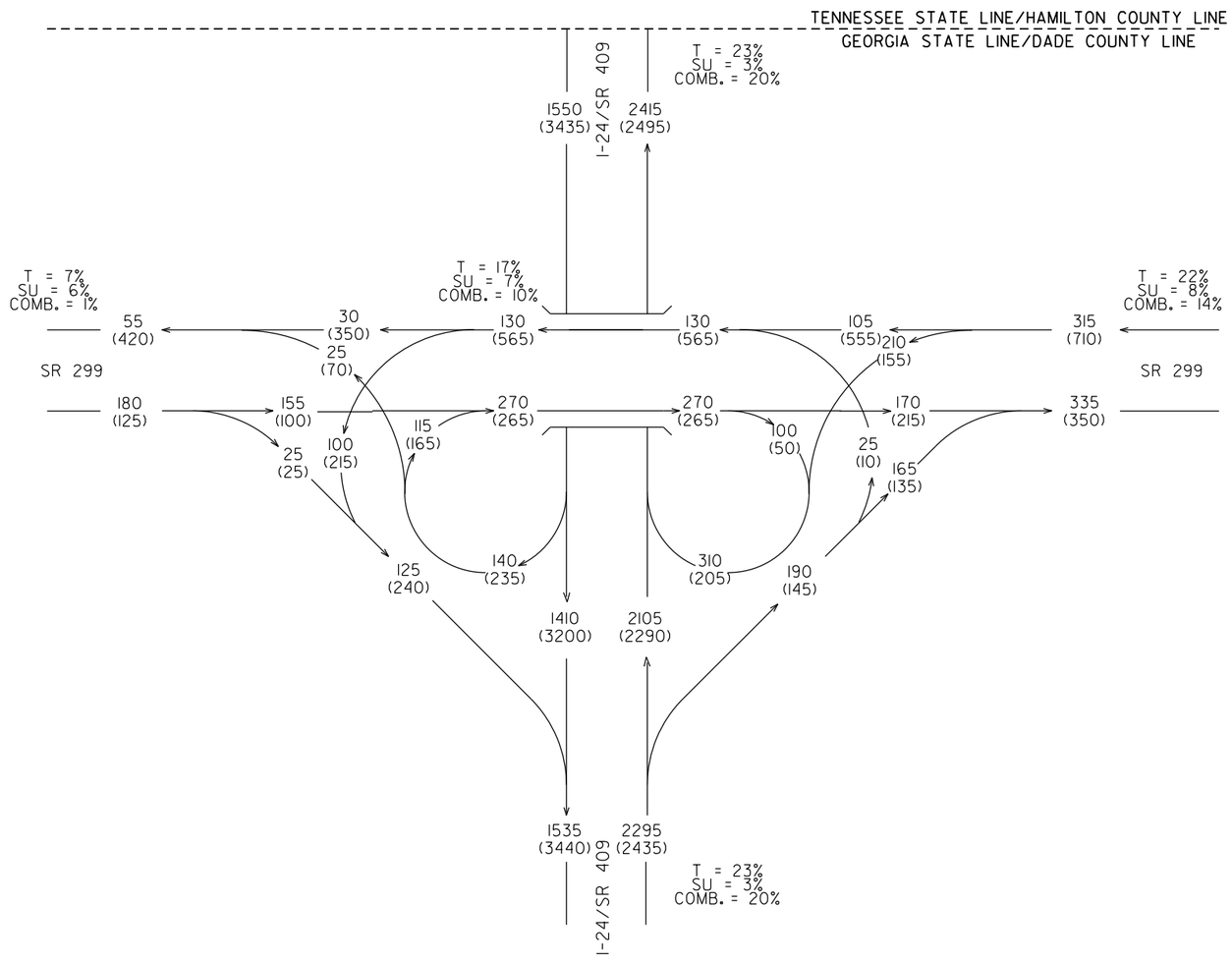
ATLANTA, GEORGIA 30327

2035 NO-BUILD/BUILD DHV

DADE COUNTY



STP00-0012-01(081)
PI# 0011682
DADE COUNTY

SR 299
BRIDGE REPLACEMENT
OVER I-24/SR 409

2035 AM DHV = 000
2035 PM DHV = (000)

KAM 08/13

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/19/13*
Analysis Time Period	*AM*

Site Information

Intersection	*SR 299 at I-24 WB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI No. 0011682*

East/West Street: *SR 299*

North/South Street: *I-24 WB On and Off Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*120*	*20*	*55*	*25*	
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		*T*	*R*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	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		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
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*		*B*				
Approach Delay (s/veh)	--	--	*10.0*					
Approach LOS	--	--	*B*					

 HCS+™ Version 5.6 Generated: 8/19/13 2:56 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*PM*

Site Information

Intersection	*SR 299 at I-24 WB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI No. 0011682*

East/West Street: *SR 299*

North/South Street: *I-24 WB On and Off Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	T	R	L	T	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*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
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*		*B*				
Approach Delay (s/veh)	--	--	*13.5*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*AM*

Site Information

Intersection	*SR 299 at I-24 EB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI No. 0011682*

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 Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
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*		*B*				
Approach Delay (s/veh)	--	--	*10.8*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*PM*

Site Information

Intersection	*SR 299 at I-24 EB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI No. 0011682*

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 Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
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*		*B*				
Approach Delay (s/veh)	--	--	*10.7*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/19/13*
Analysis Time Period	*AM*

Site Information

Intersection	*SR 299 at I-24 WB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI No. 0011682*

East/West Street: *SR 299*

North/South Street: *I-24 WB On and Off Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
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*		*B*				
Approach Delay (s/veh)	--	--	*10.1*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*PM*

Site Information

Intersection	*SR 299 at I-24 WB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI No. 0011682*

East/West Street: *SR 299*

North/South Street: *I-24 WB On and Off Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	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		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

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*		*B*				
Approach Delay (s/veh)	--	--	*13.7*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/19/13*
Analysis Time Period	*AM*

Site Information

Intersection	*SR 299 at I-24 EB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI No. 0011682*

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 Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	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*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

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*		*B*				
Approach Delay (s/veh)	--	--	*10.9*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*PM*

Site Information

Intersection	*SR 299 at I-24 EB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI No. 0011682*

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 Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	T	R	L	T	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*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			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*		*B*				
Approach Delay (s/veh)	--	--	*10.7*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/19/13*
Analysis Time Period	*AM*

Site Information

Intersection	*SR 299 at I-24 WB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI No. 0011682*

East/West Street: *SR 299*

North/South Street: *I-24 WB On and Off Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			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*		*B*				
Approach Delay (s/veh)	--	--	*10.9*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*PM*

Site Information

Intersection	*SR 299 at I-24 WB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI No. 0011682*

East/West Street: *SR 299*

North/South Street: *I-24 WB On and Off Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
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		*0.17*		*0.51*				
95% queue length		*0.59*		*2.85*				
Control Delay (s/veh)		*8.2*		*20.0*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*20.0*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*AM*

Site Information

Intersection	*SR 299 at I-24 EB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI No. 0011682*

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 Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			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*		*B*				
Approach Delay (s/veh)	--	--	*13.6*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Keith McCage*
Agency/Co.	*GDOT*
Date Performed	*8/9/13*
Analysis Time Period	*PM*

Site Information

Intersection	*SR 299 at I-24 EB Ramps*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI No. 0011682*

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 Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	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	*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	T	R	L	T	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		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			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*		*B*				
Approach Delay (s/veh)	--	--	*13.0*					
Approach LOS	--	--	*B*					

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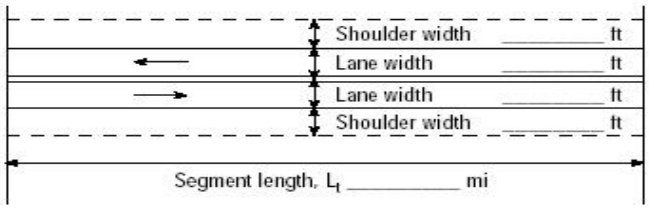
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to Slygo Road*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2013*

Project Description: *SR 299 Bridge over I-24*

Input Data



Class I highway ☐ Class II highway ☑ Class III highway ☐

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Analysis direction vol., V_d	*140*veh/h	% Trucks and Buses , P_T	*7* %
Opposing direction vol., V_o	*45*veh/h	% Recreational vehicles, P_R	*0*%
Shoulder width ft	*6.0*	Access points *mi*	*12*/mi
Lane Width ft	*12.0*		
Segment Length mi	*0.9*		

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.5*	*2.7*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.905*	*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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.6 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*46.9 mi/h*
		Percent free flow speed, PFFS	*90.2* %

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_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*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)	*47.4*	
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)	*C*	
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 only)	*90.2*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*153.8*	
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)	*B*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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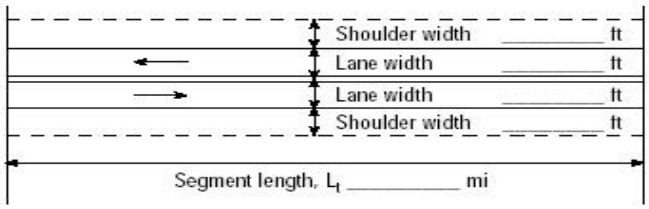
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to Slygo Road*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2013*

Project Description: *SR 299 Bridge over I-24*

Input Data



Class I highway ☐ Class II highway ☑ Class III highway ☐

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

% Trucks and Buses , P_T *7%*

% Recreational vehicles, P_R *0%*

Access points *mi* *12*/mi

Analysis direction vol., V_d *295*veh/h

Opposing direction vol., V_o *100*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.9*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.1*	*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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*43.6 mi/h*
		Percent free flow speed, PFFS	*83.9 %*

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 15-19)	*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)	*0.86*	*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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*37.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*44.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*69.1*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*C*	
Volume to capacity ratio, *v/c*	*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	*324.2*	
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)	*3.75*	
Bicycle level of service (Exhibit 15-4)	*D*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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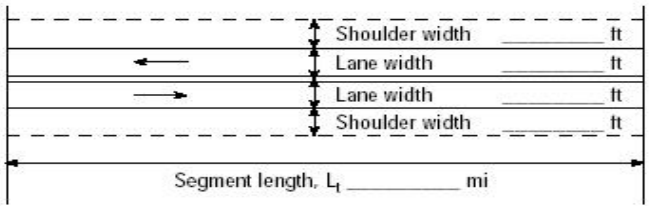
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to I-24 EB Ramps*
Date Performed	*8/9/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2013*

Project Description: *SR 299 Bridge over I-24*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Show North Arrow

% Trucks and Buses , P_T *17%*

% Recreational vehicles, P_R *0%*

Access points *mi* *13*/mi

Analysis direction vol., V_d	*180*veh/h
Opposing direction vol., V_o	*80*veh/h
Shoulder width ft	*6.0*
Lane Width ft	*12.0*
Segment Length mi	*0.2*

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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*3.3 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.6 mi/h*	Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	*51.8 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*44.4 mi/h*
		Percent free flow speed, PFFS	*85.7 %*

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_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.880*	*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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*28.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*49.2*	
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)	*C*	
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) veh/h	*197.8*	
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)	*7.96*	
Bicycle level of service (Exhibit 15-4)	*F*	
Notes		

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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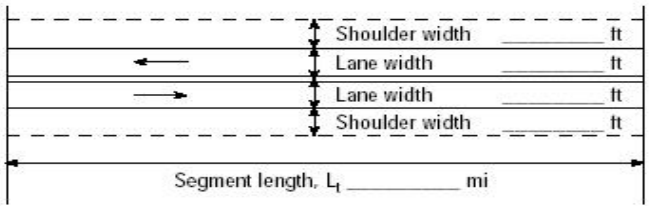
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to I-24 EB Ramps*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*702013*

Project Description: *SR 299 Bridge over I-24*

Input Data



Class I highway ☐ Class II highway ☑ Class III highway ☐

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Analysis direction vol., V_d	*345*veh/h	% Trucks and Buses , P_T	*17* %
Opposing direction vol., V_o	*160*veh/h	% Recreational vehicles, P_R	*0*%
Shoulder width ft	*6.0*	Access points *mi*	*13*/mi
Lane Width ft	*12.0*		
Segment Length mi	*0.2*		

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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.3 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.4 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*51.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*42.2 mi/h*
		Percent free flow speed, PFFS	*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 15-19)	*1.0*	*1.0*
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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*44.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*40.9*	
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, *v/c*	*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, v_{OL} (Eq. 15-24) veh/h	*379.1*	
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)	*8.29*	
Bicycle level of service (Exhibit 15-4)	*F*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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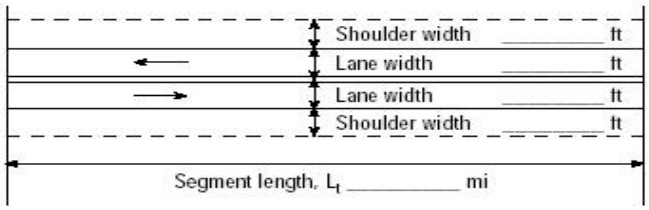
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 EB Ramps to SR 58*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2013*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *185* veh/h
Opposing direction vol., V_o *170* veh/h
Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *0.8*

☐ Class I highway ☑ Class II highway ☐ Class III highway
Terrain ☐ Level ☑ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.91*
No-passing zone *100%*
Show North Arrow
% Trucks and Buses , P_T *22 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *11*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.3*	*2.4*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.778*	*0.765*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.75*	*0.74*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*348*	*330*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776($v/f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*2.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.2 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.3 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*43.8 mi/h*
		Percent free flow speed, PFFS	*83.8 %*

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*	*1.8*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-	*1.0*	*1.0*

19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.867*	*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, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*61.2*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*C*	
Volume to capacity ratio, *v/c*	*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		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*203.3*	
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)	*10.98*	
Bicycle level of service (Exhibit 15-4)	*F*	
Notes		
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 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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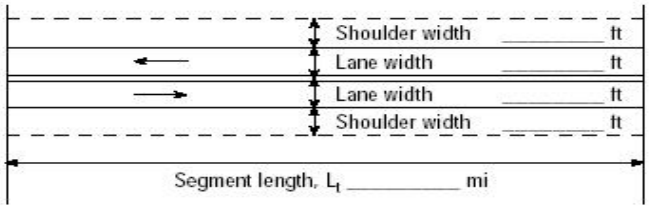
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 EB Ramps to SR 58*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2013*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *410* veh/h
Opposing direction vol., V_o *185* veh/h
Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *0.8*

☐ Class I highway ☑ Class II highway ☐ Class III highway
Terrain ☐ Level ☑ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.91*
No-passing zone *100%*
Show North Arrow
% Trucks and Buses , P_T *22 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *11*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*2.3*
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)	*0.93*	*0.75*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*580*	*348*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*2.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.1 mi/h*	Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	*52.3 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*42.0 mi/h*
		Percent free flow speed, PFFS	*80.3 %*

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)		
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, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*72.9*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*D*	
Volume to capacity ratio, *v/c*	*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		
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		
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 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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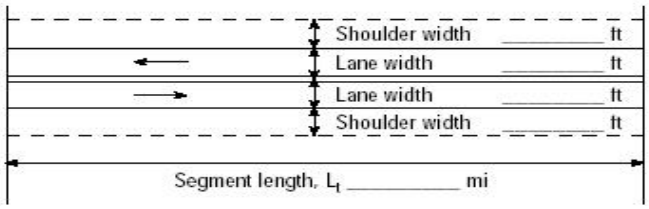
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to Slygo Road*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2015*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *140* veh/h

Opposing direction vol., V_o *45* veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.9*

☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Show North Arrow

% Trucks and Buses , P_T *7%*

% Recreational vehicles, P_R *0%*

Access points *mi* *12*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.5*	*2.7*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.905*	*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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.6 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*46.9 mi/h*
		Percent free flow speed, PFFS	*90.2 %*

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_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*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)	*47.4*	
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)	*C*	
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 only)	*90.2*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*153.8*	
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)	*B*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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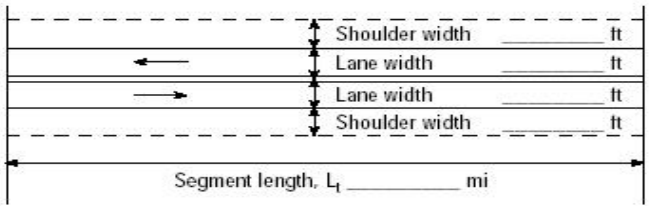
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to Slygo Road*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2015*

Project Description: *SR 299 Bridge over I-24*

Input Data



Class I highway ☐ Class II highway ☑ Class III highway ☐

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Analysis direction vol., V_d	*310* veh/h	% Trucks and Buses , P_T	*7* %
Opposing direction vol., V_o	*100* veh/h	% Recreational vehicles, P_R	*0%*
Shoulder width ft	*6.0*	Access points *mi*	*12*/mi
Lane Width ft	*12.0*		
Segment Length mi	*0.9*		

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.1*	*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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*3.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.8 mi/h*	Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	*52.0 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*43.5 mi/h*
		Percent free flow speed, PFFS	*83.7 %*

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 15-19)	*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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*38.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*43.6*	
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)	*C*	
Volume to capacity ratio, *v/c*	*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 only)	*83.7*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*340.7*	
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		

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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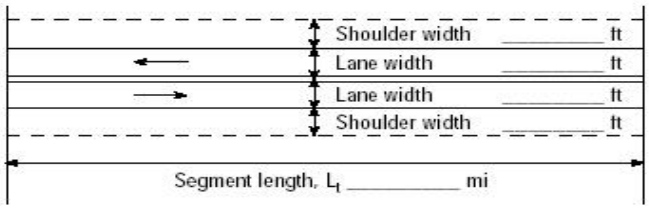
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to I-24 EB Ramps*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2015*

Project Description: *SR 299 Bridge over I-24*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Show North Arrow

Analysis direction vol., V_d	*185*veh/h	% Trucks and Buses , P_T	*17* %
Opposing direction vol., V_o	*85*veh/h	% Recreational vehicles, P_R	*0*%
Shoulder width ft	*6.0*	Access points *mi*	*13*/mi
Lane Width ft	*12.0*		
Segment Length mi	*0.2*		

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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.3 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*51.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*44.0 mi/h*
		Percent free flow speed, PFFS	*85.1* %

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 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.894*	*0.867*
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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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)	*C*	
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)	*85.1*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*203.3*	
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)	*7.98*	
Bicycle level of service (Exhibit 15-4)	*F*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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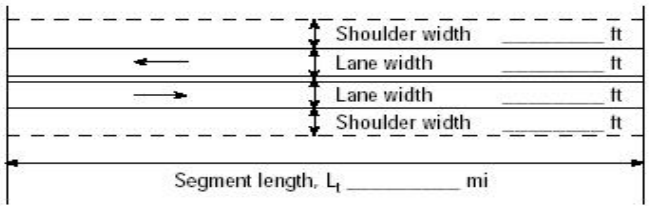
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to I-24 EB Ramps*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2015*

Project Description: *SR 299 Bridge over I-24*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.91*

No-passing zone *100%*

Show North Arrow

% Trucks and Buses , P_T *17%*

% Recreational vehicles, P_R *0%*

Access points *mi* *13*/mi

Analysis direction vol., V_d	*360*veh/h
Opposing direction vol., V_o	*165*veh/h
Shoulder width ft	*6.0*
Lane Width ft	*12.0*
Segment Length mi	*0.2*

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)	*0.90*	*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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.3 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.3 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*51.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*42.0 mi/h*
		Percent free flow speed, PFFS	*81.2 %*

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 15-19)	*1.0*	*1.0*
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)	*0.90*	*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, *v/c*	*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)	*81.2*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*395.6*	
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 terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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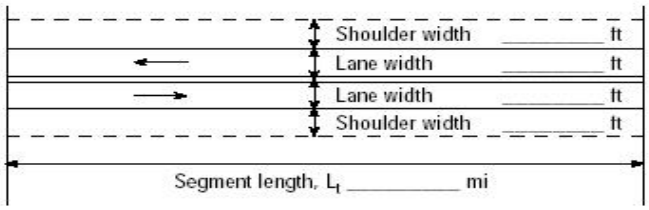
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 EB Ramps to SR 58*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2015*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *195* veh/h
Opposing direction vol., V_o *180* veh/h
Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *0.8*

Show North Arrow

☐ Class I highway ☑ Class II highway ☐ Class III highway
Terrain ☐ Level ☑ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.91*
No-passing zone *100%*
% Trucks and Buses , P_T *22 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *11*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.3*	*2.3*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.778*	*0.778*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.76*	*0.75*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*362*	*339*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*2.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.3 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*43.7 mi/h*
		Percent free flow speed, PFFS	*83.6 %*

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*	*1.8*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-	*1.0*	*1.0*

19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.867*	*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, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*62.7*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*C*	
Volume to capacity ratio, *v/c*	*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		
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

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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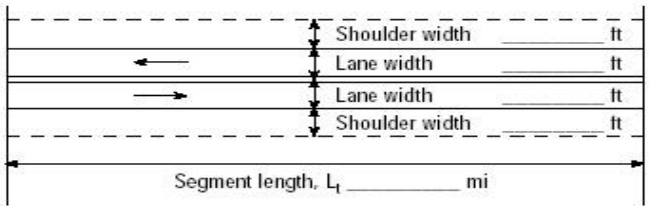
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 EB Ramps to SR 58*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2015*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *430* veh/h
Opposing direction vol., V_o *195* veh/h
Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *0.8*

☐ Class I highway ☑ Class II highway ☐ Class III highway
Terrain ☐ Level ☑ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.91*
No-passing zone *100%*
Show North Arrow
% Trucks and Buses , P_T *22 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *11*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*2.3*
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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776($v/f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*2.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.0 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.3 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*41.8 mi/h*
		Percent free flow speed, PFFS	*80.0 %*

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)		
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, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*73.1*	
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, v_{OL} (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		
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 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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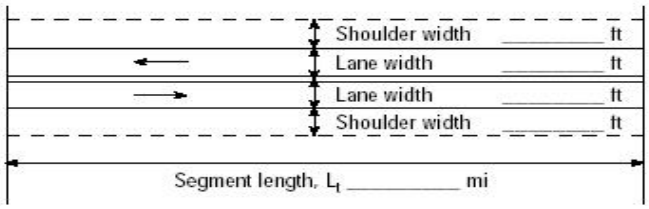
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to Slygo Road*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2035*

Project Description: *SR 299 Bridge over I-24*

Input Data



Class I highway ☐ Class II highway ☑ Class III highway ☐

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.95*

No-passing zone *100%*

Analysis direction vol., V_d	*180*veh/h	% Trucks and Buses , P_T	*7* %
Opposing direction vol., V_o	*55*veh/h	% Recreational vehicles, P_R	*0*%
Shoulder width ft	*6.0*	Access points *mi*	*12*/mi
Lane Width ft	*12.0*		
Segment Length mi	*0.9*		

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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*3.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.6 mi/h*	Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	*52.0 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*46.5 mi/h*
		Percent free flow speed, PFFS	*89.4* %

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_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*0.941*
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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*26.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*46.5*	
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)	*C*	
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 only)	*89.4*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*189.5*	
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)	*3.48*	
Bicycle level of service (Exhibit 15-4)	*C*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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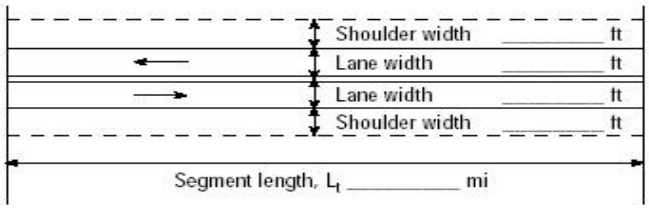
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to Slygo Road*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2035*

Project Description: *SR 299 Bridge over I-24*

Input Data



Class I highway ☐ Class II highway ☑ Class III highway ☐

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.95*

No-passing zone *100%*

Analysis direction vol., V_d	*420*veh/h	% Trucks and Buses , P_T	*7* %
Opposing direction vol., V_o	*125*veh/h	% Recreational vehicles, P_R	*0*%
Shoulder width ft	*6.0*	Access points *mi*	*12*/mi
Lane Width ft	*12.0*		
Segment Length mi	*0.9*		

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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*4.0 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*42.4 mi/h*
		Percent free flow speed, PFFS	*81.6* %

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*	*1.8*

Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.973*	*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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*44.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*38.1*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*71.6*	
Level of Service and Other Performance Measures		
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 only)	*81.6*	
Bicycle Level of Service		
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*442.1*	
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		

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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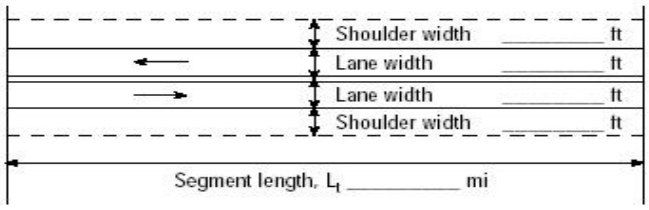
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to I-24 EB Ramps*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2035*

Project Description: *SR 299 Bridge over I-24*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.95*

No-passing zone *100%*

% Trucks and Buses , P_T *17 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *13*/mi

Analysis direction vol., V_d *270*veh/h

Opposing direction vol., V_o *130*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.2*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.1*	*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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.3 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*51.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*42.9 mi/h*
		Percent free flow speed, PFFS	*82.9 %*

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*	*1.8*

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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*36.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*49.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*68.0*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*C*	
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) veh/h	*284.2*	
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)	*8.15*	
Bicycle level of service (Exhibit 15-4)	*F*	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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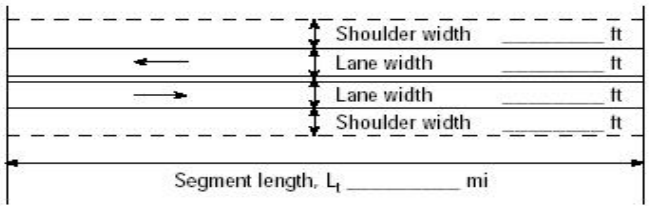
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 WB Ramps to I-24 EB Ramps*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2035*

Project Description: *SR 299 Bridge over I-24*

Input Data



☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.95*

No-passing zone *100%*

Show North Arrow

% Trucks and Buses , P_T *17%*

% Recreational vehicles, P_R *0%*

Access points *mi* *13*/mi

Analysis direction vol., V_d	*565*veh/h
Opposing direction vol., V_o	*265*veh/h
Shoulder width ft	*6.0*
Lane Width ft	*12.0*
Segment Length mi	*0.2*

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 Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*3.3 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*51.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*40.6 mi/h*
		Percent free flow speed, PFFS	*78.4 %*

Percent Time-Spent-Following

	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 15-19)	*1.0*	*1.0*
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], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*57.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*77.4*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*D*	
Volume to capacity ratio, *v/c*	*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	*594.7*	
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)	*8.52*	
Bicycle level of service (Exhibit 15-4)	*F*	
Notes		

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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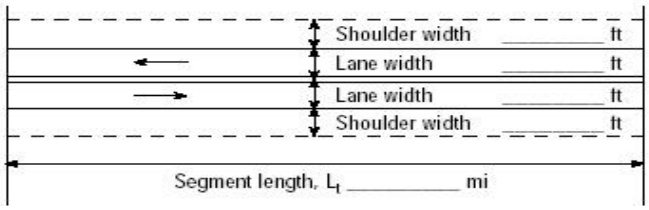
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 EB Ramps to SR 58*
Date Performed	*8/19/13*	Jurisdiction	*Dade County*
Analysis Time Period	*AM*	Analysis Year	*2035*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *335* veh/h

Opposing direction vol., V_o *315* veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.8*

☐ Class I highway ☑ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.95*

No-passing zone *100%*

Show North Arrow

% Trucks and Buses , P_T *22 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *11*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.0*	*2.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.820*	*0.805*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.87*	*0.85*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*494*	*485*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*2.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.4 mi/h*	Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	*52.3 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*42.3 mi/h*
		Percent free flow speed, PFFS	*80.9 %*

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*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-	*1.0*	*1.0*

19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.883*	*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, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*69.9*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*C*	
Volume to capacity ratio, *v/c*	*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		
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

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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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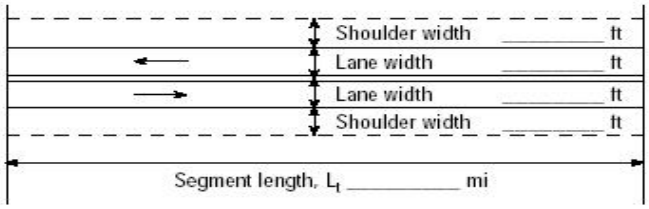
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*Keith McCage*	Highway / Direction of Travel	*SR 299*
Agency or Company	*GDOT/HNTB*	From/To	*I-24 EB Ramps to SR 58*
Date Performed	*8/9/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2035*

Project Description: *SR 299 Bridge over I-24*

Input Data



Analysis direction vol., V_d *710* veh/h
Opposing direction vol., V_o *350* veh/h
Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *0.8*

☐ Class I highway ☑ Class II highway ☐ Class III highway
Terrain ☐ Level ☑ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.95*
No-passing zone *100%*
Show North Arrow
% Trucks and Buses , P_T *22 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *11*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.5*	*2.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.901*	*0.820*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.88*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*846*	*511*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*55.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS} (Exhibit 15-7)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*2.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.3 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*52.3 mi/h*
		Average travel speed, ATS_d=FFS-0.00776 ($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*39.4 mi/h*
		Percent free flow speed, PFFS	*75.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-	*1.0*	*1.0*

19)		
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*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, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*81.4*	
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 15-3)	*D*	
Volume to capacity ratio, *v/c*	*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		
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 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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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1860*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1375*	pc/h/ln
S	*73.4*	mph
D = v_p / S	*18.7*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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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	*GDOT/HNTB*	From/To	*SR 299 to US 41/64*
Date Performed	*8/12/13*	Jurisdiction	*Dade County*
Analysis Time Period	*PM*	Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1419*	pc/h/ln
S	*73.1*	mph
D = v_p / S	*19.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1190*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*879*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.7*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2650*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1958*	pc/h/ln
S	*64.8*	mph
D = v_p / S	*30.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1670*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1234*	pc/h/ln
S	*74.4*	mph
D = v_p / S	*16.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1805*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1334*	pc/h/ln
S	*73.8*	mph
D = v_p / S	*18.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*820*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*10.9*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1851*	pc/h/ln
S	*67.0*	mph
D = v_p / S	*27.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1312*	pc/h/ln
S	*69.9*	mph
D = v_p / S	*18.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1880*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1389*	pc/h/ln
S	*69.6*	mph
D = v_p / S	*20.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*876*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.7*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2013*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2640*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1951*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*30.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1895*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1400*	pc/h/ln
S	*73.2*	mph
D = v_p / S	*19.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1960*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1448*	pc/h/ln
S	*72.8*	mph
D = v_p / S	*19.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1215*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*898*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*12.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2705*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1999*	pc/h/ln
S	*64.0*	mph
D = v_p / S	*31.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1700*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1256*	pc/h/ln
S	*74.3*	mph
D = v_p / S	*16.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

 HCS 2010™ Version 6.41 Generated: 8/20/13 8:35 AM

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1840*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1360*	pc/h/ln
S	*73.6*	mph
D = v_p / S	*18.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

 HCS 2010™ Version 6.41 Generated: 8/20/13 8:34 AM

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1130*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*835*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2555*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1888*	pc/h/ln
S	*66.3*	mph
D = v_p / S	*28.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1810*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*2.0*
E_T	*2.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1338*	pc/h/ln
S	*69.8*	mph
D = v_p / S	*19.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1419*	pc/h/ln
S	*69.4*	mph
D = v_p / S	*20.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1210*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*894*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2015*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2690*	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 x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1988*	pc/h/ln
S	*64.2*	mph
D = v_p / S	*31.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

 HCS 2010™ Version 6.41 Generated: 8/20/13 9:09 AM

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2415*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*2.0*
E_T	*2.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1710*	pc/h/ln
S	*69.4*	mph
D = v_p / S	*24.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2495*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1766*	pc/h/ln
S	*68.5*	mph
D = v_p / S	*25.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1550*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1097*	pc/h/ln
S	*74.9*	mph
D = v_p / S	*14.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 to US 41/64*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*3435*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2432*	pc/h/ln
S	*52.3*	mph
D = v_p / S	*46.5*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2105*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1490*	pc/h/ln
S	*72.3*	mph
D = v_p / S	*20.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2290*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1621*	pc/h/ln
S	*70.7*	mph
D = v_p / S	*22.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*1410*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*998*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*SR 299 off to SR 299 on ramp*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2265*	pc/h/ln
S	*57.3*	mph
D = v_p / S	*39.5*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2295*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1625*	pc/h/ln
S	*67.9*	mph
D = v_p / S	*23.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 EB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*2435*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1724*	pc/h/ln
S	*66.8*	mph
D = v_p / S	*25.8*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*AM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning 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, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1087*	pc/h/ln
S	*74.9*	mph
D = v_p / S	*14.5*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*Keith McCage*
Agency or Company	*GDOT/HNTB*
Date Performed	*8/12/13*
Analysis Time Period	*PM*

Site Information

Highway/Direction of Travel	*I-24 WB*
From/To	*I-59 to SR 299*
Jurisdiction	*Dade County*
Analysis Year	*2035*

Project Description *PI# 0011682, SR 299 Bridge Replacement over I-24*

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

Flow Inputs

Volume, V	*3440*	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_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Rolling*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*2.0*
E_T	*2.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.743*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2435*	pc/h/ln
S	*52.2*	mph
D = v_p / S	*46.6*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

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

Glossary

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

Factor Location

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

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1200 ft
V_u = 105 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1500
Deceleration Lane Length L_D	
Freeway Volume, V_F	1670
Ramp Volume, V_R	190
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

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

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1670	0.91	Rolling	23	0	0.743	1.00	2468
Ramp	190	0.91	Rolling	19	0	0.778	1.00	268
UpStream	105	0.91	Rolling	25	0	0.727	1.00	159
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2468 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2736	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	2736	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 17.3 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.291 (Exibit 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 13-11)	S_0= mph (Exhibit 13-12)
S = 61.8 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1200 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 75 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1805	
	Ramp Volume, V_R: 115	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 30.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1805	0.91	Rolling	23	0	0.743	1.00	2668
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								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2668 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2830	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	2830	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 18.1 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.297 (Exibit 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 13-11)	S_0= mph (Exhibit 13-12)
S = 61.7 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1685 ft	Acceleration Lane Length, L_A: 735	L_{down} = ft
V_u = 80 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1110	
	Ramp Volume, V_R: 75	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 45.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1110	0.91	Rolling	23	0	0.743	1.00	1641
Ramp	75	0.91	Rolling	18	0	0.787	1.00	105
UpStream	80	0.91	Rolling	22	0	0.752	1.00	117
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1641 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1746	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	1746	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 14.4 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.277 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 62.2 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 62.2 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1685 ft	Acceleration Lane Length, L_A: 735	L_{down} = ft
V_u = 145 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2505	
	Ramp Volume, V_R: 135	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 45.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2505	0.91	Rolling	23	0	0.743	1.00	3702
Ramp	135	0.91	Rolling	18	0	0.787	1.00	188
UpStream	145	0.91	Rolling	22	0	0.752	1.00	212
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 3702 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3890	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	3890	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
D_R = 31.1 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = D (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.446 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 57.5 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 57.5 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1200 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 110 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1700	
	Ramp Volume, V_R: 195	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 30.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1700	0.91	Rolling	23	0	0.743	1.00	2513
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								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)

L_{EQ} =

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2513 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2788	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)

L_{EQ} =

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	2788	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 17.7 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.294 (Exibit 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 13-11)	S_0= mph (Exhibit 13-12)
S = 61.8 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1200 ft	Acceleration Lane Length, L_A: 1500	L_{down} = ft
V_u = 80 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1840	
	Ramp Volume, V_R: 120	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 30.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1840	0.91	Rolling	23	0	0.743	1.00	2720
Ramp	120	0.91	Rolling	19	0	0.778	1.00	169
UpStream	80	0.91	Rolling	25	0	0.727	1.00	121
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2720 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2889	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	2889	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 18.5 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.301 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 61.6 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 61.6 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1685 ft	Acceleration Lane Length, L_A: 735	L_{down} = ft
V_u = 85 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1130	
	Ramp Volume, V_R: 80	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 45.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1130	0.91	Rolling	23	0	0.743	1.00	1670
Ramp	80	0.91	Rolling	18	0	0.787	1.00	112
UpStream	85	0.91	Rolling	22	0	0.752	1.00	124
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1670 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	1782	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	1782	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 14.7 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.278 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 62.2 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 62.2 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1685 ft
V_u = 150 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	735
Deceleration Lane Length L_D	
Freeway Volume, V_F	2555
Ramp Volume, V_R	135
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	45.0

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

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2555	0.91	Rolling	23	0	0.743	1.00	3776
Ramp	135	0.91	Rolling	18	0	0.787	1.00	188
UpStream	150	0.91	Rolling	22	0	0.752	1.00	219
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 3776 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3964	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	3964	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 31.7 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = D (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.460 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 57.1 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 57.1 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/9/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1200 ft
V_u = 190 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1500
Deceleration Lane Length L_D	
Freeway Volume, V_F	2105
Ramp Volume, V_R	310
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

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

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	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								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 2980 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} =

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1200 ft
V_u = 145 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1500
Deceleration Lane Length L_D	
Freeway Volume, V_F	2290
Ramp Volume, V_R	205
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

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

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2290	0.95	Rolling	23	0	0.743	1.00	3242
Ramp	205	0.95	Rolling	19	0	0.778	1.00	277
UpStream	145	0.95	Rolling	25	0	0.727	1.00	210
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)

L_{EQ} =

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 3242 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3519	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)

L_{EQ} =

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	3519	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 23.4 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = C (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.363 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 59.8 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 59.8 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 2	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 1685 ft	Acceleration Lane Length, L_A: 735	L_{down} = ft
V_u = 140 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1410	
	Ramp Volume, V_R: 125	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 45.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1410	0.95	Rolling	23	0	0.743	1.00	1996
Ramp	125	0.95	Rolling	18	0	0.787	1.00	167
UpStream	140	0.95	Rolling	22	0	0.752	1.00	196
DownStream								

Merge Areas

Estimation of v_{12}

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

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

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 1996 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2163	Exhibit 13-8		No

Diverge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	2163	Exhibit 13-8	4600:All	No	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 17.7 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = B (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.289 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 61.9 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 61.9 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp
☑ Yes ☐ On
☐ No ☑ Off
L_{up} = 1685 ft
V_u = 235 veh/h

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	735
Deceleration Lane Length L_D	
Freeway Volume, V_F	3200
Ramp Volume, V_R	240
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	45.0

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

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3200	0.95	Rolling	23	0	0.743	1.00	4531
Ramp	240	0.95	Rolling	18	0	0.787	1.00	321
UpStream	235	0.95	Rolling	22	0	0.752	1.00	329
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)

L_{EQ} =

P_{FM} = 1.000 using Equation (Exhibit 13-6)

V_{12} = 4531 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4852	Exhibit 13-8		Yes

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)

L_{EQ} =

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V_{R12}	4852	Exhibit 13-8	4600:All	Yes	V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)	Level of Service Determination (if not F)
$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$	$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 38.6 (pc/mi/ln)	D_R = (pc/mi/In)
LOS = F (Exhibit 13-2)	LOS = (Exhibit 13-2)

Speed Determination	Speed Determination
M_S = 0.754 (Exibit 13-11)	D_s = (Exhibit 13-12)
S_R= 48.9 mph (Exhibit 13-11)	S_R= mph (Exhibit 13-12)
S_0= N/A mph (Exhibit 13-11)	S_0= mph (Exhibit 13-12)
S = 48.9 mph (Exhibit 13-13)	S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	1775
Ramp Volume, V_R	105
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1200 ft
V_D = 190 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1775	0.91	Rolling	23	0	0.743	1.00	2623
Ramp	105	0.91	Rolling	25	0	0.727	1.00	159
UpStream								
DownStream	190	0.91	Rolling	19	0	0.778	1.00	268

Merge Areas

Estimation of v_{12}

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 2623 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2623	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	2464	Exhibit 13-8	4800	No
V_R	159	Exhibit 13-10	2200	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	2623	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 21.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.182 (Exhibit 13-12)

S_R= 64.9 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 64.9 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	1880
Ramp Volume, V_R	75
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1200 ft
V_D = 115 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
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 Areas | **Diverge Areas**

Estimation of v_{12} (Merge Areas)

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

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

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

V_{12} = pc/h

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

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

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

If Yes, V_{12a} =

Estimation of v_{12} (Diverge Areas)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	235
Freeway Volume, V_F	1190
Ramp Volume, V_R	80
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1685 ft
V_D = 75 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1190	0.91	Rolling	23	0	0.743	1.00	1759
Ramp	80	0.91	Rolling	22	0	0.752	1.00	117
UpStream								
DownStream	75	0.91	Rolling	18	0	0.787	1.00	105

Merge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 1759 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1759	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	1642	Exhibit 13-8	4800	No
V_R	117	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	1759	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 17.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.504 (Exhibit 13-12)

S_R= 55.9 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 55.9 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2013

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	235
Freeway Volume, V_F	2650
Ramp Volume, V_R	145
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1685 ft
V_D = 135 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
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								
DownStream	135	0.91	Rolling	18	0	0.787	1.00	188

Merge Areas | **Diverge Areas**

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

If Yes, V_{12a} =

Estimation of v_{12}

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	1810
Ramp Volume, V_R	110
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1200 ft
V_D = 195 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1810	0.91	Rolling	23	0	0.743	1.00	2675
Ramp	110	0.91	Rolling	25	0	0.727	1.00	166
UpStream								
DownStream	195	0.91	Rolling	19	0	0.778	1.00	275

Merge Areas

Estimation of v_{12}

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 2675 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2675	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	2509	Exhibit 13-8	4800	No
V_R	166	Exhibit 13-10	2200	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	2675	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 21.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.183 (Exhibit 13-12)

S_R= 64.9 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 64.9 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	1920
Ramp Volume, V_R	80
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1200 ft
V_D = 120 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1920	0.91	Rolling	23	0	0.743	1.00	2838
Ramp	80	0.91	Rolling	25	0	0.727	1.00	121
UpStream								
DownStream	120	0.91	Rolling	19	0	0.778	1.00	169

Merge Areas

Estimation of v_{12}

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 2838 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2838	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	2717	Exhibit 13-8	4800	No
V_R	121	Exhibit 13-10	2200	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	2838	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 22.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.179 (Exhibit 13-12)

S_R= 65.0 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 65.0 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 2	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 1685 ft
V_u = veh/h	Deceleration Lane Length L_D: 235	V_D = 80 veh/h
	Freeway Volume, V_F: 1215	
	Ramp Volume, V_R: 85	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 30.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1215	0.91	Rolling	23	0	0.743	1.00	1796
Ramp	85	0.91	Rolling	22	0	0.752	1.00	124
UpStream								
DownStream	80	0.91	Rolling	18	0	0.787	1.00	112

Merge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 1796 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_F	1796	Exhibit 13-8	4800	No
$V_{FO} = V_F - V_R$	1672	Exhibit 13-8	4800	No
V_R	124	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	1796	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 17.6 (pc/mi/ln)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2015

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	235
Freeway Volume, V_F	2705
Ramp Volume, V_R	150
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1685 ft
V_D = 135 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2705	0.91	Rolling	23	0	0.743	1.00	3998
Ramp	150	0.91	Rolling	22	0	0.752	1.00	219
UpStream								
DownStream	135	0.91	Rolling	18	0	0.787	1.00	188

Merge Areas

Estimation of v_{12}

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 3998 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3998	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	3779	Exhibit 13-8	4800	No
V_R	219	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	3998	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 36.5 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.513 (Exhibit 13-12)

S_R= 55.6 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 55.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	AM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	2295
Ramp Volume, V_R	190
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1200 ft
V_D = 310 veh/h

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	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

Merge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 3249 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3249	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	2974	Exhibit 13-8	4800	No
V_R	275	Exhibit 13-10	2200	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	3249	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 26.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.193 (Exhibit 13-12)

S_R= 64.6 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 64.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 EB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	2435
Ramp Volume, V_R	145
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1200 ft
V_D = 205 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2435	0.95	Rolling	23	0	0.743	1.00	3447
Ramp	145	0.95	Rolling	25	0	0.727	1.00	210
UpStream								
DownStream	205	0.95	Rolling	19	0	0.778	1.00	277

Merge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 3447 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3447	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	3237	Exhibit 13-8	4800	No
V_R	210	Exhibit 13-10	2200	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	3447	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 28.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.187 (Exhibit 13-12)

S_R = 64.8 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 64.8 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	235
Freeway Volume, V_F	1550
Ramp Volume, V_R	140
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1685 ft
V_D = 125 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1550	0.95	Rolling	23	0	0.743	1.00	2194
Ramp	140	0.95	Rolling	22	0	0.752	1.00	196
UpStream								
DownStream	125	0.95	Rolling	18	0	0.787	1.00	167

Merge Areas

Estimation of v_{12}

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 1.000 using Equation (Exhibit 13-7)
V_{12} = 2194 pc/h
V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2194	Exhibit 13-8	4800	No
V_{FO} = V_F - V_R	1998	Exhibit 13-8	4800	No
V_R	196	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	2194	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 21.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.511 (Exhibit 13-12)

S_R = 55.7 mph (Exhibit 13-12)

S_0 = N/A mph (Exhibit 13-12)

S = 55.7 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Keith McCage	Freeway/Dir of Travel	I-24 WB
Agency or Company	GDOT/HNTB	Junction	SR 299
Date Performed	8/12/13	Jurisdiction	Dade County
Analysis Time Period	PM	Analysis Year	2035

Project Description SR 299 Bridge Replacement

Inputs

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

Freeway Number of Lanes, N	2
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	235
Freeway Volume, V_F	3435
Ramp Volume, V_R	235
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 1685 ft
V_D = 240 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3435	0.95	Rolling	23	0	0.743	1.00	4863
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

Merge Areas

Estimation of v_{12}

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

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

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

V_{12} = pc/h

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

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

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

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

Capacity Checks

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

Diverge Areas

Estimation of v_{12}

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

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

P_{FD} = 1.000 using Equation (Exhibit 13-7)

V_{12} = 4863 pc/h

V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)

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

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

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

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4863	Exhibit 13-8	4800	Yes
V_{FO} = V_F - V_R	4534	Exhibit 13-8	4800	No
V_R	329	Exhibit 13-10	2000	No

Flow Entering Merge Influence Area				
	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?
V_{12}	4863	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

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

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Level of Service Determination (if not F)

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

D_R = 44.0 (pc/mi/ln)

LOS = F (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Speed Determination

D_s = 0.523 (Exhibit 13-12)

S_R= 55.4 mph (Exhibit 13-12)

S_0= N/A mph (Exhibit 13-12)

S = 55.4 mph (Exhibit 13-13)