

AIR QUALITY ANALYSIS

**I-66 Widening, Rte 29 to Rte 15
0066-076-003, B674, B675, C501, P101, R201
(UPC 93577)**

**Prince William County
Northern Virginia District**

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TABLE OF CONTENTS

Executive Summary	ES-1
1. Project Description	1
2. Traffic Forecasts	2
3. Regulatory Requirements and Guidance	14
3.1 NEPA and Related Requirements	14
3.1.1 FHWA-VDOT Agreements.....	16
3.1.1.1 Project-Level Carbon Monoxide Air Quality Studies Agreement	16
3.1.1.2 Procedures for Updating Air Studies When New Planning Assumptions Become Available	17
3.1.1.3 No-Build Analysis Agreement for Air and Noise Studies.....	17
3.1.1.4 Programmatic Categorical Exclusion Agreement	18
3.1.2 NEPA Requirements for Mobile Source Air Toxic (MSATs) Analyses	19
3.1.2.1 Selection of Level of Analysis for MSATs	20
3.3 Transportation Conformity	21
3.3.1 Regional Conformity Requirements Relating to Projects.....	22
3.3.2 Project-Level Conformity Requirements	23
3.3.2.1 Applicability	23
3.3.2.2 Models	24
3.3.2.3 Background Concentrations.....	25
3.3.2.4 Projects of Air Quality Concern for Particulate.....	25
3.3.2.5 Mitigation and Control Measures	27
3.3.3 Conformity SIP	28
4. Project Assessment	29
4.1 State and Regional Context	29
4.1.1 Attainment and State Implementation Plan (SIP) Status for the Project Area	29
4.1.2 Regional Conformity	30
4.1.3 State Environmental Review Process (SERP).....	30
4.1.4 State and Regional Requirements for Mitigation Measures.....	30
4.2 Carbon Monoxide Analysis.....	31
4.2.1 Background	31
4.2.2 Modeling Approach.....	33
4.2.3 Project Opening and Design Years	35
4.2.4 Emission Factors.....	35
4.2.5 Build and No-Build Modeling Scenarios	39
4.2.6 Average Speeds & Emission Factors for the Modeling Scenarios.....	39
4.2.7 Traffic Volumes for the Modeling Scenarios.....	39
4.2.8 Dispersion Modeling Inputs.....	40
4.2.8.1 Receptor Locations for Dispersion Modeling.....	41
4.2.8.2 Other Inputs to the Dispersion Model.....	42
4.2.9 Worst-Case Modeling Configuration for the Build Scenario	42
4.2.10 Summary of Worst-Case Assumptions	43
4.2.10.1 Traffic Forecasts	44
4.2.10.2 Dispersion and Emission Modeling.....	45

4.2.11 Modeling Results for Carbon Monoxide.....	46
4.3 Particulate Matter Analysis	46
4.4 Mobile Source Air Toxics Analysis	47
4.4.1 Background	48
4.4.2 Unavailable Information for Project Specific MSAT Impact Analysis	49
4.4.3 Conclusion for MSATs	52
4.5 Indirect Effects and Cumulative Impacts Analysis.....	52
5. Mitigation	53
6. Conclusion.....	53

ATTACHMENTS

- A. Traffic Forecasts
- B. Sample MOBILE6.2 & CAL3QHC Inputs

LIST OF EXHIBITS

Exhibit 1-1: Project Location	3
Exhibit 1-2(a): Project Concept.....	4
Exhibit 1-2(b): Project Concept.....	5
Exhibit 1-2(c): Project Concept.....	6
Exhibit 1-2(d): Project Concept.....	7
Exhibit 1-2(e): Project Concept.....	8
Exhibit 1-3: Typical Section.....	9
Exhibit 1-4: Aerial of the I-66 Interchange with Route 15 (James Madison Highway).....	10
Exhibit 2-1: Annual Average Daily Traffic (AADT) Data and Forecasts.....	11
Exhibit 2-2: 2014 Peak Hour Traffic (Opening Year Build Scenario)	12
Exhibit 2-3: 2036 Peak Hour Traffic (Design Year Build Scenario).....	13
Exhibit 3-1: National Ambient Air Quality Standards.....	15
Exhibit 4-1: Long-Term Trend in Public Road Mileage and Vehicle Miles Traveled (VMT)	32
Exhibit 4-2: Highway VMT - US and Virginia	32
Exhibit 4-3: Federal Emission Standards for CO for New Automobiles and Light Trucks	33
Exhibit 4-4: Nationwide Long-Term Trend in Ambient CO Concentrations	34
Exhibit 4-5: Ambient Concentrations of Carbon Monoxide in Virginia in 2009.....	34
Exhibit 4-6: Key Input Data for MOBILE6.2 (via EMIT)	36
Exhibit 4-7(a): Fleet Average Emission Factors – Opening Year, Freeways	37
Exhibit 4-7(b): Fleet Average Emission Factors – Opening Year, Arterials	37

Exhibit 4-8(a):	Fleet Average Emission Factors - Design Year, Freeways	38
Exhibit 4-8(b):	Fleet Average Emission Factors - Design Year, Arterials.....	38
Exhibit 4-10:	Key CAL3QHC/CALINE3 Worst-Case Inputs (via Cal3Interface).....	41
Exhibit 4-11:	Cal3interface Worst-Case Configuration & Receptor Locations - Build Scenario	44
Exhibit 4-12:	Maximum CO Concentrations (ppm) (and Receptor Location) for Worst-Case Scenarios	46
Exhibit 4-13:	National MSAT Emission Trends 1999 - 2050.....	49

Executive Summary

The Virginia Department of Transportation (VDOT) is planning to widen Interstate 66 (I-66) in Prince William County, generally between Route 15 (James Madison Highway) and Route 29 (Lee Highway). More specifically¹:

Proposed improvements consist of adding two travel lanes to eastbound and westbound Interstate 66 (I-66) from 0.50 miles west of U.S. Route 15 near the Town of Haymarket to 0.43 miles west of U.S. Route 29 in Gainesville, Prince William County, for a distance of approximately 2.60 miles. One lane in each direction would serve as a general purpose (or Single Occupancy Vehicle) lane and the other for peak period, High Occupancy Vehicle (HOV) usage. The Interstate would be widened primarily to the outside to preserve the median for possible future transit options and to maintain a rural freeway typical section. Widening to the outside to accommodate the additional lanes will require replacement of two overpasses, the two-span bridges carrying Old Carolina Road and Catharpin Road over I-66. Minor modifications will also be required to the I-66 / Route 15 Interchange. The westbound SOV lane will be eliminated at the I-66 / Route 15 Interchange, while the westbound HOV lane will terminate no more than 2,640 feet beyond the Route 15 overpass. Existing ramps at the I-66 and Route 15 Interchange will be modified as necessary under this project and coordinated with the I-66 / Route 15 Interchange Reconstruction Project.

The project has been assessed for potential air quality impacts and conformity with applicable air quality regulations and requirements². The assessment indicates that the project would meet all applicable air quality requirements of the National Environmental Policy Act (NEPA) and federal and state transportation conformity regulations. As such, the project will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of national ambient air quality standards (NAAQS) as established by the US Environmental Protection Agency (US EPA).

Additionally, best available information indicates that, nationwide, regional levels of air toxics are expected to decrease in the future due to fleet turnover and the continued implementation of more stringent emission and fuel quality regulations. Nevertheless, it is possible that some localized areas may show an increase in emissions and ambient levels of these pollutants due to locally increased traffic levels associated with the project.

This project is located within a moderate ozone nonattainment area, a fine particulate matter (PM_{2.5}) nonattainment area, and a volatile organic compounds (VOC) and nitrogen oxides (NO_x) emission control area. As such, all reasonable precautions should be taken to limit the emissions of VOC, NO_x, and particulate matter. In addition, the following Virginia Department of Environmental Quality (VDEQ) air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions³; 9 VAC 5-40-5490 *et seq.*, Cutback Asphalt restrictions⁴; and 9 VAC 5-50-60 *et seq.*, Fugitive Dust precautions⁵.

¹ "Additional Project Information" as included on the NEPA Documentation Concurrence Form signed June 3, 2011.

² An air quality study was completed May 1, 2009 for this project. This update reflects changes to the project design that have occurred subsequently to the completion of that study and also includes updated background information as appropriate.

³ See <http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130>

⁴ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-40-5490>

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. In order to mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*⁶.

As of the date of preparation of this analysis, the project is included in the currently conforming 2010 Constrained Long Range Transportation Plan (CLRP) and FY 2011-2016 Transportation improvement Program (TIP)^{7,8}. The CLRP and TIP are developed by the National Capital Region Transportation Planning Board (TPB), which is the federally designated Metropolitan Planning Organization (MPO) for the region and whose members include VDOT⁹.

⁵ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60>

⁶ See <http://www.virginiadot.org/business/const/spec-default.asp>

⁷ The conformity analysis and finding of conformity were approved by the US DOT in a letter dated September 27, 2011 to the NCR TPB.

⁸ The project status in the currently conforming CLRP and TIP was confirmed in email dated September 22 and 30, 2011 from VDOT Northern Virginia District staff.

⁹ See: <http://www.mwcog.org/transportation/tpb/>.

1. Project Description

The Virginia Department of Transportation (VDOT) is planning to widen Interstate 66 (I-66) in Prince William County, generally between Route 15 (James Madison Highway) and Route 29 (Lee Highway). More specifically¹⁰:

Proposed improvements consist of adding two travel lanes to eastbound and westbound Interstate 66 (I-66) from 0.50 miles west of U.S. Route 15 near the Town of Haymarket to 0.43 miles west of U.S. Route 29 in Gainesville, Prince William County, for a distance of approximately 2.60 miles. One lane in each direction would serve as a general purpose (or Single Occupancy Vehicle) lane and the other for peak period, High Occupancy Vehicle (HOV) usage. The Interstate would be widened primarily to the outside to preserve the median for possible future transit options and to maintain a rural freeway typical section. Widening to the outside to accommodate the additional lanes will require replacement of two overpasses, the two-span bridges carrying Old Carolina Road and Catharpin Road over I-66. Minor modifications will also be required to the I-66 / Route 15 Interchange. The westbound SOV lane will be eliminated at the I-66 / Route 15 Interchange, while the westbound HOV lane will terminate no more than 2,640 feet beyond the Route 15 overpass. Existing ramps at the I-66 and Route 15 Interchange will be modified as necessary under this project and coordinated with the I-66 / Route 15 Interchange Reconstruction Project.

The project narrative included in the final scoping package provides some additional detail¹¹:

I-66 will be widened from existing four-lane roadway to an eight-lane roadway section. The proposed project would consist of constructing two additional lanes in each direction of I-66 (one HOV lane and one SOV lane) from approximately 0.5 miles west of Route 15 to 0.43 miles west of Route 29, for an approximate length of 2.6 miles (please refer to attached typical section). The widening will be accomplished towards the existing outside lanes within the existing 330 ft. wide right-of-way. Minor widening of the inside shoulder is also planned towards the existing median.

In the off-peak period and off-peak direction, the HOV lanes will be open to all traffic.

The existing ramps at I-66 and Rte 15 interchange may be modified as necessary under this project and coordinated with the I-66/Rte 15 Interchange Reconstruction Project with UPC 100566.

The project will also include the reconstruction of two 2-span bridges (the overpasses at Catharpin Road and Old Carolina Road), storm drainage, storm water management basins, Intelligent Transportation System (ITS) detection for incident management, overhead sign structures, and roadway lighting, and may include retaining walls, sound barriers, and utility relocations (if required).

I-66 corridor has been designated as a Limited Access facility. I-66 is in the Interstate System. The Functional Classification is Rural Interstate (Principal Arterial GS-1).

¹⁰ "Additional Project Information" as included on the NEPA Documentation Concurrence Form signed June 3, 2011.

¹¹ VDOT, "Final Scoping Package", June 6, 2011 (file "Final scoping package I-66 Widening UPC 93577.pdf, on VDOT IPM). The typical section referenced in this excerpt is included in this report as Exhibit 1-3.

Exhibit 1-1 shows the general project location. Exhibits 1-2(a) through (e) present the design concept for the project. Exhibit 1-3 provides the typical section for the widening of I-66.

Exhibit 1-4 presents an aerial of the interchange with Route 15 (James Madison Highway) at the west end of the project area.

2. Traffic Forecasts

Exhibit 2-1 presents a summary of base (2011), interim (2014) and design year (2036) average daily traffic (ADT) for the project as developed by VDOT Northern Virginia District¹².

For I-66 between Routes 15 and 29, ADT will reach up to 95 thousand (47 thousand eastbound and 48 thousand westbound) for the design year 2036 build scenario. For the 2036 no-build scenario, ADT will reach only 80 thousand (40 thousand in each direction).

Truck traffic in this section reaches six percent of ADT in the eastbound direction and eight percent in the westbound direction. The percentage applies to both the build and no-build scenarios. For reference, truck traffic reaches eight percent of ADT on Route 15 north of the interchange with I-66 where the design year ADT reaches only 40 thousand for the build scenario.

Exhibits 2-2 and 2-3 respectively present the morning and afternoon peak hour turning movements for the interim and design year build scenarios.

A copy of the 2011 memorandum, which includes peak hour turning movements in addition to the summary data referenced above, is included with this report as Attachment A.

¹² VDOT Northern Virginia District, "I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29 UPC# 93577, Activity Code 616", memorandum dated May 18, 2011.

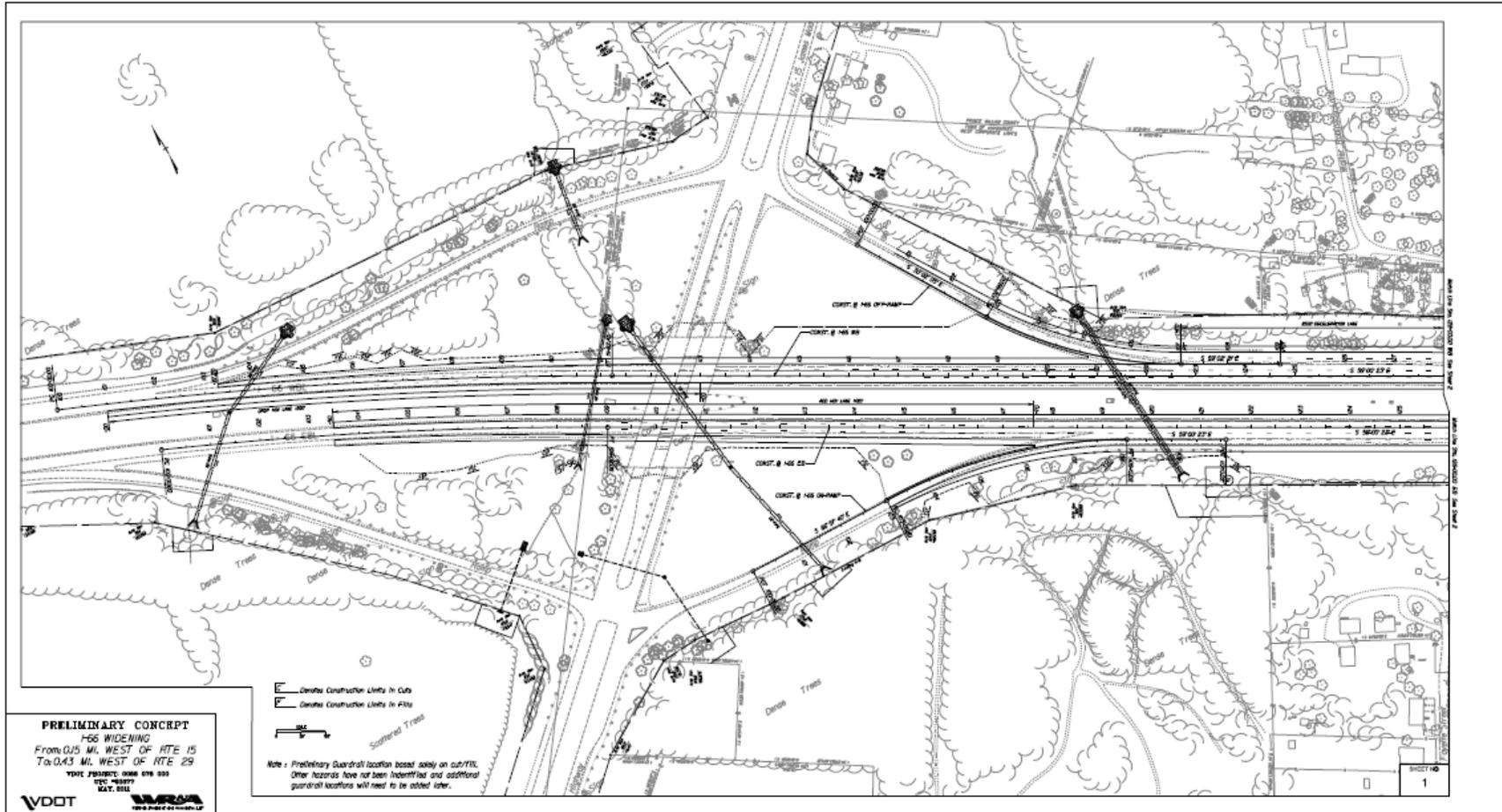
Exhibit 1-1: Project Location

I-66 HOV+SOV Widening
Prince William County
UPC 93577



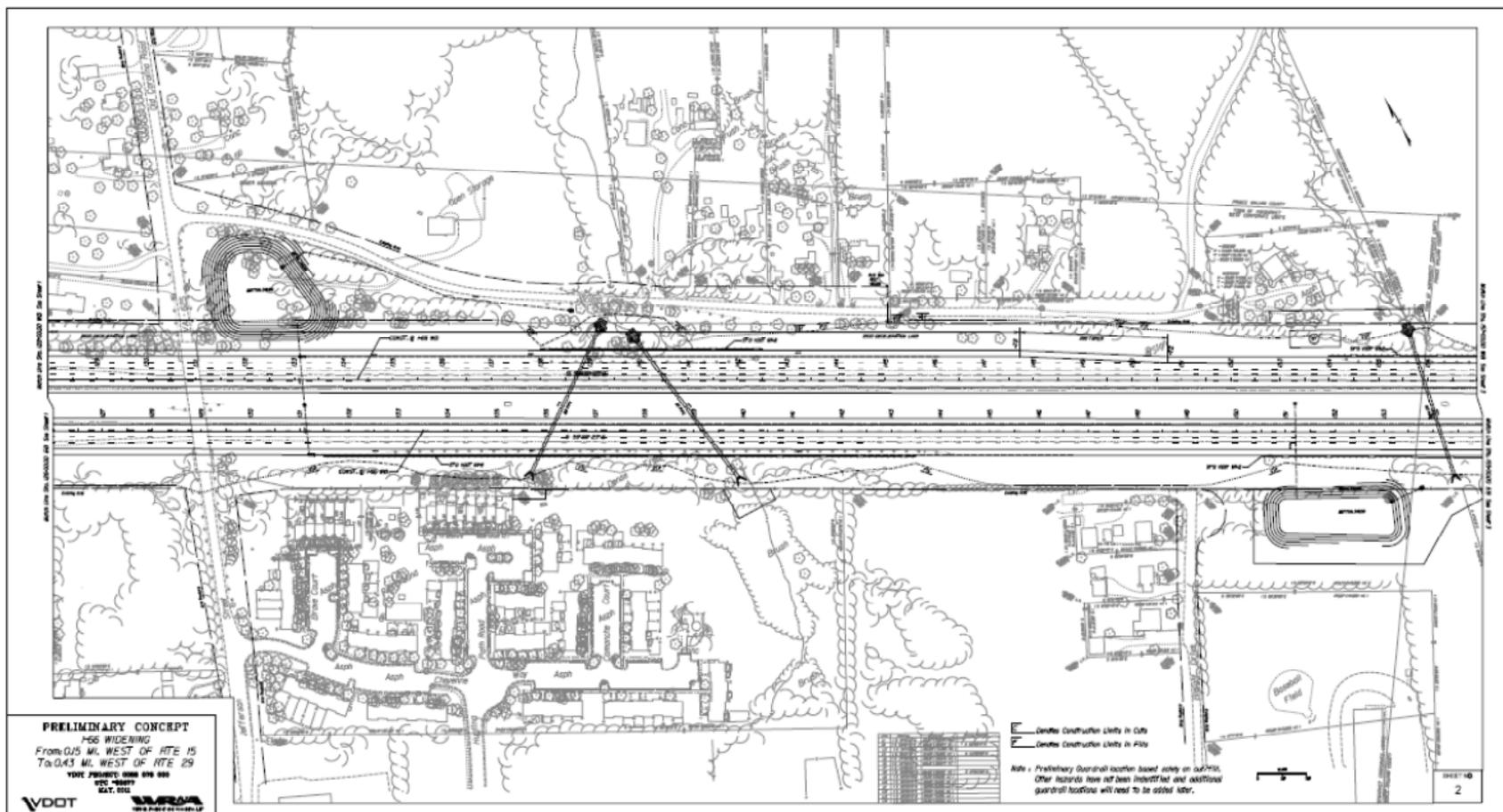
Source: VDOT IPM, file entitled "93577 Loc Map.jpg", dated 3/3/11.

Exhibit 1-2(a): Project Concept



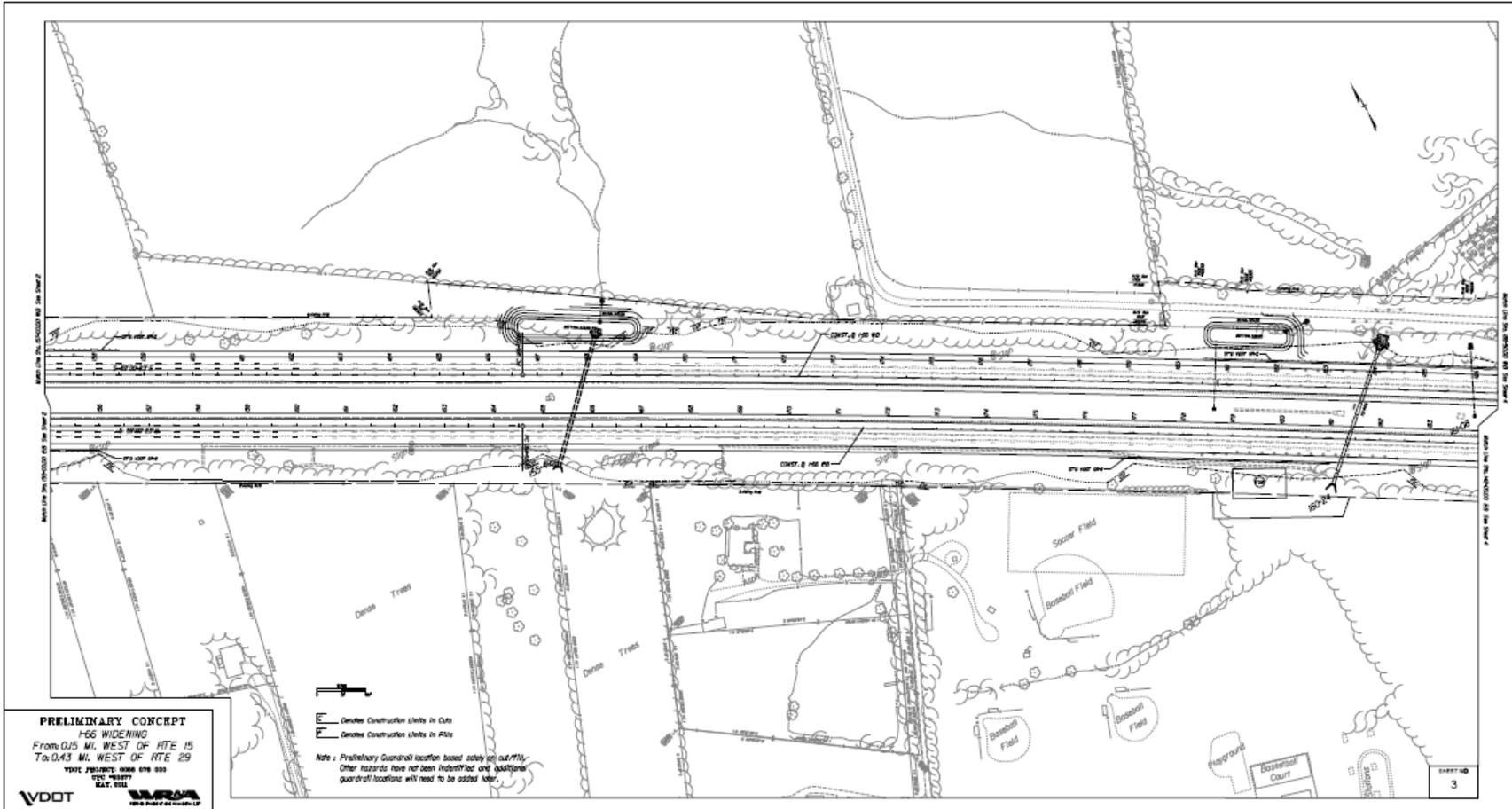
Source: VDOT IPM, File 0066-076-000 c501_01.pdf (427CCE13-F93C-48C0-B92D-797D469EB8DA-985409.pdf), dated 5/24/2011.

Exhibit 1-2(b): Project Concept



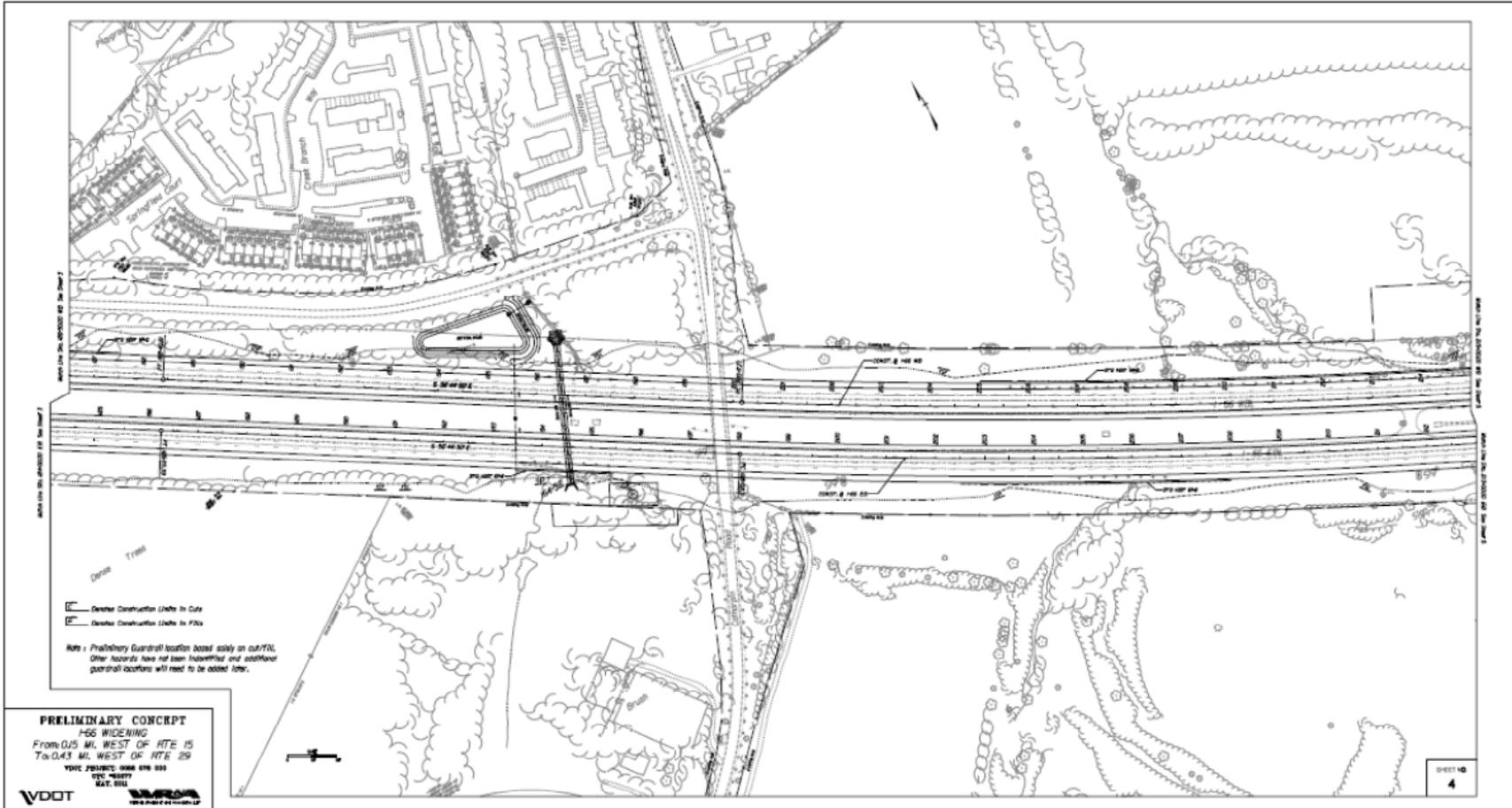
Source: VDOT IPM, File 0066-076-000 c501_02.pdf (427CCE13-F93C-48C0-B92D-797D469EB8DA-985411.pdf), dated 5/24/2011.

Exhibit 1-2(c): Project Concept



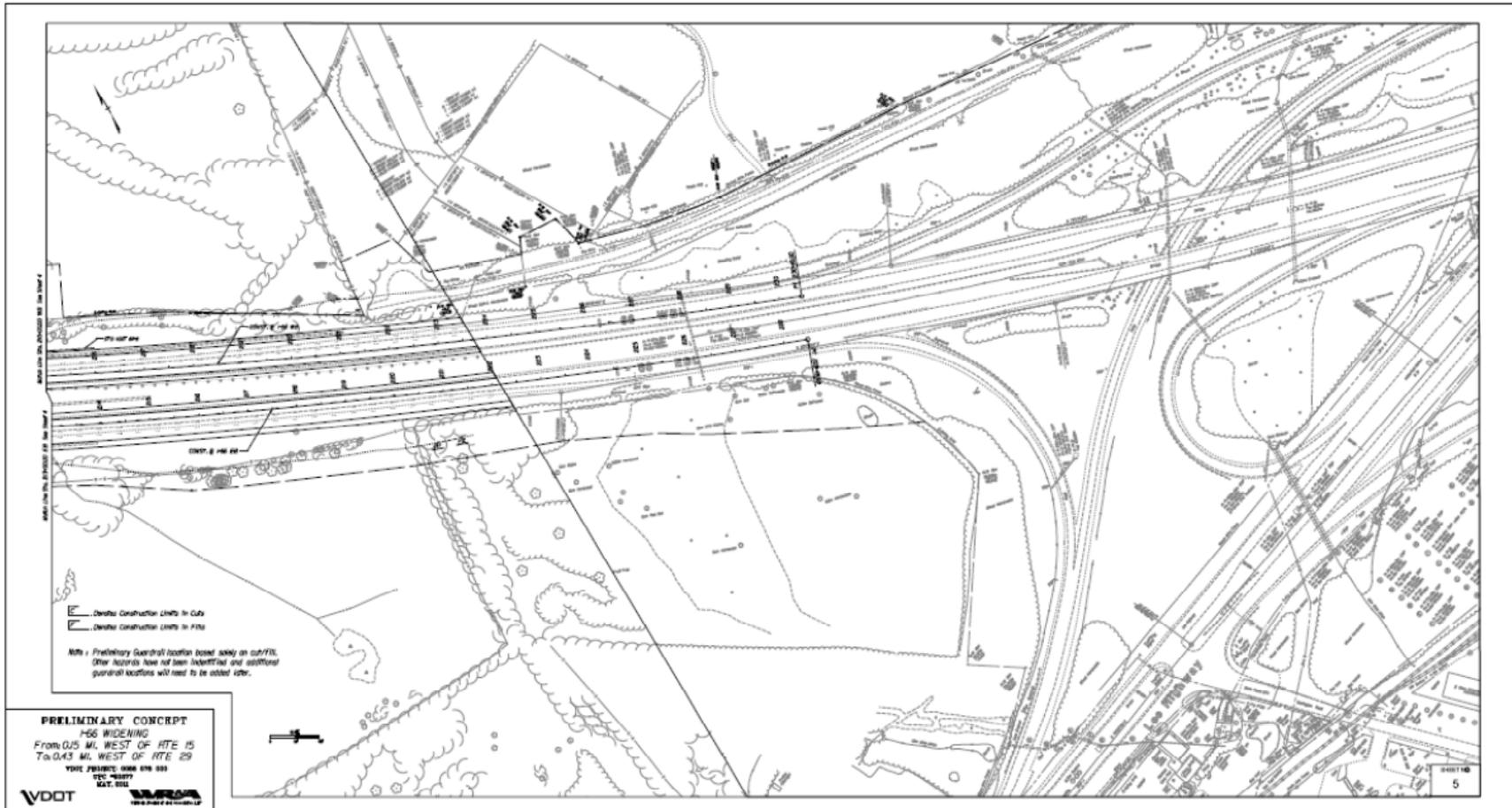
Source: VDOT IPM, File 0066-076-000 c501_03.pdf (427CCE13-F93C-48C0-B92D-797D469EB8DA-985413.pdf), dated 5/24/2011.

Exhibit 1-2(d): Project Concept



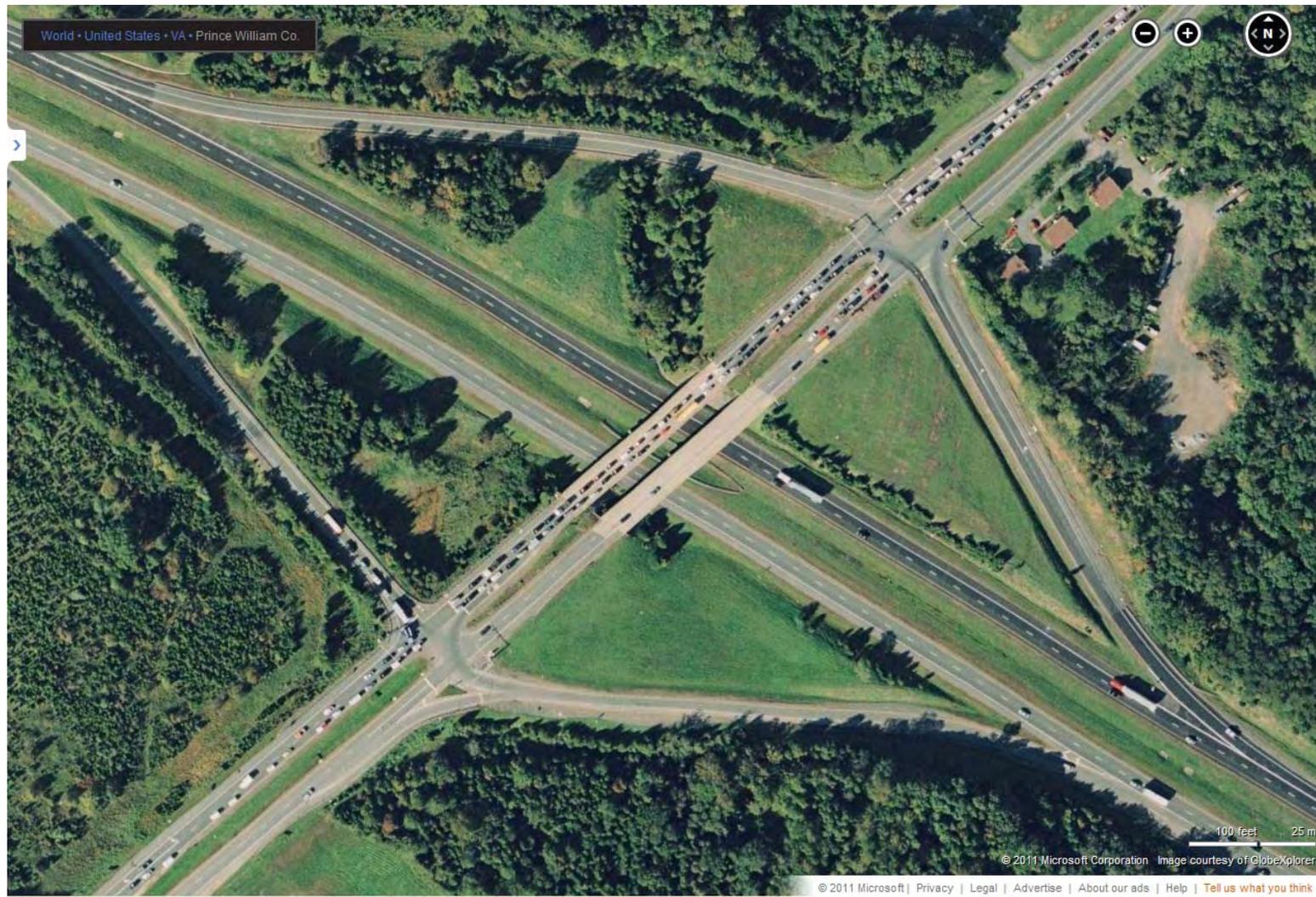
Source: VDOT IPM, File 0066-076-000 c501_04.pdf (427CCE13-F93C-48C0-B92D-797D469EB8DA-985415.pdf), dated 5/24/2011.

Exhibit 1-2(e): Project Concept



Source: VDOT IPM, File 0066-076-000 c501_05.pdf (427CCE13-F93C-48C0-B92D-797D469EB8DA-985417.pdf), dated 5/24/2011.

Exhibit 1-4: Aerial of the I-66 Interchange with Route 15 (James Madison Highway)



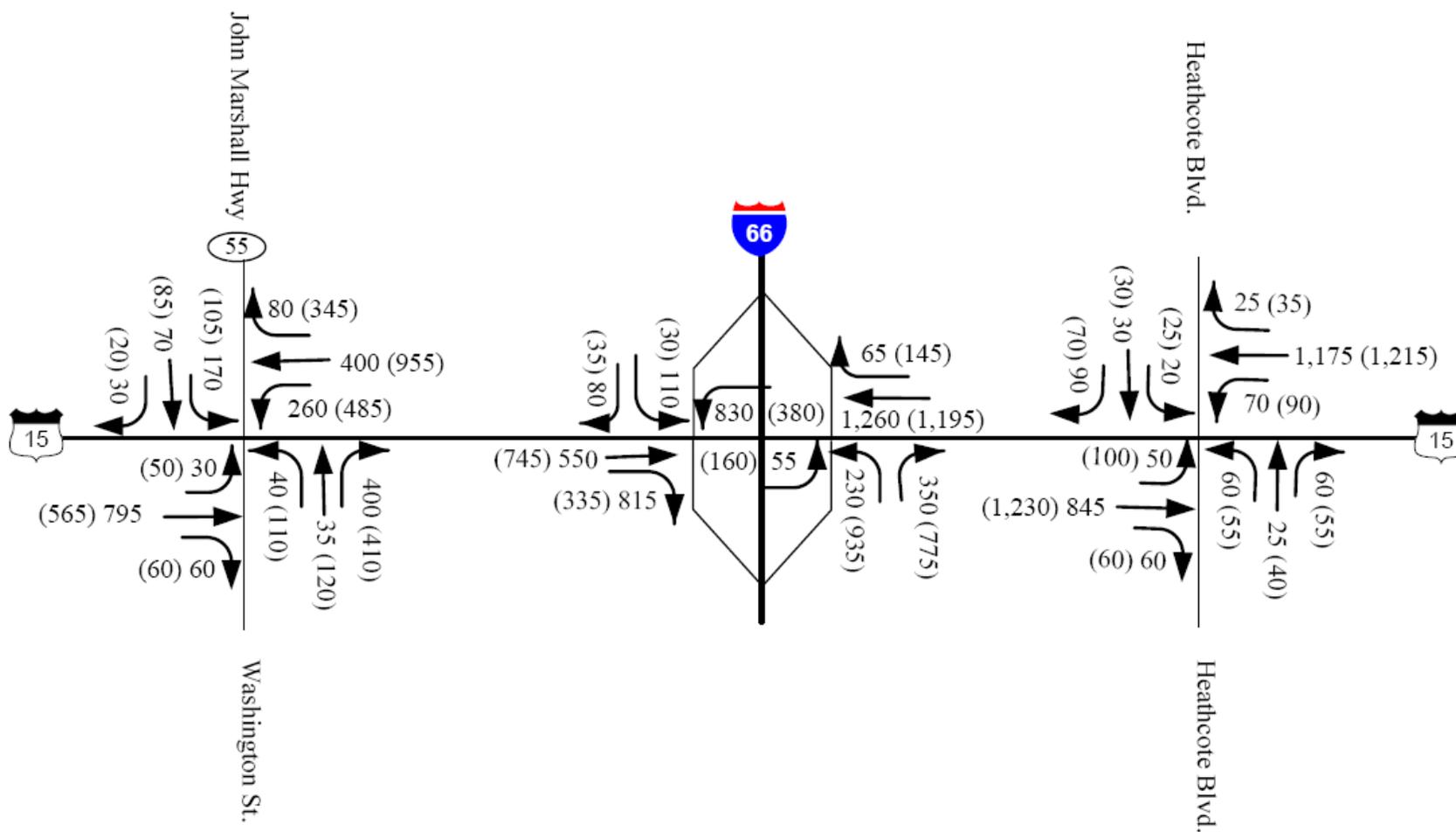
Source: <http://www.bing.com/maps/>, accessed August 15, 2011

Exhibit 2-1: Annual Average Daily Traffic (AADT) Data and Forecasts

ENTRADA Study Area ADT						
#	Facility	2011 Exist	2014 Bld	2014 Nblld	2036 Bld	2036 Nblld
<<< Gainesville I-66/US-29 >>>						
1	US-29 North of I-66	19,000	20,000	20,000	40,000	39,000
2	US-29 South of I-66	52,000	55,000	55,000	69,000	67,000
3	US-29 On-Ramp to I-66 WB	1,300	1,300	1,300	1,900	1,700
4	US-29 SB On-Ramp to I-66 EB	5,200	5,500	5,500	8,300	7,200
5	I-66 EB Off-Ramp to US-29 SB	1,700	1,800	1,800	2,700	2,300
6	I-66 WB Off-Ramp to US-29 SB	17,100	18,100	18,100	27,400	23,600
<<< Haymarket I-66/US-15 >>>						
7	I-66 EB bet. US-29 & US-15	29,000	31,000	31,000	47,000	40,000
8	I-66 WB bet. US-29 & US-15	29,000	31,000	31,000	48,000	40,000
9	I-66 EB Off-Ramp to US-15	1,900	2,000	2,000	5,300	5,200
10	I-66 EB On-Ramp from US-15	13,200	14,000	14,000	20,100	19,800
11	I-66 WB Off-Ramp to US-15	12,600	13,000	13,000	21,200	20,800
12	I-66 WB On-Ramp from US-15	2,100	2,200	2,200	5,300	5,200
13	US-15 North of I-66	30,000	31,000	31,000	40,000	39,000
14	US-15 South of I-66	31,000	32,000	32,000	48,000	47,000
<<< I-66 Overpass >>>						
15	Old Carolina Road	7,000	8,000	8,000	12,000	10,000
16	Catherpin Road	6,000	6,000	6,000	13,000	12,000

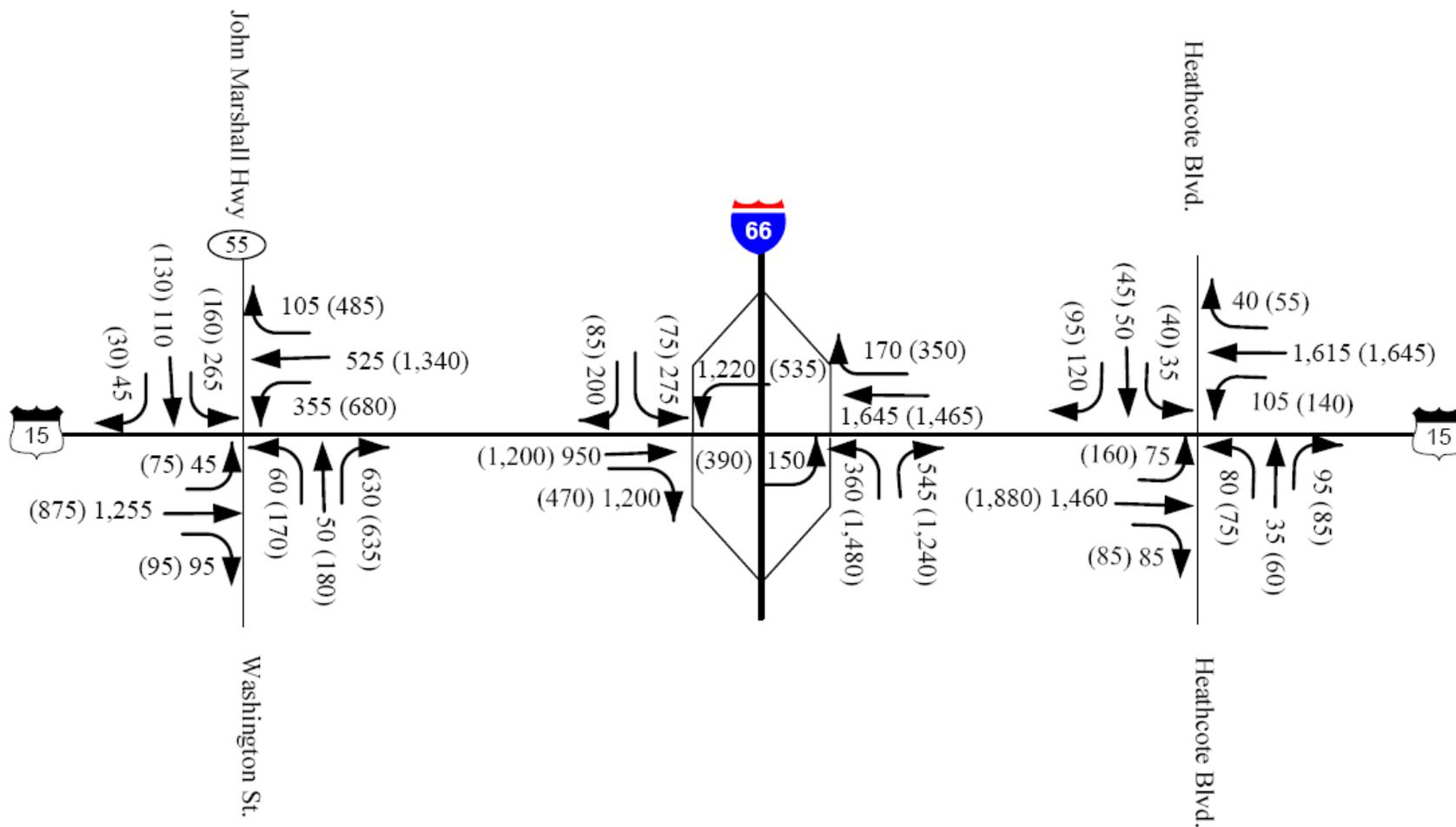
Source: Excerpted from VDOT Northern Virginia District, "I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29 UPC# 93577, Activity Code 616", memorandum dated May 18, 2011..

Exhibit 2-2: 2014 Peak Hour Traffic (Opening Year Build Scenario)



Source: Excerpted from Figure 2 in VDOT Northern Virginia District, "I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29 UPC# 93577, Activity Code 616", memorandum dated May 18, 2011

Exhibit 2-3: 2036 Peak Hour Traffic (Design Year Build Scenario)



Source: Excerpted from Figure 3 in VDOT Northern Virginia District, "I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29 UPC# 93577, Activity Code 616", memorandum dated May 18, 2011

3. Regulatory Requirements and Guidance

Federal requirements for air quality (hot-spot) analyses for transportation projects derive from the National Environmental Policy Act (NEPA) and the federal transportation conformity rule (40 CFR Parts 51 and 93). In general, while NEPA requirements apply for all transportation projects regardless of location, federal transportation conformity requirements apply only for projects in areas designated by the US Environmental Protection Agency (US EPA) as ones in “nonattainment” or “maintenance” of specific national ambient air quality standards (NAAQS). Exhibit 3-1 presents an EPA tabulation of the currently applicable NAAQS¹³.

NEPA and conformity requirements applicable to each pollutant or pollutant class are summarized with the corresponding project-level analyses presented later in this report. Background information on the federal requirements and guidance, which includes references for sources for more information, is provided below.

3.1 NEPA and Related Requirements

NEPA guidance for air quality analyses for transportation projects may be found on or via the Federal Highway Administration (FHWA) website for planning and the environment¹⁴. Additional information is provided on Transportation Research Board¹⁵ and Council of Environmental Quality websites¹⁶. As noted above, more detailed information on the applicable requirements and guidance is provided with the individual analyses presented later in this report.

For projects located within the Commonwealth of Virginia, a number of agreements addressing project-level air quality (hot-spot) analyses directly or indirectly have been established between FHWA and VDOT. Summaries of these agreements are provided below.

An overview of federal guidance for MSATs analyses is also provided below.

¹³ The NAAQS for carbon monoxide was the subject of a final rule issued by the US EPA in the Federal Register on August 31, 2011 (effective October 31, 2011). The final rule includes the following summary on page 54294: “*SUMMARY: This rule is being issued at this time as required by a court order governing the schedule for completion of this review of the air quality criteria and the national ambient air quality standards (NAAQS) for carbon monoxide (CO). Based on its review, the EPA concludes the current primary standards are requisite to protect public health with an adequate margin of safety, and is retaining those standards. After review of the air quality criteria, EPA further concludes that no secondary standard should be set for CO at this time. EPA is also making changes to the ambient air monitoring requirements for CO, including those related to network design, and is updating, without substantive change, aspects of the Federal reference method. DATES: This final rule is effective on October 31, 2011.*” See 76 FR 54294: <http://www.gpo.gov/fdsys/pkg/FR-2011-08-31/html/2011-21359.htm>. With regard to the project-level analysis for CO presented later in this report, the final rule from EPA did not change the NAAQS for CO. For reference, while the NAAQS table from EPA presented in the Exhibit on the following page was updated following the issuance of the final rule by EPA, the EPA table does not as yet make reference to the final rule. More background on regulatory actions by EPA with respect to CO may be obtained from the following website: <http://www.epa.gov/airquality/carbonmonoxide/actions.html>.

¹⁴ <http://www.fhwa.dot.gov/environment/index.htm>.

¹⁵ <http://trbairquality.org/>

¹⁶ See the [CEQ NEPA net web site](#) as well as the [CEQ Section of the Code of Federal Regulations](#).

Exhibit 3-1: National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
<u>Carbon Monoxide</u>	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾		
<u>Lead</u>	0.15 µg/m ³ ⁽²⁾	Rolling 3-Month Average	Same as Primary	
<u>Nitrogen Dioxide</u>	53 ppb ⁽³⁾	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour ⁽⁴⁾	None	
<u>Particulate Matter (PM₁₀)</u>	150 µg/m ³	24-hour ⁽⁵⁾	Same as Primary	
<u>Particulate Matter (PM_{2.5})</u>	15.0 µg/m ³	Annual ⁽⁶⁾ (Arithmetic Average)	Same as Primary	
	35 µg/m ³	24-hour ⁽⁷⁾	Same as Primary	
<u>Ozone</u>	0.075 ppm (2008 std)	8-hour ⁽⁸⁾	Same as Primary	
	0.08 ppm (1997 std)	8-hour ⁽⁹⁾	Same as Primary	
	0.12 ppm	1-hour ⁽¹⁰⁾	Same as Primary	
<u>Sulfur Dioxide</u>	0.03 ppm ⁽¹¹⁾ (1971 std)	Annual (Arithmetic Average)	0.5 ppm	3-hour ⁽¹⁾
	0.14 ppm ⁽¹¹⁾ (1971 std)	24-hour ⁽¹⁾		
	75 ppb ⁽¹²⁾	1-hour	None	

- ⁽¹⁾ Not to be exceeded more than once per year.
- ⁽²⁾ Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
- ⁽³⁾ The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
- ⁽⁴⁾ To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).
- ⁽⁵⁾ Not to be exceeded more than once per year on average over 3 years.
- ⁽⁶⁾ To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.
- ⁽⁷⁾ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).
- ⁽⁸⁾ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
- ⁽⁹⁾ (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
 (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
- ^(c) EPA is in the process of reconsidering these standards (set in March 2008).
- ⁽¹⁰⁾ (a) EPA revoked the [1-hour ozone standard](#) in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
 (b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.
- ⁽¹¹⁾ The 1971 sulfur dioxide standards remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
- ⁽¹²⁾ Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Source: US EPA web page at <http://www.epa.gov/air/criteria.html>, accessed September 2, 2011.

3.1.1 FHWA-VDOT Agreements

FHWA and VDOT have executed several agreements relating to requirements for project-level air quality (hot-spot) analyses for projects located within the Commonwealth of Virginia. Key elements of the Agreements are summarized below.

3.1.1.1 Project-Level Carbon Monoxide Air Quality Studies Agreement

On February 27, 2009, FHWA and VDOT executed a “*Project-Level Carbon Monoxide Air Quality Studies Agreement*” (2009 Air Agreement)¹⁷. The terms in the 2009 Air Agreement were based on an extensive review and worst-case analyses presented in a separate Technical Support Document¹⁸. The 2009 Air Agreement incorporates new technical criteria and thresholds (based on the worst-case modeling results) and represents a major update to agreements executed in 2004¹⁹ and 2000²⁰.

In brief, the 2009 Air Agreement requires hot-spot (modeling) analyses to be conducted for carbon monoxide (CO) for all projects planned for construction within the Commonwealth of Virginia for which an Environmental Impact Statement (EIS) is being prepared or, if an EIS is not being prepared for the project, if certain criteria listed in the Agreement are not met. If an EIS is not being prepared for the project and the specified criteria are met, then a hot-spot analysis for CO is not required. The 2009 Air Agreement effectively focuses limited resources for project-specific hot-spot analyses on the largest projects and those with the greatest potential impacts to local air quality.

Under the 2009 Air Agreement, smaller projects or ones with less potential impact do not require individual project-specific hot-spot analyses, as their potential impact was assessed categorically in the worst-case modeling documented in the TSD referenced above. This categorical approach is consistent in concept with provisions for categorical determinations for hot-spot analyses in the federal transportation conformity rule²¹.

The 2009 Air Agreement includes both general and technical criteria. Projects meeting the following general criteria do not require a project-specific air quality study or modeling analysis for CO:

1. *Any project that is exempt from the requirement to determine conformity under the federal transportation conformity rule,*
2. *Any project that qualifies for a Programmatic Categorical Exclusion (PCE) according to the PCE Agreement in effect between the FHWA and VDOT (see the section below for more on the PCE Agreement), or*
3. *Projects that do not change (add, remove or relocate) roadway capacity or transit services...*

¹⁷ FHWA-VDOT, “*Project-Level Carbon Monoxide Air Quality Studies Agreement*”, letter agreement executed February 27, 2009.

¹⁸ C.Voigt, “*FHWA-VDOT Agreement On Project-Level Carbon Monoxide Air Quality Studies - Technical Support Document*”, VDOT Environmental Division, February 2009

¹⁹ FHWA-VDOT, “*Project Level Air Quality Studies Agreement*”, letter dated August 4, 2004 from FHWA to VDOT.

²⁰ FHWA-VDOT, “*VDOT request to raise the ADT threshold at which quantitative project-level carbon monoxide analyses are conducted*”, letter dated August 7, 2000

²¹ [See 40 CFR 93.123\(a\)\(3\) for CO, and 40 CFR 93.123\(b\)\(3\) for particulate.](#)

Under the 2009 Air Agreement, projects meeting the following technical criteria do not require a project-specific air quality study or modeling analysis for CO:

Any project affecting capacity for roadways with intersections and/or freeway interchanges for which the build scenario design year intersection/freeway interchange [Level of Service] LOS is E or better (or reasonable proxy thereof) and the corresponding ADT does not exceed the following levels for the roadway being improved as part of the project or any intersecting roadway within the project area:

- (i) 59,000, for intersections and freeway interchanges for which the minimum skew angle (defined here as the smallest angle modeled between intersecting roadways in a reasonable representation of the intersection or interchange selected for air quality analysis following applicable state and federal guidance) is 60 degrees or more,*
- (ii) 49,000, for skew angles from 45 degrees up to (but not including) 60 degrees, or*
- (iii) 39,000, for skew angles from 30 degrees up to (but not including) 45 degrees.*

For projects with an intersection skew angle of less than 30 degrees (and not exempt or otherwise excluded from requirements for project-level analyses), a project-level analysis may need to be conducted.

3.1.1.2 Procedures for Updating Air Studies When New Planning Assumptions Become Available

On October 28, 2004, FHWA and VDOT executed a letter agreement defining “*Procedures for Updating Air Studies When New Planning Assumptions Become Available*” (2004 Update Procedures)²². The 2004 Update Procedures provide guidance on when new or updated air quality studies are needed. Although the focus at the time the letter agreement was executed was on carbon monoxide, the procedures were written generally and therefore may be applied more broadly.

Under the 2004 Update Procedures, updates for air quality analyses may be required for projects for which a re-evaluation of the overall environmental document is being initiated to meet NEPA requirements and/or for projects for which changes may be needed for key modeling inputs for the air studies (such as design year and associated traffic forecasts). As noted in the agreement, decisions on the former (NEPA re-evaluations) would be made by FHWA in consultation with VDOT and on the latter (when re-evaluations are not being prepared) by VDOT air quality staff.

3.1.1.3 No-Build Analysis Agreement for Air and Noise Studies

On May 22, 2009, FHWA and VDOT executed a “*No-Build Analysis Agreement for Air and Noise Studies*” (2009 No-Build Agreement)²³. With regard to air quality, the 2009 No-Build Agreement only addresses CO. It requires:

...for transportation projects within the Commonwealth of Virginia that require a carbon monoxide (CO) air study under the current Project-Level CO Air Quality Studies Agreement in

²² FHWA, “*Procedures for Updating Air Studies When New Planning Assumptions Become Available*”, letter dated October 28, 2004 from FHWA to VDOT.

²³ FHWA-VDOT, “*No-Build Analysis Agreement for Air and Noise Studies*”, letter agreement dated May 22, 2009.

effect between VDOT and FHWA, the following will govern the need for analysis of the interim and design year no-build alternatives in CO air studies:

A. Any project that qualifies for a Categorical Exclusion (CE) will be exempt from analysis of the no-build alternatives, although VDOT may choose to analyze the no-build alternatives if they determine it appropriate;

B. Any project that qualifies for an Environmental Assessment (EA) will generally be exempt from analysis of the no-build alternatives, although VDOT may choose to analyze the no-build alternatives if they determine it appropriate;

C. Any project that qualifies for an Environmental Impact Statement (EIS) will require analysis of the no-build alternative;

D. Notwithstanding (A), (B), and (C) above, transportation conformity requirements may apply to transportation projects that lie within a CO nonattainment/maintenance area, no-build scenarios for CO be assessed for projects located in CO nonattainment or maintenance area (where the federal transportation conformity rule would require such analyses) and also for all projects for which an EIS is being prepared. Otherwise, no-build analyses for CO are not required but may be conducted at the discretion of VDOT.

3.1.1.4 Programmatic Categorical Exclusion Agreement

On September 17, 2010, FHWA and VDOT executed an update to the existing “*Programmatic Categorical Exclusion Agreement*” (PCE Agreement)²⁴. FHWA and VDOT have had a PCE Agreement in-place since 1983 and have updated it on several occasions²⁵. From the preface to the 2010 PCE Agreement:

“[FHWA and VDOT] ... have developed this Programmatic Agreement to outline the policy and procedures for approving Categorical Exclusion (CE) classifications for Federal-aid actions in accordance with the National Environmental Policy Act. These procedures comply with FHWA's implementing regulations for NEPA found at 23 CFR 771.

FHWA concurs in advance, on a "programmatic" basis with VDOT's recommendation that those categories of projects listed on Attachment "A," and which satisfy the conditions and criteria in Attachment "B," will not result in significant impacts on the human and natural environment, and are therefore categorically excluded from the requirement to prepare a documented Categorical Exclusion, an Environmental Assessment (EA), or Environmental Impact Statement (EIS). FHWA further concurs with VDOT's recommendation that based on past experience with similar actions, FHWA will not require project specific documentation for the actions listed on Attachment "C." The actions on Attachment "c" meet the criteria for CE's in CEQ regulation and Section 771.117 (a) of FHWA's implementing regulations and normally don't require any further NEPA approvals.”

The 2010 PCE Agreement includes the following definitions:

²⁴ FHWA-VDOT, “*Programmatic Categorical Exclusion Agreement*”, executed September 17, 2010.

²⁵ As noted in the letter accompanying the updated agreement: “*The Programmatic Categorical Exclusion Agreement between the Federal Highway Administration (FHWA) and the Virginia Department of Transportation (VDOT) was first executed October 18, 1983. Since that time, the Agreement has been revised and updated as streamlining opportunities presented themselves (April 6, 1988; August 28, 1991; May 20, 1998; June 23, 2000; November 1, 2003; and December 29, 2004).*”

Blanket Categorical Exclusion (BCE): An action listed on Attachment "C" that FHWA has determined requires no further NEPA approval and will not require any documentation for the action.

Programmatic Categorical Exclusions (PCE): An action listed on Attachment "A" that meets the conditions and criteria in Attachment "B" and based on past experience, does not involve significant environmental impacts and is documented by VDOT under this Agreement utilizing the PCE form.

Categorical Exclusion (CE): An action that does not individually or cumulatively have significant environmental impacts. Categorical Exclusions are reviewed by VDOT and approved by FHWA.

The project types listed in Attachments A (“PCE Project Categories”) and C (“BCE’s Project Categories That Require No Documentation”) are consistent with and expand upon those listed in 23 CFR 771.117(c) and/or would be considered exempt under the federal transportation conformity rule. However, if the proposed project involves significant air quality impacts, then, with regard to PCEs, the condition stated in Attachment B (“PCE Documentation Qualifying Conditions and Criteria”) to that agreement would apply:

“VDOT proposed actions in Appendix "A" may be classified as PCE’s [sic] if all of the conditions listed below are true; otherwise, proposed actions must have individual approval of their CE determination by FHWA. ...

6. The proposed action does not involve significant air, noise, or water quality impacts.”

As noted above for the 2009 *Project-Level Carbon Monoxide Air Quality Studies Agreement*, projects that qualify for a PCE do not require a hot-spot analysis for CO. Under the 2010 PCE Agreement, a PCE is only selected if the project meets the criteria in that agreement and otherwise is not expected to have significant air quality impacts. The latter condition regarding potential air quality impacts is generally assessed for each project by air quality staff following standard criteria and procedures for each pollutant or pollutant class to meet NEPA and conformity requirements.

3.1.2 NEPA Requirements for Mobile Source Air Toxic (MSATs) Analyses

On February 3, 2006, FHWA and EPA issued joint guidance²⁶ for the assessment of MSATs in the NEPA process for highways. The guidance includes specific criteria for determining which projects are to be considered exempt from MSAT analysis requirements, which may require a qualitative analysis, and which should undergo a quantitative assessment. The priority MSATs identified in the guidance were benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene. The priority list was noted in the guidance as subject to change.

²⁶ EPA and FHWA, “*Interim Guidance on Air Toxic Analysis in NEPA Documents*”, dated 2/3/06.

On September 30, 2009, FHWA updated the 2006 guidance²⁷. The 2009 update superseded the previous guidance, addressing “...recent regulatory changes; ... stakeholder requests to broaden the horizon years of emission trends performed with MOBILE6.2; and ... the status of scientific research on air toxics.”²⁸ The 2009 guidance updated the list for priority MSATs to the following seven: “acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter.”²⁹

The reference text provided in the federal guidance for qualitative analyses was updated as appropriate to reflect the changes. The requirements for quantitative analyses as specified in the guidance were not changed.

3.1.2.1 Selection of Level of Analysis for MSATs

The FHWA 2/3/2006 Interim Guidance established and the 9/20/2009 Update re-affirmed a three-tiered approach to determine the level of analysis needed for MSATs in a project-level study. Descriptions for each of the tiers are provided below, using text from the guidance (*italicized*).

(1) Projects with No Meaningful Potential MSAT Effects or Exempt Projects.

The types of projects included in this category are:

- *Projects qualifying as a categorical exclusion under 23 CFR 771.117(c);*
- *Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or*
- *Other projects with no meaningful impacts on traffic volumes or vehicle mix.*

For projects that are categorically excluded under 23 CFR 771.117(c), or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is required.¹ However, the project record should document the basis for the determination of “no meaningful potential impacts” with a brief description of the factors considered. ...

(2) Projects with Low Potential MSAT Effects

The types of projects included in this category are those that serve to improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

We anticipate that most highway projects that need an MSAT assessment will fall into this category. Any projects not meeting the criteria in subsection (1) or subsection (3) as follows

²⁷ FHWA, “*INFORMATION: Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*”, September 30, 2009. See: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/100109quidmem.cfm

²⁸ *Ibid*, p.1

²⁹ *Ibid*, p.1

should be included in this category. Examples of these types of projects are minor widening projects; new interchanges, such as those that replace a signalized intersection on a surface street; or projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects are low, we expect there would be no appreciable difference in overall MSAT emissions among the various alternatives. In addition, quantitative analysis of these types of projects will not yield credible results that are useful to project-level decision-making due to the limited capabilities of the transportation and emissions forecasting tools. ...

(3) Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. We expect a limited number of projects to meet this two-pronged test. To fall into this category, a project must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year;

And also

- Proposed to be located in proximity to populated areas.

Projects falling within this category should be more rigorously assessed for impacts....

3.3 Transportation Conformity

While both federal and state regulations for transportation conformity apply, the latter generally focuses on consultation requirements (rather than technical) and is therefore only briefly addressed at the end of this section. This section focuses on the technical requirements of the federal transportation conformity rule.

The federal transportation conformity rule (40 CFR Parts 51 and 93) was issued by the EPA pursuant to requirements in the Clean Air Act (CAA) as amended³⁰. As indicated in Section 176(c) of the CAA, conformity means:

³⁰ See <http://www.epa.gov/air/caa/>.

(A) conformity to an [air quality] implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and
(B) that such activities will not – (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violation of any standard in any area; or (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area. ...

Section 176(c)(4)(B) of the CAA requires regulatory action in the form of criteria and procedures for conformity to be promulgated by EPA in concurrence with the US DOT:

176(c)(4)(B) Transportation plans, programs, and projects. – The Administrator, with the concurrence of the Secretary of Transportation, shall promulgate, and periodically update, criteria and procedures for demonstrating and assuring conformity in the case of transportation plans, programs, and projects.

Detailed regulations and guidance for transportation conformity are provided on the US Environmental Protection Agency (US EPA) website³¹. In general, the federal transportation conformity rule requires conformity determinations for transportation plans, programs and projects in “non-attainment or maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan” (40 CFR 93.102(b)).

Areas that fail to meet the NAAQS may be designated by EPA as nonattainment areas. Areas that have failed to meet the standards in the past but have since re-attained them may be designated as attainment (maintenance) areas, which are commonly referred to as maintenance areas. Maintenance areas must meet federal CAA requirements for a significant time period after attainment is reached, after which the maintenance designation may be removed. Federal conformity requirements would then no longer apply for that area for the pollutant(s) involved.

Transportation-related criteria pollutants are those specified in the transportation conformity rule (40 CFR 93.102(b)), namely ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), and particulate matter less than 10 and 2.5 microns in diameter (PM₁₀ and PM_{2.5}, respectively)³². Precursors to these pollutants are also specified.

Generally, regional conformity analysis requirements apply for regional transportation plans and programs. Project-level “hot-spot” analysis requirements apply for transportation projects.

3.3.1 Regional Conformity Requirements Relating to Projects

The federal transportation conformity rule requires a currently conforming transportation plan and program at the time of project approval (40 CFR 93.114)³³ and for the project to be from a conforming plan and program (40 CFR 93.115)³⁴. If the project is of a type or one that is not required to be specifically identified in the plan, the project must be consistent with the policies

31 See <http://www.epa.gov/otaq/stateresources/transconf/index.htm>

32 See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.102.htm

33 See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.114.htm

34 See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.115.htm

and purpose of the transportation plan and not interfere with other projects specifically included in the transportation plan (40 CFR 93.115(b)).

Additionally, the design concept and scope of the project as specified in the program at the time of the regional conformity determination should be adequate to determine its contribution to regional emissions, and any mitigation measures associated with the project should have written commitments from the project sponsor and/or operator (40 CFR 93.1115(c)).

By their nature, regional conformity analyses, and by extension the associated air quality state implementation plans for nonattainment and maintenance areas that establish the motor vehicle emission budgets applied in the regional conformity analyses, provide an indication of the potential indirect effects and cumulative impacts for regional transportation systems that are not otherwise addressed in analyses of direct emissions for individual projects.

3.3.2 Project-Level Conformity Requirements

3.3.2.1 Applicability

In general, conformity determinations and supporting project-level (hot-spot) air quality conformity analyses are required for CO, PM₁₀ and PM_{2.5} for FHWA and Federal Transit Administration (FTA) projects located in air quality non-attainment and/or maintenance areas. The federal conformity rule addresses these requirements in several locations. First, under “Applicability” (40 CFR 93.102)³⁵:

“(a) Action applicability

(1)...conformity determinations are required for... (iii) The approval, funding, or implementation of FHWA/FTA projects.

(2) Conformity determinations are not required under this subpart for individual projects which are not FHWA/FTA projects...

(b) Geographic applicability.

The provisions of this subpart shall apply in all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan...”

FHWA and FTA projects are generally ones for which federal funding or approvals are required (40 CFR 93.101)³⁶. Applicability for pollutants is addressed with specific requirements for “hot-spots” later in the conformity rule, at 40 CFR 93.116³⁷:

“...Criteria and procedures: Localized CO, PM10, and PM2.5 violations (hot-spots).

(a) ...The FHWA/FTA project must not cause or contribute to any new localized CO, PM10, and/or PM2.5 violations, increase the frequency or severity of any existing CO, PM10, and/or PM2.5 violations, or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in CO, PM10, and PM2.5 nonattainment and maintenance areas...”

³⁵ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.102.htm

³⁶ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.101.htm

³⁷ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.116.htm

3.3.2.2 Models

Requirements for the preparation of hot-spot analyses for both CO and particulate are specified in 40 CFR 93.123³⁸. Specific requirements apply for models, as follows³⁹:

"... (a) CO hot-spot analysis.

(1) The demonstrations ... must be based on quantitative analysis using the applicable air quality models, data bases, and other requirements specified in 40 CFR part 51, Appendix W (Guideline on Air Quality Models) ...

(b) PM10 and PM2.5 hot-spot analyses...

(2) Where quantitative analysis methods are not available, the demonstration ... must be based on a qualitative consideration of local factors...

(4) The requirements for quantitative analysis ... will not take effect until EPA releases modeling guidance on this subject and announces in the Federal Register that these requirements are in effect..."

On December 20, 2010, EPA official released via federal register notice updated models and guidance for project-level analyses for both CO and PM⁴⁰. Following a two-year grace period, the new MOVES model will be required for emission modeling for project-level analyses for both CO and PM. While the existing CAL3QHC model may continue to be applied for CO⁴¹, the dispersion models AERMOD and CAL3QHCR will be required for modeling for PM. The two-year grace period was provided in the federal register notice as follows:

"...EPA is approving the latest version of the MOVES model (MOVES2010a) for official use for quantitative CO, PM2.5, and PM10 hot-spot analyses outside of California. This notice also

³⁸ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.123.htm

³⁹ The referenced "Appendix W (Guideline on Air Quality Models" is available at: http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

⁴⁰ US EPA, "Official Release of the MOVES2010a and EMFAC2007 Motor Vehicle Emissions Models for Transportation Conformity Hot-Spot Analyses and Availability of Modeling Guidance", 75 FR 79370-79374, December 20, 2010. Federal Register notice: <http://edocket.access.gpo.gov/2010/2010-31909.htm>

Associated Guidance:

- US EPA, "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas", EPA-420-B-10-040, December 2010. See: <http://www.epa.gov/otag/stateresources/transconf/policy/420b10040.pdf>
- US EPA, "Using MOVES in Project-Level Carbon Monoxide Analyses", EPA-420-B-10-041, December 2010. See: <http://www.epa.gov/otag/stateresources/transconf/policy/420b10041.pdf>

⁴¹ The new guidance for PM did not change existing requirements for CO for the use of CAL3QHC for screening analyses. The new guidance for quantitative hot-spot analyses for PM (EPA-420-B-10-040) indicates on page 80 that "...the CAL3QHC model ... is the model recommended for use in analyzing CO impacts from intersections". The new guidance for using MOVES in project-level analyses for CO (EPA-420-B-10-041) provides additional detail, indicating on page 1 that "...EPA's regulatory recommendations for CO air quality modeling can be found in Appendix W to 40 CFR Part 51. Users should continue to consult the "1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections" (1992 Guideline) for screening analyses of intersection projects for all issues not related to the calculation of vehicle emission rates (including intersection scope and selection, receptor site selection, and air quality modeling procedures)..." it further indicates on page 7 that "...According to EPA's regulatory recommendations for air quality modeling (Section 5.2.3 of Appendix W to 40 CFR Part 51), CO screening analyses of intersection projects should use the CAL3QHC dispersion model..." The footnote to that statement clarifies the guidance for screening versus refined analyses as follows: "The 1992 Guideline describes how to use CAL3QHC when performing dispersion modeling for intersections (see 1992 Guideline, page 1-5). To be consistent with the 1992 Guideline, this guidance recommends use of the CAL3QHC queuing algorithm for intersection idle queues when completing a CO screening analysis of an intersection. This differs from the recommendation for refined analyses, where idling should be explicitly included in the link activity entered into MOVES, rather than determined by the CAL3QHC queuing algorithm. Since the purpose of a screening analysis is inherently different from that of a refined analysis, the separate methods still serve the respective goals of each approach."

announces a two-year grace period before the MOVES2010a emissions model is required to be used in quantitative CO and PM hot-spot analyses for project-level conformity determinations outside California...

The Federal Register notice indicated a number of factors influenced the decision on the grace period⁴²:

"...In deciding the length of the MOVES2010a conformity grace period, EPA consulted with DOT and considered the degree of change in the model and the scope of re-planning likely to be necessary for project development, pursuant to 40 CFR 93.111(b). EPA understands that numerous areas will be required to conduct quantitative hot-spot analyses using MOVES, and sufficient time must be allowed for State and local agencies to obtain the necessary training and otherwise prepare to use MOVES for these analyses..."

Projects initiated within the grace period may continue to use existing models and guidance. For particulate, this effectively means that the federal conformity rule requirements for hot-spot analyses for particulate may still be met by qualitative analyses only. Qualitative analyses for particulate would be conducted for projects determined to be of air quality concern, namely, one of the types listed under 40 CFR 93.123(b)(1).

3.3.2.3 Background Concentrations

Requirements of the federal conformity rule relating to background concentrations are specified in 40 CFR 93.113(c)⁴³:

"...(c) General requirements. (1) Estimated pollutant concentrations must be based on the total emissions burden which may result from the implementation of the project, summed together with future background concentrations. The total concentration must be estimated and analyzed at appropriate receptor locations in the area substantially affected by the project.

(2) Hot-spot analyses must include the entire project, and may be performed only after the major design features which will significantly impact concentrations have been identified. The future background concentration should be estimated by multiplying current background by the ratio of future to current traffic and the ratio of future to current emission factors..."

3.3.2.4 Projects of Air Quality Concern for Particulate

For particulate, the federal conformity requirements for hot-spot analyses are limited to the following types of projects (40 CFR 93.123(b)(1))⁴⁴:

"...(1) The hot-spot demonstration required by §93.116 must be based on quantitative analysis methods for the following types of projects:

- (i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;*
- (ii) Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because*

⁴² The referenced section, 40 CFR 93.111(b), is available at: http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.111.htm

⁴³ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.123.htm

⁴⁴ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.123.htm

- of increased traffic volumes from a significant number of diesel vehicles related to the project;*
- (iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;*
 - (iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and*
 - (v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM10 or PM2.5 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation..."*

In March 2006, FHWA and EPA issued a final rule⁴⁵ and associated guidance⁴⁶ for the conduct of qualitative hot-spot analyses for particulate. The preamble to the final rule included examples of projects that would be and would not be of air quality concern, which were summarized in Appendix A of the guidance, respectively, as follows⁴⁷:

Examples of projects of air quality concern:

"Note: EPA noted in the March 2006 final rule that the examples below are considered to be the most likely projects that would be covered by 40 CFR 93.123(b)(1) and require a PM2.5 or PM10 hot-spot analysis (71 FR 12491).

Some examples of projects of air quality concern that would be covered by 40 CFR 93.123(b)(1)(i) and (ii) are:

- A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT) and 8% or more of such AADT is diesel truck traffic;*
- New exit ramps and other highway facility improvements to connect a highway or expressway to a major freight, bus, or intermodal terminal;*
- Expansion of an existing highway or other facility that affects a congested intersection (operated at Level-of-Service D, E, or F) that has a significant increase in the number of diesel trucks; and,*
- Similar highway projects that involve a significant increase in the number of diesel transit busses and/or diesel trucks.*

Some examples of projects of air quality concern that would be covered by 40 CFR 93.123(b)(1)(iii) and (iv) are:

- A major new bus or intermodal terminal that is considered to be a "regionally significant project" under 40 CFR 93.101; and,*
- An existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses increases by 50% or more, as measured by bus arrivals."*

⁴⁵ US EPA, 71 FR 12468 (40 CFR Part 93, EPA-HQ-OAR-2003-0049, FRL-8039-5), "PM2.5 and PM10 Hot-Spot Analyses in Project-Level Transportation Conformity Determinations for the New PM2.5 and Existing PM10 National Ambient Air Quality Standards; Final Rule", March 10, 2006. See: <http://www.epa.gov/otaq/stateresources/transconf/conf-regs-PMhotspot.htm>

⁴⁶ US EPA Office of Transportation and Air Quality and FHWA Office of Natural and Human Environment, "Transportation Conformity Guidance for Qualitative Hot-spot Analysis in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas", March 2006, EPA420-B-06-902. See: <http://www.epa.gov/otaq/stateresources/transconf/conf-regs-PMhotspot.htm>

⁴⁷ As noted previously, EPA issued updated models and guidance for project-level analyses for both CO and PM on December 20, 2010. The federal register notice indicated that a two-year grace period would apply for application of the new models and guidance. The updated guidance in any case includes in its Appendix B the same examples for projects of air quality concern and those not of air quality concern as presented in the existing 2006 guidance.

Examples of projects that are not of air quality concern:

“Note: The March 2006 final rule also provided examples of projects that would not be covered by 40 CFR 93.123(b)(1) and would not require a PM2.5 or PM10 hot-spot analysis (71 FR 12491). However, as noted elsewhere in this guidance, PM10 nonattainment and maintenance areas with approved conformity SIPs that include PM10 hot-spot provisions from previous rulemakings must continue to follow those approved conformity SIP provisions until the SIP is revised.

The following are examples of projects that are not an air quality concern under 40 CFR 93.123(b)(1)(i) and (ii):

- *Any new or expanded highway project that primarily services gasoline vehicle traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at Level-of-Service D, E, or F;*
- *An intersection channelization project or interchange configuration project that involves either turn lanes or slots, or lanes or movements that are physically separated. These kinds of projects improve freeway operations by smoothing traffic flow and vehicle speeds by improving weave and merge operations, which would not be expected to create or worsen PM2.5 or PM10 violations; and,*
- *Intersection channelization projects, traffic circles or roundabouts, intersection signalization projects at individual intersections, and interchange reconfiguration projects that are designed to improve traffic flow and vehicle speeds, and do not involve any increases in idling. Thus, they would be expected to have a neutral or positive influence on PM2.5 or PM10 emissions.*

Examples of projects that are not an air quality concern under 40 CFR 93.123(b)(1)(iii) and (iv) would be:

- *A new or expanded bus terminal that is serviced by non-diesel vehicles (e.g., compressed natural gas) or hybrid-electric vehicles; and,*
- *A 50% increase in daily arrivals at a small terminal (e.g., a facility with 10 buses in the peak hour)...”*

3.3.2.5 Mitigation and Control Measures

Requirements for project-level mitigation and control measures are addressed in several locations in the federal conformity rule.

- Requirements for transportation control measures are specified in 40 CFR 93.113 as follows⁴⁸:

“... (a) The transportation plan, TIP, or any FHWA/FTA project which is not from a conforming plan and TIP must provide for the timely implementation of TCMs from the applicable implementation plan....

(d) For FHWA/FTA projects which are not from a conforming transportation plan and TIP, this criterion is satisfied if the project does not interfere with the implementation of any TCM in the applicable implementation plan....”

⁴⁸ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.113.htm

- Requirements for control measures for particulate for projects in nonattainment and/or maintenance areas for particulate are specified in 40 CFR 93.117, as follows⁴⁹:
“...The FHWA/FTA project must comply with any PM10 and PM2.5 control measures in the applicable implementation plan. This criterion is satisfied if the project-level conformity determination contains a written commitment from the project sponsor to include in the final plans, specifications, and estimates for the project those control measures (for the purpose of limiting PM10 and PM2.5 emissions from the construction activities and/or normal use and operation associated with the project) that are contained in the applicable implementation plan.”
- Requirements mitigation and control measures for CO and particulate are specified in 40 CFR 93.123 as follows⁵⁰:
*“...(4) CO, PM10, or PM2.5 mitigation or control measures shall be assumed in the hot-spot analysis only where there are written commitments from the project sponsor and/or operator to implement such measures, as required by §93.125(a).
(5) CO, PM10, and PM2.5 hot-spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established “Guideline” methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site...”*
- Requirements for written commitments for project-level mitigation and control measures for CO and/or particulate that may stem from NEPA or conformity are specified in 40 CFR 93.125⁵¹:
“... written commitments to implement in the construction of the project and operation of the resulting facility or service any project-level mitigation or control measures which are identified as conditions for NEPA process completion with respect to local CO, PM10, or PM2.5 impacts. Before a conformity determination is made, written commitments must also be obtained for project-level mitigation or control measures which are conditions for making conformity determinations for a transportation plan or TIP and are included in the project design concept and scope which is used in the regional emissions analysis ... or used in the project-level hot-spot analysis...”

3.3.3 Conformity SIP

The federal transportation conformity rule at Part 51 Subpart T §51.390 requires the establishment of a state conformity regulation to reflect the federal rule with state requirements. The state regulation is commonly referred to as the conformity SIP and is intended to primarily address consultation for conformity purposes. The requisite state conformity regulation for Virginia is specified at 9 VAC 5-151 (*Regulation for Transportation Conformity*)⁵².

⁴⁹ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.117.htm

⁵⁰ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.123.htm

⁵¹ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.125.htm

⁵² The state regulation was made effective January 19, 2010 through a direct final rule issued in the Federal Register by EPA on November 20, 2009 (74 FR 60194). Updates may be tracked through the Virginia Regulatory Town Hall website. See:

US EPA, “Approval and Promulgation of Air Quality Implementation Plans; Virginia; Transportation Conformity Regulations”, November 19, 2009 (74 FR 60194): <http://edocket.access.gpo.gov/2009/E9-27814.htm>

Regulation for Transportation Conformity (9 VAC 5-151): <http://leg1.state.va.us/000/reg/TOC09005.HTM#C0151>

Virginia Regulatory Town Hall (for updates in process): <http://www.townhall.virginia.gov/L/Viewchapter.cfm?chapterid=2459>

The state regulation does not directly provide new or updated technical guidance, or otherwise modify technical requirements for the conduct of project-level analyses. However, additional technical requirements may in time be generated locally in the course of interagency consultation conducted pursuant to the state regulation and would accordingly be noted in this section.

4. Project Assessment

This section presents the state and regional context for the project followed by assessments for each pollutant as appropriate of the potential air quality impacts for the proposed project against all applicable NEPA and transportation conformity requirements.

4.1 State and Regional Context

For context, this section presents the current regional air quality status, State Implementation Plan (SIP) status and project-related requirements (if any) for the region in which the project is located.

4.1.1 Attainment and State Implementation Plan (SIP) Status for the Project Area

At the time of preparation of this report, the area in which this project is located is in nonattainment for the NAAQS for ozone and fine particulate matter (PM_{2.5}), and in attainment of all of the other NAAQS including CO. Current nonattainment area designations may be obtained from EPA⁵³.

In keeping with the requirements of the CAA, a regional air quality state implementation plan (SIP) has been developed for the region to meet all applicable federal requirements and guidance. Separate revisions to the SIP have been completed as appropriate for each NAAQS for which the region is in nonattainment or maintenance. The SIP covers the District of Columbia as well as the contiguous portions of the State of Maryland and the Commonwealth of Virginia that are included in the broad regional area designated nonattainment by EPA.

The development of the SIP and related technical analyses for this multijurisdictional nonattainment area is led by the Metropolitan Washington Air Quality Committee (MWAQC), with technical support provided by Metropolitan Washington Council of Governments (MWCOG) staff. Each state and the District submit separate SIP revisions as appropriate once the regional plan developed via the MWAQC is approved for submission to EPA via the Interstate Air Quality Council (IAQC).

Copies of the SIP documentation for ozone and particulate matter are available from the MWCOG website⁵⁴, the VDEQ website (for the Virginia portion only)⁵⁵ and EPA⁵⁶. Links to

⁵³ See the US EPA Green Book: <http://www.epa.gov/air/oaqps/greenbk/>

⁵⁴ See the MWCOG Air Quality SIP website: <http://www.mwcoq.org/environment/air/SIP/default.asp>

⁵⁵ See the VDEQ Air Quality SIP website: <http://www.deq.virginia.gov/air/planning/sips.html>

the current regional transportation plan and program and associated conformity analyses are provided on the MWCOG transportation website⁵⁷.

4.1.2 Regional Conformity

Since the project is located in an area designated nonattainment for one or more of the NAAQS, federal transportation conformity requirements apply. The federal conformity rule (specifically 40 CFR 93.114⁵⁸ and 40 CFR 93.115⁵⁹) requires that there be a currently conforming transportation plan and program at the time of project approval and that the project come from a conforming plan and program (or otherwise meet the criteria specified in 40 CFR 93.109(b))⁶⁰.

As of the date of preparation of this analysis, the project is included in the currently conforming 2010 Constrained Long Range Transportation Plan (CLRP) and FY 2011-2016 Transportation improvement Program (TIP)^{61,62}. The CLRP and TIP are developed by the National Capital Region Transportation Planning Board (TPB), which is the federally designated Metropolitan Planning Organization (MPO) for the region and whose members include VDOT⁶³.

4.1.3 State Environmental Review Process (SERP)

Comments provided by the Virginia Department of Environmental Quality (DEQ) in relation to the State Environmental Review Process (SERP) for projects located in Prince William County, Virginia⁶⁴ are as follows:

This project is located within a Moderate Ozone Nonattainment area, a Fine Particulate Matter (PM2.5) Nonattainment area, and a volatile organic compounds (VOC) and oxides of nitrogen (NOx) Emissions Control Area. As such, all reasonable precautions should be taken to limit the emissions of VOC, NOx, and particulate matter. In addition, the following DEQ air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-[130], Open Burning restrictions; 9 VAC 5-40-5490 et seq., Cutback Asphalt restrictions; and 9 VAC 5-50-60 et seq., Fugitive Dust precautions.

4.1.4 State and Regional Requirements for Mitigation Measures

VDOT policy is that all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*⁶⁵. Additionally, as noted with the comments received in the SERP

⁵⁶ See the US EPA website for Mid-Atlantic SIPs: <http://yosemite.epa.gov/r3/r3sips.nsf/MidAtlanticSIPs?openform> and the associated index: <http://yosemite.epa.gov/r3/r3sips.nsf/SIPIndex!OpenForm>

⁵⁷ See the MWCOG Transportation web site: <http://www.mwco.org/transportation/>

⁵⁸ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.114.htm

⁵⁹ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.115.htm

⁶⁰ See http://edocket.access.gpo.gov/cfr_2009/julqtr/40cfr93.109.htm

⁶¹ The conformity analysis and finding of conformity were approved by the US DOT in a letter dated September 27, 2011 to the NCR TPB.

⁶² The project status in the currently conforming CLRP and TIP was confirmed in email dated September 22 and 30, 2011 from VDOT Northern Virginia District staff.

⁶³ See: <http://www.mwco.org/transportation/tpb/>.

⁶⁴ "DEQ SERP Comments Rev.3", spreadsheet listing comments by county, dated June 29, 2007. Note the open burning reference was updated in 2010 to 9 VAC 5-130 (from 9 VAC 5-40-5490 et. seq. as listed in the 2007 spreadsheet).

process, the project is located in a nonattainment area for ozone and particulate, and emission control area for VOC and NO_x. The following DEQ air pollution regulations apply: 9 VAC 5-130, Open Burning restrictions; 9 VAC 5-130, Open Burning restrictions⁶⁶; 9 VAC 5-40-5490 *et seq.*, Cutback Asphalt restrictions⁶⁷; and 9 VAC 5-50-60 *et seq.*, Fugitive Dust precautions⁶⁸.

Note the applicable SIP for the area in which the project is located does not impose any emission mitigation or control measures that would affect the construction or operation of this project. More specifically:

- the SIP does not include control measures for particulate “... for the purpose of limiting PM10 and PM2.5 emissions from the construction activities and/or normal use and operation associated with the project...” (40 CFR 93.117); and
- while the plans do include TCMs, all of the TCMs have been fully implemented and their timely implementation (as required in the conformity rule at 40 CFR 93.113) is therefore not affected by this project.

Similarly, no emission mitigation or control measures have been specified for purposes of NEPA for this project (40 CFR 93.125).

As the applicable SIP does not include specific emission mitigation or control measures for construction-related emissions, none are assumed in the modeling or assessments presented below for CO, particulate or MSATs (40 CFR 93.123).

4.2 Carbon Monoxide Analysis

A project-level analysis is required for CO for purposes of NEPA but not for conformity. For NEPA, the forecast demand for the design year for this project exceeds the ADT thresholds established in the applicable (2009) FHWA-VDOT Agreement for project-level studies. A CO analysis is therefore required for NEPA purposes. The requisite analysis is presented below.

For conformity, federal requirements for project-level analyses for CO do not apply since the area in which this project is located is not in nonattainment or maintenance of the NAAQS for this pollutant. The area is in attainment of the NAAQS for CO.

4.2.1 Background

Exhibits 4-1 and 4-2 present, respectively, national (public road) and local trends in vehicle-miles-traveled (VMT). VMT has increased almost continuously over the past several decades, with local trends generally reflecting the national. As emissions are calculated as the product of VMT and per-mile emission factors or rates, they would tend to increase with VMT absent concurrent reductions in emission factors or rates.

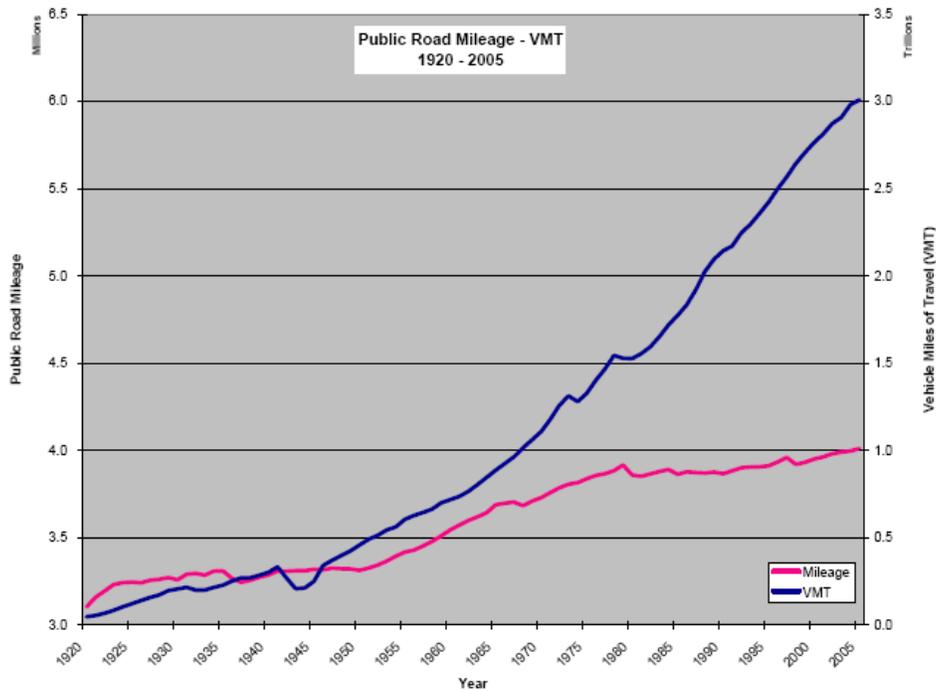
⁶⁵ See <http://www.virginiadot.org/business/const/spec-default.asp>

⁶⁶ See <http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130>

⁶⁷ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-40-5490>

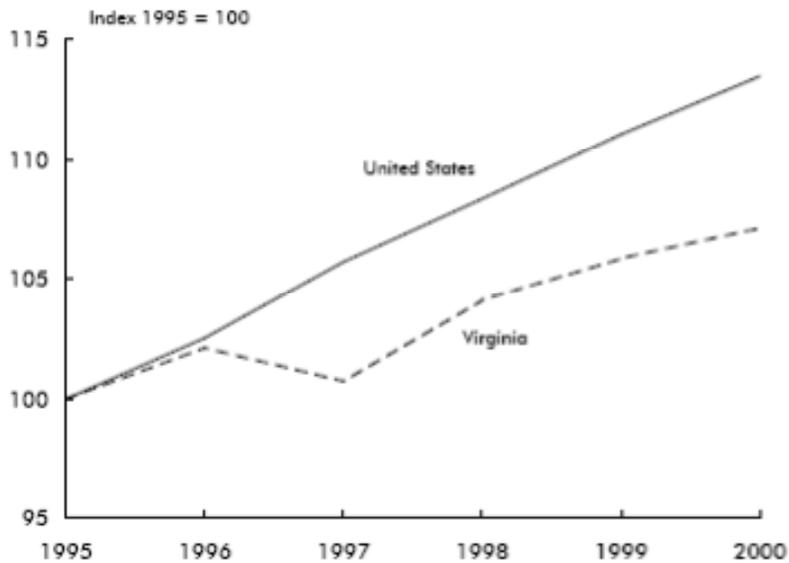
⁶⁸ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60>

Exhibit 4-1: Long-Term Trend in Public Road Mileage and Vehicle Miles Traveled (VMT)



Source: FHWA Office of Highway Policy Information (OHPI) Web site, updated 5/20/08:
<http://www.fhwa.dot.gov/policyinformation/charts/05.cfm>

Exhibit 4-2: Highway VMT - US and Virginia

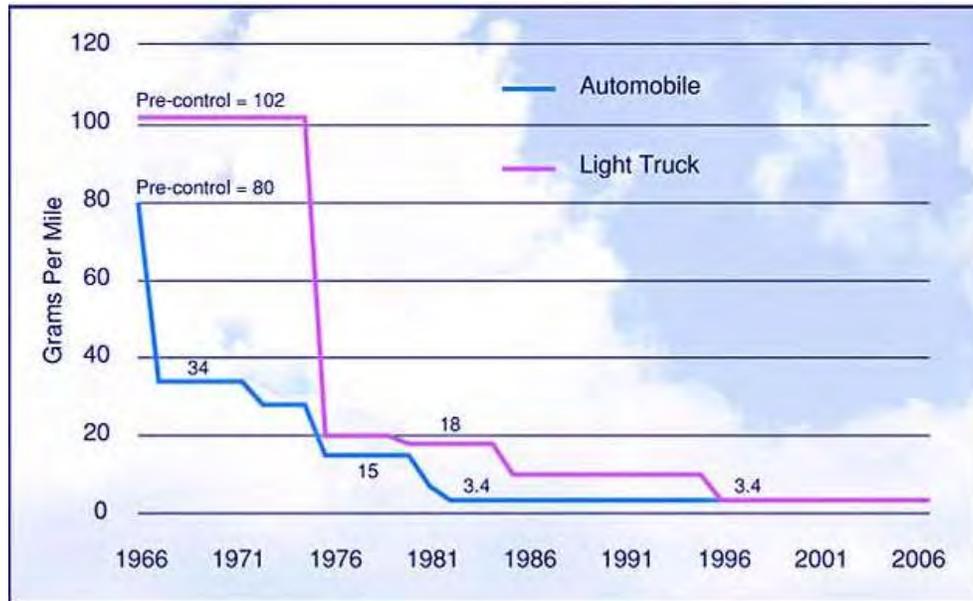


SOURCE FOR DATA ON THIS PAGE: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, annual editions, available at <http://www.fhwa.dot.gov/ohim/ohimstat.htm> as of Dec. 6, 2001.

Source for Exhibit: Figure 5-1, Highway Vehicle-Miles Traveled, United States and Virginia, from US Department of Transportation, Bureau of Transportation Statistics, "Virginia Transportation Profile", 2007.

Exhibit 4-3 presents the increasingly more stringent new vehicle emission standards for CO as introduced by the US EPA over the past few decades. With continued fleet turnover to new vehicles constructed to the more stringent emission standards, fleet average vehicle emission rates have declined to the extent that emissions and therefore ambient concentrations of CO have not only not increased with the increasing VMT, they have decreased.

Exhibit 4-3: Federal Emission Standards for CO for New Automobiles and Light Trucks



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. *Transportation Energy Data Book: Edition 24, ORNL-6973*. December 2004. Web site: <http://cta.ornl.gov/data/chapter12.shtml> 28 June 2005 as presented on the FHWA web site (accessed August 17, 2011): http://www.fhwa.dot.gov/environment/air_quality/publications/fact_book/page14.cfm.

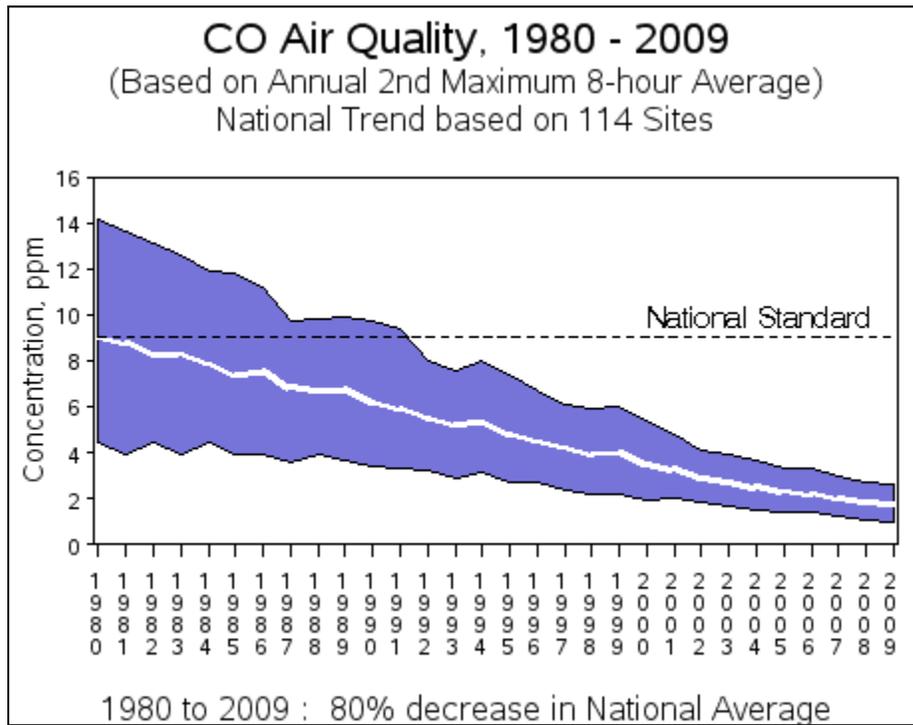
Exhibit 4-4 presents the resulting downward to flat trend in ambient concentrations of CO nationwide, while Exhibit 4-5 presents local data for the most recent year available (2009). Nationwide, from 1980 to 2009, an 80% decrease in average ambient CO concentrations was observed. Local trends reflected the national, declining to 2.0 ppm and under (eight-hour average) across the state in 2009 (the latest year for which local data have been published).

4.2.2 Modeling Approach

A worst-case modeling approach was adopted for this analysis. This is a very conservative approach that provides a high level of confidence that the potential for air quality impacts from the project have been fully addressed. The approach encompasses not only the choice of models and input data for both emission and dispersion modeling but also the selection of the intersection(s) to be modeled for the build scenario. All modeling for this project was conducted following applicable US EPA and FHWA general guidance^{69,70,71,72} as well as Department (region-specific) guidance for local applications⁷³.

⁶⁹ As noted in the review of models for project-level analyses in the chapter on regulatory requirements, the official release by EPA of updated models and guidance for project-level analyses for both CO and PM was announced in a federal register notice issued on December 20, 2010. Models addressed in the new guidance include the new emission model MOVES as well as the dispersion models AERMOD and CAL3QHCR. The federal register notice indicated however that a two-year grace

Exhibit 4-4: Nationwide Long-Term Trend in Ambient CO Concentrations



Source: <http://www.epa.gov/airtrends/carbon.html>, accessed August 17, 2011.

Exhibit 4-5: Ambient Concentrations of Carbon Monoxide in Virginia in 2009

Site	2009			
	1-Hour Avg. (ppm)		8-Hour Avg. (ppm)	
	1 st Max.	2 nd Max.	1 st Max.	2 nd Max.
(109-M) Roanoke	2.5	2.4	2.0	1.7
(158-W) Richmond	2.3	2.1	1.7	1.5
(181-A1) Norfolk	1.5	1.3	0.8	0.8
(46-B9) Fairfax Co.	1.4	1.3	1.1	1.0
(47-T) Arlington Co.	1.7	1.7	1.6	1.3
(L-126-C) Alexandria	1.8	1.7	1.4	1.4

Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2009 Data Report", September 2010.
See: http://www.deq.virginia.gov/export/sites/default/airmon/documents/Annual_Report_09.pdf and
<http://www.deq.virginia.gov/airmon/publications.html> (last accessed August 17, 2011).

period would apply. The grace period generally provides for an orderly transition to the new models and guidance. Project-level analyses initiated within the grace period may continue to apply existing models and existing guidance.

70 US EPA, "Guidelines for Modeling Carbon Monoxide from Roadway Intersections", EPA-454/R-92-005, 1992

71 US EPA, "User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections", EPA-454/R-92-006 (Revised), September 1995

72 FHWA, "Discussion Paper. Appropriate Level of Highway Air Quality Analysis for a CE, EA/FONSI, and EIS", March 1986

73 VDOT Environmental Division, Air Section, "Consultant Guide. Air Quality Conformity Project-Level Analysis", May 2009. See: <http://www.virginiadot.org/business/environmental.asp>

Emissions and ambient concentrations were modeled, respectively, using current standard US EPA models MOBILE6.2 and CAL3QHC/CALINE3 as incorporated into or employed by interface software developed and released by the FHWA. The interface software streamlines the file preparation and modeling process and thereby provides a ready means to systematically test worst-case scenarios for project level analyses.

The interface software package applied for the emission modeling was “EMIT”⁷⁴ as updated by the FHWA in September 2008. The corresponding interface software package applied for dispersion modeling of intersections was “Cal3Interface”^{75,76}, which was initially released by the FHWA in December 2006 and most recently updated in October 2008. More information on these models may be obtained from FHWA⁷⁷.

Project details including worst-case assumptions where applied are outlined in the following sections. Key assumptions applied for worst-case modeling are summarized at the end of these sections.

4.2.3 Project Opening and Design Years

The project opening and design years were taken as 2014 and 2036 respectively⁷⁸.

4.2.4 Emission Factors

Exhibit 4-6 presents a summary of the input data applied for project-specific/worst-case emission factor modeling using the MOBILE6.2 (via EMIT) model. A conservative approach was taken following the general direction provided in the VDOT Consultant Guide.

In general, inputs included vehicle registration data⁷⁹, vehicle-miles-traveled (VMT) mix data⁸⁰, emission inspection and maintenance program parameters, fuel quality (sulfur, Reid Vapor Pressure or RVP, and fuel oxygenate), and other data. VMT mix data for 2008 for an urban interstate for I-66 and urban minor arterial for Route 15 were selected for the analysis to correspond to the roadway functional classes listed on the *Virginia Highway Functional Classification –Prince William County 2005 Functional Classification* map.

⁷⁴ M.Claggett (FHWA) and J.Houk (FHWA), “*The Easy Mobile Inventory Tool – EMIT*”, November 2, 2006. Contact Michael Claggett, Ph.D. (Principal Author and Model Designer), Air Quality Modeling Specialist, Federal Highway Administration Resource Center, 604 West San Mateo Road, Santa Fe, New Mexico 87505, and Jeffrey Houk, Air Quality Modeling Specialist, Federal Highway Administration Resource Center, 12300 West Dakota Avenue, Suite 340, Lakewood, Colorado 80228.

⁷⁵ M.Claggett (FHWA), “*CAL3Interface – A Graphical User Interface for the CALINE3 and CAL3QHC Highway Air Quality Models*”, ca 2006.

⁷⁶ M.Claggett (FHWA), “*Update of FHWA’s CAL3Interface – A Graphical User Interface for the CALINE3 and CAL3QHC Highway Air Quality Models*”, ca 2008

⁷⁷ See <http://www.fhwa.dot.gov>. Models may be downloaded from:
<http://fhwa.adobeconnect.com/airqualitytst?launcher=false&disclaimer-consent=true>

⁷⁸ Forecast years as noted with traffic forecasts referenced earlier. The opening year (2014) is as specified for the preparation of the traffic forecasts by the VDOT Project Manager in email 4/11/2011.

⁷⁹ Based on vehicle identification number (VIN) data for 2008, as provided by the VDEQ (email August 27, 2010).

⁸⁰ C.Voigt, R.Jones, and T.Schinkel, “*Traffic Data for the 2008 Highway Emissions Inventory Air Quality Planning Areas: Fredericksburg, Hampton Roads, Northern Virginia, Richmond, Roanoke & Winchester. MOBILE6.2 MODEL VERSION*”, September 2009

Exhibit 4-6: Key Input Data for MOBILE6.2 (via EMIT)

Parameter	Input
Evaluation Month	January
Min/Max Temperature (Fahrenheit)	Area-Specific (N.Virginia) (22/22 °F)
Gasoline Reid Vapor Pressure (RVP)(psi)	Area-Specific (N.Virginia) (13.5 psi)
Gasoline Sulfur	EPA Defaults for RFG (Winter)
Fuel Oxygenate	Zero (worst-case assumption)
Emission Inspection and Maintenance & Anti-tampering Programs	Area-specific (N.Virginia)
VMT Mix by Vehicle Class	Area-Specific (N.Virginia) (2008 Data for Urban Interstate for I-66, and Urban Minor Arterial for Route 15)
Vehicle Registration by Vehicle Class	Area-Specific (N.Virginia/Prince William County)(2008 Data)

Available data indicate fuel oxygen content reached 3.08% by weight in 2006, which is the most recent year for which data were published by EPA for the region⁸¹. However, future use of oxygenates may be expected to follow federal energy requirements for increased use of renewable fuels (ethanol)⁸². As a conservative approach for modeling for this analysis, the fuel oxygen content was set to zero.

The temperature data were selected as specified in the VDOT Consultant Guide and represents an average minimum monthly temperature for January. Other data such as absolute humidity were kept at EPA defaults.

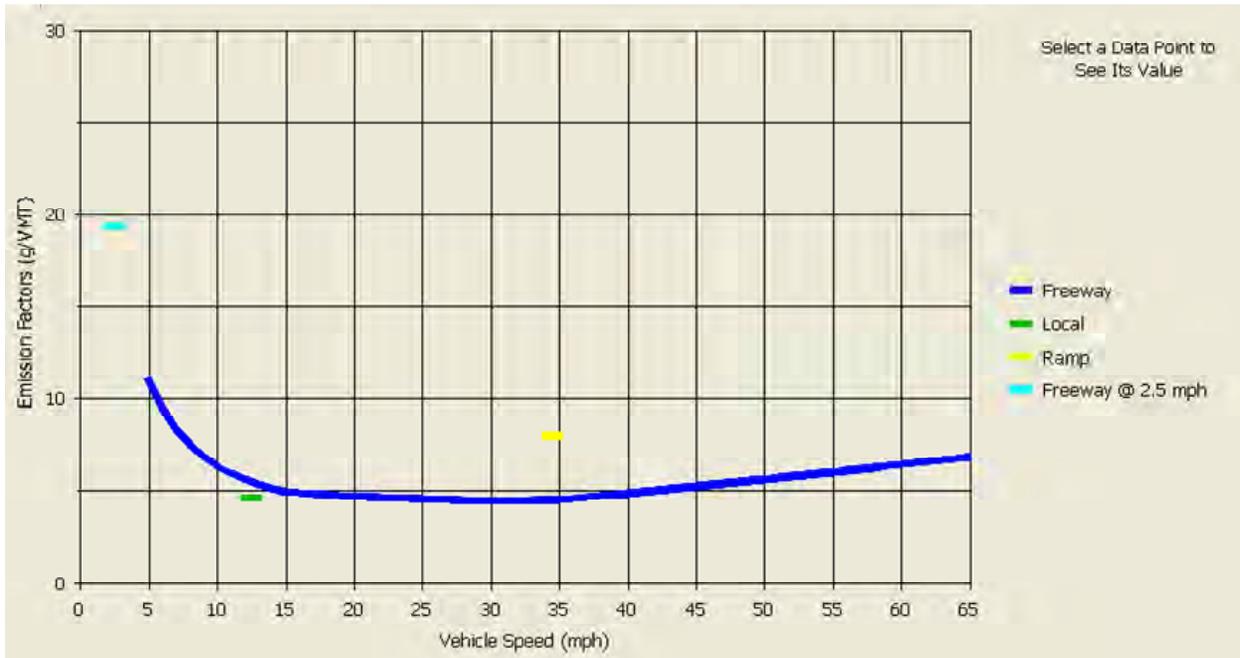
Exhibits 4-7 and 4-8 present respectively the modeled emission factors as a function of average speed for the project opening and design years. The model also generates output in tabular format, which facilitates the selection of speed-specific emission factors for input to the dispersion models as summarized in the next section. As may be seen from these exhibits, the modeled emission factor-speed curve for CO has a minimum at about 30 miles per hour (mph). Roadways operating at average speeds either higher or lower than this speed will have relatively higher emissions.

The shape of the emission factor- speed curves has implications for the general approach for a worst-case analysis. For roadways operating at speeds above 30 mph, an assumption of 65 mph (the limit for the model) for the roadway operating speed for the project would represent a worst-case approach since it would yield the highest possible emission factor for the analysis. Conversely, for roadways operating below 30 mph, the worst-case approach would be to assume a roadway operating speed lower than the expected congested speed for that facility.

⁸¹ See: <http://www.epa.gov/otaq/regs/fuels/rfg/properf/dc-area.htm>.

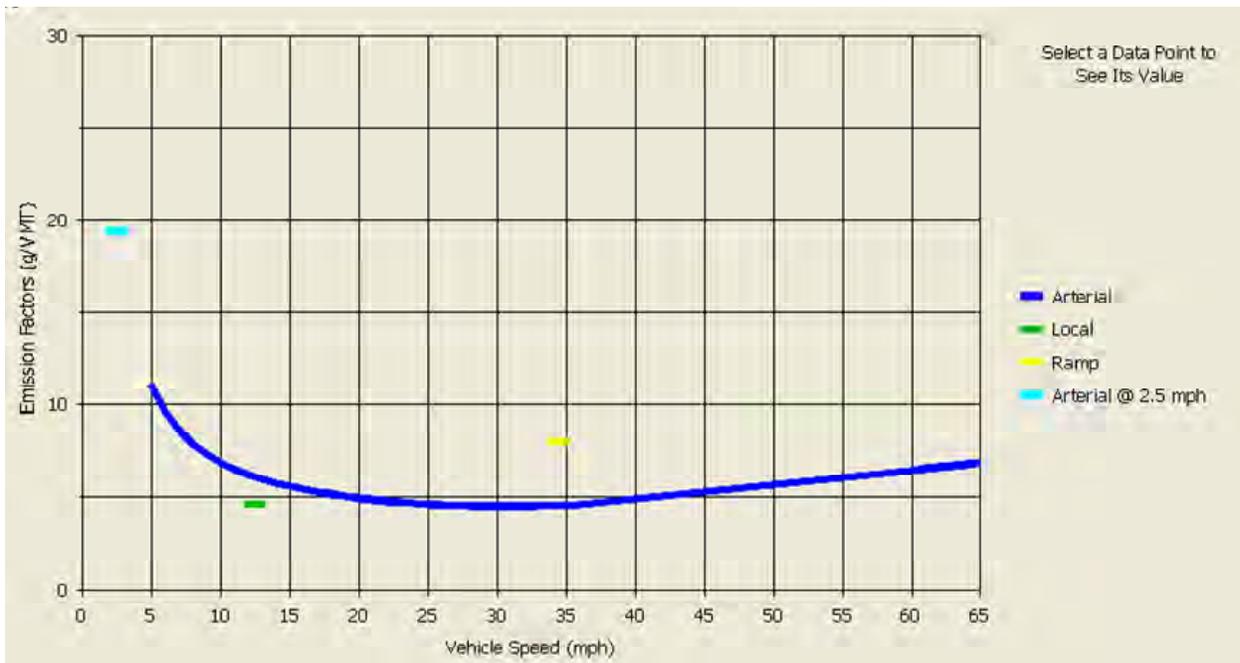
⁸² See: <http://www.epa.gov/otaq/fuels/renewablefuels/index.htm>

Exhibit 4-7(a): Fleet Average Emission Factors – Opening Year, Freeways



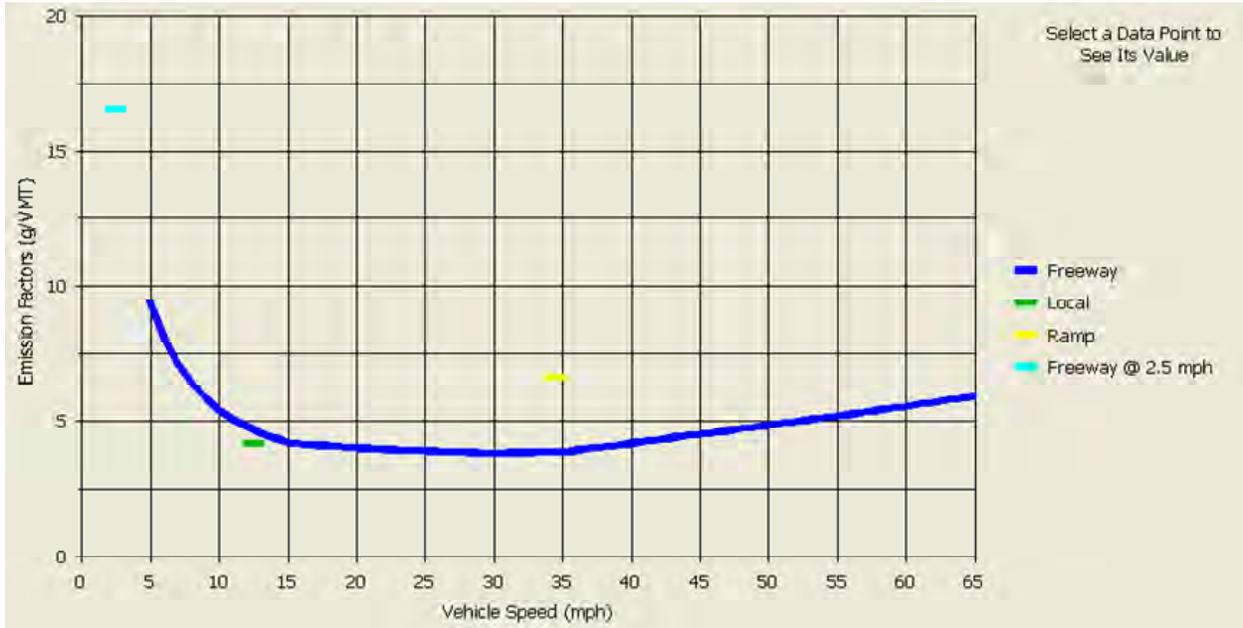
Source: Model output from EMIT, the FHWA interface model for the US EPA MOBILE6.2 emission factor model

Exhibit 4-7(b): Fleet Average Emission Factors – Opening Year, Arterials



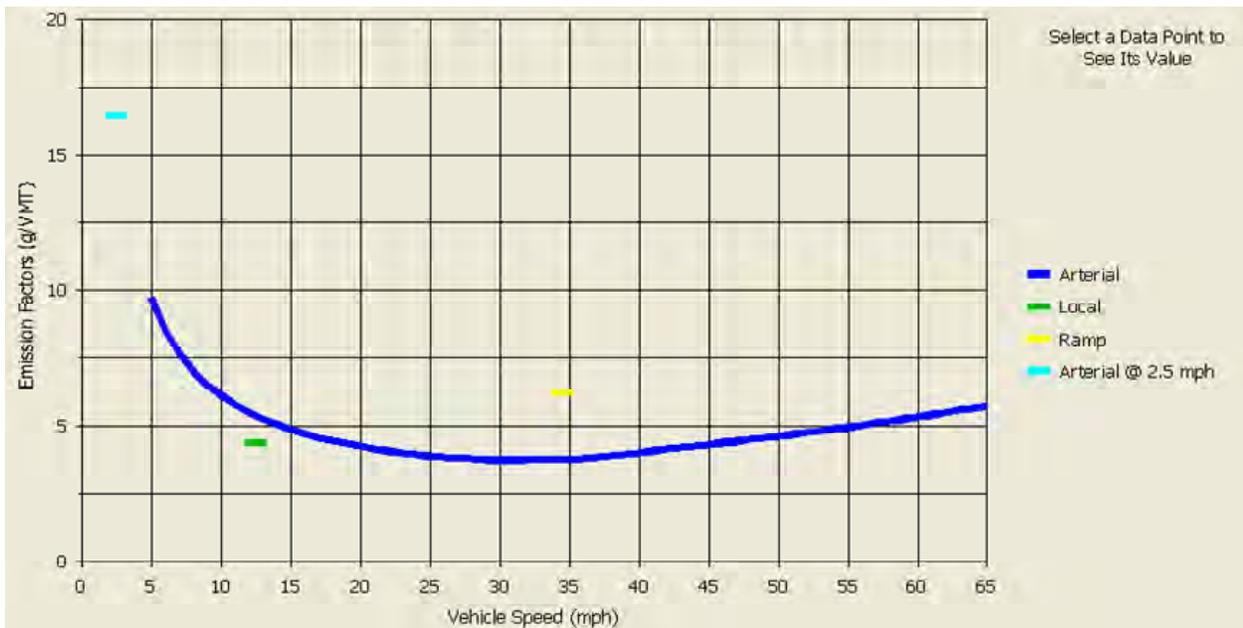
Source: Model output from EMIT, the FHWA interface model for the US EPA MOBILE6.2 emission factor model

Exhibit 4-8(a): Fleet Average Emission Factors – Design Year, Freeways



Source: Model output from EMIT, the FHWA interface model for the US EPA MOBILE6.2 emission factor model

Exhibit 4-8(b): Fleet Average Emission Factors – Design Year, Arterials



Source: Model output from EMIT, the FHWA interface model for the US EPA MOBILE6.2 emission factor model

4.2.5 Build and No-Build Modeling Scenarios

In general, interchanges and intersections are the focus for project-level analyses for CO. In both cases, the convergence of traffic at one location tends to result in increased emissions and ambient concentrations in the general vicinity of that interchange or intersection. For signalized intersections, there is the additional contribution to emissions from idling vehicles queued at the stop light.

For this project, the I-66 interchange with Route 15 was selected for analysis for the build scenario. Although improvements planned for this project are targeted to the I-66 mainline, with relatively minor improvements planned for the interchange itself, this selection is made given that the interchange is within the designated project area, improvements to the interchange though relatively minor are nonetheless planned, and the interchange is forecast to carry significantly increased traffic volumes as a result of the planned improvements to the I-66 mainline. Additionally, the interchange includes two adjacent signalized ramp intersections that contribute to the traffic, emissions and concentrations of CO in the project area, and its selection for analysis would therefore be consistent with a worst-case analysis approach. Exhibits 1-2(a) and 1-3 present the plan concept for the interchange as well as an aerial of the existing facility.

In keeping with the FHWA-VDOT 2009 Agreement for No-Build Analyses, a no-build scenario was determined to not be needed for this analysis, given that: a) the project is not located within a nonattainment or maintenance area for CO, and b) an environmental impact statement is not planned for this project.

4.2.6 Average Speeds & Emission Factors for the Modeling Scenarios

Exhibit 4-9 presents a tabulation of the modeled emission factors by speed. The speeds selected for the tabulation are those modeled for one or more roadway segments in this project; see Appendix A for the detailed tabulations of speeds and traffic volumes by roadway segment.

For this analysis, rather than model emissions using the relatively low speeds tabulated above, the modeled emission factors for 65 mph for freeways and arterials were applied for all roadway segments. These emission factors are higher than those for lower speeds, and their use therefore is in keeping with a worst-case modeling approach as previously noted. Idle and ramp emission factors as tabulated below were also applied as appropriate. Overall, this worst-case analysis approach will tend to result in modeled emissions that are significantly in excess of those expected.

4.2.7 Traffic Volumes for the Modeling Scenarios

Federal default values for worst-case traffic volumes as specified in the guidance for the Cal3Interface model were applied in this analysis. The worst-case volumes are intended to reflect over-capacity operating conditions, which is taken as level of service (LOS) E for the federal defaults. With the assumptions of a volume-to-capacity ratio of 1.44 and the EPA-recommended saturation flow rate of 1600 vehicles per hour per lane (vphpl) for arterial roadways, the federal default LOS E volume for arterial street intersections is 1037 vphpl. For

reference, Cal3Interface model (federal) default volume for mainline freeway segments operating at capacity is 2200 vphpl.

Exhibit 4-9: Emission Factors Generated with MOBILE6.2 (via EMIT)

Operation	Emission Factor (grams per mile)*			
	Arterial		Freeway	
	2014	2036	2014	2036
Idle	48.464	41.125	na	na
Ramp	na	na	7.946	6.593
5	-	-	10.981	9.401
26	4.583	3.837	-	-
33	4.518	3.725	-	-
37	4.699	3.849	-	-
39	4.844	3.958	-	-
43	5.150	4.196	-	-
45	5.291	4.307	-	-
46	5.374	4.375	-	-
47	5.454	4.440	-	-
49	5.604	4.562	-	-
53	-	-	5.875	5.048
56	-	-	6.108	5.255
65	6.889	5.726	6.853	5.917

* Grams per brake-horsepower-hour for idle operation

Typically, in aggregate, the assumed federal worst-case traffic volumes tend to be significantly higher than the design (and opening) year modeled volumes. A comparison of the worst-case traffic volumes to the project-specific forecast volumes is presented in the section below, with the summary of all of the worst-case assumptions applied in this analysis. Additional detail on the traffic forecasts is presented in Appendix A, including a table comparing the modeled forecast volumes and the federal default worst-case volumes.

4.2.8 Dispersion Modeling Inputs

Exhibit 4-10 summarizes key input data as applied in the worst-case dispersion modeling for this project. The data were generally selected as the Cal3Interface software worst-case analysis defaults unless otherwise noted. A sample copy of an input file generated using CAL3Interface for the CAL3QHC model is provided with Attachment B to this report.

Traffic volumes and speeds as well as corresponding emission factors as summarized in the preceding sections were applied in the dispersion modeling. Consistent with federal guidance for the Cal3Interface model, intersection approaches were modeled for this worst-case analysis with both a queue link and a free-flow link. All links were assumed to carry worst-case traffic volumes.

Exhibit 4-10: Key CAL3QHC/CALINE3 Worst-Case Inputs (via Cal3Interface)

Parameter	Data*
Background CO Concentration, ppm**	
- One-hour	2.9
- Eight-Hour	2.3
Surface Roughness Coefficient, cm	108
Wind Speed, meters per second	1.0
Wind Direction Increments, degrees (multipliers)	10 (1 through 36)
Stability Class	4 (D – Neutral)
Mixing Height, meters	1000
Settling Velocity, cm/s	0
Deposition Velocity, cm/s	0
Wake Distance, ft (meters)	9.8 (3)
Median Width, ft	0
Source Height, ft	0
Receptor Height, ft	5.9
Persistence Factor	0.7

* Cal3Interface Defaults unless otherwise specified.

** As specified as a conservative estimate for projects in northern Virginia (VDOT 2008)⁸³.

4.2.8.1 Receptor Locations for Dispersion Modeling

Receptor locations (points for which CO concentrations are estimated) were generally determined following federal guidance as incorporated into the Cal3Interface software package. A worst-case approach was taken in which all receptors were located along the right-of-way edge, which for arterials is 10 feet from the roadway edge and for freeways is 20 feet.

More specifically, receptors were located for the worst-case analysis:

- at the corners of the roadway intersections (i.e., at the intersection of the right-of-way edges);
- along each side of the intersecting roadways at 82 feet (25 meters) and 164 feet (50 meters) from the corners; and
- at the midpoint of each side of the intersecting roadways.

Exceptions were made to provide better coverage due to model limitations on the total number of receptors (60). In order to place select receptors at the ramp connections to the I-66 mainline, receptors at the 50 meter mark from the ramp intersections with the Route 15 intersection were relocated to the mainline connections. Since the model typically generates higher estimates for concentrations for receptors located closer to the intersection and grade separation, the

⁸³ C.Voigt, "Background Carbon Monoxide (CO) Values", VDOT memorandum dated July 11, 2008

relocation of more distant receptors (the 50 meter receptors) would not affect the modeling results in terms of identification of the peak concentrations and the location of the peak concentrations.

4.2.8.2 Other Inputs to the Dispersion Model

All roadways were assumed at-grade. Median widths were set at zero, as a conservative assumption. Lane widths were set at the federal default of twelve feet.

For right way, the federal default of ten feet for arterial streets was applied. For reference, the federal default for right of way for freeway segments is twenty feet.

4.2.9 Worst-Case Modeling Configuration for the Build Scenario

Exhibit 1-2(a) presented earlier shows the plan concept for the I-66/ Route 15 interchange. As may be seen in the aerial presented in Exhibit 1-4, the existing interchange includes the following number of lanes:

- I-66 interchange:
 - Westbound mainline – two lanes, plus an auxiliary lane for the exit and on-ramps respectively
 - Eastbound mainline – two lanes, plus an auxiliary lane for the exit and on-ramps respectively
- Route 15:
 - Northbound mainline – two lanes, plus a right turn lane for the eastbound I-66 on-ramp
 - Southbound mainline – two lanes, plus a right turn lane for the westbound I-66 on-ramp
- Ramp intersection with Route 15 north of I-66:
 - Route 15 southbound approach: two through lanes and one right-turn lane
 - Route 15 northbound departure: two lanes that merge to one and then diverges into one left-turn, one through lane and one right turn lane
 - Route 15 northbound approach: two through lanes and one left-turn lane
 - Route 15 southbound departure: two through lanes
 - Ramp eastbound I-66 to northbound Route 15: one lane diverging to one right turn lane and one left-turn lane
 - Ramp southbound Route 15 to westbound I-66: one lane
- Ramp intersection with route 15 south of I-66:
 - Route 15 southbound approach: two through lanes and one left-turn lane
 - Route 15 northbound departure: two through lanes
 - Route 15 northbound approach: two through lanes and one right-turn lane
 - Route 15 southbound departure: two through lanes
 - Ramp eastbound I-66 to southbound Route 15: one lane diverging to one through-left turn lane and one right turn lane at Route 15

- Ramp northbound Route 15 to eastbound I-66: two lanes (one through and one right-turn from northbound Route 15) merging to one lane at I-66

As noted in section 1, the build scenario involves the addition of an HOV and a general purpose lane in each direction. The HOV lane would extend through the interchange while the added general purpose lane would extend into but not through the interchange.

The worst-case analysis includes the lanes planned for the build scenario as noted above, plus additional lanes for the mainline in both directions, for Route 15 in both directions, and for the ramps. The modeling configuration for the worst-case analysis was taken to include the following number of lanes:

- I-66 & Route 15 interchange (modeled as a free-flow grade-separation):
 - I-66 westbound mainline – five through lanes
 - I-66 eastbound mainline – five through lanes
 - Route 15 northbound mainline – three through lanes
 - Route 15 southbound mainline – three through lanes
- Ramp intersection with Route 15 north of I-66:
 - Route 15 southbound approach: three queue/through lanes
 - Route 15 northbound departure: three through lanes
 - Route 15 northbound approach: three queue/through lanes
 - Route 15 southbound departure: three through lanes
 - Ramp eastbound I-66 to northbound Route 15: two through lanes
 - Ramp southbound Route 15 to westbound I-66: two through lanes
- Ramp intersection with Route 15 south of I-66:
 - Route 15 southbound approach: three queue/through lanes
 - Route 15 northbound departure: three through lanes
 - Route 15 northbound approach: three queue/through lanes
 - Route 15 southbound departure: three through lanes
 - Ramp eastbound I-66 to southbound Route 15: two through lanes
 - Ramp northbound Route 15 to eastbound I-66: two through lanes

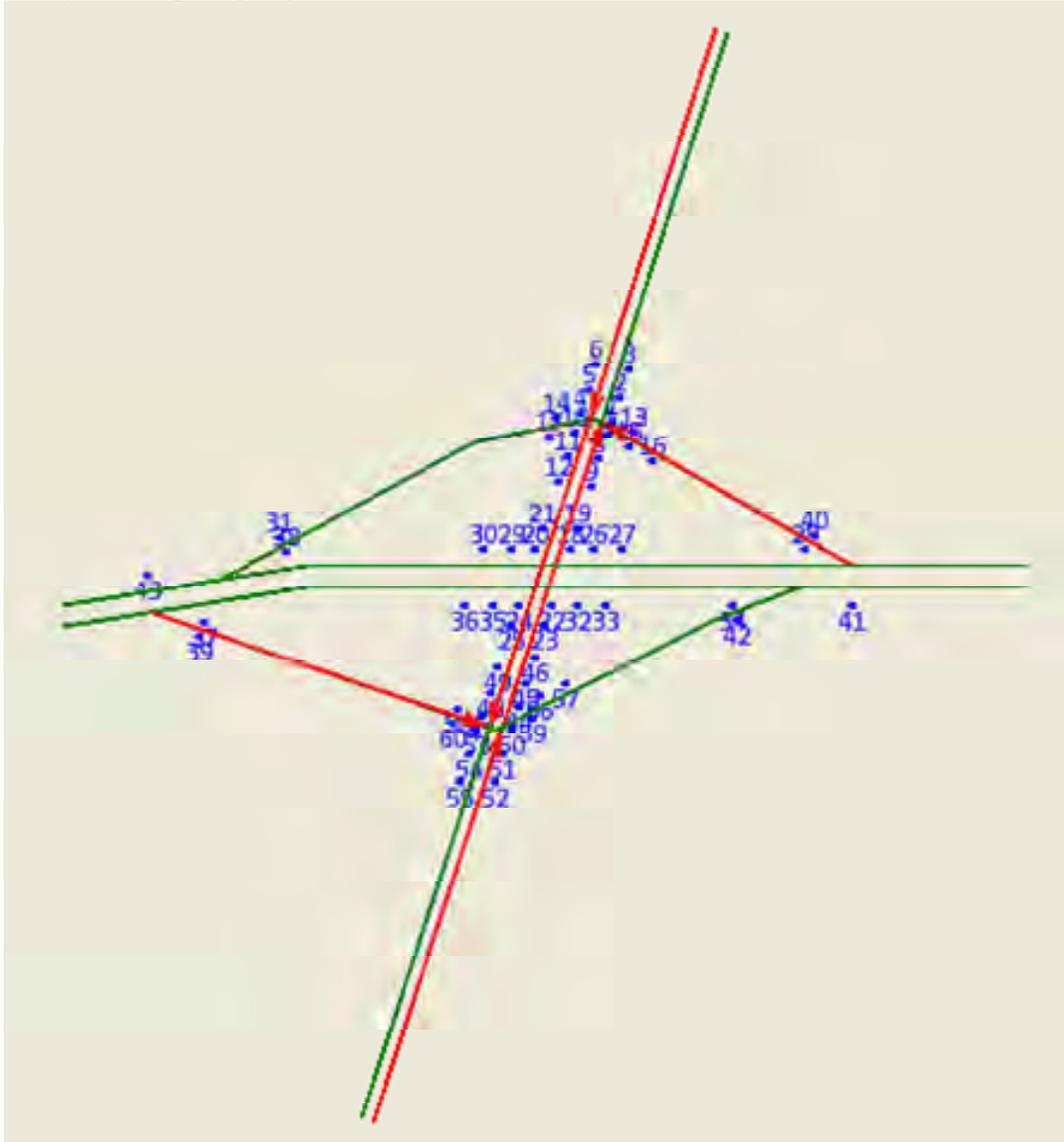
Note, to simplify the modeling and as a conservative (worst-case) approach, turn lanes were treated as full length through and turn lanes. All of the lanes would carry worst-case traffic volumes. The added lanes over the planned configuration therefore make for a more stringent worst-case test for the intersection.

Exhibit 4-11 presents the planned build roadway configuration as modeled for this analysis using Cal3Interface. Receptor locations (numbered) are also shown in the exhibit. The worst-case roadway configuration and receptor locations (points for which CO concentrations are estimated) were otherwise specified as provided in the Cal3Interface guidance.

4.2.10 Summary of Worst-Case Assumptions

Worst-case assumptions for traffic and other factors as applied in this analysis are summarized in this section.

Exhibit 4-11: Cal3interface Worst-Case Configuration & Receptor Locations – Build Scenario



Source: Excerpted from FHWA Cal3Interface model output.

4.2.10.1 Traffic Forecasts

The table entitled “Worst-Case Versus Modeled Traffic Volumes” included with Attachment A provides a comparison of the approach, departure and total volumes assumed for the worst-case analysis compared to the project-specific modeling forecasts.

For the design year 2036 build scenario, for the morning peak hour, the assumed worst-case volumes were higher than the forecast or modeled volumes for the ramp intersection north of I-66, the I-66/Route 15 Interchange grade separation, and the ramp intersection south of I-66 by factors of 2.6, 1.7 and 2.2 respectively. Similarly, for the afternoon peak hour, the assumed worst-case volumes were higher than the modeled volumes for the ramp intersection north of I-

66, the I-66/Route 15 Interchange grade separation, and the ramp intersection south of I-66 by factors of 1.7, 1.5 and 2.1 respectively.

For the opening year 2014 build scenario, the ratio is significantly higher than for the design year since the modeled or expected demand for that year is significantly lower compared to the same assumed worst-case traffic volumes. For the morning peak hour for the opening year 2014 build scenario, the assumed worst-case volumes were higher than the modeled volumes for the ramp intersection north of I-66, the I-66/Route 15 Interchange grade separation, and the ramp intersection south of I-66 by factors of 4.0, 2.6, and 3.4 respectively. Similarly, for the afternoon peak hour, the assumed worst-case volumes were higher than the modeled volumes for the ramp intersection north of I-66, the I-66/Route 15 Interchange grade separation, and the ramp intersection south of I-66 by factors of 2.7, 2.3 and 3.1 respectively.

These differences in traffic volume forecasts between the assumed worst-case scenarios and the modeled or expected values are consistent with a general worst-case analysis approach, i.e., modeled traffic, emissions and ambient concentrations for the worst-case analysis are significantly higher than the expected actual traffic, emissions and ambient concentrations.

4.2.10.2 Dispersion and Emission Modeling

The principal worst-case assumptions applied in this analysis include:

For dispersion modeling:

- Application of a screening model, CAL3QHC, for dispersion modeling, which by design is conservative and tends to generate relatively high concentrations.
- Worst-case inputs (all of which tend to increase modeled emissions and ambient concentrations of carbon monoxide) for CAL3QHC modeling, including:
 - federal default worst-case traffic volumes for peak hour modeling, after comparisons to modeled forecasts (and summarized above and in Appendix A) showed the assumed worst-case traffic volumes significantly exceed the modeled or expected traffic volumes for this project for both the opening and design years for this project,
 - turn lanes modeled as full-length through- and turn-lanes, loaded with the default worst-case traffic volumes,
 - worst-case receptor locations on the edge of the roadway right-of-way, following federal guidance,
 - zero median widths (concentrating traffic, emissions and concentrations to the greatest extent possible),
 - zero vertical separation for the interchange mainlines and ramps, and
 - other federal default input data for most model inputs (see the exhibit above)

For emission factor modeling:

- Application of the current emission factor model, MOBILE6.2, as specified by EPA, recognizing that the next generation model (MOVES2010) would tend to generate lower emission factors for CO, based on preliminary comparisons with the new model,
- Worst-case inputs (tending to increase modeled emission factors), including:
 - For the mainline roadways, the assumption of conservatively high emission

- factors by selecting the maximum speed (65 mph) for which the MOBILE model can generate emission factors,
- lowest typical minimum and maximum temperatures for Virginia, following federal and state guidance,
 - highest Reid Vapor Pressure expected for the region, following state guidance,
 - zero oxygenate,
 - earliest reasonable opening year (2014), and
 - other federal default input data as noted in the exhibit above.

4.2.11 Modeling Results for Carbon Monoxide

Exhibit 4-12 presents the forecast maximum concentrations for CO for the worst-case scenarios modeled. All forecasts include background concentrations as noted previously.

Exhibit 4-12: Maximum CO Concentrations (ppm) (and Receptor Location) for Worst-Case Scenarios

NAAQS	Opening Year (2014)	Design Year (2036)
One-Hour (35 ppm)	9.9 (18)	8.8 (18)
Eight-Hour (9 ppm)	7.2 (18)	6.4 (18)

* Including background concentrations of 2.9 and 2.3 ppm for the one- and eight-hour standards respectively, based on trend data for Northern Virginia (per VDOT memorandum July 2008). Receptor locations noted are only for the first location if more than one location has the same value.

** In keeping with the FHWA-VDOT 2009 Agreement for No-Build Analyses, a no-build scenario analysis was determined to not be needed for this project, given: a) the project location (not within a nonattainment or maintenance area for CO), and b) the level of environmental documentation planned for this project (i.e., not an environmental impact statement).

Modeled emissions and maximum concentrations are highest for the project opening year. The forecast maximum concentrations for CO reach 9.9 and 7.2 ppm, respectively, against the one- and eight-hour standards of 35 and 9 ppm. The location of the forecast maximum concentration was at Receptor #18, which is located at the northeast corner of the grade separation at the center of the main interchange. Forecast peak concentrations drop to 8.8 and 6.4 ppm respectively for the one- and eight-hour standards for the design year, and were located at the same receptor.

In all scenarios, forecast peak concentrations for CO are well below the respective one- and eight-hour standards of 35 and 9 ppm. In general, emissions and ambient concentrations drop significantly over time through the opening and design years due to continued fleet turnover to vehicles constructed to more stringent emission standards.

Overall, the results indicate that, even assuming worst-case traffic volumes, ambient levels of CO in the vicinity of the project are expected to decline significantly over time and to remain below both the one-hour and the eight-hour NAAQS. The project therefore is not expected to cause or contribute to a violation of the CO standards.

4.3 Particulate Matter Analysis

The federal conformity rule requires hotspot analyses for specific project types (40 CFR 93.123(b)(1)). An assessment of this project in relation to each project type is provided below.

40 CFR 93.123(b)(1) project types:

- (i) *New or expanded highway projects that have a significant number of or significant increase in diesel vehicles*

The number of diesel vehicles is not expected to be significant or to increase significantly as a result of the project. Average daily traffic is only expected to reach 95 thousand (47 thousand eastbound, and 48 thousand westbound) in the design year (2036), with trucks (diesel and non-diesel combined) percentages of 6% eastbound and 8% westbound. This compares to 80 thousand ADT (40 thousand in each direction) for the design year no-build scenario. The percentage of trucks does not change between the build and no-build scenarios. Overall, daily total (diesel and non-diesel) truck traffic in the design year is expected to be less than 6700 for the build scenario, which is well under the 125 thousand ADT with 8% diesel trucks (which equates to ten thousand diesel trucks) identified in the 2006 US EPA/FHWA Guidance as an example of a project of air quality concern.

- (ii) *Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.*

Diesel truck volumes are not projected to be significant as indicated above.

- (iii) *New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location:*

This project does not affect bus or rail terminals.

- (iv) *Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and*

This project does not affect bus or rail terminals.

- (v) *Projects in or affecting locations, areas, or categories of sites which are identified in the PM10 or PM2.5 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.*

This project is not located in such an area.

In summary, based on the criteria specified in the transportation conformity rule and associated guidance, this project is not expected to be one of air quality concern for particulate matter.

4.4 Mobile Source Air Toxics Analysis

A qualitative analysis for Mobile Source Air Toxics (MSATs) was conducted for this project in accordance with the recently issued (2009) federal guidance. A qualitative analysis was selected

as forecasts for the project indicate annual average daily traffic (AADT) for the design year to be well under the 140,000 to 150,000 AADT threshold specified in the federal guidance for a Category 3 project (*Projects with Higher Potential MSAT Effects*). This project therefore falls into the category listed in the federal guidance for projects with “*Low Potential MSAT Effects*”, for which federal guidance calls for a qualitative analysis only.

As indicated in federal guidance, a qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*⁸⁴.

4.4.1 Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (<http://cfcpub.epa.gov/ncea/iris/index.cfm>). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (<http://www.epa.gov/ttn/atw/nata1999/>). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA’s MOBILE6.2 model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in the exhibit below.

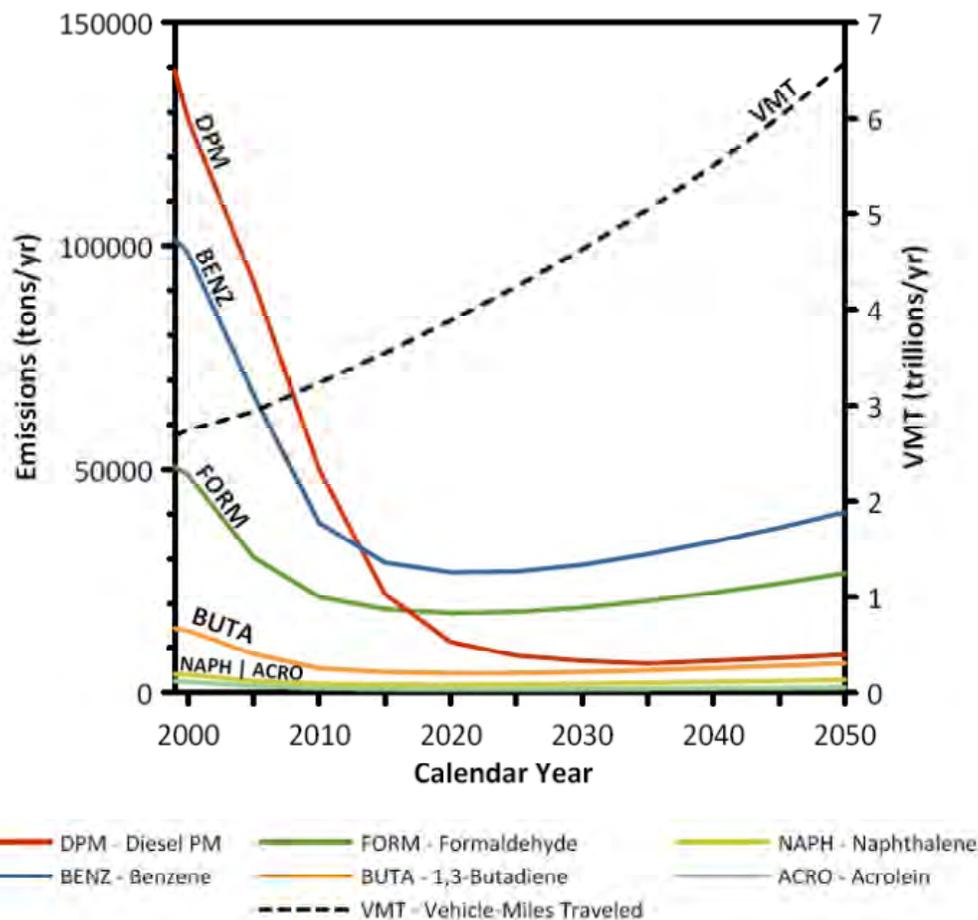
Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects

⁸⁴ The study may be found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

Exhibit 4-13: National MSAT Emission Trends 1999 – 2050



Note: (1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
 (2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

4.4.2 Unavailable Information for Project Specific MSAT Impact Analysis

This document includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable prediction of the health impacts of the emission changes associated with the project. Due to these limitations, the following discussion is included in accordance with Council of Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, <https://www.epa.gov/iris/>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM.

The EPA (<http://www.epa.gov/risk/basicinformation.htm#g>) and the HEI (<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries.

The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information

against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

4.4.3 Conclusion for MSATs

Overall, MSAT emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent from 1999 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Accordingly, for this project, there may be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore it is possible that localized increases and decreases in MSAT emissions may occur. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, it is expected that in the design year there would be reduced MSAT emissions in the immediate area of the project due to EPA's MSAT reduction programs.

4.5 Indirect Effects and Cumulative Impacts Analysis

The potential for indirect effects or cumulative impacts to air quality that may be attributable to this project is not expected to be significant for several reasons. First, the area in which the project is located is already highly developed, which limits the potential for incremental indirect effects or cumulative impacts. Second, from a broader national (and regional) perspective, the ongoing implementation of ever more stringent motor vehicle emission and fuel quality standards as previously referenced helps to minimize the potential for growth in emissions and associated impacts even with long-term growth in economic activity and associated traffic. Related trends in ambient air quality data as presented earlier show the benefit of these controls for specific pollutants.

Additionally, available analyses indicate compliance with related transportation conformity and SIP requirements. Federally-required regional transportation conformity analyses are conducted to document compliance or conformity of long-range transportation plans and programs with the applicable air quality state implementation plan (SIP) revision. Land use changes are considered as appropriate in the development of and modeling for the regional long-range transportation plan. In the conformity analysis process, motor vehicle emissions for the entire on-road regional transportation systems must be shown to not exceed the budgets or caps for emissions set in the regional air quality state implementation plan (SIP). The emission budgets must be met for near term years, an interim year, and the horizon year of the long-range transportation plan. The emission budgets specified in the SIP are developed by the state air agency (and approved by EPA) based on detailed regional modeling that considers emissions from all sources (including industrial, institutional and other stationary, area, and nonroad mobile sources, as well as the on-road mobile source sector, i.e., the regional

transportation system). The motor vehicle emission budgets are set in the SIP at a level that would allow the region to meet the NAAQS. In summary, as long as the regional conformity analysis that includes the proposed project demonstrates that emission budgets or caps specified in the SIP are met for all years tested through the horizon year of the long-range transportation plan, the development of which includes consideration as appropriate of changes in the near-, mid- and long-term to regional land use patterns and the associated transportation system, it may be reasonably be concluded that the corresponding NAAQS would be met well into the future.

Overall, therefore, inclusion of the proposed project in the currently conforming transportation plan and program for which compliance or “conformity” with the applicable air quality plan or SIP has been or will be demonstrated through the horizon year of the regional long-range transportation plan supports a general conclusion that the potential for indirect effects or cumulative impacts attributable to the proposed project are not expected to be significant. At the time of preparation of this report, the region in which the project is located typically conducts a conformity analysis each year for the transportation plan and program. This project would be included in a conforming plan and program prior to implementation, consistent with federal conformity requirements.

5. Mitigation

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. To mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*⁸⁵.

As noted with the comments received in the SERP process, the project is located in a nonattainment area for ozone and particulate, and emission control area for VOC and NO_x. The following DEQ air pollution regulations apply: 9 VAC 5-130, Open Burning restrictions⁸⁶; 9 VAC 5-40-5490 *et seq.*, Cutback Asphalt restrictions⁸⁷; and 9 VAC 5-50-60 *et seq.*, Fugitive Dust precautions⁸⁸.

6. Conclusion

The project has been assessed for potential air quality impacts and compliance with applicable air quality regulations and requirements. The assessment indicates that the project would meet all applicable air quality requirements of the National Environmental Policy Act and federal and state transportation conformity regulations. As such, the project will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the national ambient air quality standards as established by the US EPA.

⁸⁵ See <http://www.virginiadot.org/business/const/spec-default.asp>

⁸⁶ See <http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130>

⁸⁷ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-40-5490>

⁸⁸ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60>

Additionally, best available information indicates that, nationwide, regional levels of air toxics are expected to decrease in the future due to fleet turnover and the continued implementation of more stringent emission and fuel quality regulations. Nevertheless, it is possible that some localized areas may show an increase in emissions and ambient levels of these pollutants due to locally increased traffic levels associated with the project.

This project is located within a moderate ozone nonattainment area, a fine particulate matter (PM_{2.5}) nonattainment area, and a volatile organic compounds (VOC) and nitrogen oxides (NO_x) emission control area. As such, all reasonable precautions should be taken to limit the emissions of VOC, NO_x, and particulate matter. In addition, the following Virginia Department of Environmental Quality (VDEQ) air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions⁸⁹; 9 VAC 5-40-5490 *et seq.*, Cutback Asphalt restrictions⁹⁰; and 9 VAC 5-50-60 *et seq.*, Fugitive Dust precautions⁹¹.

Emissions may be produced in the construction of this project from heavy equipment and vehicle travel to and from the site, as well as from fugitive sources. Construction emissions are short term or temporary in nature. In order to mitigate these emissions, all construction activities are to be performed in accordance with VDOT *Road and Bridge Specifications*⁹².

As of the date of preparation of this analysis, the project is included in the currently conforming 2010 Constrained Long Range Transportation Plan (CLRP) and FY 2011-2016 Transportation improvement Program (TIP)^{93,94}. The CLRP and TIP are developed by the National Capital Region Transportation Planning Board (TPB), which is the federally designated Metropolitan Planning Organization (MPO) for the region and whose members include VDOT⁹⁵.

⁸⁹ See <http://leg1.state.va.us/000/reg/TOC09005.HTM#C0130>

⁹⁰ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-40-5490>

⁹¹ See <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC5-50-60>

⁹² See <http://www.virginiadot.org/business/const/spec-default.asp>

⁹³ The conformity analysis and finding of conformity were approved by the US DOT in a letter dated September 27, 2011 to the NCR TPB.

⁹⁴ The project status in the currently conforming CLRP and TIP was confirmed in email dated September 22 and 30, 2011 from VDOT Northern Virginia District staff.

⁹⁵ See: <http://www.mwcog.org/transportation/tpb/>.

Attachment A

Traffic Forecasts

WORST-CASE VERSUS MODELED TRAFFIC VOLUMES

UPC 93577 - I66 Widening (Route 15 to Route 29)

2014 (Opening Year Build Scenario)

Ramp Intersection (E-W) with Route 15 (N-S) North of I-66

Leg	C3I Worst Case Volumes		Modeled Demand		Ratio (C3I/Mod.)		
	Lanes	Volume/lane	Volumes	AM	PM	AM	PM
N.Leg App.	3	1037	3,111	1,325	1,340	2.348	2.322
N.Leg Dep.	3	1037	3,111	955	1,390	3.258	2.238
S.Leg App.	3	1037	3,111	660	775	4.714	4.014
S.Leg Dep.	3	1037	3,111	1,490	2,130	2.088	1.461
W.Leg App.	2	1037	2,074	0	0		
W.Leg Dep.	2	1037	2,074	120	305	17.283	6.800
E.Leg App.	2	1037	2,074	580	1,710	3.576	1.213
E.Leg Dep.	2	1037	2,074	0	0		
Total	-	-	20,740	5,130	7,650	4.043	2.711

I-66 (E-W) & Route 15 (N-S) Interchange Mainlines

Leg	C3I Worst Case Volumes		Modeled Demand		Ratio (C3I/Mod.)		
	Lanes	Volume/lane	Volumes	AM	PM	AM	PM
N.Leg App.	5	1037	5,185	1,490	2,130	3.480	2.434
N.Leg Dep.	5	1037	5,185	660	775	7.856	6.690
S.Leg App.	5	1037	5,185	660	775	7.856	6.690
S.Leg Dep.	5	1037	5,185	1,490	2,130	3.480	2.434
W.Leg App.	3	1037	3,111	3,071	1,432	1.013	2.172
W.Leg Dep.	3	1037	3,111	3,071	1,432	1.013	2.172
E.Leg App.	3	1037	3,111	1,101	2,715	2.826	1.146
E.Leg Dep.	3	1037	3,111	1,101	2,715	2.826	1.146
Total	-	-	33,184	12,644	14,104	2.624	2.353

Ramp Intersection with Route 15 South of I-66

Leg	C3I Worst Case Volumes		Modeled Demand		Ratio (C3I/Mod.)		
	Lanes	Volume/lane	Volumes	AM	PM	AM	PM
N.Leg App.	3	1037	3,111	1,490	2,130	2.088	1.461
N.Leg Dep.	3	1037	3,111	660	775	4.714	4.014
S.Leg App.	3	1037	3,111	1,365	1,080		
S.Leg Dep.	3	1037	3,111	740	1,785		
W.Leg App.	2	1037	2,074	190	65	10.916	31.908
W.Leg Dep.	2	1037	2,074	0	0		
E.Leg App.	2	1037	2,074	0	0		
E.Leg Dep.	2	1037	2,074	1,645	715	1.261	2.901
Total	-	-	20,740	6,090	6,550	3.406	3.166

WORST-CASE VERSUS MODELED TRAFFIC VOLUMES

UPC 93577 - I66 Widening (Route 15 to Route 29)

2036 (Design Year Build)

Ramp Intersection (E-W) with Route 15 (N-S) North of I-66

Leg	C3I Worst Case Volumes		Modeled Demand		Ratio (C3I/Mod.)		
	Lanes	Volume/lane	Volumes	AM	PM	AM	PM
N.Leg App.	3	1037	3,111	1,815	1,815	1.714	1.714
N.Leg Dep.	3	1037	3,111	1,620	2,125	1.920	1.464
S.Leg App.	3	1037	3,111	1,225	1,275	2.540	2.440
S.Leg Dep.	3	1037	3,111	2,005	2,945	1.552	1.056
W.Leg App.	2	1037	2,074	0	0		
W.Leg Dep.	2	1037	2,074	320	740	6.481	2.803
E.Leg App.	2	1037	2,074	905	2,720	2.292	0.763
E.Leg Dep.	2	1037	2,074	0	0		
Total	-	-	20,740	7,890	11,620	2.629	1.785

I-66 (E-W) & Route 15 (N-S) Interchange Mainlines

Leg	C3I Worst Case Volumes		Modeled Demand		Ratio (C3I/Mod.)		
	Lanes	Volume/lane	Volumes	AM	PM	AM	PM
N.Leg App.	5	1037	5,185	2,005	2,945	2.586	1.761
N.Leg Dep.	5	1037	5,185	1,225	1,275	4.233	4.067
S.Leg App.	5	1037	5,185	1,225	1,275	4.233	4.067
S.Leg Dep.	5	1037	5,185	2,005	2,945	2.586	1.761
W.Leg App.	3	1037	3,111	4,656	2,171	0.668	1.433
W.Leg Dep.	3	1037	3,111	4,656	2,171	0.668	1.433
E.Leg App.	3	1037	3,111	1,705	4,203	1.825	0.740
E.Leg Dep.	3	1037	3,111	1,705	4,203	1.825	0.740
Total	-	-	33,184	19,182	21,188	1.730	1.566

Ramp Intersection with Route 15 South of I-66

Leg	C3I Worst Case Volumes		Modeled Demand		Ratio (C3I/Mod.)		
	Lanes	Volume/lane	Volumes	AM	PM	AM	PM
N.Leg App.	3	1037	3,111	2,005	2,945	1.552	1.056
N.Leg Dep.	3	1037	3,111	1,225	1,275	2.540	2.440
S.Leg App.	3	1037	3,111	2,150	1,670		
S.Leg Dep.	3	1037	3,111	985	2,495		
W.Leg App.	2	1037	2,074	475	160	4.366	12.963
W.Leg Dep.	2	1037	2,074	0	0		
E.Leg App.	2	1037	2,074	0	0		
E.Leg Dep.	2	1037	2,074	2,420	1,005	0.857	2.064
Total	-	-	20,740	9,260	9,550	2.240	2.172

Traffic Forecasts

VDOT Northern Virginia District

May 2011



COMMONWEALTH of VIRGINIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

4975 Alliance Drive
Fairfax, VA 22030
(800) FOR-ROAD

GREG WHIRLEY
COMMISSIONER

May 18, 2011

TO: Monica Franz
Amir Salahshoor
Christopher Voigt

FR: Ed Azimi

RE: I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29
UPC# 93577, Activity Code 616

We are forwarding you the traffic data required for LD-104 (Revised design year), Air and Noise studies. The Existing turning and 24-hour traffic volume were collected in March and May 2011. For the traffic forecasts, we consulted the 2010 CLRP model outputs for the 2011 and 2030, and analyzed the latest Regional Cooperative Land Use Forecasts, Round 8.0 for the Prince William County and Transportation Area Zones (TAZ) north of I-66. The Existing 2011, the forecasted *Build*; Interim year 2014 and Design year 2036 traffic data including peak hour directional **HOV** volumes are illustrated in attached **Figures 1 through 4**.

The peak hour and daily truck percentages are presented in Table 1. For the Air and Noise traffic data, we ran the ENTRADA program, version 11.5, and the inputs and outputs are in attached in Appendix A.

Table 1 – I-66 and US Route 15 Existing and Future Truck Data

US-15 North of I-66 Truck Data			
Period	Class 4-5	Class 6-7	Class 8+
AADT	2%	1%	3%
AMPH	2%	1%	3%
PMPH	1%	1%	2%
I-66 EB bet. US-29&15 Truck Data			
AADT	1%	3%	2%
AMPH	1%	1%	1%
PMPH	1%	2%	1%

I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29 to US Route 15,
UPC# 93577, Activity Code 616

I-66 WB bet. US-29&15 Truck Data			
AADT	4%	3%	1%
AMPH	7%	3%	3%
PMPH	3%	1%	1%

- Plan Design Year Level of Service: **Directional Peak Hour LOS “C”**
- Do-nothing Design Year Level of Service: **Directional Peak Hour LOS “F”**
- Functional Classification: **URBAN INTERSTATE & INTERSTATE RAMP**

If additional information is required, please advise.

Attachments.

Cc: Kanathur “Kanti” Srikanth
Fatemeh Allahdoust

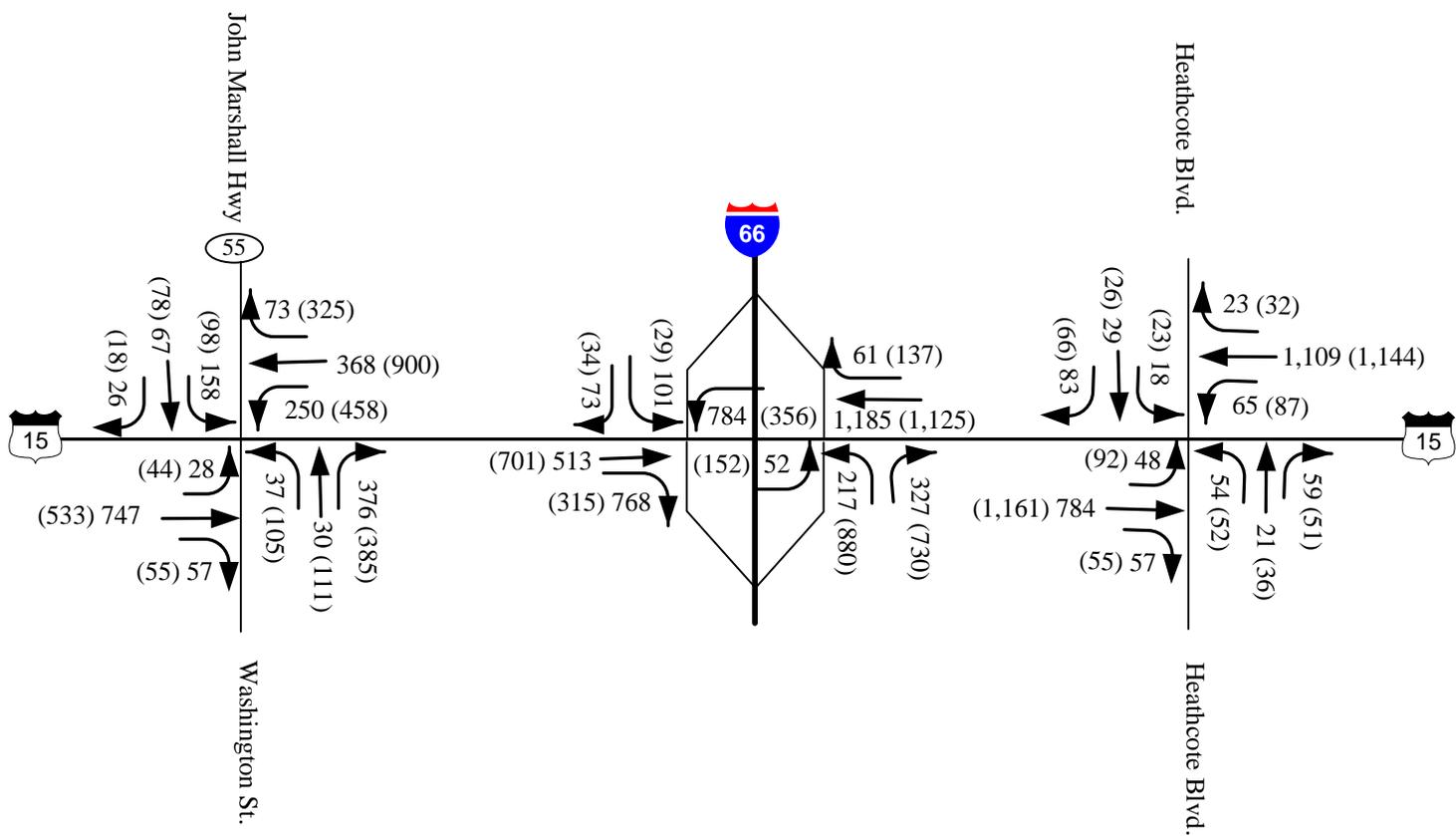
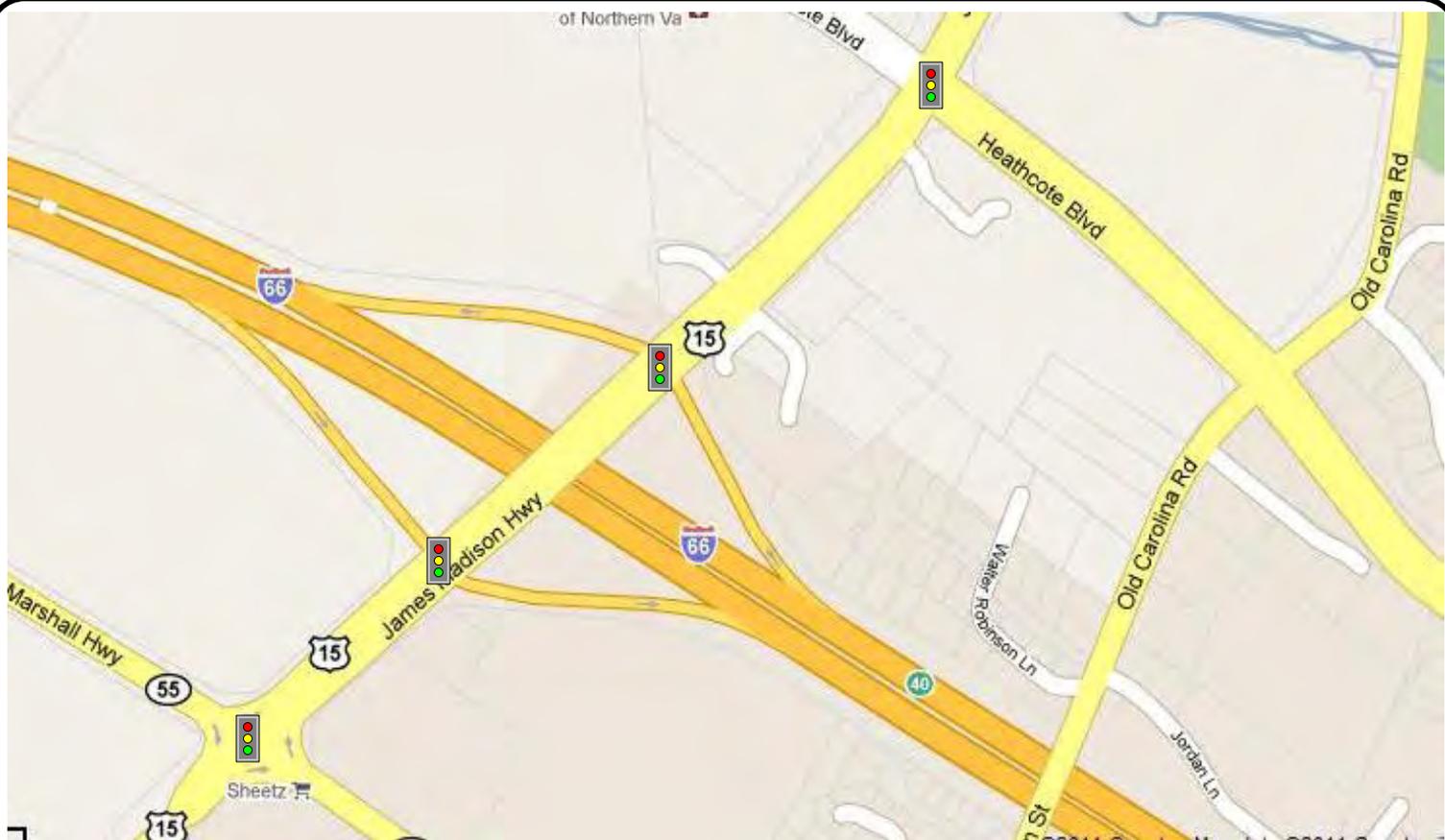


Figure 1 – Existing 2011 Peak Hour Traffic Volume (ENTRADA)

I-66 Two-way Widening (1 HOV + 1 SOV) From US-29 to US-15
 Project: 0066-076-003-P101, UPC# 93577/Act. 616



May 18, 2011



NOVA-TP<EA>

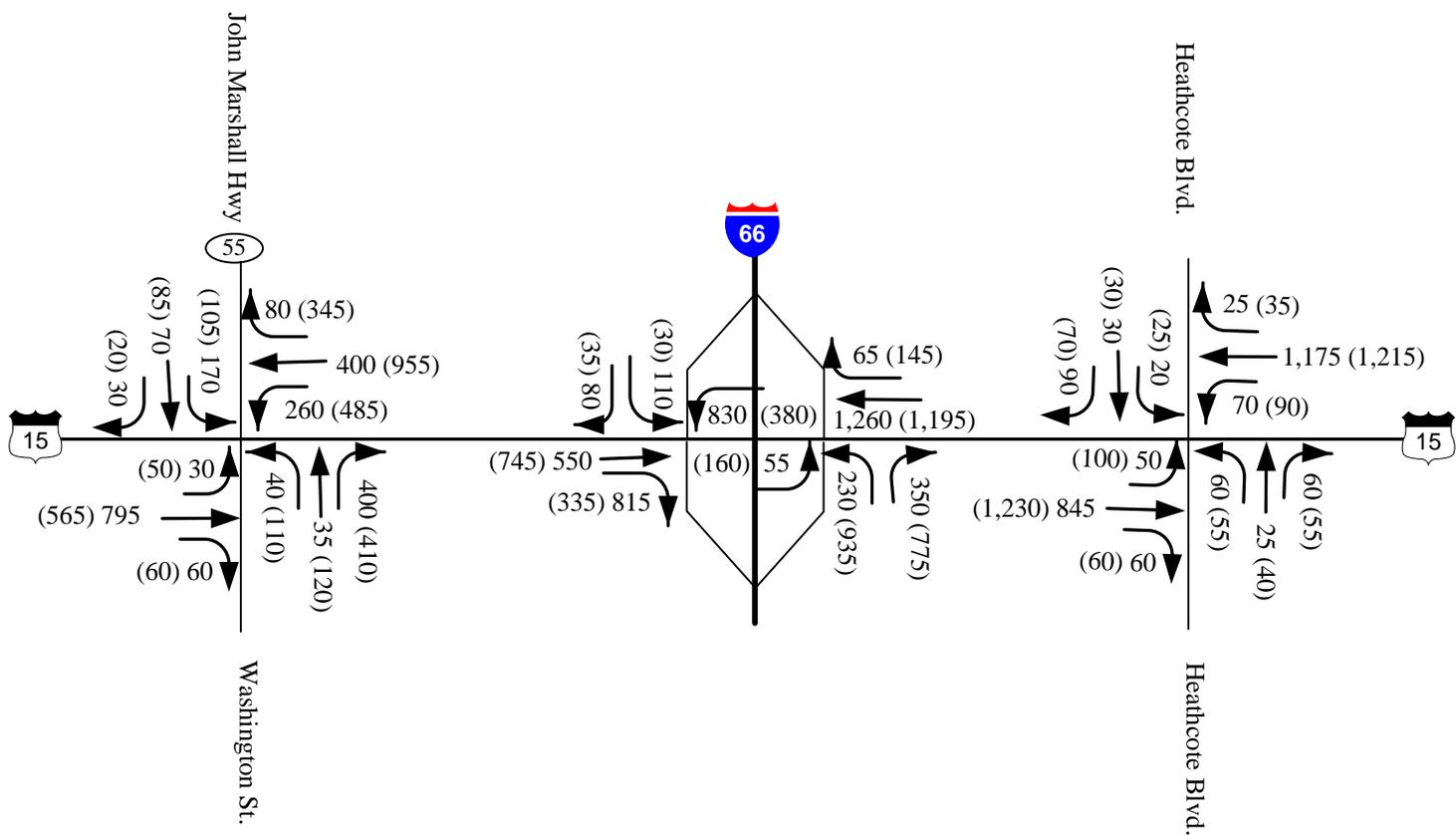
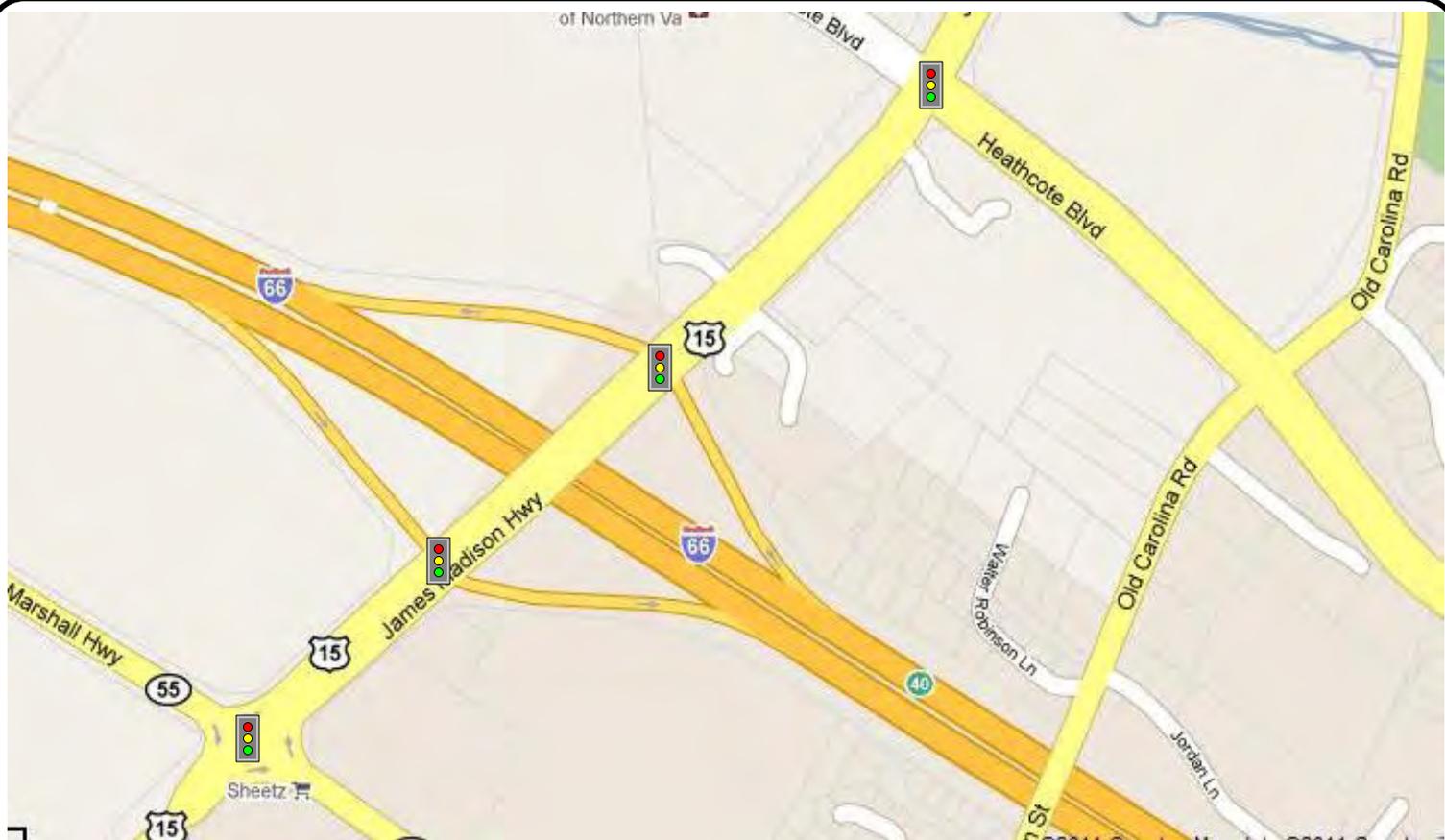


Figure 2 – Interim Build Year 2014 Peak Hour Traffic Volume (ENTRADA)

I-66 Two-way Widening (1 HOV + 1 SOV) From US-29 to US-15
 Project: 0066-076-003-P101, UPC# 93577/Act. 616



May 18, 2011



NOVA-TP<EA>

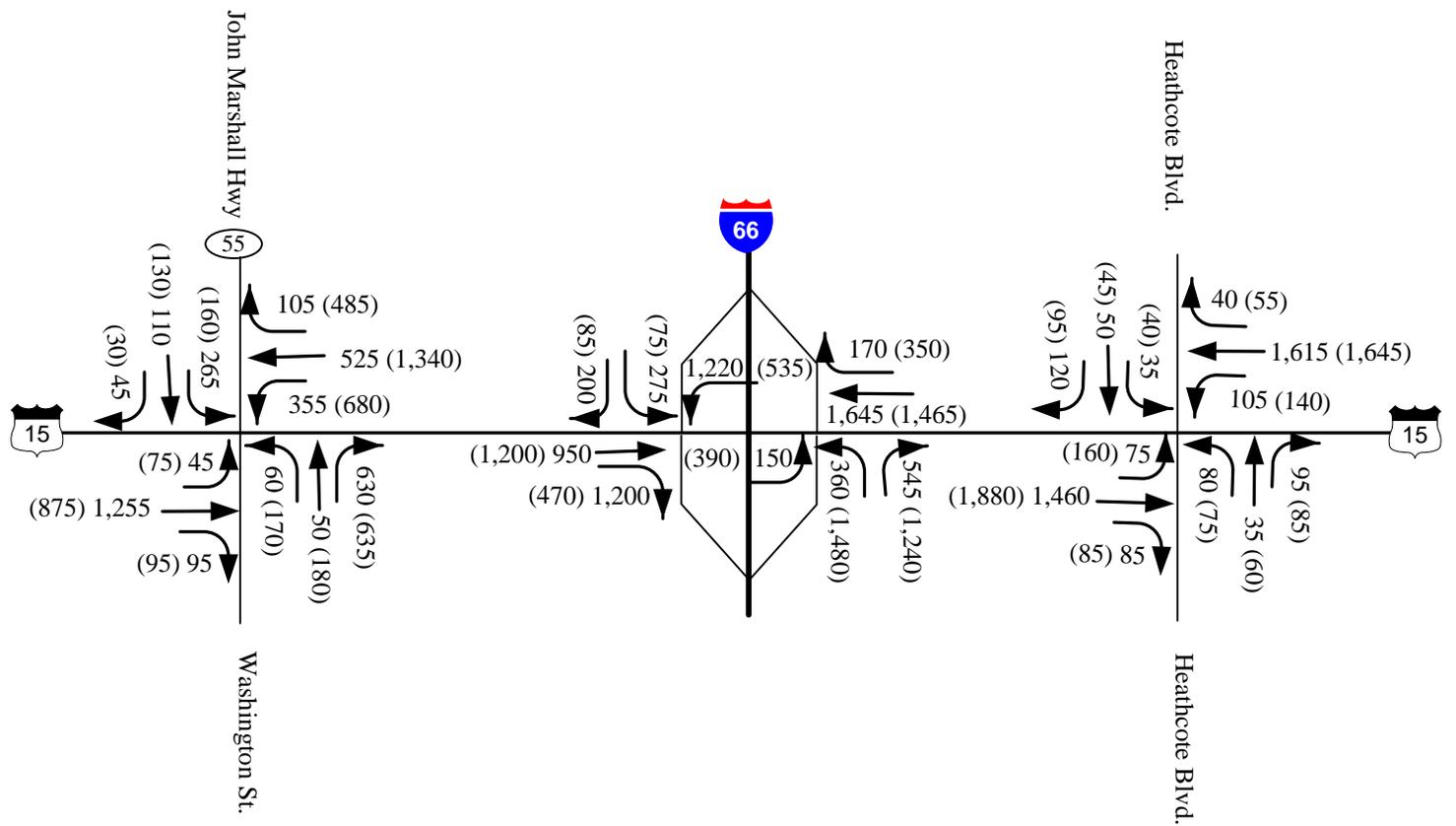
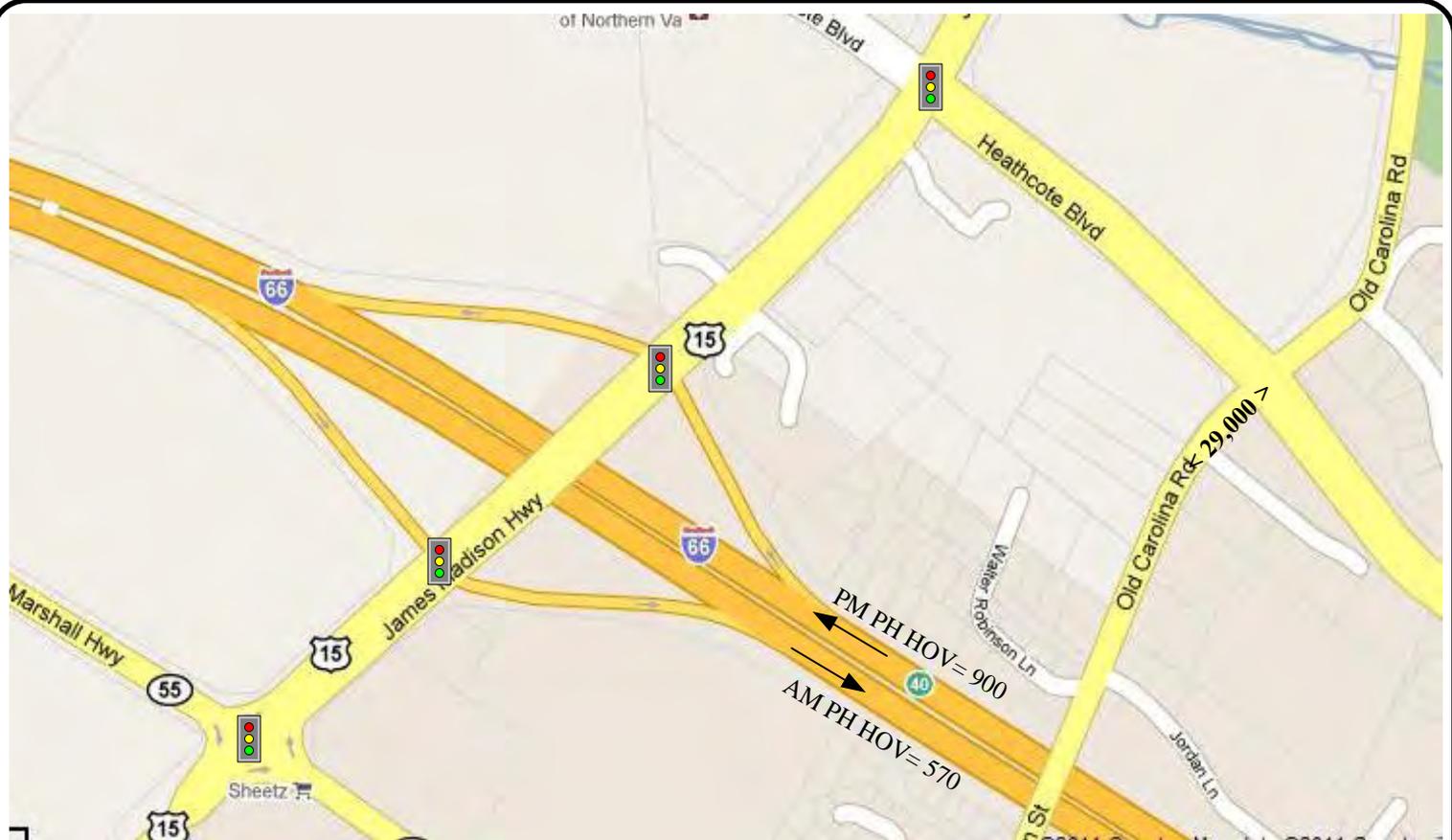


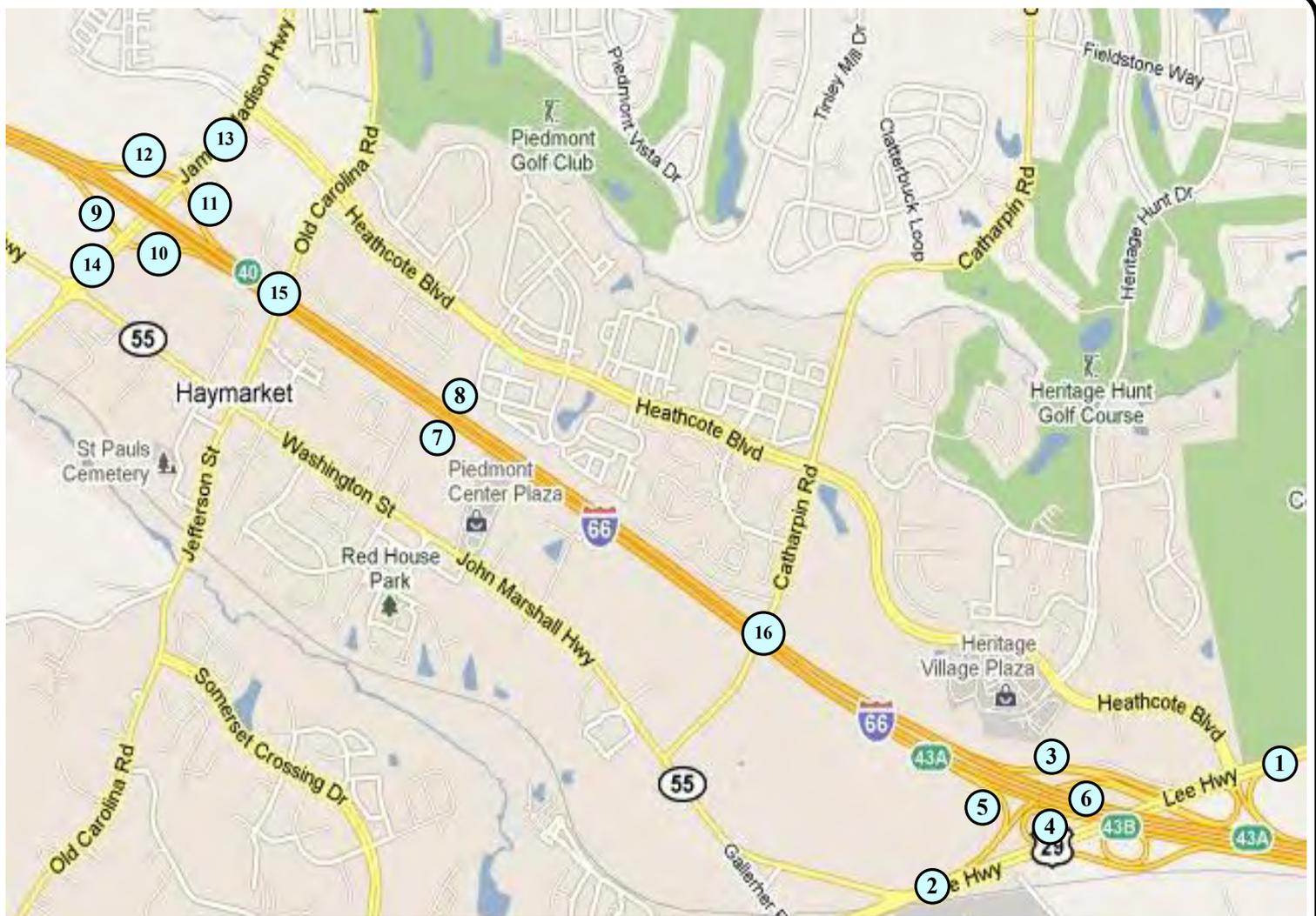
Figure 3 – Design Build Year 2036 AM and (PM) Peak Hour Traffic Volume (ENTRADA)

I-66 Two-way Widening (1 HOV + 1 SOV) From US-29 to US-15
 Project: 0066-076-003-P101, UPC# 93577/Act. 616



May 18, 2011





ENTRADA Study Area ADT						
#	Facility	2011 Exist	2014 Bld	2014 Nblld	2036 Bld	2036 Nblld
<<< Gainesville I-66/US-29 >>>						
1	US-29 North of I-66	19,000	20,000	20,000	40,000	39,000
2	US-29 South of I-66	52,000	55,000	55,000	69,000	67,000
3	US-29 On-Ramp to I-66 WB	1,200	1,300	1,300	1,900	1,700
4	US-29 SB On-Ramp to I-66 EB	5,200	5,500	5,500	8,300	7,200
5	I-66 EB Off-Ramp to US-29 SB	1,700	1,800	1,800	2,700	2,300
6	I-66 WB Off-Ramp to US-29 SB	17,100	18,100	18,100	27,400	23,600
<<< Haymarket I-66/US-15 >>>						
7	I-66 EB bet. US-29 & US-15	29,000	31,000	31,000	47,000	40,000
8	I-66 WB bet. US-29 & US-15	29,000	31,000	31,000	48,000	40,000
9	I-66 EB Off-Ramp to US-15	1,900	2,000	2,000	5,300	5,200
10	I-66 EB On-Ramp from US-15	13,200	14,000	14,000	20,100	19,800
11	I-66 WB Off-Ramp to US-15	12,600	13,000	13,000	21,200	20,800
12	I-66 WB On-Ramp from US-15	2,100	2,200	2,200	5,300	5,200
13	US-15 North of I-66	30,000	31,000	31,000	40,000	39,000
14	US-15 South of I-66	31,000	32,000	32,000	48,000	47,000
<<< I-66 Overpass >>>						
15	Old Carolina Road	7,000	8,000	8,000	12,000	10,000
16	Catharpin Road	6,000	6,000	6,000	13,000	12,000

Figure 3 – Existing 2011, Interim Year 2014 and Design Year 2036 Average Daily Traffic Volume

I-66 Two-way Widening (1 HOV + 1 SOV) From US-29 to US-15
 Project: 0066-076-003-P101, UPC# 93577/Act. 616



May 18, 2011



NOVA-TP<EA>

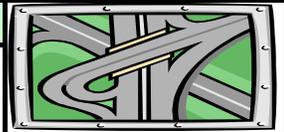
I-66 Widening (Two-way, 1 HOV & 1 SOV Lane) from Gainesville US Route 29 to US Route 15,
UPC# 93577, Activity Code 616

APPENDIX A

ENTRADA Ver. 11.5
Inputs and Outputs



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 29, Lee Hwy	Direction	N/S	Present Year	2011	Analyst
From	I-66	Map Reference	DC 5754 & 575	Interim Year	2014	EA
To	The North	County	Prince William County	Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

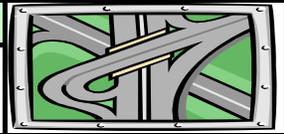
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.71 & 2.1		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	19,000	20,000	20,000	40,000	39,000	Multi-lane Hwy BPR parameters selected.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	768	768	768	768	768			
Facility Type	Major Art.	Major Art.	Major Art.	Major Art.	Major Art.			
Median Type	Divided	Divided	Divided	Divided	Divided			
NB # of lanes	3	3	3	3	3			
SB # of lanes	3	3	3	3	3			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	45	45	45	45	45			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	55	55	55	55	55	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.064	6.38%	0.064	0.064	0.064	0.064	
7:00	0.079	7.90%	0.079	0.079	0.079	0.079	
8:00	0.067	6.67%	0.067	0.067	0.067	0.067	
9:00	0.050	5.01%	0.050	0.050	0.050	0.050	
10:00	0.040	3.98%	0.040	0.040	0.040	0.040	
11:00	0.040	4.05%	0.040	0.040	0.040	0.040	
12:00	0.045	4.45%	0.045	0.045	0.045	0.045	
13:00	0.048	4.82%	0.048	0.048	0.048	0.048	
14:00	0.058	5.83%	0.058	0.058	0.058	0.058	
15:00	0.076	7.58%	0.076	0.076	0.076	0.076	
16:00	0.091	9.11%	0.091	0.091	0.091	0.091	
17:00	0.098	9.85%	0.098	0.098	0.098	0.098	
18:00	0.079	7.93%	0.079	0.079	0.079	0.079	
19:00	0.054	5.40%	0.054	0.054	0.054	0.054	
20:00	0.030	3.00%	0.030	0.030	0.030	0.030	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	

**ENTRADA® - Environmental Traffic Data Program Inputs**I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616



Facility	US Route 29, Lee Hwy		Direction		N/S	Present Year	2011	Analyst
From	I-66		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	The North		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(NB Vol.*%T) + (SB Vol.*%T)] / 2 way Vol. T: Truck
	NB			SB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	1.1%	0.7%	0.7%	12.4%	2.7%	3.4%	3.2%	1.1%	4.2%	
7:00	1.0%	0.6%	0.8%	3.3%	3.7%	1.3%	1.6%	1.5%	3.1%	
8:00	1.8%	1.0%	1.0%	2.7%	3.6%	1.2%	2.1%	1.9%	4.0%	
9:00	3.9%	1.9%	1.0%	2.9%	2.9%	1.4%	3.5%	2.2%	5.7%	
10:00	2.8%	2.7%	2.1%	2.0%	4.9%	3.6%	2.5%	3.6%	6.1%	
11:00	1.9%	2.3%	1.4%	1.8%	4.3%	1.8%	1.9%	3.3%	5.1%	
12:00	1.8%	3.5%	1.7%	1.3%	4.4%	2.2%	1.6%	3.9%	5.5%	
13:00	2.1%	3.3%	1.8%	9.1%	3.0%	1.6%	5.7%	3.1%	8.8%	
14:00	2.7%	2.1%	0.7%	2.4%	2.8%	1.1%	2.5%	2.4%	4.9%	
15:00	2.0%	1.5%	1.0%	1.3%	1.6%	0.6%	1.6%	1.6%	3.1%	
16:00	3.9%	1.7%	0.4%	1.0%	0.3%	0.2%	2.2%	0.9%	3.1%	
17:00	1.1%	0.6%	0.6%	0.4%	0.2%	0.1%	0.7%	0.4%	1.1%	
18:00	0.8%	0.2%	0.4%	0.4%	0.2%	0.2%	0.6%	0.2%	0.7%	
19:00	0.8%	0.2%	0.6%	0.4%	0.1%	0.4%	0.6%	0.2%	0.7%	
20:00	0.5%	1.4%	0.0%	0.1%	0.0%	0.8%	0.3%	0.7%	0.9%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	NB					SB				
	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	2011	Interim Bld	Interim Nblld	Design Bld	Design Nblld
0:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
2:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
3:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
4:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
5:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
6:00	81%	81%	81%	81%	81%	19%	19%	19%	19%	19%
7:00	73%	73%	73%	73%	73%	27%	27%	27%	27%	27%
8:00	64%	64%	64%	64%	64%	36%	36%	36%	36%	36%
9:00	63%	63%	63%	63%	63%	37%	37%	37%	37%	37%
10:00	58%	58%	58%	58%	58%	42%	42%	42%	42%	42%
11:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
12:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
13:00	48%	48%	48%	48%	48%	52%	52%	52%	52%	52%
14:00	46%	46%	46%	46%	46%	54%	54%	54%	54%	54%
15:00	44%	44%	44%	44%	44%	56%	56%	56%	56%	56%
16:00	42%	42%	42%	42%	42%	58%	58%	58%	58%	58%
17:00	45%	45%	45%	45%	45%	55%	55%	55%	55%	55%
18:00	43%	43%	43%	43%	43%	57%	57%	57%	57%	57%
19:00	43%	43%	43%	43%	43%	57%	57%	57%	57%	57%
20:00	47%	47%	47%	47%	47%	53%	53%	53%	53%	53%
21:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
22:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
23:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

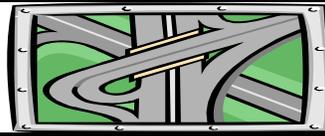
Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov



ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616



Route	US Route 29, Lee Hwy		Map Reference	ADC 5754 & 5755	
From	I-66		Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
To	The North		Present Year 2011 ADT	19,000	No-build
City/County	Prince William County		Interim Year 2014 ADT	20,000	20,000
Date	5/13/2011	Time Span	24 Hours	Design Year 2036 ADT	40,000 39,000

Northbound

Starting Time	Hourly Volume						Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck			
								2A-6T	3A+	Total	
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
6:00	986	1,038	1,038	2,075	2,023	6.38%	81%	1.1%	0.7%	1.7%	
7:00	1,096	1,153	1,153	2,307	2,249	7.90%	73%	1.0%	0.6%	1.7%	
8:00	806	848	848	1,696	1,653	6.67%	64%	1.8%	1.0%	2.7%	
9:00	600	632	632	1,264	1,232	5.01%	63%	3.9%	1.9%	5.7%	
10:00	435	458	458	916	893	3.98%	58%	2.8%	2.7%	5.5%	
11:00	403	425	425	849	828	4.05%	52%	1.9%	2.3%	4.2%	
12:00	436	459	459	918	895	4.45%	52%	1.8%	3.5%	5.3%	
13:00	443	467	467	933	910	4.82%	48%	2.1%	3.3%	5.3%	
14:00	510	537	537	1,073	1,047	5.83%	46%	2.7%	2.1%	4.7%	
15:00	637	671	671	1,342	1,308	7.58%	44%	2.0%	1.5%	3.5%	
16:00	728	766	766	1,532	1,494	9.11%	42%	3.9%	1.7%	5.6%	
17:00	836	880	880	1,759	1,715	9.85%	45%	1.1%	0.6%	1.6%	
18:00	648	683	683	1,365	1,331	7.93%	43%	0.8%	0.2%	1.0%	
19:00	446	470	470	940	916	5.40%	43%	0.8%	0.2%	1.0%	
20:00	270	284	284	568	554	3.00%	47%	0.5%	1.4%	1.9%	
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%	

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	48	48	48	48	48	48	34	34	35	35
7:00	47	47	46	46	46	46	31	31	32	32
8:00	50	50	50	50	50	50	39	39	40	40
9:00	52	52	52	52	52	52	45	45	45	45
10:00	53	53	53	53	53	53	49	49	49	49
11:00	53	53	53	53	53	53	50	50	50	50
12:00	53	53	53	53	53	53	49	49	49	49
13:00	53	53	53	53	53	53	49	49	49	49
14:00	53	53	53	53	53	53	47	47	48	48
15:00	52	52	52	52	52	52	44	44	44	44
16:00	51	51	51	51	51	51	42	42	42	42
17:00	50	50	50	50	50	50	38	38	39	39
18:00	52	52	52	52	52	52	44	44	44	44
19:00	53	53	53	53	53	53	49	49	49	49
20:00	54	54	54	54	54	54	53	53	53	53
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT

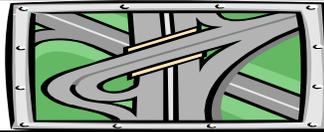


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 29, Lee Hwy		
From	I-66		
To	The North		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	19,000	No-build
Interim Year 2014 ADT	20,000	20,000
Design Year 2036 ADT	40,000	39,000

Southbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	227	239	239	477	465	6.38%	19%	12.4%	2.7%	15.1%
7:00	405	427	427	854	832	7.90%	27%	3.3%	3.7%	6.9%
8:00	461	486	486	971	947	6.67%	36%	2.7%	3.6%	6.3%
9:00	352	371	371	741	723	5.01%	37%	2.9%	2.9%	5.8%
10:00	320	337	337	674	658	3.98%	42%	2.0%	4.9%	6.9%
11:00	366	385	385	770	750	4.05%	48%	1.8%	4.3%	6.2%
12:00	410	431	431	862	841	4.45%	48%	1.3%	4.4%	5.7%
13:00	472	497	497	993	968	4.82%	52%	9.1%	3.0%	12.1%
14:00	598	630	630	1,260	1,228	5.83%	54%	2.4%	2.8%	5.1%
15:00	804	846	846	1,692	1,650	7.58%	56%	1.3%	1.6%	2.9%
16:00	1,004	1,056	1,056	2,113	2,060	9.11%	58%	1.0%	0.3%	1.3%
17:00	1,035	1,089	1,089	2,179	2,124	9.85%	55%	0.4%	0.2%	0.6%
18:00	858	903	903	1,805	1,760	7.93%	57%	0.4%	0.2%	0.6%
19:00	580	610	610	1,221	1,190	5.40%	57%	0.4%	0.1%	0.5%
20:00	300	316	316	632	616	3.00%	53%	0.1%	0.0%	0.1%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	54	54	54	54	54	54	53	53	53	53
7:00	53	53	53	53	53	53	50	50	50	50
8:00	53	53	53	53	53	53	49	49	49	49
9:00	54	54	54	54	54	54	51	51	51	51
10:00	54	54	54	54	54	54	51	51	51	51
11:00	54	54	54	54	54	54	51	51	51	51
12:00	53	53	53	53	53	53	49	49	50	50
13:00	53	53	53	53	53	53	48	48	48	48
14:00	52	52	52	52	52	52	45	45	45	45
15:00	50	50	50	50	50	50	39	39	40	40
16:00	48	48	48	48	48	48	34	34	35	35
17:00	48	48	48	48	48	48	33	33	34	34
18:00	50	50	50	50	50	50	38	38	39	39
19:00	52	52	52	52	52	52	46	46	46	46
20:00	54	54	54	54	54	54	52	52	52	52
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow

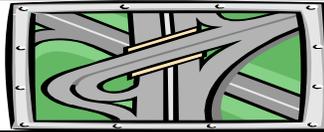


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 29, Lee Hwy		
From	I-66		
To	The North		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	19,000	No-build
Interim Year 2014 ADT	20,000	20,000
Design Year 2036 ADT	40,000	39,000

Two-way

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.			
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	Two-way	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
6:00	1,212	1,276	1,276	2,552	2,489	6.38%	=	3.2%	1.1%	4.2%
7:00	1,501	1,580	1,580	3,161	3,082	7.90%	=	1.6%	1.5%	3.1%
8:00	1,267	1,333	1,333	2,667	2,600	6.67%	=	2.1%	1.9%	4.0%
9:00	953	1,003	1,003	2,005	1,955	5.01%	=	3.5%	2.2%	5.7%
10:00	756	795	795	1,591	1,551	3.98%	=	2.5%	3.6%	6.1%
11:00	769	810	810	1,619	1,579	4.05%	=	1.9%	3.3%	5.1%
12:00	846	890	890	1,781	1,736	4.45%	=	1.6%	3.9%	5.5%
13:00	915	963	963	1,926	1,878	4.82%	=	5.7%	3.1%	8.8%
14:00	1,108	1,167	1,167	2,333	2,275	5.83%	=	2.5%	2.4%	4.9%
15:00	1,441	1,517	1,517	3,034	2,958	7.58%	=	1.6%	1.6%	3.1%
16:00	1,731	1,823	1,823	3,645	3,554	9.11%	=	2.2%	0.9%	3.1%
17:00	1,871	1,969	1,969	3,938	3,840	9.85%	=	0.7%	0.4%	1.1%
18:00	1,506	1,585	1,585	3,171	3,091	7.93%	=	0.6%	0.2%	0.7%
19:00	1,026	1,080	1,080	2,160	2,106	5.40%	=	0.6%	0.2%	0.7%
20:00	570	600	600	1,200	1,170	3.00%	=	0.3%	0.7%	0.9%
21:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%

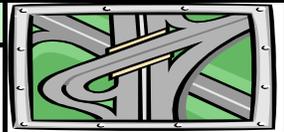
Average Two-way Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	50	50	49	49	49	49	38	38	38	38
7:00	49	49	48	48	48	48	36	36	37	37
8:00	51	51	51	51	51	51	43	43	43	43
9:00	53	53	53	53	53	53	47	47	47	47
10:00	53	53	53	53	53	53	50	50	50	50
11:00	54	54	53	53	53	53	50	50	50	50
12:00	53	53	53	53	53	53	49	49	49	49
13:00	53	53	53	53	53	53	48	48	49	49
14:00	53	53	52	52	52	52	46	46	46	46
15:00	51	51	51	51	51	51	41	41	42	42
16:00	50	50	49	49	49	49	37	37	38	38
17:00	49	49	48	48	48	48	36	36	36	36
18:00	51	51	50	50	50	50	41	41	41	41
19:00	53	53	53	53	53	53	47	47	48	48
20:00	54	54	54	54	54	54	52	52	52	52
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 29, Lee Hwy	Direction	N/S	Present Year	2011	Analyst
From	I-66	Map Reference	DC 5754 & 575	Interim Year	2014	EA
To	Route 55 and Route 619	County	Prince William County	Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

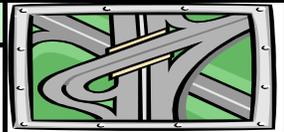
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.71 & 2.1		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	52,000	55,000	55,000	69,000	67,000	Multi-lane Hwy BPR parameters selected.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,008	1,008	1,008	1,008	1,008			
Facility Type	Major Art.	Major Art.	Major Art.	Major Art.	Major Art.			
Median Type	Divided	Divided	Divided	Divided	Divided			
NB # of lanes	2	2	2	2	2			
SB # of lanes	3	3	3	3	3			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	45	45	45	45	45			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	55	55	55	55	55	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.059	5.94%	0.059	0.059	0.059	0.059	
7:00	0.063	6.33%	0.063	0.063	0.063	0.063	
8:00	0.058	5.84%	0.058	0.058	0.058	0.058	
9:00	0.053	5.29%	0.053	0.053	0.053	0.053	
10:00	0.050	4.95%	0.050	0.050	0.050	0.050	
11:00	0.050	5.03%	0.050	0.050	0.050	0.050	
12:00	0.053	5.31%	0.053	0.053	0.053	0.053	
13:00	0.054	5.43%	0.054	0.054	0.054	0.054	
14:00	0.054	5.40%	0.054	0.054	0.054	0.054	
15:00	0.062	6.16%	0.062	0.062	0.062	0.062	
16:00	0.067	6.67%	0.067	0.067	0.067	0.067	
17:00	0.067	6.68%	0.067	0.067	0.067	0.067	
18:00	0.057	5.74%	0.057	0.057	0.057	0.057	
19:00	0.051	5.07%	0.051	0.051	0.051	0.051	
20:00	0.042	4.15%	0.042	0.042	0.042	0.042	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 29, Lee Hwy			Direction		N/S	Present Year		2011	Analyst
From	I-66			Map Reference		DC 5754 & 5755	Interim Year		2014	EA
To	Route 55 and Route 619			County	Prince William County		Design Year		2036	Ver. 2009-NG
Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									
	NB			SB			Weighted TWO-WAY (Editable)			Weighted %T = [(NB Vol.*%T) + (SB Vol.*%T)] / 2 way Vol. T: Truck
2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck		
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	0.6%	0.7%	1.1%	1.8%	1.1%	2.9%	0.9%	0.8%	1.7%	1.7%
7:00	0.7%	0.8%	1.0%	1.3%	1.3%	1.8%	0.9%	0.9%	1.8%	1.8%
8:00	1.3%	0.9%	1.0%	1.4%	1.2%	1.9%	1.3%	1.0%	2.3%	2.3%
9:00	1.4%	1.2%	1.4%	2.1%	1.0%	1.7%	1.7%	1.1%	2.8%	2.8%
10:00	1.8%	0.9%	1.6%	2.1%	1.3%	2.9%	1.9%	1.1%	3.0%	3.0%
11:00	1.5%	1.0%	1.7%	1.6%	1.4%	2.9%	1.5%	1.2%	2.8%	2.8%
12:00	1.5%	1.2%	1.8%	1.6%	1.1%	2.0%	1.5%	1.1%	2.7%	2.7%
13:00	1.4%	1.0%	1.4%	1.7%	1.1%	2.0%	1.5%	1.0%	2.6%	2.6%
14:00	1.7%	0.9%	1.1%	1.3%	1.0%	1.5%	1.5%	1.0%	2.5%	2.5%
15:00	0.9%	0.7%	1.3%	0.6%	0.6%	1.0%	0.7%	0.6%	1.4%	1.4%
16:00	0.6%	0.4%	1.0%	0.4%	0.4%	0.7%	0.5%	0.4%	0.9%	0.9%
17:00	0.5%	0.3%	0.7%	0.4%	0.5%	0.8%	0.5%	0.4%	0.9%	0.9%
18:00	0.5%	0.3%	0.7%	0.6%	0.4%	1.1%	0.6%	0.3%	0.9%	0.9%
19:00	0.4%	0.2%	1.5%	0.5%	0.2%	1.0%	0.4%	0.2%	0.6%	0.6%
20:00	0.7%	0.3%	1.5%	0.3%	0.4%	0.6%	0.5%	0.3%	0.8%	0.8%
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Starting Time	Directional Split, D-factor									
	NB					SB				
	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	2011	Interim Bld	Interim Nblld	Design Bld	Design Nblld
0:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
2:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
3:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
4:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
5:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
6:00	76%	76%	76%	76%	76%	24%	24%	24%	24%	24%
7:00	68%	68%	68%	68%	68%	32%	32%	32%	32%	32%
8:00	61%	61%	61%	61%	61%	39%	39%	39%	39%	39%
9:00	59%	59%	59%	59%	59%	41%	41%	41%	41%	41%
10:00	57%	57%	57%	57%	57%	43%	43%	43%	43%	43%
11:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
12:00	49%	49%	49%	49%	49%	51%	51%	51%	51%	51%
13:00	49%	49%	49%	49%	49%	51%	51%	51%	51%	51%
14:00	48%	48%	48%	48%	48%	52%	52%	52%	52%	52%
15:00	43%	43%	43%	43%	43%	57%	57%	57%	57%	57%
16:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
17:00	43%	43%	43%	43%	43%	57%	57%	57%	57%	57%
18:00	43%	43%	43%	43%	43%	57%	57%	57%	57%	57%
19:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
20:00	41%	41%	41%	41%	41%	59%	59%	59%	59%	59%
21:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
22:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
23:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

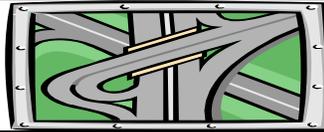


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 29, Lee Hwy		
From	I-66		
To	Route 55 and Route 619		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	52,000	No-build
Interim Year 2014 ADT	55,000	55,000
Design Year 2036 ADT	69,000	67,000

Northbound

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck		
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	2,361	2,497	2,497	3,133 *	3,042 *	5.94%	76%	0.6%	0.7%	1.3%
7:00	2,222	2,350	2,350	2,948 *	2,863 *	6.33%	68%	0.7%	0.8%	1.4%
8:00	1,862	1,970	1,970	2,471	2,400	5.84%	61%	1.3%	0.9%	2.1%
9:00	1,620	1,713	1,713	2,150	2,087	5.29%	59%	1.4%	1.2%	2.6%
10:00	1,481	1,567	1,567	1,965	1,908	4.95%	57%	1.8%	0.9%	2.7%
11:00	1,386	1,466	1,466	1,839	1,786	5.03%	53%	1.5%	1.0%	2.5%
12:00	1,362	1,440	1,440	1,807	1,754	5.31%	49%	1.5%	1.2%	2.7%
13:00	1,375	1,454	1,454	1,824	1,772	5.43%	49%	1.4%	1.0%	2.4%
14:00	1,350	1,428	1,428	1,791	1,739	5.40%	48%	1.7%	0.9%	2.6%
15:00	1,371	1,450	1,450	1,819	1,766	6.16%	43%	0.9%	0.7%	1.6%
16:00	1,366	1,445	1,445	1,812	1,760	6.67%	39%	0.6%	0.4%	1.1%
17:00	1,497	1,583	1,583	1,986	1,928	6.68%	43%	0.5%	0.3%	0.8%
18:00	1,273	1,347	1,347	1,690	1,641	5.74%	43%	0.5%	0.3%	0.8%
19:00	1,028	1,088	1,088	1,365	1,325	5.07%	39%	0.4%	0.2%	0.6%
20:00	881	931	931	1,168	1,135	4.15%	41%	0.7%	0.3%	1.0%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	27	27	25	25	25	25	19	19	19	19
7:00	28	28	27	27	27	27	20	20	21	21
8:00	33	33	32	32	32	32	25	25	26	26
9:00	37	37	35	35	35	35	29	29	30	30
10:00	39	39	37	37	37	37	31	31	32	32
11:00	40	40	39	39	39	39	33	33	34	34
12:00	40	40	39	39	39	39	33	33	34	34
13:00	41	41	39	39	39	39	34	34	34	34
14:00	41	41	40	40	40	40	34	34	35	35
15:00	41	41	39	39	39	39	34	34	34	34
16:00	41	41	40	40	40	40	34	34	35	35
17:00	39	39	38	38	38	38	32	32	33	33
18:00	43	43	41	41	41	41	36	36	37	37
19:00	46	46	45	45	45	45	41	41	41	41
20:00	48	48	47	47	47	47	44	44	44	44
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

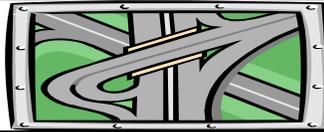


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 29, Lee Hwy		
From	I-66		
To	Route 55 and Route 619		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	52,000	No-build
Interim Year 2014 ADT	55,000	55,000
Design Year 2036 ADT	69,000	67,000

Southbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	728	770	770	966	938	5.94%	24%	1.8%	1.1%	2.9%
7:00	1,069	1,131	1,131	1,418	1,377	6.33%	32%	1.3%	1.3%	2.7%
8:00	1,176	1,244	1,244	1,561	1,515	5.84%	39%	1.4%	1.2%	2.6%
9:00	1,132	1,197	1,197	1,502	1,458	5.29%	41%	2.1%	1.0%	3.1%
10:00	1,095	1,158	1,158	1,453	1,411	4.95%	43%	2.1%	1.3%	3.4%
11:00	1,231	1,302	1,302	1,634	1,586	5.03%	47%	1.6%	1.4%	3.0%
12:00	1,400	1,481	1,481	1,858	1,804	5.31%	51%	1.6%	1.1%	2.6%
13:00	1,451	1,534	1,534	1,925	1,869	5.43%	51%	1.7%	1.1%	2.7%
14:00	1,460	1,544	1,544	1,937	1,881	5.40%	52%	1.3%	1.0%	2.3%
15:00	1,834	1,940	1,940	2,434	2,363	6.16%	57%	0.6%	0.6%	1.2%
16:00	2,105	2,226	2,226	2,793	2,712	6.67%	61%	0.4%	0.4%	0.8%
17:00	1,978	2,092	2,092	2,625	2,549	6.68%	57%	0.4%	0.5%	0.9%
18:00	1,714	1,813	1,813	2,274	2,208	5.74%	57%	0.6%	0.4%	0.9%
19:00	1,606	1,698	1,698	2,130	2,069	5.07%	61%	0.5%	0.2%	0.6%
20:00	1,279	1,353	1,353	1,697	1,648	4.15%	59%	0.3%	0.4%	0.7%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	52	52	52	52	52	52	51	51	51	51
7:00	50	50	50	50	50	50	47	47	47	47
8:00	49	49	49	49	49	49	46	46	46	46
9:00	50	50	49	49	49	49	46	46	47	47
10:00	50	50	49	49	49	49	46	46	47	47
11:00	48	48	48	48	48	48	44	44	45	45
12:00	47	47	46	46	46	46	42	42	43	43
13:00	47	47	46	46	46	46	42	42	42	42
14:00	47	47	46	46	46	46	42	42	42	42
15:00	43	43	42	42	42	42	37	37	38	38
16:00	41	41	39	39	39	39	34	34	34	34
17:00	42	42	41	41	41	41	35	35	36	36
18:00	44	44	43	43	43	43	38	38	39	39
19:00	45	45	45	45	45	45	40	40	41	41
20:00	49	49	48	48	48	48	45	45	45	45
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow

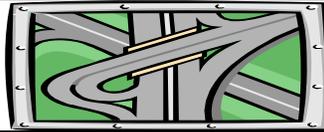


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 29, Lee Hwy		
From	I-66		
To	Route 55 and Route 619		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	52,000	No-build
Interim Year 2014 ADT	55,000	55,000
Design Year 2036 ADT	69,000	67,000

Two-way

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	Two-way	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
6:00	3,089	3,267	3,267	4,099	3,980	5.94%	=	0.9%	0.8%	1.7%
7:00	3,291	3,481	3,481	4,367	4,240	6.33%	=	0.9%	0.9%	1.8%
8:00	3,039	3,214	3,214	4,032	3,915	5.84%	=	1.3%	1.0%	2.3%
9:00	2,752	2,910	2,910	3,651	3,545	5.29%	=	1.7%	1.1%	2.8%
10:00	2,576	2,725	2,725	3,419	3,319	4.95%	=	1.9%	1.1%	3.0%
11:00	2,617	2,768	2,768	3,473	3,372	5.03%	=	1.5%	1.2%	2.8%
12:00	2,762	2,921	2,921	3,665	3,559	5.31%	=	1.5%	1.1%	2.7%
13:00	2,826	2,989	2,989	3,749	3,641	5.43%	=	1.5%	1.0%	2.6%
14:00	2,810	2,972	2,972	3,728	3,620	5.40%	=	1.5%	1.0%	2.5%
15:00	3,205	3,390	3,390	4,253	4,130	6.16%	=	0.7%	0.6%	1.4%
16:00	3,471	3,671	3,671	4,605	4,472	6.67%	=	0.5%	0.4%	0.9%
17:00	3,475	3,675	3,675	4,611	4,477	6.68%	=	0.5%	0.4%	0.9%
18:00	2,987	3,160	3,160	3,964	3,849	5.74%	=	0.6%	0.3%	0.9%
19:00	2,634	2,786	2,786	3,495	3,394	5.07%	=	0.4%	0.2%	0.6%
20:00	2,159	2,284	2,284	2,865	2,782	4.15%	=	0.5%	0.3%	0.8%
21:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%

Average Two-way Hourly Speed (MPH)

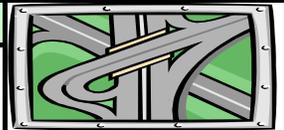
Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	33	33	31	31	31	31	26	26	27	27
7:00	35	35	34	34	34	34	29	29	30	30
8:00	39	39	38	38	38	38	33	33	34	34
9:00	42	42	41	41	41	41	36	36	37	37
10:00	43	43	42	42	42	42	38	38	38	38
11:00	44	44	43	43	43	43	38	38	39	39
12:00	44	44	43	43	43	43	38	38	39	39
13:00	44	44	43	43	43	43	38	38	38	38
14:00	44	44	43	43	43	43	38	38	39	39
15:00	42	42	41	41	41	41	35	35	36	36
16:00	41	41	39	39	39	39	34	34	34	34
17:00	41	41	39	39	39	39	34	34	34	34
18:00	44	44	43	43	43	43	37	37	38	38
19:00	46	46	45	45	45	45	40	40	41	41
20:00	48	48	48	48	48	48	44	44	45	45
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound On-Ramp	Direction		E/W	Present Year	2011	Analyst
From	US-29	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	I-66 WB	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

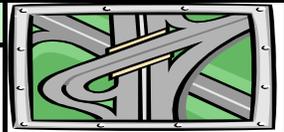
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	1,200	1,300	1,300	1,900	1,700	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	0	0	0	0	0			
N/A	1	1	1	1	1			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.032	3.18%	0.032	0.032	0.032	0.032	
7:00	0.041	4.08%	0.041	0.041	0.041	0.041	
8:00	0.052	5.18%	0.052	0.052	0.052	0.052	
9:00	0.027	2.75%	0.027	0.027	0.027	0.027	
10:00	0.026	2.63%	0.026	0.026	0.026	0.026	
11:00	0.024	2.43%	0.024	0.024	0.024	0.024	
12:00	0.027	2.66%	0.027	0.027	0.027	0.027	
13:00	0.058	5.76%	0.058	0.058	0.058	0.058	
14:00	0.070	7.00%	0.070	0.070	0.070	0.070	
15:00	0.113	11.26%	0.113	0.113	0.113	0.113	
16:00	0.177	17.71%	0.177	0.177	0.177	0.177	
17:00	0.148	14.84%	0.148	0.148	0.148	0.148	
18:00	0.096	9.64%	0.096	0.096	0.096	0.096	
19:00	0.047	4.66%	0.047	0.047	0.047	0.047	
20:00	0.018	1.77%	0.018	0.018	0.018	0.018	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound On-Ramp		Direction		E/W	Present Year	2011	Analyst
From	US-29		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	I-66 WB		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	0.0%	0.0%	0.0%	23.6%	2.7%	6.4%	23.6%	2.7%	26.4%	
7:00	0.0%	0.0%	0.0%	5.0%	7.1%	5.7%	5.0%	7.1%	12.1%	
8:00	0.0%	0.0%	0.0%	2.8%	3.9%	2.8%	2.8%	3.9%	6.7%	
9:00	0.0%	0.0%	0.0%	5.3%	4.2%	2.1%	5.3%	4.2%	9.5%	
10:00	0.0%	0.0%	0.0%	5.5%	9.9%	6.6%	5.5%	9.9%	15.4%	
11:00	0.0%	0.0%	0.0%	2.4%	3.6%	4.8%	2.4%	3.6%	6.0%	
12:00	0.0%	0.0%	0.0%	2.2%	7.6%	8.7%	2.2%	7.6%	9.8%	
13:00	0.0%	0.0%	0.0%	30.7%	4.0%	2.5%	30.7%	4.0%	34.7%	
14:00	0.0%	0.0%	0.0%	0.8%	3.7%	3.3%	0.8%	3.7%	4.5%	
15:00	0.0%	0.0%	0.0%	3.1%	0.8%	2.1%	3.1%	0.8%	3.9%	
16:00	0.0%	0.0%	0.0%	0.5%	0.2%	0.5%	0.5%	0.2%	0.7%	
17:00	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.4%	0.0%	0.4%	
18:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	
19:00	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	
20:00	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
1:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
2:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
3:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
4:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
5:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
6:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
7:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
8:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
9:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
10:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
11:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
12:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
13:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
14:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
15:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
16:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
17:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
18:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
19:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
20:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
21:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
22:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
23:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

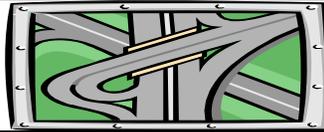


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Westbound On-Ramp		
From	US-29		
To	I-66 WB		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	1,200	No-build
Interim Year 2014 ADT	1,300	1,300
Design Year 2036 ADT	1,900	1,700

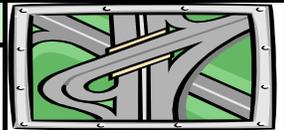
Ramp										
Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	38	41	41	60	54	3.18%	100%	23.6%	2.7%	26.4%
7:00	49	53	53	78	69	4.08%	100%	5.0%	7.1%	12.1%
8:00	62	67	67	98	88	5.18%	100%	2.8%	3.9%	6.7%
9:00	33	36	36	52	47	2.75%	100%	5.3%	4.2%	9.5%
10:00	32	34	34	50	45	2.63%	100%	5.5%	9.9%	15.4%
11:00	29	32	32	46	41	2.43%	100%	2.4%	3.6%	6.0%
12:00	32	35	35	51	45	2.66%	100%	2.2%	7.6%	9.8%
13:00	69	75	75	109	98	5.76%	100%	30.7%	4.0%	34.7%
14:00	84	91	91	133	119	7.00%	100%	0.8%	3.7%	4.5%
15:00	135	146	146	214	191	11.26%	100%	3.1%	0.8%	3.9%
16:00	213	230	230	336	301	17.71%	100%	0.5%	0.2%	0.7%
17:00	178	193	193	282	252	14.84%	100%	0.4%	0.0%	0.4%
18:00	116	125	125	183	164	9.64%	100%	0.0%	0.0%	0.0%
19:00	56	61	61	89	79	4.66%	100%	0.0%	0.0%	0.0%
20:00	21	23	23	34	30	1.77%	100%	0.0%	0.0%	0.0%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	33	33	33	33	33	33	33	33	33	33
7:00	33	33	33	33	33	33	33	33	33	33
8:00	33	33	33	33	33	33	33	33	33	33
9:00	33	33	33	33	33	33	33	33	33	33
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound On-Ramp	Direction		E/W	Present Year	2011	Analyst
From	US-29 SB	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	I-66 EB	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

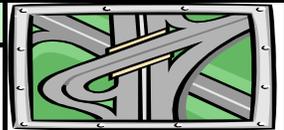
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	5,200	5,500	5,500	8,300	7,200	Ramp designated speed of 25 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	1	1	1	1	1			
N/A	0	0	0	0	0			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	25	25	25	25	25			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	23	23	23	23	23	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.085	8.54%	0.085	0.085	0.085	0.085	
7:00	0.105	10.47%	0.105	0.105	0.105	0.105	
8:00	0.093	9.27%	0.093	0.093	0.093	0.093	
9:00	0.073	7.34%	0.073	0.073	0.073	0.073	
10:00	0.061	6.13%	0.061	0.061	0.061	0.061	
11:00	0.050	4.99%	0.050	0.050	0.050	0.050	
12:00	0.047	4.66%	0.047	0.047	0.047	0.047	
13:00	0.042	4.22%	0.042	0.042	0.042	0.042	
14:00	0.045	4.54%	0.045	0.045	0.045	0.045	
15:00	0.050	5.03%	0.050	0.050	0.050	0.050	
16:00	0.052	5.25%	0.052	0.052	0.052	0.052	
17:00	0.065	6.48%	0.065	0.065	0.065	0.065	
18:00	0.046	4.57%	0.046	0.046	0.046	0.046	
19:00	0.029	2.93%	0.029	0.029	0.029	0.029	
20:00	0.022	2.23%	0.022	0.022	0.022	0.022	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound On-Ramp		Direction		E/W	Present Year	2011	Analyst
From	US-29 SB		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	I-66 EB		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	0.8%	0.7%	0.8%	0.0%	0.0%	0.0%	0.8%	0.7%	1.5%	1.5%
7:00	0.6%	0.4%	0.3%	0.0%	0.0%	0.0%	0.6%	0.4%	1.0%	1.0%
8:00	0.7%	1.2%	0.4%	0.0%	0.0%	0.0%	0.7%	1.2%	1.9%	1.9%
9:00	0.4%	0.4%	0.7%	0.0%	0.0%	0.0%	0.4%	0.4%	0.9%	0.9%
10:00	0.6%	1.3%	1.3%	0.0%	0.0%	0.0%	0.6%	1.3%	2.0%	2.0%
11:00	1.3%	1.9%	1.3%	0.0%	0.0%	0.0%	1.3%	1.9%	3.2%	3.2%
12:00	0.5%	1.6%	1.4%	0.0%	0.0%	0.0%	0.5%	1.6%	2.2%	2.2%
13:00	1.1%	1.1%	0.9%	0.0%	0.0%	0.0%	1.1%	1.1%	2.1%	2.1%
14:00	1.1%	1.1%	0.4%	0.0%	0.0%	0.0%	1.1%	1.1%	2.2%	2.2%
15:00	1.8%	1.3%	0.6%	0.0%	0.0%	0.0%	1.8%	1.3%	3.0%	3.0%
16:00	1.2%	0.2%	0.0%	0.0%	0.0%	0.0%	1.2%	0.2%	1.5%	1.5%
17:00	0.3%	0.2%	0.2%	0.0%	0.0%	0.0%	0.3%	0.2%	0.5%	0.5%
18:00	0.6%	0.0%	0.1%	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%	0.6%
19:00	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.2%	0.2%	0.4%	0.4%
20:00	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
1:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
2:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
3:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
4:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
5:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
6:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
7:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
8:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
9:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
10:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
11:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
12:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
13:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
14:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
15:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
16:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
17:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
18:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
19:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
20:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
21:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
22:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
23:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

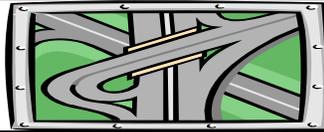


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Eastbound On-Ramp		
From	US-29 SB		
To	I-66 EB		
City/County	Prince William County		
Date	5/16/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	5,200	No-build
Interim Year 2014 ADT	5,500	5,500
Design Year 2036 ADT	8,300	7,200

Ramp

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck		
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
6:00	444	470	470	709	615	8.54%	100%	0.8%	0.7%	1.5%
7:00	545	576	576	869	754	10.47%	100%	0.6%	0.4%	1.0%
8:00	482	510	510	769	667	9.27%	100%	0.7%	1.2%	1.9%
9:00	382	404	404	610	529	7.34%	100%	0.4%	0.4%	0.9%
10:00	319	337	337	509	442	6.13%	100%	0.6%	1.3%	2.0%
11:00	260	275	275	414	360	4.99%	100%	1.3%	1.9%	3.2%
12:00	242	256	256	386	335	4.66%	100%	0.5%	1.6%	2.2%
13:00	219	232	232	350	304	4.22%	100%	1.1%	1.1%	2.1%
14:00	236	250	250	377	327	4.54%	100%	1.1%	1.1%	2.2%
15:00	261	276	276	417	362	5.03%	100%	1.8%	1.3%	3.0%
16:00	273	289	289	436	378	5.25%	100%	1.2%	0.2%	1.5%
17:00	337	356	356	538	466	6.48%	100%	0.3%	0.2%	0.5%
18:00	238	252	252	380	329	4.57%	100%	0.6%	0.0%	0.6%
19:00	152	161	161	243	211	2.93%	100%	0.2%	0.2%	0.4%
20:00	116	123	123	185	161	2.23%	100%	0.0%	0.0%	0.0%
21:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

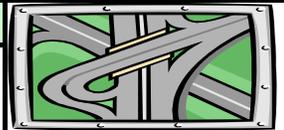
Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	23	23	23	23	23	23	23	23	23	23
7:00	23	23	23	23	23	23	23	23	23	23
8:00	23	23	23	23	23	23	23	23	23	23
9:00	23	23	23	23	23	23	23	23	23	23
10:00	23	23	23	23	23	23	23	23	23	23
11:00	23	23	23	23	23	23	23	23	23	23
12:00	23	23	23	23	23	23	23	23	23	23
13:00	23	23	23	23	23	23	23	23	23	23
14:00	23	23	23	23	23	23	23	23	23	23
15:00	23	23	23	23	23	23	23	23	23	23
16:00	23	23	23	23	23	23	23	23	23	23
17:00	23	23	23	23	23	23	23	23	23	23
18:00	23	23	23	23	23	23	23	23	23	23
19:00	23	23	23	23	23	23	23	23	23	23
20:00	23	23	23	23	23	23	23	23	23	23
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound Off-Ramp	Direction		E/W	Present Year	2011	Analyst
From	I-66 EB	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	US-29 SB	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

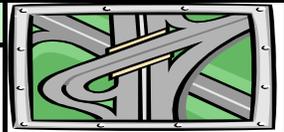
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	1,700	1,800	1,800	2,700	2,300	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	1	1	1	1	1			
N/A	0	0	0	0	0			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.041	4.11%	0.041	0.041	0.041	0.041	
7:00	0.078	7.76%	0.078	0.078	0.078	0.078	
8:00	0.077	7.68%	0.077	0.077	0.077	0.077	
9:00	0.063	6.26%	0.063	0.063	0.063	0.063	
10:00	0.054	5.38%	0.054	0.054	0.054	0.054	
11:00	0.056	5.60%	0.056	0.056	0.056	0.056	
12:00	0.072	7.22%	0.072	0.072	0.072	0.072	
13:00	0.052	5.18%	0.052	0.052	0.052	0.052	
14:00	0.076	7.60%	0.076	0.076	0.076	0.076	
15:00	0.066	6.56%	0.066	0.066	0.066	0.066	
16:00	0.047	4.73%	0.047	0.047	0.047	0.047	
17:00	0.047	4.65%	0.047	0.047	0.047	0.047	
18:00	0.062	6.20%	0.062	0.062	0.062	0.062	
19:00	0.063	6.32%	0.063	0.063	0.063	0.063	
20:00	0.050	4.97%	0.050	0.050	0.050	0.050	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound Off-Ramp			Direction		E/W	Present Year			2011	Analyst
From	I-66 EB			Map Reference		DC 5754 & 5755	Interim Year			2014	EA
To	US-29 SB			County	Prince William County		Design Year			2036	Ver. 2009-NG
Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)										
	EB			WB			Weighted TWO-WAY (Editable)			Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck	
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck		
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
6:00	1.0%	0.0%	1.0%	0.0%	0.0%	0.0%	1.0%	0.0%	1.0%		
7:00	0.3%	0.5%	0.8%	0.0%	0.0%	0.0%	0.3%	0.5%	0.8%		
8:00	1.6%	1.0%	2.1%	0.0%	0.0%	0.0%	1.6%	1.0%	2.6%		
9:00	1.0%	0.3%	0.3%	0.0%	0.0%	0.0%	1.0%	0.3%	1.3%		
10:00	3.0%	0.7%	1.1%	0.0%	0.0%	0.0%	3.0%	0.7%	3.7%		
11:00	1.4%	0.4%	1.1%	0.0%	0.0%	0.0%	1.4%	0.4%	1.8%		
12:00	0.8%	0.0%	2.2%	0.0%	0.0%	0.0%	0.8%	0.0%	0.8%		
13:00	1.9%	1.6%	0.8%	0.0%	0.0%	0.0%	1.9%	1.6%	3.5%		
14:00	6.3%	0.0%	1.1%	0.0%	0.0%	0.0%	6.3%	0.0%	6.3%		
15:00	0.3%	0.3%	0.6%	0.0%	0.0%	0.0%	0.3%	0.3%	0.6%		
16:00	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
17:00	0.9%	0.4%	0.4%	0.0%	0.0%	0.0%	0.9%	0.4%	1.3%		
18:00	1.0%	0.0%	0.6%	0.0%	0.0%	0.0%	1.0%	0.0%	1.0%		
19:00	0.6%	0.0%	0.6%	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%		
20:00	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
1:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
2:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
3:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
4:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
5:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
6:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
7:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
8:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
9:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
10:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
11:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
12:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
13:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
14:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
15:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
16:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
17:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
18:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
19:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
20:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
21:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
22:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
23:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

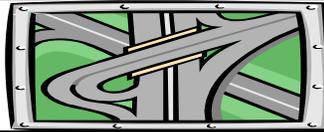


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Eastbound Off-Ramp		
From	I-66 EB		
To	US-29 SB		
City/County	Prince William County		
Date	5/16/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	1,700	No-build
Interim Year 2014 ADT	1,800	1,800
Design Year 2036 ADT	2,700	2,300

Ramp

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.			
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
6:00	70	74	74	111	95	4.11%	100%	1.0%	0.0%	1.0%
7:00	132	140	140	210	179	7.76%	100%	0.3%	0.5%	0.8%
8:00	131	138	138	207	177	7.68%	100%	1.6%	1.0%	2.6%
9:00	106	113	113	169	144	6.26%	100%	1.0%	0.3%	1.3%
10:00	91	97	97	145	124	5.38%	100%	3.0%	0.7%	3.7%
11:00	95	101	101	151	129	5.60%	100%	1.4%	0.4%	1.8%
12:00	123	130	130	195	166	7.22%	100%	0.8%	0.0%	0.8%
13:00	88	93	93	140	119	5.18%	100%	1.9%	1.6%	3.5%
14:00	129	137	137	205	175	7.60%	100%	6.3%	0.0%	6.3%
15:00	112	118	118	177	151	6.56%	100%	0.3%	0.3%	0.6%
16:00	80	85	85	128	109	4.73%	100%	0.0%	0.0%	0.0%
17:00	79	84	84	126	107	4.65%	100%	0.9%	0.4%	1.3%
18:00	105	112	112	167	143	6.20%	100%	1.0%	0.0%	1.0%
19:00	107	114	114	171	145	6.32%	100%	0.6%	0.0%	0.6%
20:00	85	90	90	134	114	4.97%	100%	0.0%	0.0%	0.0%
21:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	33	33	33	33	33	33	33	33	33	33
7:00	33	33	33	33	33	33	33	33	33	33
8:00	33	33	33	33	33	33	33	33	33	33
9:00	33	33	33	33	33	33	33	33	33	33
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound Off-Ramp	Direction		E/W	Present Year	2011	Analyst
From	I-66 WB	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	US-29 SB	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

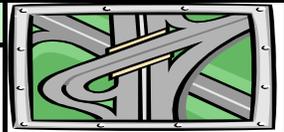
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	17,100	18,100	18,100	27,400	23,600	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	0	0	0	0	0			
N/A	2	2	2	2	2			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.041	4.11%	0.041	0.041	0.041	0.041	
7:00	0.078	7.76%	0.078	0.078	0.078	0.078	
8:00	0.077	7.68%	0.077	0.077	0.077	0.077	
9:00	0.063	6.26%	0.063	0.063	0.063	0.063	
10:00	0.054	5.38%	0.054	0.054	0.054	0.054	
11:00	0.056	5.60%	0.056	0.056	0.056	0.056	
12:00	0.072	7.22%	0.072	0.072	0.072	0.072	
13:00	0.052	5.18%	0.052	0.052	0.052	0.052	
14:00	0.076	7.60%	0.076	0.076	0.076	0.076	
15:00	0.066	6.56%	0.066	0.066	0.066	0.066	
16:00	0.047	4.73%	0.047	0.047	0.047	0.047	
17:00	0.047	4.65%	0.047	0.047	0.047	0.047	
18:00	0.062	6.20%	0.062	0.062	0.062	0.062	
19:00	0.063	6.32%	0.063	0.063	0.063	0.063	
20:00	0.050	4.97%	0.050	0.050	0.050	0.050	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound Off-Ramp		Direction		E/W	Present Year	2011	Analyst
From	I-66 WB		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	US-29 SB		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	0.0%	0.0%	0.0%	1.0%	0.0%	1.0%	1.0%	0.0%	1.0%	1.0%
7:00	0.0%	0.0%	0.0%	0.3%	0.5%	0.8%	0.3%	0.5%	0.8%	0.8%
8:00	0.0%	0.0%	0.0%	1.6%	1.0%	2.1%	1.6%	1.0%	2.6%	2.6%
9:00	0.0%	0.0%	0.0%	1.0%	0.3%	0.3%	1.0%	0.3%	1.3%	1.3%
10:00	0.0%	0.0%	0.0%	3.0%	0.7%	1.1%	3.0%	0.7%	3.7%	3.7%
11:00	0.0%	0.0%	0.0%	1.4%	0.4%	1.1%	1.4%	0.4%	1.8%	1.8%
12:00	0.0%	0.0%	0.0%	0.8%	0.0%	2.2%	0.8%	0.0%	0.8%	0.8%
13:00	0.0%	0.0%	0.0%	1.9%	1.6%	0.8%	1.9%	1.6%	3.5%	3.5%
14:00	0.0%	0.0%	0.0%	6.3%	0.0%	1.1%	6.3%	0.0%	6.3%	6.3%
15:00	0.0%	0.0%	0.0%	0.3%	0.3%	0.6%	0.3%	0.3%	0.6%	0.6%
16:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%
17:00	0.0%	0.0%	0.0%	0.9%	0.4%	0.4%	0.9%	0.4%	1.3%	1.3%
18:00	0.0%	0.0%	0.0%	1.0%	0.0%	0.6%	1.0%	0.0%	1.0%	1.0%
19:00	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%	0.6%	0.0%	0.6%	0.6%
20:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
1:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
2:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
3:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
4:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
5:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
6:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
7:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
8:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
9:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
10:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
11:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
12:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
13:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
14:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
15:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
16:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
17:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
18:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
19:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
20:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
21:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
22:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
23:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

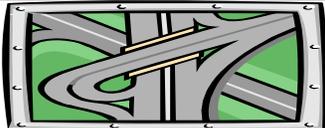
Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov



ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Westbound Off-Ramp				Map Reference	ADC 5754 & 5755	
From	I-66 WB				Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
To	US-29 SB				Present Year 2011 ADT	17,100	No-build
City/County	Prince William County				Interim Year 2014 ADT	18,100	18,100
Date	5/16/2011	Time Span	24 Hours	Design Year 2036 ADT	27,400	23,600	

Ramp

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	703	744	744	1,127	971	4.11%	100%	1.0%	0.0%	1.0%
7:00	1,328	1,405	1,405	2,127	1,832	7.76%	100%	0.3%	0.5%	0.8%
8:00	1,314	1,391	1,391	2,105	1,813	7.68%	100%	1.6%	1.0%	2.6%
9:00	1,070	1,133	1,133	1,715	1,477	6.26%	100%	1.0%	0.3%	1.3%
10:00	919	973	973	1,473	1,269	5.38%	100%	3.0%	0.7%	3.7%
11:00	957	1,013	1,013	1,534	1,321	5.60%	100%	1.4%	0.4%	1.8%
12:00	1,235	1,307	1,307	1,979	1,704	7.22%	100%	0.8%	0.0%	0.8%
13:00	885	937	937	1,418	1,221	5.18%	100%	1.9%	1.6%	3.5%
14:00	1,300	1,376	1,376	2,083	1,794	7.60%	100%	6.3%	0.0%	6.3%
15:00	1,122	1,187	1,187	1,797	1,548	6.56%	100%	0.3%	0.3%	0.6%
16:00	810	857	857	1,297	1,117	4.73%	100%	0.0%	0.0%	0.0%
17:00	796	842	842	1,275	1,098	4.65%	100%	0.9%	0.4%	1.3%
18:00	1,060	1,122	1,122	1,698	1,463	6.20%	100%	1.0%	0.0%	1.0%
19:00	1,081	1,144	1,144	1,731	1,491	6.32%	100%	0.6%	0.0%	0.6%
20:00	851	900	900	1,363	1,174	4.97%	100%	0.0%	0.0%	0.0%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

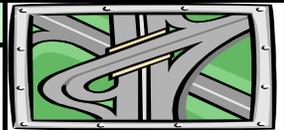
Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	33	33	33	33	33	33	33	33	33	33
7:00	33	33	33	33	33	33	33	33	33	33
8:00	33	33	33	33	33	33	33	33	33	33
9:00	33	33	33	33	33	33	33	33	33	33
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Interstate 66 Eastbound Direction	Direction		E/W	Present Year	2011	Analyst
From	Rte 29, Gainesville	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	US-15	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

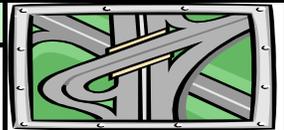
Sys. Unit	E	Facility Length (Mi)		2.10	BPR a & b= 0.88 & 9.8		Terrain	Level
Input	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	Notes		
Two-way ADT	29,000	31,000	31,000	47,000	40,000	The hourly lane capacity of the I-66 for the Build Condition was adjusted to 1,725 from 1,800 to account for the 4 hours of HOV Lane.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,380	1,440	1,380	1,440			
Facility Type	Freeway	Freeway	Freeway	Freeway	Freeway			
Median Type	Divided	Divided	Divided	Divided	Divided			
EB # of lanes	2	4	2	4	2			
WB # of lanes	2	4	2	4	2			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	65	65	65	65	65			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS > 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	66	69	66	69	66	FFS (PoS <= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V _h /V ₂₄), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.095	9.53%	0.095	0.095	0.095	0.095	
7:00	0.099	9.91%	0.099	0.099	0.099	0.099	
8:00	0.084	8.38%	0.084	0.084	0.084	0.084	
9:00	0.071	7.09%	0.071	0.071	0.071	0.071	
10:00	0.054	5.43%	0.054	0.054	0.054	0.054	
11:00	0.047	4.67%	0.047	0.047	0.047	0.047	
12:00	0.045	4.46%	0.045	0.045	0.045	0.045	
13:00	0.042	4.16%	0.042	0.042	0.042	0.042	
14:00	0.042	4.16%	0.042	0.042	0.042	0.042	
15:00	0.043	4.26%	0.043	0.043	0.043	0.043	
16:00	0.045	4.49%	0.045	0.045	0.045	0.045	
17:00	0.046	4.62%	0.046	0.046	0.046	0.046	
18:00	0.041	4.09%	0.041	0.041	0.041	0.041	
19:00	0.029	2.85%	0.029	0.029	0.029	0.029	
20:00	0.023	2.27%	0.023	0.023	0.023	0.023	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Interstate 66 Eastbound Direction			Direction			E/W	Present Year			2011	Analyst
From	Rte 29, Gainesville			Map Reference			DC 5754 & 5755	Interim Year			2014	EA
To	US-15			County	Prince William County			Design Year			2036	Ver. 2009-NG
Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)										Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 T: Truck	
	EB			WB			Weighted TWO-WAY (Editable)					
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck			
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
6:00	0.6%	2.0%	2.6%	0.0%	0.0%	0.0%	0.6%	2.0%	2.6%			
7:00	0.4%	1.7%	2.1%	0.0%	0.0%	0.0%	0.4%	1.7%	2.1%			
8:00	0.6%	2.4%	3.0%	0.0%	0.0%	0.0%	0.6%	2.4%	3.0%			
9:00	0.6%	3.6%	4.3%	0.0%	0.0%	0.0%	0.6%	3.6%	4.3%			
10:00	1.0%	5.0%	6.0%	0.0%	0.0%	0.0%	1.0%	5.0%	6.0%			
11:00	1.2%	5.3%	6.5%	0.0%	0.0%	0.0%	1.2%	5.3%	6.5%			
12:00	1.5%	4.9%	6.4%	0.0%	0.0%	0.0%	1.5%	4.9%	6.4%			
13:00	1.1%	5.3%	6.4%	0.0%	0.0%	0.0%	1.1%	5.3%	6.4%			
14:00	1.3%	4.4%	5.7%	0.0%	0.0%	0.0%	1.3%	4.4%	5.7%			
15:00	1.4%	3.8%	5.2%	0.0%	0.0%	0.0%	1.4%	3.8%	5.2%			
16:00	1.1%	3.3%	4.4%	0.0%	0.0%	0.0%	1.1%	3.3%	4.4%			
17:00	0.9%	2.7%	3.6%	0.0%	0.0%	0.0%	0.9%	2.7%	3.6%			
18:00	0.7%	4.4%	5.1%	0.0%	0.0%	0.0%	0.7%	4.4%	5.1%			
19:00	0.6%	5.8%	6.4%	0.0%	0.0%	0.0%	0.6%	5.8%	6.4%			
20:00	0.6%	7.1%	7.6%	0.0%	0.0%	0.0%	0.6%	7.1%	7.6%			
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	2011	Interim Bld	Interim Nbl	Design Bld	Design Nbl
0:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
1:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
2:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
3:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
4:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
5:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
6:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
7:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
8:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
9:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
10:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
11:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
12:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
13:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
14:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
15:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
16:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
17:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
18:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
19:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
20:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
21:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
22:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
23:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

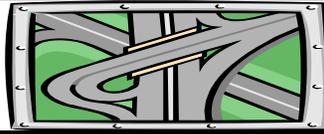


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Interstate 66 Eastbound Direction		
From	Rte 29, Gainesville		
To	US-15		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.88 and b= 9.8		
Present Year 2011 ADT	29,000	No-build
Interim Year 2014 ADT	31,000	31,000
Design Year 2036 ADT	47,000	40,000

Eastbound

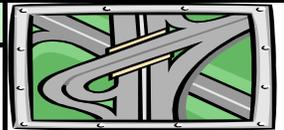
Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck		
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	2,764	2,955	2,955	4,480	3,812	9.53%	100%	0.6%	2.0%	2.6%
7:00	2,873	3,071	3,071	4,656	3,962	9.91%	100%	0.4%	1.7%	2.1%
8:00	2,430	2,597	2,597	3,938	3,351	8.38%	100%	0.6%	2.4%	3.0%
9:00	2,055	2,197	2,197	3,331	2,835	7.09%	100%	0.6%	3.6%	4.3%
10:00	1,575	1,684	1,684	2,553	2,173	5.43%	100%	1.0%	5.0%	6.0%
11:00	1,354	1,447	1,447	2,194	1,867	4.67%	100%	1.2%	5.3%	6.5%
12:00	1,293	1,382	1,382	2,095	1,783	4.46%	100%	1.5%	4.9%	6.4%
13:00	1,206	1,289	1,289	1,954	1,663	4.16%	100%	1.1%	5.3%	6.4%
14:00	1,207	1,290	1,290	1,955	1,664	4.16%	100%	1.3%	4.4%	5.7%
15:00	1,237	1,322	1,322	2,004	1,706	4.26%	100%	1.4%	3.8%	5.2%
16:00	1,302	1,391	1,391	2,109	1,795	4.49%	100%	1.1%	3.3%	4.4%
17:00	1,339	1,432	1,432	2,171	1,848	4.62%	100%	0.9%	2.7%	3.6%
18:00	1,187	1,269	1,269	1,924	1,637	4.09%	100%	0.7%	4.4%	5.1%
19:00	828	885	885	1,341	1,141	2.85%	100%	0.6%	5.8%	6.4%
20:00	658	704	704	1,067	908	2.27%	100%	0.6%	7.1%	7.6%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	30	30	68	68	20	20	55	55	2	2
7:00	25	25	68	68	16	16	53	53	2	2
8:00	47	47	68	68	38	38	64	64	7	7
9:00	59	59	68	68	54	54	67	67	19	19
10:00	65	65	68	68	64	64	68	68	51	51
11:00	65	65	68	68	65	65	68	68	61	61
12:00	65	65	68	68	65	65	68	68	63	63
13:00	65	65	68	68	65	65	68	68	64	64
14:00	65	65	68	68	65	65	68	68	64	64
15:00	65	65	68	68	65	65	68	68	64	64
16:00	65	65	68	68	65	65	68	68	64	64
17:00	65	65	68	68	65	65	68	68	64	64
18:00	65	65	68	68	65	65	68	68	65	65
19:00	65	65	68	68	65	65	68	68	65	65
20:00	65	65	68	68	65	65	68	68	65	65
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Interstate 66 Westbound Direction	Direction		E/W	Present Year	2011	Analyst
From	Rte 29, Gainesville	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	US-15	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

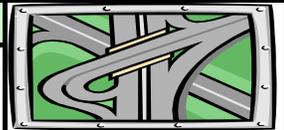
Sys. Unit	E	Facility Length (Mi)		2.10	BPR a & b= 0.88 & 9.8		Terrain	Level
Input	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	Notes		
Two-way ADT	29,000	31,000	31,000	48,000	40,000	The hourly lane capacity of the I-66 for the Build Condition was adjusted to 1,725 from 1,800 to account for the 4 hours of HOV Lane.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,380	1,440	1,380	1,440			
Facility Type	Freeway	Freeway	Freeway	Freeway	Freeway			
Median Type	Divided	Divided	Divided	Divided	Divided			
EB # of lanes	2	4	2	4	2			
WB # of lanes	2	4	2	4	2			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	65	65	65	65	65			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS > 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	66	69	66	69	66	FFS (PoS <= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.033	3.34%	0.033	0.033	0.033	0.033	
7:00	0.036	3.55%	0.036	0.036	0.036	0.036	
8:00	0.038	3.76%	0.038	0.038	0.038	0.038	
9:00	0.038	3.83%	0.038	0.038	0.038	0.038	
10:00	0.039	3.89%	0.039	0.039	0.039	0.039	
11:00	0.043	4.31%	0.043	0.043	0.043	0.043	
12:00	0.048	4.83%	0.048	0.048	0.048	0.048	
13:00	0.066	6.59%	0.066	0.066	0.066	0.066	
14:00	0.088	8.81%	0.088	0.088	0.088	0.088	
15:00	0.101	10.05%	0.101	0.101	0.101	0.101	
16:00	0.099	9.87%	0.099	0.099	0.099	0.099	
17:00	0.088	8.76%	0.088	0.088	0.088	0.088	
18:00	0.074	7.45%	0.074	0.074	0.074	0.074	
19:00	0.057	5.66%	0.057	0.057	0.057	0.057	
20:00	0.039	3.88%	0.039	0.039	0.039	0.039	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Interstate 66 Westbound Direction			Direction			E/W	Present Year		2011	Analyst	
From	Rte 29, Gainesville			Map Reference			DC 5754 & 5755	Interim Year		2014	EA	
To	US-15			County	Prince William County			Design Year		2036	Ver. 2009-NG	
Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)											
	EB			WB			Weighted TWO-WAY (Editable)			Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck		
2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T		3X +	Total Truck
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
6:00	0.0%	0.0%	0.0%	6.9%	5.9%	12.8%	6.9%	5.9%	12.8%	6.9%	5.9%	12.8%
7:00	0.0%	0.0%	0.0%	7.3%	5.3%	12.6%	7.3%	5.3%	12.6%	7.3%	5.3%	12.6%
8:00	0.0%	0.0%	0.0%	6.8%	6.1%	12.9%	6.8%	6.1%	12.9%	6.8%	6.1%	12.9%
9:00	0.0%	0.0%	0.0%	7.6%	7.9%	15.5%	7.6%	7.9%	15.5%	7.6%	7.9%	15.5%
10:00	0.0%	0.0%	0.0%	5.7%	8.4%	14.1%	5.7%	8.4%	14.1%	5.7%	8.4%	14.1%
11:00	0.0%	0.0%	0.0%	6.1%	7.8%	13.9%	6.1%	7.8%	13.9%	6.1%	7.8%	13.9%
12:00	0.0%	0.0%	0.0%	6.3%	6.8%	13.1%	6.3%	6.8%	13.1%	6.3%	6.8%	13.1%
13:00	0.0%	0.0%	0.0%	5.5%	4.2%	9.7%	5.5%	4.2%	9.7%	5.5%	4.2%	9.7%
14:00	0.0%	0.0%	0.0%	4.1%	2.6%	6.7%	4.1%	2.6%	6.7%	4.1%	2.6%	6.7%
15:00	0.0%	0.0%	0.0%	3.5%	2.1%	5.6%	3.5%	2.1%	5.6%	3.5%	2.1%	5.6%
16:00	0.0%	0.0%	0.0%	3.3%	1.4%	4.7%	3.3%	1.4%	4.7%	3.3%	1.4%	4.7%
17:00	0.0%	0.0%	0.0%	3.0%	1.8%	4.8%	3.0%	1.8%	4.8%	3.0%	1.8%	4.8%
18:00	0.0%	0.0%	0.0%	3.1%	1.9%	5.0%	3.1%	1.9%	5.0%	3.1%	1.9%	5.0%
19:00	0.0%	0.0%	0.0%	3.3%	2.1%	5.4%	3.3%	2.1%	5.4%	3.3%	2.1%	5.4%
20:00	0.0%	0.0%	0.0%	3.3%	2.1%	5.4%	3.3%	2.1%	5.4%	3.3%	2.1%	5.4%
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
1:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
2:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
3:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
4:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
5:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
6:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
7:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
8:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
9:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
10:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
11:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
12:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
13:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
14:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
15:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
16:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
17:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
18:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
19:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
20:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
21:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
22:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
23:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

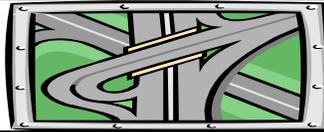


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Interstate 66 Westbound Direction		
From	Rte 29, Gainesville		
To	US-15		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.88 and b= 9.8		
Present Year 2011 ADT	29,000	No-build
Interim Year 2014 ADT	31,000	31,000
Design Year 2036 ADT	48,000	40,000

Westbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
6:00	968	1,035	1,035	1,602	1,335	3.34%	100%	6.9%	5.9%	12.8%
7:00	1,030	1,101	1,101	1,705	1,421	3.55%	100%	7.3%	5.3%	12.6%
8:00	1,090	1,165	1,165	1,804	1,503	3.76%	100%	6.8%	6.1%	12.9%
9:00	1,111	1,187	1,187	1,839	1,532	3.83%	100%	7.6%	7.9%	15.5%
10:00	1,127	1,204	1,204	1,865	1,554	3.89%	100%	5.7%	8.4%	14.1%
11:00	1,251	1,337	1,337	2,070	1,725	4.31%	100%	6.1%	7.8%	13.9%
12:00	1,402	1,498	1,498	2,320	1,933	4.83%	100%	6.3%	6.8%	13.1%
13:00	1,912	2,044	2,044	3,165	2,638	6.59%	100%	5.5%	4.2%	9.7%
14:00	2,555	2,731	2,731	4,229	3,524	8.81%	100%	4.1%	2.6%	6.7%
15:00	2,915	3,116	3,116	4,825	4,021	10.05%	100%	3.5%	2.1%	5.6%
16:00	2,863	3,061	3,061	4,739	3,949	9.87%	100%	3.3%	1.4%	4.7%
17:00	2,539	2,715	2,715	4,203	3,503	8.76%	100%	3.0%	1.8%	4.8%
18:00	2,159	2,308	2,308	3,574	2,979	7.45%	100%	3.1%	1.9%	5.0%
19:00	1,641	1,755	1,755	2,717	2,264	5.66%	100%	3.3%	2.1%	5.4%
20:00	1,126	1,204	1,204	1,864	1,553	3.88%	100%	3.3%	2.1%	5.4%
21:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	0%	0.0%	0.0%	0.0%

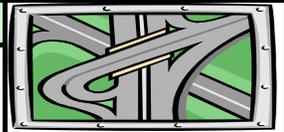
Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	65	65	68	68	65	65	68	68	65	65
7:00	65	65	68	68	65	65	68	68	64	64
8:00	65	65	68	68	65	65	68	68	63	63
9:00	65	65	68	68	65	65	68	68	61	61
10:00	65	65	68	68	65	65	68	68	61	61
11:00	65	65	68	68	65	65	68	68	56	56
12:00	64	64	68	68	63	63	68	68	45	45
13:00	55	55	68	68	48	48	65	65	12	12
14:00	25	25	68	68	16	16	49	49	2	2
15:00	12	12	68	68	7	7	33	33	1	1
16:00	16	16	68	68	10	10	40	40	1	1
17:00	34	34	68	68	23	23	56	56	3	3
18:00	54	54	68	68	47	47	65	65	11	11
19:00	64	64	68	68	64	64	68	68	48	48
20:00	65	65	68	68	65	65	68	68	65	65
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound Off-Ramp	Direction		E/W	Present Year	2011	Analyst
From	I-66 EB	Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	US-15	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

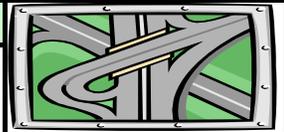
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	2,000	2,000	2,000	5,000	5,000	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	1	1	1	1	1			
N/A	0	0	0	0	0			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.122	12.18%	0.122	0.122	0.122	0.122	
7:00	0.121	12.09%	0.121	0.121	0.121	0.121	
8:00	0.097	9.67%	0.097	0.097	0.097	0.097	
9:00	0.064	6.37%	0.064	0.064	0.064	0.064	
10:00	0.049	4.91%	0.049	0.049	0.049	0.049	
11:00	0.038	3.79%	0.038	0.038	0.038	0.038	
12:00	0.038	3.79%	0.038	0.038	0.038	0.038	
13:00	0.043	4.33%	0.043	0.043	0.043	0.043	
14:00	0.041	4.11%	0.041	0.041	0.041	0.041	
15:00	0.052	5.23%	0.052	0.052	0.052	0.052	
16:00	0.046	4.58%	0.046	0.046	0.046	0.046	
17:00	0.049	4.91%	0.049	0.049	0.049	0.049	
18:00	0.034	3.40%	0.034	0.034	0.034	0.034	
19:00	0.025	2.54%	0.025	0.025	0.025	0.025	
20:00	0.020	2.00%	0.020	0.020	0.020	0.020	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound Off-Ramp		Direction		E/W	Present Year	2011	Analyst
From	I-66 EB		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	US-15		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	1.1%	0.3%	1.5%	0.0%	0.0%	0.0%	1.1%	0.3%	1.5%	
7:00	1.0%	0.5%	1.5%	0.0%	0.0%	0.0%	1.0%	0.5%	1.5%	
8:00	1.0%	0.4%	1.4%	0.0%	0.0%	0.0%	1.0%	0.4%	1.4%	
9:00	1.1%	0.5%	1.6%	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	
10:00	1.1%	0.6%	1.7%	0.0%	0.0%	0.0%	1.1%	0.6%	1.7%	
11:00	1.3%	0.6%	1.8%	0.0%	0.0%	0.0%	1.3%	0.6%	1.8%	
12:00	1.1%	0.6%	1.6%	0.0%	0.0%	0.0%	1.1%	0.6%	1.6%	
13:00	1.2%	0.5%	1.6%	0.0%	0.0%	0.0%	1.2%	0.5%	1.6%	
14:00	1.1%	0.5%	1.6%	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	
15:00	0.8%	0.4%	1.2%	0.0%	0.0%	0.0%	0.8%	0.4%	1.2%	
16:00	0.7%	0.3%	1.0%	0.0%	0.0%	0.0%	0.7%	0.3%	1.0%	
17:00	0.4%	0.2%	0.6%	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	
18:00	0.5%	0.3%	0.8%	0.0%	0.0%	0.0%	0.5%	0.3%	0.8%	
19:00	0.4%	0.2%	0.6%	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	
20:00	0.2%	0.1%	0.3%	0.0%	0.0%	0.0%	0.2%	0.1%	0.3%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	2011	Interim Bld	Interim Nblld	Design Bld	Design Nblld
0:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
1:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
2:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
3:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
4:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
5:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
6:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
7:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
8:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
9:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
10:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
11:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
12:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
13:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
14:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
15:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
16:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
17:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
18:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
19:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
20:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
21:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
22:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
23:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

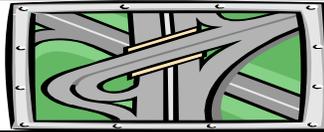


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Eastbound Off-Ramp		
From	I-66 EB		
To	US-15		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	2,000	No-build
Interim Year 2014 ADT	2,000	2,000
Design Year 2036 ADT	5,000	5,000

Ramp

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.			
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	244	244	244	609	609	12.18%	100%	1.1%	0.3%	1.5%
7:00	242	242	242	604	604	12.09%	100%	1.0%	0.5%	1.5%
8:00	193	193	193	483	483	9.67%	100%	1.0%	0.4%	1.4%
9:00	127	127	127	318	318	6.37%	100%	1.1%	0.5%	1.6%
10:00	98	98	98	246	246	4.91%	100%	1.1%	0.6%	1.7%
11:00	76	76	76	189	189	3.79%	100%	1.3%	0.6%	1.8%
12:00	76	76	76	189	189	3.79%	100%	1.1%	0.6%	1.6%
13:00	87	87	87	217	217	4.33%	100%	1.2%	0.5%	1.6%
14:00	82	82	82	205	205	4.11%	100%	1.1%	0.5%	1.6%
15:00	105	105	105	261	261	5.23%	100%	0.8%	0.4%	1.2%
16:00	92	92	92	229	229	4.58%	100%	0.7%	0.3%	1.0%
17:00	98	98	98	246	246	4.91%	100%	0.4%	0.2%	0.6%
18:00	68	68	68	170	170	3.40%	100%	0.5%	0.3%	0.8%
19:00	51	51	51	127	127	2.54%	100%	0.4%	0.2%	0.6%
20:00	40	40	40	100	100	2.00%	100%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

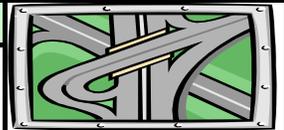
Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	33	33	33	33	33	33	33	33	33	33
7:00	33	33	33	33	33	33	33	33	33	33
8:00	33	33	33	33	33	33	33	33	33	33
9:00	33	33	33	33	33	33	33	33	33	33
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound On-Ramp	Direction		E/W	Present Year	2011	Analyst
From	US-15	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	I-66 EB	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

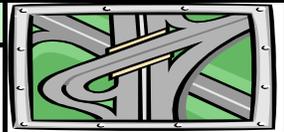
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	13,000	14,000	14,000	20,000	20,000	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	1	1	1	1	1			
N/A	0	0	0	0	0			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS > 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS <= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.091	9.06%	0.091	0.091	0.091	0.091	
7:00	0.109	10.94%	0.109	0.109	0.109	0.109	
8:00	0.094	9.43%	0.094	0.094	0.094	0.094	
9:00	0.081	8.12%	0.081	0.081	0.081	0.081	
10:00	0.060	6.01%	0.060	0.060	0.060	0.060	
11:00	0.051	5.15%	0.051	0.051	0.051	0.051	
12:00	0.049	4.91%	0.049	0.049	0.049	0.049	
13:00	0.045	4.49%	0.045	0.045	0.045	0.045	
14:00	0.047	4.71%	0.047	0.047	0.047	0.047	
15:00	0.048	4.83%	0.048	0.048	0.048	0.048	
16:00	0.052	5.18%	0.052	0.052	0.052	0.052	
17:00	0.052	5.19%	0.052	0.052	0.052	0.052	
18:00	0.044	4.43%	0.044	0.044	0.044	0.044	
19:00	0.029	2.87%	0.029	0.029	0.029	0.029	
20:00	0.020	2.05%	0.020	0.020	0.020	0.020	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Eastbound On-Ramp		Direction		E/W	Present Year	2011	Analyst
From	US-15		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	I-66 EB		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	1.1%	0.3%	1.5%	0.0%	0.0%	0.0%	1.1%	0.3%	1.5%	
7:00	1.0%	0.5%	1.5%	0.0%	0.0%	0.0%	1.0%	0.5%	1.5%	
8:00	1.0%	0.4%	1.4%	0.0%	0.0%	0.0%	1.0%	0.4%	1.4%	
9:00	1.1%	0.5%	1.6%	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	
10:00	1.1%	0.6%	1.7%	0.0%	0.0%	0.0%	1.1%	0.6%	1.7%	
11:00	1.3%	0.6%	1.8%	0.0%	0.0%	0.0%	1.3%	0.6%	1.8%	
12:00	1.1%	0.6%	1.6%	0.0%	0.0%	0.0%	1.1%	0.6%	1.6%	
13:00	1.2%	0.5%	1.6%	0.0%	0.0%	0.0%	1.2%	0.5%	1.6%	
14:00	1.1%	0.5%	1.6%	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	
15:00	0.8%	0.4%	1.2%	0.0%	0.0%	0.0%	0.8%	0.4%	1.2%	
16:00	0.7%	0.3%	1.0%	0.0%	0.0%	0.0%	0.7%	0.3%	1.0%	
17:00	0.4%	0.2%	0.6%	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	
18:00	0.5%	0.3%	0.8%	0.0%	0.0%	0.0%	0.5%	0.3%	0.8%	
19:00	0.4%	0.2%	0.6%	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	
20:00	0.2%	0.1%	0.3%	0.0%	0.0%	0.0%	0.2%	0.1%	0.3%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
1:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
2:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
3:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
4:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
5:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
6:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
7:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
8:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
9:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
10:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
11:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
12:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
13:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
14:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
15:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
16:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
17:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
18:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
19:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
20:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
21:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
22:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
23:00	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

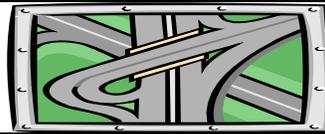


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Eastbound On-Ramp		
From	US-15		
To	I-66 EB		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	13,000	No-build
Interim Year 2014 ADT	14,000	14,000
Design Year 2036 ADT	20,000	20,000

Ramp

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck		
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	1,178	1,268	1,268	1,812	1,812	9.06%	100%	1.1%	0.3%	1.5%
7:00	1,422	1,532	1,532	2,188 *	2,188 *	10.94%	100%	1.0%	0.5%	1.5%
8:00	1,226	1,321	1,321	1,887	1,887	9.43%	100%	1.0%	0.4%	1.4%
9:00	1,056	1,137	1,137	1,624	1,624	8.12%	100%	1.1%	0.5%	1.6%
10:00	781	841	841	1,202	1,202	6.01%	100%	1.1%	0.6%	1.7%
11:00	669	721	721	1,029	1,029	5.15%	100%	1.3%	0.6%	1.8%
12:00	639	688	688	982	982	4.91%	100%	1.1%	0.6%	1.6%
13:00	583	628	628	897	897	4.49%	100%	1.2%	0.5%	1.6%
14:00	613	660	660	943	943	4.71%	100%	1.1%	0.5%	1.6%
15:00	628	676	676	966	966	4.83%	100%	0.8%	0.4%	1.2%
16:00	674	726	726	1,037	1,037	5.18%	100%	0.7%	0.3%	1.0%
17:00	675	727	727	1,038	1,038	5.19%	100%	0.4%	0.2%	0.6%
18:00	576	620	620	886	886	4.43%	100%	0.5%	0.3%	0.8%
19:00	374	402	402	575	575	2.87%	100%	0.4%	0.2%	0.6%
20:00	266	287	287	410	410	2.05%	100%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrupt.	Interrupt.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	33	33	33	33	33	33	19	19	19	19
7:00	31	31	29	29	29	29	5	5	5	5
8:00	33	33	32	32	32	32	16	16	16	16
9:00	33	33	33	33	33	33	26	26	26	26
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound Off-Ramp	Direction		E/W	Present Year	2011	Analyst
From	I-66 WB	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	US-15	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

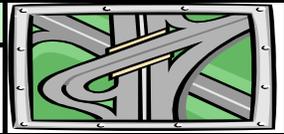
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	13,000	13,000	13,000	21,000	21,000	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	0	0	0	0	0			
N/A	2	2	2	2	2			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS > 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS <= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.032	3.24%	0.032	0.032	0.032	0.032	
7:00	0.039	3.94%	0.039	0.039	0.039	0.039	
8:00	0.041	4.08%	0.041	0.041	0.041	0.041	
9:00	0.034	3.36%	0.034	0.034	0.034	0.034	
10:00	0.032	3.21%	0.032	0.032	0.032	0.032	
11:00	0.034	3.43%	0.034	0.034	0.034	0.034	
12:00	0.042	4.17%	0.042	0.042	0.042	0.042	
13:00	0.049	4.94%	0.049	0.049	0.049	0.049	
14:00	0.064	6.40%	0.064	0.064	0.064	0.064	
15:00	0.084	8.40%	0.084	0.084	0.084	0.084	
16:00	0.097	9.72%	0.097	0.097	0.097	0.097	
17:00	0.103	10.27%	0.103	0.103	0.103	0.103	
18:00	0.102	10.18%	0.102	0.102	0.102	0.102	
19:00	0.084	8.37%	0.084	0.084	0.084	0.084	
20:00	0.053	5.30%	0.053	0.053	0.053	0.053	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	

**ENTRADA® - Environmental Traffic Data Program Inputs**I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616



Facility	I-66 Westbound Off-Ramp		Direction		E/W	Present Year	2011	Analyst
From	I-66 WB		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	US-15		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	0.0%	0.0%	0.0%	1.1%	0.3%	1.5%	1.1%	0.3%	1.5%	
7:00	0.0%	0.0%	0.0%	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	
8:00	0.0%	0.0%	0.0%	1.0%	0.4%	1.4%	1.0%	0.4%	1.4%	
9:00	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
10:00	0.0%	0.0%	0.0%	1.1%	0.6%	1.7%	1.1%	0.6%	1.7%	
11:00	0.0%	0.0%	0.0%	1.3%	0.6%	1.8%	1.3%	0.6%	1.8%	
12:00	0.0%	0.0%	0.0%	1.1%	0.6%	1.6%	1.1%	0.6%	1.6%	
13:00	0.0%	0.0%	0.0%	1.2%	0.5%	1.6%	1.2%	0.5%	1.6%	
14:00	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
15:00	0.0%	0.0%	0.0%	0.8%	0.4%	1.2%	0.8%	0.4%	1.2%	
16:00	0.0%	0.0%	0.0%	0.7%	0.3%	1.0%	0.7%	0.3%	1.0%	
17:00	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
18:00	0.0%	0.0%	0.0%	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	
19:00	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
20:00	0.0%	0.0%	0.0%	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
1:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
2:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
3:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
4:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
5:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
6:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
7:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
8:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
9:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
10:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
11:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
12:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
13:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
14:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
15:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
16:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
17:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
18:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
19:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
20:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
21:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
22:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
23:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

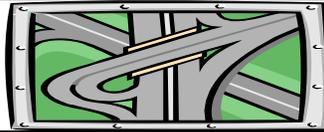


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Westbound Off-Ramp		
From	I-66 WB		
To	US-15		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	13,000	No-build
Interim Year 2014 ADT	13,000	13,000
Design Year 2036 ADT	21,000	21,000

Ramp

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	421	421	421	680	680	3.24%	100%	1.1%	0.3%	1.5%
7:00	512	512	512	828	828	3.94%	100%	1.0%	0.5%	1.5%
8:00	530	530	530	856	856	4.08%	100%	1.0%	0.4%	1.4%
9:00	437	437	437	706	706	3.36%	100%	1.1%	0.5%	1.6%
10:00	417	417	417	673	673	3.21%	100%	1.1%	0.6%	1.7%
11:00	446	446	446	721	721	3.43%	100%	1.3%	0.6%	1.8%
12:00	543	543	543	877	877	4.17%	100%	1.1%	0.6%	1.6%
13:00	642	642	642	1,038	1,038	4.94%	100%	1.2%	0.5%	1.6%
14:00	832	832	832	1,343	1,343	6.40%	100%	1.1%	0.5%	1.6%
15:00	1,092	1,092	1,092	1,763	1,763	8.40%	100%	0.8%	0.4%	1.2%
16:00	1,263	1,263	1,263	2,041	2,041	9.72%	100%	0.7%	0.3%	1.0%
17:00	1,335	1,335	1,335	2,156	2,156	10.27%	100%	0.4%	0.2%	0.6%
18:00	1,324	1,324	1,324	2,138	2,138	10.18%	100%	0.5%	0.3%	0.8%
19:00	1,088	1,088	1,088	1,758	1,758	8.37%	100%	0.4%	0.2%	0.6%
20:00	689	689	689	1,113	1,113	5.30%	100%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

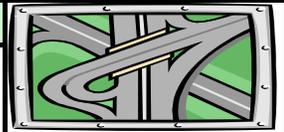
Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	33	33	33	33	33	33	33	33	33	33
7:00	33	33	33	33	33	33	33	33	33	33
8:00	33	33	33	33	33	33	33	33	33	33
9:00	33	33	33	33	33	33	33	33	33	33
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound On-Ramp	Direction		E/W	Present Year	2011	Analyst
From	US-15	Map Reference		DC 5754 & 575	Interim Year	2014	EA
To	I-66 WB	County	Prince William County		Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

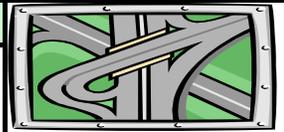
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	2,000	2,000	2,000	5,000	5,000	Ramp designated speed of 35 mph observed.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,440	1,440	1,440	1,440	1,440			
Facility Type	Ramp	Ramp	Ramp	Ramp	Ramp			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
Ramp # of lanes	0	0	0	0	0			
N/A	1	1	1	1	1			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	35	35	35	35	35			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS > 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	33	33	33	33	33	FFS (PoS <= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.018	1.84%	0.018	0.018	0.018	0.018	
7:00	0.039	3.90%	0.039	0.039	0.039	0.039	
8:00	0.061	6.06%	0.061	0.061	0.061	0.061	
9:00	0.036	3.63%	0.036	0.036	0.036	0.036	
10:00	0.033	3.32%	0.033	0.033	0.033	0.033	
11:00	0.041	4.14%	0.041	0.041	0.041	0.041	
12:00	0.048	4.78%	0.048	0.048	0.048	0.048	
13:00	0.054	5.40%	0.054	0.054	0.054	0.054	
14:00	0.077	7.65%	0.077	0.077	0.077	0.077	
15:00	0.105	10.52%	0.105	0.105	0.105	0.105	
16:00	0.121	12.08%	0.121	0.121	0.121	0.121	
17:00	0.121	12.08%	0.121	0.121	0.121	0.121	
18:00	0.080	8.00%	0.080	0.080	0.080	0.080	
19:00	0.051	5.08%	0.051	0.051	0.051	0.051	
20:00	0.034	3.44%	0.034	0.034	0.034	0.034	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	I-66 Westbound On-Ramp		Direction		E/W	Present Year	2011	Analyst
From	US-15		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	I-66 WB		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(EB Vol.*%T) + (WB Vol.*%T)] / 2 way Vol. T: Truck
	EB			WB			Weighted TWO-WAY (Editable)			
	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	0.0%	0.0%	0.0%	1.1%	0.3%	1.5%	1.1%	0.3%	1.5%	
7:00	0.0%	0.0%	0.0%	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	
8:00	0.0%	0.0%	0.0%	1.0%	0.4%	1.4%	1.0%	0.4%	1.4%	
9:00	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
10:00	0.0%	0.0%	0.0%	1.1%	0.6%	1.7%	1.1%	0.6%	1.7%	
11:00	0.0%	0.0%	0.0%	1.3%	0.6%	1.8%	1.3%	0.6%	1.8%	
12:00	0.0%	0.0%	0.0%	1.1%	0.6%	1.6%	1.1%	0.6%	1.6%	
13:00	0.0%	0.0%	0.0%	1.2%	0.5%	1.6%	1.2%	0.5%	1.6%	
14:00	0.0%	0.0%	0.0%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
15:00	0.0%	0.0%	0.0%	0.8%	0.4%	1.2%	0.8%	0.4%	1.2%	
16:00	0.0%	0.0%	0.0%	0.7%	0.3%	1.0%	0.7%	0.3%	1.0%	
17:00	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
18:00	0.0%	0.0%	0.0%	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	
19:00	0.0%	0.0%	0.0%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
20:00	0.0%	0.0%	0.0%	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	EB					WB				
	Existing	Interim Bld	Interim Nbld	Design Bld	Design Nbld	2011	Interim Bld	Interim Nbld	Design Bld	Design Nbld
0:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
1:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
2:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
3:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
4:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
5:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
6:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
7:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
8:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
9:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
10:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
11:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
12:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
13:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
14:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
15:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
16:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
17:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
18:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
19:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
20:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
21:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
22:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
23:00	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

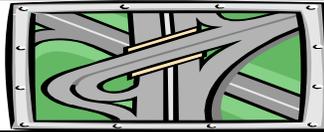


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	I-66 Westbound On-Ramp		
From	US-15		
To	I-66 WB		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	2,000	No-build
Interim Year 2014 ADT	2,000	2,000
Design Year 2036 ADT	5,000	5,000

Ramp

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
6:00	37	37	37	92	92	1.84%	100%	1.1%	0.3%	1.5%
7:00	78	78	78	195	195	3.90%	100%	1.0%	0.5%	1.5%
8:00	121	121	121	303	303	6.06%	100%	1.0%	0.4%	1.4%
9:00	73	73	73	182	182	3.63%	100%	1.1%	0.5%	1.6%
10:00	66	66	66	166	166	3.32%	100%	1.1%	0.6%	1.7%
11:00	83	83	83	207	207	4.14%	100%	1.3%	0.6%	1.8%
12:00	96	96	96	239	239	4.78%	100%	1.1%	0.6%	1.6%
13:00	108	108	108	270	270	5.40%	100%	1.2%	0.5%	1.6%
14:00	153	153	153	383	383	7.65%	100%	1.1%	0.5%	1.6%
15:00	210	210	210	526	526	10.52%	100%	0.8%	0.4%	1.2%
16:00	242	242	242	604	604	12.08%	100%	0.7%	0.3%	1.0%
17:00	242	242	242	604	604	12.08%	100%	0.4%	0.2%	0.6%
18:00	160	160	160	400	400	8.00%	100%	0.5%	0.3%	0.8%
19:00	102	102	102	254	254	5.08%	100%	0.4%	0.2%	0.6%
20:00	69	69	69	172	172	3.44%	100%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	100%	0.0%	0.0%	0.0%

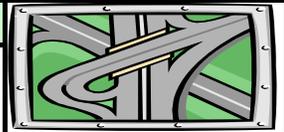
Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
0:00	n/a	n/a								
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	33	33	33	33	33	33	33	33	33	33
7:00	33	33	33	33	33	33	33	33	33	33
8:00	33	33	33	33	33	33	33	33	33	33
9:00	33	33	33	33	33	33	33	33	33	33
10:00	33	33	33	33	33	33	33	33	33	33
11:00	33	33	33	33	33	33	33	33	33	33
12:00	33	33	33	33	33	33	33	33	33	33
13:00	33	33	33	33	33	33	33	33	33	33
14:00	33	33	33	33	33	33	33	33	33	33
15:00	33	33	33	33	33	33	33	33	33	33
16:00	33	33	33	33	33	33	33	33	33	33
17:00	33	33	33	33	33	33	33	33	33	33
18:00	33	33	33	33	33	33	33	33	33	33
19:00	33	33	33	33	33	33	33	33	33	33
20:00	33	33	33	33	33	33	33	33	33	33
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 15, James Madison Hwy	Direction	N/S	Present Year	2011	Analyst
From	I-66	Map Reference	DC 5754 & 575	Interim Year	2014	EA
To	Heathcote Blvd.	County	Prince William County	Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

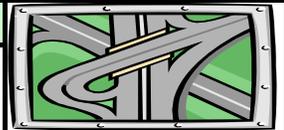
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.71 & 2.1		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	29,000	31,000	31,000	40,000	39,000	Multi-lane Hwy BPR parameters selected.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,008	1,008	1,008	1,008	1,008			
Facility Type	Major Art.	Major Art.	Major Art.	Major Art.	Major Art.			
Median Type	Divided	Divided	Divided	Divided	Divided			
NB # of lanes	2	2	2	2	2			
SB # of lanes	2	2	2	2	2			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	45	45	45	45	45			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	55	55	55	55	55	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.059	5.86%	0.059	0.059	0.059	0.059	
7:00	0.066	6.64%	0.066	0.066	0.066	0.066	
8:00	0.067	6.70%	0.067	0.067	0.067	0.067	
9:00	0.056	5.63%	0.056	0.056	0.056	0.056	
10:00	0.049	4.86%	0.049	0.049	0.049	0.049	
11:00	0.046	4.61%	0.046	0.046	0.046	0.046	
12:00	0.050	5.03%	0.050	0.050	0.050	0.050	
13:00	0.050	5.00%	0.050	0.050	0.050	0.050	
14:00	0.061	6.08%	0.061	0.061	0.061	0.061	
15:00	0.068	6.80%	0.068	0.068	0.068	0.068	
16:00	0.072	7.24%	0.072	0.072	0.072	0.072	
17:00	0.079	7.87%	0.079	0.079	0.079	0.079	
18:00	0.072	7.18%	0.072	0.072	0.072	0.072	
19:00	0.052	5.20%	0.052	0.052	0.052	0.052	
20:00	0.046	4.58%	0.046	0.046	0.046	0.046	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 15, James Madison Hwy	Direction	N/S	Present Year	2011	Analyst
From	I-66	Map Reference	DC 5754 & 5755	Interim Year	2014	EA
To	Heathcote Blvd.	County	Prince William County	Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(NB Vol.*%T) + (SB Vol.*%T)] / 2 way Vol. T: Truck
	NB			SB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	1.1%	0.3%	1.5%	1.1%	0.3%	1.5%	1.1%	0.3%	1.5%	
7:00	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	
8:00	1.0%	0.4%	1.4%	1.0%	0.4%	1.4%	1.0%	0.4%	1.4%	
9:00	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
10:00	1.1%	0.6%	1.7%	1.1%	0.6%	1.7%	1.1%	0.6%	1.7%	
11:00	1.3%	0.6%	1.8%	1.3%	0.6%	1.8%	1.3%	0.6%	1.8%	
12:00	1.1%	0.6%	1.6%	1.1%	0.6%	1.6%	1.1%	0.6%	1.6%	
13:00	1.2%	0.5%	1.6%	1.2%	0.5%	1.6%	1.2%	0.5%	1.6%	
14:00	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
15:00	0.8%	0.4%	1.2%	0.8%	0.4%	1.2%	0.8%	0.4%	1.2%	
16:00	0.7%	0.3%	1.0%	0.7%	0.3%	1.0%	0.7%	0.3%	1.0%	
17:00	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
18:00	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	
19:00	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
20:00	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	NB					SB				
	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	2011	Interim Bld	Interim Nblld	Design Bld	Design Nblld
0:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
2:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
3:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
4:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
5:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
6:00	68%	68%	68%	68%	68%	32%	32%	32%	32%	32%
7:00	60%	60%	60%	60%	60%	40%	40%	40%	40%	40%
8:00	59%	59%	59%	59%	59%	41%	41%	41%	41%	41%
9:00	56%	56%	56%	56%	56%	44%	44%	44%	44%	44%
10:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
11:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
12:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
13:00	49%	49%	49%	49%	49%	51%	51%	51%	51%	51%
14:00	42%	42%	42%	42%	42%	58%	58%	58%	58%	58%
15:00	40%	40%	40%	40%	40%	60%	60%	60%	60%	60%
16:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
17:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
18:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
19:00	40%	40%	40%	40%	40%	60%	60%	60%	60%	60%
20:00	45%	45%	45%	45%	45%	55%	55%	55%	55%	55%
21:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
22:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
23:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

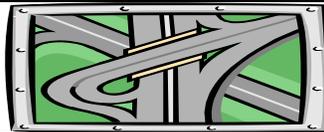


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 15, James Madison Hwy		
From	I-66		
To	Heathcote Blvd.		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	29,000	No-build
Interim Year 2014 ADT	31,000	31,000
Design Year 2036 ADT	40,000	39,000

Northbound

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.			
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	1,152	1,232	1,232	1,589	1,549	5.86%	68%	1.1%	0.3%	1.5%
7:00	1,157	1,237	1,237	1,596	1,556	6.64%	60%	1.0%	0.5%	1.5%
8:00	1,153	1,233	1,233	1,590	1,551	6.70%	59%	1.0%	0.4%	1.4%
9:00	915	978	978	1,262	1,230	5.63%	56%	1.1%	0.5%	1.6%
10:00	747	799	799	1,031	1,005	4.86%	53%	1.1%	0.6%	1.7%
11:00	688	735	735	949	925	4.61%	52%	1.3%	0.6%	1.8%
12:00	736	787	787	1,016	990	5.03%	50%	1.1%	0.6%	1.6%
13:00	710	759	759	979	955	5.00%	49%	1.2%	0.5%	1.6%
14:00	736	787	787	1,016	990	6.08%	42%	1.1%	0.5%	1.6%
15:00	780	834	834	1,076	1,049	6.80%	40%	0.8%	0.4%	1.2%
16:00	819	876	876	1,130	1,101	7.24%	39%	0.7%	0.3%	1.0%
17:00	883	944	944	1,218	1,187	7.87%	39%	0.4%	0.2%	0.6%
18:00	811	866	866	1,118	1,090	7.18%	39%	0.5%	0.3%	0.8%
19:00	598	639	639	824	804	5.20%	40%	0.4%	0.2%	0.6%
20:00	593	634	634	818	797	4.58%	45%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrupt.	Interrupt.	Un-Interrupt.	Interrupt.	Un-Interrupt.	Interrupt.	Un-Interrupt.	Interrupt.	Un-Interrupt.	Interrupt.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	44	44	43	43	43	43	37	37	38	38
7:00	44	44	43	43	43	43	37	37	38	38
8:00	44	44	43	43	43	43	37	37	38	38
9:00	47	47	47	47	47	47	42	42	43	43
10:00	50	50	49	49	49	49	46	46	46	46
11:00	50	50	50	50	50	50	47	47	47	47
12:00	50	50	49	49	49	49	46	46	46	46
13:00	50	50	50	50	50	50	47	47	47	47
14:00	50	50	49	49	49	49	46	46	46	46
15:00	49	49	49	49	49	49	45	45	46	46
16:00	49	49	48	48	48	48	45	45	45	45
17:00	48	48	47	47	47	47	43	43	44	44
18:00	49	49	48	48	48	48	45	45	45	45
19:00	52	52	51	51	51	51	49	49	49	49
20:00	52	52	51	51	51	51	49	49	49	49
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

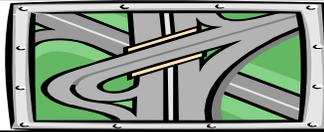


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 15, James Madison Hwy		
From	I-66		
To	Heathcote Blvd.		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	29,000	No-build
Interim Year 2014 ADT	31,000	31,000
Design Year 2036 ADT	40,000	39,000

Southbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	547	585	585	754	736	5.86%	32%	1.1%	0.3%	1.5%
7:00	767	820	820	1,058	1,032	6.64%	40%	1.0%	0.5%	1.5%
8:00	789	843	843	1,088	1,061	6.70%	41%	1.0%	0.4%	1.4%
9:00	718	768	768	990	966	5.63%	44%	1.1%	0.5%	1.6%
10:00	662	708	708	913	890	4.86%	47%	1.1%	0.6%	1.7%
11:00	648	692	692	893	871	4.61%	48%	1.3%	0.6%	1.8%
12:00	724	773	773	998	973	5.03%	50%	1.1%	0.6%	1.6%
13:00	739	790	790	1,020	994	5.00%	51%	1.2%	0.5%	1.6%
14:00	1,026	1,096	1,096	1,415	1,379	6.08%	58%	1.1%	0.5%	1.6%
15:00	1,190	1,273	1,273	1,642	1,601	6.80%	60%	0.8%	0.4%	1.2%
16:00	1,280	1,369	1,369	1,766	1,722	7.24%	61%	0.7%	0.3%	1.0%
17:00	1,399	1,495	1,495	1,929	1,881	7.87%	61%	0.4%	0.2%	0.6%
18:00	1,271	1,358	1,358	1,753	1,709	7.18%	61%	0.5%	0.3%	0.8%
19:00	909	972	972	1,254	1,222	5.20%	60%	0.4%	0.2%	0.6%
20:00	736	787	787	1,015	990	4.58%	55%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	52	52	52	52	52	52	50	50	50	50
7:00	49	49	49	49	49	49	45	45	46	46
8:00	49	49	49	49	49	49	45	45	45	45
9:00	50	50	49	49	49	49	46	46	47	47
10:00	51	51	50	50	50	50	47	47	48	48
11:00	51	51	50	50	50	50	48	48	48	48
12:00	50	50	49	49	49	49	46	46	47	47
13:00	50	50	49	49	49	49	46	46	46	46
14:00	46	46	45	45	45	45	40	40	40	40
15:00	44	44	42	42	42	42	36	36	37	37
16:00	42	42	41	41	41	41	35	35	35	35
17:00	41	41	39	39	39	39	33	33	33	33
18:00	43	43	41	41	41	41	35	35	36	36
19:00	48	48	47	47	47	47	43	43	43	43
20:00	50	50	50	50	50	50	47	47	47	47
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

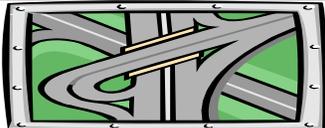
* Shown when volume exceeds Max. Service Flow



ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 15, James Madison Hwy			Map Reference	ADC 5754 & 5755	
From	I-66			Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
To	Heathcote Blvd.			Present Year 2011 ADT	29,000	No-build
City/County	Prince William County			Interim Year 2014 ADT	31,000	31,000
Date	5/13/2011	Time Span	24 Hours	Design Year 2036 ADT	40,000	39,000

Two-way

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	Two-way	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
6:00	1,699	1,816	1,816	2,344	2,285	5.86%	=	1.1%	0.3%	1.5%
7:00	1,924	2,057	2,057	2,654	2,588	6.64%	=	1.0%	0.5%	1.5%
8:00	1,942	2,076	2,076	2,679	2,612	6.70%	=	1.0%	0.4%	1.4%
9:00	1,633	1,746	1,746	2,252	2,196	5.63%	=	1.1%	0.5%	1.6%
10:00	1,409	1,507	1,507	1,944	1,895	4.86%	=	1.1%	0.6%	1.7%
11:00	1,336	1,428	1,428	1,842	1,796	4.61%	=	1.3%	0.6%	1.8%
12:00	1,460	1,561	1,561	2,014	1,963	5.03%	=	1.1%	0.6%	1.6%
13:00	1,449	1,549	1,549	1,999	1,949	5.00%	=	1.2%	0.5%	1.6%
14:00	1,762	1,884	1,884	2,430	2,370	6.08%	=	1.1%	0.5%	1.6%
15:00	1,971	2,107	2,107	2,718	2,650	6.80%	=	0.8%	0.4%	1.2%
16:00	2,099	2,244	2,244	2,896	2,823	7.24%	=	0.7%	0.3%	1.0%
17:00	2,281	2,439	2,439	3,147	3,068	7.87%	=	0.4%	0.2%	0.6%
18:00	2,081	2,225	2,225	2,871	2,799	7.18%	=	0.5%	0.3%	0.8%
19:00	1,507	1,611	1,611	2,078	2,026	5.20%	=	0.4%	0.2%	0.6%
20:00	1,329	1,421	1,421	1,833	1,787	4.58%	=	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%

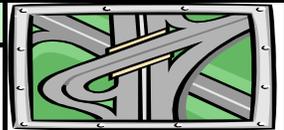
Average Two-way Hourly Speed (MPH)

Starting Time	Average Two-way Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	47	47	46	46	46	46	41	41	42	42
7:00	46	46	45	45	45	45	40	40	41	41
8:00	46	46	45	45	45	45	40	40	41	41
9:00	49	49	48	48	48	48	44	44	44	44
10:00	50	50	50	50	50	50	47	47	47	47
11:00	51	51	50	50	50	50	47	47	48	48
12:00	50	50	49	49	49	49	46	46	46	46
13:00	50	50	49	49	49	49	46	46	47	47
14:00	48	48	47	47	47	47	42	42	43	43
15:00	46	46	45	45	45	45	40	40	40	40
16:00	45	45	44	44	44	44	39	39	39	39
17:00	44	44	42	42	42	42	37	37	37	37
18:00	45	45	44	44	44	44	39	39	39	39
19:00	49	49	49	49	49	49	45	45	46	46
20:00	51	51	50	50	50	50	48	48	48	48
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 15, James Madison Hwy	Direction	N/S	Present Year	2011	Analyst
From	I-66	Map Reference	DC 5754 & 575	Interim Year	2014	EA
To	Route 55 - Washington Street	County	Prince William County	Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.71 & 2.1		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	30,000	32,000	32,000	48,000	47,000	Multi-lane Hwy BPR parameters selected.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	1,008	1,008	1,008	1,008	1,008			
Facility Type	Major Art.	Major Art.	Major Art.	Major Art.	Major Art.			
Median Type	Divided	Divided	Divided	Divided	Divided			
NB # of lanes	2	2	2	2	2			
SB # of lanes	2	2	2	2	2			
Outside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Inside shldr. width (ft)	6.00	6.00	6.00	6.00	6.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	45	45	45	45	45			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Uninterrupted FFS (mph)	55	55	55	55	55	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.056	5.61%	0.056	0.056	0.056	0.056	
7:00	0.064	6.37%	0.064	0.064	0.064	0.064	
8:00	0.065	6.50%	0.065	0.065	0.065	0.065	
9:00	0.057	5.73%	0.057	0.057	0.057	0.057	
10:00	0.049	4.85%	0.049	0.049	0.049	0.049	
11:00	0.049	4.85%	0.049	0.049	0.049	0.049	
12:00	0.052	5.25%	0.052	0.052	0.052	0.052	
13:00	0.049	4.86%	0.049	0.049	0.049	0.049	
14:00	0.060	6.01%	0.060	0.060	0.060	0.060	
15:00	0.071	7.12%	0.071	0.071	0.071	0.071	
16:00	0.077	7.68%	0.077	0.077	0.077	0.077	
17:00	0.082	8.18%	0.082	0.082	0.082	0.082	
18:00	0.068	6.83%	0.068	0.068	0.068	0.068	
19:00	0.050	4.99%	0.050	0.050	0.050	0.050	
20:00	0.041	4.11%	0.041	0.041	0.041	0.041	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	US Route 15, James Madison Hwy	Direction	N/S	Present Year	2011	Analyst
From	I-66	Map Reference	DC 5754 & 5755	Interim Year	2014	EA
To	Route 55 - Washington Street	County	Prince William County	Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(NB Vol.*%T) + (SB Vol.*%T)] / 2 way Vol. T: Truck
	NB			SB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	1.1%	0.3%	1.5%	1.1%	0.3%	1.5%	1.1%	0.3%	1.5%	
7:00	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	1.0%	0.5%	1.5%	
8:00	1.0%	0.4%	1.4%	1.0%	0.4%	1.4%	1.0%	0.4%	1.4%	
9:00	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
10:00	1.1%	0.6%	1.7%	1.1%	0.6%	1.7%	1.1%	0.6%	1.7%	
11:00	1.3%	0.6%	1.8%	1.3%	0.6%	1.8%	1.3%	0.6%	1.8%	
12:00	1.1%	0.6%	1.6%	1.1%	0.6%	1.6%	1.1%	0.6%	1.6%	
13:00	1.2%	0.5%	1.6%	1.2%	0.5%	1.6%	1.2%	0.5%	1.6%	
14:00	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	1.1%	0.5%	1.6%	
15:00	0.8%	0.4%	1.2%	0.8%	0.4%	1.2%	0.8%	0.4%	1.2%	
16:00	0.7%	0.3%	1.0%	0.7%	0.3%	1.0%	0.7%	0.3%	1.0%	
17:00	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
18:00	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	
19:00	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	0.4%	0.2%	0.6%	
20:00	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	NB					SB				
	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	2011	Interim Bld	Interim Nblld	Design Bld	Design Nblld
0:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
2:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
3:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
4:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
5:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
6:00	68%	68%	68%	68%	68%	32%	32%	32%	32%	32%
7:00	60%	60%	60%	60%	60%	40%	40%	40%	40%	40%
8:00	59%	59%	59%	59%	59%	41%	41%	41%	41%	41%
9:00	56%	56%	56%	56%	56%	44%	44%	44%	44%	44%
10:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
11:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
12:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
13:00	49%	49%	49%	49%	49%	51%	51%	51%	51%	51%
14:00	42%	42%	42%	42%	42%	58%	58%	58%	58%	58%
15:00	40%	40%	40%	40%	40%	60%	60%	60%	60%	60%
16:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
17:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
18:00	39%	39%	39%	39%	39%	61%	61%	61%	61%	61%
19:00	40%	40%	40%	40%	40%	60%	60%	60%	60%	60%
20:00	45%	45%	45%	45%	45%	55%	55%	55%	55%	55%
21:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
22:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
23:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

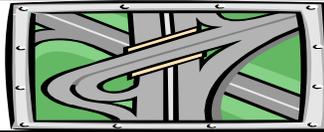


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 15, James Madison Hwy		
From	I-66		
To	Route 55 - Washington Street		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	30,000	No-build
Interim Year 2014 ADT	32,000	32,000
Design Year 2036 ADT	48,000	47,000

Northbound

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck		
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	1,141	1,217	1,217	1,825	1,787	5.61%	68%	1.1%	0.3%	1.5%
7:00	1,149	1,225	1,225	1,838	1,800	6.37%	60%	1.0%	0.5%	1.5%
8:00	1,158	1,235	1,235	1,852	1,813	6.50%	59%	1.0%	0.4%	1.4%
9:00	964	1,028	1,028	1,542	1,510	5.73%	56%	1.1%	0.5%	1.6%
10:00	772	824	824	1,235	1,210	4.85%	53%	1.1%	0.6%	1.7%
11:00	750	799	799	1,199	1,174	4.85%	52%	1.3%	0.6%	1.8%
12:00	794	847	847	1,271	1,244	5.25%	50%	1.1%	0.6%	1.6%
13:00	714	761	761	1,142	1,118	4.86%	49%	1.2%	0.5%	1.6%
14:00	754	804	804	1,206	1,181	6.01%	42%	1.1%	0.5%	1.6%
15:00	846	902	902	1,354	1,326	7.12%	40%	0.8%	0.4%	1.2%
16:00	898	958	958	1,437	1,407	7.68%	39%	0.7%	0.3%	1.0%
17:00	950	1,013	1,013	1,519	1,488	8.18%	39%	0.4%	0.2%	0.6%
18:00	798	851	851	1,276	1,250	6.83%	39%	0.5%	0.3%	0.8%
19:00	594	633	633	950	930	4.99%	40%	0.4%	0.2%	0.6%
20:00	550	587	587	881	862	4.11%	45%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	44	44	43	43	43	43	33	33	34	34
7:00	44	44	43	43	43	43	33	33	34	34
8:00	44	44	43	43	43	43	33	33	34	34
9:00	47	47	46	46	46	46	38	38	38	38
10:00	49	49	49	49	49	49	43	43	43	43
11:00	50	50	49	49	49	49	43	43	43	43
12:00	49	49	48	48	48	48	42	42	42	42
13:00	50	50	50	50	50	50	44	44	44	44
14:00	50	50	49	49	49	49	43	43	43	43
15:00	49	49	48	48	48	48	41	41	41	41
16:00	48	48	47	47	47	47	40	40	40	40
17:00	47	47	46	46	46	46	39	39	39	39
18:00	49	49	49	49	49	49	42	42	43	43
19:00	52	52	51	51	51	51	47	47	48	48
20:00	52	52	52	52	52	52	48	48	49	49
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

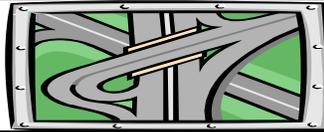


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 15, James Madison Hwy		
From	I-66		
To	Route 55 - Washington Street		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	30,000	No-build
Interim Year 2014 ADT	32,000	32,000
Design Year 2036 ADT	48,000	47,000

Southbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	542	578	578	866	848	5.61%	32%	1.1%	0.3%	1.5%
7:00	762	813	813	1,219	1,194	6.37%	40%	1.0%	0.5%	1.5%
8:00	792	845	845	1,267	1,241	6.50%	41%	1.0%	0.4%	1.4%
9:00	756	807	807	1,210	1,185	5.73%	44%	1.1%	0.5%	1.6%
10:00	684	730	730	1,094	1,072	4.85%	47%	1.1%	0.6%	1.7%
11:00	706	753	753	1,129	1,106	4.85%	48%	1.3%	0.6%	1.8%
12:00	781	833	833	1,249	1,223	5.25%	50%	1.1%	0.6%	1.6%
13:00	743	793	793	1,189	1,164	4.86%	51%	1.2%	0.5%	1.6%
14:00	1,050	1,120	1,120	1,680	1,645	6.01%	58%	1.1%	0.5%	1.6%
15:00	1,291	1,377	1,377	2,066	2,023	7.12%	60%	0.8%	0.4%	1.2%
16:00	1,404	1,498	1,498	2,247	2,200	7.68%	61%	0.7%	0.3%	1.0%
17:00	1,504	1,605	1,605	2,407	2,357	8.18%	61%	0.4%	0.2%	0.6%
18:00	1,251	1,334	1,334	2,001	1,959	6.83%	61%	0.5%	0.3%	0.8%
19:00	903	963	963	1,445	1,415	4.99%	60%	0.4%	0.2%	0.6%
20:00	683	729	729	1,094	1,071	4.11%	55%	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
0:00	n/a	n/a								
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	52	52	52	52	52	52	48	48	48	48
7:00	50	50	49	49	49	49	43	43	43	43
8:00	49	49	49	49	49	49	42	42	43	43
9:00	50	50	49	49	49	49	43	43	43	43
10:00	50	50	50	50	50	50	45	45	45	45
11:00	50	50	50	50	50	50	44	44	45	45
12:00	49	49	49	49	49	49	42	42	43	43
13:00	50	50	49	49	49	49	43	43	44	44
14:00	45	45	44	44	44	44	36	36	36	36
15:00	42	42	41	41	41	41	30	30	31	31
16:00	40	40	39	39	39	39	28	28	29	29
17:00	39	39	37	37	37	37	26	26	27	27
18:00	43	43	42	42	42	42	31	31	32	32
19:00	48	48	47	47	47	47	40	40	40	40
20:00	51	51	50	50	50	50	45	45	46	46
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow

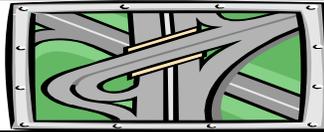


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	US Route 15, James Madison Hwy		
From	I-66		
To	Route 55 - Washington Street		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.71 and b= 2.1		
Present Year 2011 ADT	30,000	No-build
Interim Year 2014 ADT	32,000	32,000
Design Year 2036 ADT	48,000	47,000

Two-way

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	Two-way	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
6:00	1,682	1,794	1,794	2,692	2,636	5.61%	=	1.1%	0.3%	1.5%
7:00	1,910	2,038	2,038	3,057	2,993	6.37%	=	1.0%	0.5%	1.5%
8:00	1,949	2,079	2,079	3,119	3,054	6.50%	=	1.0%	0.4%	1.4%
9:00	1,720	1,835	1,835	2,752	2,695	5.73%	=	1.1%	0.5%	1.6%
10:00	1,456	1,553	1,553	2,330	2,281	4.85%	=	1.1%	0.6%	1.7%
11:00	1,455	1,552	1,552	2,328	2,280	4.85%	=	1.3%	0.6%	1.8%
12:00	1,575	1,680	1,680	2,520	2,467	5.25%	=	1.1%	0.6%	1.6%
13:00	1,457	1,554	1,554	2,331	2,282	4.86%	=	1.2%	0.5%	1.6%
14:00	1,804	1,924	1,924	2,886	2,826	6.01%	=	1.1%	0.5%	1.6%
15:00	2,137	2,280	2,280	3,419	3,348	7.12%	=	0.8%	0.4%	1.2%
16:00	2,303	2,456	2,456	3,684	3,608	7.68%	=	0.7%	0.3%	1.0%
17:00	2,454	2,618	2,618	3,926	3,845	8.18%	=	0.4%	0.2%	0.6%
18:00	2,048	2,185	2,185	3,278	3,209	6.83%	=	0.5%	0.3%	0.8%
19:00	1,497	1,597	1,597	2,395	2,345	4.99%	=	0.4%	0.2%	0.6%
20:00	1,234	1,316	1,316	1,974	1,933	4.11%	=	0.2%	0.1%	0.3%
21:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%

Average Two-way Hourly Speed (MPH)

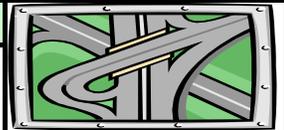
Starting Time	Average Two-way Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	47	47	46	46	46	46	38	38	39	39
7:00	46	46	45	45	45	45	37	37	38	38
8:00	46	46	45	45	45	45	37	37	37	37
9:00	48	48	47	47	47	47	40	40	40	40
10:00	50	50	49	49	49	49	44	44	44	44
11:00	50	50	49	49	49	49	44	44	44	44
12:00	49	49	48	48	48	48	42	42	43	43
13:00	50	50	49	49	49	49	44	44	44	44
14:00	47	47	46	46	46	46	39	39	39	39
15:00	45	45	43	43	43	43	34	34	35	35
16:00	43	43	42	42	42	42	33	33	33	33
17:00	42	42	41	41	41	41	31	31	32	32
18:00	45	45	44	44	44	44	36	36	36	36
19:00	49	49	49	49	49	49	43	43	43	43
20:00	51	51	51	51	51	51	47	47	47	47
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Old Carolina Road, Overpass I-66	Direction	N/S	Present Year	2011	Analyst
From	EB I-66	Map Reference	DC 5754 & 575	Interim Year	2014	EA
To	WB I-66	County	Prince William County	Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

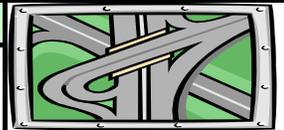
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	7,000	8,000	8,000	12,000	10,000	Signalized BPR parameters selected.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	560	560	560	560	560			
Facility Type	Collector	Collector	Collector	Collector	Collector			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
NB # of lanes	1	1	1	1	1			
SB # of lanes	1	1	1	1	1			
Outside shldr. width (ft)	0.00	0.00	0.00	0.00	0.00			
Inside shldr. width (ft)	0.00	0.00	0.00	0.00	0.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	25	25	25	25	25			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS > 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	25	25	25	25	25	FFS (PoS <= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.033	3.33%	0.033	0.033	0.033	0.033	
7:00	0.044	4.42%	0.044	0.044	0.044	0.044	
8:00	0.067	6.71%	0.067	0.067	0.067	0.067	
9:00	0.059	5.92%	0.059	0.059	0.059	0.059	
10:00	0.040	3.95%	0.040	0.040	0.040	0.040	
11:00	0.050	4.96%	0.050	0.050	0.050	0.050	
12:00	0.065	6.54%	0.065	0.065	0.065	0.065	
13:00	0.055	5.50%	0.055	0.055	0.055	0.055	
14:00	0.065	6.51%	0.065	0.065	0.065	0.065	
15:00	0.085	8.49%	0.085	0.085	0.085	0.085	
16:00	0.089	8.95%	0.089	0.089	0.089	0.089	
17:00	0.090	8.97%	0.090	0.090	0.090	0.090	
18:00	0.082	8.22%	0.082	0.082	0.082	0.082	
19:00	0.061	6.10%	0.061	0.061	0.061	0.061	
20:00	0.050	5.03%	0.050	0.050	0.050	0.050	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Old Carolina Road, Overpass I-66			Direction			N/S			Present Year	2011	Analyst
From	EB I-66			Map Reference			DC 5754 & 5755			Interim Year	2014	EA
To	WB I-66			County	Prince William County			Design Year			2036	Ver. 2009-NG
Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)										Weighted %T = [(NB Vol.*%T) + (SB Vol.*%T)] / 2 way Vol. T: Truck	
	NB			SB			Weighted TWO-WAY (Editable)					
	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck	2X-6T	3X +	Total Truck			
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
6:00	4.7%	0.2%	0.0%	2.3%	0.0%	0.0%	3.8%	0.1%	3.9%			
7:00	2.4%	0.0%	0.0%	1.3%	0.2%	0.0%	1.9%	0.1%	2.0%			
8:00	1.3%	0.0%	0.0%	2.1%	0.0%	0.0%	1.8%	0.0%	1.8%			
9:00	1.3%	0.0%	0.0%	0.5%	0.0%	0.0%	0.9%	0.0%	0.9%			
10:00	1.4%	0.0%	0.0%	0.5%	0.0%	0.0%	0.9%	0.0%	0.9%			
11:00	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%	0.0%	0.1%			
12:00	0.3%	0.0%	0.0%	0.5%	0.0%	0.0%	0.4%	0.0%	0.4%			
13:00	0.9%	0.4%	0.0%	1.0%	0.0%	0.0%	0.9%	0.3%	1.2%			
14:00	2.0%	0.0%	0.0%	3.1%	0.0%	0.1%	2.6%	0.0%	2.6%			
15:00	0.7%	0.0%	0.0%	1.6%	0.0%	0.2%	1.1%	0.0%	1.1%			
16:00	1.3%	0.1%	0.0%	0.3%	0.1%	0.1%	0.8%	0.1%	0.9%			
17:00	0.8%	0.0%	0.0%	0.3%	0.0%	0.0%	0.5%	0.0%	0.5%			
18:00	0.4%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.1%	0.3%			
19:00	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%			
20:00	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%			
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

Starting Time	Directional Split, D-factor									
	NB					SB				
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	2011	Interim Bld	Interim Nbl	Design Bld	Design Nbl
0:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
2:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
3:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
4:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
5:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
6:00	63%	63%	63%	63%	63%	37%	37%	37%	37%	37%
7:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
8:00	37%	37%	37%	37%	37%	63%	63%	63%	63%	63%
9:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
10:00	49%	49%	49%	49%	49%	51%	51%	51%	51%	51%
11:00	43%	43%	43%	43%	43%	57%	57%	57%	57%	57%
12:00	54%	54%	54%	54%	54%	46%	46%	46%	46%	46%
13:00	58%	58%	58%	58%	58%	42%	42%	42%	42%	42%
14:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
15:00	51%	51%	51%	51%	51%	49%	49%	49%	49%	49%
16:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
17:00	47%	47%	47%	47%	47%	53%	53%	53%	53%	53%
18:00	52%	52%	52%	52%	52%	48%	48%	48%	48%	48%
19:00	57%	57%	57%	57%	57%	43%	43%	43%	43%	43%
20:00	61%	61%	61%	61%	61%	39%	39%	39%	39%	39%
21:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
22:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
23:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

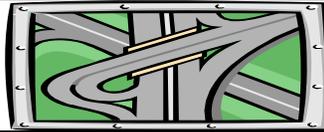


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Old Carolina Road, Overpass I-66		
From	EB I-66		
To	WB I-66		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	7,000	No-build
Interim Year 2014 ADT	8,000	8,000
Design Year 2036 ADT	12,000	10,000

Northbound

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	Present hourly % truck		
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	147	168	168	251	210	3.33%	63%	4.7%	0.2%	4.9%
7:00	161	184	184	276	230	4.42%	52%	2.4%	0.0%	2.4%
8:00	175	200	200	299	249	6.71%	37%	1.3%	0.0%	1.3%
9:00	218	249	249	373	311	5.92%	53%	1.3%	0.0%	1.3%
10:00	137	156	156	235	196	3.95%	49%	1.4%	0.0%	1.4%
11:00	149	170	170	255	213	4.96%	43%	0.0%	0.0%	0.0%
12:00	245	280	280	420	350	6.54%	54%	0.3%	0.0%	0.3%
13:00	224	256	256	385	321	5.50%	58%	0.9%	0.4%	1.3%
14:00	238	272	272	409	341	6.51%	52%	2.0%	0.0%	2.0%
15:00	305	349	349	523	436	8.49%	51%	0.7%	0.0%	0.7%
16:00	316	361	361	542	452	8.95%	50%	1.3%	0.1%	1.4%
17:00	293	334	334	502	418	8.97%	47%	0.8%	0.0%	0.8%
18:00	300	343	343	515	429	8.22%	52%	0.4%	0.0%	0.4%
19:00	244	279	279	419	349	6.10%	57%	0.5%	0.0%	0.5%
20:00	216	247	247	370	308	5.03%	61%	0.6%	0.0%	0.6%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
	0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	18	18	18	18	18	18	18	18	18	18
7:00	18	18	18	18	18	18	18	18	18	18
8:00	18	18	18	18	18	18	18	18	18	18
9:00	18	18	18	18	18	18	18	18	18	18
10:00	18	18	18	18	18	18	18	18	18	18
11:00	18	18	18	18	18	18	18	18	18	18
12:00	18	18	18	18	18	18	18	18	18	18
13:00	18	18	18	18	18	18	18	18	18	18
14:00	18	18	18	18	18	18	18	18	18	18
15:00	18	18	18	18	18	18	18	18	18	18
16:00	18	18	18	18	18	18	17	17	18	18
17:00	18	18	18	18	18	18	18	18	18	18
18:00	18	18	18	18	18	18	18	18	18	18
19:00	18	18	18	18	18	18	18	18	18	18
20:00	18	18	18	18	18	18	18	18	18	18
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT

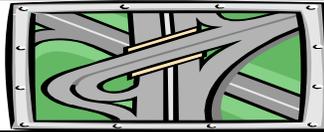


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Old Carolina Road, Overpass I-66		
From	EB I-66		
To	WB I-66		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	7,000	No-build
Interim Year 2014 ADT	8,000	8,000
Design Year 2036 ADT	12,000	10,000

Southbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	86	99	99	148	124	3.33%	37%	2.3%	0.0%	2.3%
7:00	148	169	169	254	212	4.42%	48%	1.3%	0.2%	1.5%
8:00	295	337	337	506	421	6.71%	63%	2.1%	0.0%	2.1%
9:00	197	225	225	337	281	5.92%	47%	0.5%	0.0%	0.5%
10:00	140	160	160	240	200	3.95%	51%	0.5%	0.0%	0.5%
11:00	198	227	227	340	283	4.96%	57%	0.2%	0.0%	0.2%
12:00	213	243	243	365	304	6.54%	46%	0.5%	0.0%	0.5%
13:00	160	183	183	275	229	5.50%	42%	1.0%	0.0%	1.0%
14:00	218	249	249	373	311	6.51%	48%	3.1%	0.0%	3.1%
15:00	289	331	331	496	413	8.49%	49%	1.6%	0.0%	1.6%
16:00	310	355	355	532	443	8.95%	50%	0.3%	0.1%	0.4%
17:00	335	383	383	575	479	8.97%	53%	0.3%	0.0%	0.3%
18:00	275	314	314	471	393	8.22%	48%	0.0%	0.1%	0.1%
19:00	183	209	209	313	261	6.10%	43%	0.0%	0.0%	0.0%
20:00	136	156	156	234	195	5.03%	39%	0.0%	0.0%	0.0%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
0:00	n/a	n/a								
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	18	18	18	18	18	18	18	18	18	18
7:00	18	18	18	18	18	18	18	18	18	18
8:00	18	18	18	18	18	18	18	18	18	18
9:00	18	18	18	18	18	18	18	18	18	18
10:00	18	18	18	18	18	18	18	18	18	18
11:00	18	18	18	18	18	18	18	18	18	18
12:00	18	18	18	18	18	18	18	18	18	18
13:00	18	18	18	18	18	18	18	18	18	18
14:00	18	18	18	18	18	18	18	18	18	18
15:00	18	18	18	18	18	18	18	18	18	18
16:00	18	18	18	18	18	18	17	17	18	18
17:00	18	18	18	18	18	18	17	17	18	18
18:00	18	18	18	18	18	18	18	18	18	18
19:00	18	18	18	18	18	18	18	18	18	18
20:00	18	18	18	18	18	18	18	18	18	18
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow

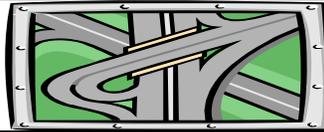


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Old Carolina Road, Overpass I-66		
From	EB I-66		
To	WB I-66		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	7,000	No-build
Interim Year 2014 ADT	8,000	8,000
Design Year 2036 ADT	12,000	10,000

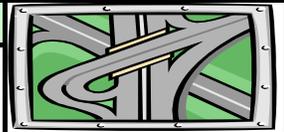
Two-way										
Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.	2A-6T	3A+	Total
	0:00	0	0	0	0	0	0.00%	Two-way	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
6:00	233	266	266	400	333	3.33%	=	3.8%	0.1%	3.9%
7:00	309	353	353	530	442	4.42%	=	1.9%	0.1%	2.0%
8:00	470	537	537	805	671	6.71%	=	1.8%	0.0%	1.8%
9:00	415	474	474	711	592	5.92%	=	0.9%	0.0%	0.9%
10:00	277	316	316	474	395	3.95%	=	0.9%	0.0%	0.9%
11:00	347	397	397	595	496	4.96%	=	0.1%	0.0%	0.1%
12:00	458	523	523	785	654	6.54%	=	0.4%	0.0%	0.4%
13:00	385	440	440	659	550	5.50%	=	0.9%	0.3%	1.2%
14:00	456	521	521	782	651	6.51%	=	2.6%	0.0%	2.6%
15:00	594	679	679	1,019	849	8.49%	=	1.1%	0.0%	1.1%
16:00	626	716	716	1,074	895	8.95%	=	0.8%	0.1%	0.9%
17:00	628	718	718	1,076	897	8.97%	=	0.5%	0.0%	0.5%
18:00	575	657	657	986	822	8.22%	=	0.2%	0.1%	0.3%
19:00	427	488	488	732	610	6.10%	=	0.3%	0.0%	0.3%
20:00	352	402	402	604	503	5.03%	=	0.4%	0.0%	0.4%
21:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%

Average Two-way Hourly Speed (MPH)										
Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
0:00	n/a	n/a								
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	18	18	18	18	18	18	18	18	18	18
7:00	18	18	18	18	18	18	18	18	18	18
8:00	18	18	18	18	18	18	18	18	18	18
9:00	18	18	18	18	18	18	18	18	18	18
10:00	18	18	18	18	18	18	18	18	18	18
11:00	18	18	18	18	18	18	18	18	18	18
12:00	18	18	18	18	18	18	18	18	18	18
13:00	18	18	18	18	18	18	18	18	18	18
14:00	18	18	18	18	18	18	18	18	18	18
15:00	18	18	18	18	18	18	18	18	18	18
16:00	18	18	18	18	18	18	17	17	18	18
17:00	18	18	18	18	18	18	17	17	18	18
18:00	18	18	18	18	18	18	18	18	18	18
19:00	18	18	18	18	18	18	18	18	18	18
20:00	18	18	18	18	18	18	18	18	18	18
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow



ENTRADA© - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Catharpin Road, Overpass I-66	Direction	N/S	Present Year	2011	Analyst
From	EB I-66	Map Reference	DC 5754 & 575	Interim Year	2014	EA
To	WB I-66	County	Prince William County	Design Year	2036	Ver. 2009-NG

Traffic and Geometric Data

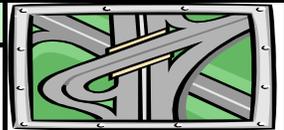
Sys. Unit	E	Facility Length (Mi)		0.1.	BPR a & b= 0.05 & 10		Terrain	Level
Input	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	Notes		
Two-way ADT	6,000	6,000	6,000	13,000	12,000	Signalized BPR parameters selected.		
% Truck ADT	0%	0%	0%	0%	0%			
Adjusted ADT	Hourly	Percent	Truck	Is	Available			
Practical Capacity (phpl)	560	560	560	560	560			
Facility Type	Collector	Collector	Collector	Collector	Collector			
Median Type	Un-Div.	Un-Div.	Un-Div.	Un-Div.	Un-Div.			
NB # of lanes	1	1	1	1	1			
SB # of lanes	1	1	1	1	1			
Outside shldr. width (ft)	0.00	0.00	0.00	0.00	0.00			
Inside shldr. width (ft)	0.00	0.00	0.00	0.00	0.00			
Lane Width (ft)	12.00	12.00	12.00	12.00	12.00			
Access/Intchg Density	0	0	0	0	0			
Number of Signals	0	0	0	0	0			
Signal Quality	-	-	-	-	-			
Cycle Length (sec.)	0	0	0	0	0			
Effective Green (sec.)	0	0	0	0	0			
Posted Speed (mph)	45	45	45	45	45			
Ideal FFS Calc. Method	Freeway (NCHRP 3-45): FFS= 70 mph - Adj. Factors, Others (NCHRP 3-55, Uninterrupted): FFS (PoS> 50mph)= (0.88*PoS+22)							
Interrupted FFS (mph)	45	45	45	45	45	FFS (PoS<= 50 mph)= (0.79*PoS+19)		

Past, Present & Future Traffic Statistics

Starting Time	K-factor (Hourly rate as the percent of daily traffic volume) for 15 hours						NOTE: If Hourly Volume is available, enter the hourly volume, or you may enter the calculated Hourly Rates in the "Present HV or HR" column. If neither are available, a selection is provided. If considered, please use copy and paste (as value) procedure.
	Existing	Present K	Interim Bld	Interim Nblld	Design Bld	Design Nblld	
0:00	0.000	0.00%	0.000	0.000	0.000	0.000	For more K-factors (V_h/V_{24}), see Lookup Tables. These tables (19-36) are extracted from NCHRP Report # 187.
1:00	0.000	0.00%	0.000	0.000	0.000	0.000	
2:00	0.000	0.00%	0.000	0.000	0.000	0.000	
3:00	0.000	0.00%	0.000	0.000	0.000	0.000	
4:00	0.000	0.00%	0.000	0.000	0.000	0.000	
5:00	0.000	0.00%	0.000	0.000	0.000	0.000	
6:00	0.032	3.16%	0.032	0.032	0.032	0.032	
7:00	0.056	5.59%	0.056	0.056	0.056	0.056	
8:00	0.077	7.75%	0.077	0.077	0.077	0.077	
9:00	0.054	5.41%	0.054	0.054	0.054	0.054	
10:00	0.042	4.25%	0.042	0.042	0.042	0.042	
11:00	0.044	4.41%	0.044	0.044	0.044	0.044	
12:00	0.052	5.15%	0.052	0.052	0.052	0.052	
13:00	0.046	4.62%	0.046	0.046	0.046	0.046	
14:00	0.061	6.05%	0.061	0.061	0.061	0.061	
15:00	0.079	7.89%	0.079	0.079	0.079	0.079	
16:00	0.087	8.74%	0.087	0.087	0.087	0.087	
17:00	0.099	9.85%	0.099	0.099	0.099	0.099	
18:00	0.086	8.57%	0.086	0.086	0.086	0.086	
19:00	0.060	6.05%	0.060	0.060	0.060	0.060	
20:00	0.047	4.65%	0.047	0.047	0.047	0.047	
21:00	0.000	0.00%	0.000	0.000	0.000	0.000	
22:00	0.000	0.00%	0.000	0.000	0.000	0.000	
23:00	0.000	0.00%	0.000	0.000	0.000	0.000	



ENTRADA® - Environmental Traffic Data Program Inputs



I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Facility	Catharpin Road, Overpass I-66		Direction		N/S	Present Year	2011	Analyst
From	EB I-66		Map Reference		DC 5754 & 5755	Interim Year	2014	EA
To	WB I-66		County	Prince William County		Design Year	2036	Ver. 2009-NG

Starting Time	Percent Hourly Truck Traffic (Truck Vol./Total Vol.)									Weighted %T = [(NB Vol.*%T) + (SB Vol.*%T)] / 2 way Vol. T: Truck
	NB			SB			Weighted TWO-WAY (Editable)			
	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	2X-6T	3X+	Total Truck	
0:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:00	7.1%	0.0%	0.0%	5.8%	0.0%	0.0%	6.5%	0.0%	6.5%	
7:00	2.0%	0.2%	0.0%	5.3%	0.2%	0.0%	3.5%	0.2%	3.7%	
8:00	6.1%	0.0%	0.0%	8.0%	0.3%	0.0%	7.2%	0.2%	7.4%	
9:00	2.5%	0.0%	0.0%	1.7%	0.0%	0.2%	2.1%	0.0%	2.1%	
10:00	2.4%	0.3%	0.3%	1.6%	0.3%	0.0%	2.0%	0.3%	2.3%	
11:00	2.2%	0.0%	0.3%	0.7%	0.2%	0.2%	1.4%	0.1%	1.5%	
12:00	0.4%	0.4%	0.2%	1.5%	0.0%	0.0%	0.9%	0.2%	1.2%	
13:00	1.3%	0.0%	0.0%	0.5%	0.0%	0.0%	0.9%	0.0%	0.9%	
14:00	4.2%	0.4%	0.2%	4.5%	0.2%	0.0%	4.3%	0.3%	4.6%	
15:00	4.4%	0.0%	0.0%	4.8%	0.1%	0.0%	4.6%	0.1%	4.7%	
16:00	2.2%	0.0%	0.0%	2.1%	0.0%	0.0%	2.2%	0.0%	2.2%	
17:00	0.1%	0.0%	0.0%	0.4%	0.1%	0.0%	0.3%	0.1%	0.4%	
18:00	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.1%	0.0%	0.1%	
19:00	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.2%	
20:00	0.2%	0.0%	0.0%	0.6%	0.3%	0.0%	0.4%	0.1%	0.5%	
21:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
22:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
23:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Starting Time	Directional Split, D-factor									
	NB					SB				
	Existing	Interim Bld	Interim Nblld	Design Bld	Design Nblld	2011	Interim Bld	Interim Nblld	Design Bld	Design Nblld
0:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
1:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
2:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
3:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
4:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
5:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
6:00	60%	60%	60%	60%	60%	40%	40%	40%	40%	40%
7:00	55%	55%	55%	55%	55%	45%	45%	45%	45%	45%
8:00	40%	40%	40%	40%	40%	60%	60%	60%	60%	60%
9:00	54%	54%	54%	54%	54%	46%	46%	46%	46%	46%
10:00	47%	47%	47%	47%	47%	53%	53%	53%	53%	53%
11:00	44%	44%	44%	44%	44%	56%	56%	56%	56%	56%
12:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
13:00	49%	49%	49%	49%	49%	51%	51%	51%	51%	51%
14:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
15:00	47%	47%	47%	47%	47%	53%	53%	53%	53%	53%
16:00	47%	47%	47%	47%	47%	53%	53%	53%	53%	53%
17:00	45%	45%	45%	45%	45%	55%	55%	55%	55%	55%
18:00	45%	45%	45%	45%	45%	55%	55%	55%	55%	55%
19:00	53%	53%	53%	53%	53%	47%	47%	47%	47%	47%
20:00	59%	59%	59%	59%	59%	41%	41%	41%	41%	41%
21:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
22:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
23:00	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%

ENTRADA program is developed by Ed Azimi @VDOT-NOVA/TP

Question, Problem & Comments, Please e-mail @ ed.azimi@vdot.virginia.gov

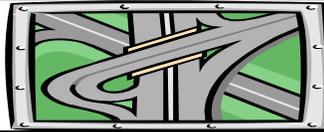


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Catharpin Road, Overpass I-66		
From	EB I-66		
To	WB I-66		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	6,000	No-build
Interim Year 2014 ADT	6,000	6,000
Design Year 2036 ADT	13,000	12,000

Northbound

Starting Time	Hourly Volume					Existing		Present hourly % truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.			
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	114	114	114	246	227	3.16%	60%	7.1%	0.0%	7.1%
7:00	184	184	184	399	368	5.59%	55%	2.0%	0.2%	2.2%
8:00	185	185	185	402	371	7.75%	40%	6.1%	0.0%	6.1%
9:00	175	175	175	379	350	5.41%	54%	2.5%	0.0%	2.5%
10:00	119	119	119	258	238	4.25%	47%	2.4%	0.3%	2.8%
11:00	118	118	118	255	235	4.41%	44%	2.2%	0.0%	2.2%
12:00	164	164	164	355	328	5.15%	53%	0.4%	0.4%	0.9%
13:00	135	135	135	293	270	4.62%	49%	1.3%	0.0%	1.3%
14:00	193	193	193	418	386	6.05%	53%	4.2%	0.4%	4.5%
15:00	221	221	221	480	443	7.89%	47%	4.4%	0.0%	4.4%
16:00	247	247	247	536	495	8.74%	47%	2.2%	0.0%	2.2%
17:00	266	266	266	577	533	9.85%	45%	0.1%	0.0%	0.1%
18:00	231	231	231	500	462	8.57%	45%	0.0%	0.0%	0.0%
19:00	192	192	192	417	385	6.05%	53%	0.2%	0.0%	0.2%
20:00	165	165	165	358	331	4.65%	59%	0.2%	0.0%	0.2%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Starting Time	Hourly Speed (MPH)									
	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	38	38	38	38	38	38	38	38	38	38
7:00	38	38	38	38	38	38	38	38	38	38
8:00	38	38	38	38	38	38	38	38	38	38
9:00	38	38	38	38	38	38	38	38	38	38
10:00	38	38	38	38	38	38	38	38	38	38
11:00	38	38	38	38	38	38	38	38	38	38
12:00	38	38	38	38	38	38	38	38	38	38
13:00	38	38	38	38	38	38	38	38	38	38
14:00	38	38	38	38	38	38	38	38	38	38
15:00	38	38	38	38	38	38	38	38	38	38
16:00	38	38	38	38	38	38	37	37	37	37
17:00	38	38	38	38	38	38	36	36	37	37
18:00	38	38	38	38	38	38	37	37	38	38
19:00	38	38	38	38	38	38	38	38	38	38
20:00	38	38	38	38	38	38	38	38	38	38
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

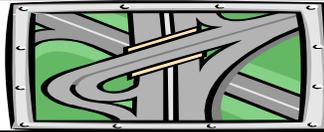


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Catharpin Road, Overpass I-66		
From	EB I-66		
To	WB I-66		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	6,000	No-build
Interim Year 2014 ADT	6,000	6,000
Design Year 2036 ADT	13,000	12,000

Southbound

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nbl	Design Bld	Design Nbl	% ADT	Dir. Dist.			
								2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
6:00	76	76	76	164	152	3.16%	40%	5.8%	0.0%	5.8%
7:00	152	152	152	328	303	5.59%	45%	5.3%	0.2%	5.5%
8:00	279	279	279	605	559	7.75%	60%	8.0%	0.3%	8.2%
9:00	150	150	150	325	300	5.41%	46%	1.7%	0.0%	1.7%
10:00	136	136	136	294	272	4.25%	53%	1.6%	0.3%	1.9%
11:00	147	147	147	319	294	4.41%	56%	0.7%	0.2%	1.0%
12:00	145	145	145	315	291	5.15%	47%	1.5%	0.0%	1.5%
13:00	142	142	142	308	284	4.62%	51%	0.5%	0.0%	0.5%
14:00	170	170	170	369	340	6.05%	47%	4.5%	0.2%	4.7%
15:00	252	252	252	546	504	7.89%	53%	4.8%	0.1%	4.9%
16:00	277	277	277	601	554	8.74%	53%	2.1%	0.0%	2.1%
17:00	325	325	325	704	650	9.85%	55%	0.4%	0.1%	0.6%
18:00	283	283	283	613	566	8.57%	55%	0.3%	0.0%	0.3%
19:00	170	170	170	369	341	6.05%	47%	0.2%	0.0%	0.2%
20:00	114	114	114	246	227	4.65%	41%	0.6%	0.3%	1.0%
21:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	50%	0.0%	0.0%	0.0%

Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nbl		Design Bld		Design Nbl	
	Un-Interrup.	Interrup.								
0:00	n/a	n/a								
1:00	n/a	n/a								
2:00	n/a	n/a								
3:00	n/a	n/a								
4:00	n/a	n/a								
5:00	n/a	n/a								
6:00	38	38	38	38	38	38	38	38	38	38
7:00	38	38	38	38	38	38	38	38	38	38
8:00	38	38	38	38	38	38	34	34	36	36
9:00	38	38	38	38	38	38	38	38	38	38
10:00	38	38	38	38	38	38	38	38	38	38
11:00	38	38	38	38	38	38	38	38	38	38
12:00	38	38	38	38	38	38	38	38	38	38
13:00	38	38	38	38	38	38	38	38	38	38
14:00	38	38	38	38	38	38	38	38	38	38
15:00	38	38	38	38	38	38	37	37	37	37
16:00	38	38	38	38	38	38	35	35	36	36
17:00	38	38	38	38	38	38	25	25	31	31
18:00	38	38	38	38	38	38	34	34	36	36
19:00	38	38	38	38	38	38	38	38	38	38
20:00	38	38	38	38	38	38	38	38	38	38
21:00	n/a	n/a								
22:00	n/a	n/a								
23:00	n/a	n/a								

* Shown when volume exceeds Max. Service Flow

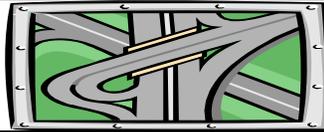


ENTRADA® - Environmental Traffic Data Program, Speed Output

I-66 Widening, 1-SOV & 1-HOV

UPC 93577/Act 616

Route	Catharpin Road, Overpass I-66		
From	EB I-66		
To	WB I-66		
City/County	Prince William County		
Date	5/13/2011	Time Span	24 Hours



Map Reference	ADC 5754 & 5755	
Unit Sys= US , BPR Eq with a= 0.05 and b= 10		
Present Year 2011 ADT	6,000	No-build
Interim Year 2014 ADT	6,000	6,000
Design Year 2036 ADT	13,000	12,000

Two-way

Starting Time	Hourly Volume					Existing		Present % Truck		
	Existing	Interim Bld	Interim Nblnd	Design Bld	Design Nblnd	% ADT	Dir. Dist.	2A-6T	3A+	Total
0:00	0	0	0	0	0	0.00%	Two-way	0.0%	0.0%	0.0%
1:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
2:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
3:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
4:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
5:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
6:00	189	189	189	410	379	3.16%	=	6.5%	0.0%	6.5%
7:00	335	335	335	727	671	5.59%	=	3.5%	0.2%	3.7%
8:00	465	465	465	1,007	930	7.75%	=	7.2%	0.2%	7.4%
9:00	325	325	325	704	650	5.41%	=	2.1%	0.0%	2.1%
10:00	255	255	255	552	510	4.25%	=	2.0%	0.3%	2.3%
11:00	265	265	265	574	530	4.41%	=	1.4%	0.1%	1.5%
12:00	309	309	309	670	618	5.15%	=	0.9%	0.2%	1.2%
13:00	277	277	277	601	554	4.62%	=	0.9%	0.0%	0.9%
14:00	363	363	363	787	726	6.05%	=	4.3%	0.3%	4.6%
15:00	474	474	474	1,026	947	7.89%	=	4.6%	0.1%	4.7%
16:00	524	524	524	1,136	1,049	8.74%	=	2.2%	0.0%	2.2%
17:00	591	591	591	1,281	1,182	9.85%	=	0.3%	0.1%	0.4%
18:00	514	514	514	1,114	1,028	8.57%	=	0.1%	0.0%	0.1%
19:00	363	363	363	786	726	6.05%	=	0.2%	0.0%	0.2%
20:00	279	279	279	605	558	4.65%	=	0.4%	0.1%	0.5%
21:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
22:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%
23:00	0	0	0	0	0	0.00%	=	0.0%	0.0%	0.0%

Average Two-way Hourly Speed (MPH)

Starting Time	Existing		Interim Bld		Interim Nblnd		Design Bld		Design Nblnd	
	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.	Un-Interrup.	Interrup.
0:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6:00	38	38	38	38	38	38	38	38	38	38
7:00	38	38	38	38	38	38	38	38	38	38
8:00	38	38	38	38	38	38	36	36	37	37
9:00	38	38	38	38	38	38	38	38	38	38
10:00	38	38	38	38	38	38	38	38	38	38
11:00	38	38	38	38	38	38	38	38	38	38
12:00	38	38	38	38	38	38	38	38	38	38
13:00	38	38	38	38	38	38	38	38	38	38
14:00	38	38	38	38	38	38	38	38	38	38
15:00	38	38	38	38	38	38	37	37	38	38
16:00	38	38	38	38	38	38	36	36	37	37
17:00	38	38	38	38	38	38	30	30	34	34
18:00	38	38	38	38	38	38	35	35	37	37
19:00	38	38	38	38	38	38	38	38	38	38
20:00	38	38	38	38	38	38	38	38	38	38
21:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23:00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* Shown when volume exceeds Max. Service Flow

ENTRADA, Ver. 2009-NG, VDOT

Attachment B

Sample MOBILE6.2 and CAL3QHC Inputs

Sample MOBILE6.2 Inputs
As generated using the FHWA EMIT Model

2036 Worst Case Build Scenario
(excerpt only)

```
*EMIT Data File
*UPC 93577
*Design Yr 2036
*2008 PEI VMT Fractions for Urban Interstate
*
MOBILE6 INPUT FILE :
POLLUTANTS       : CO
RUN DATA        :

NO REFUELING     :
EXPAND EXHAUST   :
REG DIST         : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE  : MILEDAT.D
VMT FRACTIONS    :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR     : HVMT.DEF
STARTS PER DAY   : STPERDAY.D
START DIST      : SDIST.D
FUEL PROGRAM     : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE   : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG  :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP     : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 2.5 mph, NON-RAMP
MPG ESTIMATES   : MPG.CSV
CALENDAR YEAR   : 2036
EVALUATION MONTH : 1
ALTITUDE        : 1
MIN/MAX TEMP    : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED  : 2.5 NON-RAMP
FUEL RVP        : 13.5

END OF RUN      :

NO REFUELING     :
EXPAND EXHAUST   :
REG DIST         : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE  : MILEDAT.D
VMT FRACTIONS    :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR     : HVMT.DEF
STARTS PER DAY   : STPERDAY.D
START DIST      : SDIST.D
FUEL PROGRAM     : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE   : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG  :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP     : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 5.0 mph, NON-RAMP
MPG ESTIMATES   : MPG.CSV
CALENDAR YEAR   : 2036
EVALUATION MONTH : 1
ALTITUDE        : 1
MIN/MAX TEMP    : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED  : 5.0 NON-RAMP
```

FUEL RVP : 13.5
END OF RUN :
NO REFUELING :
EXPAND EXHAUST :
REG DIST : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR : HVMT.DEF
STARTS PER DAY : STPERDAY.D
START DIST : SDIST.D
FUEL PROGRAM : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 6.0 mph, NON-RAMP
MPG ESTIMATES : MPG.CSV
CALENDAR YEAR : 2036
EVALUATION MONTH : 1
ALTITUDE : 1
MIN/MAX TEMP : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED : 6.0 NON-RAMP
FUEL RVP : 13.5

END OF RUN :
NO REFUELING :
EXPAND EXHAUST :
REG DIST : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR : HVMT.DEF
STARTS PER DAY : STPERDAY.D
START DIST : SDIST.D
FUEL PROGRAM : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 7.0 mph, NON-RAMP
MPG ESTIMATES : MPG.CSV
CALENDAR YEAR : 2036
EVALUATION MONTH : 1
ALTITUDE : 1
MIN/MAX TEMP : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED : 7.0 NON-RAMP
FUEL RVP : 13.5

END OF RUN :
NO REFUELING :
EXPAND EXHAUST :
REG DIST : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR : HVMT.DEF
STARTS PER DAY : STPERDAY.D
START DIST : SDIST.D
FUEL PROGRAM : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.

1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 8.0 mph, NON-RAMP
MPG ESTIMATES : MPG.CSV
CALENDAR YEAR : 2036
EVALUATION MONTH : 1
ALTITUDE : 1
MIN/MAX TEMP : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED : 8.0 NON-RAMP
FUEL RVP : 13.5

END OF RUN :

NO REFUELING :
EXPAND EXHAUST :
REG DIST : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR : HVMT.DEF
STARTS PER DAY : STPERDAY.D
START DIST : SDIST.D
FUEL PROGRAM : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 9.0 mph, NON-RAMP
MPG ESTIMATES : MPG.CSV
CALENDAR YEAR : 2036
EVALUATION MONTH : 1
ALTITUDE : 1
MIN/MAX TEMP : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED : 9.0 NON-RAMP
FUEL RVP : 13.5

END OF RUN :

NO REFUELING :
EXPAND EXHAUST :
REG DIST : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR : HVMT.DEF
STARTS PER DAY : STPERDAY.D
START DIST : SDIST.D
FUEL PROGRAM : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 10.0 mph, NON-RAMP
MPG ESTIMATES : MPG.CSV
CALENDAR YEAR : 2036
EVALUATION MONTH : 1
ALTITUDE : 1
MIN/MAX TEMP : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED : 10.0 NON-RAMP
FUEL RVP : 13.5

```

END OF RUN      :

NO REFUELING    :
EXPAND EXHAUST  :
REG DIST        : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS   :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR     : HVMT.DEF
STARTS PER DAY  : STPERDAY.D
START DIST      : SDIST.D
FUEL PROGRAM    : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE   : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG  :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP     : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 11.0 mph, NON-RAMP
MPG ESTIMATES   : MPG.CSV
CALENDAR YEAR   : 2036
EVALUATION MONTH : 1
ALTITUDE        : 1
MIN/MAX TEMP    : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED   : 11.0 NON-RAMP
FUEL RVP        : 13.5

END OF RUN      :

NO REFUELING    :
EXPAND EXHAUST  :
REG DIST        : C:\M6_NOVA\PLAs\PrWm2008.rdt
MILE ACCUM RATE : MILEDAT.D
VMT FRACTIONS   :
.41140 .09483 .31569 .09613 .04420 .01118 .00110 .00090
.00067 .00249 .00295 .0032 .01142 .00057 .00026 .00301
VMT BY HOUR     : HVMT.DEF
STARTS PER DAY  : STPERDAY.D
START DIST      : SDIST.D
FUEL PROGRAM    : 4
300. 299. 279. 259. 121. 92. 33. 33.
30. 30. 30. 30. 30. 30. 30. 30.
1000. 1000. 1000. 1000. 303. 303. 87. 87.
80. 80. 80. 80. 80. 80. 80. 80.
I/M DESC FILE   : C:\M6\IM_NOVA\VA_IM_09.IM
ANTI-TAMP PROG  :
89 68 50 22222 21111111 1 12 098. 22112222
94+ LDG IMP     : nlevne.d

SCENARIO RECORD : EMIT | Calendar Year - 2036; Month - January; Speed - 12.0 mph, NON-RAMP
MPG ESTIMATES   : MPG.CSV
CALENDAR YEAR   : 2036
EVALUATION MONTH : 1
ALTITUDE        : 1
MIN/MAX TEMP    : 22 22
ABSOLUTE HUMIDITY : 75.0
AVERAGE SPEED   : 12.0 NON-RAMP
FUEL RVP        : 13.5

END OF RUN      :

...

```

Sample CAL3QHC Inputs
As generated using the FHWA Cal3Interface Model

2036 Worst-Case Build Scenario

'UPC 93577',60.,108.,0.0,0.0,60,0.3048,1,0
'N.Ramp Int.- N Leg E Side-Corner',196.4,455.5,5.9
'N.Ramp Int.- N Leg E Side - 25 m',218.6,524.0,5.9
'N.Ramp Int.- N Leg E Side - 50 m',244.0,602.0,5.9
'N.Ramp Int.- N Leg W Side-Corner',105.3,472.9,5.9
'N.Ramp Int.- N Leg W Side - 25 m',127.5,541.4,5.9
'N.Ramp Int.- N Leg W Side - 50 m',152.9,619.4,5.9
'N.Ramp Int.- S Leg E Side-Corner',182.3,412.3,5.9
'N.Ramp Int.- S Leg E Side - 25 m',160.0,343.8,5.9
'N.Ramp Int.- S Leg E Side - 50 m',134.7,265.8,5.9
'N.Ramp Int.- S Leg W Side-Corner',88.7,421.9,5.9
'N.Ramp Int.- S Leg W Side - 25 m',66.4,353.4,5.9
'N.Ramp Int.- S Leg W Side - 50 m',41.1,275.4,5.9
'N.Ramp Int.- E Leg N Side - 25 m',258.7,419.5,5.9
'N.Ramp Int.- W Leg N Side - 25 m',34.6,459.2,5.9
'N.Ramp Int.- E Leg S Side - 25 m',244.7,376.3,5.9
'N.Ramp Int.- E Leg S Side - 50 m',315.7,335.3,5.9
'N.Ramp Int.- W Leg S Side - 25 m',18.0,408.2,5.9
'GS - N Leg E Side-Corner',74.4,80.0,5.9
'GS - N Leg E Side - 25 m',93.5,139.0,5.9
'GS - N Leg W Side-Corner',-22.4,80.0,5.9
'GS - N Leg W Side - 25 m',-3.2,139.0,5.9
'GS - S Leg E Side-Corner',22.4,-80.0,5.9
'GS - S Leg E Side - 25 m',3.2,-139.0,5.9
'GS - S Leg W Side-Corner',-74.4,-80.0,5.9
'GS - S Leg W Side - 25 m',-93.5,-139.0,5.9
'GS - E Leg N Side - 25 m',146.4,80.0,5.9
'GS - E Leg N Side - 50 m',228.4,80.0,5.9
'GS - E Leg N.Side, w/o N.Ramp',758.6,80.0,5.9
'GS - W Leg N Side - 25 m',-94.4,80.0,5.9
'GS - W Leg N Side - 50 m',-176.4,80.0,5.9
'GS - W Leg N.Side, w/o N.Ramp',-764.0,110.6,5.9
'GS - E Leg S Side - 25 m',94.4,-80.0,5.9
'GS - E Leg S Side - 50 m',176.4,-80.0,5.9
'GS - E Leg S.Side, w/o S.Ramp',545.0,-80.0,5.9
'GS - W Leg S Side - 25 m',-146.4,-80.0,5.9
'GS - W Leg S Side - 50 m',-228.4,-80.0,5.9
'GS - W Leg, S.Side, w/o S.Ramp',-984.8,-127.6,5.9
'GS - W Leg N.Side, e/o N.Ramp',-743.0,71.9,5.9
'GS - W Leg, S.Side, e/o S.Ramp',-999.1,-169.2,5.9
'GS - E Leg N.Side, e/o N.Ramp',780.6,118.1,5.9
'GS - E Leg, at N.Ramp on S.Side',889.0,-80.0,5.9
'GS - E Leg S.Side, e/o S.Ramp',560.3,-121.2,5.9
'GS - W Leg, N.Side, at S.Ramp',-1149.1,8.3,5.9
'S.Ramp Int.- N Leg E Side-Corner',-74.0,-376.5,5.9
'S.Ramp Int.- N Leg E Side - 25 m',-51.7,-308.0,5.9
'S.Ramp Int.- N Leg E Side - 50 m',-26.4,-230.0,5.9
'S.Ramp Int.- N Leg W Side-Corner',-179.8,-404.5,5.9
'S.Ramp Int.- N Leg W Side - 25 m',-157.5,-336.0,5.9
'S.Ramp Int.- N Leg W Side - 50 m',-132.2,-258.0,5.9
'S.Ramp Int.- S Leg E Side-Corner',-96.3,-445.1,5.9
'S.Ramp Int.- S Leg E Side - 25 m',-118.6,-513.6,5.9
'S.Ramp Int.- S Leg E Side - 50 m',-143.9,-591.6,5.9
'S.Ramp Int.- S Leg W Side-Corner',-193.4,-446.3,5.9
'S.Ramp Int.- S Leg W Side - 25 m',-215.7,-514.8,5.9
'S.Ramp Int.- S Leg W Side - 50 m',-241.0,-592.8,5.9
'S.Ramp Int.- E Leg N Side - 25 m',-9.8,-343.8,5.9
'S.Ramp Int.- E Leg N Side - 50 m',63.3,-306.6,5.9
'S.Ramp Int.- W Leg N Side - 25 m',-247.9,-381.0,5.9
'S.Ramp Int.- E Leg S Side - 25 m',-32.1,-412.4,5.9
'S.Ramp Int.- W Leg S Side - 25 m',-261.5,-422.8,5.9
'2036 I66 & Route 15 Interchange',24,1,0,'C'
1
'N.Ramp Int.- N Leg App - FreeFlow', 'AG',127.9,452.0,498.9,1593.0,3111,5.726,0.000,55.7
2
'N.Ramp Int.- N Leg App - Queue', 'AG',134.9,474.0,498.9,1593.0,0,36,3
120,62,2,3111,41.125,1600,1,3
1
'N.Ramp Int.- N Leg Dep - FreeFlow', 'AG',161.9,440.0,532.9,1582.0,3111,5.726,0,55.7
1
'N.Ramp Int.- S Leg App - FreeFlow', 'AG',169.3,462.9,-129.8,-457.8,3111,5.726,0,55.7
2

'N.Ramp Int.- S Leg App - Queue', 'AG', 162.3, 440.9, -129.8, -457.8, 0, 36, 3
120, 62, 2, 3111, 41.125, 1600, 1, 3
1
'N.Ramp Int.- E Leg App - FreeFlow', 'AG', 146.9, 459.0, 889, 30.0, 2074, 6.593, 0, 43.7
2
'N.Ramp Int.- E Leg App - Queue', 'AG', 181.9, 438.0, 889, 30.0, 0, 24, 2
120, 62, 2, 2074, 41.125, 1600, 1, 3
1
'N.Ramp Int.- W Leg Dep Link 1 - FreeFlow', 'AG', 146.9, 459.0, -200.0, 391.5, 2074, 6.593, 0, 43.7
1
'N.Ramp Int.- W Leg Dep Link 2 - FreeFlow', 'AG', -200.0, 391.5, -940.0, -9.9, 2074, 6.593, 0, 43.7
1
'GS - E Leg App - FreeFlow', 'AG', 0, 30, 1400, 30, 11000, 5.92, 0, 79.7
1
'GS - E Leg Dep - FreeFlow', 'AG', 0, -30, 1400, -30, 11000, 5.92, 0, 79.7
1
'GS - W Leg App Link 1 - FreeFlow', 'AG', 0, -30, -688, -30, 11000, 5.92, 0, 79.7
1
'GS - W Leg App Link 2 - FreeFlow', 'AG', -688, -30, -1400, -142.8, 11000, 5.92, 0, 79.7
1
'GS - W Leg Dep Link 1 - FreeFlow', 'AG', 0, 30, -688, 30, 11000, 5.92, 0, 79.7
1
'GS - W Leg Dep Link 2 - FreeFlow', 'AG', -688, 30, -1400, -82.8, 11000, 5.92, 0, 79.7
1
'S.Ramp Int.- N Leg App - FreeFlow', 'AG', -163.8, -445.8, 135.3, 474.9, 3111, 5.726, 0, 55.7
2
'S.Ramp Int.- N Leg App - Queue', 'AG', -156.8, -423.8, 135.3, 474.9, 0, 36, 3
120, 62, 2, 3111, 41.125, 1600, 1, 3
1
'S.Ramp Int.- S Leg App - FreeFlow', 'AG', -122.4, -434.9, -493.4, -1575.9, 3111, 5.726, 0, 55.7
2
'S.Ramp Int.- S Leg App - Queue', 'AG', -129.4, -456.9, -493.4, -1575.9, 0, 36, 3
120, 62, 2, 3111, 41.125, 1600, 1, 3
1
'S.Ramp Int.- S Leg Dep - FreeFlow', 'AG', -156.4, -422.9, -527.4, -1564.9, 3111, 5.726, 0, 55.7
1
'S.Ramp Int.- E Leg Dep Link 1 - FreeFlow', 'AG', -138.4, -441.9, 474.7, -129.7, 2074, 6.593, 0, 43.7
1
'S.Ramp Int.- E Leg Dep Link 2 - FreeFlow', 'AG', 474.7, -129.7, 742.0, -30.0, 2074, 6.593, 0, 43.7
1
'S.Ramp Int.- W Leg App - FreeFlow', 'AG', -138.4, -441.9, -1131.9, -100.3, 2074, 6.593, 0, 43.7
2
'S.Ramp Int.- W Leg App - Queue', 'AG', -177.4, -428.9, -1131.9, -100.3, 0, 24, 2
120, 62, 2, 2074, 41.125, 1600, 1, 3
1.0, 0, 4, 1000., 0.0, 'Y', 10., 1, 36

