Appendix A Traffic Report

Section 1	Introduction	1
Section 2	Study Area	3
Section 3	Existing 2001 Conditions	7
	<ul> <li>3.1 Existing (2001) Traffic Volumes</li></ul>	7 11 11 12 12
Section 4	Safety	15
	4.1 Safety Issues By Section	15
Section 5	Alternatives	
	<ul> <li>5.1 Grandview Section</li></ul>	29 29 30 30
Section 6	Travel Demand	33
	<ul> <li>6.1 Traffic Volumes</li> <li>6.1.1 Grandview Section</li> <li>6.1.2 Florida Mesa and Valley Section</li> <li>6.1.3 Dry Creek and Gem Village Section</li> <li>6.1.4 Bayfield Section</li> </ul>	33 33 33 39 39 39
Section 7	2025 Analysis of Options That Were Dismissed	41
Section 8	2025 Operational Analysis	43
	<ul> <li>8.1 2025 Grandview Section Operational Analysis</li></ul>	43 43 1 45 47 son 49 51
	8.2.1 2025 Florida Mesa and Valley Section Highway Analys	is51

		8.2.2	2025 Florida Mesa and Valley Section Intersection Analysis	52
		8.2.3	2025 Florida Mesa and Valley Section Operational Analysis Summary	
	8.3	2025 I	Dry Creek and Gem Village Section Operational Analysis	53
		8.3.1	2025 Dry Creek and Gem Village Section Highway Analysis	53
		8.3.2	2025 Dry Creek and Gem Village Operational Analysis Summary	53
	8.4	2025 H	Bayfield Section Operational Analysis	54
		8.4.1	2025 Bayfield Section Highway Analysis	54
		8.4.2	2025 Bayfield Section Intersection Analysis	54
		8.4.3	2025 Bayfield Section Operations Analysis Summary	55
	8.5	Summ	nary	55
Section 9	Refer	ences		57

#### LIST OF TABLES

Table 3.1	Existing US 160 Highway Segment Traffic Analysis Summary
Table 3.2	Existing US 160 Signalized Intersection Traffic Analysis Summary
Table 7.1	Grandview Section Alternative Options Intersection Analysis Summary
Table 8.1	Alternative G Modified, Highway Segment Traffic Operations Summary
Table 8.2	Alternative G Modified, Ramp Merge/Diverge and Weaving Area Traffic Operations Summary
Table 8.3	Alternative F Modified, Highway Segment Traffic Operations Summary
Table 8.4	Alternative F Modified, Ramp Merge/Diverge and Weaving Area Traffic Operations Summary
Table 8.5	Grandview Section Highway Segment Alternative Comparison Summary
Table 8.6	Grandview Section Ramp Merge/Diverge and Weaving Area Alternative Comparison Summary
Table 8.7	Alternative G Modified, Signalized Intersection Operations Summary
Table 8.8	Alternative F Modified, Signalized Intersection Operations Summary
Table 8.9	2025 Grandview Section Signalized Intersection Alternative Comparison Summary

#### LIST OF FIGURES

Figure 1	Location Map
Figure 2	Existing (2001) Daily and Peak-Hour Traffic Volumes
Figure 3	US 550 Accident Histogram from CR 220 to US 160
Figure 4	US 160 Accident Histogram West of Farmington Hill to SH 172/CR 234
Figure 5	US 160 Accident Histogram SH 172/CR 234 to CR 222/CR 223 (west)
Figure 6	US 160 Accident Histogram CR 222/CR 223 (west) to CR 502
Figure 7	US 160 Accident Histogram CR 502 to East of Bayfield
Figure 8	2025 Seasonal Daily and Peak-Hour Traffic Volumes and Main Lane Laneage (Grandview Alternative G Modified, Florida Mesa and Valley Alternative C, Dry Creek & Gem Village Alternative H, and Bayfield Alternative B)
Figure 9	2025 Seasonal Daily and Peak-Hour Traffic Volumes and Main Lane Laneage (Grandview Alternative F Modified, Florida Mesa and Valley Alternative A, Dry Creek & Gem Village Alternative C, and Bayfield Alternative A)

#### LIST OF PHOTOS

Photo 1 Farmington Hill

#### LIST OF ATTACHMENTS

Attachment A	Existing Highway Segment Analyses				
Attachment B	Existing Intersection Analyses				
Attachment C	Grandview Section	on Trip Generation Tables			
Attachment D 2025 Grandview Section Highway Analyses					
	Attachment D-1	2025 Grandview Section, No Action Alternative, Highway Analyses			
	Attachment D-2	2025 Grandview Section, Alternative G Modified, Highway Analyses			
	Attachment D-3	2025 Grandview Section, Alternative F Modified, Highway Analyses			
Attachment E	2025 Grandview	Section Intersection Analyses			
	Attachment E-1	2025 Grandview Section, No Action Alternative, Intersection Analyses			
	Attachment E-2	2025 Grandview Section, Alternative G Modified, Intersection Analyses			
	Attachment E-3	2025 Grandview Section, Alternative F Modified, Intersection Analyses			
	Attachment E-4	2025 Grandview Section, Additional Analyses for At-Grade Options			

Attachment F	2025 Florida Mesa and Valley Section Highway Analyses					
	Attachment F-1 Attachment F-2	2025 Florida Mesa and Valley Section, No Action Alternative, Highway Analyses 2025 Florida Mesa and Valley Section, Alternative C and Alternative A, Highway Analyses				
Attachment G	2025 Florida Mesa and Valley Section Intersection Analyses					
	Attachment G-1 Attachment G-2	2025 Florida Mesa and Valley Section, No Action Alternative, Intersection Analyses 2025 Florida Mesa and Valley Section, Alternative C and				
		Alternative A, Intersection Analyses				
Attachment H	2025 Dry Creek and Gem Village Section Highway Analyses					
	Attachment H-1 Attachment H-2	<ul><li>2025 Dry Creek and Gem Village Section, No Action</li><li>Alternative, Highway Analyses</li><li>2025 Dry Creek and Gem Village Section, Alternative H</li><li>and Alternative C, Highway Analyses</li></ul>				
Attachment I	2025 Bayfield Se	ction Highway Analyses				
	Attachment I-1 Attachment I-2	2025 Bayfield Section, No Action Alternative, Highway Analyses 2025 Bayfield Section, Alternative B and Alternative A,				
		Highway Analyses				
Attachment J	2025 Bayfield Section Intersection Analyses					
	Attachment J-1 Attachment J-2 Attachment J-3	<ul> <li>2025 Bayfield Section, No Action Alternative, Intersection</li> <li>Analyses</li> <li>2025 Bayfield Section, Alternative B, Intersection Analyses</li> <li>2025 Bayfield Section, Alternative A, Intersection</li> <li>Analyses</li> </ul>				

# **List of Acronyms**

- FEIS Final Environmental Impact Statement
- LOS Level of Service
- MP milepost
- mph miles per hour
- WHI weighted hazard index

This report documents the existing and future alternative traffic conditions for the US 160 project corridor study area, and supplements the <u>Final</u> Environmental Impact Statement (FEIS) being prepared for this proposed roadway project. This report documents the existing (2001) and future year (2025) seasonal peak traffic conditions for roadways and intersections within the study area. The future year conditions examined consist of the No Action Alternative and other action alternatives that are described in detail in Chapter 2, Alternatives, of the FEIS. The action alternatives analyzed in this report represent the alternatives that were carried forward for detailed analysis in the FEIS.

The traffic study area is located in La Plata County, Colorado. The project length on US 160 would be 16.2 miles, extending from milepost (MP) 88.0, located east of Durango, to MP 104.2, located east of Bayfield. The project length on US 550 would be 1.2 miles, extending from MP 16.6, located at the US 160/US 550 (south) intersection, to MP 15.4, located south of the US 550/CR 220 intersection. The study area is shown in Figure 1, Location Map. The highway corridor includes four distinguishable geographic sections that have similar land use and traffic issues. The alternative analysis will focus on the four sections separately. The four sections are:

- **Grandview section** US 160 from MP 88.0 to MP 91.8, and a portion of US 550 from MP 16.6 to MP 15.4.
- Florida Mesa and Valley section US 160 from MP 91.8 to MP 94.2.
- Dry Creek and Gem Village section US 160 from MP 94.2 to MP 101.6.
- **Bayfield** section US 160 from MP 101.6 to MP 104.2.



This section summarizes the existing traffic volumes and Level of Service (LOS) for the roadways and intersections along the US 160 project corridor. The existing conditions analysis year used for this report is 2001. All traffic count data were collected by Bechtolt Engineering, LLC, on weekdays in June 2001. Since the traffic counts were conducted in June, they are representative of peak season traffic volumes.

# 3.1 EXISTING (2001) TRAFFIC VOLUMES

Twenty-four-hour machine traffic counts were conducted at the following locations:

- US 160 east and west of US 550 (south) (June 18-22, 2001)
- US 160 east and west of CR 222/CR 223 (west) (June 6-8, 2001)
- US 160 west of CR 508 (June 18-20, 2001)
- US 160 east and west of US 160 Business Route (US 160B) (east) (June 13-15, 2001)
- US 550 south of US 160 (June 18-22, 2001)
- SH 172/CR 234 north and south of US 160 (June 11-13, 2001)
- CR 222/CR 223 (west) north and south of US 160 (June 6-8, 2001)
- US 160B (east) south of US 160 (June 13-15, 2001)

Morning and evening peak-period turning movement count data were also collected at the following intersection locations:

- US 160 and US 550 (south) (June 5, 2001)
- US 160 and SH 172/CR 234 (June 12, 2001)
- US 160 and CR 222/CR 223 (west) (June 7, 2001)
- US 160 and CR 501 (June 20, 2001)

The existing daily and peak-hour turning movement traffic volume counts are shown in Figure 2, Existing (2001) Daily and Peak-Hour Traffic Volumes.



## 3.2 EXISTING (2001) TRAFFIC OPERATIONS

The existing (2001) levels of service for the highway segments and intersections along the project corridor were estimated using the existing lane configuration, the peak-hour traffic volumes shown in Figure 2, Existing (2001) Daily and Peak-Hour Traffic Volumes, and the procedures documented in the *Highway Capacity Manual 2000* (HCM 2000). The following subsections summarize the results of these evaluations. The capacity analysis worksheets for the existing highway segment analyses and the intersection analyses are included in Attachments A and B, respectively.

#### 3.2.1 Existing (2001) Highway Segment Analysis

#### Grandview Section

Through the Grandview section, US 160 is a two-lane highway with a passing lane eastbound from the intersection with US 550 (south) to the CR 233 (east) intersection. Passing is not permitted for 25 percent of the eastbound, and 100 percent of the westbound direction. The capacity analysis results indicate that during the AM peak hour, US 160 is currently operating at LOS C in the eastbound direction, and LOS F in the westbound direction. In addition, this analysis shows that during the PM peak hour, US 160 is operating at LOS D in the eastbound direction, and LOS E in the westbound direction.

#### Florida Mesa and Valley Section

Through the Florida Mesa and Valley section, US 160 is a two-lane highway. Passing is not permitted for 42 percent of the eastbound and 44 percent of the westbound direction. The capacity analysis results indicate that during the AM peak hour, US 160 is currently operating at LOS D in the eastbound direction, and LOS E in the westbound direction. In addition, this analysis shows US 160 is operating at LOS E in both the eastbound and westbound directions during the PM peak hour.

#### Dry Creek and Gem Village Section

Through the Dry Creek and Gem Village section, US 160 is a two-lane highway. Passing is not permitted for 58 percent of the eastbound, and 57 percent of the westbound direction. The capacity analysis results indicate that during the AM peak hour, US 160 is currently operating at LOS D in the eastbound direction, and LOS E in the westbound direction. In addition, this analysis shows that during the PM peak hour, US 160 is operating at LOS E in the eastbound direction, and LOS D in the westbound direction.

#### **Bayfield Section**

Through the Bayfield section, US 160 is a two-lane highway. Passing is not permitted for 72 percent of the eastbound, and 65 percent of the westbound direction. The capacity analysis results indicate that during the AM peak hour, US 160 is currently operating at LOS E in both the eastbound and westbound directions. In addition, this analysis shows that during the PM

peak hour, US 160 is operating at LOS E in the eastbound direction, and LOS D in the westbound direction.

#### 3.2.2 Existing (2001) Intersection Analysis

#### Grandview Section

In the Grandview section, there are currently two signalized intersections on US 160 at US 550 (south) and SH 172/CR 234. The capacity analysis results indicate that the US 160 intersection with US 550 (south) is currently operating at LOS C during the AM and PM peak hours. The US 160 intersection with SH 172/CR 234 is currently operating at LOS C during the AM peak hour, and LOS D during the PM peak hour.

#### Florida Mesa and Valley Section

In the Florida Mesa and Valley section, an unsignalized intersection analysis was performed for the CR 222/CR 223 (west) intersection with US 160. The analysis indicates that all critical movements at this intersection are currently operating at LOS D or better.

#### Dry Creek and Gem Village Section

In the Dry Creek and Gem Village section, all of the intersections are minor unsignalized county roads, and, therefore, no intersections were analyzed in this section.

#### **Bayfield Section**

In the Bayfield section, there is currently one signalized intersection on US 160 at CR 501. The capacity analysis results indicate that this intersection is currently operating at LOS C during the AM and PM peak hours.

#### 3.2.3 Existing (2001) Operational Analysis Summary

Table 3.1, Existing US 160 Highway Segment Traffic Analysis Summary, summarizes the existing traffic operations for the US 160 highway segments along the project corridor.

		-		•	
	Eastbound		Westbound		
	AM Peak	PM Peak	AM Peak	PM Peak	
Highway Segment	LOS	LOS	LOS	LOS	
Grandview section					
US 550 (south) to SH 172/CR 234	С	D	F	Е	
Florida Mesa and Valley section					
SH 172/CR 234 to CR 222/CR 223 (west)	D	Е	Е	Е	
Dry Creek and Gem Village section					
CR 222/CR 223 (west) to Gem Village	D	E	Е	D	

Table 3.1Existing US 160 Highway Segment Traffic Analysis Summary

	Eastbound		Westbound	
Highway Segment	AM Peak LOS	PM Peak LOS	AM Peak LOS	PM Peak LOS
Bayfield section				
Gem Village to Bayfield	Е	Е	Е	D

Table 3.1Existing US 160 Highway Segment Traffic Analysis Summary

As seen in Table 3.1, most of the highway segments along the US 160 project corridor are operating at LOS D, or worse, during both the AM and PM peak hours. The poor operating conditions are a result of high traffic volumes in conjunction with steep grades and insufficient lanes for passing.

Table 3.2, Existing US 160 Signalized Intersection Traffic Analysis Summary, summarizes the existing intersection traffic operations at the signalized intersections along the US 160 corridor.

Table 3.2Existing US 160 Signalized Intersection Traffic Analysis Summary

	Eastbound		Westbound		
US 160 Intersection	Delay (sec /veh )	1.05	Delay (sec /veh )	1.05	
Grandview section	(,		()		
US 550 (south)	23.6	С	25.0	С	
SH 172/CR 234	31.9	С	35.9	D	
Bayfield section					
CR 501	24.7	С	26.7	С	

As seen in Table 3.2, the signalized intersections along the US 160 corridor are operating at LOS D, or better, during both the AM and PM peak hours.

US 160 has a higher-than-average number and severity of accidents in the state. Contributing to this rating is uncontrolled access; lack of shoulders, turning lanes, and wildlife crossings; and steep grades with insufficient lanes for passing. These problems are compounded by the increasingly high traffic demands that are being placed on this section of highway. Design improvements for US 160 are needed to reduce both the accident rates and the severity of the accidents, as well as mitigate wildlife collisions through the use of wildlife crossings.

During the 5-year period from December 31, 1996, through December 31, 2001, 532 accidents occurred on US 160 from west of the US 160/US 550 (south) intersection (MP 88.0) to east of Bayfield (MP 104.2). Of those accidents, 34 percent resulted in injuries and 1.3 percent resulted in fatalities. The most frequent accident types were rear-end (32 percent), animal (27 percent), and overturning (8 percent). Also, 42 percent of the accidents occurred at intersections, were intersection-related, or occurred at driveway accesses. Accidents typically occurred during daylight (65 percent) and under dry conditions (83 percent).

The accident data suggest that the most frequent accident types occurred at locations on US 160 with similar physical features. Rear-end, turning, and overturning accidents occurred most frequently in areas that lack turning lanes and have large numbers of access points, insufficient shoulders, steep grades, and steep embankments.

Specific segments of the corridor exhibited a higher frequency of animal-related accidents. These segments, typically 1,000 to 1,500 feet in length, are likely deer/elk migration routes that intersect the US 160 project corridor. Contributing factors to animal-related accidents are lack of wildlife crossings, insufficient shoulders, steep grades, and steep embankments. The highway characteristics described above contributed to the overall accident rate by forcing wildlife onto the highway and by limiting the ability of motorists to stop or make evasive maneuvers.

## 4.1 SAFETY ISSUES BY SECTION

The US 160 project corridor was divided into four sections for this accident analysis. US 550 from CR 220 to US 160 was also reviewed. Figures 3 through 7 are accident histograms depicting the types of accidents and accident severity for each highway section during the 5-year period of December 31, 1996, through December 31, 2001. An analysis of more recent data indicated similar traffic accident trends in the project corridor when compared to the 1996-2001 data. As development, tourism, and traffic increase, accident rates and severity are also expected to increase throughout the project corridor if no improvements are made.

Following is an analysis of the types and severity of accidents for each section of US 160. Hazardous sections of roadway are identified through calculation of the weighted hazard index (WHI). WHI is a statistic computed by considering accident frequency, accident severity, and traffic volumes, and comparing these data with the accident history of similar highways. Positive values of the WHI indicate highway sections that have an accident frequency and severity higher than the statewide average. All of the US 160 and US 550 sections analyzed yielded hazard indexes higher than the statewide average, demonstrating that the majority of the US 160 project corridor and the connecting US 550 segment are in need of improvement to reduce unsafe conditions.











# **SECTION**FOUR

#### US 550 – From CR 220 to US 160

This section of US 550 extends south from the US 160/US 550 (south) intersection as a two-lane highway, ascending from the Animas River valley to the Florida Mesa in an area known as

Farmington Hill (Photo 1). The roadway is cut into the side of the Farmington Hill embankment and follows the sharp horizontal curves of the hillside at a steep grade, rising over 200 feet in approximately 0.66 mile. There are minimal paved shoulders of 2 feet or less. The traversable ground surface outside the roadway is as narrow as 5 feet in many places, and only one-third of the section has guardrail along the downward slope embankment, leaving little room for driver error or emergency stops. Outside the traversable area, the embankment both above and below the roadway is steep: approximately 34

degrees. The embankment below the roadway ranges from 46 to 290 feet in height. The north-facing slope



Photo 1 Farmington Hill

of the road surface makes this area prone to winter icing. The steep embankment above the roadway comprises decomposed shale overlain by sandy cobbles and boulders, which are prone to sloughing onto the roadway surface, creating hazards for drivers. Because of the sharp horizontal curves, driver visibility along the road is short—as little as 100 feet at some locations; hence, assuming a 30-miles per hour (mph) travel speed, drivers have only 2.0 seconds to react to roadway hazards.

The roadway conditions are factors in the type and severity of accidents occurring on Farmington Hill (Figure 3, US 550 Accident Histogram from CR 220 to US 160). The steep winding roadway, icing conditions, and roadway obstructions contribute to drivers losing control of their vehicles. If drivers lose control, the narrow shoulders, lack of guardrails, and steep embankments make it difficult for them to regain control once their vehicles leave the roadway. Accidents on Farmington Hill generally fall into two categories: drivers lose the ability to slow or stop their vehicles due to the steep grade and either strike vehicles located in front of them or run out into the US 160/US 550 (south) intersection, or drivers lose control and run off the roadway surface and down the steep embankment below the roadway.

# *US 160 – From West of the US 160/US 550 (South) Intersection to and Including the SH 172/CR 234 Intersection*

This section (Figure 4, US 160 Accident Histogram West of Farmington Hill to SH 172/CR 234) is one of the most developed along the project corridor, and development in this area is increasing. Development is residential, commercial, and industrial. The existing traffic volumes in this section are the highest in the project corridor and are projected to more than double within the next 20 years. This segment also includes the heavily traveled Farmington Hill and the SH

172/CR 234 intersection with US 160. The data indicate that uncontrolled access and lack of turning lanes are contributing factors to accidents in this section.

# US 160 – From the SH 172/CR 234 Intersection to and Including the CR 222/CR 223 (west) Intersection

This section [Figure 5, US 160 Accident Histogram SH 172/CR 234 to CR 222/CR 223 (west)] is semi-rural with sparse residential and commercial development. Development is expected to accelerate as residential density increases in the Grandview area and pushes growth to the east. The data indicate that uncontrolled access, lack of turning lanes, and insufficient shoulders are contributing factors to accidents in this section.

#### US 160 – From the CR 222/CR 223 (west) Intersection to and Including CR 502

This section [Figure 6, US 160 Accident Histogram CR 222/CR 223 (west) to CR 502] is rural with sparse residential and commercial development, with the exception of Gem Village. Development along US 160 in this region is generally occurring at a slower rate than other sections. However, development along the county road system is increasing, resulting in additional traffic demands at the existing county road connections.

The high percentage of animal-related accidents is due to this area being a prime migration corridor for wintering elk and mule deer. The data indicate that lack of wildlife crossings, insufficient shoulders, steep grades, and steep embankments are contributing factors to accidents in this section.

#### US 160 – From CR 502 to East of Bayfield

This is one of the more developed sections (Figure 7, US 160 Accident Histogram CR 502 to East of Bayfield) along the project corridor. Additionally, there are commercial developments currently in the planning and construction phases. Development consists of residential and commercial. The accident data along this section indicate that intersections, driveways, and lack of wildlife crossings are contributing factors to accidents, as well as insufficient shoulders and steep embankments.

There were two action alternatives, in addition to the No Action Alternative, in each of the four sections that were carried forward for detailed analysis and are analyzed in this report. These are described below.

## 5.1 GRANDVIEW SECTION

#### Alternative G Modified

From the west project limit to the US 160/US 550 (south) intersection, US 160 would be four lanes with an eastbound climbing lane and a westbound auxiliary lane. From the US 550 (south) intersection to the intersection with SH 172/CR 234, US 160 would be four lanes. There would be single point urban interchanges at CR 233 (west) and SH 172/CR 234. US 160 would remain on the existing alignment except near the SH 172/CR 234 intersection, where it would be shifted north to avoid Crestview Memorial Gardens.

US 550 would be four lanes from CR 220 to the intersection with US 160. US 550 would be realigned to the east of the existing US 550 and skirt the western edge of the Florida Mesa before connecting to US 160 with a trumpet interchange approximately 0.6 miles east of the existing US 160/US 550 (south) intersection.

#### Alternative F Modified

From the west project limit to the US 160/US 550 (south) intersection, US 160 would be four lanes with an eastbound climbing lane and a westbound auxiliary lane. From the US 550 (south) intersection to the intersection with SH 172/CR 234, US 160 would be four lanes. There would be a single point urban interchange at SH 172/CR 234. US 160 would remain on the existing alignment except near the SH 172/CR 234 intersection, where it would be shifted north to avoid Crestview Memorial Gardens.

US 550 would be four lanes from CR 220 to the intersection with US 160. US 550 would be realigned to the east of the existing US 550 and cross the top of the Florida Mesa before connecting to US 160 with a single point urban interchange at the existing US 160/CR 233(west) intersection location.

## 5.2 FLORIDA MESA AND VALLEY SECTION

#### Alternative C

US 160 would be four lanes and generally remain on the existing alignment, with slight shifts as necessary to avoid residential structures on the north side of US 160 and the Griffin Dairy farm complex on the south side of US 160. Continuous access roads would be constructed both north and south of the highway. CR 222 and CR 223 would be realigned and connect to access roads on both sides of US 160. A new intersection with US 160 would be created approximately 4,500 feet east of the existing CR 222/CR 223 (west) intersection. Because this is on the east side of the Florida River, new roadway connections would be made to CR 510 on the south and CR 223 on the north.

#### Alternative A

US 160 would be four lanes and generally remain on the existing alignment, with slight shifts as necessary to avoid residential structures on the north side of US 160 and the Griffin Dairy Farm complex on the south side of US 160. Continuous access roads would be constructed both north and south of the highway. CR 222 and CR 223 would be realigned and connect to US 160 at a new intersection approximately 500 feet west of the existing CR 222/CR 223 (west) intersection with US 160.

## 5.3 DRY CREEK AND GEM VILLAGE SECTION

#### Alternative H

US 160 would be four lanes and generally remain on the existing alignment with improvements for curvature, grades, and sight distance from the CR 222/CR 223 (west) intersection to the CR 223 (east) intersection. CR 223 would be realigned and connect to US 160 approximately 1,500 feet west of the existing US 160/CR 223 (east) intersection. To reduce impacts to high quality wetlands, a 36-foot median would be used from MP 98 to MP 99 to separate opposing travel lanes. A 46-foot median would be used in all other areas. Access roads are provided on both sides of US 160 between MP 94 and MP 95 and on the north side of US 160 between MP 96 and MP 97 to consolidate direct highway access and reduce out-of-direction travel. East of the US 160/CR 223 (east) intersection, US 160 would be realigned and bypass Gem Village to the south. The realigned US 160 would leave the existing US 160 on the west side of Gem Village near MP 100 and rejoin it near MP 101. No access roads would be constructed, but access would be provided at the east end of Gem Village. A one-way slip ramp would provide access for westbound traffic at the west end of Gem Village.

#### Alternative C

US 160 would be four lanes and generally remain on the existing alignment with improvements for curvature, grades, and sight distance. CR 223 would be realigned and connect to US 160 approximately 1,500 feet west of the existing US 160/CR 223 (east) intersection. To reduce impacts to high quality wetlands, a 36-foot median would be used at this intersection to separate opposing travel lanes. A 46-foot median would be used in all other areas. Access roads are provided on both sides of US 160 between MP 94 and MP 95 and on the north side of US 160 between MP 96 and MP 97 to consolidate direct highway access and reduce out-of-direction travel. In Gem Village, US 160 would be widened to the south. Access roads would be constructed on both sides of US 160 and access would be provided at the west end of Gem Village.

## 5.4 BAYFIELD SECTION

### Alternative B

US 160 would be four lanes and generally remain on the existing alignment with improvements for curvature, grades, and sight distance. Three closely spaced intersections with US 160 [US 160B (west), CR 506, and CR 502] would be consolidated into a single unsignalized

intersection. CR 502 would be realigned and connect to US 160 approximately 1,500 feet west of the existing US 160/CR 502 intersection. The realigned CR 502 would intersect CR 506 north of US 160 and continue south of US 160 to intersect with US 160B. This realignment would eliminate both of the existing US 160 intersections with CR 502 and CR 506. Access to US 160B would be maintained through an access road on the south side of US 160. The US 160/CR 501 intersection would remain a signalized intersection at its present location. The intersections of US 160B/CR 501 and US 160B/CR 521 would be reconstructed as a roundabout.

#### Alternative A

US 160 would be four lanes and generally remain on the existing alignment with improvements for curvature, grades, and sight distance. Three closely spaced intersections with US 160 [US 160B (west), CR 506, and CR 502] would be consolidated into a single unsignalized intersection. CR 502 would be realigned and connect to US 160 approximately 1,500 feet west of the existing US 160/CR 502 intersection. The realigned CR 502 would intersect CR 506 north of US 160 and continue south of US 160 to intersect with US 160B. This realignment would eliminate both of the existing US 160 intersections with CR 502 and CR 506. Access to US 160B would be maintained through an access road on the south side of US 160. CR 501 would be realigned and connect to US 160 approximately 800 feet west of the existing US 160/CR 501 intersection. This new intersection with US 160 would be a diamond interchange. From US 160 to the US 160B/CR 521 intersection, the existing CR 501 would be eliminated.

This section summarizes the development of the 2025 daily and peak-hour traffic volumes for the peak season conditions.

#### 6.1 TRAFFIC VOLUMES

Traffic volumes for the project corridor were estimated using available data in the area including traffic impact reports, the US 550 and US 160 Feasibility Study, the *Grandview Area Plan*, and through coordination with CDOT, the City of Durango, and La Plata County. The following paragraphs describe the methodology used for assessing the design year 2025 traffic volumes for each of the sections along the corridor.

#### 6.1.1 Grandview Section

The City of Durango's *Grandview Area Plan* provided the basis for development of traffic volumes in the Grandview section. Through coordination with the City of Durango and La Plata County, the trips generated by the Grandview development were estimated according to the proposed land uses and the Institute of Transportation Engineer's Trip Generation Manual. The trip generation tables for the Grandview section development are included in Attachment C, Grandview Section Trip Generation Tables. As shown in the trip generation tables, the total trips were reduced by 20 percent in Subareas I and III to account for internal and pass-by trips. This trip diversion rate was approved by the City of Durango, La Plata County, and CDOT. The trips were distributed based on the same distribution used for current traffic studies in the area (75 percent to/from the west, 20 percent to/from the east, and 5 percent to/from the north and south).

A 2025 seasonal background daily volume of 42,500 (a number approved by CDOT, the City of Durango, and La Plata County) was applied to the west of the project and used as a control volume for the project corridor through Grandview. The AM peak-hour background traffic was assigned using an AM peak hour to daily percentage of 6.4 percent, with a directional split of 35 percent eastbound and 65 percent westbound. The PM peak-hour background traffic was assigned using a PM peak hour to daily percentage of 10 percent, with a directional split of 56 percent eastbound and 44 percent westbound. The background volume does not include trips generated by the Grandview development. The trips generated by the Grandview development (shown in the trip generation tables in Attachment C, Grandview Section Trip Generation Tables) were added to the background traffic to estimate the total 2025 seasonal daily traffic. The 2025 seasonal daily and peak-hour volumes for Alternative G Modified and Alternative F Modified are shown in Figures 8 and 9, respectively.

#### 6.1.2 Florida Mesa and Valley Section

The 2025 seasonal traffic volumes in the Florida Mesa and Valley section were developed according to the volumes entering and exiting the east end of the Grandview section. The turning volumes at the CR 222/CR 223 (west) intersection with US 160 were developed using a growth rate of 2.19 percent per year based on the state demographer's population forecasts. The 2025 seasonal daily and peak hour volumes for Alternative C and Alternative A are shown in Figures 8 and 9, respectively. The only difference between these two alternatives is the location of the CR 222/CR 223 (west) intersection; therefore, the traffic volumes are the same for both alternatives.




#### 6.1.3 Dry Creek and Gem Village Section

The 2025 seasonal traffic volumes in the Dry Creek and Gem Village section were developed according to the volumes entering and exiting the east end of the Florida Mesa and Valley section, and the volumes entering and exiting the west end of the Bayfield section. There are no major intersections in the Dry Creek and Gem Village section; therefore, analysis was performed only for the US 160 main lane. The 2025 seasonal daily and peak-hour volumes for Alternative H and Alternative C are shown in Figures 8 and 9, respectively. The traffic volumes for theses alternatives are the same since the only difference between the alternatives is the alignment.

#### 6.1.4 Bayfield Section

The 2025 seasonal traffic volumes in the Bayfield section were developed according to 2020 traffic projections from the 1999 Traffic Memorandum for US 160 in Bayfield, by URS Corporation. The 2020 traffic volumes from this memorandum were increased by 1.79 percent per year for five years to reflect the 2025 condition. This growth rate was based on the state demographer's population growth projection from 2020 to 2025. The 2025 seasonal daily and peak-hour volumes for Alternative B and Alternative A are shown in Figures 8 and 9, respectively.

This section documents the analysis of alternative options that were carried forward for analysis on this traffic study. The analysis focuses on two options that were considered but dismissed due to operational deficiencies and safety concerns. These two options are described in the following subsections.

#### Intersection Options in the Grandview Section

For Grandview section Alternative G Modified and Alternative F Modified, single-point urban interchanges were recommended on US 160 at the intersections of CR 233 (west) and SH 172/CR 234. These two locations were originally analyzed as intersections and the results are summarized in Table 7.1, Grandview Section Alternative Options Intersection Analysis Summary.

	Alternative G Modified				ļ	Alternative I	- Modified	
	AMI	AM Peak PM Peak AM Peak		eak	PM F	Peak		
	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of
US 160 Intersection	(sec./veh.)	Service	(sec./veh.)	Service	(sec./veh.)	Service	(sec./veh.)	Service
SH 172/CR 234								
Eastbound left	53.1	D	57.1	Е	53.1	D	57.1	Е
Eastbound through	35.8	D	68.2	Е	35.8	D	68.2	Е
Eastbound right	8.7	А	22.0	С	8.7	А	22.0	С
Westbound left	48.6	D	47.8	D	48.6	D	47.8	D
Westbound through	30.3	С	49.6	D	30.3	С	49.6	D
Westbound right	7.0	А	8.2	А	7.0	Α	8.2	А
Northbound left	50.9	D	77.3	Е	50.9	D	77.3	Е
Northbound through	53.6	D	68.3	Е	53.6	D	68.3	Е
Northbound right	35.3	D	34.2	С	35.3	D	34.2	С
Southbound left	36.5	D	42.5	D	36.5	D	42.5	D
Southbound through	52.5	D	56.7	Е	52.5	D	56.7	Е
Southbound right	45.2	D	80.8	F	45.2	D	80.8	F
Overall	36.8	D	55.5	Е	36.8	D	55.5	Е
CR 233 (west) *								
Eastbound left	79.5	Е	208.2	F	253.0	F	244.8	F
Eastbound through	50.9	D	225.0	F	78.6	Е	496.0	F
Eastbound right	15.1	В	11.2	В	27.6	С	350.7	F
Westbound left	38.5	D	44.7	D	37.4	D	36.8	D
Westbound through	48.6	D	191.0	F	155.6	F	496.0	F
Westbound right	13.1	В	9.8	А	16.5	В	16.5	В
Northbound left	58.9	Е	245.5	F	220.7	F	212.6	F
Northbound through	53.9	D	58.1	Е	164.0	F	225.3	F
Northbound right	26.3	С	33.9	С	45.7	D	35.8	D
Southbound left	54.7	D	52.3	D	36.8	D	39.2	D
Southbound through	53.9	D	58.1	Е	123.2	F	293.1	F
Southbound right	0.1	А	0.7	А	0.7	Α	18.2	В
Overall	45.1	D	157.7	F	119.2	F	278.3	F

 Table 7.1

 Grandview Section Alternative Options Intersection Analysis Summary

\* For Alternative F Modified, US 550 is realigned to connect to US 160 at CR 233 (west).

As seen in Table 7.1, an intersection at US 160 and SH 172/CR 234 would operate the same for both Alternative G Modified and Alternative F Modified. Overall, this intersection would operate at LOS D during the AM peak hour and LOS E during the PM peak hour. During the PM peak hour, six movements are projected to operate at LOS E and one movement at LOS F. The intersection at US 160/CR 233 (west) is projected to operate at LOS D during the AM peak hour and LOS F during the PM peak hour for Alternative G Modified and LOS F during both the AM and PM peak hours for Alternative F Modified. Several movements at this intersection are projected to operate at LOS F during the peak hours.

The results of the signalized intersection analysis for these two intersections would not meet the level of service criteria for the Grandview section; therefore, interchanges were recommended at these locations.

#### Three-Lane Highway Option

A three-lane highway option was considered for the US 160 corridor from US 550 (south) to Bayfield. The three-lane alternative was an improved two-lane that provided one 12-foot travel lane in each direction and a center passing lane for use by only one travel direction at a time.

The traffic operations of a three-lane highway are similar to that of a two-lane highway. The direction of travel that has the passing lane would have an improved level of service but the opposing single travel lane would still result in unacceptable levels of service (LOS E or LOS F). This is due to the inability of the single lane of travel to pass slower-moving vehicles. Rolling terrain and truck percentages in excess of 5.0 percent also contribute to increased traffic congestion along the corridor.

The three-lane alternative also results in unrestricted access to US 160, with left turns allowed at all accesses to provide reasonable access to property owners along the corridor. The unrestricted access results in more conflict points along the corridor which increases the potential for accidents.

The three-lane option was dismissed as an alternative due to the safety concerns and the undesirable levels of service for the single-lane direction of travel.

This section documents the operational analysis conducted in support of the US 160 FEIS from Durango to Bayfield. The 2025 traffic operations for the highway sections and intersections were evaluated for the No Action Alternative as well as the two action alternatives in each of the four sections. The purpose of this analysis is to provide an objective and thorough evaluation of the traffic operations for each alternative, and a comparison between the alternatives. The 2025 peak hour levels of service were estimated using the peak-hour traffic volumes shown in Figures 8 and 9, and the methodologies described in the *Highway Capacity Manual 2000* (HCM 2000).

### 8.1 2025 GRANDVIEW SECTION OPERATIONAL ANALYSIS

Operational analyses were performed in the Grandview section for the No Action Alternative, Alternative G Modified, and Alternative F Modified. The capacity analysis worksheets for the Grandview section highway analyses and the intersection analyses are included as Attachments D and E, respectively.

### 8.1.1 2025 Grandview Section Highway Analysis

#### No Action Alternative

The No Action Alternative would include a safety improvement currently under construction that would provide an additional lane westbound from SH 172/CR 234 to approximately 0.5 mile east of the US 550 (south) intersection with US 160. The resulting four-lane highway section from east of the US 160/US 550 (south) intersection to the US 160/CR 233 (west) intersection is projected to operate at LOS D eastbound, and LOS C westbound during the AM peak hour. It is projected to operate at LOS E eastbound, and LOS F westbound during the PM peak hour. Since the fourth lane westbound would end east of the US 160/US 550 (south) intersection, this transition back to a three-lane highway would be a bottleneck and result in additional congestion in this section. The four-lane highway section on US 160 between the CR 233 (west) and SH 172/CR 234 intersections is projected to operate at LOS C eastbound and westbound during the PM peak hour. Additional congestion would occur in this section due to the bottleneck east of SH 172/CR 234, as US 160 transitions back to a two-lane highway.

### Alternative G Modified

Alternative G Modified would provide an access-controlled US 160 through the Grandview section. US 550 would be realigned to the east of the existing location and would also provide access from the north of US 160. There would be interchanges along US 160 at US 550 (south), CR 233 (west), and SH 172/CR 234. US 160 would be four lanes (two lanes in each direction) east of the US 550 (south) interchange, and four lanes (two lanes in each direction) plus an auxiliary lane and a climbing lane (one lane in each direction) west of the US 550 (south) interchange. Table 8.1, Alternative G Modified, Highway Segment Traffic Operations Summary, summarizes the US 160 highway segment levels of service along the corridor in the Grandview section for this alternative. Table 8.2, Alternative G Modified, Ramp Merge/Diverge and Weaving Area Traffic Operations Summary, summarizes the highway ramp junction

merge/diverge and weaving area levels of service along US 160 in the Grandview section for this alternative.

#### Table 8.1 Alternative G Modified, Highway Segment Traffic Operations Summary

	Eastb	ound	Westbound		
	AM Peak	PM Peak	AM Peak	PM Peak	
US 160 Highway Segment	LUS	LUS	LUS	LUS	
West of US 550 (south)	В	D	С	D	
US 550 (south) to CR 233 (west)	С	D	С	D	
CR 233 (west) to SH 172/CR 234	В	С	В	С	

# Table 8.2 Alternative G Modified, Ramp Merge/Diverge and Weaving Area Traffic Operations Summary

	Alternative G Modified						
	Merge/Div	erge Area	Weavir	ng Area			
US 160 Location	AM Peak LOS	PM Peak LOS	AM Peak LOS	PM Peak LOS			
Eastbound							
Off-Ramp to US 550 (south)	В	D					
On-Ramp from US 550 (south)	С	D					
Off-Ramp to CR 233 (west)	С	D					
On-Ramp to CR 233 (west)	В	С					
Off-Ramp to SH 172/CR 234	В	С					
On-Ramp to SH 172/CR 234	В	В					
Westbound							
Off-Ramp to SH 172/CR 234	В	В					
On-Ramp to SH 172/CR 234	В	С					
Off-Ramp to CR 233 (west)	В	С					
On-Ramp to CR 233 (west)	N/A	N/A					
Between CR 233 (west) On-Ramp and US 550 (south) Off-Ramp			В	D			
On-Ramp from northbound US 550 (south) (Loop)	В	С					
On-Ramp from southbound US 550 (south)	В	С					

#### Alternative F Modified

Alternative F Modified would provide an access-controlled US 160 through the Grandview section. US 550 would be realigned to connect with US 160 at CR 233 (west). Interchanges would be provided at the US 550 (south)/CR 233 (west) intersection and the SH 172/CR 234 intersection. US 160 would be four lanes (two lanes in each direction) between the US 550 (south)/CR 233 (west) and SH 172/CR 234 interchanges, and four lanes (two lanes in each direction) west of the US 550 (south)/CR 233 (west) interchange. Table 8.3, Alternative F Modified, Highway

Segment Traffic Operations Summary, summarizes the US 160 highway segment levels of service along the corridor in the Grandview section for this alternative. Table 8.4, Alternative F Modified, Ramp Merge/Diverge and Weaving Area Traffic Operations Summary, summarizes the highway ramp junction merge/diverge and weaving area levels of service along US 160 in the Grandview section for this alternative.

	Eastb	ound	Westbound		
US 160 Highway Segment	AM Peak LOS	PM Peak LOS	AM Peak LOS	PM Peak LOS	
West of US 550 (south)/CR 233 (west)	В	D	С	D	
US 550 (south)/CR 233 (west) to SH 172/CR 234	В	С	В	С	

 Table 8.3

 Alternative F Modified, Highway Segment Traffic Operations Summary

Table 8.4
Alternative F Modified, Ramp Merge/Diverge and Weaving Area Traffic
<b>Operations Summary</b>

	Alternative F Modified						
	Merge/Div	erge Area	Weavir	ng Area			
US 160 Location	AM Peak LOS	PM Peak LOS	AM Peak LOS	PM Peak LOS			
Eastbound				_			
Off-Ramp to US 550 (south)	N/A	N/A					
On-Ramp from US 550 (south)	N/A	N/A					
Off-Ramp to CR 233 (west)	В	В					
On-Ramp to CR 233 (west)	В	С					
Off-Ramp to SH 172/CR 234	В	С					
On-Ramp to SH 172/CR 234	В	В					
Westbound							
Off-Ramp to SH 172/CR 234	В	В					
On-Ramp to SH 172/CR 234	В	С					
Off-Ramp to CR 233 (west)	В	С					
On-Ramp to CR 233 (west)	С	D					
Between CR 233 On-Ramp and US 550 (south) Off-Ramp			N/A	N/A			
On-Ramp from northbound US 550 (south) (Loop)	N/A	N/A					
On-Ramp from southbound US 550 (south)	N/A	N/A					

### 8.1.2 2025 Grandview Section Highway Analysis Comparison Summary

Table 8.5, Grandview Section Highway Segment Alternative Comparison Summary, shows an alternative comparison of the levels of service for the highway segments along US 160 in the Grandview section.

No Action Alternative			Alternative G Modified				Alternative F Modified					
	Eastb	ound	Westbound		Eastbound		Westbound		Eastbound		Westbound	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
US 160 Highway Segment	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS
West of US 550 (south)	D	F	D	F	В	D	С	D	В	D	С	D
US 550 (south) to CR 233 (west)	D	Е	С	F	С	D	С	D	*	*	*	*
CR 233 (west) to SH 172/CR 234	В	С	В	С	В	С	В	С	В	С	В	С

 Table 8.5

 Grandview Section Highway Segment Alternative Comparison Summary

\* For Alternative F Modified, US 550 is realigned to connect with CR 233

As seen in Table 8.5, the No Action Alternative would not provide the needed capacity for the 2025 design year. Although the safety improvement, currently under construction, would provide acceptable levels of service through a portion of the Grandview section, bottlenecks would occur at each end of the improvement as US 160 transitions back to existing lane geometry. The main lane segments for Alternative G Modified and Alternative F Modified are expected to operate at the same level of service.

Table 8.6, Grandview Section Ramp Merge/Diverge and Weaving Area Alternative Comparison Summary, shows a comparison of the levels of service for the ramp merge/diverge and weaving areas between Alternative G Modified and Alternative F Modified. The No Action Alternative does not include interchanges with ramps; therefore, it was not included in the comparison table.

Table 8.6
Grandview Section Ramp Merge/Diverge and Weaving
Area Alternative Comparison Summary

	Alternative G Modified				Alternative F Modified			
	Merge/Dive	rge Area	Weaving Area		Merge/Diverge Area		Weavir	ng Area
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
US 160 Location	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS
Eastbound								
Off-Ramp to US 550 (south)	В	D			N/A	N/A		
On-Ramp from US 550 (south)	С	D			N/A	N/A		
Off-Ramp to CR 233 (west)	С	D			В	В		
On-Ramp from CR 233 (west)	В	С			В	С		
Off-Ramp to SH 172/CR 234	В	С			В	С		
On-Ramp from SH 172/CR 234	В	В			В	В		
Westbound								
Off-Ramp to SH 172/CR 234	В	В			В	В		
On-Ramp from SH 172/CR 234	В	С			В	С		
Off-Ramp to CR 233 (west)	В	С			В	С		
On-Ramp from CR 233 (west)	N/A	N/A			С	D		

US 160 Final EIS, May 2006

	A	Iternative G	6 Modified		Alternative F Modified			
	Merge/Diverge Area		Weaving Area		Merge/Diverge Area		Weaving Area	
	AM Peak	AM Peak PM Peak		PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
US 160 Location	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS
Between CR 233 (west) On-Ramp and US 550 (south) Off-Ramp			В	D			N/A	N/A
On-Ramp from northbound US 550 (south) (Loop)	В	С			N/A	N/A		
On-Ramp from southbound US 550 (south)	В	С			N/A	N/A		

Table 8.6Grandview Section Ramp Merge/Diverge and Weaving<br/>Area Alternative Comparison Summary

Table 8.6 indicates that all ramp merge/diverge and weaving areas are projected to operate at LOS D or better for both alternatives. Alternative G Modified and Alternative F Modified are projected to have similar main lane merge/diverge traffic operations in the design year.

#### 8.1.3 2025 Grandview Section Intersection Analysis

#### No Action Alternative

Signalized intersection analyses were performed for the No Action Alternative on US 160 at US 550 (south), CR 233 (west), and SH 172/CR 234. The results of the analyses indicate that all three intersections are projected to operate at LOS F during the AM and PM peak hours under the No Action Alternative.

#### Alternative G Modified

Alternative G Modified would have an interchange at the realigned US 160/US 550 (south) intersection with a signalized intersection on the north side and an unsignalized intersection on the south side of US 160. There are single-point urban interchanges on US 160 at the intersections with CR 233 (west) and SH 172/CR 234. Table 8.7, Alternative G Modified, Signalized Intersection Operations Summary, summarizes the results of the signalized intersections for this alternative at these locations in the Grandview section.

	Alternative G Modified						
	AN	/I Peak	PM	Peak			
US 160 Intersection	Delay		Delay				
	sec/veh	Level of Service	sec/veh	Level of Service			
SH 172/CR 234 (west)				_			
Eastbound left	23.3	С	42.6	D			
Eastbound right	33.4	C	34.2	С			
Westbound left	22.3	C	35.6	D			
Westbound right	23.3	C	9.0	А			
Northbound left	28.7	С	10.6	В			
Northbound through	28.3	C	40.6	D			
Northbound right	8.0	A	22.4	C			
Southbound left	22.8	C	9.3	Α			
Southbound through	28.0	С	38.5	D			
Southbound right	9.3	A	39.8	D			
Overall	24.7	С	28.8	С			
CR 233 (west)							
Eastbound left	22.3	С	34.8	С			
Eastbound right	30.5	С	18.7	В			
Westbound left	17.9	В	25.0	С			
Westbound right	23.4	С	16.1	В			
Northbound left	21.2	C	17.0	В			
Northbound through	37.6	D	38.8	D			
Northbound right	9.2	А	15.6	В			
Southbound left	21.0	C	15.1	В			
Southbound through	37.6	D	38.8	D			
Southbound right	0.1	А	0.7	А			
Overall	18.7	В	17.5	В			
US 550 (south) (north side)							
Eastbound left	22.1	С	26.2	С			
Eastbound right	0.1	A	1.5	А			
Westbound left	5.9	A	9.0	А			
Westbound right	28.0	C	29.7	С			
Northbound through	28.6	C	23.1	С			
Southbound through	30.7	С	26.4	С			
Southbound right	0.1	A	0.2	А			
Overall	12.9	В	10.2	В			

Table 8.7Alternative G Modified,Signalized Intersection Operations Summary

#### Alternative F Modified

Alternative F Modified would have single-point urban interchanges along US 160 at the US 550 (south)/CR 233 (west) and SH 172/CR 234 intersections. Table 8.8, Alternative F Modified, Signalized Intersection Operations Summary, summarizes the results of the signalized intersections for Alternative F Modified at these locations in the Grandview section.

	Alternative F Modified							
	AM	Peak	PM	Peak				
US 160 Intersection	Delay	Louis of Comise	Delay	Louis of Comise				
SH 172/CD 234 (west)	Sec/ven	Level of Service	Sec/ven	Level of Service				
SH 172/CR 234 (west)	22.2	C	12.6	D				
	23.3	C	42.6	D				
Eastbound right	33.4	С	34.2	C				
Westbound left	22.3	С	35.6	D				
Westbound right	23.3	С	9.0	А				
Northbound left	28.7	С	10.6	В				
Northbound through	28.3	С	40.6	D				
Northbound right	8.0	А	22.4	С				
Southbound left	22.8	С	9.3	А				
Southbound through	28.0	С	38.5	D				
Southbound right	9.3	А	39.8	D				
Overall	24.7	С	28.8	С				
US 550 (south)/CR 233 (west)								
Eastbound left	54.1	D	63.3	Е				
Eastbound right	Free-flow	Free-flow	Free-flow	Free-flow				
Westbound left	25.9	С	26.8	С				
Westbound right	33.9	С	35.9	D				
Northbound left	54.3	D	63.5	Е				
Northbound through	54.7	D	49.2	D				
Northbound right	18.1	В	15.1	В				
Southbound left	26.9	С	30.0	С				
Southbound through	51.3	D	52.7	D				
Southbound right	Free-flow	Free-flow	Free-flow	Free-flow				
Overall	44.2	D	49.5	D				

Table 8.8
Alternative F Modified, Signalized Intersection Operations Summary

### 8.1.4 2025 Grandview Section Intersection Analysis Comparison Summary

Table 8.9, 2025 Grandview Section Signalized Intersection Alternative Comparison Summary, shows an alternative comparison of the signalized intersection levels of service for the Grandview section.

	No Action Alternative		Alternative G Modified			Alternative F Modified						
	AM P	eak	PM Pe	eak	AM P	eak	PM Pe	eak	AM P	eak	PMI	Peak
	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of
US 160 Intersection	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service
SH 172/CR 234	<u></u>	<u> </u>	<u> </u>	I				I		<b></b>		
Eastbound left	326.6	F	444.3	F	23.3	С	42.6	D	23.3	С	42.6	D
Eastbound through	260.9	F	471.1	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eastbound right	7.4	А	18.4	В	33.4	С	34.2	С	33.4	С	34.2	С
Westbound left	51.9	D	52.2	D	22.3	С	35.6	D	22.3	С	35.6	D
Westbound through	124.1	F	406.3	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Westbound right	6.0	А	7.1	А	23.3	С	9.0	А	23.3	С	9.0	А
Northbound left	280.1	F	369.2	F	28.7	С	10.6	В	28.7	С	10.6	В
Northbound through	53.6	D	68.3	Е	28.3	С	40.6	D	28.3	С	40.6	D
Northbound right	37.8	D	36.7	D	8.0	А	22.4	С	8.0	А	22.4	С
Southbound left	34.9	С	39.7	D	22.8	С	9.3	А	22.8	С	9.3	А
Southbound through	52.5	D	56.7	Е	28.0	С	38.5	D	28.0	С	38.5	D
Southbound right	52.2	D	112.0	F	9.3	А	39.8	D	9.3	А	39.8	D
Overall	180.6	F	300.1	F	24.7	С	28.8	С	24.7	С	28.8	С
CR 233 (west)							-					
Eastbound left	900.4	F	884.2	F	22.3	С	34.8	С	54.1	D	63.3	Е
Eastbound through	48.4	D	235.8	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eastbound right	16.9	В	16.7	В	30.5	С	18.7	В	Free- flow	Free- flow	Free- flow	Free- flow
Westbound left	36.0	D	35.9	D	17.9	В	25.0	С	25.9	С	26.8	C
Westbound through	43.3	D	209.8	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Westbound right	16.5	В	16.4	В	23.4	С	16.1	В	33.9	С	35.9	D
Northbound left	221.6	F	1445.0	F	21.2	С	17.0	В	54.3	D	63.5	Е
Northbound through	53.9	D	58.1	Е	37.6	D	38.8	D	54.7	D	49.2	D
Northbound right	24.3	С	26.3	С	9.2	А	15.6	В	18.1	В	15.1	В
Southbound left	91.5	F	317.2	F	21.0	С	15.1	В	26.9	С	30.0	С
Southbound through	53.9	D	58.1	Е	37.6	D	38.8	D	51.3	D	52.7	D
Southbound right	344.1	F	804.4	F	0.1	А	0.7	А	Free- flow	Free- flow	Free- flow	Free- flow
Overall	265.7	F	478.3	F	18.7	В	17.5	В	44.2	D	49.5	D
US 550 (south)												
Eastbound left	N/A	N/A	N/A	N/A	22.1	С	26.2	С	N/A	N/A	N/A	N/A
Eastbound through	302.5	F	334.5	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eastbound right	2.2	А	12.8	В	0.1	А	1.5	Α	N/A	N/A	N/A	N/A
Westbound left	428.0	F	428.0	F	5.9	А	9.0	А	N/A	N/A	N/A	N/A
Westbound through	Free-flow	Free- flow	Free-flow	Free- flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Westbound right	N/A	N/A	N/A	N/A	28.0	С	29.7	С	N/A	N/A	N/A	N/A
Northbound left	378.7	F	357.5	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

# Table 8.9 2025 Grandview Section Signalized Intersection Alternative Comparison Summary

	Ν	No Action Alternative			Alternative G Modified				Alternative F Modified			
	AM P	Peak	PM P	eak	AM P	eak	PM P	eak	AM P	Peak	PM I	Peak
	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of	Delay	Level of
US 160 Intersection	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service	sec./veh.	Service
Northbound through	N/A	N/A	N/A	N/A	28.6	С	23.1	С	N/A	N/A	N/A	N/A
Northbound right	30.1	С	35.5	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Southbound left	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Southbound through	N/A	N/A	N/A	N/A	30.7	С	26.4	С	N/A	N/A	N/A	N/A
Southbound right	N/A	N/A	N/A	N/A	0.1	А	0.2	А	N/A	N/A	N/A	N/A
Overall	274.0	F	261.1	F	12.9	В	10.2	В	N/A	N/A	N/A	N/A

 Table 8.9

 2025 Grandview Section Signalized Intersection Alternative Comparison Summary

Table 8.9 indicates that the three signalized intersections under the No Action Alternative are projected to operate at LOS F during the AM and PM peak hours and would not provide the capacity needed for the design year.

The intersection at US 160 and SH 172/CR 234 would operate the same for Alternative G Modified and Alternative F Modified. All movements at this intersection are projected to operate at LOS D or better during the AM and PM peak hours.

For the US 160/CR 233 (west) intersection, US 550 is realigned to join US 160 at the CR 233 (west) interchange under Alternative F Modified. Under Alternative G Modified, the US 160/US 550 (south) interchange is located to the west of the US 160/CR 233 (west) interchange. The US 160/CR 233 (west) interchange is projected to operate at LOS B overall during both the AM and PM peak hours for Alternative G Modified and LOS D during the AM and PM peak hours for Alternative F Modified. Table 8.9 indicates that the US 160/CR 233 (west) intersection in the Grandview G Modified alternative would have reserve capacity to accommodate additional growth beyond the 2025 design year. In comparison, for Alternative F Modified, this intersection is near capacity and would not accommodate any additional growth beyond the 2025 design year.

### 8.2 2025 FLORIDA MESA AND VALLEY SECTION OPERATIONAL ANALYSIS

Operational analyses were performed in the Florida Mesa and Valley section for the No Action Alternative, Alternative C, and Alternative A. The capacity analysis worksheets for the Florida Mesa and Valley section highway analyses and the intersection analyses are included in Attachments F and G, respectively.

#### 8.2.1 2025 Florida Mesa and Valley Section Highway Analysis

#### No Action Alternative

Under the No Action Alternative, the existing roadway conditions would remain in the Florida Mesa and Valley section. US 160 is projected to operate at LOS E in the eastbound and

westbound directions during the AM peak hour, and LOS F in both directions during the PM peak hour.

#### Alternative C

Alternative C would provide four lanes (two in each direction) on US 160 through the Florida Mesa and Valley section, and would follow the existing alignment. US 160 is projected to operate at LOS A in both directions during the AM peak hour, and LOS B in both directions during the PM peak hour.

#### Alternative A

Alternative A would provide four lanes (two in each direction) on US 160 through the Florida Mesa and Valley section, and would follow the existing alignment. US 160 is projected to operate at LOS A in both directions during the AM peak hour, and LOS B in both directions during the PM peak hour.

#### 8.2.2 2025 Florida Mesa and Valley Section Intersection Analysis

#### No Action Alternative

Under the No Action Alternative, the existing roadway conditions would remain in the Florida Mesa and Valley section. The critical movements at the US 160 and CR 222/CR 223 (west) unsignalized intersection are projected to operate at LOS E or worse during the AM peak hour, and LOS F during the PM peak hour.

#### Alternative C

Under Alternative C, the intersection of CR 222/CR 223 (west) with US 160 would be relocated to the east of the existing intersection and signalized. The signalized intersection is projected to operate at LOS C during the AM and PM peak hours.

#### Alternative A

Under Alternative A, the intersection of CR 222/CR 223 (west) with US 160 would be relocated to the west of the existing intersection and signalized. The signalized intersection is projected to operate at LOS C during the AM and PM peak hours.

#### 8.2.3 2025 Florida Mesa and Valley Section Operational Analysis Summary

The No Action Alternative would not provide the needed capacity for the 2025 design year through the Florida Mesa and Valley section. US 160 is projected to operate at LOS E in both directions during the AM peak hour, and LOS F in both directions during the PM peak hour. The unsignalized intersection at CR 222/CR 223 (west) is projected to have failing critical movements during the AM and PM peak hours.

Alternative C and Alternative A are projected to operate the same through the Florida Mesa and Valley section. The only difference between the two action alternatives is the location of the

CR 222/CR 223 (west) intersection. US 160 is projected to operate at LOS A in both directions during the AM peak hour, and LOS B in both directions during the PM peak hours. The CR 222/CR 223 (west) signalized intersection with US 160 is projected to operated at LOS C during both the AM and PM peak hour. Alternative C and Alternative A would operate the same in this section and provide the needed capacity to accommodate the traffic demand beyond the 2025 design year.

#### 8.3 2025 DRY CREEK AND GEM VILLAGE SECTION OPERATIONAL ANALYSIS

Operational analyses were performed in the Dry Creek and Gem Village section for the No Action Alternative, Alternative H, and Alternative C. The capacity analysis worksheets for the Dry Creek and Gem Village section highway analyses are included in Attachment H, 2025 Dry Creek and Gem Village Section Highway Analyses. The intersections along US 160 through the Dry Creek and Gem Village area are minor unsignalized county roads and were not analyzed for this report.

#### 8.3.1 2025 Dry Creek and Gem Village Section Highway Analysis

#### No Action Alternative

Under the No Action Alternative, the existing roadway conditions would remain in the Dry Creek and Gem Village section. US 160 is projected to operate at LOS E in the eastbound and westbound directions during the AM and PM peak hours.

#### Alternative H

Alternative H would provide four lanes (two in each direction) on US 160 through the Florida Mesa and Valley section. This alternative would realign US 160 as a bypass south of Gem Village, and would rejoin the existing alignment at the east and west ends of Gem Village. US 160 is projected to operate at LOS A in both directions during the AM peak hour, and LOS B in both directions during the PM peak hour.

#### Alternative C

Alternative C would provide four lanes (two in each direction) on US 160 through the Dry Creek and Gem Village section. This alternative would remain on the existing alignment through this section. US 160 is projected to operate at LOS A in both directions during the AM peak hour, and LOS B in both directions during the PM peak hour.

#### 8.3.2 2025 Dry Creek and Gem Village Operational Analysis Summary

The No Action Alternative would not provide the needed capacity for the 2025 design year through the Dry Creek and Gem Village section. US 160 is projected to operate at LOS E in both directions during the AM and PM peak hours.

Alternative H and Alternative C are projected to operate the same through the Dry Creek and Gem Village section. The only difference between these alternatives is the alignment of US 160

through Gem Village. US 160 is projected to operate at LOS A in both directions during the AM peak hour, and LOS B in both directions during the PM peak hour.

#### 8.4 2025 BAYFIELD SECTION OPERATIONAL ANALYSIS

Operational analyses were performed in the Bayfield section for the No Action Alternative, Alternative B, and Alternative A. The capacity analysis worksheets for the Bayfield section highway analyses and the intersection analyses are included in Attachments I and J, respectively.

#### 8.4.1 2025 Bayfield Section Highway Analysis

#### No Action Alternative

Under the No Action Alternative, the existing roadway conditions would remain in the Bayfield section. US 160 is projected to operate at LOS E in the eastbound and westbound directions during the AM and PM peak hours.

#### Alternative B

Alternative B would provide four lanes (two in each direction) on US 160 through the Bayfield section and would follow the existing alignment. US 160 is projected to operate at LOS A in both directions during the AM and PM peak hours.

#### Alternative A

Alternative A would provide four lanes (two in each direction) on US 160 through the Bayfield section and would follow the existing alignment. US 160 is projected to operate at LOS A in both directions during the AM and PM peak hours.

#### 8.4.2 2025 Bayfield Section Intersection Analysis

#### No Action Alternative

Under the No Action Alternative, the existing roadway conditions would remain in the Bayfield section. The signalized intersection at US 160/CR 501 is projected to operate at LOS D overall during the AM peak hour, with the westbound and northbound approaches operating at LOS E. During the PM peak hour, the intersection is projected to operate at LOS F.

#### Alternative B

Under Alternative B, the intersection at US 160/CR 501 would remain a signalized intersection. The analysis results indicate the intersection is projected to operate at LOS C during the AM and PM peak hours.

## **SECTION**EIGHT

### Alternative A

Under Alternative A, a diamond interchange would be provided at the US 160/CR 501 intersection. The ramp terminal intersections on the north and south of US 160 are projected to operate at LOS C or better during the AM and PM peak hours.

#### 8.4.3 2025 Bayfield Section Operations Analysis Summary

The No Action Alternative would not provide the needed capacity for the 2025 design year through the Bayfield section. US 160 is projected to operate at LOS E in both directions during the AM and PM peak hours. The US 160/CR 501 intersection is projected to operate at LOS D during the AM peak hour, and LOS F during the PM peak hour.

Although Alternative A would provide free flow movements through the Bayfield section, due to the diamond interchange at US 160/CR 501, the interchange would not be needed to provide acceptable levels of service through this section. US 160 is projected to operate at LOS A for both Alternative B and Alternative A through the Bayfield section. The intersections for both alternatives are projected to operate at LOS C or better during both the AM and PM peak hours.

### 8.5 SUMMARY

The No Action Alternative would not meet the capacity needs for the design year in any of the sections along the US 160 corridor.

The following subsections provide a summary of the traffic operational comparisons between the two action alternatives in each section along the US 160 corridor.

#### Grandview Section

- Alternative G Modified and Alternative F Modified would both provide acceptable levels of service in the Grandview section.
- Alternative G Modified provides three interchanges along US 160 in the Grandview section at US 550 (south), CR 233 (west), and SH 172/CR 234. These interchanges provide three access points to the north that distribute traffic onto US 160 from the projected residential commercial and hospital development on the north side of US 160.
- Alternative F Modified provides two interchanges along US 160 in this section at US 550 (south)/CR 233 (west) and SH 272/CR 234. This alternative provides two access points to the north for the projected development on the north side of US 160.
- The single-point urban interchange at US 160 and SH 172/CR 234 would operate the same for both action alternatives.
- The single-point urban interchange at US 160/CR 233 (west) would operate better under Alternative G Modified (LOS B) than Alternative F Modified (LOS D). Under Alternative F Modified, this intersection is near capacity and would not accommodate any additional growth beyond the design year 2025. Under Alternative G Modified, this intersection would have reserve capacity to accommodate additional growth beyond the 2025 design year.

### **SECTION**EIGHT

#### Florida Mesa and Valley Section

Traffic operations for the two action alternatives in this section would be the same. The only difference between the action alternatives is the location of the CR 222/CR 223 (west) intersection with US 160.

#### Dry Creek and Gem Village Section

Traffic operations for the two action alternatives in this section would be the same. The only difference between the action alternatives is the alignment of US 160.

#### **Bayfield Section**

Traffic operations for the two action alternatives in this section would be similar. The only difference between the action alternatives is that Alternative A has a diamond interchange at US 160/CR 501 and Alternative B has an intersection. Both alternatives provide acceptable levels of service at the US 160/CR 501 intersection.

- *Highway Capacity Manual, 2000.* 2000. Transportation Research Board, National Research Council. Washington, D.C.
- *Trip Generation Manual.* 2003. 7<sup>th</sup> edition. Institute of Transportation Engineers. Washington, D.C.

Attachment A Existing Highway Segment Analyses

URS Corporation						
sing sorperation						
9960 Federal Drive, Suit Colorado Springs, CO 8	e 300 0920					
Phone: E-Mail:		Fax:				
Directi	onal Two-La	ne Highway	Segment	Analys	is	
Analyst	DEA					
Agency/Co. Date Performed	URS 3/19/2005					
Analysis Time Period	AM PEAK					
Highway	EB US 160					
From/To	US 550 TO S	H 172/CR 23	34			
Jurisdiction						
Analysis Year Description US 160	EXISTING					
	I	nput Data				
		Deels been	<b>f</b>	DUE		
nignway class Class 1 Shoulder width	f+	<pre>reak-nour % Trucke *</pre>	iactor,	rnf	0.90 5	9
Jane width 12.	0 ft	% Trucks of	rawling	5	0.0	0
Segment length 3.0	mi	Truck craw	vl speed		0.0	mi/hr
Terrain type Rol	ling	% Recreati	lonal vel	nicles	0	00
Grade: Length	mi	% No-passi	lng zone	5	25	8
Up/down	00	Access poi	lnts/mi		12	/mi
Analysis direction volum	ne, Vd 440	veh/h				
Opposing direction volum	ne, Vo 1130	veh/h				
	Average	e Travel Spe	ed			
Direction		Analysis	s (d)	aO	posing	(o)
PCE for trucks, ET		1.9		-1- -	1.5	
PCE for RVs, ER		1.1			1.1	
Heavy-vehicle adj. facto	or, (note-5)	fHV 0.95	57		0.976	
Grade adj. factor, (note-	·1) fG	0.93	3	h	0.99	/L
Directional flow rate, (r	lote-2) VI	520	pc/.	i I	1232	pc/n
Free-Flow Speed from Fie	ld Measurem	ent:				
Field measured speed, (no	te-3) S FM		-	mi/h		
Observed volume, (note-3)	VÍ		-	veh/h		
Escimated Free-Flow Spee	u: (ta-3) BFFC		60 0	mi/b		
Adj. for lane and should	ler width.(n	ote-3) fLS	0.0	mi/h		
Adj. for access points,	note-3) fA		3.0	mi/h		
Free-flow speed, FFSd			57.0	mi/h		
Adductment for as assis		5	06	mi /h		
Augustment for no-passir	ig zones, In rea	ιÞ	0.0 12 0	ni⊥/n mi/b		
Average travel speed, Al	'Sd		42.8	mi/h		

Percent Time	-Spent-Foll	owing		· · · · · · · · · · · · · · · · · · ·
Direction PCE for trucks, ET PCE for RVs, ER Heavy-vehicle adjustment factor, fHV Grade adjustment factor, (note-1) fG Directional flow rate, (note-2) vi	Analysis(d 1.5 1.0 0.976 0.94 505	) pc/h	Opposing 1.0 1.00 1.00 1.00 1189	(o) D pc/h
Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFd	Ce-4) Brish	1.3 86.9	° ₽	
Level of Service and	Other Perfo	rmance Me	asures	
Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, Peak-hour vehicle-miles of travel, VM Peak 15-min total travel time, TT15	VMT15 T60	E 0.31 347 1320 8.1	veh-mi veh-mi veh-h	· · · · ·
Notes: 1. If the highway is extended segment 2. If vi (vd or vo ) >= 1,700 pc/h, t 3. For the analysis direction only. 4. Exhibit 20-21 provides factors a a 5. Use alternative Equation 20-14 if on a specific downgrade.	(level) or erminate an nd b. some trucks	rolling alysis-th operate	terrain, : e LOS is l at crawl :	fG = 1.0 F. speeds
Passing	Lane Analys	is		
Total length of analysis segment, Lt Length of two-lane highway upstream o Length of passing lane including tape Average travel speed, ATSd (from abov Percent time-spent-following, PTSFd ( Level of service, (note-1) LOSd (from	f the passi rs, Lpl e) from above) above)	ng lane,	3.0 Lu 0.5 2.4 42.8 86.9 E	mi mi mi/h
Average	Travel Spee	d		
Downstream length of two-lane highway length of passing lane for averag	within eff te travel sp	ective eed, Lde	1.70	mi
Adj. factor for the effect of passing on average speed, fpl Average travel speed including passing	rerage trave alane lane, (not	l speed, e-2) ATSp	Ld -1.60 1.10 01 46.4	mi
Percent Time	-Spent-Foll	owing		
Downstream length of two-lane highway of passing lane for percent time- Length of two-lane highway downstream	within eff spent-follo of effecti	ective le wing, Lde ve length	ength e 7.26 n of	mi
the passing lane for percent time Adj. factor for the effect of passing on percent time-spent-following,	-spent-foll lane fpl	owing, Ld	-7.16 0.61	mi
Percent time-spent-following including passing lane, (note-3) P	TSFpl		58.6	0 0
Level of Service and Other	Performanc	e Measure	es (note-4	)

Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

С

7.5

#### Notes:

- 1. If LOSd = F, passing lane analysis cannot be performed.
- 2. If Ld < 0, use alternative Equation 20-22.
- 3. If Ld < 0, use alternative Equation 20-20. 4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

HCS2000: Two-Lane Highways Release 4.1d

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-Mail: Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	DEA						
Agency/Co.	URS						
Date Performed	3/19/2005						
Analysis Time Period	PM PEAK						
Highway	EB US 160						
From/To	US 550 TO S	H 172/C	R 234	Ł			
Jurisdiction							
Analysis Year	EXISTING						
Description US 160							
	I	nput Da	ta				
	<u></u>	-		*******			<u>,</u>
Highway class Class 1		Peak-h	our f	factor,	PHF	0.95	
Shoulder width 6.	.0 ft	% Truc	ks ar	nd buses		5	oto
Lane width 12	2.0 ft	% Truc	ks cı	rawling		0.0	olo .
Segment length 3.	0 mi	Truck	craw]	speed		0.0	mi/hr
Terrain type Ro	olling	% Recr	eatio	onal veh	icles	0	00
Grade: Length	mi	% No-p	assir	ng zones		25	8
Up/down	ð	Access	poir	its/mi		12	/mi
Analysis direction volu Opposing direction volu	ume, Vd 1200 ume, Vo 680	veh veh	/h /h	Ad			
	Average	liavei	spee	eu			
Direction		Anal	ysis	(d)	ra0	osing (	(0)
PCE for trucks, ET			1.5			1.5	
PCE for RVs, ER			1.1			1.1	
Heavy-vehicle adj. fact	cor, (note-5)	fHV	0.976	5		0.976	
Grade adj. factor, (note	e-1) fG		0.99			0.99	
Directional flow rate,	(note-2) vi		1308	pc/h		741	pc/h
Fron-Flow Spood from Fi	old Moscurom	ont.					
Field measured speed (r	oto-3) S FM	enc.		-	mi/h		
Observed volume (note-	V = 0				$\frac{101}{voh}/h$		
Estimated Free-Flow Spe	ad.				V C II / II		
Base free-flow speed (r	ote-3) BFFS			60 0	mi/h		
Adi, for lane and shoul	lder width.(n	ote-3)	fls	0.0	mi/h		
Adj. for access points,	(note-3) fA		~	3.0	mi/h		
				E7 0			
riee-liow speed, FrSd				57.0	mı/n		
Adjustment for no-passi	ing zones, fn	р		0.7	mi/h		
Average travel speed, A	ATSd			40.4	mi/h		

Percent Time	e-Spent-Follow	/ing		<u></u>
Direction PCE for trucks, ET PCE for RVs. ER	Analysis(d) 1.0 1.0	Opp	oosing (c 1.0 1.0	)
Heavy-vehicle adjustment factor, fHV Grade adjustment factor, (note-1) fG Directional flow rate, (note-2) vi	1.000 1.00 1263 p	oc/h	1.000 1.00 716	pc/h
Base percent time-spent-following, (no Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFd	ote-4) BPTSFd	87.6 § 4.2 91.7 %		
Level of Service and	Other Perform	nance Measur	es	
Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, Peak-hour vehicle-miles of travel, VN Peak 15-min total travel time, TT15	VMT15 MT60	E 0.77 947 ve 3600 ve 23.5 ve	eh-mi eh-mi eh-h	
Notes: <ol> <li>If the highway is extended segment</li> <li>If vi (vd or vo ) &gt;= 1,700 pc/h, t</li> <li>For the analysis direction only.</li> <li>Exhibit 20-21 provides factors a a</li> <li>Use alternative Equation 20-14 if on a specific downgrade.</li> </ol>	t (level) or m terminate anal and b. some trucks o	colling terr Lysis-the LC operate at c	cain, fG OS is F. crawl spe	= 1.0
Passing	Lane Analysis	5		
Total length of analysis segment, Lt Length of two-lane highway upstream of Length of passing lane including tape Average travel speed, ATSd (from above Percent time-spent-following, PTSFd Level of service, (note-1) LOSd (from	of the passing ers, Lpl ve) (from above) above)	g lane, Lu	3.0 0.5 2.4 40.4 91.7 E	mi mi mi/h
Average	Travel Speed			
Downstream length of two-lane highway length of passing lane for average Length of two-lane highway downstream	y within effec ge travel spec m of effective	ctive ed, Lde	1.70	mi
length of the passing lane for av Adj. factor for the effect of passing on average speed, fpl	verage travel g lane	speed, Ld	-1.60	mi
Percent Time	e-Spent-Follo	-z) AISPI	44.0	
of passing lane for percent time- Length of two-lane highway downstrear	spent-follow: n of effective	ing, Lde e length of	3.60	mi
the passing lane for percent time Adj. factor for the effect of passing on percent time-spent-following,	e-spent-follow g lane fpl	wing, Ld	-3.50	mi
Percent time-spent-following including passing lane, (note-3) H	PTSFpl		62.7	0
Level of Service and Other	r Performance	Measures (1	note-4)	

Level of service including passing lane, LOSpl D Peak 15-min total travel time, TT15 21.5 veh-h

#### Notes:

- 1. If LOSd = F, passing lane analysis cannot be performed.
- 2. If Ld < 0, use alternative Equation 20-22.
- 3. If Ld < 0, use alternative Equation 20-20.
- 4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET						
General Information	Site Information					
Analyst DEA Agency of Company LIRS	Highway / Direction of Travel	WB US 160				
Date Performed 3/19/2005	Jurisdiction					
Analysis Time Period AM PEAK	Analysis Year					
	I					
‡ Shoulder width tt						
Lane width tt	Class I hi	ghway 🔳 Class II highway				
Lane width t	Terrain	Level Rolling				
Shoulder width t	Grade Length Peak-hour fact	mi Up/down or, PHF 0.95% ne 100				
Segment length, L <sub>t</sub> mi	Show North Arrow % Trucks and	Buses , P <sub>T</sub> 5 %				
Analysis direction vol., V <sub>d</sub> 1130veh/h	% Recreationa Access points	i vehicles, P <sub>R</sub> 0% 7 mi 12				
Opposing direction vol., V <sub>o</sub> 440veh/h						
Average Travel Speed						
	Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.5	1.9				
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1				
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	0.957				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.99	0.93				
Directional flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PHF*f_{HV}*f_G)$	1232	520				
Free-Flow Speed from Field Measurement	Estimated Fre	e-Flow Speed				
Field Measured speed <sup>3</sup> , S <sub>EM</sub> mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h				
Observed volume <sup>3</sup> , V <sub>f</sub> veh/h	Adj. for lane width and shoulder wi	dth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h				
Free-flow speed, FFS, FFS=S <sub>EM</sub> +0.00776(V,/ f <sub>HV</sub> ) 57.0 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 3.0 mi/h				
Adjustment for no-passing zones f (Exhibit 20-19) 2.3 mi/h	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 57.0 mi					
	Average travel speed, ATS ATS=F	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 41.1 mi/h				
Percent Time-Spent-Following	Applusia Direction (d)					
Passenger-car equivalents for trucks E_(Exhibit 20-10 or 20-16)	Analysis Direction (d)	1.5				
Passenger-car equivalents for RVs. En (Exhibit 20-10 or 20-16)	1.0	1.0				
Heavy-vehicle adjustment factor, $f_{LN}$ , $f_{LN}$ =1/ (1+ $P_{T}(E_{T}-1)+P_{D}(E_{D}-1)$ )	1.000	0.976				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)	1.00	0.94				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	1189	505				
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	8	4.3				
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)	1	6.3				
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np	10	0.5				
Level of Service and Other Performance Measures						
Level of service, LOS (Exhibit 20-3 or 20-4)	· · · · · · · · · · · · · · · · · · ·	F				
Volume to capacity ratio v/c v/c=V <sub>p</sub> / 1,700	0	.72				
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	8	92				
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi)  VMT <sub>60</sub> =V*L <sub>t</sub>	3	390				
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS	2	1.7				
Notes		·····				
1. If the highway is extended segment (level) or rolling terrain, $f_G = 1.0$ 2. If $v_i (v_d)$	<sub>l</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	ysisthe LOS is F.				

For the analysis direction only.
 Exhibit 20-21 provides factors a and b.
 Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

DIRECTIONAL TWO-LANE HIGHW	AY SEGMENT WORKSHEET				
General Information	Site Information				
Analyst DEA Agency of Company LIPS	Highway / Direction of Travel	WB US 160			
Date Performed 3/19/2005	Jurisdiction	03 550 TO SH 1/2/UK 234			
Analysis Time Period PM PEAK	Analysis Year	EXISTING			
input Data					
Shoulder width tt					
Lane width tt	Class   h	ighway 🔲 Class II highway			
Lane width	Terrain	Level Rolling			
🕽 Shoulder width 👥 tt	Grade Length	mi Up/down			
	No-passing zo	tor, PHF 0.95% one 100			
Segment length, L <sub>t</sub> mi	Sheet North Arrow % Trucks and	Buses, P <sub>T</sub> 5%			
ł	% Recreation	al vehicles, P <sub>D</sub> 0%			
Analysis direction vol., V <sub>d</sub> 680veh/h	Access points	/mi 12			
Opposing direction vol., V 1200veh/h					
Average Travel Speed					
	Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.5	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1			
Heavy-vehicle adjustment factor, $f_{HV} = f_{HV} = 1/(1 + P_T(E_T-1) + P_R(E_R-1))$	0.976	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.99	0.99			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	741	1308			
Free-Flow Speed from Field Measurement	Estimated Fre	e-Flow Speed			
Field Measured speed <sup>3</sup> , S <sub>EM</sub> mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
Chserved volume <sup>3</sup> V. veh/h	Adj. for lane width and shoulder w	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
Erection speed EES EES $\approx$ S +0.00776(V//f) 57.0 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 3.0 mi/h			
Adjustment for a president space $f_{\rm H}$ (Subject 20.40) 10 million	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 57.0 mi/h				
Adjustment for no-passing zones, Inp (Exhibit zo-19) 1.0 mini	Average travel speed, ATS ATS=FFS-0.00776vp-fpp 40.1 mi/				
Percent Time-Spent-Following					
	Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-10 or 20-16)	1.0	1.0			
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, $f_{HV} = 1/(1 + P_T(E_T-1) + P_R(E_R-1))$	1.000	1.000			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)	1.00	1.00			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	716	1263			
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	8	8.6			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		3.2			
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np	§	91.9			
Level of Service and Other Performance Measures Level of service. LOS (Exhibit 20-3 or 20-4)		E			
Volume to capacity ratio v/c v/c≈V <sub>p</sub> / 1,700	C	),44			
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		537			
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L	2	040			
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS	1	3.4			
Notes					
1. If the highway is extended segment (level) or rolling terrain, $f_G=1.0$ 2. If $v_i$	(v <sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysis-the LOS is F.			
3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b. 5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a	specific downgrade.				

Copyright © 2000 University of Florida, All Rights Reserved

DIRECTIONAL TWO-LANE HIGHWAY					
General Information	Site Information				
Analyst DEA Agency or Company URS	From/To	5H 172/CR 234 TO CR 222/223			
Date Performed 3/19/2005	Jurisdiction				
Analysis Time Period AM PEAK	Analysis Year E				
Shoukder width tt					
Lane width tt	Class I hig	hway 🔲 Class II highway			
Lane width tt	Terrain	Level 🗹 Rolling			
Shoulder width tt	Grade Length	mi Up/down			
	Peak-hour fact	or, PHF 0.95%			
Segment length, L <sub>t</sub> mì	Show North Arrow % Trucks and I	Buses, P <sub>T</sub> 5%			
Analysis direction vol., V <sub>d</sub> 235veh/h	% Recreationa Access points/	vehicles, P <sub>R</sub> 0% mi 8			
Opposing direction vol., V <sub>o</sub> 570veh/h					
Average Travel Speed					
	Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.9	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1			
Heavy-vehicle adjustment factor, $f_{HV} = f_{HV} = 1/(1 + P_T(E_T-1) + P_R(E_R-1))$	0.957	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.93	0.99			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	278	621			
Free-Flow Speed from Field Measurement	Estimated Free	e-Flow Speed			
Field Measured speed <sup>3</sup> . Sev. mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
Observed volume <sup>3</sup> V. veh/h	Adj. for lane width and shoulder wid	tth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
Erro flow around EEC EEC=S $\pm 0.00776(1/1f)$ 58.0 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit :	20-5) 2.0 mi/h			
(100 - 100	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>l,S</sub> -f <sub>A</sub> ) 58.0 mi/h				
Adjustment for no-passing zones, t <sub>np</sub> (Exhibit 20-19) 1.2 min	Average travel speed, ATS ATS=F	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 49.8 mi/h			
Percent Time-Spent-Following					
	Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-10 or 20-16)	1.5	1.0			
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	1.000			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)	0.94	1.00			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> ≕V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	270	600			
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	6:	3.6			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)	7	.7			
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np	7'	1.2			
Level of Service and Other Performance Measures		<u> </u>			
Volume to capacity ratio v/c $v/c=V_{n}/1,700$	0.	16			
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>1</sub> (V/PHF)	6	2			
Peak-hour vehicle-miles of travel, VMT <sub>en</sub> (veh- mi) VMT <sub>en</sub> =V*L,	235				
Peak 15-min total travel time, $TT_{45}$ (veh-h) $TT_{45}$ = VMT <sub>45</sub> /ATS	1	.2			
Notes					
1. If the highway is extended segment (level) or rolling terrain, $f_{G}$ =1.0 2. If $v_{i}(v_{d}$ 3. For the analysis direction only 4. Exhibit 20-21 provides factors a and b	or v <sub>o</sub> ) >=1,700 pc/h, terminate anal	ysisthe LOS is F.			
3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b.					

Copyright © 2000 University of Florida, All Rights Reserved

	DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET						
General Information		Site Information					
Analyst Agency or Company	URS	Highway / Direction of Travel From/To	EB US 160 SH 172/CR 234 TO CR 222/223				
Date Performed	3/19/2005	Jurisdiction					
Analysis Time Period	PM PEAK	Analysis Year	EXISTING				
	Shoulder width tt		· · · · · · · · · · · · · · · · · · ·				
<b>4</b>	Lane width tt	Class I h	ighway   🕅 Class II highway				
<b></b>	Lane widtht	Terrain	Level 🕅 Rolling				
	Shoulder widthtt	Grade Length	mi Up/down				
		No-passing zo	one 42				
Segment length,	Υ Υ ··································	Show North Arrow % Trucks and	Buses , P <sub>T</sub> 5 %				
Analysis direction vol., V <sub>d</sub> 655ve	h/h	% Recreation Access points	al vehicles, P <sub>R</sub> 0% :/ mi 8				
Opposing direction vol., V 360ve	h/h						
Average Travel Speed							
		Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for trucks, E <sub>1</sub>	(Exhibit 20-9 or 20-15)	1.5	1.9				
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-9 or 20-17)	1.1	1.1				
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>H</sub>	1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	0.957				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	0-7 or 20-13)	0.99	0.93				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHI	<sup>-*f</sup> Hv <sup>*</sup> f <sub>G</sub> )	714	426				
Free-Flow Speed fro	m Field Measurement	Estimated Fre	e-Flow Speed				
Field Measured speed <sup>3</sup> . S <sub>EM</sub>	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h				
Observed volume <sup>3</sup> . V.	veh/h	Adj. for lane width and shoulder w	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h				
Erection speed EES EES=S +0.00	776(\//f) 58.0 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 2.0 mi/h					
Adjustment for a possible possible for		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.0 mi/h					
Adjustment for no-passing zones, inp		Average travel speed, ATS ATS=FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 47.2 mi/h					
Percent Time-Spent-Following							
Descenter en en ivelente for trucko. E	(Eybibit 20.10 or 20.16)	Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for RVc. E		1.0	1.0				
Hassenger-call equivalents for RVS, ER		1.00	0.976				
Grade adjustment fester 1 f. (Cybibit 20	$W^{-17}$ (1+ $P_{T}(E_{T}^{-1})$ + $P_{R}(E_{R}^{-1})$ )	1.00	0.970				
Grade adjustment factor, r <sub>G</sub> (Exhibit 20	-8 or 20-14)	680	413				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/n) v <sub>i</sub> =v <sub>i</sub> /(PH		009	415				
Base percent time-spent-following*, BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d )	······································	42.0				
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit	(. 20-20)						
Percent time-spent-following, P1SF(%)	PISE=BPISE+t np		35.6				
Level of service, LOS (Exhibit 20-3 or 20	0-4)	· · · · · · · · · · · · · · · · · · ·	E				
Volume to capacity ratio v/c v/c≈V <sub>p</sub> / 1	700		0.42				
Peak 15-min veh-miles of travel,VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> ≕ 0.25L <sub>t</sub> (V/PHF)		172				
Peak-hour vehicle-miles of travel, VMT <sub>6</sub>	<sub>0</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	655					
Peak 15-min total travel time, TT <sub>15</sub> (veh-	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		3.6				
Notes			······································				
1.If the highway is extended segment (le	evel) or rolling terrain, $f_G = 1.0$ 2. If $v_i (v_i)$	r <sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	alysisthe LOS is F.				
<ol> <li>For the analysis direction only.</li> <li>Example 5. Use alternative Equation 20-14 if som</li> </ol>	chibit 20-21 provides factors a and b. the trucks operate at crawl speeds on a s	pecific downgrade.					

HCS2000<sup>TM</sup>

Copyright © 2000 University of Florida, All Rights Reserved

	DIRECTIONAL TWO-LANE HIGHWA	Y SEGMENT WORKSHEET				
General Information		Site Information				
Analyst Agency or Company	DEA	Highway / Direction of Travel	WB US 160 SH 172/CB 234 TO CB 222/223			
Date Performed	3/19/2005	Jurisdiction				
Analysis Time Period		Analysis Year	EXISTING			
	Sheulder width tt		_			
<b></b>	Lane width tt	Class I h	ghway 📃 Class II highway			
	Lane width ti	Terrain	Level 🕅 Rolling			
	Shoulder width It	Grade Length Peak-hour fac	tor, PHF 0.95%			
Segment longth	- 1 mž	No-passing zo	ne 44			
Segmentiengu	· · · · · · · · · · · · · · · · · · ·	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%			
		% Recreationa	al vehicles, P <sub>R</sub> 0%			
Analysis direction vol., V <sub>d</sub> 570ve	eh/h	Access points	/mi 8			
Opposing direction vol., V <sub>o</sub> 235ve	əh/h					
Average Travel Speed		Analysis Direction (d)	Opposing Direction (a)			
Passenger-car equivalents for trucks. F	(Exhibit 20-9 or 20-15)					
		1.5	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub>	=1/(1+ P (F -1)+P (F -1))	0.976	0.957			
Grade adjustment factor <sup>1</sup> , f <sub>a</sub> (Exhibit 2	$V^{-7}$ (1.1 $T_{T}^{-7}$ ) R( $R^{-7}$ )	0.99	0.93			
Directional flow rate <sup>2</sup> $y/(pc/h) y = V/(PcH)$	E*f * f )	621	278			
Free-Flow Speed fro	' 'HV 'G'	Estimated Fre	e-Flow Speed			
		Base free-flow speed <sup>3</sup> , BFFS	60.0 mi/h			
Field Measured speed <sup>3</sup> , S <sub>FM</sub>	mi/h	Adi, for lane width and shoulder wi	dth. <sup>3</sup> f. (Exb 20-5) 0.0 mi/h			
Observed volume <sup>3</sup> , V <sub>f</sub>	veh/h	Adi for access points <sup>3</sup> f (Evhibit	20.5 20 mi/h			
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> +0.00	776(V <sub>f</sub> / f <sub>HV</sub> ) 58.0 mi/h	Fron flow spood EES (ESS-REE	20-5, $2.0$ mi/h			
Adjustment for no-passing zones, f <sub>np</sub>	(Exhibit 20-19) 2.6 mi/h	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS- $_{LS}$ - $_{LS}$ - $_{A}$ ) 30.0 mi/n				
Percent Time-Spent-Following	<u></u>	Average traver speed, A15 A15=r	rs-0.00776v <sub>p</sub> -1 <sub>np</sub> 40.5 min			
		Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E	(Exhibit 20-10 or 20-16)	1.0	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f	<sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20	)-8 or 20-14)	1.00	0.94			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	600	270			
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	7	3.7			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibi	t. 20-20)	1	6.9			
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np	9	0.6			
Level of Service and Other Performa	nce Measures		F			
Volume to capacity ratio v/c $v/c=V_p/1$	,700	0.37				
Peak 15-min veh-miles of travel,VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	1	150			
Peak-hour vehicle-miles of travel, VMT	<sub>50</sub> (veh- mi) ∨MT <sub>60</sub> =V*L <sub>t</sub>	570				
Peak 15-min total travel time, TT <sub>15</sub> (veh	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS	3.1				
Notes						
1.If the highway is extended segment (l	evel) or rolling terrain, f <sub>G</sub> =1.0 2. If v <sub>i</sub> (v	<sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysisthe LOS is F.			
3. For the analysis direction only. 4. Ex	chibit 20-21 provides factors a and b.					

HCS2000<sup>™</sup>

Copyright © 2000 University of Florida, All Rights Reserved

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company	URS	Highway / Direction of Travel	VB US 160 SH 172/CR 234 TO CR 222/223
Date Performed	3/19/2005	Jurisdiction	
Analysis Time Period	PM PEAK	Analysis Year	EXISTING
		T	
	Shoulder width tt		
	Lane width tt	Class I hi	ghway   🕅 Class II highway
	Lane widtht	Terrain	Level 🛛 Rolling
Shoulder width tt		Grade Length mi Up/down Peak-hour factor, PHF 0.95% No-passing zone 44 Show North Arrow % Trucks and Buses , P <sub>T</sub> 5 % % Recreational vehicles, P <sub>R</sub> 0% Access points/ mi 8	
Segment length, L <sub>1</sub> mi			
Analysis direction vol., V <sub>d</sub> 360veh/h			
Opposing direction vol., V <sub>o</sub> 655ve	eh/h		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E	T (Exhibit 20-9 or 20-15)	1.9	1.5
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)		1.1	1.1
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))		0.957	0.976
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)		0.93	0.99
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	426	714
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed <sup>3</sup> , S <sub>EM</sub>	mi/h	Base free-flow speed <sup>o</sup> , BFFS <sub>FM</sub>	60.0 mi/n
Observed volume <sup>3</sup> V	veh/h	Adj. for lane width and shoulder wi	dth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h
$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{i$		Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 2.0 mi/h	
		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.0 mi/h	
Adjustment for no-passing zones, inp	(EXMIDIL 20-19) 1.1 11/11	Average travel speed, ATS ATS=F	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 48.1 mi/h
Percent Time-Spent-Following		Apolygia Direction (d)	Opposing Direction (c)
		Analysis Direction (d)	Opposing Direction (0)
Passenger-car equivalents for trucks, E	T(EXNIDIT 20-10 or 20-16)	1.5	1.0
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))		0.976	1.000
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)		0.94	1.00
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	413	689
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>avd<sup>b</sup></sup> )		73.9	
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		6.5	
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np		80.4	
Level of Service and Other Performa	nce Measures		F
Volume to capacity ratio v/c $v/c=V_1/1,700$		0.25	
Peak 15-min veh-miles of travel, VMT <sub>4c</sub> (veh- mi)VMT <sub>4c</sub> = 0.25L(V/PHF)		95	
Peak-hour vehicle-miles of travel, VMT <sub>en</sub> (veh- mi) VMT <sub>en</sub> =V*L,		360	
Peak 15-min total travel time, $TT_{15}$ (veh-h) $TT_{15}$ = VMT <sub>15</sub> /ATS		2.0	
Notes			
1.If the highway is extended segment (	evel) or rolling terrain, $f_G = 1.0$ 2. If $v_i(v_i)$	d or vo) >=1,700 pc/h, terminate ana	lysisthe LOS is F.
3. For the analysis direction only. 4. Ex	xhibit 20-21 provides factors a and b.		

HCS2000<sup>™</sup>

Copyright © 2000 University of Florida, All Rights Reserved

DIRECTIONAL TWO-LANE HIGHWA	SEGMENT WORKSHEET	
General Information	Site Information	ER LIS 160
Analyst DEA Agency or Company URS	From/To	CR 222/223 TO GEM VILLAGE
Date Performed 3/19/2005	Jurisdiction	
Analysis Time Period AM PEAK	Analysis Year	
1 Shoulder width ti		
Lane width tt	Class I hi	ghway 🖉 Class II highway
Lane width tt	Terrain	Level 🛛 Rolling
Shoukder width ti	Grade Length Peak-hour fact	mi Up/down tor, PHF 0.95% ne 58
Segment length, L <sub>1</sub> mì	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%
Analysis direction vol., V <sub>d</sub> 185veh/h	% Recreationa Access points	/ mi 5
Opposing direction vol., V <sub>o</sub> 325veh/h		·
Average Travel Speed		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	2.5	1.9
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1
Heavy-venicle adjustment factor, $T_{HV}$ $T_{HV} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.930	0.95/
Grade adjustment factor ', f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.71	0.93
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =v <sub>i</sub> /(PHF <sup>1</sup> f <sub>HV</sub> <sup>1</sup> G)	290 Estimated Fre	J04 e-Elow Speed
	Base free flow speed <sup>3</sup> PEES	60.0 mi/b
Field Measured speed <sup>3</sup> , S <sub>FM</sub> mi/h	A di fan lana width and abauldarwi	
Observed volume <sup>3</sup> , V <sub>f</sub> veh/h	Adj. for lane width and shoulder wi	$d(n, T_{LS}) = 0.0 \text{ min}$
Free-flow speed, FFS, FFS=S <sub>EM</sub> +0.00776(V/ f <sub>LV</sub> ) 58.8 mi/h	Adj. for access points <sup>2</sup> , f <sub>A</sub> (Exhibit	20-5) 1.3 mi/n
Adjustment for no-passing zones, f <sub>np</sub> (Exhibit 20-19) 2.5 mi/h	Free-flow speed, FFS <sub>d</sub> (FSS=BFF Average travel speed, ATS ATS=F	·S-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h ·FS-0.00776v_f 51.0 mi/h
Percent Time-Spent-Following	Average liaver speed, Are Are-	re-d.dd/rovp np
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-10 or 20-16)	1.8	1.5
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.962	0.976
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)	0.77	0.94
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	263	373
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	57.2	
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)	15.9	
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np	73.1	
Level of Service and Other Performance Measures Level of service, LOS (Exhibit 20-3 or 20-4)	T	D
Volume to capacity ratio v/c v/c=V <sub>p</sub> / 1,700	0.17	
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	292	
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	1110	
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS	5.7	
Notes		
1. If the highway is extended segment (level) or rolling terrain, $f_G=1.0$ 2. If $v_i(v_i)$	$_1$ or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysis-the LOS is F.
3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b.	pecific downgrade.	

Copyright © 2000 University of Florida, All Rights Reserved

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET				
General Information		Site Information	Site Information	
Agency or Company	URS	From/To	CR 222/223 TO GEM VILLAGE	
Date Performed	3/19/2005			
Input Data		Analysis fear	EXISTING	
	Shoulder widthtt		-	
	Lane widtht	Class I hi	ghway 🛛 Class II highway	
<b></b>	Lane width 1	Terrain	Level Rolling	
	Shoulder width tt	Grade Length	mi Up/down tor.PHF 0.95%	
		No-passing zo	ne 58	
Segment length	k L <sub>4</sub>	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%	
		% Recreational vehicles, P <sub>R</sub> 0%		
Analysis direction vol., V <sub>d</sub> 415ve	eh/h	Access points/ mi 5		
Opposing direction vol., V <sub>o</sub> 310ve	eh/h			
Average Travel Speed				
·····		Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E	(Exhibit 20-9 or 20-15)	1.9	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)		1.1	1.1	
Heavy-vehicle adjustment factor, $f_{HV} = f_{HV} = 1/(1 + P_T(E_T-1) + P_R(E_R-1))$		0.957	0.957	
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)		0.93	0.93	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )		491 367		
Free-Flow Speed fro	om Field Measurement	Estimated Fre	e-Flow Speed	
Field Measured speed <sup>3</sup> , S <sub>EM</sub>	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h	
$\frac{1}{2} \frac{1}{2} \frac{1}$		Adj. for lane width and shoulder width, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h		
Free-flow speed FES, FES=S, +0.00	776(\//f.) 58.8 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 1.3 mi/h		
Adjustment for an appendix reason $f$		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h		
Adjustment for no-passing zones, inp	(EXHIBIT 20-19) 2.0 HIVH	Average travel speed, ATS ATS=F	FS-0.00776v <sub>o</sub> -f <sub>np</sub> 49.5 mi/h	
Percent Time-Spent-Following				
		Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E	T(Exhibit 20-10 or 20-16)	1.5	1.5	
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> f	<sub>-IV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.976	
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)		0.94	0.94	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	476	356	
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>avd<sup>b</sup></sup> )		69.0		
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		16.7		
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np		8	5.7	
Level of Service and Other Performa- level of service 1 OS (Exhibit 20-3 or 2)	nce Measures		F	
Volume to capacity ratio v/c $v/c=V_n/1,700$		0.29		
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		655		
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>		2490		
Peak 15-min total travel time, $TT_{15}$ (veh-h) $TT_{15}$ = VMT <sub>15</sub> /ATS		13.2		
Notes	······································	•		
1.If the highway is extended segment (le	evel) or rolling terrain, $f_G = 1.0$ 2. If $v_i (v_d)$	or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysisthe LOS is F.	
3 For the analysis direction only 1 Fi	whihit 20-21 provides factors a and h			

Copyright © 2000 University of Florida, All Rights Reserved

	DIRECTIONAL TWO-LANE HIGHWA	Y SEGMENT WORKSHEET		
General Information		Site Information		
Analyst Agency or Company	URS	Highway / Direction of Travel	WB US 160 CR 222/223 TO GEM VILLAGE	
Date Performed	3/19/2005	Jurisdiction		
Analysis Time Period		Analysis Year	ZXISTING	
	<u> </u>		· · · · · · · · · · · · · · · · · · ·	
	Shoulder widthtt			
	Lane widtht	Class I hi	ghway 🕅 Class II highway	
<b>-</b> -	Lane width tt	Terrain	Level 🔽 Rolling	
	Shoulder width tt	Grade Length Peak-hour fac	mi Up/down tor, PHF 0.95%	
Segment length, L <sub>1</sub> mi		Show North Arrow % Trucks and	Buses , P <sub>T</sub> 5 %	
Analysis direction vol., V <sub>d</sub> 325veh/h		% Recreationa Access points	al vehicles, P <sub>R</sub> 0% / mi 5	
Opposing direction vol., V <sub>o</sub> 185ve	eh/h			
Average Travel Speed				
		Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E	<sub>T</sub> (Exhibit 20-9 or 20-15)	1.9	2.5	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)		1.1	1.1	
Heavy-vehicle adjustment factor, $f_{HV} = f_{HV} = 1/(1 + P_T(E_T-1) + P_R(E_R-1))$		0.957	0.930	
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)		0.93	0.71	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	384	295	
Free-Flow Speed fro	om Field Measurement	Estimated Fre	e-Flow Speed	
Field Measured speed <sup>3</sup> S	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h	
Observed volume $^3$ V.	veh/h	Adj. for lane width and shoulder wi	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h	
Erection around EES EES-S ±0.00	776/\//f \ 58.8 mi/b	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 1.3 mi/h		
riee-now speed, rrsd rrs=s <sub>FM</sub> +0.00		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h		
Adjustment for no-passing zones, f <sub>np</sub>	(Exhibit 20-19) 3.0 mi/n	Average travel speed, ATS ATS=F	Average travel speed, ATS ATS=FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 50.5 mi/h	
Percent Time-Spent-Following				
<u></u>	<u> </u>	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E	<sub>T</sub> (Exhibit 20-10 or 20-16)	1.5	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> f	<sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.962	
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)		0.94	0.77	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	373	263	
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		62.7		
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		20.7		
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np	8	J3.3	
Level of Service and Other Performa	nce Measures		E	
Level or service, LUS (Exhibit 20-3 of 20-4)		0.23		
Peak 15-min veh-miles of travel VMT <sub>x</sub> (veh- mi)VMT <sub>x</sub> = 0.25L (V/PHF)		513		
Peak-hour vehicle-miles of travel. VMT <sub>25</sub> (veh-mi) VMT <sub>25</sub> =V*L.		1950		
Peak 15-min total travel time, $TT_{15}$ (veh-h) $TT_{45}$ = VMT <sub>45</sub> /ATS		10.2		
Notes	<u>כו נו</u>			
1.If the highway is extended segment ()	evel) or rolling terrain, f <sub>c</sub> =1.0 2. If v.(v	or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	Ilysisthe LOS is F.	
3. For the analysis direction only. 4. Ex	whibit 20-21 provides factors a and b.	u v · · · · · · · · · · · · · · · · · ·	-	

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

ł

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst DEA Agency or Company URS		Highway / Direction of Travel	WB US 160 CR 222/223 TO GEM VILLAGE
Date Performed 3/19/2005		Jurisdiction	
Analysis Time Period PM PEAK		Analysis Year	EXISTING
1 Shoulder width	tt		
Lane width	<u>tı</u>	Class I hi	ghway   🕅 Class II highway
Lane width	tt	Terrain	Level 🛛 Rolling
Shoulder width	<u>t</u>	Grade Length	mi Up/down
		No-passing zone 57	
Segment length, L <sub>1</sub> mi		Shaw North Arrow % Trucks and	Buses, P <sub>T</sub> 5%
	1	% Recreational vehicles, Pp 0%	
Analysis direction vol., V <sub>d</sub> 310veh/h		Access points/ mi 5	
Opposing direction vol., V 415veh/h			
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)		1.9	1.9
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)		1.1	1.1
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))		0.957	0.957
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)		0.93	0.93
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	·	367 491	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field Measured speed <sup>3</sup> . Sc.	ni/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h
Observed volume <sup>3</sup> . V.	eh/h	Adj. for lane width and shoulder wi	dth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h
Free-flow speed FFS FFS=S+0.00776( $1/f$ ) 58	8 mi/b	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.3 mi/h
Adjustment for an appendix space $f$ (Exhibit 20.40)	0 mi/h	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h	
Aujustment for ho-passing zones, r <sub>np</sub> (Exhibit 20-19) 2.0	0 110/11	Average travel speed, ATS ATS=FFS-0.00776vp-fnp 50.1 mi/h	
Percent Time-Spent-Following		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-10 or 20-16)		1.5	1.5
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)		1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = f_{HV} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$	)	0.976	0.976
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)		0.94	0.94
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )		356	476
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		65.2	
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		12.6	
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np		77.8	
Level of Service and Other Performance Measures			
Volume to capacity ratio v/c $v/c=V_n/1,700$		0.22	
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		489	
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>		1860	
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> ≈ VMT <sub>15</sub> /ATS		9.8	
Notes			
1. If the highway is extended segment (level) or rolling terrain, $f_G = 1.0$	2. lf v <sub>i</sub> (v <sub>d</sub>	or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysisthe LOS is F.

For the analysis direction only.
 Exhibit 20-21 provides factors a and b.
 Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS2000<sup>™</sup>

Copyright © 2000 University of Florida, All Rights Reserved
DIRECTIONAL TWO-LANE HIGHWA	Y SEGMENT WORKSHEET					
General Information	Site Information					
Agency or Company URS	From/To	GEM VILLAGE TO BAYFIELD				
Date Performed 3/19/2005	Jurisdiction	EVISTING				
Input Data						
Shoulder width 1		Person				
Lane width t	Class I hi	ghway 🖾 Class II highway				
Lane width 11	Terrain	Level 🕅 Rolling				
<b>J</b> Shoulder width <u>t</u>	Grade Length	mi Up/down tor. PHF 0.95%				
segment length, L	No-passing zo % Trucks and	ne 72 Buses . P+ 5%				
	Snow Norin Arrow % Recreation:	l vehicles P. 0%				
Analysis direction vol., V, 285veh/h	Access points	/mi 4				
Opposing direction vol. V 270veh/h						
Average Travel Speed						
	Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.9	1.9				
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1				
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.957	0.957				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.93	0.93				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	337	319				
Free-Flow Speed from Field Measurement	Estimated Fre	e-Flow Speed				
Field Measured speed <sup>3</sup> , S <sub>ra</sub> , mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h				
Observed volume <sup>3</sup> V. veh/h	Adj. for lane width and shoulder wi	dth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h				
Free flow speed EES EES-S $\pm 0.00776(1/f)$ 59.0 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 1.0					
$A_{\text{instants}} = A_{\text{dist}} = A_{\text{dist}$	Free-flow speed, FFS <sub>d</sub> (FSS=BFF	S-f <sub>LS</sub> -f <sub>A</sub> ) 59.0 mi/h				
Adjustment for no-passing zones, T <sub>np</sub> (Exhibit 20-19) 3.1 mini	Average travel speed, ATS ATS=F	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 50.8 mi/h				
Percent Time-Spent-Following	Analysis Direction (d)	Opposing Direction (a)				
Dessenance or or ivelants for trucks E. (Evhibit 20.40 or 20.46)	Analysis Direction (d)	Opposing Direction (0)				
Passenger-car equivalents for RVs. E. (Exhibit 20-10 or 20-16)	1.0	1.0				
Heavy-vehicle adjustment factor $f = f = 1/(1+P(F_{-1})+P(F_{-1}))$	0.976	0.976				
Grade adjustment factor <sup>1</sup> f <sub>-</sub> (Exhibit 20-8 or 20-14)	0.94	0.94				
Directional flow rate <sup>2</sup> , $y_{(pc/h)} = y_{(pc/h)} = y_{(pc/h)} = y_{(pc/h)}$	327	310				
Base percent time-spent-following <sup>4</sup> BPTSE(%) BPTSE=100(1-e <sup>av</sup> d <sup>b</sup> )	6	2.3				
Adj. for no-passing zone, $f_{nn}(%)$ (Exhibit. 20-20)	2	0.2				
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f on	8	2.5				
Level of Service and Other Performance Measures		· · · · · · · · · · · · · · · · · · ·				
Level of service, LOS (Exhibit 20-3 or 20-4)	-	E				
Volume to capacity ratio v/c v/c=Vp/ 1,700	0	.20				
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	1	50				
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>		570				
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		3.0				
Notes						
1. If the highway is extended segment (level) or rolling terrain, $f_G=1.0$ 2. If $v_i(v_i)$ 3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b.	d or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysisthe LOS is F.				

5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

## Page 1 of 1

	DIRECTIONAL TWO-LANE HIGHW	AY SEGMENT WORKSHEET	
General Information		Site Information	
Analyst	DEA	Highway / Direction of Travel	EB US 160
Agency or Company	URS 2/10/2005	From/10	GEM VILLAGE TO BAYFIELD
Analysis Time Period	5/19/2005 PM PEAK	Analysis Year	EXISTING
Input Data		, thuy old i out	
			,
	Shoulder widtht		
	Lane width tt	Class I I	nighway 🔲 Class II highway
	l one width th	Tamia	
		Peak-hour fa	ctor PHF 0.95%
		No-passing z	one 72
Segment le	ngth, L	% Trucks and	Buses, P <sub>T</sub> 5%
	•	Show North Arrow	volumbialas D 00/
		% Recreation	ial venicles, P <sub>R</sub> 0%
Analysis direction vol., V <sub>d</sub> 3	335veh/h	Access point	s/mi 4
Opposing direction vol., V <sub>o</sub> 3	325veh/h		
Average Travel Speed	· · · · · · · · · · · · · · · · · · ·		
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for truck	s, Ε <sub>τ</sub> (Exhibit 20-9 or 20-15)	1.9	1.9
Passenger-car equivalents for RVs	, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1
Heavy-vehicle adjustment factor, f		0.957	0.957
Grade adjustment factor <sup>1</sup> , f <sub>C</sub> (Exh	ibit 20-7 or 20-13)	0.93	0.93
Directional flow rate <sup>2</sup> , v.(pc/h) v.=V.	/(PHF*f <sub>uv</sub> ,* f <sub>o</sub> )	396	384
Free-Flow Spee	ed from Field Measurement	Estimated Fr	ee-Flow Speed
		Base free flow speed <sup>3</sup> BEES	60.0 mi/h
Field Measured speed <sup>3</sup> , S <sub>EM</sub>	mi/h	base free-flow speed , BFF 3FM	
Observed volume <sup>3</sup> V.	veb/h	Adj. for lane width and shoulder v	vidth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h
		Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibi	t 20-5) 1.0 mi/h
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> +	$0.00776(V_f t_{HV})$ 59.0 mi/n	Free-flow speed EFS. (ESS=BE	FS-f.,-f.) 59.0 mi/h
Adjustment for no-passing zones, f	<sub>np</sub> (Exhibit 20-19) 2.7 mi/h	Average travel speed, ATS ATS=	FFS-0.00776v -f 50.2 mi/h
Percent Time-Spent-Following			рпр
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for truck	(s, E <sub>+</sub> (Exhibit 20-10 or 20-16)	1.5	1.5
Passenger-car equivalents for RVs	, E <sub>P</sub> (Exhibit 20-10 or 20-16)	1.0	1.0
Heavy-vehicle adjustment factor, f.	$f_{\rm m} = 1/(1 + P_{\rm r}(E_{\rm r}-1) + P_{\rm r}(E_{\rm r}-1))$	0.976	0.976
Grade adjustment factor <sup>1</sup> f. (Exhit	$\frac{1}{10^{-1}} \frac{1}{10^{-1}} $	0.94	0.94
Directional flow rate <sup>2</sup> $v(nc/b) v = V$	//PHE*f * f )	385	373
Directional now rate , $v_i(poin)v_i = v_i$			64.3
Adi for no possing zono f (%) (E	$, BP1SF(\%) BP1SF=100(1-e^{-1}a)$		17.1
Adj. for ho-passing zone, i <sub>np</sub> (%) (E		· · · · · · · · · · · · · · · · · · ·	91.2
Percent time-spent-tollowing, PTS	np	l	01.J
Level of Service and Other Period Level of service, LOS (Exhibit 20-3	or 20-4)		E
Volume to capacity ratio v/c v/c=1	V <sub>p</sub> / 1,700		0.23
Peak 15-min veh-miles of travel,VM	/T <sub>15</sub> (veh- mi)VMT <sub>15</sub> ≃ 0.25L <sub>t</sub> (V/PHF)		176
Peak-hour vehicle-miles of travel, \	/MT <sub>e0</sub> (veh- mi) VMT <sub>e0</sub> =V*L,		670
Peak 15-min total travel time. TT	(veh-h) TT <sub>15</sub> = VMT <sub>16</sub> /ATS	· · · · · · · · · · · · · · · · · · ·	3.5
Notes	10 15		
		(	
1.11 the highway is extended segme	ent (level) or rolling terrain, t <sub>G</sub> =1.0 2. If v	$(v_d \cup v_o) \ge 1,7 \cup 0$ pc/n, terminate an	aiysis-(iie LUS is r.
<ol> <li>For the analysis direction only.</li> <li>Use alternative Equation 20-14 i</li> </ol>	<ol> <li>Exhibit 20-21 provides factors a and b.</li> <li>f some trucks operate at crawl speeds on a</li> </ol>	specific downgrade.	

5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

## Page 1 of 1

<u> </u>	DIRECTIONAL TWO-LAN	E HIGHWAY	SEGMENT WORKSHEET	<u></u>					
General Information	· · · · · · · · · · · · · · · · · · ·		Site Information						
Analyst	DEA		Highway / Direction of Travel	WB US 160					
Agency or Company Date Performed	UKS 3/19/2005	From/10 Jurisdiction	GEM VILLAGE TO BAYFIELD						
Analysis Time Period	AM PEAK	Analysis Year	EXISTING						
Input Data			r						
	Shoulder width								
	Lane width		Class I highway						
	Lane width	tt I	Tormin						
	Shoulder width		Grade Leng	ith mi Up/down					
]		==-24	Peak-hour f	actor, PHF 0.95%					
Segment length	. Ц mi	Shaw North Arrow % Trucks a	nd Buses , P <sub>T</sub> 5%						
Analysis direction vol., V . 270ve	₽b/h	% Recreation Access poir	onal vehicles, P <sub>R</sub> 0% hts/mi 4						
	>b/b		· ·						
Opposing direction vol., v <sub>o</sub> 205ve		,,							
Average Travel Speed			Analysis Direction (d)	Opposing Direction (o)					
Passenger-car equivalents for trucks E.	(Exhibit 20-9 or 20-15)		19	1.9					
Passenger-car equivalents for RVs. F-	(Exhibit 20-9 or 20-17)		1.1	1.1					
Heavy-vehicle adjustment factor $f_{\rm exp}$		))	0.957	0.957					
Grade adjustment factor <sup>1</sup> , fo (Exhibit 2	0-7 or 20-13)	,,	0.93	0.93					
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHI		<u> </u>	319	337					
Free-Flow Speed fro	m Field Measurement		Estimated I	Free-Flow Speed					
	· · · · · · · · · · · · · · · · · · ·		Base free-flow speed <sup>3</sup> , BFFS <sub>EA</sub>	60.0 mi/h					
Field Measured speed <sup>3</sup> , S <sub>FM</sub>		mi/h	Adi, for lane width and shoulder	width. <sup>3</sup> f. (Exh 20-5) 0.0 mi/h					
Observed volume <sup>3</sup> , V <sub>f</sub>		veh/h	Adj. for access points <sup>3</sup> , $f_{A}$ (Exhibit 20-5) 1.0 mi/t						
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> +0.00	776(V,/ f <sub>HV</sub> )	59.0 mi/h	Adj. for access points <sup>2</sup> , $T_A$ (Exhibit 20-5) 1.0 III						
Adjustment for no-passing zones, f <sub>np</sub>	(Exhibit 20-19)	2.9 mi/h	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 59.0 r Average travel speed ATS $\Delta$ TS=EFS-0.00776y ef 51.0 u						
Percent Time-Spent-Following	<u></u>			p np					
			Analysis Direction (d)	Opposing Direction (o)					
Passenger-car equivalents for trucks, E-	<sub>(</sub> Exhibit 20-10 or 20-16)		1.5	1.5					
Passenger-car equivalents for RVs, $E_{R}$	(Exhibit 20-10 or 20-16)		1.0	1.0					
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>H</sub>		1))	0.976	0.976					
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20	-8 or 20-14)		0.94	0.94					
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )		310	327					
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e	e <sup>av</sup> d <sup>b</sup> )		61.3					
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit	i. 20-20)			18.8					
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f			80.1					
Level of Service and Other Performation	nce Measures		· · · · · · · · · · · · · · · · · · ·						
Level of service, LOS (Exhibit 20-3 or 20	<u>)-4)</u>			<u> </u>					
Volume to capacity ratio v/c v/c=V <sub>p</sub> / 1	,700		0.19						
Peak 15-min veh-miles of travel, VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> ≈ 0.25L <sub>t</sub> (V/F	PHF)	142						
Peak-hour vehicle-miles of travel, VMT <sub>6</sub>	<sub>0</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>		540						
Peak 15-min total travel time, TT <sub>15</sub> (veh-	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS			2.8					
			· · · · · · · · ·						
1. If the highway is extended segment (le	evel) or rolling terrain, f <sub>G</sub> =1.0	ບ 2.lfv <sub>i</sub> (v <sub>o</sub>	<sub>i</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate a	analysisthe LOS is F.					
<ol> <li>For the analysis direction only. 4. Ex</li> <li>Use alternative Equation 20-14 if son</li> </ol>	thibit 20-21 provides factors the trucks operate at crawl sp	a and D. beeds on a sp	pecific downgrade.						

Copyright © 2000 University of Florida, All Rights Reserved

	DIRECTIONAL TWO-LANE HIGHWA	Y SEGMENT WORKSHEET					
General Information		Site Information					
Analyst	DEA	Highway / Direction of Travel					
Date Performed	3/19/2005	Jurisdiction	SEM VILLAGE TO BATTILED				
Analysis Time Period	PM PEAK	Analysis Year	EXISTING				
Input Data							
	Shoulder width tt						
	Lane widthtt	Class I hi	ighway 🔲 Class II highway				
	Lane width tt	Terrain	level 🗹 Rolling				
	Shoulder width tt	Grade Length	mi Up/down				
		Peak-hour fac	tor, PHF 0.95%				
Segment length	ь Цт	% Trucks and	Buses P_ 5%				
	1	Show North Arrow % Process and	Justislas D 0%				
Analysis direction vol. V 325ve	ah/h	% Recreationa Access points	arvenicies, P <sub>R</sub> 0% /mi 4				
	51//11		· · · · · · · · · · · · · · · · · · ·				
Opposing direction vol., V <sub>o</sub> 335ve	ən/n						
Average Travel Speed		Applyoic Direction (d)	Opposing Direction (c)				
Dessenant ser en úvelente for trucke. E	(Exhibit 20.0 or 20.15)						
Passenger-car equivalents for trucks, E-	T (Exhibit 20-9 of 20-15)	1.9	1.9				
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-9 or 20-17)	1.1	1.1				
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>H</sub>	V <sup>=1/(1+P<sub>T</sub>(E<sub>T</sub>-1)+P<sub>R</sub>(E<sub>R</sub>-1))</sup>	0.957	0.957				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	0-7 or 20-13)	0.93	0.93				
Directional flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PH)$	F*f <sub>HV</sub> * f <sub>G</sub> )	384	396				
Free-Flow Speed fro	om Field Measurement	Estimated Fre	e-Flow Speed				
Field Measured speed <sup>3</sup> S	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h				
Observed volume <sup>3</sup> V	veh/h	Adj. for lane width and shoulder w	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h				
Free flow encode FFC FFC-C 10.00	776()//f ) 50.0 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.0 mi/h				
Free-now speed, FFS <sub>d</sub> FFS-S <sub>FM</sub> +0.00	776(v) 1 <sub>HV</sub> ) 59.0 mini	Free-flow speed, FFS <sub>d</sub> (FSS=BFF	=S-f <sub>LS</sub> -f <sub>A</sub> ) 59.0 mi/h				
Adjustment for no-passing zones, t <sub>np</sub>	(Exhibit 20-19) 2.6 mi/n	Average travel speed, ATS ATS=	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 50.4 mi/h				
Percent Time-Spent-Following	·····						
		Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for trucks, E	T(Exhibit 20-10 or 20-16)	1.5	1.5				
Passenger-car equivalents for RVs, $E_R$	(Exhibit 20-10 or 20-16)	1.0	1.0				
Heavy-vehicle adjustment factor, f <sub>HV</sub> f	<sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.976				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20	)-8 or 20-14)	0.94	0.94				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	373	385				
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	6	33.1				
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibi	t. 20-20)	1	6.0				
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np	7	/9.1				
Level of Service and Other Performan	nce Measures	··· · · · · · · · · · · · · · · · · ·	D				
Volume to capacity ratio v/c $v/c=V_{p}/1$	,700	0.23					
Peak 15-min veh-miles of travel,VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> ≃ 0.25L <sub>+</sub> (V/PHF)	·	171				
Peak-hour vehicle-miles of travel, VMT <sub>c</sub>	vo(veh-mi) VMT <sub>eo</sub> ≖V*L,		650				
Peak 15-min total travel time, TT <sub>45</sub> (veh-	-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS	3.4					
Notes	י פו פו						
1. If the highway is extended segment (le	evel) or rolling terrain f_=10 2 lfv/	(, or y ) >=1.700 pc/b terminate and	lvsisthe LOS is F				
3. For the analysis direction only. 4. Ex	khibit 20-21 provides factors a and b.	a	······································				

5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

Attachment B Existing Intersection Analyses

#### HCS2000: Signalized Intersections Release 4.1d

Inter.: US 160 / US 550 Analyst: DEA Agency: URS Area Type: All other areas Date: 3/18/2005 Jurisd: Period: AM PEAK HOUR Year : EXISTING 2001 Project ID: US 160 E/W St: US 160 N/S St: US 550 SIGNALIZED INTERSECTION SUMMARY Eastbound | Westbound | Northbound Southbound | L R | L Т т T R | L Т R L R 2 1 0 1 1 0 0 1 0 0 0 No. Lanes 1 1 0 LGConfig Т R | L | L R Volume 410 130 120 1480 30 Lane Width 12.0 12.0 |12.0 112.0 12.0 1 RTOR Vol 0 1 0 L 1 ł Duration 0.25 Area Type: All other areas Signal Operations 5 Phase Combination 1 2 3 4 1 6 7 8 EB Left Left Α | NB Thru Α Thru 1 Right А Right A Peds Peds 1 WB Left А SB Left Thru Thru 1 Right Right 1 Peds Peds 1 NB Right | EB Right A Α SB Right WB Right 12.0 28.0 Green 35.0 Yellow 4.0 4.0 4.0 All Red 1.0 1.0 1.0 Cycle Length: 90.0 secs Intersection Performance Summary Lane Group Appr/ Lane Adj Sat Approach Ratios Lane Group Flow Rate Grp Capacity q/C Delay LOS Delay LOS (s) v/c Eastbound Т 3438 0.40 0.31 24.7 С 19.5 1070 В R 1162 1538 0.12 0.76 3.0 А Westbound 0.09 34.4 L 229 1719 0.13 С 34.4 С Northbound L 1719 0.75 0.39 28.7 669 С 27.5 С R 889 1538 0.04 0.58 8.2 А Southbound

Intersection Delay = 23.6 (sec/veh) Intersection LOS = C

#### HCS2000: Signalized Intersections Release 4.1d

Analyst: DEA Inter.: US 160 / US 550 Area Type: All other areas Agency: URS Date: 3/18/2005 Jurisd: Period: PM PEAK HOUR Year : EXISTING 2001 Project ID: US 160 E/W St: US 160 N/S St: US 550 SIGNALIZED INTERSECTION SUMMARY | Westbound | Northbound Southbound Eastbound L Т L Т R Т Т L R R | L R 2 1 Ō No. Lanes 0 1 1 0 0 1 0 1 0 0 LGConfig Т R L LL R T Volume 1175 515 250 25 115 Lane Width 12.0 12.0 |12.0 |12.0 12.0 | RTOR Vol 0 0 1 1 1 Duration 0.25 Area Type: All other areas Signal Operations\_ Phase Combination 1 2 5 6 7 8 3 4 EB Left Left | NB А Thru А Thru Right Right A Α 1 Peds Peds WB Left А SB Left 1 Thru Thru Right Right Peds Peds NB Right Right A Α 1 EΒ SB Right | WB Right Green 12.0 35.0 26.0 Yellow 4.0 4.0 4.0 1.0 1.0 All Red 1.0 Cycle Length: 88.0 secs Intersection Performance Summary Appr/ Lane Adj Sat Ratios Lane Group Approach Lane Group Flow Rate q/C Delay LOS Delay LOS Grp Capacity (s) v/c Eastbound Т 1367 3438 0.90 0.40 33.8 С 24.9 С 1154 1538 0.47 0.75 4.5 R А Westbound 234 1719 0.07 0.14 33.3 L С 33.3 C Northbound 508 1719 0.52 0.30 26.7 С L 25.4 С R 752 1538 0.03 0.49 11.7 В Southbound

Intersection Delay = 25.0 (sec/veh) Intersection LOS = C

Analyst: DEA Agency: URS Date: 3/18/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234
Area Type: All other areas
Jurisd:
Year : EXISTING 2001

N/S St: SH 172/CR 234

	Eas	stbour	nd	Wes	stbour	nd	Northbound				Southbound			
	L	Т	R	L	Т	R	L	Т	R	I	ച	Т	R	-
	1			_ I			I			1				_
No. Lanes	1	1	1	1	1	1	0	1	1	1	0	1	1	1
LGConfig	L	т	R	L	Т	R	1	LT	R	1		LT	R	- 1
Volume	125	210	165	30	530	10	340	20	20	5		25	90	j
Lane Width	112.0	12.0	12.0	112.0	12.0	12.0	1	12.0	12.0	1 -		12.0	12.0	I
RTOR Vol	1		0	ļ		0	1		0	1			0	

Dur	ation	0.25		Area	Type:	All	ot	her	areas		u <u></u>			
					Si	gnal	Op	Operations						
Pha	se Combin	nation	1	2	3	-	4			5	6	7	8	
EΒ	Left		А				1	NB	Left	А				
	Thru			А			1		Thru	А				
	Right			А			1		Right	А				
	Peds						1		Peds					
WB	Left		А				1	SB	Left	А				
	Thru			А			ł		Thru	А				
	Right			А			ļ		Right	A				
	Peds						1		Peds					
NB	Right		А				1	EΒ	Right					
SB	Right		А				1	WB	Right					
Gre	en	1	.0.0	48.0	)				-	47.0				
Yel	low	4	1.0	4.0						4.0				
All	Red	1	.0	1.0						1.0				

Cycle Length: 120.0 secs

		Intersec	tion Pe	erformance	ce Summa	iry					
Appr/ Lane Adj Sat R				.05	Lane G	Group	Appr	oach			
Lane	Group	Flow Rate			·						
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS			
Eastbou	und		· · · · · · · · · · · · · · · · · · ·								
L	148	1770	0.18	0.08	51.7	D					
Т	724	1810	0.31	0.40	24.8	С	26.4	С			
R	633	1583	0.27	0.40	24.5	С					
Westbou	und										
L	148	1770	0.22	0.08	52.1	D					
Т	724	1810	0.77	0.40	36.3	D	36.9	D			
R	633	1583	0.02	0.40	21.8	С					
Northbo	ound										
$\mathbf{LT}$	522	1332	0.73	0.39	36.1	D	34.9	С			
R	818	1583	0.03	0.52	14.2	В					
Southbo	ound										
LT	693	1769	0.04	0.39	22.6	С	16.9	в			
R	818	1583	0.12	0.52	15.0	В					
	Intersec	tion Delay	= 31.9	(sec/ve	eh) Ir	nterse	ction	LOS =	С		

Analyst: DEA Agency: URS Date: 3/18/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234
Area Type: All other areas
Jurisd:
Year : EXISTING 2001

N/S St: SH 172/CR 234

	Eas	stboui	nd	Wes	stbour	nd	No:	ind	So	Southbound			
	L	Т	R	L	$\mathbf{T}$	R	ΗL	т	R	L	т	R	1
				<u> </u>			<u> </u>			_ I			
No. Lanes	1	1	1	1	1	1	0	1	1	0	1	1	1
LGConfig	L	Т	R	L	Т	R	[	LT	R	1	$_{ m LT}$	R	1
Volume	115	580	380	40	300	20	280	50	35	40	40	50	
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	1	12.0	12.0	I	12.0	12.0	l
RTOR Vol	l		0	Ì		0	1		0	1		0	1

Dura	ation	0.25		Area	Type:	All	oth	ner	areas					
					Si	gnal	Ope	erat	ions					
Phas	se Combin	nation	1	2	3	-	4			5	6	7	8	<u>,                                     </u>
EB	Left		А				. 1	NB	Left	А				
	Thru			A			1		Thru	А				
	Right			A			1		Right	А				
	Peds								Peds					
WB	Left		A				1	SB	Left	А				
	Thru			А			}		Thru	А				
	Right			А			1		Right	А				
	Peds						ļ		Peds					
NB	Right		А				ł	EΒ	Right					
SB	Right		А				1	WB	Right					
Gree	en		15.0	50.0	)					40.0				
Yell	Low	4	4.0	4.0						4.0				
All	Red	-	1.0	1.0						1.0				

Cycle Length: 120.0 secs

		Intersec	tion Pe	rforman	ce Summa	ary					
Appr/	Lane	 Adj Sat	Rati	os	Lane (	Group	Appr	oach			
Lane	Group	Flow Rate									
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS			
Eastbou	und									. <u></u>	- <del> </del>
L	221	1770	0.55	0.13	52.2	D					
Т	754	1810	0.81	0.42	37.5	D	36.0	D			
R	660	1583	0.61	0.42	28.9	С					
Westbou	und										
L	221	1770	0.19	0.13	47.5	D					
Т	754	1810	0.42	0.42	25.1	С	27.3	C			
R	660	1583	0.03	0.42	20.7	С					
Northbo	ound										
LT	413	1238	0.84	0.33	51.7	D	48.2	D			
R	792	1583	0.05	0.50	15.4	В					
Southbo	ound										
LT	389	1168	0.22	0.33	29.0	С	23.8	С			
R	792	1583	0.07	0.50	15.6	В					
	Intersec	tion Delay	= 35.9	(sec/v	eh) In	nterse	ection	LOS =	D		

TWO-WAY STOP CONTROL SUMMARY										
General Information	on	• • • • • •	Site I	nformati	on	· · ·				
Analyst	DEA		Interse	ection		US 160/C	R 222/22	3		
Agency/Co.	URS		Jurisdi	ction						
Date Performed	3/19/200	5	Analys	sis Year		EXISTING	G 2001			
Analysis Time Period	AM PEAI	κ								
Project Description L	JS 160									
East/West Street: US	160		North/S	South Stre	et: CR 22	22/CR 223				
Intersection Orientation	: East-West		Study	Period (hrs	s): 0.25					
Vehicle Volumes a	and Adjustr	nents					<u> </u>			
Major Street		Eastbound				Westbou	nd			
Movement	1	<u>- 2</u> - <del>-</del> -				5		<u>0</u>		
Volume (veh/h)	20	175	15		L 5	315		5		
Peak-hour factor PHF	0.95	0.95	0.05		0 95	0.95		95		
Hourly Flow Rate	0.00	0.00	0.00		-	0.00	<b>-</b>			
(veh/h)	31	184	15		5	331		5		
Proportion of heavy	2	_			2					
vehicles, P <sub>HV</sub>					2					
Median type				Undivideo	db					
RT Channelized?			0					0		
Lanes	0	1	1		0	1		0		
Configuration	<u>L1</u>	<u>.T</u> 0			LIR					
Upstream Signal	<u></u>	0				0				
Minor Street		Northbound				Southbou	und	10		
Movement	· · · · ·		9		10			12		
Valuma (vah/h)	L	<u>_</u>			<u> </u>			115		
Peak-bour factor, PHF	0.95	0.05	0 05		0.05	0.05	-+-	115		
Hourly Flow Rate	121	5	5		5	5		121		
Proportion of heavy										
vehicles, P <sub>HV</sub>	2	2	2		2	2	l l	2		
Percent grade (%)		0				0				
Flared approach		N		_		N				
Storage		0				0				
RT Channelized?			0			I		0		
Lanes	0	1	0		0	1		0		
Configuration		LTR				LTR				
Control Delay, Queue	Length, Leve	el of Service								
Approach	EB	WB		Northboun	d	S	outhboun	d		
Movement	1	4	7	7 8 9		10	11	12		
Lane Configuration	LT	LTR		LTR			LTR			
Volume, v (vph)	31	5	131				131			
Capacity, c <sub>m</sub> (vph)	1223	1373		316			668			
v/c ratio	0.03	0.00		0.41			0.20			
Queue length (95%)	0.08	0.01		1.96			0.72			
Control Delay (s/veh)	8.0	7.6		24.2			11.7			
, i		F	1		1	1		1		

LOS	A	A	С	В
Approach delay (s/veh)	-		24.2	11.7
Approach LOS			С	В
HCS2000 <sup>TM</sup>	Ce	opyright © 2003 University	of Florida, All Rights Reserved	Version 4.1d

TWO-WAY STOP CONTROL SUMMARY										
General Information	on		Site I	nforma	tion					
Analyst	DEA		Inters	ection		US 160/C	R 222/223	3		
Agency/Co.	URS	"	Jurisd	iction						
Date Performed	3/19/200	5	Analy	sis Year		EXISTIN	G 2001			
Analysis Time Period	PM PEA	<								
Project Description L	JS 160									
East/West Street: US	160	-	North/	South Str	eet: CR 22	22/CR 223				
Intersection Orientation	: East-West		Study	Period (h	rs): 0.25					
Vehicle Volumes a	and Adjustr	nents								
Major Street		Eastbound	<del></del>			Westbou	nd			
Movement	1		3		4	5		6		
Volume (voh/h)	L 105	1 100	K 120		<u> </u>	200		R 5		
Peak hour factor PHE	105	400	130		0.05	300		05		
Hourly Flow Rate	0.95	0.95	0.90	<del>-   -</del>	0.95	0.95	<u> </u>	.90		
(veh/h)	110	421	136		5	315		5		
Proportion of heavy vehicles, P <sub>HV</sub>	2				2					
Median type				Undivide	əd					
RT Channelized?			0					0		
Lanes	0	1	1 0		0	1		0		
Configuration	LT		R		LTR					
Upstream Signal		0				0	-			
Minor Street	1	Northbound				Southbou	und	The second se		
Movement	7	8	9		10	11		12		
	L	Т	R		L	Т		R		
Volume (veh/h)	35	10	10		5	10		60		
Peak-hour factor, PHF	0.95	0.95	0.95		0.95	0.95	C	.95		
Hourly Flow Rate (veh/h)	36	10	10		5	10		63		
Proportion of heavy	2	2	2			2		2		
vehicles, P <sub>HV</sub>	2		2		<u>ک</u>	2		2		
Percent grade (%)		0				0				
Flared approach		N				<u>N</u>				
Storage		0				0				
RT Channelized?			0					0		
Lanes	0	1	0		0	1		0		
Configuration		LTR				LTR				
Control Delay, Queue	Length, Leve	of Service					· · · · · · · · ·			
Approach	EB	WB		Northbou	nd	S	outhbound	ť		
Movement	1	4	7	8	9	10	11	12		
Lane Configuration	LT	LTR		LTR			LTR			
Volume, v (vph)	110	5	56							
Capacity, c <sub>m</sub> (vph)	1240	1014	210			1	460			
v/c ratio	0.09	0.00		0.27	T		0.17			
Queue length (95%)	0.29	0.01	1	1.04	1	1	0.60	1		
Control Delay (s/veh)	8.2	8.6		28.3	1	1	14.4			
······			† ··		+	1	<u> </u>	<u> </u>		

LOS	A	A	D	В
Approach delay (s/veh)			28.3	14.4
Approach LOS			D	В
HCS2000 <sup>TM</sup>	C	opyright © 2003 Univer	sity of Florida, All Rights Reserved	Version 4.1d

HCS2000<sup>TM</sup>

Analyst: DEA Agency: URS Date: 3/18/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160

Inter.: US 160/CR 501 Area Type: All other areas Jurisd: Year : EXISTING 2001

### N/S St: CR 501

#### SIGNALIZED INTERSECTION SUMMARY

	Eas	stbour	nd	Wes	stbour	nd	) No:	rthbou	nd	Sou	thbour	nd
	L	Т	R	L	т	R	ļL	Т	R	L	Т	R
	}			. I <u></u>						<u> </u>		I
No. Lanes	1	1	0	1	1	0	0	1	0	1 0	1	0
LGConfig	L	TR		L	TR			LTR	l	1	LTR	l I
Volume	30	210	45	75	185	35	55	50	110	30	85	30
Lane Width	12.0	12.0		112.0	12.0		l	12.0		1 .	12.0	. 1
RTOR Vol	1		0	1		0	1		0	1	. (	) C

Dura	ation	0.25		Area	Type:	All	ot	her	areas					
					Si	gnal	. Op	erat	ions					
Phas	se Combi	nation	1	2	3	-	4			5	6	7	8	
EΒ	Left		А				1	NB	Left	A				
	Thru			А			1		Thru	А				
	Right			A			i		Right	А				
	Peds						1		Peds					
WB	Left		А				ł	SB	Left	A				
	Thru			А			1		Thru	А				
	Right			А			1		Right	A				
	Peds						1		Peds					
NB	Right						l	EΒ	Right					
SB	Right						1	WB	Right					
Gree	∋n	-	15.0	30.0	)					30.0				
Yell	Low	4	4.0	4.0						4.0				
All	Red	-	1.0	1.0						1.0				

		Cycle	Length:	90.0	secs
Intersection	Performance	Summary			

Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rati	os	Lane G	roup	Appı	roach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	/ LOS	_	
Eastbou	und			<u> </u>			<u> </u>			 
L	295	1770	0.11	0.17	32.0	С				
TR	590	1771	0.45	0.33	24.1	С	25.0	С		
Westbou	und									
L	295	1770	0.27	0.17	33.2	С				
TR	591	1774	0.39	0.33	23.4	С	25.9	С		
Northbo	ound									
LTR	513	1538	0.44	0.33	24.1	С	24.1	С		
Southbo	ound									
LTR	547	1641	0.28	0.33	22.3	С	22.3	С		
	Intersec	tion Delay	= 24.7	(sec/v	eh) In	terse	ction	LOS =	С	

Analyst: DEA Agency: URS Date: 3/18/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501
Area Type: All other areas
Jurisd:
Year : EXISTING 2001

N/S St: CR 501

## \_\_\_\_\_SIGNALIZED INTERSECTION SUMMARY\_\_\_\_\_

	Eas	stbour	nd	Wes	stbour	nd	Nc	orthbo	ound	Sc	outhbo	ound	ļ
	L	Т	R	L	Т	R	L	т	R	L	Т	R	1
							!			_			
No. Lanes	1	1	0	1	1	0	1 0	) 1	0	(	) 1	0	1
LGConfig	L	TR		L	TR		1	LI	'R	1	LI	'R	1
Volume	55	220	60	130	225	40	60	85	140	125	80	40	1
Lane Width	12.0	12.0		112.0	12.0		1	12.0	)		12.0	)	1
RTOR Vol	1		0	1		0	1		0	ł		0	ł

Dura	ation	0.25	,	Area	Type:	All	. ot	her	areas					
					Si	gnal	. Op	erat	cions					
Pha	se Combi	nation	1	2	3	-	4			5	6	7	8	
EB	Left		А				. 1	NB	Left	A				
	Thru			А			1		Thru	А				
	Right			А			1		Right	А				
	Peds						1		Peds					
WΒ	Left		А				1	SB	Left	A				
	Thru			А			1		Thru	А				
	Right			А			1		Right	А				
	Peds						1		Peds					
NB	Right							EΒ	Right					
SB	Right							WΒ	Right					
Gre	en		17.0	30.0	)				-	28.0				
Yel	low		4.0	4.0						4.0				
A11	Red		1.0	1.0						1.0				

Cycle Length: 90.0 secs Intersection Performance Summary Adj Sat Ratios Lane Group Approach

Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rati	os	Lane G	Group	Appı	roach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	/ LOS		
Eastbou	und			······						
L	334	1770	0.17	0.19	30.9	С				
TR	587	1762	0.50	0.33	24.7	С	25.7	С		
Westbou	ınd									
L	334	1770	0.41	0.19	32.9	С				
TR	592	1776	0.47	0.33	24.3	С	27.2	C		
Northbo	ound									
LTR	488	1569	0.61	0.31	28.7	С	28.7	С		
Southbo	ound									
LTR	512	1646	0.30	0.31	23.9	C	23.9	С		
	Intersec	tion Delay:	= 26.7	(sec/ve	eh) Ir	nterse	ction	LOS =	С	

Attachment C Grandview Section Trip Generation Tables

Table 5.1 Trip Generation in 2025 - Sub Area I

											Peak Hour		
Notes	ITE Code 210	ITE Code 230	ITE Code 221	ITE Code 813	ITE Code 814	ITE Code 110	ITE Code 710 plus ITE Code 230	ITE Code 610	ITE Codes 520+522+530/3	ITE Code 417	ITE Code 411 for Daily, ITE Code 412 for		
PM Peak Hour Trips Out	271	103	<b>3</b> 5	647	246	173	663	270	109	52	0	2,931	2,345
PM Peak Hour Trips In	461	509	174	622	193	24	426	133	109	19	0	2,370	1,896
PM Peak Hour Trips Generated	732	311	268	1,269	439	197	1,419	404	217	4	0	5,301	4,241
AM Peak Hour Trips Out	408	219	168	596	37	ส	393	135	210	#	0	1,899	1,519
AM Peak Hour Trips In	136	45	45	308	78	163	1.012	275	314	15	o	2,390	1,912
AM Peak Hour Trips Generated	544	264	213	604	115	185	1,405	410	524	26	0	4,288	3,430
Daily Trips Generated	6,938	3,510	3,045	16,141	7,180	1,401	11,910	6,009	1,784	111	9	58,701	46,961
PM Peak Hour Trips per Unit	1.01	0.52	0.58	3.87	2.71	0.98	2.01	1.18	1.67	0.26	0.06		
AM Peak Hour Trips per Unit	0.75	0.44	0.46	1.84	0.71	0.92	1.99	1.20	4.03	0.15	0.01		
No. of Trips per Unit	9.57	5.86	6.59	49.21	44.32	6:97	16.87	17.57	13.72	4.57	1.59		
Quantity	725	200	462	328	162	201	706	345	130	170	4		
Unit	Dwelling Unit	Dwelling Unit	Dwelling Unit	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	Acres	Acres		
Land Use	Single Family Detached Housing	Singl e Family Attached Housing	Multi-Family Housing	Regional Commercial	Specialty Commercial	Mixed Comm/Light Industrial Space	Mixed-Use Space	Institutional/Hospital area	Institutional/School area	Reginal Parks/Recreation Area	Neighborhood Parks	Total	Total with 20% diversion

Table 5.2 Trip Generation in 2025 - Sub Area II

											eak Hour		
Notes	ITE Code 210	ITE Code 230	ITE Code 221	ITE Code 813	ITE Code 814	ITE Code 110	ITE Code 710 plus ITE Code 230	ITE Code 610	ITE Codes 520+522+530/3	TTE Code 417	ITE Code 411 for Daily, ITE Code 412 for P		
PM Peak Hour Trips Out	3	o	55	o	322	348	0	Ð	o	0	0	758	758
PM Peak Hour Trips In	59	0	101	0	253	47	0	0	0	0	0	460	460
PM Peak Hour Trips Generated	63	0	156	0	575	395	0	o	0	0	0	1,218	1,218
AM Peak Hour Trips Out	52	o	86	0	48	4	o	0	0	0	0	242	242
AM Peak Hour Trips In	17	0	56	o	102	326	o	0	0	0	0	472	472
AM Peak Hour Trips Generated	69	0	124	0	151	371	0	0	0	0	0	714	714
Daily Trips Generated	880	o	1,773	o	9,396	2,809	0	0	Ð	0	0	14,858	14,858
PM Peak Hour Trips per Unit	1.01	0.52	0.58	3.87	2.71	0.98	2.01	1.18	1.67	0.26	0.06		
AM Peak Hour Trips per Unit	0.75	0.44	0.46	1.84	0.71	0.92	1.99	1.20	4.03	0.15	0.01		
No. of Trips per Unit	9.57	5.86	6.59	49.21	44.32	6.97	16.87	17.57	13.72	4.57	1.59		
Quantity	32	G	269		212	403							
Umit	Dwelling Unit	Dwelling Unit	Dwelling Unit	1000 sf Gross Floor Årea	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Årea	1000 sf Gross Floor Area	1000 sf Gross Floor Area	Acres	Acres		
Land Use	Single Family Detached Housing	Singl e Family Attached Housing	Multi-Family Housing	Regional Commercial	Specialty Commercial	Mixed Comm/Light Industrial Space	Mixed-Use Space	Institutional/Hospital area	Institutional/School area	Reginal Parks/Recreation Area	Neighborhood Parks	Total	Total with 0% diversion

Table 5.3 Trip Generation in 2025 - Subarea III

												ak Hour		2
	Notes	ITE Code 210	ITE Code 230	ITE Code 221	ITE Code 813	ITE Code 814	ITE Code 110	ITE Code 710 plus ITE Code 230	ITE Code 610	ITE Codes 520+522+530/3	ITE Code 417	ITE Code 411 for Daily, ITE Code 412 for Pe		
	PM Peak Hour Trips Out	95	80	47	o	266	o	202	o	0	0	0	883	706
	PM Peak Hour Trips In	95	16	87	o	209	0	217	0	0	0	o	624	499
	PM Peak Hour Trips Generated	152	23	134	0	474	0	724	o	o	٥	0	1,507	1,205
	AM Peak Hour Trips Out	28	16	8	0	40	o	501	o	0	0	٥	425	340
,	AM Peak Hour Trips In	28	ę	ន	0	8	o	516	0	0	0	o	654	523
	AM Peek Hour Trips Generated	113	50	106	0	124	0	716	0	o	o	0	1,079	863
	Daily Trips Generated	1,436	264	1,522	0	7,756	0	6,073	0	0	o	0	17,051	13,641
	PM Peak Hour Trips per Unit	1.01	0.52	0.58	3.87	2.71	0.98	2.01	1.18	1.67	0.26	0.06		
	AM Peak Hour Trips per Unit	0.75	0.44	0.46	1.84	0.71	0.92	1.99	1.20	4.03	0.15	0.01		
	No. of Trips per Unit	9.57	5.86	6.59	49.21	44.32	6.97	16.87	17.57	13.72	4.57	1.59		
	Quantity	150	45	231		175		360						
	Unit	Dwelling Unit	Dwelling Unit	Dwelling Unit	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	Acres	Acres		
	Land Use	Single Family Detached Housing	Singl e Family Attached Housing	Multi-Family Housing	Regional Commercial	Specialty Commercial	Mixed Comm/Light Industrial Space	Multiple-Use Space	Institutional/Hospital area	Institutional/School area	Reginal Parks/Recreation Area	Neighborhood Parks	Total	Total with 20% diversion

Table 5.4 Trip Generation in 2025 - Sub Area IV

Land Use	Cuit	Quantity	No. of Trips per Unit	AM Peak Hour Trips per Unit	PM Peak Hour Trips per Unit	Daily Trips Generated	AM Peak Hour Trips Generated	AM Peak Hour Trips In	AM Peak Hour Trips Out	PM Peak Hour Trips Generated	PM Peak Hour Trips in	PM Peak Hour Trips Out	Notes
Single Family Detached Housing	Dwelling Unit		9.57	0.75	1.01	0	0	Q	0	0	0	0	ITE Code 210
Singl e Family Attached Housing	Dwelling		5.86	0.44	0.52	o	0	0	0	0.	0	0	ITE Code 230
Multi-Family Housing	Dwelling Unit		6.59	0.46	0.58	0	o	0	0	0	0	0	ITE Code 221
Regional Commercial	1000 sf Gross Floor Area		49.21	1.84	3.87	0	0	0	0	0	0	0	ITE Code 813
Spectatty Commercial	1000 sf Gross Floor Area	152	44.32	0.71	2.71	6,737	108	13	32	412	181	231	ITE Code 814
Mixed Comm/Light Industrial Space	1000 sf Gross Floor Area		6.97	0.92	0.98	0	0	0	0	0	0	0	ITE Code 110
Mixed-Use Space	1000 sf Gross Floor Area		16.87	1.99	2.01	0	0	0	0	0	0	0	ITE Code 710 plus ITE Code 230
Institutional/Hospital area	1000 sf Gross Floor Area		17.57	1.20	1.18	0	o	0	0	0	o	o	ITE Code 610
Institutional/School area	1000 sf Gross Floor Area		13.72	4.03	1.67	0	0	0	o	0	0	o	ITE Codes 520+522+530/3
Reginal Parks/Recreation Area	Acres		4.57	0.15	0.26	0	0	0	0	o	0	0	ITE Code 417
Neighborhood Parks	Acres		1.59	0.01	0.06	0	0	o	0	0	0	0	ITE Code 411 for Daily, ITE Code 412 for Peak Hour
Total	1					6,737	108	£	35	412	181	231	
Total with 0% diversion						6,737	108	23	35	412	181	231	

ea V
- Sub Ar
n in 2025
Seneratio
5.5 Trip (
Table

				-									
Notes	ITE Code 210	ITE Code 230	ITE Code 221	ITE Code 813	ITE Code 814	ITE Code 110	ITE Code 710 plus ITE Code 230	ITE Code 610	ITE Codes 520+522+530/3	ITE Code 417	ITE Code 411 for Daily, ITE Code 412 for Peak Hour		
PM Peak Hour Trips Out	51	o	o	o	11	0	0	0	o	0	0	135	135
PM Peak Hour Trips In	97	o	0	0	61	0	0	0	0	0	0	158	158
PM Peak Hour Trips Generated	155	0	0	0	138	0	0	0	0	0	0	293	293
AM Peak Hour Trips Out	98	o	0	0	5	0	0	ø	0	0	0	86	88
AM Peak Hour Trips In	29	o	0	o	25	0	0	0	0	0	0	53	8
AM Peak Hour Trips Generated	115	o	0	0	96	0	o	o	0	0	o	151	151
Daily Trips Generated	1,464	o	0	0	2,260	0	0	0	0	o	o	3,725	3,725
PM Peak Hour Trips per Unit	1.01	0.52	0.58	3.87	2.71	0.98	2.01	1.18	1.67	0.26	0.06		
AM Peak Hour Trips per Unit	0.75	0.44	0.46	1.84	0.71	0.92	1.99	1.20	4.03	0.15	0.01		
No. of Trips per Unit	6.57	5.86	6.59	49.21	44.32	6.97	16.87	17.57	13.72	4.57	1.59		
Quantity	153				51								
Unit	Dwelling Unit	Dwelling Unit	Dwelling Unit	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	1000 sf Gross Floor Area	Acres	Acres		
Land Use	Single Family Detached Housing	Singl e Family Attached Housing	Multi-Family Housing	Regional Commercial	Specialty Commercial	Mixed Comm/Light Industrial Space	Mixed-Use Space	institutional/Hospital area	Institutional/School area	Reginal Parks/Recreation Area	Neighborhood Parks	Tota	

Table 5.6 Trip Generation in 2025 - Grandview Area

Land Use	Cuit	Quantity	No. of Trips per Unit	AM Peak Hour Trips per Unit	PM Peak Hour Trips per Unit	Daity Trips Generated	AM Peak Hour Trips Generated	AM Peak Hour Trips In	AM Peak Hour Trips Out	PM Peak Hour Trips Generated	PM Peak Hour Trips In	PM Peak Hour Trips Out	Notes
Single Family Detached Housing	Dwelling Unit	1,120	9.57	0.75	1:01	10,718	840	210	630	1,131	713	419	ITE Code 210
Singl e Family Attached Housing	Dwetting Unit	644	5.86	0.44	0.52	3,774	283	48	235	335	224	111	ITE Code 230
Multi-Family Housing	Dwelling Unit	962	6.59	0.46	0.58	6,340	443	83	350	558	363	195	ITE Code 221
Regional Commercial	1000 sf Gross Floor Area	328	49.21	1.84	3.87	16,141	604	308	596	1,269	622	647	ITE Code 813
Specialty Commercial	1000 sf Gross Floor Area	752	44.32	0.71	2.71	33,329	234	363	171	2,038	897	1,141	ITE Code 814
Mixed Comm/Light Industrial Space	1000 sf Gross Floor Area	604	6.97	0.92	0.98	4,210	556	489	67	592	17	521	ITE Code 110
Mixed-Use Space/Multiple Use	1000 sf Gross Floor Area	1,066	16.87	1.99	2.01	17,983	2,121	1,527	594	2,143	643	1,500	ITE Code 710 plus ITE Code 230
Institutional/Hospital area	1000 sf Gross Floor Area	342	17.57	1.20	1,18	6'00	410	275	135	404	133	270	ITE Code 610
Institutional/School area	1000 sf Gross Floor Area	130	13.72	4.03	1.67	1,784	524	314	210	217	109	60↓	ITE Codes 520+522+530/3
Reginal Parks/Recreation Area	Acres	170	4.57	0.15	0.26	111	- 36	15	5	44	19	25	ITE Code 417
Neighborhood Parks	Acres	4	1.59	0.01	90:06	9	0	0	0	o	o	D	ITE Code 411 for Daily, ITE Code 412 for Peak Hour
Total						101,070	6,340	3,642	2,698	8,731	3,793	4,938	
Total with diversion						85,920	5,267	3,033	2,233	7,369	3,195	4,175	

Attachment D 2025 Grandview Section Highway Analyses Attachment D-1 2025 Grandview Section, No Action Alternative, Highway Analyses

URS Corporation				
9960 Federal Drive, Suite 300				
Colorado Springs, CO 80920				
Phone:	Fa	x:		
E-mail:				
OPERATIC	NAL ANALYS	IS		
Analyst: DEA				
Agency/Co: URS				
Date: 3/15/2005				
Analysis Period: AM PEAK				
Highway: US 160				
From/To: WEST OF US 550				
Jurisdiction:				
Analysis Year: 2025 NO ACTION	_			
Project ID: US 160 (DIRECTION	1 = EASTB	OUND)		
FREE	-FLOW SPEE	D		
Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	4	×	4	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	1.0	mph	1.0	mph
Free-flow speed	59.0	mph	59.0	mph
	_VOLUME			·
Direction	1		2	
Volume, V	2700	vph	3080	vph
Peak-hour factor, PHF	0.95	. 1	0,95	. 5
Peak 15-minute volume, v15	711		811	
Trucks and buses	5	90	5	00
Recreational vehicles	0	00	0	0
Terrain type	Rolling		Rolling	
Grade	0.00	0	0.00	00
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	2.5		2.5	
Recreational vehicles PCE, ER	2.0		2.0	
Heavy vehicle adjustment, fHV	0.930		0.930	
Flow rate, vp	1527	pcphpl	1742	pcphpl

Direction	1		2	
Flow rate, vp	1527	pcphpl	1742	pcphpl
Free-flow speed, FFS	59.0	mph	59.0	mph
Avg. passenger-car travel speed, S	58.6	mph	57.4	mph
Level of service, LOS	D		D	
Density, D	26.1	pc/mi/ln	30.4	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

OPERATIONAL ANALYSIS\_\_\_\_\_

Analyst: Agency/Co: Date: Analysis Period: Highway: From/To: Jurisdiction: Analysis Year: Project ID:	DEA URS 3/15/2005 PM PEAK US 160 WEST OF US 550 2025 NO ACTION US 160 (DIRECT	$ION \ 1 = EAST$	BOUND)		
	E	REE-FLOW SPEN	ED		· · · · · · · · · · · · · · · · · · ·
	Direction	. ]		2	
Lane width	222000-000	12.0	ft	12.0	ft
Lateral clearanc	e:				
Right edge		6.0	ft	6.0	ft
Left edge		6.0	ft	6.0	ft
Total later	al clearance	12.0	ft	12.0	ft
Access points pe	r mile	4		4	
Median type		Divided		Divided	
Free-flow speed:		Base		Base	
FFS or BFFS		60.0	mph	60.0	mph
Lane width adjus	tment, FLW	0.0	mph	0.0	mph
Lateral clearanc	e adjustment, FL	C 0.0	mph	0.0	mph
Median type adju	stment, FM	0.0	mph	0.0	mph
Access points ad	justment, FA	1.0	mph	1.0	mph
Free-flow speed		59.0	mph	59.0	mph
		VOLUME			
		1		0	
Molume M	Direction	1	ann h		h
Pool hour foster	סוות	4265	vpn	4290	vpn
Peak-Hour ractor	rnr	0.95		1120	
Trucks and buses	orume, vis	5	9	5	<u>0</u>
Pecreational web	icles	0	о 9	0	о О
Terrain type	ICIES	Polling	0	Polling	0
Grade			<u>0</u>		Q.
Segment leng	⊦h	0.00	mi	0.00	mi
Number of lanes	~**	2		2	****
Driver population	n adjustment, fP	1.00		1.00	
Trucks and buses	PCE, ET	2.5		2.5	
Recreational veh	icles PCE. ER	2.0		2.0	
Heavy vehicle ad	iustment, fHV	0.930		0.930	
Flow rate, vp	,	2413	ladqoq	2427	pcphpl
			L - L - L -		T. = T T

Direction	1		2	
Flow rate, vp	2413	pcphpl	2427	pcphpl
Free-flow speed, FFS	59.0	mph	59.0	mph
Avg. passenger-car travel speed, S		mph		mph
Level of service, LOS	F		F	
Density, D		pc/mi/ln		pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

# \_\_\_\_\_OPERATIONAL ANALYSIS\_\_\_\_\_

Analyst: Agency/Co: Date: Analysis Period: Highway: From/To: Jurisdiction: Analysis Year: Project ID:	DEA URS 3/15/2005 AM PEAK US 160 EAST OF US 550 2025 NO ACTION US 160 (DIREC	0 TO CI N CTION :	r 233 1 = EASTBO	UND)		
	·····	_FREE-1	FLOW SPEED			
	Direction		1		2	
Lane width			12.0	ft	12.0	ft
Lateral clearanc	e:					
Right edge			6.0	ft	6.0	ft
Left edge			6.0	ft	6.0	ft
Total later	al clearance		12.0	ft	12.0	ft
Access points pe	r mile		12		12	
Median type			Divided		Divided	
Free-Ilow speed:			Base	mah	Base 60 0	mph
rrs or Brrs	tmont FIN		0.0	mph	0.0	mph
Lane width adjus	e adjustment	FLC	0.0	mph	0.0	mph
Median type adju	stment FM		0.0	mph	0.0	mph
Access points ad	justment. FA		3.0	mph	3.0	mph
Free-flow speed	juoemene, m		57.0	mph	57.0	mph
rice rick speed			0,.0			
·			VOLUME			
	Direction		1		2	
Volume, V			2870	vph	2375	vph
Peak-hour factor	, PHF		0.95	*	0.95	-
Peak 15-minute v	olume, v15		755		625	
Trucks and buses			5	<u>0</u> 0	5	00
Recreational veh	icles		0	olo	0	90 10
Terrain type			Rolling		Rolling	
Grade			0.00	00	0.00	00
Segment leng	th		0.00	mi	0.00	mi
Number of lanes			2		2	
Driver populatio	n adjustment,	fP	1.00		1.00	
Trucks and buses	PCE, ET		2.5		2.5	
Recreational veh	icles PCE, ER		2.0		2.0	
Heavy vehicle ad	justment, fHV		0.930		0.930	
Flow rate, vp			1623	pcphpl	1343	pcphp⊥

Direction	1		2	
Flow rate, vp	1623	pcphpl	1343	pcphpl
Free-flow speed, FFS	57.0	mph	57.0	mph
Avg. passenger-car travel speed, S	56.1	mph	57.0	mph
Level of service, LOS	D		C	
Density, D	28.9	pc/mi/ln	23.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation					
9960 Federal Dri Colorado Springs	ve, Suite 300 , CO 80920				
Phone: E-mail:		Fa	x :		
	OPERATIO	NAL ANALYS	IS		
7 + 1 +					
Analyst: Agency/Co: Date: Analysis Period:	DEA URS 3/15/2005 PM PEAK				
Highway: From/To: Jurisdiction:					
Analysis Year: Project ID:	2025 NO ACTION US 160 (DIRECTION	1 = EASTB	OUND)		
	FREE	-FLOW SPEE	D		
	Direction	1		2	
Lane width Lateral clearanc	e:	12.0	ft	12.0	ft
Right edge		6.0	ft	6.0	ft
Leit edge Total later	al clearance	6.0 12.0	Íť ft	6.U 12.0	IT. ft
Access points pe	r mile	12.0	10	12	10
Median type		Divided		Divided	
Free-flow speed:		Base		Base	_
FFS or BFFS		60.0	mph	60.0	mph
Lane width adjus	tment, FLW	0.0	mph	0.0	mph
Lateral clearanc	e adjustment, FLC	0.0	mpn	0.0	mpn
Median type adju	2.0	mph	0.0	mph	
Free-flow speed	juschient, rA	57.0	mph	57.0	mph
		_VOLUME			
	Direction	1		2	
Volume, V	222000200	3500	vph	3965	vph
Peak-hour factor	, PHF	0.95	. 1	0.95	. 1
Peak 15-minute v	olume, v15	921		1043	
Trucks and buses		5	00	5	90
Recreational veh	icles	0	olo	0	90
Terrain type		Rolling		Rolling	
Grade		0.00	olo	0.00	olo
Segment leng	th	0.00	mi	0.00	mi
Number of lanes		2		2	
Driver populatio	n adjustment, fP	1.00		1.00	
Trucks and buses	PCE, ET	2.5		2.5	
Recreational veh	icles PCE, ER	2.0		2.0	

0.930

1980

0.930

pcphpl

pcphpl 2243

Heavy vehicle adjustment, fHV

Flow rate, vp

Direction	1	2	
Flow rate, vp	1980	pcphpl 2243	pcphpl
Free-flow speed, FFS	57.0	mph 57.0	mph
Avg. passenger-car travel speed, S	53.9	mph	mph
Level of service, LOS	E	F	
Density, D	36.7	pc/mi/ln	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation						
9960 Federal Drive, Suite 300 Colorado Springs, CO 80920						
Phone: E-mail:		Fax	:,			
OI	ERATION	AL ANALYSI	S			
Analyst:DEAAgency/Co:URSDate:3/15/2005						
Analysis Period: AM PEAK Highway: US 160 From/To: CR 233 TO SH Jurisdiction:	172/CR	234				
Analysis Year: 2025 NO ACTI Project ID: US 160 (DIF	ON	1 = EASTBC	UND)			
FREE-FLOW SPEED						
Direction Lane width		1 12.0	ft	2 12.0	ft	
Lateral clearance: Right edge Left edge Total lateral clearance Access points per mile		6.0 6.0 12.0 12	ft ft ft	6.0 6.0 12.0 12	ft ft ft	
Median type Free-flow speed: FFS or BFFS Lane width adjustment, FLW Lateral clearance adjustment, Median type adjustment, FM Access points adjustment, FA	FLC	Divided Base 60.0 0.0 0.0 0.0 3.0	mph mph mph mph mph	Divided Base 60.0 0.0 0.0 0.0 3.0	mph mph mph mph mph	
Free-flow speed		57.0	mph	57.0	mph	
		VOLUME				
Direction Volume, V Peak-hour factor, PHF Peak 15-minute volume, v15		1 1605 0.95 422	vph	2 1685 0.95 443	vph	
Trucks and buses Recreational vehicles Terrain type Grade		5 0 Rolling 0.00	00 00 00	5 0 Rolling 0.00	ତ୍ତ ତ ତ	
Segment length Number of lanes Driver population adjustment,	fP	0.00 2 1.00	mi	0.00 2 1.00	mi	
Trucks and buses PCE, ET Recreational vehicles PCE, EF Heavy vehicle adjustment, fHV Flow rate, vp	7	2.5 2.0 0.930 908	pcphpl	2.5 2.0 0.930 953	pcphpl	
		RESULTS	_			

Direction	1		2	
Flow rate, vp	908	pcphpl	953	pcphpl
Free-flow speed, FFS	57.0	mph	57.0	mph
Avg. passenger-car travel speed, S	57.0	mph	57.0	mph
Level of service, LOS	В		B	
Density, D	15.9	pc/mi/ln	16.7	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation							
9960 Federal Dri	ve, Suite 300						
oororado ppringb	,						
Phone:		Faz	x :				
E-mail:							
	OPERATIO	NAL ANALYS	IS				
Apalwst.	רידע						
Agency/Co:	UBS						
Date:	3/15/2005						
Analysis Period:	PM PEAK						
Highway:	US 160						
From/To:	CR 233 TO SH 172/C	R 234					
Jurisdiction:	· · · · · · · · · · · · · · · · · · ·						
Analysis Year:	2025 NO ACTION						
Project ID:	US 160 (DIRECTION	1 = EASTBO	OUND)				
	FREE	-FLOW SPEE	D				
······································		-					
7	Direction	1	<b>C</b> 1.	2	<b>5</b> 1		
Lane width		12.0	IT	12.0	IT		
Dight odgo	e:	6 0	f+	6 0	f+		
		6.0	1 L f+	6.0	ft		
Total later	al clearance	12 0	f+	12 0	ft		
Access points pe	r mile	12.0	τc	12.0	IC		
Median type	I MILE	Divided		Divided			
Free-flow speed:		Base		Base			
FFS or BFFS		60.0	mph	60.0	mph		
Lane width adjus	tment, FLW	0.0	mph	0.0	mph		
Lateral clearance	e adjustment, FLC	0.0	mph	0.0	mph		
Median type adju	stment, FM	0.0	mph	0.0	mph		
Access points ad	justment, FA	3.0	mph	3.0	mph		
Free-flow speed		57.0	mph	57.0	mph		
		VOLUME					
	Direction	1		2			
Volume, V		2525	vph	2290	vph		
Peak-hour factor	, PHF	0.95		0.95			
Peak 15-minute v	olume, v15	664		603			
Trucks and buses		5	00	5	00		
Recreational veh	icles	0	010	0	00		
Terrain type		Rolling	_	Rolling			
Grade	_	0.00	00	0.00	00		
Segment leng	th	0.00	mi	0.00	mı		
Number of Lanes 2 2							
Driver populatio	n adjustment, fP	1.00		1.00			
Trucks and buses	PCE, ET	2.5		2.5			
Recreational veh	icles PCE, ER	2.0		2.0			
Heavy vehicle ad	justment, fHV	0.930		0.930			
riow rate, vp		1428	pcpnpı	1292	pcpnpi		

Direction	1		2	
Flow rate, vp	1428	pcphpl	1295	pcphpl
Free-flow speed, FFS	57.0	mph	57.0	mph
Avg. passenger-car travel speed, S	56.9	mph	57.0	mph
Level of service, LOS	С		С	
Density, D	25.1	pc/mi/ln	22.7	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.
Attachment D-2 2025 Grandview Section, Alternative G Modified (Preferred Alternative), Highway Analyses

URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: \_\_Operational Analysis\_\_\_ Analyst: DEA Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: AM PEAK Freeway/Direction: EASTBOUND US 160 WEST OF US 550 From/To: Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments Volume, V 2700 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 711 v Trucks and buses 5 ÷ Recreational vehicles % 0 Rolling Terrain type: Ŷ Grade 0.00 Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1018 pc/h/ln \_\_\_\_\_Speed Inputs and Adjustments\_\_\_\_ Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 3 Free-flow speed: Measured mi/h FFS or BFFS 60.0 Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN mi/h 3.0 Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures 1018 pc/h/ln Flow rate, vp Free-flow speed, FFS 60.0 mi/h Average passenger-car speed, S 60.0 mi/h Number of lanes, N 3 Density, D 17.0 pc/mi/ln Level of service, LOS в

HCS2000: Basic Freeway Segments Release 4.1d

### HCS2000: Basic Freeway Segments Release 4.1d

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

Operational Analysis

Analyst:DEAAgency or Company:URSDate Performed:4/21/2005Analysis Time Period:PM PEAKFreeway/Direction:EASTBOUND US 160From/To:WEST OF US 550Jurisdiction:Jurisdiction:Analysis Year:2025 ALT 1GDescription:US 160

Flow Inputs and Adjustments\_\_\_\_\_

Volume, V	4265	veh/h	
Peak-hour factor, PHF	0.95		
Peak 15-min volume, v15	1122	v	
Trucks and buses	5	20	
Recreational vehicles	0	8	
Terrain type:	Rolling		
Grade	0.00	8	
Segment length	0.00	mi	
Trucks and buses PCE, ET	2.5		
Recreational vehicle PCE, ER	2.0		
Heavy vehicle adjustment, fHV	0.930		
Driver population factor, fp	1.00		
Flow rate, vp	1609	pc/h/ln	

\_Speed Inputs and Adjustments\_\_\_\_\_

ft interchange/mi Mi/h
interchange/mi 1 mi/h
1 mi/h
1 mi/h
mi/h
mi/h
reeway
r

Flow rate, vp	1609	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	3	
Density, D	26.8	pc/mi/ln
Level of service, LOS	D	_

URS Corporation

Level of service, LOS

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

Operational Analysis\_\_\_\_\_ DEA Analyst: Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: AM PEAK Freeway/Direction: EASTBOUND US 160 From/To: US 550 TO CR 233 Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments veh/h 2500 Volume, V Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 658 v 5 Trucks and buses ջ Recreational vehicles 0 ÷ Terrain type: Rolling ŝ Grade 0.00 Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 pc/h/ln 1414 Flow rate, vp Speed Inputs and Adjustments ft Lane width 12.0 Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS 60.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h 0.0 Interchange density adjustment, fID mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures Flow rate, vp 1414 pc/h/ln Free-flow speed, FFS 60.0 mi/h mi/h Average passenger-car speed, S 60.0 Number of lanes, N 2 23.6 pc/mi/ln Density, D

Overall results are not computed when free-flow speed is less than 55 mph.

С

HCS2000: Basic Freeway Segments Release 4.1d

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

Operational Analysis
----------------------

DEA
URS
4/21/2005
PM PEAK
EASTBOUND US 160
US 550 TO CR 233
2025 ALT 1G

Flow Inputs and Adjustments

Volume, V	3190	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	839	v
Trucks and buses	5	8
Recreational vehicles	0	8
Terrain type:	Rolling	
Grade	0.00	8
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	1805	pc/h/ln

### \_\_\_\_\_Speed Inputs and Adjustments\_\_\_\_\_\_

Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N	12.0 6.0 0.50 2	ft ft interchange/mi
Free-flow speed: FFS or BFFS	Measured 60.0	mi/h
Lane width adjustment, fLW Lateral clearance adjustment, fLC Interchange density adjustment, fID Number of lanes adjustment, fN Free-flow speed, FFS	0.0 0.0 0.0 4.5 60.0	mi/h mi/h mi/h mi/h mi/h
	Urban Freeway	

### LOS and Performance Measures\_\_\_\_\_

Flow rate up	1905	ng/h/ln
Filow face, vp	1805	pc/11/111
Free-flow speed, FFS	60.0	m1/1
Average passenger-car speed, S	59.6	mı/h
Number of lanes, N	2	
Density, D	30.3	pc/mi/ln
Level of service, LOS	D	

HCS2000: Basic Freeway Segments Release 4.1d URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis DEA Analyst: Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: AM PEAK Freeway/Direction: EASTBOUND US 160 CR 233 to SH 172/CR 234 From/To: Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments Volume, V 1605 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 422 v Trucks and buses 5 % Recreational vehicles 0 양 Terrain type: Rolling 0.00 Grade % Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV Driver population factor, fp 0.930 1.00 Flow rate, vp 908 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS 60.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h mi/h Interchange density adjustment, fID 0.0 Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures\_\_\_\_ 908 pc/h/ln Flow rate, vp Free-flow speed, FFS 60.0 mi/h Average passenger-car speed, S mi/h 60.0 Number of lanes, N 2 Density, D 15.1 pc/mi/ln Level of service, LOS В

HCS2000: Basic Freeway Segments Release 4.1d URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis Analyst: DEA URS Agency or Company: Date Performed: 4/21/2005 Analysis Time Period: PM PEAK Freeway/Direction: EASTBOUND US 160 From/To: CR 233 to SH 172/CR 234 Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments\_\_\_\_\_ veh/h Volume, V 2525 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 664 v Trucks and buses 5 % Recreational vehicles 0 8 Rolling Terrain type: Grade 0.00 8 Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1429 pc/h/ln \_\_\_\_\_Speed Inputs and Adjustments\_\_\_ ft Lane width 12.0 Right-shoulder lateral clearance 6.0 ft Interchange density interchange/mi 0.50 Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS mi/h 60.0 Lane width adjustment, fLW 0.0 mi/h mi/h Lateral clearance adjustment, fLC 0.0 Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures Flow rate, vp 1429 pc/h/ln Free-flow speed, FFS 60.0 mi/h Average passenger-car speed, S 60.0 mi/h Number of lanes, N 2 pc/mi/ln Density, D 23.8 Level of service, LOS С

HCS2000: Basic Freeway Segments Release 4.1d URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis DEA Analyst: Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: AM PEAK Freeway/Direction: WESTBOUND US 160 From/To: SH 172/CR 234 TO CR 233 Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments 1685 veh/h Volume, V Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 443 v Trucks and buses 5 ° Recreational vehicles 0 % Terrain type: Rolling ŝ 0.00 Grade Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 953 pc/h/ln Flow rate, vp Speed Inputs and Adjustments ft Lane width 12.0 Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS mi/h 60.0 Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID mi/h 0.0 Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures 953 pc/h/ln Flow rate, vp Free-flow speed, FFS 60.0 mi/h mi/h Average passenger-car speed, S 60.0 Number of lanes, N 2 Density, D 15.9 pc/mi/ln Level of service, LOS В Overall results are not computed when free-flow speed is less than 55 mph.

HCS2000: Basic Freeway Segments Release 4.1d URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis Analyst: DEA Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: PM PEAK Freeway/Direction: WESTBOUND US 160 From/To: SH 172/CR 234 TO CR 233 Jurisdiction: 2025 ALT 1G Analysis Year: Description: US 160 Flow Inputs and Adjustments veh/h Volume, V 2290 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 603 v Trucks and buses 5 % Recreational vehicles 0 % Terrain type: Rolling Grade 0.00 ŝ Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1296 pc/h/ln \_\_\_\_\_Speed Inputs and Adjustments\_\_\_ Lane width ft 12.0 Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS mi/h 60.0 Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC mi/h 0.0 Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures\_ Flow rate, vp 1296 pc/h/ln Free-flow speed, FFS 60.0 mi/h Average passenger-car speed, S 60.0 mi/h Number of lanes, N 2 pc/mi/ln Density, D 21.6 Level of service, LOS С Overall results are not computed when free-flow speed is less than 55 mph. HCS2000: Basic Freeway Segments Release 4.1d

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

E-mail:

Operational Analysis

Analyst:	DEA
Agency or Company:	URS
Date Performed:	4/21/2005
Analysis Time Period:	AM PEAK
Freeway/Direction:	WESTBOUND US 160
From/To:	CR 233 TO US 550
Jurisdiction:	
Analysis Year:	2025 ALT 1G
Description: US 160	
· · ·	
	Flow Inputs and Adjustments

Volume, V	2130	veh/h
Peak-nour lactor, PHF	0.95	
Peak 15-min volume, v15	561	v
Trucks and buses	5	00
Recreational vehicles	0	8
Terrain type:	Rolling	
Grade	0.00	<b>0</b> 0
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	1205	pc/h/ln

### \_\_\_\_\_Speed Inputs and Adjustments\_\_\_\_\_

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	-
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	60.0	mi/h
	Urban Freeway	

### LOS and Performance Measures

Flow rate, vp	1205	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	2	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis Analyst: DEA Agency or Company: URS 4/21/2005 Date Performed: Analysis Time Period: PM PEAK Freeway/Direction: WESTBOUND US 160 CR 233 TO US 550 From/To: Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments Volume, V 3510 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 924 ν Trucks and buses 5 % Recreational vehicles 0 % Terrain type: Rolling 응 Grade 0.00 Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1986 pc/h/ln \_\_\_\_\_Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS 60.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures\_\_\_\_ Flow rate, vp 1986 pc/h/ln Free-flow speed, FFS 60.0 mi/h Average passenger-car speed, S 58.1 mi/h Number of lanes, N 2 pc/mi/ln Density, D 34.2 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

HCS2000: Basic Freeway Segments Release 4.1d

HCS2000: Basic Freeway Segments Release 4.1d URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis DEA Analyst: Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: AM PEAK Freeway/Direction: WESTBOUND US 160 WEST OF US 550 From/To: Jurisdiction: Analysis Year: 2025 ALT 1G Description: US 160 Flow Inputs and Adjustments\_\_\_\_ Volume, V 3080 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 811 v Trucks and buses 5 8 Recreational vehicles 0 % Terrain type: Rolling Grade 0.00 ş Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1162 pc/h/ln \_\_\_\_\_Speed Inputs and Adjustments\_\_\_ Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density interchange/mi 0.50 Number of lanes, N 3 Free-flow speed: Measured FFS or BFFS 60.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 3.0 mi/h 60.0 Free-flow speed, FFS mi/h Urban Freeway LOS and Performance Measures 1162 pc/h/ln Flow rate, vp Free-flow speed, FFS 60.0 mi/h 60.0 Average passenger-car speed, S mi/h Number of lanes, N 3 Density, D 19.4 pc/mi/ln Level of service, LOS С

### HCS2000: Basic Freeway Segments Release 4.1d

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

Operat:	ional	Analysis

Analyst:	DEA
Agency or Company:	URS
Date Performed:	4/21/2005
Analysis Time Period:	PM PEAK
Freeway/Direction:	WESTBOUND US 160
From/To:	WEST OF US 550
Jurisdiction:	
Analysis Year:	2025 ALT 1G
Description: US 160	

\_\_\_\_\_Flow Inputs and Adjustments\_\_\_\_\_

Volume, V		4290	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1129	v
Trucks and buses		5	8
Recreational vehicles		0	20
Terrain type:		Rolling	
Grade		0.00	olo
Segment length		0.00	mi
Trucks and buses PCE, ET		2.5	
Recreational vehicle PCE,	ER	2.0	
Heavy vehicle adjustment,	fhV	0.930	
Driver population factor,	fp	1.00	
Flow rate, vp		1618	pc/h/ln

### \_Speed Inputs and Adjustments\_\_\_\_

Lane width Right-shoulder lateral clearance Interchange density Number of lanes, N	12.0 6.0 0.50 3	ft ft interchange/mi
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	60.0	mi/h
-	Urban Freeway	

### LOS and Performance Measures\_\_\_\_

Flow rate, vp Free-flow speed FFS	1618 60 0	pc/h/ln mi/h
Average passenger-car speed, S	60.0	mi/h
Density, D	27.0	pc/mi/ln
Level of service, LOS	D	

# Job US 160 ALT IG Project No. Sheet of \_\_\_\_\_ Description Eastbound US 160 OFF-Ramp Computed by Date \_\_\_\_\_ +0 US 550 Am Peak Checked by Date \_\_\_\_\_ Reference



ANALYZED AS A LANE DROP AT OFF-RAMP

<u>Upstream of Off-Ramp</u> 2700 vph/0.95 \* 0.93 = 3,056 / 3 = 1,019 pcphpl Density = 1,019/60 = 16.98 (LOS B)

Ramp 795 uph/0.95 x 0.971= 862 pcph < 2,100 (maximum for 1-lane ramp) : under capacity





ANALYZED AS A LANE DROP AT OFF-RAMP

Upstream of Off-Ramp  

$$4,265 \text{ wph}/0.95 * 0.93 = 4,827/3 = 1,609 \text{ pcphpl}$$
  
Density = 1,609/60 = 26.82 (LOS D)

Ramp 1,540 vph/0.95 \* 0.971 = 1,669 pcph < 2,100 (maximum for 1-lane ramp) .. under capacity

		RAM	PS AN	D RAMP	<b>JUNC</b>	TIONS W	OR	KSHEET					
General Info	rmation			Sit	rmation								
Analyst		DEA			Fre	eway/Dir	of T	fravel E	ASTBO	DUND US	160		
Agency or Co	mpany	URS			Jur	nction		C	N FRC	OM US 550	)		
Date Perform	ed	3/15/200	5		Jur	isdiction							
Analysis Time	Period	AM PEA	K		An	alysis Yea	ar	2	025 AL	. <u>T 1G</u>			
Project Descr	iption US	160											
Inputs		Tomoin											
Upstream Adj	Ramp	rerrain								Downstre Ramp	eam Adj		
I Yes 🖾	On									🕼 Yes	🗖 On		
🗖 No 👘 🗖	Off									No 🕅	l Off		
L <sub>up</sub> = ft								40.0		L <sub>down</sub> =	ft		
		S	FF = (	50.0 mpr	ו	S	FR	= 40.0 mpl	1	VD =	veh/h		
Vu = ve	:h/h		S	ketch (s	how lar	nes, L <sub>A</sub> , L	<u>,</u> V <sub>F</sub>	<sub>2</sub> ,V <sub>f</sub> )					
<b>Conversion</b>	o pc/h Un	der Base (	Conditi	ons									
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>HV</sub>	fp	v=V/PHF f <sub>HV</sub> f <sub>p</sub>			
Freeway	1905	5	0	0.	.930	1.00	2156						
Ramp	595	0.95	Rol	ling	2	0	0.	.971	1.00	645			
UpStream													
DownStream													
	Me	erge Areas						Dive	erge Are	eas			
Estimation o	f v <sub>12</sub>					Estimation of V <sub>12</sub>							
	V <sub>12</sub> :	= V <sub>F</sub> ( P <sub>FM</sub> )				$V_{12} = V_{R} + (V_{F} - V_{R})P_{FD}$							
L <sub>FO</sub> = (Equat	ion 25-2 or	25-3)				$L_{FO} = (E$	iqua	tion 25-8 o	r 25-9)				
$P_{EM} = 1.000$	usina Eaua	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)							
$V_{42} = 2156$	nc/h	,		,		$V_{12} = pc/h$							
Capacity Ch	ecks					Capacity Checks							
	Actual	Maxin	ามท	105	F?	Actual Maximum LOS F?							
					<u> </u>	V <sub>EI</sub> =V <sub>E</sub> See Exhibit 25-							
V <sub>FO</sub>	2801	460	0	No	; ;	VFI <sup></sup> VF				14			
						V <sub>12</sub>			44	00:All			
						$V_{FO} = V_{I}$	F -		See E	xhibit 25-			
V <sub>R12</sub>	2801	4600	:All	No	) 	V_R				14			
Louis of Com			6	<u> </u>		V <sub>R</sub>			See Ex				
Level of Serv				0.00607		Leveror	-Se				<u>/</u>		
$D_{\rm R} = 5.475$	- 0.00734 \	R + 0.007	o v <sub>12</sub> -	0.00027	LA			- 4.232 + 1	0.0000	v <sub>12</sub> - 0.000	θ L <sub>D</sub>		
$D_{R} = 23$	.3 (pc/ mi /	ln)				D <sub>R</sub> =	(pc/	' mi /ln)					
LOS = C	(Exhibit 25	-4)				LOS= (Exhibit 25-4)							
Speed Estim	ation					Speed E	Estir	mation					
$M_{\rm S} = 0.33^{\circ}$	7 (Exibit 25	-19)				$D_s = (Exhibit 25-19)$							
S <sub>R</sub> = 53.9	mph (Exhi	bit 25-19)				S <sub>R</sub> = mph (Exhibit 25-19)							
S <sub>0</sub> = N/A	mph (Exhi	bit 25-19)				S <sub>0</sub> =	mp	h (Exhibit 2	25-19)				
S= 53.9	mph (Exhi	bit 25-14)				S =	mp	h (Exhibit 2	.5-15)				

		RAM	PS AN	DRAMP	, JUNC	TIONS W	ORKSHE	ET					
General Info	rmation			Sit	mation								
Analyst		DEA			eway/Dir of Travel EASTBOUND US 160					160			
Agency or Co	mpany	URS			Jur	nction		ROM US 550					
Date Perform	ed	3/15/2005	5		Jur	risdiction							
Analysis Time	Period	PM PEA	K		An	alysis Yea	ar	2	<u>025 AL</u>	T 1G			
Project Descr	iption US	160					•••						
Inputs		Tamain		-					<del> </del>				
Upstream Adj	Ramp	rerrain								Downstre Ramp	am Adj		
🛙 Yes 🛛 🖿	On									🕼 Yes	🔽 On		
No 🗖	Off									🖾 No	C Off		
L <sub>up</sub> = ft				0.0			- 40	0		L <sub>down</sub> =	ft		
	- I- <i>B</i> -	5	FF = (	50.0 mpr	1 		FR = 40	u mp	n ·	VD =	veh/h		
vu= ve	en/n		S	ketch (s	show lar	nes, L <sub>A</sub> , L	_,V <sub>R</sub> ,V <sub>f</sub> )						
Conversion	to pc/h Un	der Base C	Conditi	ions	T	<del></del>			· , ···				
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>H∨</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>			
Freeway	2725	0.95	Rol	ling	5	0	0.930		1.00	3084			
Ramp	465	0.95	Rol	ling	2	0	0.971	Τ	1.00	504			
UpStream													
DownStream													
	Me	erge Areas						Div	erge Are	as			
Estimation o	of v <sub>12</sub>												
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )				$V_{12} = V_{R} + (V_{F} - V_{R})P_{FD}$							
L <sub>FO</sub> = (Equa	tion 25-2 or	25-3)				$L_{FO} = (E$	quation 2	25-8 c	or 25-9)				
$P_{EM} = 1.000$	using Equa	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)							
$V_{10} = 3084$	nc/h	,		,		$V_{12} = pc/h$							
Capacity Ch	ecks			<u> </u>		Capacity Checks							
	Actual	Maxin	าแท	1.05	F?	Actual Maximum LOS F?							
	710100				• •	Actual Maximum LOS							
VEO	3588	460	0	No	, ,	v <sub>FI</sub> =v <sub>F</sub>	-			14			
FU						V <sub>12</sub>			44(	00:All			
						$V_{FO} = V_{f}$	= - <b> </b>		See Ex	chibit 25-			
V <sub>R12</sub>	3588	4600	:All	No	)	V <sub>R</sub>				14			
						V <sub>R</sub>			See Ex	hibit 25-3			
Level of Ser	vice Deterr	nination (i	f not F	)		Level of	<sup>F</sup> Service	Dete	rminatio	on (if not F	5)		
D <sub>R</sub> = 5.475	+ 0.00734	v <sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	′ L <sub>4</sub>		$D_{R} = 4.2$	252 +	0.0086 \	/ <sub>12</sub> - 0.000	9 L <sub>D</sub>		
$D_{\rm R} = 29$	9.5 (pc/ mi /	/ln)			~	D <sub>R</sub> =	(pc/ mi /li	ר)			_		
LOS = D	(Exhibit 25	-4)				LOS=	(Exhibit 2	25-4)					
Speed Estim	ation					Speed E	Estimatic	n					
M <sub>s</sub> = 0.41	4 (Exibit 25	5-19)				D <sub>s</sub> = (Exhibit 25-19)							
S <sub>R</sub> = 52.5	mph (Exhi	bit 25-19)				S <sub>R</sub> = mph (Exhibit 25-19)							
$S_0 = N/A$	mph (Exhi	bit 25-19)				S <sub>0</sub> =	mph (Ex	hibit 2	25-19)				
S= 52.5	mph (Exhi	, ibit 25-14)				S =	mph (Ex	hibit 2	25-15)				

Page 1 of 🗰 丨

# RAMPS AND RAMP JUNCTIONS WORKSHEET

<b></b>	*	RAMP	S AND	RAME	JUNC	TIONS W		SHEET			<u></u>	
General Info	rmation			Sit	te Infori	mation						
Analyst	· · · ·	DEA			Fre	eway/Dir	of T	ravel	EASTB	OUND U	S 160	
Agency or Co	mpany	URS			Jur	oction OFF TO CR 233						
Date Perform	ed	3/15/2005			Jur	risdiction						
Analysis Time	Period	AM PEAK			Ana	alysis Yea	ar		2025 AI	LT 1G		
Project Descr	iption US	160										
Inputs												
Upstream Adj	Ramp	Terrain								Downstr Ramp	eam Adj	
🗐 Yes 🛛 🕅	On									🕼 Yes	🗖 On	
🕼 No 🛛 🕅	Off									🕼 No	Cff Off	
L <sub>up</sub> = ft		S	_ = 6	0.0 mpł		S	=	40.0 m	nh	L <sub>down</sub> =	ft	
Vu= ve	eh/h		- SI	etch (s	show lar	es I I	V V	V)	P	VD =	veh/h	
Conversion	to pc/h Up	der Base Co	nditi				D' R	, • <sub>f</sub> /				
Conversion	v=V/PH											
(pc/h)	(Veh/hr)	PHF	Ter	rain	Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	f <sub>HV</sub> f <sub>p</sub>		
Freeway	2500	ling	5	0	0.	930	1.00	2829				
Ramp	Ramp 1090 0.95 Rolling 2							971	1.00			
UpStream						ļ	<u> </u>					
DownStream	NA				<b>I</b>	·	Ļ					
Ectimation	الالة ج بر	erge Areas				Ectimoti	ion	<u></u>	verge Ar	eas		
	<u>1 • 12</u>				<u> </u>	Esumau		<sup>1</sup> v <sub>12</sub>				
1	V <sub>12</sub> :	= V <sub>F</sub> ( P <sub>FM</sub> )				l I		V <sub>12</sub>	= V <sub>R</sub> + (\	/ <sub>F</sub> - V <sub>R</sub> )P <sub>FC</sub>	)	
L <sub>EQ</sub> = (Equat	tion 25-2 or	· 25-3)				L <sub>EQ</sub> = (E	quat	tion 25-8	or 25-9)			
P <sub>FM</sub> = using E	quation (	Exhibit 25-5)				P <sub>FD</sub> =1.000 using Equation (Exhibit 25-11)						
V <sub>12</sub> = pc/h						V <sub>12</sub> = 2829 pc/h						
Capacity Ch	ecks				· · · · · · ·	Capacity Checks						
	Actual	Maximu	Im	LOS	F?	Actual Maximum LOS F						
		See Exhib	it 25-			V <sub>FI</sub> =V <sub>F</sub>	-	2829	4	600	No	
V <sub>FO</sub>		7				$V_{12}$ 2829 4				00:All	No	
VB10		4600:A				V <sub>FO</sub> = V <sub>F</sub>	F -	1647	4	600	No	
NIZ					-	V <sub>R</sub>		1182	2	100	No	
Level of Serv	/ice Deterr	nination (if I	not F)		<u> </u>	Level of	f Ser	vice Del	erminati	on (if not	F)	
D <sub>R</sub> = 5.475	+ 0.00734	/ <sub>R</sub> + 0.0078	V <sub>12</sub> - 0	0.00627	′ L <sub>A</sub>	Γ	D <sub>R</sub>	= 4.252 ·	+ 0.0086	V <sub>12</sub> - 0.000	)9 L <sub>D</sub>	
D <sub>R</sub> = (pe	c/ mi /ln)					D <sub>R</sub> =	25.9	) (pc/ mi	/ln)		-	
LOS = (E	xhibit 25-4)					LOS=	C (E	xhibit 25	5-4)			
Speed Estim	ation					Speed E	Estin	nation				
M <sub>S</sub> = (Exib	it 25-19)					D <sub>s</sub> =	0.46	69 (Exhib	oit 25-19)			
S <sub>R</sub> = mph	(Exhibit 25	i-19)				S <sub>R</sub> = 51.6 mph (Exhibit 25-19)						
S <sub>0</sub> = mph	(Exhibit 25	5-19)				$S_0 = N/A \text{ mph}$ (Exhibit 25-19)						
S= mph	(Exhibit 25	5-14)				S =	51.6	ó mph (E	xhibit 25	-15)		
HCS2000 <sup>TM</sup>		Co	opyright	© 2000 Un	iversity of	Florida, All F	Rights	Reserved			Version 4.1	

 $file://C:\Documents\%20 and\%20 Settings\ALLISON\Local\%20 Settings\Temp\r2k60.tmp$ 3/12/2005

		RAM	PS AN	D RAMF	, JNNC.	TIONS W	OR	KSHEE	Т				
General Infor	rmation			Sit	mation								
Analyst		DEA			eway/Dir of Travel EASTBOUND US 160						160		
Agency or Co	mpany	URS			Jur	oction OFF TO CR 233							
Date Perform	ed	3/15/2003	5		Jur	risdiction							
Analysis Time	Period	PM PEA	K		Ana	alysis Ye	ar		202	<u>25 ALT</u>	<u>1G</u>		
Project Descri	iption US	160											
Inputs													
Upstream Adj	Ramp	lerrain									Downstre Ramp	am Adj	
T Yes	On										🕅 Yes	🗖 On	
🗖 No 🖉	Off										🕅 No	I Off	
L <sub>up</sub> = ft		S	= (	30 0 mot	<u> </u>			= 40.0	mnh		L <sub>down</sub> =	ft	
	h/h		FF `	kotob ( s	' boulor		FR	10.0 1/1	mpri		VD =	veh/h	
				ies, L <sub>A</sub> , L	D <sup>, V</sup> I	₹ <sup>, ∨</sup> f)		<u></u>					
Conversion	opc/nUn	der Base C	onalti	ons	T	I	<u>1                                    </u>	·					
(pc/h)	v (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>H∨</sub>		fp	f <sub>HV</sub> f <sub>p</sub>		
Freeway	3190	0.95	Rol	ling	5	0	0	.930	1.	.00	3610		
Ramp	1065	0.95	Rol	ling	2	0	0	.971	1.	.00	1155		
UpStream													
DownStream													
	Me	erge Areas							Diver	ge Area	IS		
Estimation o	t v <sub>12</sub>					Estimat	ion	of V <sub>12</sub>				· • • •	
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )				$V_{12} = V_R + (V_F - V_R)P_{FD}$							
L <sub>EQ</sub> = (Equat	ion 25-2 or	25-3)				$L_{EQ} = (Equation 25-8 \text{ or } 25-9)$							
P <sub>FM</sub> = using E	quation (I	Exhibit 25-	5)			$P_{FD} = 1.000$ using Equation (Exhibit 25-11)							
$V_{12} = pc/h$						$V_{12} = 3610 \text{ pc/h}$							
Capacity Ch	ecks					Capacit	y C	hecks					
	Actual	Maxin	านm	LOS	F?	Actual Maximum LOS F?							
		See Evh	ibit 25.			$V_{\rm FI} = V_{\rm F}$ 3610 4600 No							
V <sub>FO</sub>		7		i		V <sub>12</sub>		3610		4400	D:All	No	
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V <sub>I</sub> V <sub>R</sub>	F -	2455		460	00	No	
					ſ	V <sub>R</sub>		1155		210	00	No	
Level of Serv	vice Detern	nination (i	f not F	)		Level of	f Se	rvice D	etern	ninatio	n (if not F	)	
$D_{p} = 5.475$	+ 0.00734 \	/ <sub>p</sub> + 0.007	8 V12 -	0.00627	7 L,		D	= 4.252	2 + 0.	0086 V.	12 - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = (po	c/ mi /ln)	R	12		~	D <sub>R</sub> =	32.	6 (pc/ m	ni /In)		12	U	
LOS = (E	xhibit 25-4)	I				LOS=	D (	Exhibit	25-4)				
Speed Estim	ation					Speed E	sti	mation				<u></u>	
$M_{o} = (Exib)$	it 25-19)					D, =	0.4	67 (Exh	ibit 2	5-19)			
$S_{n}$ = mnh	(Exhibit 25	-19)				$S_{p} = 51.6 \text{ mph} (Exhibit 25-19)$							
$S = mn^{L}$	(Evhibit 25	10)				s_=	N/	4 mph	(Eyhi	hit 25-1	9)		
S = mph	(Exhibit 25	-14)				S =	51.	6 mph	(Exhi	bit 25-1	-, 5)		
L	· · · · · · · · · · · · · · · · · · ·					L			<u>,                                     </u>		·		

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

file://C:\Documents%20and%20Settings\ALLISON\Local%20Settings\Temp\r2k60.tmp 3/12/2005

		RAM	PS AN	D RAMP	JUNC	TIONS W	ORKS	HEET					
General Info	rmation			Sit	e Infori	mation							
Analyst		DEA			Fre	eway/Dir of Travel EASTBOUND US 160					160		
Agency or Co	mpany	URS			Jur	nction		0	N FROM	И CR 23.	3		
Date Perform	ed	3/15/200	5		Jur	risdiction							
Analysis Time	Period	AM PEA	<u>K</u>		An	alysis Yea	ar	2(	025 ALT	<u> </u>			
Project Descr	iption US	160					<u> </u>						
Inputs		Taunalu						_			<u> </u>		
Upstream Adj	Ramp	rerrain								Downstre Ramp	am Adj		
I Yes I	On									🕼 Yes	🕼 On		
🖾 No 🛛	Off									🕅 No	C Off		
l = fi										L <sub>down</sub> =	ft		
Lup II		S	<sub>FF</sub> = (	60.0 mph	1	S	FR =	40.0 mph	า		1. A.		
Vu= ve	eh/h		S	ketch ( s	how lar	nes, $L_{a}$ , $L_{D}$ , $V_{B}$ , $V_{f}$ ) VD = veh/h							
Conversion	o pc/h Un	der Base (	conditi	ons			<u> </u>						
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>H</sub>	iv	f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>			
Freeway	ay 1410 0.95 Rolling 5						0.93	30	1.00	1596			
Ramp	195	0.95	0.95 Rolling 2				0.97	71	1.00	211			
UpStream				<u> </u>									
DownStream													
	Me	erge Areas						Dive	erge Area	IS			
Estimation o	f v <sub>12</sub>					Estimat	ion of	V <sub>12</sub>					
	V <sub>12</sub> :	= V <sub>F</sub> ( P <sub>FM</sub> )				$V_{12} = V_{R} + (V_{F} - V_{R})P_{FD}$							
L <sub>EO</sub> = (Equat	tion 25-2 or	25-3)				$L_{EO} = (E$	quatio	n 25-8 oi	r 25-9)				
$P_{rw} = 1.000$	using Equa	ition (Exhi	bit 25-!	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)							
$V_{10} = 1596$	 nc/h	(		-,		$V_{12} = pc/h$							
Canacity Ch	pon	<u></u>	<u> </u>	<u></u>		$v_{12} = pc/n$							
Capacity On	Actual	Maxin	21100	105	F2	Capacity Checks							
	Actual	IVIGAIII	um	00	<u> </u>			Actual	See Ext	nibit 25-	LOOT		
Vro	1807	460	0	No		V <sub>FI</sub> =V <sub>F</sub>	:		1	4			
- FO	1007	100				V <sub>12</sub>			440	D:All			
						$V_{FO} = V_{I}$	= <b>-</b>		See Ex	nibit 25-			
V <sub>P12</sub>	1807	4600	:All	No	,	V <sub>R</sub>			1	4			
:					ľ	V <sub>R</sub>			See Exh	ibit 25-3			
Level of Ser	vice Deterr	mination (i	f not F	)		Level of	<sup>r</sup> Servi	ice Deter	minatio	n (if not F	;)		
$D_{p} = 5.475$	+ 0.00734	v <sub>p</sub> + 0.007	8 V12 -	0.00627	Ľ.		$D_{p} =$	4.252 + (	0.0086 V	12 - 0.000	9 L <sub>D</sub>		
$D_{\rm p} = 15$	5.7 (pc/ mi /	/ln)	12		A	D <sub>₽</sub> =	(pc/ m	ii /ln)		12	D		
0S = B	(Exhibit 25	-4)				LOS=	(Exhib	, pit 25-4)					
Speed Estim	ation					Sneed F	stima	tion	· · · ·				
M = 0.20	7 (Evibit 26	5 10)		<u> </u>		$D_{r} = (Exhibit 25-19)$							
$S_{1} = 5.47$	mnh /Evh	ibit 25 10)				$S_{p} = mph$ (Exhibit 25-19)							
$P_{R}^{-}$ 34./	mpn (⊏xn	$\frac{1011}{100} = \frac{20}{10}$				ск S.=	mph (		5.10				
$P_0 = N/A$	mpn (Exhi	1011 25-19)				~	mpii (		U-18)				
<b>&gt;=</b> 54.7	mpn (Exh	idit 25-14)				P =	mph (	Exhibit 2	5-15)	<u>.</u>			

## RAMPS AND RAMP JUNCTIONS WORKSHEET

4		RAMP	<b>PS ANI</b>	D RAMP	<b>JUNC</b>	TIONS W	<b>ORKS</b>	HEET				
General Info	rmation			Sit	te Infor	mation						
Analyst		DEA			eway/Dir of Travel EASTBOUND US 160							
Agency or Co	mpany	URS			Jur	nction ON FROM CR 233						
Date Perform	ed	3/15/2005	;		Jur	risdiction						
Analysis Time	Period	PM PEAK	ζ		An	alysis Ye	ar	2	025 AI	LT 1G		
Project Descr	iption US	160										
Inputs												
Upstream Adj	Ramp	Terrain								Downstre Ramp	eam Adj	
I Yes	On									🕼 Yes	M On	
П No 🔳	Off					III No III C						
L <sub>up</sub> = ft				0.0 mm				40.0		L <sub>down</sub> =	ft	
	L. 4.	5		ou.u mpr	1 		FR <sup>=</sup>	40.0 mp	n	VD =	veh/h	
vu = ve	en/n		S	ketch (s	how lar	ies, L <sub>A</sub> , L	. <u>.</u> ,V <sub>R</sub> ,V	( <sub>f</sub> )				
Conversion	to pc/h Un	der Base C	onditi	ons	····-							
(pc/h)	V (Veh/hr)	PHF	Ter	rrain	Truck	%Rv	f <sub>H</sub>	V	fp	v=V/PHF f <sub>HV</sub> f <sub>p</sub> _	-	
Freeway	2125	0.95	Rol	ling	5	0	0.93	30	1.00	2405		
Ramp	400	0.95	Rol	ling	2	0	0.97	71	1.00	434		
UpStream												
DownStream												
	Me	erge Areas						Div	erge Ar	eas		
Estimation o	of v <sub>12</sub>					Estimat	ion of	v <sub>12</sub>			·	
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>12</sub> =	V <sub>R</sub> + (V	/ <sub>F</sub> - V <sub>R</sub> )P <sub>FD</sub>		
L <sub>FO</sub> = (Equa	tion 25-2 or	25-3)				L <sub>FO</sub> = (E	quatio	n 25-8 o	or 25-9)			
$P_{EM} = 1.000$	usina Eaua	tion (Exhit	oit 25-5	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)						
$V_{40} = 2405$	nc/h	<b>,</b>				$V_{12} = pc/h$						
Canacity Ch	ecks					Capacity Checks						
		Maxim	um	105	F2	Actual Maximum LOS F?						
	/ total	- Maxim			<u>.</u> .	V <sub>-</sub> =V <sub>-</sub> See Exhibit 25-						
VEO	2839	4600	)	No	, [	V <sub>FI</sub> =V <sub>F</sub> See Exhibit 25-						
						V <sub>12</sub>			44	00:All		
						V <sub>FO</sub> = V	F -		See E	xhibit 25-		
V <sub>R12</sub>	2839	4600:	All	No	·	V <sub>R</sub>				14		
						V <sub>R</sub>		·	See Ex	chibit 25-3		
Level of Ser	vice Deterr	nination (if	not F	)		Level of	f Servi	ce Dete	rminati	on (if not H	7	
D <sub>R</sub> = 5.475	+ 0.00734 \	/ <sub>R</sub> + 0.0078	3 V <sub>12</sub> -	0.00627	L <sub>A</sub>		D <sub>R</sub> =	4.252 +	0.0086	V <sub>12</sub> - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = 23	8.7 (pc/ mi /	ln)				D <sub>R</sub> =	(pc/ m	i /ln)				
LOS = C	(Exhibit 25	-4)				LOS=	(Exhib	it 25-4)				
Speed Estim	ation					Speed E	Estima	tion				
$M_{s} = 0.34$	0 (Exibit 25	-19)				D <sub>s</sub> =	(Exhib	it 25-19)	)			
						S <sub>B</sub> = mph (Exhibit 25-19)						
S <sub>R</sub> = 53.9	mph (Exhi	bit 25-19)				$S_R$ = mpn (Exhibit 25-19)						
S <sub>R</sub> = 53.9 S <sub>0</sub> = N/A	mph (Exhi mph (Exhi	bit 25-19) bit 25-19)				S <sub>R</sub> - S <sub>0</sub> =	mph (	Exhibit 2	25-19)			
$V_{12}$ = 2405 Capacity Cho $V_{FO}$ $V_{R12}$ Level of Serr $D_R$ = 5.475 $D_R$ = 23 LOS = C Speed Estim $M_s$ = 0.34	pc/h ecks Actual 2839 2839 2839 vice Detern + 0.00734 v 3.7 (pc/ mi / (Exhibit 25) ation 0 (Exibit 25)	Maxim 4600 4600: <u>mination (if</u> / <sub>R</sub> + 0.0078 /In) -4)	um ) All 3 V <sub>12</sub> -	LOS No No 0.00627	F?	$V_{12} = pc$ $Capacit$ $V_{FI} = V_{F}$ $V_{12}$ $V_{FO} = V$ $V_{R}$ $V_{R}$ $Level of$ $D_{R} =$ $LOS =$ $Speed E$ $D_{S} =$ $S = -$	r/h <b>y Chee</b> <b>y Chee</b> <b>y</b> <b>f</b> <b>f</b> <b>f</b> <b>f</b> <b>f</b> <b>f</b> <b>f</b> <b>f</b>	cks Actual <u>ce Dete</u> 4.252 + i /ln) it 25-4) tion it 25-19) Exhibit 2	Ma See E 44 See E See E rminati 0.0086	ximum xhibit 25- 14 00:All xhibit 25- 14 khibit 25-3 <b>on (if not F</b> V <sub>12</sub> - 0.000	LOS F? -) 9 L <sub>D</sub>	

Page 1 of 🛚 🛛

## RAMPS AND RAMP JUNCTIONS WORKSHEET

		RAM	PS AN	DRAMP	JUNC.	TIONS W	OR	KSHEET				
General Infor	rmation			Sit	e Infori	nation						
Analyst		DEA			Fre	eway/Dir	of T	Travel E	ASTBC	UND US	160	
Agency or Co	mpany	URS			Jur	nction		C	OFF TO	TO SH 172/CR 234		
Date Perform	ed	3/15/200	5		Jur	isdiction						
Analysis Time	Period	AM PEA	K		Ana	alysis Yea	ar	2	025 AL	<u>T 1'G</u>		
Project Descr	iption US	160							<u> </u>	<u> </u>		
Inputs		Tamain								- <b>F</b>		
Upstream Adj	Ramp	i errain								Downstre Ramp	eam Adj	
Ves	On									T Yes	🕼 On	
🖾 No 🛛	Off	•								No No	Cff	
L <sub>up</sub> = ft	1	e						40.0 mp		L <sub>down</sub> =	ft	
	h/h	5	FF ~ C	Jostala ( a	1 1		'FR -	- 40.0 mp	11 .	VD =	veh/h	
vu- ve			<u> </u>	Ketch (s	now lan	ies, L <sub>A</sub> , L	D, V F	<sub></sub> ,ν <sub>f</sub> )				
Conversion t	opc/hUno	der Base (	Sonditi	ons	ī —		<b>T</b>	<u>-</u>				
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>HV</sub>	fp	v=v/PHr f <sub>HV</sub> f <sub>p</sub>		
Freeway	1605	0.95	ling	5	0	0.	930	1.00	1816			
Ramp	585	0.95	Rol	ling	2	0	0.	971	1.00	634		
UpStream												
DownStream												
	Me	erge Areas			·			Div	erge Are	as		
Estimation o	f v <sub>12</sub>					Estimat	ion	of v <sub>12</sub>				
l = (Equat	= V <sub>12</sub> 12 vion 25-2 or	= V <sub>F</sub> ( P <sub>FM</sub> ) : 25-3)				   = (F	- - -	V <sub>12</sub> =	V <sub>R</sub> + (V <sub>i</sub> r 25-9)	- V <sub>R</sub> )P <sub>FD</sub>		
P = using E	austion //	Evhibit 25.	5)			$E_{EQ}$ (E	.എവവ നനന		- 20 0) Notion (E	white of 1	11)	
FM Using L			5)			FD = 1.0	14	using Ly		Ambit 25-		
v <sub>12</sub> - pc/n						$v_{12} - 18$	010	pc/n				
Capacity Che	ecks				<b>FO</b>	Capacit	y Cr	necks		·		
	Actual	Maxin	num	LOS	F?		_	Actual	Мах	imum	LOS F?	
Vro		See Exh	ibit 25-		Ļ	V <sub>Fl</sub> ≡V <sub>F</sub>	:	1816	40	500	No	
FO						V <sub>12</sub>		1816	440	0:All	No	
V <sub>P12</sub>		4600	:All			$V_{FO} = V_F - V_P$		1182	46	00	No	
R12					ŀ	V <sub>R</sub>		634	21	00	No	
Level of Serv	vice Detern	nination (i	f not F	)		Level of	f Sei	rvice Dete	rminatio	on (if not F	5)	
D <sub>R</sub> = 5.475 ·	+ 0.00734 v	/ <sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	Ľ,		D <sub>R</sub>	= 4.252 +	0.0086 \	/ <sub>12</sub> - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = (po	c/ mi /ln)					D <sub>R</sub> =	17.2	2 (pc/ mi /lı	n)		2	
LOS = (E	xhibit 25-4)					LOS=	B (E	Exhibit 25-4	4)			
Speed Estim	ation					Speed E	Estir	mation				
M <sub>s</sub> = (Exib	it 25-19)					D <sub>s</sub> =	0.42	20 (Exhibit	25-19)			
S <sub>p</sub> ≈ mnh	(Exhibit 25	-19)				S <sub>R</sub> =	52.4	4 mph (Ex	hibit 25-	19)		
S_= mph	(Exhibit 25					S <sub>o</sub> =	N/A	A mph (Fx	hibit 25-1	19)		
S = mnh	(Exhibit 25	-14)				S =	52 4	4 mph (Ev	hibit 25-	15)		
		· ·/				<u> </u>	<u></u>	- mpn ( <b>L</b>				

### $HCS2000^{TM}$

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

file://C.\Documents%20and%20Settings\ALLISON\Local%20Settings\Temp\r2k68.tmp 3/12/2005

RAMPS AND RAMP JUNCTIONS WORKSHEET														
General Infor	mation			Sit	e Inforr	nation								
Analyst		DEA			Fre	eway/Dir	of T	ravel	EASTB	OUND US	5 160			
Agency or Co	mpany	URS	_		Jur	iction			OFF TC	O SH 172/0	CR 234			
Date Performe	ed	3/15/200	5		Jur	isdiction								
Analysis Time	Period	PM PEA	K		Ana	alysis Ye	ar		2025 A	LT 1G				
Project Descri	ption US	160												
inputs	<u> </u>	Torrain												
Upstream Adj	Ramp	rerram								Downstr Ramp	eam Adj			
I Yes I	On									🕼 Yes	🗖 On			
I No I	Off									🕅 No	Coff			
L <sub>un</sub> = ft								<u> </u>		L <sub>down</sub> =	ft			
		S	<sub>FF</sub> = 6	60.0 mph	1	S	FR <sup>=</sup>	40.0 m	iph		veh/h			
Vu= ve	h/h		S	ketch ( s	how lan	es, L <sub>A</sub> , L	<sub>D</sub> ,V <sub>F</sub>	<sub>₹</sub> ,V <sub>f</sub> )		VD -	verm			
Conversion t	o pc/h Uno	der Base (	onditi	ons										
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>H∨</sub>	f <sub>p</sub>	v=V/PHI f <sub>HV</sub> f <sub>p</sub>	=			
Freeway	2525	0.95	Rol	ling	5	0	0.	930	1.00	2857				
Ramp	1180	0.95	Rol	ling	2	0	0.	971	1.00	1279				
UpStream														
DownStream														
	Me	erge Areas						D	iverge Ar	eas				
Estimation o	f v <sub>12</sub>					Estimat	ion	of v <sub>12</sub>						
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )		-				V <sub>12</sub>	= V <sub>R</sub> + (	V <sub>F</sub> - V <sub>R</sub> )P <sub>FC</sub>	)			
L <sub>EO</sub> = (Equat	ion 25-2 or	25-3)				L <sub>EO</sub> = (E	Iqua	tion 25-8	or 25-9)					
P <sub>EM</sub> = using E	ouation (I	Exhibit 25-	5)			$P_{FD} = 1.000$ using Equation (Exhibit 25-11)								
$V_{in} = nc/h$			,			$F_{D} = 1.000$ using Equation (Exhibit 25-11) V = = 2857 pc/b								
Canacity Ch	acks	" .				Canacit	V CI	pon						
	Actual	Maxin	num	105	F2	Capacit	<u>y ()</u>	Actual	Ma	vimum	LOS E2			
	7.0000					V_=V		2857	,vic	4600	No			
V <sub>FO</sub>		See Exh	ibit 25-		ł	<u>FI</u> F		2057			No			
· ·	- <u> </u>	·				v 12		2031		+UU.All	INU			
V <sub>R12</sub>		4600	:All			v <sub>FO</sub> = V V <sub>R</sub>	F	1578	4	600	No			
	· ·					V <sub>R</sub>		1279	2	100	No			
Level of Serv	vice Determ	nination (i	f not F	)		Level of	f Sei	rvice De	terminat	ion (if not l	F)			
D <sub>R</sub> = 5.475	+ 0.00734 v	0.00627	L <sub>A</sub>		D <sub>R</sub>	= 4.252	+ 0.0086	V <sub>12</sub> - 0.000	)9 L <sub>D</sub>					
D <sub>R</sub> = (p			D <sub>R</sub> =	26.	l (pc/ mi	/ln)		-						
LOS = (E	xhibit 25-4)					LOS= C (Exhibit 25-4)								
Speed Estim	ation					Speed I	Estir	nation						
$M_c = (Frib$	it 25-19)					$D_s = 0.478$ (Exhibit 25-19)								
S_= mnh	(Evhibit 25	-10)				S <sub>p</sub> =	51.4	4 mph (F	xhibit 25	i-19)				
$\mathbf{S} = \frac{\mathbf{mpn}}{\mathbf{s} - \mathbf{s}}$	$h_{R} = mph (Exhibit 25-19)$						NI/ /			(_1Q)				
$S_0 - mpn$	(Exhibit 25	-19) -14)				S = 51.4  mph (Exhibit 25-15)								
		-14/				15 = 51.4  mph (Exhibit 25-15)								

HCS2000<sup>TM</sup>

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

file://C:\Documents%20and%20Settings\ALLISON\Local%20Settings\Temp\r2k68.tmp 3/12/2005

## RAMPS AND RAMP JUNCTIONS WORKSHEET

General InformationSite InformationAnalystDEAFreeway/Dir of TravelEASTBOUND US 160Agency or CompanyURSJunctionON FROM SH 172/CR 234Date Performed $3/15/2005$ JurisdictionAnalysis Time PeriodAM PEAKAnalysis Year2025 ALT 1GProject DescriptionUS 160InputsUpstream Adj RampTerrainDownstream Ad Ramp $\blacksquare$ YesOnImputs $\square$ NoOffImputs $U_{up} = ft$ S FF = 60.0 mph Sketch ( show lanes, LA, LD, VR, Vf)Down treat VD = vehConversion to pc/h Under Base ConditionsValueValue	Àdj On Off	UND US 160				nation	e Inforr	Sif			motion	General Infor					
AnalystDEAFreeway/Dir of TravelEASTBOUND US 160 ON FROM SH 172/CR 234Agency or CompanyURSJunctionON FROM SH 172/CR 234Date Performed $3/15/2005$ JurisdictionAnalysis Time PeriodAM PEAKAnalysis Year $2025 \text{ ALT 1G}$ Project DescriptionUS 160ImputsUpstream Adj RampTerrainDownstream Ad Ramp $\blacksquare$ YesOnImputs $\square$ NoOffImputs $\square_{up} = ft$ S FF = 60.0 mph Sketch ( show lanes, LA, LD, VR, Vf)Down treat of the VD = treat of the	\dj On Off h/h	UND US 160				nation	•		shot DEA								
Agency or CompanyURSJunctionON FROM SH 172/CR 234Date Performed $3/15/2005$ JurisdictionAnalysis Time PeriodAM PEAKAnalysis Year $2025 \text{ ALT 1G}$ Project DescriptionUS 160InputsUpstream Adj RampTerrain $\blacksquare$ YesOnImputs $\blacksquare$ YesOn $\blacksquare$ NoOffImputs $\sqcup_{up} = ft$ $S_{FF} = 60.0 \text{ mph}$ $S_{FR} = 40.0 \text{ mph}$ Vu = veh/hSketch ( show lanes, L <sub>A</sub> , L <sub>D</sub> , V <sub>R</sub> , V <sub>f</sub> )VD = vehConversion to pc/h Under Base ConditionsVD = Veh	 Adj On Off h/h	0100 05 100	ASTBOU	ravel E	of T	eway/Dir	Fre			DEA		Analyst					
Date Performed $3/15/2005$ Jurisdiction         Analysis Time Period       AM PEAK       Analysis Year $2025 \text{ ALT 1G}$ Project Description       US 160       Imputs       Downstream Ad         Upstream Adj Ramp       Terrain       Downstream Ad         Yes       On       Terrain       Downstream Ad         No       Off       Yes       On       Mo       Coversion to pc/h Under Base Conditions	Àdj On Off	M SH 172/CR	N FRON 34	O 23		iction	Jun			URS	mpany	Agency or Cor					
Analysis Time Period       AM PEAK       Analysis Year       2025 ALT 1G         Project Description       US 160         Inputs       Upstream Adj Ramp       Terrain $\square$ Yes       On $\square$ Yes       Downstream Ad Ramp $\square$ Yes       On $\square$ Yes $\square$ Off $\square$ Yes $\square$ Off $\square$ up =       ft       S FF = 60.0 mph       S FR = 40.0 mph $\square$ Off $\square$ up =       ft       S Ketch ( show lanes, L <sub>A</sub> , L <sub>D</sub> , V <sub>R</sub> , V <sub>f</sub> ) $\square$ Development         Conversion to pc/h Under Base Conditions $\square$ Market Additions $\square$ Market Additions $\square$ Market Additions	Adj On Off h/h					isdiction	Juri		5	3/15/200	ed	Date Performe					
Project Description       US 160         Inputs       Downstream Ad         Upstream Adj Ramp       Terrain       Downstream Ad         Yes       On       Imputs       Imputs       Imputs       Imputs         No       On       Imputs	 Adj On Off h/h	[ 1G	025 ALT	20	ar	alysis Yea	Ana		K	AM PEA	Period	Analysis Time					
Inputs       Downstream Adj         Upstream Adj Ramp       Terrain       Downstream Adg         Yes       On       Yes       Terrain         No       Off       Yes       Terrain         Lup =       ft       S <sub>FF</sub> = 60.0 mph       S <sub>FR</sub> = 40.0 mph         Vu =       veh/h       Sketch ( show lanes, L <sub>A</sub> , L <sub>D</sub> , V <sub>R</sub> , V <sub>f</sub> )       VD =         Conversion to pc/h Under Base Conditions       VD       VD	Adj On Off h/h									160	iption US	Project Descri					
Upstream Adj RampDownstream Ad RampYesOnNoOff $L_{up} = ft$ $S_{FF} = 60.0 \text{ mph}$ Vu = veh/hSketch ( show lanes, $L_A, L_D, V_R, V_f$ )Conversion to pc/h Under Base Conditions	Adj On Off h/h	r								Townsin		Inputs					
Yes       Yes <thy< td=""><td>On Off h/h</td><td>Downstream A Ramp</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>rerrain</td><td>Ramp</td><td>Upstream Adj</td></thy<>	On Off h/h	Downstream A Ramp								rerrain	Ramp	Upstream Adj					
NoOffNoNoNo $L_{up} = ft$ $S_{FF} = 60.0 \text{ mph}$ $S_{FR} = 40.0 \text{ mph}$ $L_{down} = ft$ $Vu = veh/h$ Sketch ( show lanes, $L_A, L_D, V_R, V_f$ ) $VD = veh$ Conversion to pc/h Under Base Conditions	Off h/h	🖾 Yes 🗖 🤇									On	Martine Yes					
$L_{up} = ft$ $V_{u} = veh/h$ $V_{u} = veh/h$ $S_{FF} = 60.0 mph$ $S_{FR} = 40.0 mph$ $VD = veh$ $VD = veh$ $Conversion to pc/h Under Base Conditions$	h/h	🖾 No 🛛 🖾 🤇									Off	🖾 No 🖉					
up $S_{FF} = 60.0 \text{ mph}$ $S_{FR} = 40.0 \text{ mph}$ Vu = veh/hSketch ( show lanes, $L_A, L_D, V_R, V_f$ )VD = vehConversion to pc/h Under Base Conditions	h/h	L <sub>down</sub> = ft				•						L <sub>un</sub> = ft					
Conversion to pc/h Under Base Conditions		VD = veh	ו	40.0 mpł ,V <sub>f</sub> )	FR <sup>≕</sup> <sub>D</sub> ,V <sub>R</sub>	S ies, L <sub>A</sub> , L	ı how lan	60.0 mph ketch ( s	<sub>FF</sub> = (	S	⊧h/h	Vu = ve					
		<b>A</b>				······································		ons	Conditi	der Base (	to pc/h Une	Conversion to					
$(pc/h)$ $V$ PHF Terrain Truck %Rv $f_{HV}$ $f_p$ $f_{HV}$ $f_p$		v=V/PHF f <sub>HV</sub> f <sub>p</sub>	f <sub>p</sub>	f <sub>HV</sub>		%Rv	Truck	rrain	Te	PHF	V (Veh/hr)	(pc/h)					
Freeway 1020 0.95 Rolling 5 0 0.930 1.00 1154		1154	1.00	930	0.	0	5	ling	Rol	0.95	1020	Freeway					
Ramp 110 0.95 Rolling 2 0 0.971 1.00 119		119	1.00	971	0.	0	2	ling	Rol	0.95	110	Ramp					
UpStream									UpStream								
DownStream											L	DownStream					
Diverge Areas Diverge Areas		IS	erge Area	Dive		<b>F</b> adin at		<u> </u>		erge Areas	Me						
				or v <sub>12</sub>		Estimati		·· · ·			<sup>r v</sup> <sub>12</sub>	Estimation of					
$V_{12} = V_F (P_{FM})$ $V_{12} = V_R + (V_F - V_R)P_{FD}$		- V <sub>R</sub> )P <sub>FD</sub>	V <sub>R</sub> + (V <sub>F</sub>	V <sub>12</sub> =						= V <sub>F</sub> ( P <sub>FM</sub> )	V <sub>12</sub> =						
$L_{EQ} = (Equation 25-2 \text{ or } 25-3)$ $L_{EQ} = (Equation 25-8 \text{ or } 25-9)$			r 25-9)	ion 25-8 o	qua	L <sub>EQ</sub> = (E				25-3)	ion 25-2 or	L <sub>EQ</sub> = (Equati					
$P_{FM}$ = 1.000 using Equation (Exhibit 25-5) $P_{FD}$ = using Equation (Exhibit 25-11)		5-11)	Exhibit 25	Equation (	sing	P <sub>FD</sub> = u		5)	ibit 25-	tion (Exh	using Equa	Ρ <sub>FM</sub> =1.000 ι					
$V_{12}$ = 1154 pc/h $V_{12}$ = pc/h					:/h	V <sub>12</sub> = po					pc/h	V <sub>12</sub> = 1154 p					
Capacity Checks Capacity Checks				ecks	y Ch	Capacity					ecks	Capacity Che					
Actual Maximum LOS F? Actual Maximum LOS	<u>S F?</u>	mum LOS	Maxin	Actual	_		<u>F?</u>	LOS	num	Maxir	Actual						
$V_{FO}$ 1273 4600 No $V_{FI} = V_{F}$ See Exhibit 25- 14		1)bit 25- 4	See Exh		:	V <sub>FI</sub> =V <sub>F</sub>	,	No	0	460	1273	V <sub>FO</sub>					
V <sub>12</sub> 4400:All		):All	4400			V <sub>12</sub>											
$V_{FO} = V_F -$ See Exhibit 25- V_{P12} 1273 4600:All No $V_P$ 14		nibit 25- 4	See Exh 14		= -	$V_{FO} = V_{F}$		No	):All	4600	1273	V <sub>P12</sub>					
V <sub>R</sub> See Exhibit 25-3		ibit 25-3	See Exhi			V <sub>R</sub>					12/0	R12					
Level of Service Determination (if not F) Level of Service Determination (if not F)		n (if not F)	rmination	vice Deter	<sup>r</sup> Ser	Level of		)	if not F	nination (i	vice Detern	Level of Serv					
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ $D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$		<sub>12</sub> - 0.0009 L <sub>D</sub>	0.0086 V <sub>1</sub>	= 4.252 + (	D <sub>R</sub>		LA	$D_{R} = 5.475 + 0.00734 v_{R} + 0.0078 V_{12} - 0.00627 L_{A}$									
$D_{R} = 11.6 \text{ (pc/ mi /ln)}$ $D_{R} = (\text{pc/ mi /ln})$				mi /ln)	(pc/	D <sub>R</sub> =				ln)	.6 (pc/ mi /	D <sub>R</sub> = 11.					
LOS = B (Exhibit 25-4) LOS= (Exhibit 25-4)				ibit 25-4)	(Exł	LOS=				-4)	(Exhibit 25	LOS = B					
Speed Estimation Speed Estimation				nation	stin	Speed E					ation	Speed Estima					
$M_s = 0.287$ (Exibit 25-19) $D_s =$ (Exhibit 25-19)	$D_{\rm s}$ = (Exhibit 25-19)								-19)	7 (Exibit 25	$M_{s} = 0.287$						
$S_{-} = 54.8 \text{ mnh}$ (Exhibit 25.10) $S_{-} = \text{mnh}$ (Exhibit 25.19)			5-19)	، Exhibit 2 (Exhibit	mpł	S <sub>R</sub> =				bit 25-19)	mnh (Fyhi	$S_{p} = 54.8$					
		$S_0 = mph$ (Exhibit 25-19)					<ul> <li>54.8 mph (Exhibit 25-19)</li> <li>N/A mph (Exhibit 25-19)</li> </ul>										

S=	54.8 mph (Exhibit 25-14)	S =	mph (Exhibit 25-15)

 $HCS2000^{\text{TM}}$ 

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	PS AN	DRAMP	ICTIONS WORKSHEET								
General Infor	rmation			Sit	e Infor	mation							
Analyst		DEA			Fre	eway/Dir	of Tr	avel	EASTBO	OUND US	5 160 2 (CP		
Agency or Co	mpany	URS			Jur	nction		,	on fro 234	M SH 1/	2/CR		
Date Performe	ed	3/15/2005	5		Jur	isdiction							
Analysis Time	Period	PM PEA	K		An	alysis Yea	ar		2025 AL	T 1G			
Project Descri	iption US	160											
Inputs		Torrain								1			
Upstream Adj	Ramp	Terrain								Downstro Ramp	eam Adj		
Ves 🖿	On									T Yes	🗖 On		
🕅 No 🛛	Off									🕅 No	Cff Off		
L <sub>up</sub> = ft				20.0				40.0		_L <sub>down</sub> =	ft		
	h./l-	5	FF = t	50.0 mpr	1 	$S_{FR} = 40.0 \text{ mph}$ VD = veh							
vu= ve	en/n		S	ketch (s	how lar	ies, L <sub>A</sub> , L <sub>I</sub>	<u>,</u> ,V <sub>R</sub> ,	V <sub>f</sub> )					
Conversion t	o pc/h Un	der Base (	onditi	ons		r	·	·····					
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f	HV	f <sub>p</sub>	v=v/₽нг f <sub>HV</sub> f <sub>p</sub>	-		
Freeway	1345	0.95	Rol	ling	5	0	0.9	030	1.00	1522			
Ramp	240	0.95	Rol	ling	2	0	0.9	071	1.00	260			
UpStream													
DownStream	L				L		I	<u> </u>	•				
	Me	erge Areas				<b>F</b> - 4 <sup>2</sup> - 4 <sup>2</sup>			verge Are	as			
Estimation o	<sup>T V</sup> 12					Estimati		r v <sub>12</sub>					
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>I</sub>	<sub>F</sub> - V <sub>R</sub> )P <sub>FD</sub>			
L <sub>EQ</sub> = (Equat	ion 25-2 or	25-3)				$L_{EQ} = (Equation 25-8 \text{ or } 25-9)$							
P <sub>FM</sub> = 1.000 a	using Equa	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)							
V <sub>12</sub> = 1522	pc/h					$V_{12} = pc$	:/h						
Capacity Che	ecks					Capacit	y Che	ecks					
	Actual	Maxin	num	LOS	F?			Actual	Max	imum	LOS F?		
VEO	1782	460	)	No	)	V <sub>FI</sub> =V <sub>F</sub>	:		See Ex	(hibit 25- 14			
						V <sub>12</sub>			440	0:All	<u> </u>		
Vala	1782	4600	۰Ali	No		V <sub>FO</sub> = V <sub>F</sub>			See Ex	chibit 25- 14			
* R12	1702	4000	.7 .11	110	ĺ		-+		See Ex	hibit 25-3			
Level of Sen	vice Deterr	nination (i	f not F	<u> </u>		l evel of	- L	vice Det	orminatio	n (if not F	=}		
D = 5.475	+ 0 00734	$\frac{1}{1} + 0.007$	8 V -	/ 0.00627	1	Level Of		= 4 252 +	0.0086 \	/ _ 0.000	<u> </u>		
$D_{\rm R} = 0.470$	⊾A	n –			0.0000	12 - 0.000	- <u>-</u> D						
$D_R = 15$		in)				$D_R =$	(pc/ r	ти /ит) 					
LOS = B	(Exhibit 25	-4)				LOS=	(Exhi	bit 25-4)					
Speed Estim	ation				<u> </u>	Speed Estimation							
M <sub>s</sub> = 0.29	6 (Exibit 25	i-19)				$\nu_{\rm s} = (\text{Exhibit 25-19})$							
S <sub>R</sub> = 54.7	<sub>R</sub> = 54.7 mph (Exhibit 25-19)						$S_R = mph$ (Exhibit 25-19)						
S <sub>0</sub> = N/A	N/A mph (Exhibit 25-19)						S <sub>0</sub> = mph (Exhibit 25-19)						

S=	54.7 mph (Exhibit 25-14)	S =	mph (Exhibit 25-15)

 $HCS2000^{\text{TM}}$ 

Copyright © 2000 University of Florida, All Rights Reserved

	RAMPS AND RAMP JUNCTIONS WORKSHEET													
General Infor	mation			Sit	e Infori	nation	-							
Analyst		DEA			Fre	eway/Dir	of <sup>-</sup>	Travel	WEST	BOUND	US 160			
Agency or Co	mpany	URS			Jur	nction			OFF T	O SH 172	/CR 234			
Date Performe	ed	3/15/2005	5		Jur	isdiction								
Analysis Time	Period	AM PEA	K	··	Ana	alysis Yea	ar		2025 A	ALT 1G				
Project Descri	ption US	160												
Inputs		Tamaia												
Upstream Adj	Ramp	rerrain								Downs Ramp	tream Adj			
Ves 🖿	On									T Yes	s 🗖 On			
🗖 No 🖉	Off	-								No 🕅	M Off			
L <sub>up</sub> = ft		S	= f	50.0 mpt				= 40.0 m	nh	<sup>L</sup> down <sup>=</sup>	= ft			
Vu= ve	h/h	Ū	FF S	ketch ( s	bowlar	ا اعمر	FR V	V)	ipii	VD =	veh/h			
Conversion	o no/h Un	dar Bass (	onditi				D, •	R' <sup>v</sup> f/						
Conversion			Unuti	0115	I		T	T		v=V/P	-IF			
(pc/h)	v (Veh/hr)	PHF	Te	rrain	Truck	%Rv	v f <sub>HV</sub> f <sub>p</sub>			f <sub>HV</sub> f <sub>p</sub>				
Freeway	935	0.95	Rol	ling	5	0	0	.930	1.00	105	8			
Ramp	135	0.95	Rol	ling	2	0	0	.971	1.00	140	146			
UpStream														
DownStream						L		<u> </u>						
	Me	erge Areas						U	iverge A	Areas				
Estimation o	r V <sub>12</sub>					Estimat		or $v_{12}$						
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>12</sub>	= V <sub>R</sub> +	(V <sub>F</sub> - V <sub>R</sub> )P <sub>I</sub>	=D			
L <sub>EQ</sub> = (Equat	ion 25-2 or	25-3)				L <sub>EQ</sub> = (E	Equa	ation 25-8	3 or 25-9	))				
P <sub>FM</sub> = using E	quation (I	Exhibit 25-	5)			P <sub>FD</sub> =1.000 using Equation (Exhibit 25-11)								
V <sub>12</sub> = pc/h						$V_{12} = 10$	58	pc/h						
Capacity Ch	ecks					Capacit	y C	hecks	;					
	Actual	Maxim	num	LOS	F?	<u></u>	<u> </u>	Actual	N	laximum	LOS F?			
	1	Soo Evh	hit 25			V <sub>c1</sub> =V	-	1058	_	4600	No			
V <sub>FO</sub>		5ee Lxii	DII 20-		· F	V <sub>12</sub>	-	1058		4400:All	No			
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V V <sub>R</sub>	F -	912	-	4600	No			
						V <sub>R</sub>		146		2100	No			
Level of Serv	vice Deterr	nination (i	f not F	)		Level of	f Se	rvice De	termina	tion (if no	t F)			
D <sub>R</sub> = 5.475 ·	0.00627	'L <sub>A</sub>		DR	= 4.252	+ 0.008	6 V <sub>12</sub> - 0.0	009 L <sub>D</sub>						
D <sub>R</sub> = (pr	c/ mi /ln)		12		~	D <sub>R</sub> =	10.	7 (pc/ mi	/ln)		2			
LOS = (E	xhibit 25-4)	)				LOS=	В (	Exhibit 2	5-4)					
Speed Estim	ation					Speed Estimation								
$M_{c} = (Exib)$	it 25-19)					$D_s = 0.376$ (Exhibit 25-19)								
$S_{n} = mnh$	(Evhihit 25	-10)				S <sub>B</sub> = 53.2 mph (Exhibit 25-19)								
S = mnh (Exhibit 25 10)							$S_0 = N/A \text{ mph}$ (Exhibit 25-19)							
$S_0$ - mph	$P_0 = mph$ (Exhibit 25-19) S= mph (Exhibit 25-14)							2 mnh (1	Exhibit ?	. <u>0-10)</u> 25-15)				
	S= mph (Exhibit 25-14)								<b>p</b> - 33.2 mpn (Exnibit 25-15)					

Copyright © 2000 University of Florida, All Rights Reserved

	RAMPS AND RAMP JUNCTIONS WORKSHEET													
General Info	rmation			Sit	te Infori	nation								
Analyst		DEA			Fre	eway/Dir	of Trave	I V	VESTB	OUND U	S 160			
Agency or Co	mpany	URS			Jur	nction		C	FF TO	SH 172/0	CR 234			
Date Perform	ed	3/15/200	5		Jur	isdiction								
Analysis Time	Period	PM PEA	K		Ana	alysis Yea	ər	2	025 AI	LT 1G				
Project Descr	iption US	160					·				······			
Inputs								-						
Upstream Adj	Ramp	Terrain								Downstr Ramp	eam Adj			
TYes T	On									T Yes	ll On			
🖾 No 🖉	Off									🗖 No	I Off			
L = ft							<u>.</u>			L <sub>down</sub> =	ft			
		S	FF = (	30.0 mph	ו	S	<sub>FR</sub> = 40	.0 mpl	h		vob/b			
Vu = ve	h/h		S	ketch ( s	how lan	v lanes, $L_A$ , $L_D$ , $V_R$ , $V_f$ )								
<b>Conversion</b>	o pc/h Und	der Base (	conditi	ons										
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>HV</sub>		fp	v=V/PH f <sub>HV</sub> f <sub>p</sub>	=			
Freeway	1450	0.95	Rol	ling	5	0	0.930		1.00	1641				
Ramp	205	0.95	Rol	ling	2	0	0.971		1.00	222				
UpStream														
DownStream														
	Me	rge Areas						Dive	erge Are	eas				
Estimation o	f v <sub>12</sub>					Estimati	ion of v <sub>1</sub>	2						
	V <sub>12</sub> =	V <sub>F</sub> (P <sub>FM</sub> )						V <sub>12</sub> =	V <sub>R</sub> + (V	/ <sub>F</sub> - V <sub>R</sub> )P <sub>FF</sub>	)			
$L_{EO} = (Equat$	ion 25-2 or	25-3)				L <sub>EQ</sub> = (Equation 25-8 or 25-9)								
P <sub>EN</sub> = using F	ouation ()	- - xhibit 25-	5)			$P_{ED} = 1.000$ using Equation (Exhibit 25-11)								
$V_{in} = pc/h$			-)			$V_{} = 16$	$\frac{1}{1}$ nc/h	·9 – 4			•••			
Capacity Ch	acks					Canacit	v Check	~			· ·			
	Actual	Maxin	um	105	F2	Joapach		tual	Ma	vimum	LOS F2			
	/10100/				<u> </u>	 V =V	16	<u>/1</u>	1110	600	No.			
V <sub>FO</sub>		See Exh	ibit 25-			<u>FI</u> F	10	+1 						
		· · · ·				v <sub>12</sub>	16	41	44	00:Ali	NO			
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V <sub>F</sub>	- 14	19	40	500	No			
						V <sub>R</sub>	22	2	2	100	No			
Level of Serv	vice Detern	nination (i	f not F	)		Level of	Service	Dete	rminati	on (if not i	F)			
D <sub>R</sub> = 5.475 ·	+ 0.00734 v	/ <sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	L <sub>A</sub>		$D_{R} = 4.2$	252 +	0.0086	V <sub>12</sub> - 0.000	)9 L <sub>D</sub>			
D <sub>R</sub> = (po	c/ mi /ln)					D <sub>R</sub> =	15.7 (pc	/ mi /lr	ו)		-			
LOS = (E	xhibit 25-4)					LOS=	${ m B}$ (Exhib	it 25-4	4)					
Speed Estim	ation					Speed Estimation								
$M_c = (Exib)$	it 25-19)					$D_s = 0.383$ (Exhibit 25-19)								
S_= mnh	(Evhibit 25	-10)				$S_{\rm R}$ = 53.1 mph (Exhibit 25-19)								
S = mnh (Exhibit 25 10)							$S_0 = N/A mph$ (Exhibit 25-19)							
$S_0 - mph$	$b_0 = mph$ (Exhibit 25-19)							п (⊏X) ⊾ /⊏		15) 15)				
P- mpn		-14)				$\beta = 53.1 \text{ mph} (\text{Exhibit 25-15})$								

Copyright © 2000 University of Florida, All Rights Reserved

	RAMPS AND RAMP JUNCTIONS WORKSHEET											
General Infor	mation			Sit	te Infor	mation	_					
Analyst	mpany	DEA			Fre	eway/Dir	of Travel	W O	/ESTBC	OUND U M SH 17	S 160 2/CR	
Agency of Col	прапу	UKS			Jui	iction		2	34			
Date Performe	ed Deviced	3/15/2005	5		Jur	isdiction				10		
Analysis Time	Period	AM PEA	<u>K</u>		An	alysis Yea	ar	2	025 AL1	IG		
Inputs		100							<u> </u>			
Upstream Adj	Ramp	Terrain		··						Downstro Ramo	eam Adj	
🗖 Yes 🛛	On									T Yes	🕼 On	
No 🗖	Off									🕅 No	Cff Off	
L <sub>up</sub> = ft		s	= (			S		) mpl	<u> </u>	L <sub>down</sub> =	ft	
Vu= ve	h/h		S	ketch ( s	how lar	nes, L <sub>A</sub> , L	<sub>D</sub> ,V <sub>R</sub> ,V <sub>f</sub> )		-	VD =	veh/h	
Conversion t	o pc/h Une	der Base C	Conditi	ons	T	<u> </u>		· · · ·			•	
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv	f <sub>HV</sub>		f <sub>p</sub>	v=v/PHF f <sub>HV</sub> f <sub>p</sub>	-	
Freeway	800	0.95	Rol	ling	5	0	0.930		1.00	905		
Ramp	885	0.95	Rol	ling	2	0	0.971		1.00	960		
UpStream						Į				<b> </b>		
DownStream	Me	arge Areas						Dive	arga Ares			
Estimation of	fv	Age Aleas				Estimati	on of v.	Dive				
	<u> </u>	= V (P )					<u> </u>	/ -				
= (Equat	12 <sup>-</sup> 12 -	~ F ( ' FM/ 25 3)					austion 2	12 - 5 9 0	<sup>V</sup> R ' ( <sup>V</sup> F	- VR/FFD		
$E_{EQ} = (EQUAL)$		20-0) tion (Evhi	h# 25 /	=)		$L_{EQ} = (Equation 25-8 \text{ or } 25-9)$ $P_{EQ} = using Equation (Exhibit 25-11)$						
$F_{\rm FM} = 1.000$ C	using ⊏qua ./⊾		011 20-3	5)		$P_{FD} =$ using Equation (Exhibit 25-11)						
$v_{12}$ = 903 pc					······	$v_{12} - pc$	Checks					
Capacity Che		Maxim		109	F2	Capacit			Maxi	mum	LOS E2	
V	1965	460	<u>.</u>			V <sub>FI</sub> =V <sub>F</sub>			See Ext	nibit 25- 4	2001	
v FO	1805	4000	J.	ino	·	V <sub>12</sub>			4400	D:All	,	
Vau	1865	4600	۰All	No		V <sub>FO</sub> = V <sub>F</sub>	-		See Ext	nibit 25- 4		
* R12	1005		.7	110		V <sub>R</sub>			See Exh	ibit 25-3		
Level of Serv	ice Detern	nination (i	f not F	)		Level of	Service	Deter	rminatio	n (if not l	)	
D <sub>R</sub> = 5.475 +	'L <sub>A</sub>		D <sub>R</sub> = 4.28	52 + (	0.0086 V	<sub>12</sub> - 0.000	9 L <sub>D</sub>					
D <sub>R</sub> = 15	.8 (pc/ mi /	ln)				D <sub>R</sub> =	(pc/ mi /ln	)				
LOS = B	(Exhibit 25-	-4)				LOS=	(Exhibit 2	5-4)				
Speed Estima	ation				- <u></u>	Speed E	stimation	1	·····			
M <sub>s</sub> = 0.298	3 (Exibit 25	-19)				D <sub>s</sub> = (Exhibit 25-19)						
S <sub>R</sub> = 54.6	$B_{\rm B}^{=}$ 54.6 mph (Exhibit 25-19)						S <sub>R</sub> = mph (Exhibit 25-19)					
$S_0 = N/A$	mph (Exhi			S <sub>0</sub> = mph (Exhibit 25-19)								

Version 4.1d

S=	54.6 mph (Exhibit 25-14)	S	=	mph (Exhibit 25-15)	
HCS2000T	M	Copyright © 2000 University of Flor	rida, All F	Rights Reserved	

HCS2000<sup>TM</sup>

## RAMPS AND RAMP JUNCTIONS WORKSHEET

RAMPS AND RAMP JUNCTIONS WORKSHEET												
General Infor	mation			Sit	te Infori	mation						
Analyst		DEA			Fre	eway/Dir	of Travel	W	ESTBO	UND US	5 160	
Agency or Co	mpany	URS			Jur	nction		O 23	N FRON 14	M SH 172	2/CR	
Date Performe	ed	3/15/200	5		Jur	isdiction						
Analysis Time	Period	PM PEA	K		An	alysis Yea	ar	20	25 ALT	Г 1 <b>G</b>		
Project Descri	ption US	160										
Inputs				<u>-</u>								
Upstream Adj	Ramp	Terrain								Downstre Ramp	eam Adj	
Tes 📓	On									🕅 Yes	M On	
No 🕅	Off									No No	C Off	
L <sub>up</sub> = ft										L <sub>down</sub> =	π	
Vu≖ ve	h/h	S	FF <sup>= 6</sup> S	ketch ( s	n show lar	nes, L <sub>A</sub> , L	r <sub>FR</sub> = 40.0 <sub>D</sub> ,V <sub>R</sub> ,V <sub>f</sub> )	u mpn		VD =	veh/h	
Conversion t	o pc/h Un	der Base (	Conditi	ons		``	······································			······	· · · · · · · · · · · · · · · · · · ·	
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>H∨</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>		
Freeway	1245	0.95	Rol	ling	5	0	0.930		1.00	1409		
Ramp	1045	0.95	Rol	ling	2	0	0.971		1.00	1133		
UpStream												
DownStream	L,					ļ		<u> </u>			· · · · · · · · · · · · · · · · · · ·	
	Me	erge Areas				<b>F</b> adanad		Dive	rge Area	as		
Estimation of	r v <sub>12</sub>					Estimat	on of $v_{12}$					
	V <sub>12</sub> :	= V <sub>F</sub> ( P <sub>FM</sub> )					١	√ <sub>12</sub> = `	V <sub>R</sub> + (V <sub>F</sub>	- V <sub>R</sub> )P <sub>FD</sub>		
L <sub>EQ</sub> = (Equat	ion 25-2 oi	<sup>-</sup> 25-3)				L <sub>EQ</sub> = (E	quation 2	5-8 or	25-9)			
P <sub>FM</sub> = 1.000 ι	using Equa	tion (Exh	ibit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)						
V <sub>12</sub> = 1409 p	oc/h					$V_{12} = pc$	:/h					
Capacity Che	ecks					Capacit	y Checks					
	Actual	Maxir	num	LOS	F?		Act	ual	Maxi	mum	LOS F?	
V <sub>FO</sub>	2542	460	0	Nc	,	V <sub>FI</sub> =V <sub>F</sub>			See Ext	hibit 25- 4		
		_				V <sub>12</sub>			440	0:All		
Vero	2542	4600	):All	No		V <sub>FO</sub> = V <sub>I</sub> V <sub>P</sub>			See Exi 1	hibit 25- 4		
R12	2012			110	Í	V <sub>R</sub>			See Exh	nibit 25-3		
Level of Serv	vice Deteri	mination (i	if not F	)		Level of	Service	Deter	minatio	n (if not F	=)	
$D_{R} = 5.475 + 0.00734 v_{R} + 0.0078 V_{12} - 0.00627 L_{A}$							D <sub>R</sub> = 4.2	52 + 0	0.0086 V	<sub>12</sub> - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = 21		D <sub>R</sub> =	(pc/ mi /lr	ı)								
LOS = C	(Exhibit 25	-4)				LOS=	(Exhibit 2	5-4)				
Speed Estim	ation	- /		<u></u>		Speed E	stimatio	<u></u>	<u> </u>			
$M_0 = 0.322$	3 (Exibit 25	5-19)				D <sub>s</sub> = (Exhibit 25-19)						
$S_{-} = 54.2 \text{ mnh} (Exhibit 25-19)$						$S_{p} = mph$ (Exhibit 25-19)						
$S_{0} = N/A$	mph (Exh	ibit 25-19)				$S_0 = mph$ (Exhibit 25-19)						
			1									

### RAMPS AND RAMP JUNCTIONS WORKSHEET

S=	54.2 mph (Exhibit 25-14)	)		S =	mph	(Exhibit 25-15)	 
	T) (						

HCS2000<sup>TM</sup>

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	PS AN	D RAMF	JUNC	NCTIONS WORKSHEET							
General Infor	mation			Sit	e Infori	nation				-			
Analyst		DEA			Fre	eway/Dir	of 7	Fravel	WES	STBO	UND US	5 160	
Agency or Co	mpany	URS			Jur	nction			OFF	TO C	CR 233		
Date Performe	ed	3/15/200	5		Jur	isdiction							
Analysis Time	Period	AM PEA	K		Ana	alysis Yea	ar		2025	ALT	<u>1G</u>		
Project Descri	ption US	160											
Inputs													
Upstream Adj	Ramp	Terrain									Downstre Ramp	am Adj	
🖾 Yes 🗖	On										TYes	🔲 On	
No 🕅	Off										🕅 No	l Off	
L <sub>up</sub> = ft		s	= (	30.0 mph	1	S		= 40.0 i			L <sub>down</sub> =	ft	
Vu= ve	h/h		rr S	ketch ( s	how lan	es. L., L	-к V.	V.)			VD =	veh/h	
Conversion t	o pc/h Uno	ler Base (	Conditi	ons		<u> </u>	<u>D' ' I</u>	<u> </u>			<u>I</u>		
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv f <sub>HV</sub>		f	<b>.</b>	v=V/PHF f <sub>HV</sub> f <sub>n</sub>			
Freeway	1685	0.95	Rol	ling	5	0	0.930 1.00				1907		
Ramp	290	0.95	Rol	ling	2	0	Ō	971	1.0	0	314		
UpStream		0.20	1001	<u></u>	<u> </u>			.>71					
DownStream													
	Me	rge Areas			· · · · · · · · · · · · · · · · · · ·			]	Diverge	e Area	S		
Estimation o	f v <sub>12</sub>					Estimat	ion	of v <sub>12</sub>					
	V40 =	· V <sub>E</sub> ( P <sub>EM</sub> )						Va	_ = V	+ (V	- V)P		
I = (Fouat	ion 25-2 or	<u>Γ`</u> Γ™′ 25-3)				   = (F	ัดบร	ntion 25-	2 R 8 or 25	(_9)	K' FD		
P = using E	Guation (F	zo o) Evhibit 25-	5)			$P_{FD} = 1.000$ using Equation (Exhibit 25-11)							
	quation (L		)			FD = 1.0	000	using	Equalit		(111Dit 20-1	• /	
v <sub>12</sub> - pc/fi						v <sub>12</sub> - 19	07	pc/n					
Capacity Che	ecks	Maria				Capacit	y Ci	necks					
·	Actual	Maxin	num	LOS	F?			Actua		Maxi	num	LUSF	
Vro		See Exh	ibit 25-			V <sub>FI</sub> =V <sub>F</sub>	-	1907		46	00	No	
FU		(				V <sub>12</sub>		1907		4400	D:All	No	
V <sub>B12</sub>		4600	:All			V <sub>FO</sub> = V <sub>I</sub> V <sub>R</sub>	F -	1593		460	00	No	
					ľ	V <sub>R</sub>		314		210	00	No	
Level of Serv	vice Detern	nination (i	f not F	)		Level of	f Se	rvice D	etermi	natior	n (if not F	)	
$D_{p} = 5.475 +$	Ľ,		Dp	= 4.252	+ 0.00	086 V.	12 - 0.0009	9 L <sub>D</sub>					
D <sub>R</sub> = (po	~	D <sub>R</sub> =	18.	0 (pc/ m	i /ln)		12	0					
LOS = (E)	xhibit 25-4)					LOS= B (Exhibit 25-4)							
Speed Estim	ation				_	Speed E	Estii	mation					
M <sub>e</sub> = (Exib	it 25-19)					$D_{\rm s} = 0.391$ (Exhibit 25-19)							
S <sub>R</sub> = mph	S <sub>R</sub> = mph (Exhibit 25-19)							S <sub>R</sub> = 53.0 mph (Exhibit 25-19)					
S <sub>0</sub> = mph	$S_0 = mph$ (Exhibit 25-19)							A mph (	Exhibi	t 25-1	9)		
S= mph	5₀ <sup>=</sup> mph (Exhibit 25-19) 5= mph (Exhibit 25-14)							S = 53.0 mph (Exhibit 25-15)					

HCS2000<sup>TM</sup>

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	PS AN	D RAMF	<b>JUNC</b>	<b>FIONS W</b>	ORKSH	ET				
General Infor	rmation			Sit	te Inforr	nation						
Analyst Agency or Company		DEA Fre				eway/Dir of Travel WESTE				BOUND US 160		
Agency or Company		URS Jur				oction OFF TC				O CR 233		
Date Performed		3/15/2005 Jur				isdiction						
Analysis Time	Period	PM PEA	K		Ana	alysis Yea	ar	2	025 AL	<u>.T 1G</u>		
Project Descri	iption US	160								<u></u>		
Inputs		<b>T</b>										
Upstream Adj Ramp		lerrain						Downstream Adj Ramp				
Yes	On				l On							
🖩 No 📓 Off										No 🕅	C Off	
L <sub>up</sub> = ft	:	$S_{rr} = 60.0 \text{ mph}$ $S_{rr} = 40.0 \text{ mph}$							<u></u> ו	L-down =	π	
Vu = veh/h			s	ketch (s	show lan	es, L <sub>A</sub> , L	$\nabla_{\mathbf{D}}, \nabla_{\mathbf{D}}, \nabla_{\mathbf{z}}$			VD =	veh/h	
Conversion t	o pc/h Un	der Base C	Conditi	ons		· A.	י אי ט				<u></u>	
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>HV</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>n</sub>		
Freeway	2290	0.95	Rol	ling	5	0	0.930	+	1.00	2591		
Ramp	280	0.95	Rol	ling	2	0	0.971		1.00	304		
UpStream												
DownStream												
	Me	erge Areas				Diverge Areas						
Estimation o	f v <sub>12</sub>			-		Estimat	ion of v <sub>1.</sub>	2				
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>12</sub> =	V <sub>R</sub> + (V	<sub>F</sub> - V <sub>R</sub> )P <sub>FD</sub>		
L <sub>EO</sub> = (Equat	ion 25-2 or	25-3)				L <sub>EO</sub> = (E	quation 2	25-8 o	r 25-9)			
P <sub>r</sub> , ≈ using E	Equation (1	, Exhibit 25-	5)			$P_{cn} = 1.0$	)00 usir	na Fai	vation (F	-xhibit 25-	11)	
$V_{in} = nc/h$			- /			$V_{10} = 25$	01 nc/h	.9 - 4.				
Canacity Ch	acks					Canacit	V Check					
	Maximum			F2			tual	Maximum		LOS F2		
	Actual					V =V		01		600	No	
V <sub>FO</sub>		See Exhibit 25- 7					25	01	<u>4400-</u>		No	
·		+				$V_{FO} = V_{II}$	= - 22	87	44	50.All	No	
V <sub>R12</sub>		4600:All				V <sub>R</sub>		2201		,00		
						V <sub>R</sub> 30		)4	2100		No	
Level of Serv	vice Deterr	nination (i	f not F	)		Level of	Service	Dete	rminatio	on (if not l	<u>F)</u>	
D <sub>R</sub> = 5.475 ·	+ 0.00734 \	/ <sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	<sup>r</sup> L <sub>A</sub>		D <sub>R</sub> = 4.2	252 + (	0.0086 \	V <sub>12</sub> - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = (po	c/ mi /ln)					D <sub>R</sub> =	23.8 (рс	/ mi /lr	1)			
LOS = (E)	xhibit 25-4)					LOS=	C (Exhib	it 25-4	4)			
Speed Estim	ation					Speed E	Stimatic	n				
M <sub>s</sub> = (Exib	it 25-19)					D <sub>s</sub> =	0.390 (E	xhibit	25-19)			
$S_R = mph$ (Exhibit 25-19)				S <sub>R</sub> = 53.0 mph (Exhibit 25-19)								
$S_R$ - mpn (Exhibit 25-19) $S_0$ = mph (Exhibit 25-19)						$S_0 = N/A mph$ (Exhibit 25-19)						
S= mph	(Exhibit 25	-14)				S =	53.0 mp	h (Ex	hibit 25-	15)		
		<b>/</b>	- · ·			-						

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

file://C:\Documents%20and%20Settings\ALLISON\Local%20Settings\Temp\r2kC8.tmp 3/12/2005

			FREEWA	Y WEAV	<b>ING WOR</b>	KSHEE	Γ				
General	Informati	on			Site Info	rmation		_			
Analyst Agency/Company Date Performed Analysis Time Period		DEA URS 3/15/2 AM PE	005 EAK		Freeway/Dir of Travel Weaving Seg Location Jurisdiction Analysis Year		WESTBOUND US 160 CR 233 ON TO US 550 OFF 2025 ALT 1G				
Inputs				·				<u></u>			
Freeway free-flow speed, S Weaving number of lanes, Weaving seg length, L (ft) Terrain		SFF (mi/h) N	ni/h) 60 3 2070 Rolling			Weaving type Volume ratio, VR Weaving ratio, R		A 0.49 0.33			
Conver	sions to p	c/h Unde	er Base C	ondition	<u>s</u>		<u> </u>	I	1		
(pc/h)	V	PHF	Truck %	RV %	Ε <sub>Τ</sub>	E <sub>R</sub>	fHV	fp	V		
Vo1	1053	0.95	5	0	2.5	2.0	0.930	1.00	1191		
Vo2	38	0.95	5	0	2.5	2.0	0.930	1.00	42		
Vw1	342	0.95	5	0	2.5	2.0	0.930	1.00	386		
Vw2	697	0.95	5	0	2.5	2.0	0.930	1.00	788		
Vw				1174	Vnw				1233		
V	7			L					2407		
Weavin	a and Nor	-Weavin	a Speed	 S							
	<u> </u>		Unconstr	ained			Cons	trained			
Weaving (i = w)		Non-Weaving (i = nw)		Weaving (i = w)		Non-Weaving ( = nw)					
a (Exhibit 24-6)						15	0.00				
b (Exhibit 24-6)					4		00	4.00			
c (Exhibit 24-6)					0.97		1.30				
d (Exhibit 24-6)				ļ			0.80		0.75		
Weaving intensity factor, Wi				<u> </u>		1.	1.22		0.19		
speeds, Si (mi/h)					3		.47	57.00			
Number of I	anes required for	or unconstrai	ned operation	, Nw	1.62						
	if Nw < Nw	max) uncons	trained onerat	lion	(.40 K	7. if Nw 5 Nu	u (max) constr	ained onerati	on		
Weavin		t Speed	Density		Service	and Car					
Weaving se	ament speed S	(mi/h)	Density	45.45			acity		<u></u>		
Weaving segment density. D (nc/mi/ln)			17.65			· · ·					
Level of service, LOS			В								
Capacity of base condition, c <sub>k</sub> (pc/h)				4948							
Capacity as a 15-minute flow rate, c (veh/h)				4603							
Capacity as a full-hour volume, c <sub>h</sub> (veh/h)				4373							
Notes						·····		<u></u>			
a. Weaving seg b. Capacity con c. Capacity occ d. Three lane T	ments longer than 2 strained by basic fre urs under constraine ype A segments do	500 ft. are treated eway capacity. d operating cond not operate well a	l as isolated merge itions. It volume ratios gre	e and diverge area eater than 0.45. Po eter than 0.35. Po	as using the proced oor operations and or operations and s	lures of Chapter 3 some local queu	25, "Ramps and Ra ing are expected ir ig are expected in	amp Junctions". n such cases. such cases.			
General Information         Site Information           Analyst         DEA         Freeway/Dir of Travel         WESTBOUND US           Agency/Company         URS         Weaving Seg Location         CR 233 ON TO U           Date Performed         3/15/2005         Unsidication         CR 233 ON TO U           Analysis Time Period         PM PEAK         Analysis Year         2025 ALT 1G           Inputs         Freeway free-flow speed, SrF (mi/h)         60         Meaving type         ////////////////////////////////////				FREEWA	Y WEAV	ING WOR	KSHEE	Γ			
--	--	---	--	---	---	---	---	--	---	----------	--
Analyst Agency/Company Date Performed 3/15/2005         DEA Weaving Seg Location Unisdiction         WESTBOUND US Weaving Seg Location Unisdiction         WESTBOUND US Weaving Seg Location Unisdiction           Analysis Time Period         PM PEAK         Analysis Year         2025 ALT 1G           Inputs         Freeway free-flow speed, SFF (mi/h)         60         Weaving type Volume ratio, VR         C           Weaving rumber of lanes, N         3         7         Volume ratio, VR         C           Weaving seg length, L (ft)         2070         Weaving ratio, R         C         C           Conversions to pc/h Under Base Conditions         C         C         0.930         1.00           Volume 1673         0.95         5         0         2.5         2.0         0.930         1.00           Volume 1337         0.95         5         0         2.5         2.0         0.930         1.00           Vw         2035         Vnw         V         2035         Vnw         V         V           Weaving and Non-Weaving Speeds         Unconstrained         Constrained         Constrained           (Exhibit 24-6)         0.030         1.00         V         V         V         Non-Weaving (i = w)         Non-Weaving (i = w)         Non-Weaving (i = w)	Genera	I Informat	ion			Site Info	rmation				
Inputs         Freeway free-flow speed, SFF (mi/h)         60         Weaving type         //           Weaving rumber of lanes, N         3         Volume ratio, VR         Colling         Volume ratio, VR         Colling           Conversions to pc/h Under Base Conditions         Rolling         Weaving ratio, R         Colling         Veaving ratio, R         Conversions to pc/h Under Base Conditions           (pc/h)         V         PHF         Truck %         RV %         E T         E R         fnv         fp           Vol         1673         0.95         5         0         2.5         2.0         0.930         1.00           Vol         1462         0.95         5         0         2.5         2.0         0.930         1.00           Vw         2035         Vnw         2035         Vnw         2035         1.00           Vw         2035         Vnw         2.5         2.0         0.930         1.00           Vw         2035         Vnw         2.05         0         2.5         0         0.15         0           Unconstrained         Unconstrained         Constrained         0.15         0         0         0.15         0         0         0.15	Analyst DEA Agency/Company URS Date Performed 3/15/2005 Analysis Time Period PM PEAK				Freeway/Dir o Weaving Seg Jurisdiction Analysis Year	Freeway/Dir of Travel WEST Weaving Seg Location CR 23 Jurisdiction Analysis Year 2025		BOUND US 160 3 ON TO US 550 OFF ALT 1G			
Freeway free-flow speed, SFF (mi/h)       60       Weaving type       //         Weaving number of lanes, N       3       Volume ratio, VR       Colling         Veaving seg length, L (ft)       2070       Weaving ratio, R       Colling         Conversions to pc/h Under Base Conditions       (no.0000)       (no.0000)       Conversions to pc/h Under Base Conditions         (pc/h)       V       PHF       Truck %       RV %       E T       E R       ftnv       fp         Vol       1673       0.95       5       0       2.5       2.0       0.930       1.00         Vol       337       0.95       5       0       2.5       2.0       0.930       1.00         Vw1       337       0.95       5       0       2.5       2.0       0.930       1.00         Vw2       1462       0.95       5       0       2.5       2.0       0.930       1.00         Vw       2035       Vmw       0       2.5       1.0       0.930       1.00         Vw4       2035       Vmw       0.15       0       0.15       0       0       0       0       0       0       0       0       0       0       0       <	Inputs			<u></u>							
(pc/h)         V         PHF         Truck %         RV %         E <sub>T</sub> E <sub>R</sub> finv         fp           Vol         1673         0.95         5         0         2.5         2.0         0.930         1.00           Vol         337         0.95         5         0         2.5         2.0         0.930         1.00           Vw1         337         0.95         5         0         2.5         2.0         0.930         1.00           Vw2         1462         0.95         5         0         2.5         2.0         0.930         1.00           Vw         2035         Vnw         V         2035         Vnw         V           Weaving and Non-Weaving Speeds           Unconstrained         Constrained         Constrained           V         0.15         0         0.15         0           b (Exhibit 24-6)         0.97         d         d         0.97         d           d (Exhibit 24-6)         0.80         0.80         Weaving intensity factor, Wi         2.06         Weaving intensity factor, Wi         31.32         4           Number of lanes required for unconstrained operation         If Nw > Nw (max) constrai	Freeway fre Weaving nu Weaving se Terrain <b>Conver</b>	ee-flow speed, S umber of lanes, eg length, L (ft)	SFF (mi/h) N	60 3 207 Roll <b>er Base C</b>	o Ing	Weaving type Volume ratio, Weaving ratic	) VR ), R		A 0.5 0.1	51 19	
No.         No.         No.         No.         No.           Vol         1673         0.95         5         0         2.5         2.0         0.930         1.00           Vol         337         0.95         5         0         2.5         2.0         0.930         1.00           Vw1         337         0.95         5         0         2.5         2.0         0.930         1.00           Vw2         1462         0.95         5         0         2.5         2.0         0.930         1.00           Vw         2035         Vnw         2035         Vnw         2035         Non-Weaving (i = w)         Non-Weaving segment (i = w)         Non-Weaving (i = w)         Non         No <td< td=""><td>(pc/h)</td><td>V</td><td>PHF</td><td>Truck %</td><td>RV %</td><td>ΕŢ</td><td>E</td><td>fHV</td><td>fp</td><td>V V</td></td<>	(pc/h)	V	PHF	Truck %	RV %	ΕŢ	E	fHV	fp	V V	
Original System         Original	Vo1	1673	0.95	5	0	25	20	0.930	1.00	1893	
Vw1       337       0.95       5       0       2.5       2.0       0.930       1.00         Vw2       1462       0.95       5       0       2.5       2.0       0.930       1.00         Vw       2035       Vnw       2035       Vnw       1.00       1.00         V       2035       Vnw       2035       Vnw       1.00         Weaving and Non-Weaving Speeds         Unconstrained         Weaving (i = w)       Non-Weaving (i = nw)       Weaving (i = w)       Non-Weaving (i = w)         a (Exhibit 24-6)       0.15       0.15       0.15       0.15         b (Exhibit 24-6)       0.97       0.06       0.80       0.97       0.06       0.80         Weaving intensity fador, Wi       2.06       0.80	Vo2	38	0.95	5	0	2.5	2.0	0.930	1.00	42	
Vw2       1462       0.95       5       0       2.5       2.0       0.930       1.00         Vw       2035       Vnw       2035       Vnw       2035       Vnw       2035       Vnw         Weaving and Non-Weaving Speeds         Unconstrained       Constrained       Constrained         Weaving (i = w)       Non-Weaving (i = nw)       Weaving (i = w)       Non-Weaving (i = w)         a (Exhibit 24-6)       0.15       0.15       0.977       0.15       0.977         d (Exhibit 24-6)       0.977       0.800       Weaving intensity factor, Wi       2.066       Weaving intensity factor, Wi       2.06         Weaving intensity factor, Wi       1.77       Maximum number of lanes, Nw (max)       1.40       If Nw > Nw (max) constrained operation       If Nw > Nw (max) constrained operation         Weaving segment speed, S (mi/h)       38.57       9.57       9.56       9.57       9.57         Weaving segment speed, S (mi/h)       38.57       9.603       9.633       9.633       9.633         Weaving segment speed, S (mi/h)       38.57       9.603       9.633       9.633       9.633         Weaving segment speed, S (mi/h)       38.57       9.633       9.633       9.633       9.633       9.6	Vw1	337	0.95	5	0	2.5	2.0	0.930	1.00	381	
Vw       2035       Vnw         Weaving and Non-Weaving Speeds         Unconstrained       Constrained         Weaving (i = w)       Non-Weaving (i = nw)       Weaving (i = w)         Non-Weaving (i = w)       Non-Weaving (i = m)       Weaving (i = w)       Non-Weaving (i = w)         a (Exhibit 24-6)       0.15       0.15       b       b       (Exhibit 24-6)       0.15       c         b (Exhibit 24-6)       0.97       d       0.97       d       d       0.97       d         d (Exhibit 24-6)       0.97       0.80       0.80       Weaving intensity factor, Wi       2.06       Weaving intensity factor, Wi       2.06       Weaving intensity factor, Wi       1.40         Number of lanes required for unconstrained operation       1.40       If Nw < Nw (max) unconstrained operation	Vw2	1462	0.95	5	0	2.5	2.0	0.930	1.00	1654	
V       Unconstrained       Constrained         Weaving and Non-Weaving Speeds       Unconstrained       Constrained         Weaving (i = w)       Non-Weaving (i = nw)       Weaving (i = w)       Non-Weaving (i = nw)         a (Exhibit 24-6)       0.15       0.15       0.15         b (Exhibit 24-6)       0.97       0.00       0.00         c (Exhibit 24-6)       0.80       0.97       0.00         Weaving intensity factor, Wi       2.06       0.80       0.80         Weaving and non-weaving speeds, S (mi/h)       31.32       9         Number of lanes required for unconstrained operation, Nw       1.77       1.40         If Nw < Nw(max) unconstrained operation	 Vw			<u> </u>	2035	Vnw		1		1935	
Weaving and Non-Weaving Speeds         Unconstrained       Constrained         Weaving (i = w)       Non-Weaving (i = nw)       Weaving (i = w)       Non-Weaving (i = m)       Non (max)       Interm of finance (max)       Number of lanes, Nu (max)       Interm of finance (max)       Meaving (max)       Interm of finance (max)       Number of lanes, Nu (max)       Interm of finance (max)       Number of lan	V	-								3970	
Unconstrained       Constrained         Weaving (i = w)       Non-Weaving (i = nw)       Weaving (i = w)       Non-Weaving (i = nw)         a (Exhibit 24-6)       0.15       0.15       0.15         b (Exhibit 24-6)       4.00       0.97       0.97         d (Exhibit 24-6)       0.97       0.97       0.97         d (Exhibit 24-6)       0.80       0.97       0.97         d (Exhibit 24-6)       0.80       0.97       0.97         d (Exhibit 24-6)       0.80       0.97       0.97         Meaving and non-weaving speeds, Si (mi/h)       31.32       9         Weaving and non-weaving speeds, Si (mi/h)       31.32       9         Mumber of lanes, Nw (max)       1.40       1.40         If Nw < Nw(max) unconstrained operation	Weavin	and Nor	n-Weavir	a Speed	 S′		· · · ·		<u> </u>		
Weaving (i = w)Non-Weaving (i = nw)Weaving (i = w)Non-Weaving (i = w)a (Exhibit 24-6)0.15b (Exhibit 24-6)4.00c (Exhibit 24-6)0.97d (Exhibit 24-6)0.97d (Exhibit 24-6)0.80Weaving intensity factor, Wi2.06Weaving and non-weaving speeds, Si (mi/h)31.32Waaving and non-weaving speeds, Si (mi/h)1.77Maximum number of lanes, Nw (max)1.40If Nw < Nw(max) unconstrained operation				Unconstr			Cons	trained			
a (Exhibit 24-6)       0.15         b (Exhibit 24-6)       4.00         c (Exhibit 24-6)       0.97         d (Exhibit 24-6)       0.80         Weaving intensity factor, Wi       2.06         Weaving and non-weaving speeds, Si (mi/h)       31.32         Number of lanes required for unconstrained operation, Nw       1.77         Maximum number of lanes, Nw (max)       1.40         If Nw < Nw(max) unconstrained operation	Weaving (i = w)			Non-Weaving (i = nw)		Weavi	Weaving (i = w) Non-Weav		ving ( = nw)		
b (Exhibit 24-6)       4.00         c (Exhibit 24-6)       0.97         d (Exhibit 24-6)       0.80         Weaving intensity factor, Wi       2.06         Weaving and non-weaving speeds, S(mi/h)       31.32         Number of lanes required for unconstrained operation, Nw       1.77         Maximum number of lanes, Nw (max)       1.40         If Nw < Nw(max) unconstrained operation	a (Exhibit 2	24-6)				0.		15 0.0		00	
c (Exhibit 24-6)       0.97         d (Exhibit 24-6)       0.80         Weaving intensity factor, Wi       2.06         Weaving and non-weaving speeds, Si (mi/h)       31.32         Number of lanes required for unconstrained operation, Nw       1.77         Maximum number of lanes, Nw (max)       1.40         If Nw < Nw(max) unconstrained operation	b (Exhibit 2	24-6)				4.00		.00	4.00		
Waaving intensity factor, Wi       0.00         Weaving intensity factor, Wi       2.06         Weaving and non-weaving speeds, SI (mi/h)       31.32         Number of lanes required for unconstrained operation, Nw       1.77         Maximum number of lanes, Nw (max)       1.40         If Nw < Nw(max) unconstrained operation	c (Exhibit 2	<u>(4-6)</u>				0.97		.97	0.75		
Weaving and non-weaving speeds, Si (mi/h)       31.32         Number of lanes required for unconstrained operation, Nw       1.77         Maximum number of lanes, Nw (max)       1.40         If Nw < Nw(max) unconstrained operation	Weaving inten	sity factor, Wi				2.06		.06	0.39		
Number of lanes required for unconstrained operation, Nw       1.77         Maximum number of lanes, Nw (max)       1.40         If Nw < Nw(max) unconstrained operation	Weaving and r	non-weaving				31.32		50.97			
Weaving Segment Speed, Density, Level of Service, and Capacity         Weaving segment speed, S (mi/h)       38.57         Weaving segment density, D (pc/mi/ln)       34.31         Level of service, LOS       D         Capacity of base condition, c <sub>b</sub> (pc/h)       4948         Capacity as a 15-minute flow rate, c (veh/h)       4603         Capacity as a full-hour volume, c <sub>h</sub> (veh/h)       4373         Notes       a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Number of Maximum I	lanes required f number of lanes	or unconstrai , Nw (max) (max) uncons	ned operation	, Nw tion	1.77 1.40	if Nw > N	w (max) const	rained operati	on	
Weaving segment speed, S (m/n)       38.57         Weaving segment density, D (pc/mi/ln)       34.31         Level of service, LOS       D         Capacity of base condition, c <sub>b</sub> (pc/h)       4948         Capacity as a 15-minute flow rate, c (veh/h)       4603         Capacity as a full-hour volume, c <sub>h</sub> (veh/h)       4373         Notes       a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Weavir	ng Segmer	nt Speed	, Density,	<u>Level o</u>	f Service,	and Ca	pacity			
Level of service, LOS       D         Capacity of base condition, c <sub>b</sub> (pc/h)       4948         Capacity as a 15-minute flow rate, c (veh/h)       4603         Capacity as a full-hour volume, c <sub>h</sub> (veh/h)       4373         Notes       a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Weaving so	egment speed, a	S(mi/n)		38.57						
Capacity of base condition, c <sub>b</sub> (pc/h)       4948         Capacity as a 15-minute flow rate, c (veh/h)       4603         Capacity as a full-hour volume, c <sub>h</sub> (veh/h)       4373         Notes       a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Level of se	rvice. LOS									
Capacity as a 15-minute flow rate, c (veh/h)       4603         Capacity as a full-hour volume, c <sub>h</sub> (veh/h)       4373         Notes       a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Capacity o	f base condition	, c, (pc/h)		4948						
Capacity as a full-hour volume, c <sub>h</sub> (veh/h) 4373 Notes a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Capacity a	s a 15-minute flo	ow rate, c (ve	h/h)	4603						
Notes a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions" b. Capacity constrained by basic freeway capacity.	Capacity as a full-hour volume. c. (veh/h)				4373						
c. Capacity occurs under constrained operating conditions. d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases. e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases. f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C). g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases. h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.	Notes a. Weaving se b. Capacity co c. Capacity oc d. Three-lane e. Four-lane T f. Capacity cor g. Five-lane Ty h. Type B wea	gments longer than 2 instrained by basic fra curs under constraine Type A segments do ype A segments do n istrained by maximur ype A segments do n wing segments do no	2500 ft. are treater seway capacity. ed operating cond not operate well at ot operate well at n allowable weav ot operate well at t operate well at t	d as isolated merge itions. at volume ratios gre volume ratios greating flow rate: 2,800 volume ratios great volume ratios greatios greating	e and diverge are eater than 0.45. F ater than 0.35. Po pc/h (Type A), 4 ater than 0.20. Po er than 0.80. Po	Poor operations and poor operations and s 000 (Type B), 3,50 000 operations and so or operations and so	ures of Chapter some local queu ome local queui 0 (Type C). ome local queuin me local queuin	25, "Ramps and R ling are expected i ng are expected in ng are expected in g are expected in s	amp Junctions". n such cases. such cases. such cases. such cases.		

URS		Page of
JOB US 160 ALT IG	Project No.	Sheet of
Description Westbound US 160 On-Ramp	Computed by	Date
from Northbound US 550 AM Peak	Checked by	Date 3./15/05
		Reference
Fra US 5	50 - 945	



# ANALYZED AS A LANE ADDITION AT ON-RAMP

Upstream of On-Ramp  

$$1,750 vph/0.95 # 0.93 = 1,981/2 = 991 pcphpl
Density = 991/60 = 16,52 (Los B)$$

Ramp 945 vph /0.95 \* 0.971 = 1,024 pcph < 2,000 (maximum for 1-lane loop ramp) ... under capacity





ANALYZED AS A LANE ADDITION AT ON-RAMP

<u>Upstream of On-Ramp</u> 3,135 vph/0.95 \* 0.93 = 3,548/2 = 1,774pcphpl Density = 1,774/60 = 29.57 (Los D)

Downstream of On-Ramp 3,700 vph/0.95 \* 0.93 = 4,188 /3 = 1,396 pcphpl Density = 1,396/60 = 23.27 (LOS C)

Ramp 565 vph/0.95 \* 0.971= 612 pcph < 2,000 (maximum for 1-lane loop ramp) ... under capacity

RAMPS AND RAMP JUNCTIONS WOR								ET			
General Infor	te Infor	rmation									
Analyst DEA F				Fre	eeway/Dir of Travel WESTB ON FRC			ESTBO N FRON	UND U A	S 160	
Agency or Co	mpany	URS			Ju	nction		SC	OUTHB	OUND	US 550
Date Perform	ed	3/15/200	5		Ju	isdiction		•			
Analysis Time	Period	AM PEA	.K		An	alysis Yea	ar	20	25 AL1	IG	
Project Descri	iption 05	100							<u> </u>		
00		Terrain Re	olling			· · · · · · · · · · · · · · · · · · ·	<u> </u>		·		
Upstream Adj	Ramp		-							Downstr Ramp	eam Adj
🕅 Yes 🛛 🕅	On									🕼 Yes	🗖 On
∏ No ∏	Off									🕅 No	Cff Off
= 17	00 #									L <sub>down</sub> =	ft
	00 n	S	FF = (	60.0 mpł	۱	S	FR = 40.0	mph		VD =	veh/h
Vu = 94	5 veh/h		S	ketch ( s	show lar	nes, L <sub>A</sub> , L	<sub>D</sub> ,V <sub>R</sub> ,V <sub>f</sub> )				
Conversion t	o pc/h Un	der Base (	Conditi	ons					······································	••••••••••••••••••••••••••••••••••••••	
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv	f <sub>H∨</sub>		f <sub>p</sub>	v=V/PĤŀ f <sub>HV</sub> f <sub>p</sub>	=
Freeway	2695	0.95	Rol	ling	5	0	0.930	1	.00	3050	
Ramp	385	0.95	Rol	ling	2	0	0.971	1	.00	417	
UpStream	945	0.95	Rol	ling	2	0	0.971	1	.00 1025		
DownStream				·			l			<u> </u>	
Estimation o	IVIE f v	arge Areas				Estimation of v					
Louination o	<u>12</u>		·			$\frac{1}{12}$					
L <sub>EQ</sub> = (Equat	• <sub>12</sub> ion 25-2 or	- v <sub>F</sub> ( P <sub>FM</sub> ) · 25-3)				$V_{12} = V_R + (V_F - V_R)P_{FD}$ L <sub>EQ</sub> = (Equation 25-8 or 25-9)					
P <sub>FM</sub> = 0.594	using Equa	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)					
V <sub>12</sub> = 1813	oc/h			· .		V <sub>12</sub> = pc/h					
Capacity Che	ecks					Capacity Checks					
	Actual	Maxin	num	LOS	F?	Actua		al	Maxir	num	LOS F?
V <sub>FO</sub>	3467	690	0	No		V <sub>FI</sub> =V <sub>F</sub>	-			11bit 25- 4	
						V <sub>12</sub>			4400:All		
						$V_{FO} = V_{F}$	= -		See Exh	ibit 25-	
V <sub>R12</sub>	2230	4600	:Ali	No	·	V <sub>R</sub>			14	4	
					V <sub>R</sub>			See Exh	ibit 25-3		
Level of Service Determination (if not F)						Level of	Service L	Deterr	ninatior	n (if not H	<u>=)</u>
$D_{R} = 5.475$	+ 0.00734 \	/ <sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	L <sub>A</sub>		D <sub>R</sub> = 4.25	2+0.	.0086 V <sub>1</sub>	<sub>12</sub> - 0.000	9 L <sub>D</sub>
D <sub>R</sub> = 18		D <sub>R</sub> =	(pc/ mi /ln)	ł							
LOS = B		LOS=	(Exhibit 25	-4)							
Speed Estim	ation					Speed E	stimation	4.01			<u> </u>
$M_{s} = 0.30$	9 (Exibit 25	-19)				$D_s = (Exhibit 25-19)$					
S <sub>R</sub> = 54.4		S <sub>R</sub> = mph (Exhibit 25-19)									

## RAMPS AND RAMP JUNCTIONS WORKSHEET

S <sub>0</sub> =	N/A mph (Exhibit 25-19)	S <sub>0</sub> =	mph (Exhibit 25-19)
S=	55.4 mph (Exhibit 25-14)	S =	mph (Exhibit 25-15)

HCS2000<sup>TM</sup>

		RAM	PS AN	D RAMP	P JUNC	TIONS W	OR	SHEE	:T			
General Info	rmation			Sit	te Infori	mation						
Analyst DEA					Fre	eway/Dir of Travel WESTBO					OUND US M	5 160
Agency or Company URS					Jur	iction SOUTHBOUND US					JS 550	
Date Perform	ed	3/15/200	5		Jur	isdiction						
Analysis Time	Period	PM PEA	K		An	alysis Ye	ar		202	5 AL]	Г 1G	
Project Descr	iption US	160										
nputs		Francis D	. 11								1	
)0 Jpstream Adj	Ramp	Terrain R	olling								Downstre Ramp	am Adj
🛛 Yes 🛛	On										T Yes	🗖 On
	04										No No	C Off
– 17	00 #										L <sub>down</sub> =	ft
-up - 1/	00 n	s	FF = {	60.0 mph	ו	S	S <sub>FR</sub> =	40.0	mph			veh/h
√u = 56	5 veh/h		S	iketch ( s	show lar	nes, L <sub>A</sub> , L	,V <sub>R</sub>	,V <sub>f</sub> )				VCI//II
Conversion	to pc/h Un	der Base (	Condit	ions	-			•			1	
 (pc/h)	V (Veh/hr)	PHF	Terrain		Truck	%Rv		f <sub>HV</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>	
Freeway	3700	0.95	Ro	ling	5	0	0.	930	1.0	00	4187	1 <sub>21</sub> 1
Ramp	590	0.95	Ro	ling	2	0	0.	971	1.0	00	640	
UpStream	565	0.95	Ro	ling	2	0	0.	971	1.0	00	613	
	Me	erge Areas				Diverge Areas						
Estimation o	f v <sub>12</sub>					Estimat	ion e	of v <sub>12</sub>				
= (Fauet	V <sub>12</sub> : tion 25-2 or	= V <sub>F</sub> ( P <sub>FM</sub> ) : 25-3)				$V_{12} = V_R + (V_F - V_R)P_{FD}$						
P= 0 504	usina Faua	tion (Evhi	hit 25_	5)		$P_{\rm ED}$ = using Equation (Exhibit 25-11)						
FM = 2498	using Lyua		511 2.5-	5)		$V_{42} = pc/h$						
$r_{12} = 2400$						Capacity Checks						
	Actual	Maxin	num	105	F?							LOS F2
V	4827	600	0			V <sub>FI</sub> =V <sub>F</sub>		S	See Exhibit 25- 14			
* FO	4027	0900		INO		V <sub>12</sub>	V <sub>12</sub>			4400:All		· ·
V	2129	4600	· A II			V <sub>FO</sub> = V	F -		s	See Ex	hibit 25- 4	
*R12	5120	4600:All		INU	' F	V_n			s	ee Ext	nibit 25-3	· · · · · · · · · · · · · · · · · · ·
Level of Service Determination (if not F)						Level of Service Determination (if not E)						
$D_{\rm p} = 5.475 + 100$	+ 0.00734	( - + 0.007)	8 V	, 0.00627	' L.		D-	= 4.25	2+00	086 \/	( <sub>10</sub> - 0.000	<u>/</u> 9L <sub>E</sub>
$D_R = 25.8 \text{ (pc/ mi /ln)}$						$D_R = (pc/mi/ln)$						
.OS = C	(Exhibit 25	-4)				LOS=	(Exh	ibit 25	-4)			
Speed Estim	ation					Speed E	Estin	nation				
$M_{\rm s} = 0.362$	2 (Exibit 25	-19)				D <sub>s</sub> =	(Ext	ibit 25	-19)			
$S_{R} = 53.5$	mph (Exhi	bit 25-19)				$S_R = mph$ (Exhibit 25-19)						
						1						

RA	AMPS	AND	RAMP	JUNCTIONS	WORKSHEET
----	------	-----	------	-----------	-----------

S <sub>0</sub> =	N/A mph (Exhibit 25-19)	S <sub>0</sub> =	mph (Exhibit 25-19)
S=	54.2 mph (Exhibit 25-14)	S =	mph (Exhibit 25-15)

HCS2000<sup>TM</sup>

Attachment D-3 2025 Grandview Section, Alternative F Modified, Highway Analyses

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

\_\_\_\_\_Operational Analysis\_\_\_\_\_\_

/2005 EAK BOUND US 160 OF US 550/CR 233
ALT 1F

\_\_Flow Inputs and Adjustments\_\_\_\_\_

Volume, V		2700	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		711	v
Trucks and buses		5	ee
Recreational vehicles		0	8
Terrain type:		Rolling	
Grade		0.00	010
Segment length		0.00	mi
Trucks and buses PCE, ET		2.5	
Recreational vehicle PCE,	ER	2.0	
Heavy vehicle adjustment,	fhv	0,930	
Driver population factor,	fp	1.00	
Flow rate, vp		1018	pc/h/ln

## \_\_\_Speed Inputs and Adjustments\_\_\_\_\_

Lane width	12.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	60.0	mi/h
	Urban Freeway	

#### LOS and Performance Measures

Flow rate, vp	1018	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	3	
Density, D	17.0	pc/mi/ln
Level of service, LOS	В	

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

\_\_\_\_Operational Analysis\_\_\_\_\_\_

Analyst:	DEA
Agency or Company:	URS
Date Performed:	4/21/2005
Analysis Time Period:	PM PEAK
Freeway/Direction:	EASTBOUND US 160
From/To:	WEST OF US 550/CR 233
Jurisdiction:	
Analysis Year:	2025 ALT 1F
Description: US 160	

Flow Inputs and Adjustments

Volume, V		4265	veh/h
Peak-hour factor, PHF		0.95	
Peak 15-min volume, v15		1122	v
Trucks and buses		5	<del>2</del>
Recreational vehicles		0	8
Terrain type:		Rolling	
Grade		0.00	8
Segment length		0.00	mi
Trucks and buses PCE, ET		2.5	
Recreational vehicle PCE,	ER	2.0	
Heavy vehicle adjustment,	fhv	0.930	
Driver population factor,	fp	1.00	
Flow rate, vp		1609	pc/h/ln

## \_\_\_\_Speed Inputs and Adjustments\_\_\_\_\_\_

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	60.0	mi/h
-	Urban Freew	ay

## \_\_LOS and Performance Measures\_\_\_\_\_

Flow rate, vp	1609	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	3	
Density, D	26.8	pc/mi/ln
Level of service, LOS	D	

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

\_Operational Analysis\_\_\_\_\_

Analyst:DEAAgency or Company:URSDate Performed:4/21/2005Analysis Time Period:AM PEAKFreeway/Direction:EASTBOUND US 160From/To:550/CR 233 to SH 172/CR 234Jurisdiction:Analysis Year:Analysis Year:2025 ALT 1FDescription:US 160

\_\_Flow Inputs and Adjustments\_\_\_\_\_

Volume, V	1605	veh/h	
Peak-hour factor, PHF	0.95		
Peak 15-min volume, v15	422	v	
Trucks and buses	5		
Recreational vehicles	0	80	
Terrain type:	Rolling		
Grade	0.00	20	
Segment length	0.00	mi	
Trucks and buses PCE, ET	2.5		
Recreational vehicle PCE, ER	2.0		
Heavy vehicle adjustment, fHV	0.930		
Driver population factor, fp	1.00		
Flow rate, vp	908	pc/h/ln	

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	-
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	60.0	mi/h
-	Urban Freeway	

#### LOS and Performance Measures

Flow rate, vp	908	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	2	
Density, D	15.1	pc/mi/ln
Level of service, LOS	В	

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

\_\_Operational Analysis\_\_\_\_\_

Analyst:	DEA
Agency or Company:	URS
Date Performed:	4/21/2005
Analysis Time Period:	PM PEAK
Freeway/Direction:	EASTBOUND US 160
From/To:	550/CR 233 to SH 172/CR 234
Jurisdiction:	
Analysis Year:	2025 ALT 1F
Description: US 160	

\_\_\_\_\_Flow Inputs and Adjustments\_\_\_\_

2525	veh/h
0.95	ven/ n
664	v
5	8
0	26
Rolling	
0.00	olo
0.00	mi
2.5	
2.0	
0.930	
1.00	
1429	pc/h/ln
•	
	2525 0.95 664 5 0 Rolling 0.00 0.00 2.5 2.0 0.930 1.00 1429

\_\_\_\_\_Speed Inputs and Adjustments\_\_

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	60.0	mi/h
	Urban Freewa	ay

## \_LOS and Performance Measures\_\_\_\_\_

Flow rate, vp	1429	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	2	
Density, D	23.8	pc/mi/ln
Level of service, LOS	С	

HCS2000: Basic Freeway Segments Release 4.1d URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: Fax: E-mail: Operational Analysis Analyst: DEA Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: AM PEAK WESTBOUND US 160 Freeway/Direction: From/To: SH 172/CR 234 to US 550/CR 233 Jurisdiction: Analysis Year: 2025 ALT 1F Description: US 160 Flow Inputs and Adjustments Volume, V veh/h 1685 Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 443 v Trucks and buses 5 % Recreational vehicles 0 Ŷ Terrain type: Rolling Grade 0.00 ÷ Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 953 pc/h/ln Speed Inputs and Adjustments\_\_\_\_ Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS 60.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN mi/h 4.5 Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures 953 pc/h/ln Flow rate, vp Free-flow speed, FFS mi/h 60.0 Average passenger-car speed, S 60.0 mi/h Number of lanes, N 2 Density, D 15.9 pc/mi/ln Level of service, LOS в

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

Operational Analysis DEA Analyst: Agency or Company: URS Date Performed: 4/21/2005 Analysis Time Period: PM PEAK Freeway/Direction: WESTBOUND US 160 From/To: SH 172/CR 234 to US 550/CR 233 Jurisdiction: 2025 ALT 1F Analysis Year: Description: US 160 \_\_\_Flow Inputs and Adjustments\_\_\_ Volume, V 2290 veh/h Peak-hour factor, PHF 0.95 Peak 15-min volume, v15 603 ν Trucks and buses 5 ŝ Recreational vehicles 0 % Terrain type: Rolling Grade ÷ 0.00 Segment length 0.00 mi Trucks and buses PCE, ET 2.5 Recreational vehicle PCE, ER 2.0 Heavy vehicle adjustment, fHV 0.930 Driver population factor, fp 1.00 Flow rate, vp 1296 pc/h/ln Speed Inputs and Adjustments Lane width 12.0 ft Right-shoulder lateral clearance 6.0 ft Interchange density 0.50 interchange/mi Number of lanes, N 2 Free-flow speed: Measured FFS or BFFS 60.0 mi/h Lane width adjustment, fLW 0.0 mi/h Lateral clearance adjustment, fLC 0.0 mi/h Interchange density adjustment, fID 0.0 mi/h Number of lanes adjustment, fN 4.5 mi/h Free-flow speed, FFS 60.0 mi/h Urban Freeway LOS and Performance Measures Flow rate, vp pc/h/ln 1296 Free-flow speed, FFS 60.0 mi/h Average passenger-car speed, S 60.0 mi/h Number of lanes, N 2 Density, D 21.6 pc/mi/ln Level of service, LOS С Overall results are not computed when free-flow speed is less than 55 mph.

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

0	perat	ional	Analy	vsis
~				,

Analyst: Agency or Company: Date Performed: Analysis Time Period: Freeway/Direction: From/To: Jurisdiction: Analysis Year: Description: US 160	DEA URS 4/21/2005 AM PEAK WESTBOUND US 160 WEST OF US 550/CR 233 2025 ALT 1F	3	
	Flow Inputs and Adju	istments	
Volume, V Peak-hour factor, PHF	3	3080 ).95	veh/h
Peak 15-min volume, v15	3	311	v
Trucks and buses	Ę	5	00
Recreational vehicles	(	)	8
Terrain type:	F	Rolling	
Grade	C	0.00	%
Segment length	C	0.00	mi

Segment length0.00Trucks and buses PCE, ET2.5Recreational vehicle PCE, ER2.0Heavy vehicle adjustment, fHV0.930Driver population factor, fp1.00Flow rate, vp1162

## Speed Inputs and Adjustments

pc/h/ln

Lane width	12.0	ft	
Right-shoulder lateral clearance	6.0	ft	
Interchange density	0.50	interchange/mi	
Number of lanes, N	3		
Free-flow speed:	Measured		
FFS or BFFS	60.0	mi/h	
Lane width adjustment, fLW	0.0	mi/h	
Lateral clearance adjustment, fLC	0.0	mi/h	
Interchange density adjustment, fID	0.0	mi/h	
Number of lanes adjustment, fN	3.0	mi/h	
Free-flow speed, FFS	60.0	mi/h	
<b>L</b>	Urban Freeway		

LOS and Performance Measures\_\_\_\_\_

Flow rate, vp	1162	pc/h/ln
Free-flow speed, FFS	60.0	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	3	
Density, D	19.4	pc/mi/ln
Level of service, LOS	С	

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

Operational Analysis

Analyst. DEA		
Agency or Company: IIRS		
Date Performed: $4/21/2005$		
Analysis Time Period: PM PEAK		
Freeway/Direction: WESTBOUND US 160	n	
From/To: WEST OF US 550/(	~ ~ 233	
Jurisdiction:	CR 255	
Analysis Year: 2025 ALT 1F		
Description: US 160		
Flow Inputs and	d Adjustments	
Volume, V	4290	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1129	v
Trucks and buses	5	20
Recreational vehicles	0	20
Terrain type:	Rolling	
Grade	0.00	8
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	·
Flow rate, vp	1618	pc/h/ln
Speed Inputs ar	nd Adjustments	
Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	60.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	60.0	mi/h
- · · ·	Urban Freew	vay
LOS and Perform	ance Measures	······································
Flow rate un	1619	nc/h/ln
Free-flow speed FFS	60 0	mi/h
Average naggenger-gar greed g	60.0	mi/h
Number of lanes N	3	m±/ 11
Dengity D	27 0	pc/mi/lr
Level of service, LOS	D	PC/ m1/ 111
Overall results are not computed when	free-flow speed	is less than 55 mph.

# URS

URS		Page <u>1</u> of <u>1</u>
Job US 160 ALT IF	Project No.	Sheet of
Description Eastbound US 160 Off-Ramp	Computed by	Date
to CR 233 Am Peak	Checked by	Date 3/15/05
		Reference



# ANALYZED AS A MAJOR DIVERGE

# URS

URS		Page of
JOB US 160 ALT IF	Project No	Sheet of
Description Eastbound US 160 Off-Ramp	Computed by	Date
to CR 233 PM Peak	Checked by	Date 3/15/05
		Reference

017,1 4,265 05 160 2,555 TO CR 233

# ANALYZED AS A MAJOR DIVERGE

Ramp 2,555 vph/0.95 \* 0.971 = 2,770 pcph < 4,100 (maximum for 2-lane ramp) . under capacity

## RAMPS AND RAMP JUNCTIONS WORKSHEET

		RAM	PS AN	DRAMP	JUNC	TIONS W	OR	KSHEET	Ē	· · · · ·		· <u>· · · · · · · · · · · ·</u>	
General Infor	rmation			Sit	e Infori	mation							
Analyst		DEA			Fre	eway/Dir	of T	ravel	EA	ASTBO	UND US	160	
Agency or Co	mpany	URS			Jur	nction ON FRC			N FROM	M CR 23	3		
Date Perform	ed	3/15/200	5		Jur	risdiction							
Analysis Time	Period	AM PEA	K		Ana	alysis Yea	ar		20	25 AL]	[ 1 <b>F</b>		
Project Descr	iption US	160											
Inputs										-			
Upstream Adj	Ramp	Terrain				Downstream					eam Adj		
🖾 Yes 🗖	On										T Yes	🔲 On	
🖾 No 🖉	Off										I No	C Off	
L <sub>up</sub> = ft		S	<sub>FF</sub> = (	60.0 mph		S	FR <sup>=</sup>	= 40.0 r	nph		Ldown =	π	
Vu = ve	how lar	nes, $L_{\Delta}$ , $L_{I}$	,V <sub>E</sub>	,,V <sub>f</sub> )			VD =	veh/h					
Conversion t				<u> </u>			1						
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv		f <sub>H∨</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>		
Freeway	870	0.95	Rol	ling	5	0	0.	930	1	1.00	984		
Ramp	735	0.95	Rol	ling	2	0	0.	971	]	1.00	797	<u></u>	
UpStream	UpStream												
DownStream													
	Me	rge Areas							Dive	rge Area	as		
Estimation o	f v <sub>12</sub>					Estimati	ion	of v <sub>12</sub>					
	V <sub>12</sub> =	· V <sub>F</sub> ( P <sub>FM</sub> )	1					V.	, = `	V <sub>R</sub> + (V <sub>F</sub>	- V <sub>P</sub> )P <sub>ED</sub>		
L <sub>EO</sub> = (Equat	ion 25-2 or	25-3)				$L_{ro} = (E$	aua	tion 25-	- 8 or	25-9)			
$P_{-1} = 1.000$	using Equat	tion (Exhi	ibit 25_4	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)							
V = 0.84 m	using Equa			0)		$V_{40} = pc/h$							
v <sub>12</sub> - 904 pc													
Capacity Che	Actual	Movin		1.05	E2	Capach		Actuo		Moxi		100 52	
	Actual	IVIAAII	lum					Aciua		See Ex	hibit 25-	LUSF	
V <sub>EO</sub>	1781	460	0	No	, L	V <sub>FI</sub> =V <sub>F</sub>	-			1	4		
						V <sub>12</sub>				440	0:All		
		ľ				V <sub>FO</sub> = V <sub>F</sub>	F -			See Ex	hibit 25-		
V <sub>R12</sub>	1781	4600	:All	No	' l					1	4		
		<u> </u>				V <sub>R</sub>				See Exr	ibit 25-3		
Level of Serv	vice Detern	nination (i	f not F	2		Level of	f Se	rvice De	eter	minatio	n (if not F	シ	
D <sub>R</sub> = 5.475 ·	+ 0.00734 v	<sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	LA		D <sub>R</sub>	= 4.252	2 + (	).0086 V	<sub>12</sub> - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = 15	.2 (pc/ mi /l	n)				D <sub>R</sub> =	(pc/	mi /ln)					
LOS = B	(Exhibit 25-	4)				LOS=	(Exl	hibit 25-	4)				
Speed Estim	ation					Speed E	Estir	nation			· · · ·		
$M_{\rm s} = 0.290$	6 (Exibit 25	-19)				D <sub>s</sub> =	(Exi	hibit 25-	19)				
S <sub>R</sub> = 54.7	mph (Exhil	oit 25-19)				S <sub>R</sub> =	mpl	h (Exhib	oit 2	5-19)			
S <sub>0</sub> = N/A	mph (Exhit	oit 25-19)				S <sub>0</sub> =	mpl	h (Exhib	oit 2	5-19)			
S= 54.7	mph (Exhit	oit 25-14)				S =	mpl	h (Exhib	oit 2	5-15)			

# RAMPS AND RAMP JUNCTIONS WORKSHEET

		DAM				TIONC		VOUEET					
General Info	mation	RAIN	P5 AN	D RAMP Sit		nons w		KOHEEI					
Analyst	mation	DFA			Fre	eway/Dir	of	Travel 1	FASTRO	DUND US	160		
Agency or Co	mpany	URS			.iur	nction	01	(1000) I	N FRO	M CR 23	3		
Date Perform	ed	3/15/200	5		Jur	risdiction				WI CIX 25.	5		
Analysis Time	e Period	PM PEA	K		An								
Project Descr	iption US	160							1020 112				
Inputs	······································												
Upstream Adj	Ramp	Terrain								Downstre Ramp	eam Adj		
🕼 Yes 🛛	On									T Yes	la On		
	Off									I No	C Off		
и — и										L <sub>down</sub> =	ft		
∟ <sub>up</sub> – II		S	FF = (	50.0 mph	l	S	FR	= 40.0 mp	bh				
Vu = ve	eh/h		S	ketch ( s	how lar	nes, L <sub>▲</sub> , L	,V	<sub>R</sub> ,V <sub>f</sub> )		VD =	veh/h		
Conversion	to pc/h Un	ions											
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>n</sub>			
Freeway	1710	0.95	Rol	ling	5	0	0	.930	1.00	1935			
Ramp	815	0.95	0.95 Rolling 2				0	.971	1.00	884			
UpStream				0									
DownStream		······································											
	Me	erge Areas						Div	erge Are	eas			
Estimation o	f v <sub>12</sub>					Estimat	ion	of v <sub>12</sub>					
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>12</sub> =	= V <sub>R</sub> + (V	F - VR)PED			
L <sub>EO</sub> = (Equat	ion 25-2 or	25-3)				L <sub>EQ</sub> ≈ (Equation 25-8 or 25-9)							
$P_{-1} = 1.000$	using Faua	, tion (Exhi	bit 25-	5)			sinr	Fountion	(Exhibit	25-11)			
$V_{} = 1035$	oc/h					$V_{12} = pc/h$							
$v_{12} = 1935$						Capacity Checks							
	Actual	Maxin	2010	105	F2	Capacity Checks							
	Actual	WIGAN	lann					Actuar	See F	xhibit 25-			
Vro	2819	460	0	No		∨ <sub>FI</sub> =∨ <sub>F</sub>	-			14	-		
FU	2012					V <sub>12</sub>			44	00:All			
]						V <sub>FO</sub> = V	F -		See E	xhibit 25-			
V <sub>R12</sub>	2819	4600	:All	No	)	V_R				14			
						V <sub>R</sub>			See Ex	chibit 25-3			
Level of Serv	vice Detern	nination (i	t not F	)		Level of	Se	rvice Det	erminatio	on (if not F	<u>)</u>		
D <sub>R</sub> = 5.475 -	+ 0.00734 v	R + 0.007	8 V <sub>12</sub> -	0.00627	LA		DR	<sub>1</sub> = 4.252 +	0.0086	V <sub>12</sub> - 0.000	9 L <sub>D</sub>		
D <sub>R</sub> = 23	.3 (pc/ mi /	in)				D <sub>R</sub> =	(pc	/ mi /ln)					
LOS = C	(Exhibit 25-	4)				LOS=	(Ex	hibit 25-4)					
Speed Estim	ation	· · · · · · · · · · · · · · · · · · ·				Speed E	Esti	mation	<u> </u>				
M <sub>S</sub> = 0.338	3 (Exibit 25	-19)				D <sub>s</sub> =	(Ex	hibit 25-19	))				
S <sub>R</sub> = 53.9	mph (Exhil	bit 25-19)				S <sub>R</sub> =	mp	h (Exhibit	25-19)				
S <sub>0</sub> = N/A	mph (Exhil	oit 25-19)				S <sub>0</sub> =	mp	h (Exhibit	25-19)				
S= 53.9	mph (Exhil	oit 25-14)				S =	mp	h (Exhibit	25-15)				
· · · ·													

		RAM	PS AN	DRAMP	JUNC	<b>FIONS W</b>	OR	KSHEET					
General Info	rmation			Sit	e Inforr	nation							
Analyst				Fre	eeway/Dir of Travel EASTE				OUND US	160			
Agency or Co	mpany	URS			Jur	unction OFF TC			SH 172/C	CR 234			
Date Perform	ed	3/15/200	5		Jur	isdiction							
Analysis Time	Period	AM PEA	K		Ana	alysis Yea	ar		2025 AI	LT 1F			
Project Descr	iption US	160											
Inputs				· · · <u> </u>									
Upstream Adj	Ramp	rerrain								Downstre Ramp	eam Adj		
In Yes In	On									The Yes	🖪 On		
🖾 No 🖉	Off									🕅 No	Cff Off		
i = fi						<u> </u>		L <sub>down</sub> =	ft				
-up	ו	S	FR <sup>=</sup>	= 40.0 m	ph		un la /la						
Vu = veh/h Sketch ( show la							D,VF	₂,V <sub>f</sub> )		VD =	ven/n		
Conversion	to pc/h Un	der Base (	Conditi	ions				<u> </u>	<u></u>				
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>H∨</sub>	f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>o</sub>	: :		
Freeway	1605	0.95	Rol	ling	5	0	0.	.930	1.00	1816			
Ramp	585	0.95	0.95 Rolling		2	0	0.	.971	1.00	634			
UpStream													
DownStream													
	Me	erge Areas						D	verge Ar	eas			
Estimation o	of v <sub>12</sub>					Estimat	ion	of v <sub>12</sub>					
L <sub>EQ</sub> = (Equa P <sub>FM</sub> = using E V= pc/b	V <sub>12</sub> = tion 25-2 or Equation (I	= V <sub>F</sub> ( P <sub>FM</sub> ) · 25-3) Exhibit 25-{	5)			$V_{12} = V_R + (V_F - V_R)P_{FD}$ $L_{EQ} = $ (Equation 25-8 or 25-9) $P_{FD} = 1.000$ using Equation (Exhibit 25-11) $V_{12} = 1816$ pc/h							
Canacity Ch	ocks			·	÷	Capacity Checks							
	Actual	Maxin	m	1.05	F?	Joapach	<u>,                                    </u>	Actual	Ma	vimum	LOS F?		
	7 total		10111		<u> </u>	V=V.		1816		1600	No		
V <sub>FO</sub>			idit 25-		ŀ								
· · · · · · · · · · · · · · · · · · ·				I		v <sub>12</sub>		1810	44	100:All	NO		
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V V <sub>R</sub>	F <sup>-</sup>	1182	4	600	No		
						V <sub>R</sub>		634	2	.100	No		
Level of Ser	vice Deterr	nination (i	f not F	· <u>·····</u> )		Level of	f Se	rvice De	terminat	ion (if not l	F)		
$D_{p} = 5.475$	+ 0.00734 \	/ <sub>B</sub> + 0.007	8 V12 -	0.00627	′ L ,		D	= 4.252	+ 0.0086	V <sub>12</sub> - 0.000	)9 L <sub>D</sub>		
D <sub>R</sub> = (p	c/ mi /ln)	IX .	12		<u>^</u>	D <sub>R</sub> =	17.	2 (pc/ mi	/ln)	12	D		
LOS = (E	xhibit 25-4)					LOS=	B (I	Exhibit 25	5-4)				
Speed Estim	ation					Speed I	Estii	mation					
M <sub>s</sub> = (Exib	it 25-19)					D <sub>s</sub> =	0.4	20 (Exhit	oit 25-19)				
$S_{n} = mnh$	(Exhibit 25	-19)				S <sub>R</sub> ≈	52.	4 mph (E	Exhibit 25	i-19)			
$S = mn^{1}$	(Evhibit 20	10)				s_=	N/4		xhibit 25	, -19)			
$\sim_0$ - mpn $\sim_0$	(Exhibit 25	-19)				S	50	1 mph (r		(15)			
		- (+)				<u>۲</u> -	32.			-10)			

Copyright © 2000 University of Florida, All Rights Reserved

## RAMPS AND RAMP JUNCTIONS WORKSHEET

		RAM	PS AN	D RAMP	JUNC	TIONS W	OR	KSHEE	r –			
General Info	rmation			Sit	te Infori	mation						
Analyst		DEA	÷••••		Fre	eway/Dir	of	Travel	EA	STBO	UND US	160
Agency or Co	mpany	URS			Jur	nction			OF	F TO S	SH 172/C	CR 234
Date Perform	RAMPS AND RAMalyst DEAency or CompanyURSate Performed $3/15/2005$ alysis Time PeriodPM PEAKoject DescriptionUS 160outsstream Adj RampTerrainYesOnNoOff $p = ft$ S $_{FF} = 60.0 \text{ m}$ sketch (onversion to pc/h Under Base Conditions(pc/h)V(veh/hr)PHFTerraineeway25250.95Rollingamp11800.95RollingownStreamImage Areastimation of $v_{12}$ V12 = V <sub>F</sub> (P <sub>FM</sub> ) $_2 =$ (Equation 25-2 or 25-3) $_a =$ using Equation (Exhibit 25-5) $_2 = pc/h$ pacity ChecksActualMaximumV <sub>FO</sub> See Exhibit 25-7 $V_{R12}$ 4600:Allvel of Service Determination (if not F) $v_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.0062= (pc/ mi /ln)S = (Exhibit 25-4)$					isdiction						
Analysis Time	Period	Ana	alysis Yea	ar		202	5 ALT	C 1F				
Project Descr	iption US	160										
Inputs							·	····				
Upstream Adj	Ramp	Terrain									Downstre Ramp	eam Adj
TYes T	On										🕅 Yes	🕅 On
🖾 No 🛛	Off										🖾 No	Cff Off
L <sub>up</sub> = ft		s	FF = (	60.0 mpł	<u>, .</u>	S	SER =	= 40.0	mph		L <sub>down</sub> =	ft
Vu = ve	eh/h		 S	ketch (s	show lar	nes, L <sub>A</sub> , L					VD =	veh/h
Conversion		· A' -	U <sup>, 1</sup>	N 17			L					
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv		f <sub>HV</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>	
Freeway	2525	0.95	Rol	ling	5	0	0	.930	1.	00	2857	
Ramp	1180	0.95	Rol	ling	2	0	0	.971	1.	00	1279	
UpStream					1					<u> ```</u>		
DownStream												
	Me	rge Areas							Diver	ge Area	as	
Estimation o	f v <sub>12</sub>					Estimat	ion	of v <sub>12</sub>				
		- V <sub>F</sub> ( Р <sub>ЕМ</sub> )						V <sub>1</sub>	$_2 = V$	<sub>R</sub> + (V <sub>F</sub>	- V <sub>P</sub> )P <sub>FD</sub>	
L <sub>EO</sub> = (Equat	tion 25-2 or	25-3)				$L_{FO} = (E$	aua	ation 25-	- 8 or 2	25-9)		
$P_{\text{ev}} = \text{using } F$	Fountion (F	= =xhibit 25-!	5)			$P_{ro} = 1$	000	usina	Faua	tion (E	vhihit 25_	11)
V = pc/b			-,			V = 28	57	no/h	Lqua			
						$v_{12} = 20$		pc/ll				
Capacity Ch	Actual	Movin		1.05	E2	Capacit	y C	Actus		Movi		
	Actual	Waxin	lum			<u> </u>				IVIAXI		LUSF
V <sub>EO</sub>		See Exh	ibit 25-		· ]	V <sub>FI</sub> =V <sub>F</sub>	:	2857		40	00	NO
						V <sub>12</sub>		2857		440	0:All	No
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V <sub>R</sub>	F -	1578		460	00	No
		:			Γ	V <sub>R</sub>		1279		210	00	No
Level of Serv	vice Detern	nination (i	f not F	)		Level of	f Se	rvice D	etern	ninatio	n (if not l	=)
$D_{\rm p} = 5.475$	+ 0.00734 v	<sub>в</sub> + 0.007	8 V <sub>12</sub> -	0.00627	L,		D	= 4.252	2 + 0.	0086 V	12 - 0.000	9 L <sub>D</sub>
D <sub>R</sub> = (po	c/ mi /ln)	n	12		A	D <sub>R</sub> =	26.	1 (pc/ m	ni /In)		12	U
LOS = (E:	xhibit 25-4)					LOS=	С (	Exhibit 2	25-4)			
Speed Estim	ation					Speed E	Esti	mation				
$M_c = (Exib)$	it 25-19)			···		D <sub>2</sub> =	0.4	78 (Exh	ibit 2	5-19)	••	
S <sub>R</sub> = mph	(Exhibit 25	-19)				S <sub>R</sub> =	51.	4 mph	(Exhil	bit 25-1	9)	
$S_0 = mph$	(Exhibit 25-	-19)				S <sub>0</sub> =	N//	A mph	(Exhil	oit 25-1	9)	
S= mph	(Exhibit 25-	-14)				S =	51.	4 mph	(Exhil	oit 25-1	5)	
<b></b>					· · · · · ·	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~						

HCS2000<sup>TM</sup>

Copyright © 2000 University of Florida, All Rights Reserved

# RAMPS AND RAMP JUNCTIONS WORKSHEET

		RAM	PS AN	DRAM	JUNC	TIONS W	ORKSHE	ET			
General Infor	mation			Si	te Infori	mation					
Analyst		DEA			Fre	eway/Dir	of Travel	ĒÆ	ASTBO	UND US	160
Agency or Co	mpany	URS			Jur	unction ON FROM S					2/CR
Date Performe	ed	3/15/200	5		Jur	isdiction					
Analysis Time	Period	AM PEA	K		An	nalysis Year 2025 ALT 1F					
Project Descri	ption US	160									
Inputs									_		
Upstream Adj	Ramp	Terrain								Downstre Ramp	eam Adj
Tes T	On									T Yes	🗖 On
No 🗖	Off									No –	M Off
L <sub>up</sub> = ft				50.0 mpl			- 40.0	) mnh		down	n
Vu = ve	h/h	5	FF - S	ketch ( s	show lar	o nes, L <sub>A</sub> , L	<sub>FR</sub> - 40.0 <sub>D</sub> ,V <sub>R</sub> ,V <sub>f</sub> )	прп		VD =	veh/h
Conversion t	o pc/h Un	der Base (	Conditi	ons							
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv	f <sub>H∨</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>	:
Freeway	1020	0.95	Rol	ling	5	0	0.930	1	.00	1154	
Ramp	110	0.95	Rol	ling	2	0	0.971	1	1.00	119	
UpStream											
DownStream				<u>.</u>	<u> </u>						
	Me	erge Areas						Dive	rge Area	as	
Estimation of	t v <sub>12</sub>					Estimat	ion of v <sub>12</sub>				
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )					V	/ <sub>12</sub> = \	V <sub>R</sub> + (V <sub>F</sub>	- V <sub>R</sub> )P <sub>FD</sub>	
$L_{EQ} = (Equat)$	ion 25-2 or	25-3)				$L_{EQ} = (E$	quation 2	5-8 or	25-9)		
P <sub>FM</sub> = 1.000 u	using Equa	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = u	sing Equa	tion (I	Exhibit 2	5-11)	
V <sub>12</sub> = 1154 p	oc/h					$V_{12} = pc$	:/h				
Capacity Che	ecks					Capacit	y Checks				
	Actual	Maxim	านm	LOS	F?		Actu	ıal	Maxi	mum	LOS F?
V <sub>EO</sub>	1273	460	0	No	,	V <sub>FI</sub> =V <sub>F</sub>	:		See Exl	hibit 25- 4	
						V <sub>12</sub>			440	0:All	
V	1273	4600	٠ΔII	Ne		V <sub>FO</sub> = V <sub>I</sub>	= -		See Ex	hibit 25- 4	
* R12	1275	+000	,730		ŕ	V <sub>R</sub>			See Exh	nibit 25-3	
Level of Serv	ice Detern	nination (in	f not F	)	<u> </u>	Level of	Service I	Deter	minatio	n (if not l	=)
D <sub>R</sub> = 5.475 +	- 0.00734 v	<sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	'L <sub>A</sub>		D <sub>R</sub> = 4.28	52 + 0	0.0086 V	12 - 0.000	9 L <sub>D</sub>
$D_{R} = 11$	.6 (pc/ mi /	ln)				D <sub>R</sub> =	(pc/ mi /ln	)			
LOS = B	Exhibit 25	-4)				LOS=	(Exhibit 2	5-4)			
Speed Estima	ation					Speed E	stimatior	1			
$M_{s} = 0.287$	7 (Exibit 25	-19)				D <sub>s</sub> =	(Exhibit 2	5-19)			
S <sub>R</sub> = 54.8	mph (Exhil	bit 25-19)				S <sub>R</sub> =	mph (Exh	ibit 2	5-19)		
$S_0 = N/A$	mph (Exhil	oit 25-19)				S <sub>0</sub> =	mph (Exh	iibit 2	5-19)		

$\beta = -\frac{\beta}{100} =$	<u>e</u> –	5/1.8 mph (Exhibit 25.14)	<u> </u>	mph (Exhibit 25 15)
	U		<u> </u>	

HCS2000<sup>TM</sup>

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	<u>PS AN</u>	DRAME	<b>JUNC</b>	TIONS W	ORKSHE	ET			
General Info	rmation			Si	te Infor	mation					
Analyst		DEA			Fre	eway/Dir	of Travel	E	ASTBO	UND US	160
Agency or Co	mpany	URS			Jur	Inction OI 23			ON FROM 34	M SH 172	2/CR
Date Perform	ed	3/15/200	5		Jur	isdiction					
Analysis Time	Period	PM PEA	K		An	alysis Yea	ar	2	025 ALT	[ 1F	
Project Descr	iption US	160									
Inputs		<b>-</b>								·····	
Upstream Adj	Ramp	Terrain								Downstre Ramp	eam Adj
Yes 🗖	On									T Yes	🗖 On
🗖 No 🗖						No 🕅	Off Off				
L <sub>un</sub> = ft						L <sub>down</sub> =	ft				
up		s s	FF =	60.0 mpł	ר	S	<sub>FR</sub> = 40.	0 mp	h		voh/h
Vu= ve	eh/h		S	sketch ( s	show lar	nes, L <sub>A</sub> , L	<sub>D</sub> ,V <sub>R</sub> ,V <sub>f</sub> )			VD -	VEN/II
<b>Conversion</b>	to pc/h Un	der Base (	Condit	ions							
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>HV</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>	
Freeway	1345	0.95	Ro	lling	5	0	0.930	T	1.00	1522	
Ramp	240	0.95	Ro	ling	2	0	0.971	1	1.00	260	
UpStream			0.95 Köning 2								
DownStream											
	Me	erge Areas			·			Div	erge Area	as	
Estimation o	f v <sub>12</sub>					Estimat	ion of v <sub>12</sub>	•			
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )					Ň	V <sub>12</sub> =	$V_{R} + (V_{F})$	- V <sub>R</sub> )P <sub>FD</sub>	
L <sub>EO</sub> = (Equat	tion 25-2 or	25-3)				$L_{EO} = (E$	quation 2	5-8 c	or 25-9)		
$P_{r_{M}} = 1.000$	using Equa	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)					
$V_{1} = 1522$	nc/h	(		-,		$V_{42} = pc/h$					
Capacity Ch				·		$v_{12} = pc/n$					
	Actual	Maxin			E2	loapach.	y Checks		Mavi	mum	
	Actual	WidAili						uai	See Ex	hibit 25-	2001:
V <sub>FO</sub>	1782	460	0	Nc	,	V <sub>Fl</sub> =V <sub>F</sub>	:		1	4	<u></u>
				L		v <sub>12</sub>	_		440	U:All	
Vera	1782	4600	:All	No		V <sub>FO</sub> = V <sub>I</sub> V <sub>P</sub>	= -		See Ex	hibit 25- 4	
- R12						V <sub>R</sub>			See Exh	nibit 25-3	
Level of Serv	vice Detern	nination (in	f not F	 )		Level of	Service	Dete	rminatio	n (if not F	;)
D <sub>R</sub> = 5.475 -	+ 0.00734 v	/ <sub>R</sub> + 0.0078	8 V <sub>12</sub> -	0.00627	LA		D <sub>R</sub> = 4.2	52 +	0.0086 V	<sub>12</sub> - 0.000	9 L <sub>D</sub>
$D_{\rm p} = 15.5  (\rm pc/mi/ln)$						D <sub>R</sub> =	(pc/ mi /lr	i) .			
LOS = B	(Exhibit 25-	-4)				LOS=	(Exhibit 2	5-4)			
Speed Estim	ation				<u>.</u>	Speed E	stimatio	n			
$M_{s} = 0.296$	6 (Exibit 25	-19)				D <sub>s</sub> =	(Exhibit 2	5-19	)		
$S_{p} = 54.7$	mph (Fxhil	bit 25-19)				S <sub>R</sub> =	mph (Exl	nibit 2	25-19)		
$S_0 = N/A$	mph (Exhil	bit 25-19)				S <sub>0</sub> =	mph (Exi	nibit 2	25-19)		
						ł					

S=	54.7 mph (Exhibit 25-14)	s	=	mph (Exhibit 25-15)
HCS2000TM	1	Copyright © 2000 University of Flo	orida, Al	Rights Reserved

		RAM	PS AN	DRAMP	JUNC	<b>FIONS W</b>	OR	KSHEET				
General Info	rmation			Sit	e Infori	nation						
Analyst		DEA			Fre	eway/Dir	of T	Fravel	WESTBOUND US 160			
Agency or Co	mpany	URS			Jur	nction			OFF	TO S	H 172/C	CR 234
Date Perform	ed	3/15/200	5		Jur	isdiction						
Analysis Time	Period	AM PEA	K		Ana	alysis Yea	ar		2025	ALT	1F	
Project Descr	iption US	160		·								
Inputs										<u> </u>		
Upstream Adj	Ramp	lerrain				·					Downstre Ramp	eam Adj
🖾 Yes 🗖	On										🕅 Yes	🕅 On
🖾 No 🖉	Off										l No	Cff Off
L <sub>up</sub> = ft			- 4	30.0 mpt				- 40.07			L <sub>down</sub> =	ft
V	h/h	5	FF '	Joio mpi	1 		FR	- 40.01	прп		VD =	veh/h
vu – ve			<u> </u>	Ketch (s	now lan	ies, L <sub>A</sub> , L	<sub>D</sub> , V <sub>I</sub>	R,Vf)				
Conversion	o pc/h Uno	der Base (	Conditi	ons	<b></b>	r		r				
(pc/h)	V (Veh/hr)	PHF	PHF Terrain Truc		Truck	%Rv		f <sub>HV</sub>	f	)	v=v/PHF f <sub>HV</sub> f <sub>p</sub>	-
Freeway	935	0.95	Rol	ling	5	0	0	.930	1.0	0	1058	
Ramp	135	0.95	Rol	ling	2	0	0	.971	1.0	0	146	
UpStream												
DownStream	DownStream											
	Me	rge Areas							Diverge	Area	s	
Estimation o		Estimat	ion	of v <sub>12</sub>								
	V <sub>12</sub> =	: V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>1:</sub>	$_2 = V_R$	+ (V <sub>F</sub>	- V <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> = (Equal	ion 25-2 or	25-3)				L <sub>EQ</sub> = (E	qua	ation 25-	8 or 25	i-9)		
P <sub>FM</sub> = using E	quation (E	Exhibit 25-	5)			$P_{FD} = 1.0$	000	using	Equatio	on (Ex	hibit 25-	11)
$V_{42} = pc/h$						$V_{12} = 1058 \text{ pc/h}$						
Capacity Ch	ecks	<u></u>			-	Capacity Checks						
	Actual	Maxin	ามฑ	LOS	F?	Actual Maximum 109						LOS F?
	710100	Con Ful	1. 1. O.C.		· · · · · · · · · · · · · · · · · · ·	V=V_		1058		46	20	No
V <sub>FO</sub>		See Exh	IDII 25-			V.		1058		4400	ο. ΔΙΙ	No
						$V_{FO} = V_{I}$		912		460	0	No
V <sub>R12</sub>	-	4600	:All		-	V <sub>R</sub>		146		210	0	No
1			6	<u> </u>		* <u>R</u>		170		210		
Level of Serv	Ce Detern			/		Level of	<u>Se</u>	rvice De	etermi	nation	<u>1 (IT NOT I</u>	<u>-)</u>
$D_{\rm R} = 5.475$	+ 0.00734 V	R + 0.007	8 v <sub>12</sub> -	0.00627	LA		$\nu_{R}$	e 4.252	: + 0.00	186 V.	12 - 0.00C	ю с <sub>D</sub>
D <sub>R</sub> ≈ (pc/ mi /ln)							10.	7 (pc/ m	i/ln)			
LOS = (Exhibit 25-4) LOS = B (Exhibit 25-4)												
Speed Estim	ation					Speed E	sti	mation				
M <sub>s</sub> = (Exib	it 25-19)					D <sub>s</sub> =	0.3	76 (Exh	ibit 25-	19)		
S <sub>R</sub> = mph	(Exhibit 25-	-19)				S <sub>R</sub> =	53.	2 mph (	Exhibi	t 25-19	9)	
S <sub>0</sub> = mph	(Exhibit 25-	-19)				$S_0 = N/A mph$ (Exhibit 25-19)						
S= mph	(Exhibit 25-	-14)				S =	53.	2 mph (	Exhibi	t 25-1	5)	
<b>h</b>	<u> </u>		· · · · · · · · · · · · · · · · · · ·		·	I		<u> </u>			<u> </u>	

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	PS AN	D RAMP	JUNC	FIONS W	OR	KSHEET	٢				
General Infor	rmation			Sit	e Inforr	nation							
Analyst		DEA			Fre	eway/Dir	of 1	Travel	WES	TBO	BOUND US 160		
Agency or Co	mpany	URS			Jur	iction			OFF	TO S	SH 172/C	234 R 234	
Date Performe	ed	3/15/200	5		Jur	risdiction							
Analysis Time	Period	PM PEA	K		Ana	alysis Yea	ar		2025	ALT	<u> </u>	<u></u>	
Project Descri	iption US	160										<u> </u>	
Inputs	·	Tamala				. <u></u>					r		
Upstream Adj	Ramp	lerrain									Downstre Ramp	eam Adj	
Yes	On								M Yes	la On			
🖾 No 🖉	Off										🕅 No	C Off	
L <sub>up</sub> = ft		S	= f	30 0 mpt	<u></u>	S	=	= 40.0 r	noh		L <sub>down</sub> ≃	ft	
VII = Ve	h/h	•	++ S	kotch ( s	bowlan	ا ا عُم	FR V	V)			VD =	veh/h	
Conversion	ha na/h lln	der Pace (	Conditi			сз, <sub>са</sub> , с	D' * I	R' * f/					
Conversion		Jer Dase C	Jonara	0/15	r	<u> </u>	<u> </u>	r			V=V/PHF		
(pc/h)	v (Veh/hr)	PHF	Terrain		Truck	%Rv		f <sub>HV</sub>	f	p	f <sub>HV</sub> f <sub>p</sub>	. <u></u>	
Freeway	1450	0.95	Rol	ling	5	0	0	.930	1.0	0	1641		
Ramp	205	0.95	Rol	ling	2	0	0	.971	1.0	0	222		
UpStream							ļ					<u> </u>	
DownStream			-							•			
	Me	rge Areas					-		Jiverg	e Area	as	·····	
Estimation of v <sub>12</sub>								or $V_{12}$			••••••••••		
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						V <sub>1</sub>	2 = V <sub>R</sub>	+ (V <sub>F</sub>	- V <sub>R</sub> )P <sub>FD</sub>		
L <sub>EQ</sub> = (Equat	ion 25-2 or	25-3)				L <sub>EQ</sub> = (E	qua	ation 25-	8 or 2	5-9)			
P <sub>FM</sub> = using E	quation (E	Exhibit 25-	5)			P <sub>FD</sub> =1.(	000	using	Equati	on (E	xhibit 25-'	11)	
V <sub>12</sub> = pc/h						$V_{12} = 16$	41	pc/h					
Capacity Che	ecks					Capacity Checks							
	Actual	Maxim	านฑ	LOS	F?	Actual Maximum LOS						LOS F?	
		See Exh	ihit 25-			V <sub>FI</sub> =V <sub>F</sub>		1641		46	00	No	
V <sub>FO</sub>		7				V <sub>12</sub>		1641	$\top$	440	0:All	No	
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V <sub>I</sub> V <sub>R</sub>	F -	1419		46	00	No	
						V <sub>R</sub>		222		21	00	No	
Level of Serv	vice Detern	nination (in	f not F	)		Level of	f Se	rvice D	etermi	inatio	n (if not l	5	
D <sub>R</sub> = 5.475 -	+ 0.00734 v	<sub>R</sub> + 0.007	8 V <sub>12</sub> -	0.00627	′L <sub>A</sub>		D <sub>E</sub>	= 4.252	2 + 0.0	086 V	1 <sub>12</sub> - 0.000	9 L <sub>D</sub>	
$D_R = (pc/mi/ln)$							15.	7 (pc/ m	ii /ln)			U	
LOS = (E)	LOS=	В (	Exhibit 2	25-4)									
Speed Estim	ation					Speed E	sti	mation					
$M_{c} = (Exibit 25-19)$							0.3	83 (Exh	ibit 25	-19)			
S <sub>R</sub> = mph	(Exhibit 25	-19)				S <sub>R</sub> =	53.	1 mph	(Exhib	it 25-1	9)		
S <sub>0</sub> = mph	(Exhibit 25-	-19)				S <sub>0</sub> =	N/.	A mph (	Exhib	it 25-1	9)		
S= mph	(Exhibit 25	-14)				S = 53.1 mph (Exhibit 25-15)							

## $HCS2000^{\text{TM}}$

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	PS AN	DRAMP	JUNC	TIONS W	ORKS	HEET				
General Infor	mation			Sit	te Infor	mation						
Analyst		DEA			Fre	eway/Dir	of Tra	vel W	ESTBO	UND US	160	
Agency or Co	mpany	URS			Jur	nction ON FRO				4 SH 172	CR	
Date Performe	ed	3/15/200	5		Jur	isdiction						
Analysis Time	Period	AM PEA	K		An	alysis Yea	ar	20	025 ALT	`1F		
Project Descri	ption US	160										
Inputs												
Upstream Adj	Ramp	Terrain								Downstre Ramp	am Adj	
🖾 Yes 🗖	On									🗖 Yes	🕅 On	
🖾 No 🕅	Off									No No	C Off	
L <sub>up</sub> = ft			_	60.0 mph				10.0		L <sub>down</sub> =	ft	
Vu= ve	h/h	5	FF = S	Sketch(s	i show lar	ס nes, L <sub>A</sub> , L <sub>I</sub>	′fr <sup>=</sup> <sub>D</sub> ,V <sub>R</sub> ,V	40.0 mpr / <sub>f</sub> )	1	VD =	veh/h	
Conversion t	o pc/h Und	der Base (	Condit	ions			·····	· <u>·</u> ·····		•		
(pc/h)	V (Veh/hr)	PHF	Те	rrain	Truck	%Rv	f <sub>H</sub>	IV	f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>n</sub>		
Freeway	800	0.95	Ro	ling	5	0	0.93	30	1.00	905		
Ramp	885	0.95	Ro	lling	2	0	0.97	71	1.00	960		
UpStream												
DownStream												
	Ме	rge Areas						Dive	erge Area	s		
Estimation of	f v <sub>12</sub>					Estimati	ion of	V <sub>12</sub>				
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )				1		V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub>	- V <sub>R</sub> )P <sub>FD</sub>		
L <sub>FO</sub> = (Equati	ion 25-2 or	25-3)				$L_{FO} = (E$	quatio	on 25-8 oi	r 25-9)			
P <sub>FM</sub> = 1.000 L	ising Equat	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = using Equation (Exhibit 25-11)						
V <sub>12</sub> = 905 pc	:/h	,		,		$V_{12} = pc/h$						
Capacity Che	cks			·		Capacity Checks						
	Actual	Maxim	านm	LOS	F?			Actual	Maxir	num	LOS F?	
V	1965	460		No		V <sub>FI</sub> =V <sub>F</sub>			See Exh	nibit 25- 4	·	
*FO	1805	400			′ľ	V <sub>12</sub>			4400	):All		
.,	10/5	1000				$V_{FO} = V_{FO}$	-		See Ext	nibit 25-		
V <sub>R12</sub>	1865	4600	:All	No	' }	V <sub>R</sub>			See Exh	+ ibit 25-3		
Lovel of Sony	I ico Dotorn		f not F	<u> </u>		• <sub>R</sub>	Sond	ico Doto	minatio	loit 20-0		
D = 5.475 +	0 00734 v	+ 0.007	R V	0.00627		Level U		A 252 + (	10086 V		/	
$D_{\rm R} = 0.470^{\circ}$	►A	D -	0 <sub>R</sub> -		J.0000 V.	12 - 0.000	₽ ⊑D					
$D_{\rm R} = 10$		$D_R -$	(pc/m /⊑vbib	11/10) 								
LUS - B(		LUS-		1 20-4)			· · · · · · · · · · · · · · · · · · ·					
Speed Estima						speed E	Suma	H DE 40				
$w_{\rm s} = 0.298$	6 (Exibit 25-	-19)					עבצחום	m ∠ວ-19) 	<b>F</b> 40			
S <sub>R</sub> = 54.61	mph (Exhit	oit 25-19)				S <sub>R</sub> = ∶	mph (	Exhibit 2	5-19)			
$S_0 = N/A t$	nph (Exhit	oit 25-19)				S <sub>0</sub> =	mph (	Exhibit 2	5-19)			

S=	54.6 mph (E	xhibit 25-14)	S =	mph (Exhibit 25-15)

 $HCS2000^{\mathrm{TM}}$ 

Copyright © 2000 University of Florida, All Rights Reserved

		RAM	PS AN	DRAMP	JUNC	TIONS W	ORKSHE	ET					
General Infor	mation			Sit	e Infori	mation							
Analyst Agency or Col	mpany	DEA URS			Fre Jur	eway/Dir	of Travel	W O	/ESTBC	M SH 172	S 160 2/CR		
			-			234			34				
Date Performe	Deried	3/15/2003	) V		Jur	isdiction		2	005 AT -	F 1 F			
Project Descri	intion US	160	<u> </u>		A03	alysis rea	11 		025 AL				
Inputs		100				-	<del></del>						
Upstream Adj	Ramp	Terrain		·	<u> </u>				·	Downstre Ramp	eam Adj		
🗖 Yes 🗖	On									T Yes	🔽 On		
🗖 No 🖉	Off									I No	Cff		
L <sub>un</sub> = ft										L <sub>down</sub> =	ft		
Vu= ve	h/h	S	FF <sup>=</sup> (	60.0 mpr iketch ( s	n how lar	S nes, L <sub>A</sub> , L <sub>I</sub>	<sub>FR</sub> = 40.0 <sub>D</sub> ,V <sub>R</sub> ,V <sub>f</sub> )	) mpi	ר	VD =	veh/h		
Conversion t	o pc/h Un	der Base (	Conditi	ions									
(pc/h)	V (Veh/hr)	PHF	Te	rrain	Truck	%Rv	f <sub>HV</sub>		f <sub>p</sub>	v=V/PHF f <sub>HV</sub> f <sub>p</sub>			
Freeway	1245	0.95	Rol	ling	5	0	0.930		1.00	1409			
Ramp	1045	0.95	Rol	ling	2	0	0.971		1.00	1133			
UpStream													
DownStream		<b>A</b>			L	ļ							
Estimation		erge Areas				Ectimati	on of y	DIV	erge Area	as			
Estimation of	v <sub>12</sub>					Esumau	011 01 V <sub>12</sub>						
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )						/ <sub>12</sub> =	$v_R + (v_F)$	- V <sub>R</sub> )P <sub>FD</sub>			
L <sub>EQ</sub> = (Equat	ion 25-2 or	25-3)				L <sub>EQ</sub> = (E	quation 2	5-8 o	r 25-9)				
P <sub>FM</sub> =1.000 ι	using Equa	tion (Exhi	bit 25-	5)		P <sub>FD</sub> = u	sing Equa	tion (	Exhibit 2	25-11)			
V <sub>12</sub> = 1409 p	oc/h					$V_{12} = pc/h$							
Capacity Che	ecks					Capacity Checks							
ļ	Actual	Maxin	num	LOS	+?		Act	Jal	Max Soo Ex	imum bibit 25	LOS F?		
V <sub>FO</sub>	2542	460	0	No	,	V <sub>FI</sub> =V <sub>F</sub>	:	<u>.</u>		4	- <u>-</u>		
·						v <sub>12</sub>			440				
V <sub>B12</sub>	2542	4600	:All	No	,	V <sub>FO</sub> = V <sub>I</sub> V <sub>R</sub>	-		See Ex	hibit 25- 14			
102					ľ	Vp			See Ex	hibit 25-3			
Level of Serv	i vice Detern	nination (i	f not F	l ')		Level of	Service	Dete	rminatio	on (if not l	=		
$D_{\rm p} = 5.475 +$	+ 0.00734 v	ь + 0.007	8 V <sub>40</sub> -	0.00627	Ľ,		$D_{p} = 4.2$	52 +	0.0086 \	/10 - 0.000	9 L <sub>D</sub>		
$D_{-} = 21$	0 (pc/ mi /	n)	12		A	$D_{n} =$	nc/mi/lr	)		12	U		
LOS = C	(Exhibit 25-	-4)				LOS=	(Exhibit 2	, 5-4)					
Speed Estima	ation			Speed E	stimatio	n							
$M_{\rm s} = 0.323$	3 (Exibit 25	-19)				D <sub>s</sub> =	(Exhibit 2	5-19)	)				
$S_{R} = 54.2$	mph (Exhi	bit 25-19)				S <sub>R</sub> =	mph (Ext	nibit 2	25-19)				
$S_0 = N/A$	mph (Exhil	oit 25-19)				S <sub>0</sub> =	mph (Ext	nibit 2	25-19)				

S=	54.2 mph (Exhibit 25-14)	S =	mph (Exhibit 25-15)

 $HCS2000^{\text{TM}}$ 

		RAM	PS AN	DRAMP	JUNC	<b>FIONS W</b>	OR	KSHEE	T				
General Info	rmation			Sit	te Infori	nation							
Analyst		DEA			Fre	eway/Dir	of T	ravel	WESTBOUND US 160				
Agency or Co	mpany	URS			Jur	nction			OF	F TO C	CR 233		
Date Perform	ed	3/15/200	5		Jur	sdiction							
Analysis Time	Period	AM PEA	K		Ana	alysis Yea	ar		202	25 ALT	<u>1F</u>		
Project Descr	iption US	160						··				<u></u>	
Inputs		Tomain			· <u>-</u> - · · · · ·								
Upstream Adj	Ramp	rerrain									Downstre Ramp	am Adj	
Ves 📖	On										🕼 Yes	l On	
🖾 No 🖉	Off										I No	C Off	
L <sub>up</sub> = ft		S	= (	.00	<u>ו</u>	s		40.0	mph		L <sub>down</sub> ≈	ft	
Vu= ve	h/h		S S	ketch ( s	show lar	es L. L	- N-	V.)	•		VD =	veh/h	
Conversion	o nc/h Un	ler Rase (	Conditi	ons		, - <u>A</u> , -	ייט	<u>, , , , , , , , , , , , , , , , , , , </u>	·				
(nc/h)	V	PHF	Te	rrain	Truck	%Rv		f		f	v=V/PHF		
(po/ii)	(Veh/hr)	0.05	Pol	ling	5			'HV	1	'p	$f_{HV} f_p$		
Freeway	1085	0.95	Rol		- 3	0	$\begin{bmatrix} 0\\ 0 \end{bmatrix}$	930	1	.00	1907		
Ramp	035	0.95	ROI	ling	2	0	0.	9/1		.00	088		
DownStream					<u> </u>		├						
Merce Areas							L		Diver	ne Area	1		
Estimation o	f v <sub>12</sub>	<u></u>				Estimat	ion	of v <sub>12</sub>		90,7.00			
	V <sub>12</sub> =	= V <sub>F</sub> ( P <sub>FM</sub> )		<u> </u>				V	2 = V	′ <sub>R</sub> + (V <sub>F</sub>	- V <sub>R</sub> )P <sub>FD</sub>		
L <sub>FO</sub> = (Equat	ion 25-2 or	25-3)				L <sub>FO</sub> = (E	iqua	tion 25	-8 or	25-9)			
P <sub>EM</sub> ≃ using E	ouation (E	Exhibit 25-	5)			$P_{ED} = 1.0$	000	usina	Equa	ation (Ex	xhibit 25-1	1)	
	· · · · · · · · · · · · · · · · · · ·		,			$V_{12} = 10$	07	nc/h					
Canacity Ch	ocks					Capacity Checks							
		Maxin	num	105	F2	Actual Maximum LOSE2							
[	Actual		1.1.05			V=V_		1007		46		No	
V <sub>FO</sub>		See Exn	IDIT 25-	· · · ·	H			1907		440		No	
						v <sub>12</sub>		1907		440	U:All	INO	
V <sub>R12</sub>		4600	:All			V <sub>FO</sub> = V <sub>I</sub> V <sub>R</sub>	F	1219		460	00	No	
						V <sub>R</sub>		688		21	00	No	
Level of Serv	vice Detern	nination (i	f not F	)		Level of	f Se	rvice D	eterr	ninatio	n (if not l	=)	
$D_{p} = 5.475$ ·	+ 0.00734 v	<sub>P</sub> + 0.007	8 V <sub>12</sub> -	0.00627	′ L_		Dp	= 4.25	2 + 0	.0086 V	12 - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = (po	c/ mi /ln)	K	12		^	D <sub>R</sub> =	18.0	0 (pc/ n	ni /ln)	}	12	U	
LOS = (Exhibit 25-4)								Exhibit	25-4)				
Speed Estim		Speed E	Estir	nation									
$M_{o} = (Exib)$	it 25-19)					D, =	0.42	25 (Ext	nibit 2	25-19)			
S = mnh	(Evhibit 95	10)				$S_{s} = 52.4 \text{ mph} (Exhibit 25.10)$							
$R^{-}$ mpn		10)				$\sim_{\rm R}^{-}$ 52.4 mpl (Exhibit 25-19) S = N/A mph (Exhibit 25-10)							
$S_0 - mpn$		-19) 14)				~0 C	50		(EXIII	1011 20-1	5)		
$\sim$ mpn	(⊏xnibit 25	-14)	<u> </u>			<u>   </u>	52.4	+ mpn	(EXH	25-1 ווטו	כ)		

## $HCS2000^{\text{TM}}$

Copyright © 2000 University of Florida, All Rights Reserved

		RAMF	S AND I	RAMP JUNC	TIONS W	ORKSI	HEET				
General Infor	mation			Site Infor	mation						
Analyst		DEA		Fre	eway/Dir	of Trav	of Travel WESTBOUND US 160				
Agency or Cor	mpany	URS		Ju	nction		0	FF TO	CR 233		
Date Performe	ed	3/15/2005		Ju	risdiction						
Analysis Time	Period	PM PEAK	<u> </u>	An	alysis Yea	sis Year 2025 ALT 1F				i	
Project Descri	ption US	160									
Inputs		<u></u>									
Upstream Adj	Ramp	errain							Downstro Ramp	eam Adj	
Yes 🕅	On		The second secon								
No E	Off								No 🕅	M Off	
L <sub>up</sub> = ft	ŀ	6	- 60	0 mah			0.0		L <sub>down</sub> =	ft	
	ь./L	5	= <sub>F</sub> = 60.	u mpn		'FR = 4	.0.0 mpr	1	VD =	veh/h	
vu = ve			Ske	tch ( show lar	nes, L <sub>A</sub> , L	_,V <sub>R</sub> ,V <sub>f</sub>	)				
Conversion to	o pc/h Una	ler Base C	ondition	<u>s</u>	T						
(pc/h)	V (Veh/hr)	PHF	Terra	in Truck	%Rv	f <sub>H\</sub>	/	fp	v=V/PHF f <sub>HV</sub> f <sub>p</sub>	-	
Freeway	2290	0.95	Rollin	ng 5	0	0.93	0	1.00	2591		
Ramp	580	0.95	Rollin	1g 2	0	0.97	1	1.00	629		
UpStream											
DownStream											
	Mei	ge Areas					Dive	erge Are	as		
Estimation of	V <sub>12</sub>				Estimati	ion of v	12				
	V <sub>12</sub> =	V <sub>F</sub> ( P <sub>FM</sub> )					V <sub>12</sub> = 1	V <sub>R</sub> + (V <sub>I</sub>	<sub>F</sub> - V <sub>R</sub> )P <sub>FD</sub>		
L <sub>EQ</sub> = (Equati	on 25-2 or :	25-3)			L <sub>EQ</sub> = (E	quatior	n 25-8 oi	r 25-9)			
P <sub>FM</sub> = using E	quation (E	xhibit 25-5	)		$P_{FD} = 1.0$	)00 u	sing Equ	ation (E	xhibit 25-	11)	
$V_{12} = pc/h$					$V_{12} = 2591 \text{ pc/h}$						
Capacity Che	cks				Capacity Checks						
	Actual	Maxim	um	LOS F?			Actual	Max	imum	LOS F?	
		See Evhil	nit 25		V <sub>EI</sub> =V <sub>E</sub>	2	591	40	500	No	
V <sub>FO</sub>		7	JII 237		V <sub>12</sub>	2	591	440	)0:All	No	
V <sub>R12</sub>		4600:/	A11		V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub>	- 1	962	46	00	No	
					V <sub>R</sub>		529	21	00	No	
Level of Servi	ice Determ	ination (if	not F)		Level of	Servio	e Deter	minatic	on (if not l	5	
D <sub>R</sub> = 5.475 +	0.00734 v	<sub>R</sub> + 0.0078	V <sub>12</sub> - 0.0	00627 L <sub>A</sub>		$D_R = 4$	1.252 + (	).0086 \	/ <sub>12</sub> - 0.000	9 L <sub>D</sub>	
D <sub>R</sub> = (pc	/ mi /ln)				D <sub>R</sub> =	23.8 (p	oc/ mi /In	1)			
LOS = (Ex		LOS=	$\mathrm{C}$ (Exh	ibit 25-4	)						
Speed Estima	ntion		· · · ·		Speed E	stimat	tion				
M <sub>s</sub> ≈ (Exibit		D <sub>s</sub> =	0.420	(Exhibit	25-19)						
S <sub>R</sub> = mph (	Exhibit 25-	19)			S <sub>R</sub> =	52.4 m	nph (Ext	nibit 25-	19)		
S <sub>0</sub> = mph (	Exhibit 25-	19)			S <sub>0</sub> =	N/A m	nph (Ext	nibit 25-1	19)		
S= mph (	Exhibit 25-	14)			S =	52.4 m	nph (Ext	nibit 25-	15)		

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

Page 1 of 1

URS		Page of
JOB VS 160 ALT IF	Project No.	Sheet of
Description Westbound US 160 On-Ramp	Computed by	Date
from CR 233 AM Peak	Checked by	Date 3/15/05
		Reference



ANALYZED AS A MAJOR MERGE

$$\frac{Downstream of On-Ramp}{3,080 vph / 0.95 # 0.93 = 3,486 / 3 = 1,162 pcphp1Density = 1,162/60 = 19.37 (LOS C)$$

# Job US 160 ALT IF Project No. Sheet of \_\_\_\_\_\_ Description Westbound US 160 On-Ramp Computed by Date \_\_\_\_\_\_ From CR 233 PM Peak Checked by Date \_\_\_\_\_\_ Reference 2,580 From CR 233



ANALYZED AS A MAJOR MERGE

Upstream of 
$$On - Ramp$$
  
1,710 vph/0.95 # 0.93 = 1,935/2 = 968 pcphpl  
Density = 968 /60 = 16.13 (LOS B)
Attachment E 2025 Grandview Section Intersection Analyses Attachment E-1 2025 Grandview Section, No Action Alternative, Intersection Analyses

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK HOUR Project ID: US 160 E/W St: US 160

Inter.: US 160 / US 550 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

## N/S St: US 550

#### SIGNALIZED INTERSECTION SUMMARY

	1	Ea	stbou	nd	Wes	tbou	nd	N	orthl	oound		Sout	thbou	und	1
	]	L	Т	R	L	Т	R	L	Т	R	L		Т	R	ļ
	۱							I							1
No. Lanes		0	2	1	1	0	0	ł	1	0 1	1	0	0	0	
LGConfig			Т	R	L			} L		R	- I				- 1
Volume			2385	315	240			1945		485	J				1
Lane Width	1		12.0	12.0	112.0			12.	0	12.0	1				ļ
RTOR Vol	Ì			0	1			ļ		0	1				ļ

Duration	0.25	Area Type: All other areas	ype: All other areas	3
		Signal Operations	Signal Operations	

Pha	se Combination	. 1	2	3	4			5	6	7	8
EB	Left				. 1	NB	Left	А			
	Thru		А				Thru				
	Right		А		1		Right	A			
	Peds				1		Peds				
WB	Left	А				SB	Left				
	Thru				1		Thru				
	Right				1		Right				
	Peds				1		Peds				
NB	Right	А				EB	Right	А			
SB	Right				1	WB	Right				
Gre	en	10.0	55.0					40.0			
Yel	low	4.0	4.0					4.0			
A11	Red	1.0	1.0					1.0			

			CYCI					ie Length: 120.0 Se				
		Intersec	tion P	erforman	ice Summa	ry						
Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rat	ios	Lane G	roup	Appro	bach	- <del> </del>			
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS				
Eastbo	und	_ <u></u>			······································							
Т	1576	3438	1.59	0.46	302.5	F	267.4	F				
R	1282	1538	0.26	0.83	2.2	А						
Westbo	und											
L	143	1719	1.77	0.08	428.0	F						
							428.0	F				
Northb	ound											
L	573	1719	1.74	0.33	378.7	F						

0.72 0.46

R 705 Southbound

Intersection Delay = 274.0 (sec/veh) Intersection LOS = F

1538

30.1 C

260.4 F

Analyst: DEA Agency: URS Date: 3/15/2005 Period: PM PEAK HOUR Project ID: US 160 E/W St: US 160

Inter.: US 160 / US 550 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

N/S St: US 550

#### SIGNALIZED INTERSECTION SUMMARY

	1	Eastbound T R		Westbound		Northbound		und	Sou	thbo	und	1	
	L	Т	R	L	т	R	L	Т	R	L	T	R	I
No. Lanes		0 2	1	_   1	0	0		0	1		0	0	
LGConfig	i	Т	R	L					R	1			į
Volume Lane Width		3205	12.0	1240			1565		295	1			1
RTOR Vol	Ì		0				1		0	1			ļ

Area Type: All other areas 0.25 Duration Signal Operations

				_2TG	Juar	Ope	erat.	TOUR				
Pha	se Combination	1	2	3	4	: 1			5	6	7	8
EΒ	Left						NB	Left	А			
	Thru		A					Thru				
	Right		А			1		Right	А			
	Peds					ļ		Peds				
WB	Left	A					SB	Left				
	Thru					1		Thru				
	Right					1		Right				
	Peds					1	•	Peds				
NB	Right	А				1	EΒ	Right	A			
SB	Right					ł	WB	Right				
Gre	en	10.0	70.0					-	25.0			
Yel	low	4.0	4.0						4.0			
All	Red	1.0	1.0						1.0			

		Intersec	tion P	erforman	ice Summa	ry				
Appr/	Lane Group	Adj Sat Flow Rate	Rat	ios	Lane G	roup	Appro	ach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	•	
Eastbo	und	<u> </u>		, <u>, , , , , , , , , , , , , , , , </u>	- <u>.</u>	<u></u>	**************************************		<u></u>	<u></u>
т	2005	3438	1.68	0.58	334.5	F	254.5	F		
R	1282	1538	0.87	0.83	12.8	В				
Westbo	und									
L	143	1719	1.77	0.08	428.0	F				
							428.0	F		
Northb	ound									
L	358	1719	1.66	0.21	357.5	F	247 0	E.		
R	513	1538	0.61	0.33	35.5	D	247.0	Ľ		
Southb	ound									

Intersection Delay = 261.1 (sec/veh) Intersection LOS = F

Cycle Length: 120.0 secs

Analyst: DEA Agency: URS Date: 3/6/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 233 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

#### N/S St: CR 233

# SIGNALIZED INTERSECTION SUMMARY

	Eas	stbou	nd	We	stbou	nd	No	rthbou	ınd	Sou	lthboi	ind	ł
	L	Ť	R	L	Т	R	L	т	R	L	Т	R	1
No. Lanes	1	2	1	_    1	2	1		1	1	2	1	1	-
LGConfig	L	Т	R	L	т	R	ĹL	Т	R	I L	т	R	i
Volume	1215	1300	355	95	1255	335	180	60	50	255	60	940	1
Lane Width	112.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	I
RTOR Vol			0	I		0	ļ		0	1		0	ļ

Dur	ation	0.25		Area	Type:	All	otl	ner	areas				······································	
					Si	gnal	Ope	erat	ions					
Pha	se Combi	nation	1 .	2	3	- 4	: 1			5	6	7	8	
EΒ	Left		А					NB	Left	А				
	Thru			А					Thru		A			
	Right			А			1		Right		A			
	Peds						ł		Peds					
WB	Left		А				I	SB	Left	А				
	Thru			А			1		Thru		A			
	Right			А			1		Right		А			
	Peds						1		Peds					
NB	Right		А					EΒ	Right	А				
SB	Right		А				1	WB	Right	A				
Gre	en		30.0	50.0	)					10.0	10.0			
Yel	low		4.0	4.0						4.0	4.0			
All	Red		1.0	1.0						1.0	1.0			
										Cycl	e Lengt	h:	120.0	secs

		Intersec	ction Pe	rforman	ce Summaı	ry		-		
Appr/	Lane	Adj Sat	Rati	os	Lane Gi	roup	Appro	ach		
Lane	Group	Flow Rate							_	
Grp	Capacity	(s)	v/c	g/C	Delay I	LOS	Delay	LOS	-	
Eastbo	und						<u></u>	··		<u>,                                    </u>
L	443	1770	2.89	0.25	900.4	F				
Т	1432	3438	0.96	0.42	48.4	D	405.2	F		
R	857	1583	0.44	0.54	16.9	В				
Westbo	und									
L	443	1770	0.23	0.25	36.0	D				
Т	1432	3438	0.92	0.42	43.3	D	37.6	D		
R	857	1583	0.41	0.54	16.5	В				
Northbo	ound									
L	148	1770	1.28	0.08	221.6	F				
Т	155	1863	0.41	0.08	53.9	D	152.7	F		
R	594	1583	0.09	0.38	24.3	С				
Southbo	ound									
L	286	3433	0.94	0.08	91.5	F				
Т	155	1863	0.41	0.08	53.9	D	279.0	F		
R	594	1583	1.66	0.38	344.1	F				
	Intersec	tion Delay	= 265.7	(sec/v	eh) Int	terse	ction I	LOS =	F	

Analyst: DEA Agency: URS Date: 3/6/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 233 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

N/S St: CR 233

		SI	GNALIZED	INTERSE	CTION S	UMMARY	Y				
	Ea	stbound	Westb	ound	Nort	hbound	d l	Sou	thbou	nd	}
	<sup>™</sup> L	T R	L T	R	. L	т і	R I	L	Т	R	
No. Lan	les 1	2 1	1	2 1	1 1	1 :	'. 1	2	1	1	-' 
LGConfi	a L	TR		T R		Т	R I	L	Т	R	1
Volume	11200	1955 345	190 18	75 325	1570 8	5 1	50 İ	420	85	1520	Ì
Lane Wi	dth 112.0	12.0 12.0	112.0 12	.0 12.0	112.0 1	2.0 12	2.0	12.0	12.0	12.0	1
RTOR VC		0		0		0	(			0	i
	- 1		1		•		1			-	,
Duratic	on 0.25	Area	Type: Al Signa	l other l Operat	areas ions						
Phase C	ombinatio	n 1 2	3	4		5	6	7	8	• 	
EB Lef	t	A		NB	Left	A					
Thr	u	A			Thru		А				
Rig	ht	A		l	Right		А				
Ped	ls				Peds						
WB Lef	t	А		SB	Left	A					
Thr	u	А		l	Thru		А				
Rig	nt	А		ł	Right		А				
Pec	ls			I	Peds						
NB Rig	ſht	А		EB	Right	A					
SB Rig	ht	A		WB	Right	A					
Green		30.0 50.0	1			10.0	10.0	1			
Yellow		4.0 4.0				4.0	4.0				
All Red	l	1.0 1.0				1.0	1.0				
				_		Cycl	e Len	gth:	120.0	) se	ecs
	7	Interse	ction Pe	rformanc	e Summa	ary					
Appr/	Lane	Adj Sat	Rati	05	Lane G	roup	Арр	roaci	n. 		
Lane	Group	riow Rale		<u> </u>	Deler	TOS	Dala				
Grb	Capacity	(5)	v/C	g/C	Delay	102	Dera	ıу цо.	5		
Eastbou	ind	·····									
L	443	1770	2.85	0.25	884.2	F					
Т	1432	3438	1.44	0.42	235.8	F	436.	5 F			
R	857	1583	0.42	0.54	16.7	В					
Westbou	ınd										
L	443	1770	0.21	0.25	35.9	D		_			
Т	1432	3438	1.38	0.42	209.8	F	175.	5 F			
R	857	1583	0.40	0.54	16.4	В					
Northbo	und										
$\mathbf{L}$	148	1770	4.05	0.08	1445	F		<b>.</b> _			
Т	155	1863	0.57	0.08	58.1	E	1035	o F			
R	594	1583	0.27	0.38	26.3	С					
Southbo	und	0.400		0.00	015 6	_					
և 	286	3433	1.55	0.08	317.2	F.	<b>666</b>	<u> </u>			
'Г -	155	1863	0.57	0.08	58.1	E	672.	2 F			
R	594	1583	2.69	0.38	804.4	F		<b>-</b> -	_		
	Interse	ction Delay	= 478.3	(sec/ve	eh) Ir	nterse	ctior	LOS	= F		

Analyst: DEA Agency: URS Date: 3/18/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

N/S St: SH 172/CR 234

		S	IGNALIZED	INTERSE	CTION S	UMMAR	Y				
<u></u>	Eas	tbound	Westbo	ound	North	hboun	d	Soi	ithboi	ınd	
	L 	T R	IL T	R		Т	R	L	Т	R	1
No. Lane	es   1	1 1		1 1	1 1	1	1	1	1	1	
LGConfid	а   L	T R	L .	r r	L	Т	R	L	т	R	İ
Volume	1260	1020 325	165 800	D 70	630 5	56	0	50	40	255	ł
Lane Wid	dth  12.0	12.0 12.0	112.0 12	.0 12.0	112.0 1	2.0 1	2.0	12.0	12.0	12.0	I
RTOR Vol	1 j	0	j	0	1	0				0	Ì
Duration	n 0.25	Area	Type: Al Signa	l other l Operat	areas ions						
Phase Co	ombination	n 1 2	3	4		5	6	7		8	
EB Left	t	A		I NB	Left	А					
Thru	u	A		ł	Thru		А				
Rigł	ht	A		ļ	Right		A				
Peds	S			I	Peds						
WB Left	t	A		SB	Left	А					
Thru	u	A		l	Thru		A				
Righ	ht	A			Right		A				
Peds	s				Peds						
NB Rigł	ht	A		EB	Right	A					
SB Righ	nt	A	2	WB	Right	A		~			
Green		12.0 48.	0			30.0	10.	0			
Yellow		4.0 4.0				4.0	4.0				
AII Red		1.0 1.0				1.0	1.0	n ~ th .	120	0 0	
		Inters	ection Pe	rformanc		ry	е це	ng cn ;	120.	0 5	ecs
Annr/		Incers	Rati		Tano C		Än	nroac		<u> </u>	
Lane	Group	Flow Bat	A		Lane G	roup	пP.	proac			
Grn	Capacity	(5)	$\frac{1}{v/c}$	<u>a/c</u>	Delav	LOS	Del	av LO	5		
Orp	oupdotey	(2)	<b>v</b> / c	9,0	Deruy	TOD	DCT	ay no	U		
Eastbour	nd									······································	
L	177	1770	1.55	0.10	326.6	F					
т	724	1810	1.48	0.40	260.9	F	220	.3 F			
R	1095	1583	0.31	0.69	7.4	А					
Westbour	nd										
L	177	1770	0.38	0.10	51.9	D					
Т	724	1810	1.16	0.40	124.1	F	110	.2 F			
R	1095	1583	0.07	0.69	6.0	А					
R Northbou	1095 und	1583	0.07	0.69	6.0	A					
R Northbou L	1095 und 443	1583 1770	0.07 1.50	0.69 0.25	6.0 280.1	A F					
R Northbou L T	1095 und 443 155	1583 1770 1863	0.07 1.50 0.37	0.69 0.25 0.08	6.0 280.1 53.6	A F D	243	.9 F			
R Northbou L T R	1095 and 443 155 356	1583 1770 1863 1583	0.07 1.50 0.37 0.18	0.69 0.25 0.08 0.22	6.0 280.1 53.6 37.8	A F D D	243	.9 F			
R Northbou L T R Southbou	1095 and 443 155 356 and	1583 1770 1863 1583	0.07 1.50 0.37 0.18	0.69 0.25 0.08 0.22	6.0 280.1 53.6 37.8	A F D D	243	.9 F			
R Northbou L T R Southbou L	1095 and 443 155 356 and 443	1583 1770 1863 1583 1770	0.07 1.50 0.37 0.18 0.12	0.69 0.25 0.08 0.22 0.25	6.0 280.1 53.6 37.8 34.9	A F D D C	243	.9 F			
R Northbou T R Southbou L T	1095 and 443 155 356 and 443 155	1583 1770 1863 1583 1770 1863	0.07 1.50 0.37 0.18 0.12 0.27	0.69 0.25 0.08 0.22 0.25 0.08	6.0 280.1 53.6 37.8 34.9 52.5	A F D D C D	243 49.	.9 F 7 D			
R Northbou T R Southbou L T R	1095 and 443 155 356 and 443 155 356	1583 1770 1863 1583 1770 1863 1583	0.07 1.50 0.37 0.18 0.12 0.27 0.75	0.69 0.25 0.08 0.22 0.25 0.08 0.22	6.0 280.1 53.6 37.8 34.9 52.5 52.2	A F D C D D	243 49.	.9 F 7 D			

SIGNALIZED INTERSECTION SUMMARY

Analyst: DEA Agency: URS Date: 3/18/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

N/S St: SH 172/CR 234

	Eastbo	ound	West	bound	Nort	hboun	d	Sou	thbou	nd	1
	L T	R	L	T R	i L	Т	R	L	Т	R	1
	1		I								1
No. Lanes	1 1	1 1	( 1	1 1	1	1	1	1	1	1	1
LGConfig	L '	r r	L	T R	L	Т	R	L	Т	R	1
Volume	1385 13	45 795	115	245 90	640 1	.05 1	05	135	80	405	ł
Lane Width	112.0 12	.0 12.0	12.0 1	.2.0 12.0	12.0 1	2.0 1	2.0	12.0	12.0	12.0	
RTOR Vol	1	0		0	1	0	I			0	1
Duration	0.25	Area '	Гуре: А	All other	areas						
			Sigr	nal Operat	ions						
Phase Combi	nation 1	2	3	4		5	6	7	6	ł	
EB Left	A			NB	Left	A					
Thru		A		·	Thru		A				
Right		A		ļ	Right		A				
Peds				1	Peds						
WB Left	A			SB	Left	A					
Thru		A		ļ	Thru		А				
Right		A		1	Right		A				
Peds				ļ	Peds						
NB Right	A			EB	Right	A					
SB Right	A			WB	Right	A					
Green	15	.0 48.0				27.0	10.0	)			
Yellow	4.0	9 4.0				4.0	4.0				
All Red	1.0	J I.U				1.0	1.0				
						~ 1	-		100 /	<b>`</b>	
		<b>T I</b>			<u> </u>	Cycl	e Ler	ngth:	120.0	) se	CS
Dense / Lan		_Intersed	ction H	Performanc	e Summa	Cycl ary	e Ler	ngth:	120.0	) se	cs
Appr/ Lan	e I	_Intersed Adj Sat	ction H Rat	Performanc ios	e Summa Lane G	Cycl ary Group	e Ler Apr	ngth: proach	120.(	) se	cs 
Appr/ Lan Lane Gro	e 1 up Fi	_Intersed Adj Sat low Rate	ction H Rat	Performanc	e Summa Lane G	Cycl ary Group	e Ler App	oroach	120.(	) se	cs 
Appr/ Lan Lane Gro Grp Cap	e Z up F acity	_Intersed Adj Sat low Rate (s)	Rat v/c	Performanc Lios g/C	e Summa Lane G Delay	Cycl ary Group LOS	e Ler App Dela	ngth: proach ay LOS	120.0	) se	cs 
Appr/ Lan Lane Gro Grp Cap	e 1 up Fi acity	_Intersec Adj Sat low Rate (s)	ction H Rat	Performanc tios g/C	e Summa Lane G Delay	Cycl ary Group LOS	Apr Dela	ngth: proach ay LOS	120.(	) se	cs 
Appr/ Lan Lane Gro Grp Cap Eastbound	e 1 up Fi acity	_Intersec Adj Sat low Rate (s) 	ction H Rat $\overline{v/c}$	Performanc tios g/C	e Summa Lane G Delay	Cycl ary Group LOS	Apr Dela	ngth: proach ay LOS	120.(	) se	cs 
Appr/ Lan Lane Gro Grp Cap Eastbound L 22 T 72	e 2 up Fi acity 1 i 4	_Intersec Adj Sat Low Rate (s) 1770 1810	ction H Rat v/c 1.83 1.96	Performanc cios g/C 0.13 0.40	e Summa Lane G Delay 444.3 471.1	Cycl ary Group LOS F	Apr Dela	ngth: proach ay LOS	120.( 	) se	cs 
Appr/ Lan Lane Gro Grp Cap Eastbound L 22 T 72 B 10	e 1 up Fi acity 1 1 4 55	_Intersec Adj Sat low Rate (s) 1770 1810 1583	tion E Rat v/c 1.83 1.96 0.79	Performanc tios g/C 0.13 0.40 0.67	e Summa Lane G Delay 444.3 471.1 18.4	Cycl ary Froup LOS F F B	App Dela 324	ngth: proach ay LOS .5 F	120.( 	) se	CS
Appr/ Lan Lane Gro Grp Cap Eastbound L 22 T 72 R 10 Westbound	e 1 up F acity 1 1 4 55 5	_Intersec Adj Sat low Rate (s) 1770 1810 1583	ction E Rat v/c 1.83 1.96 0.79	Performanc ios g/C 0.13 0.40 0.67	e Summa Lane G Delay 444.3 471.1 18.4	Cycl ary Froup LOS F F B	App Dela	ngth: proach ay LOS .5 F	120.( n 5	) se	CS
Appr/ Lan Lane Gro Grp Cap Eastbound L 22 T 72 R 10 Westbound L 22	e 2 up F acity 1 1 55 1	_Intersed Adj Sat low Rate (s) 	tion E Rat v/c 1.83 1.96 0.79 0.55	Performanc cios g/C 0.13 0.40 0.67 0.13	e Summa Lane G Delay 444.3 471.1 18.4 52.2	Cycl ary Froup LOS F F B D	App Dela 324	ngth: proach ay LOS .5 F	120.( n 5	) se	CS
Appr/ Lan Lane Gro Grp Cap Eastbound L 22 T 72 R 10 Westbound L 22 T 72	e 1 up Fi acity 1 1 55 1 1 1	_Intersed Adj Sat Low Rate (s) 1770 1810 1583 1770 1810	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81	Performanc cios g/C 0.13 0.40 0.67 0.13 0.40	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3	Cycl ary Froup LOS F F B D F	e Ler Apr Dela 324.	ngth: proach ay LOS .5 F	120.( n 5	) se	cs 
Appr/LanLaneGroGrpCapEastboundLL22T72R10WestboundLL22T72R10	e 1 up F acity 1 5 55 1 4 1 55 1	_Intersec Adj Sat Low Rate (s) 1770 1810 1583 1770 1810 1583	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09	Performanc ios g/C 0.13 0.40 0.67 0.13 0.40 0.67	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1	Cycl ary Froup LOS F F B D F A	e Ler Apr Dela 324.	ngth: proach ay LOS .5 F .4 F	120.0	) se	cs
Appr/LanLaneGroGrpCapEastbound22T72R10Westbound22T72R10Northbound10	e 1 up F acity 1 5 55 1 4 5 55 1	_Intersec Adj Sat Low Rate (s) 1770 1810 1583 1770 1810 1583	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09	Performanc ios g/C 0.13 0.40 0.67 0.13 0.40 0.67	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1	Cycl ary Froup LOS F F B D F A	e Ler Apr Dela 324.	ngth: proach ay LOS .5 F .4 F	120.( n 5	) se	cs
Appr/LaneLaneGroGrpCapEastbound22T72R10Westbound22T72R10Northbound39	e 1 up F acity 1 5 55 5 1 5 55 5 8	_Intersec Adj Sat low Rate (s) 1770 1810 1583 1770 1810 1583	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69	Performanc ios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2	Cycl ary Froup LOS F F B D F A F	e Ler App Dela 324. 353.	ngth: proach ay LOS .5 F .4 F	120.(	) se	CS
Appr/LaneLaneGroGrpCapEastbound22T72R10Westbound22T72R10Northbound1L39T15	e 1 up F acity 1 1 55 1 4 1 55 1 4 1 55 1 8 1 5 1	_Intersec Adj Sat low Rate (s) 	ction E Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72	Performanc ios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3	Cycl ary Froup LOS F B D F A F E	e Ler Apr Dela 324. 353.	ngth: proach ay LOS .5 F .4 F	120.(	) se	CS
Appr/LanLaneGroGrpCapEastboundLL22T72R10WestboundLL22T72R10NorthboundLL39T15R39	e 1 up F acity 1 1 55 1 4 1 55 1 8 1 5 1 6 1	_Intersec Adj Sat low Rate (s) 1770 1810 1583 1770 1810 1583 1770 1863 1770 1863	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72 0.28	Performanc ios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08 0.25	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3 36.7	Cycl ary Froup LOS F F B D F A F E D	e Ler Apr Dela 324. 353.	ngth: proach ay LOS .5 F .4 F .8 F	120.( n 5	) se	CS
Appr/LaneLaneGroGrpCapEastboundLL22T72R10WestboundLL22T72R10NorthboundLL39T15R39SouthboundSouthbound	e 1 up F acity 1 1 55 1 4 1 55 1 6 1	Interseo Adj Sat Low Rate (s) 1770 1810 1583 1770 1810 1583 1770 1863 1583	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72 0.28	Performance cios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08 0.25	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3 36.7	Cycl ary Froup LOS F F B D F A F E D	e Ler Apr Dela 324. 353.	ngth: proach ay LOS .5 F .4 F .8 F	120.( n 5	) se	CS
Appr/LaneLaneGroGrpCapEastbound1L22T72R10Westbound1L22T72R10Northbound1L39T15R39Southbound29	e 1 up F acity 1 5 55 1 4 5 55 1 6 1 8 1 6 1	Interseo Adj Sat Low Rate (s) 1770 1810 1583 1770 1810 1583 1770 1863 1583	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72 0.28 0.36	Performance cios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08 0.25 0.22	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3 36.7 39.7	Cycl ary Froup LOS F F B D F A F E D D	e Ler Apr Dela 324. 353.	ngth: proach ay LOS .5 F .4 F .8 F	120.0	) se	CS
Appr/LaneLaneGroGrpCapEastbound22T72R10Westbound22T72R10Northbound15R39Southbound15L39T15R39Southbound15	e 1 up F acity 1 1 55 1 4 1 55 1 6 1 6 1 5 1 6 1 5 1 6 1	Intersec Adj Sat Low Rate (s) 1770 1810 1583 1770 1810 1583 1770 1863 1583 1770 1863	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72 0.28 0.36 0.54	Performanc ios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08 0.25 0.22 0.08	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3 36.7 39.7 56.7	Cycl ary Froup LOS F F B D F A F E D D E	e Ler Apr Dela 324. 353. 290.	ngth: proach ay LOS .5 F .4 F .8 F	120.(	) se	CS
Appr/LaneLaneGroGrpCapEastboundLL22T72R10WestboundLL22T72R10NorthboundLL39T15R39SouthboundLL39T15R39SouthboundLSouthbound39T15R39	e 1 up F acity 1 1 55 1 4 1 55 1 6 1 6 1 5 1 6 1 5 1 6 1	Intersec Adj Sat low Rate (s) 1770 1810 1583 1770 1863 1583 1770 1863 1583	ction H Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72 0.28 0.36 0.54 1.08	Performance ios g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08 0.25 0.22 0.08 0.25	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3 36.7 39.7 56.7 112.0	Cycl ary Froup LOS F F B D F A F E D D E F	e Ler Apr Dela 324 353 290	ngth: proach ay LOS .5 F .4 F .8 F 1 F	120.(	) se	CS
Appr/LaneLaneGroGrpCapEastboundLL22T72R10WestboundLL22T72R10NorthboundLL39T15R39SouthboundLL39T15R39SouthboundLSouthbound15R39T15R39T15R39T15R39	e 1 up F acity 1 1 55 1 4 55 1 1 5 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6	Intersec Adj Sat low Rate (s) 1770 1810 1583 1770 1863 1583 1770 1863 1583 1770 1863 1583 1770	ction F Rat v/c 1.83 1.96 0.79 0.55 1.81 0.09 1.69 0.72 0.28 0.36 0.54 1.08 = 300.	Performance g/C 0.13 0.40 0.67 0.13 0.40 0.67 0.22 0.08 0.25 0.22 0.08 0.25 1 (sec/ve	e Summa Lane G Delay 444.3 471.1 18.4 52.2 406.3 7.1 369.2 68.3 36.7 39.7 56.7 112.0 h) Ir	Cycl ary Froup LOS F F B D F A F E D D E F T erse	e Ler Apr Dela 324 353 290 89.7	ngth: proach ay LOS .5 F .4 F .8 F 1 F n LOS	120.0	) se	CS

Attachment E-2 2025 Grandview Section, Alternative G Modified (Preferred Alternative), Intersection Analyses

Analyst: DEA Agency: URS Date: 3/11/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/US 550 NORTH SIDE Area Type: All other areas Jurisd: Year : 2025 ALT 1G

N/S St: US 550 NORTH SIDE

#### SIGNALIZED INTERSECTION SUMMARY

	Eastbound			We	stboı	ınd	No:	rthbou	ind	S	outhbo	und	1
	L	Т	R	L	Т	R	L	т	R	L	Т	R	1
No Lanes	2	0	<u> </u>	_			_			_	0 1	1	-¦
LGConfig		0	R		0	R	1	T	U	1	U I T	R	1
Volume	480		315	240		140	1	70		1	165	385	1
Lane Width	12.0		12.0	12.0		12.0		12.0		ļ	12.0	12.0	1
RTOR Vol	I		0	I		0	I			1		0	I
Duration	0.25		Area	Type:	A11	other	areas						

Signal Operations											
Pha	se Combination	1	2	3	4		5	6	7	8	
EΒ	Left	А			NE	Left					
	Thru					Thru	A				
	Right	А	А		1	Right					
	Peds				1	Peds					
WB	Left	А	А		SE	Left					
	Thru				1	Thru	А				
	Right		А		I	Right	A				
	Peds				I	Peds					
NB	Right				EB	Right	А				
SB	Right	А	А		WE	Right					
Gre	en	32.0	23.0				20.0				
Yel	low	4.0	4.0				4.0				
All	Red	1.0	1.0				1.0				

Cycle Length: 90.0 secs

		Intersec	tion Pe	erforman	ce Summa	ry			. <u></u>	
Appr/	Lane	Adj Sat	Rati	.05	Lane G	roup	Appro	bach		
Lane	Group	Flow Rate								
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS		
Eastboi	ind									
L	1221	3433	0.41	0.36	22.1	С				
							13.4	В		
R	1583	1583	0.21	1.00	0.1	A				
Westbou	ind									
L	1180	1770	0.21	0.67	5.9	А				
							14.1	В		
Ŕ	405	1583	0.36	0.26	28.0	С				
Northbo	ound									
Т	414	1863	0.18	0.22	28.6	С	28.6	С		
Southbo	bund									
-	47.4	10.00	0 40	0.00	20 7	~	0 0	-		
T T	414	1863	0.42	0.22	30.7	C	9.3	А		
R	1583	1283	0.26	I.00	0.±	A			_	
	Intersec	tion Delay	= 12.9	(sec/ve	eh) Ir	nterse	ction	LOS =	В	

Analyst: DEA Agency: URS Date: 3/11/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/US 550 NORTH SIDE Area Type: All other areas Jurisd: Year : 2025 ALT 1G

N/S St: US 550 NORTH SIDE

#### SIGNALIZED INTERSECTION SUMMARY

	Eas	tbou	nd	Wes	tbou	nd		Nor	thbou	ınd	1	Soi	ithboi	ind	1
	ļΓ	Т	R	L	Т	R	1	L	Т	R	L		Т	R	I.
			<del></del>				_!_				_1				_
No. Lanes	2	0	1	1	0	1	1	0	1	0		. 0	1	1	
LGConfig	L		R	L		R			Т		ł		Т	R	I
Volume	480		1060	240		135			70		I		255	590	1
Lane Width	12.0		12.0	12.0		12.0			12.0		ł		12.0	12.0	1
RTOR Vol			0	1		0	1				I			0	1

Dur	ation	0.25		Area	Type:	All ot	her	areas				
					Si	gnal Op	erat	ions				
Pha	se Combi	nation	1	2	3	4			5	6	7	8
EΒ	Left		А			ł	NB	Left				
	Thru					· • •		Thru	A			
	Right		А	А		1		Right				
	Peds					1		Peds				

	Peds			1		Peds				
WВ	Left	A	А	!	SB	Left				
	Thru			1		Thru	A			
	Right		А	1		Right	А			
	Peds			· · · · · · · · · · · · · · · · · · ·		Peds				
NB	Right				EΒ	Right	A			
SB	Right	A	A	l I	WB	Right				
Gre	en	27.0	21.0				27.0			
Yel	low	4.0	4.0				4.0			
All	Red	1.0	1.0				1.0			
							Cycle	Length:	90.0	secs

		Intersec	tion Pe	erforman	ce Summa	ary				 
Appr/	Lane	Adj Sat	Rati	ios	Lane (	Group	Appr	oach		
Lane	Group	Flow Rate								
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	-	
Eastbo	und	······	·····							
L	1030	3433	0.49	0.30	26.2	С				
							9.2	A		
R	1583	1583	0.70	1.00	1.5	A				
Westbo	und									
L	1042	1770	0.24	0.59	9.0	А				
							16.4	B		
R	369	1583	0.38	0.23	29.7	С				
Northbo	ound									
Т	559	1863	0.13	0.30	23.1	С	23.1	С		
Southbo	ound									
Т	559	1863	0.48	0.30	26.4	С	8.1	A		
R	1583	1583	0.39	1.00	0.2	A				
	Intersec	tion Delay	= 10.2	(sec/v	eh) Ir	nterse	ction	LOS =	В	

	тwo	-WAY STOP	CONTRO	DL SUI	MMARY			
General Informati	on		Site Ir	nforma	tion		<u> </u>	
Analyst Agency/Co. Date Performed Analysis Time Period	DEA URS 3/11/200 AM PEA	5 {	Intersed Jurisdic Analysi	ction ction s Year		US 160 R SOUTH S 2025 ALT	AMP/US IDE 1G	550
Project Description	US 160				-		<u></u>	
East/West Street: US	160 RAMP	······································	North/S	South Str	eet: US 5	50 SOUTH	SIDE	
Intersection Orientation	n: North-Sout	h	Study F	Period (h	rs): 0.25			
Vehicle Volumes	and Adjustn	nents						
Maior Street		Northbound				Southbou	ind	
Movement	1	2	3		4	5		6
	L	Т	R		L	T		R
Volume	0	1015	485		110	560		0
Peak-Hour Factor, PH	F 0.95	0.95	0.95		0.95	0.95		0.95
Hourly Flow Rate, HFF	R 0	1068	510		115	589		0
Percent Heavy Vehicle	es O				2			
Median Type			. 1	Raised c	urb			
RT Channelized			0					0
Lanes	0	2	1		1	2		0
Configuration		Т	R		L	Т		
Upstream Signal		0				0		
Minor Street		Westbound				Eastbou	nd	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume	0	0	0		0	0		0
Peak-Hour Factor, PH	F 0.95	0.95	0.95		0.95	0.95		0.95
Hourly Flow Rate, HFF	र ०	0	0		0	0		0
Percent Heavy Vehicle	es 0	0	0		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					ō
Lanes	0	0	0		0	0		0
Configuration								
Delay, Queue Length	, and Level of	Service						
Approach	NB	SB	1	Vestbou	Ind	E	Eastboun	d
Movement	1	4	7	8	9	10	11	12
Lane Configuration	· · · · · · · · · · · · · · · · · · ·	L						
v (vph)		115						
C (m) (vph)		413						
v/c		0.28	1					
95% queue length		1.12	1			1		
Control Delav		17.0						
LOS		С			1	1		1
Approach Delay						+	<b>1</b>	
			<u> </u>					
			1			1		

Rights Reserved

Two-Way Stop Control

	TWO	-WAY STOP	CONTR	DL S	UMM	ARY				
General Informati	on		Site In	nforn	natio	n	·····			
Analyst Agency/Co. Date Performed Analysis Time Period	DEA URS 3/11/200 PM PEAI	5 K	Interse Jurisdio Analysi	ction ction s Yea	r		US 160 R SOUTH S 2025 ALT	AMP/ SIDE 1G	/US 5	50
Project Description	US 160									
East/West Street: US	160 RAMP		North/S	South	Street	: US 55	O SOUTH	SIDE		
Intersection Orientation	n: North-Sout	th	Study I	Period	(hrs):	0.25				
Vehicle Volumes	and Adjustr	nents								
Major Street		Northbound					Southbou	Ind		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume	0	635	295		· 1	70	1230			0
Peak-Hour Factor, PH	- 0.95	0.95	0.95		0.	95	0.95		0.	95
Hourly Flow Rate, HFF	<u> 0</u>	668	310		1	78	1294			0
Percent Heavy Vehicle	s 0			ا	<del></del>	2				
Median Type	e jzed				vided					
RT Channelized			0							0
Lanes	0	2	1			1	2			0
Configuration	_	1				L				
Upstream Signal						<u> </u>				
Minor Street		Westbound				40	Eastbou	nd		40
wovement		<u>-</u>	<u> </u>			10				<u>12</u>
Valuma			R			L				R
Volume Rock Hour Eactor, PH	E 0.95	0 05	0.05			0	0.05		0	0
Hourty Flow Rate HEF	2 0	0.95	0.95		0	<u>.95</u>	0.95		0.	<u>.95</u>
Percent Heavy Vehicle		0				0	0			0
Percent Grade (%)			~			<u> </u>	0			<u> </u>
Flored Approach			<u> </u>					T		
Clarea Apploach			·							
			+					<u> </u>		
RT Channelized							<u> </u>			0
Lanes	0	0	0			0	0			0
Configuration			<u></u>							
Delay, Queue Length	, and Level of	Service	r			<u></u>	r		<u> </u>	<u> </u>
Approach	NB	SB	<u> </u>	Nestb	ound		<u> </u>	Eastb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		<i>L</i>								
v (vph)	_	178								
C (m) (vph)		701			T					
v/c		0.25			T		T	Ī		
95% gueue length		1.01	1				1	1		
Control Delav		11.9					t	t		· · · ·
IOS		B					1			
Approach Delay			<u> </u>		L	<u> </u>				
Approach LOS			<u> </u>				<u> </u>			
Approach LOS							L			

Rights Reserved

Analyst: DEA Agency: URS Date: 3/6/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 233 Area Type: All other areas Jurisd: Year : 2025 ALT 1G - SPUI

### N/S St: CR 233

# SIGNALIZED INTERSECTION SUMMARY\_\_\_\_\_

	Eastbound		Wes	tbou	nd	Noi	rthbou	ınd	Sou	ithboi	ind	1	
	L	т	R	LTR		R	L	Т	R	L	т	R	}
	l						1			1			1
No. Lanes	2	0	1	1	0	1	2	1	1	2	1	1	-
LGConfig	L		R	L		R	L	Т	R	L	T	R	
Volume	1735		355	95		195	180	60	50	145	60	555	1
Lane Width	12.0		12.0	12.0		12.0	12.0	12.0	12.0	112.0	12.0	12.0	1
RTOR Vol	I		0	I		0	I		0	l		0	1

Duration 0.25 Area Type: All other areas

_	Signal Operations												
Pha	se Combination	1	2	3	4			5	6	7	8		
EΒ	Left	А			1	NB	Left	А					
	Thru				1		Thru		A				
	Right						Right		A				
	Peds				ł		Peds						
WB	Left	А				SB	Left	А					
	Thru				1		Thru		A				
	Right						Right	A	A				
	Peds				1		Peds						
NB	Right	А			1	EB	Right	A					
SB	Right	A			1	WB	Right	A					
Gre	en	35.0						30.0	10.0				
Yel	low	4.0						4.0	4.0				
A11	Red	1.0						1.0	1.0				
								Cycl	e Lengt	h: 90.	0	secs	

		Intersec	tion Pe	erforman	ce Summa	ary	-			
Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rat	Los	Lane (	Group	Appr	oach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	_	
Eastbo	und								<del></del>	 <u> </u>
L	1335	3433	0.58	0.39	22.3	С	25.0	С		
R	528	1583	0.71	0.33	30.5	С				
Westbo	und									
L	688	1770	0.15	0.39	17.9	В	21.6	C		
R	528	1583	0.39	0.33	23.4	С				
Northb	ound									
L	1144	3433	0.17	0.33	21.2	С				
Т	207	1863	0.30	0.11	37.6	D	22.5	С		
R	879	1583	0.06	0.56	9.2	А				
Southb	ound									
L	1144	3433	0.13	0.33	21.0	С				
Т	207	1863	0.30	0.11	37.6	D	7.1	А		
R	1583	1583	0.37	1.00	0.1	А				
	Intersec	tion Delay	= 18.7	(sec/v	eh) I	nterse	ction	LOS =	В	

Analyst: DEA Agency: URS Date: 3/6/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 233 Area Type: All other areas Jurisd: Year : 2025 ALT 1G - SPUI

# N/S St: CR 233

#### SIGNALIZED INTERSECTION SUMMARY

	Eas	Eastbound		Wes	tbou	nd	Nor	rthbou	ınd	Sou	ithboi	ind	
	L	Т	R	L	Т	R	L	Т	R	L	Т	R	1
	1			1									1
No. Lanes	2	0	1	1	0	1	2	1	1	2	1	1	- 
LGConfig	L		R	L		R	L	Т	R	L	т	R	!
Volume	720		345	90		190	570	85	150	250	85	930	I
Lane Width	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	1
RTOR Vol	l		0	I		0	I		0	1		0	I

Duration 0.25 Area Type: All other areas

	Signal Operations												
Phas	se Combination	1	2	3	4			5	6	7	8		
EΒ	Left	А			Į	NB	Left	A					
	Thru						Thru		A				
	Right				I		Right		A				
	Peds						Peds						
WB	Left	А			I	SB	Left	А					
	Thru				1		Thru		A				
	Right				1		Right	A	A				
	Peds				1		Peds						
NB	Right	A			1	ĒΒ	Right	A					
SB	Right	А			1	WB	Right	А					
Gree	en 2	25.0						40.0	10.0				
Yell	Low	4.0						4.0	4.0				
All	Red	1.0						1.0	1.0				

Cycle Length: 90.0 secs

		Intersec	CION PE	eriorman	ce_summa	ary				 
Appr/	Lane	Adj Sat	Rati	LOS	Lane (	Group	Appr	oach		
Lane	Group	Flow Rate							_	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS		
Eastbo	und									
L	954	3433	0.79	0.28	34.8	С				
							29.6	С		
R	704	1583	0.52	0.44	18.7	B				
Westbo	und									
L	492	1770	0.19	0.28	25.0	С				
							19.0	В		
R	704	1583	0.28	0.44	16.1	В				
Northbo	ound									
L	1526	3433	0.39	0.44	17.0	В				
Т	207	1863	0.43	0.11	38.8	D	19.0	В		
R	704	1583	0.22	0.44	15.6	В				
Southbo	ound									
L	1526	3433	0.17	0.44	15.1	В				
Т	207	1863	0.43	0.11	38.8	D	6.1	А		
R	1583	1583	0.62	1.00	0.7	А				
	Intersec	tion Delay	= 17.5	(sec/v	eh) I	nterse	ction	LOS =	В	

Analyst: DEA Agency: URS Date: 1/26/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234 Area Type: All other areas Jurisd: Year : 2025 ALT 1G - SPUI

N/S St: SH 172/CR 234

# SIGNALIZED INTERSECTION SUMMARY\_\_\_\_\_

		Eas	stbou	nd	Wes	tbou	nd	Nor	thbou	ind	Sou	ithboi	und	1
		L ·	т	R	L	Т	R	L	Т	R	L	Т	R	1
No. Lan	ies	2	0	1	1	0	1	2	1	1	1	1	1	-1
LGConfi	g l	$\mathbf{L}$		R	L		R	L	т	R	$\mathbf{L}$	т	R	1
Volume	12	260		325	65		70	1630	55	60	50	40	255	ł
Lane Wi	dth  1	12.0		12.0	112.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vo	1			0	l		0			0 1			0	[
Duratio	on (	0.25		Area '	Гуре:	A11	other	areas						
					Sig	nal	Operat	ions			<u>-</u>			
Phase C	Combina	ation	1 1	2	3	4			5	6	7		8 .	
EB Lef	t		A				NB	Left	A					
Thr	u						ļ	Thru		A				
Rig	nt							Right	:	A				
Ped	ls							Peds						
WB Lef	t		A				SB	Left	A					
Thr	u						(	Thru		A				
Rig	iht							Right		A				
Ped	ls		_					Peds	_					
NB Rig	Int		A				I EB	Right						
SB Rig	Int		A				I WB	Right						
Green			28.0						27.0	20.0				
IELIOW	1		4.0						4.0	4.0				
AII Keu	L		1.0							I.U I.e. T.e.n	ath.	വെ റ	6	005
			II	ntersed	ction	Perf	ormanc	e Summ	larv		gen.	20.0	5	005
Appr/	Lane		Ad	j Sat	Ra	tios		Lane	Group	o App	roacl	h	·····	
Lane	Group	5	Flow	w Rate					-					
Grp	Capad	city		(s)	v/c	g	7C	Delay	/ LOS	Dela	y LOS	S		
Eastbou	ind			· · · · · ·										
L	1068	3	343	33	0.26	0	.31	23.3	С	20 0	C			
R	475		158	83	0.72	0	.30	33.4	С	20.9	C			
Westbou	ind													
L	551		17	70	0.12	0	.31	22.3	С	22 8	C			
R	475		158	33	0.16	0	.30	23.3	С	22.0	C			
Northbo	und													
L	1030	)	343	33	0.64	0	.30	28.7	С					
Т	414		186	53	0.14	0	.22	28.3	С	27.0	C			
R	932		158	33	0.07	0	.59	8.0	А					
Southbo	und													
L	531		177	70	0.10	0	.30	22.8	С					
Т	414		186	53	0.10	0	.22	28.0	C	13.5	В			
R	932		158	33	0.29	0	.59	9.3	А					

Intersection Delay = 24.7 (sec/veh) Intersection LOS = C

Analyst: DEA Agency: URS Date: 1/26/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234 Area Type: All other areas Jurisd: Year : 2025 ALT 1G - SPUI

N/S St: SH 172/CR 234

# SIGNALIZED INTERSECTION SUMMARY

	Eas	tbound	Westb	ound	Nort	thbour	nd	Sout	hbound	.
	L	T R	IL T	R		Т	R	L	TR	. 1
No. Lanes	2	0 1	1	0 1	2	1	1	1	1 1	
LGConfig	L	R	L	R	L	Т	R	L	Т	R
Volume	1385	795	1115	90	640	105 1	05 1	135 8	30 40	5
Lane Widt	h  12.0	12.0	112.0	12.0	112.0	12.0 1	12.0 İ	12.0	12.0 12	.01
RTOR Vol	Î	0	Ì	0	Ì	C	)		0	1
Duration	0.25	Area	Type: Al	l other	areas				<u> </u>	
			Signa	l Operat	ions					
Phase Com	bination	1 2	3	4 (		5	6	.7	8	
EB Leit		A		I NB	Leit	A	_			
Thru					Thru		A			
Right				ł	Right		А			
Peds		7			Peas	7				
WB Left		А		SB	Leit	A	-			
Thru					Thru		A			
Right					Right		A		•	
Peds		-			Peas	-				
NB Right		A		EB	Right	A				
SB Right		A.		WB	Right	A E1 0	10 0			
Green		14.0				51.0	10.0			
Ieliow		4.0				4.0	4.0			
AII Red		1.0				1.U Cuc'	L.U Lo Ion	ath.	00 0	
		Interse	ction Pe	rformanc		arv	Te Dell	yun.	90.0	Secs
Appr/ L	ane	Adi Sat	Rati	OS	Lane	ary Group	App	roach		
Lane G	roup	Flow Rate		00	Duno	oroup		104011		
Grp C	apacity	(s)	v/c	q/C	Delay	LOS	Dela	y LOS		
Eastbound						· _				
L	534	3433	0.76	0.16	42.6	D		_		
						_	36.9	D		
R	897	1583	0.93	0.57	34.2	С				
Westbound						_				
L .	275	1770	0.44	0.16	35.6	D		-		
							23.9	- C		
R	897	1583	0.11	0.57	9.0	A				
Northboun	d					_				
L	1945	3433	0.35	0.57	10.6	В		_		
T	207	1863	0.54	0.11	40.6	D	15.8	В		
R	510	1583	0.22	0.32	22.4	С				
Southboun	d			· · ·		_				
L	1003	1770	0.14	0.57	9.3	A	· •	_		
Т	207	1863	0.41	0.11	38.5	D	33.0	С		
R	510	1583	0.84	0.32	39.8	D	·		-	
	Intersec	tion Delay	= 28.8	(sec/ve	en) I	nters	ection	LOS	= C	

Attachment E-3 2025 Grandview Section, Alternative F Modified, Intersection Analyses

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160

Inter.: US 160/US 550/CR 233 Area Type: All other areas Jurisd: Year : 2025 ALT 1F

N/S St: US 550/CR 233

#### SIGNALIZED INTERSECTION SUMMARY

	Eastbo	und	Westb	ound	Nort	thbound	1	Soi	ithboi	ind	
1	L T	R	L T	R	Г	T R	l I	L	т	R	Ì
		I		1			l				l.
No. Lanes	2 0	0	2	0 1	2	1 1	I	2	1	0	
LGConfig	$\mathbf{L}$	1	L	R	L	Т	R	L	т		
Volume	1180	13	300	335	1120	165 48	0 12	255	145		1
Lane Width	12.0	1	.2.0	12.0	12.0	12.0 12	.0  1	12.0	12.0		ļ
RTOR Vol		ļ		0		0	1				1
Duration	0.25	Area Ty	vpe: Al	l other a	areas	<u> </u>	·				
			Signa	l Operati	lons						
Phase Combina	ation 1	2	3	4		5	6	7	:	В	
EB Left	A			NB	Left	A					
Thru					Thru		A				
Right				ł	Right		А				
Peds					Peds						
WB Left	A			SB	Left	A					
Thru					Thru		A				
Right					Right						
Peds	_				Peds						
NB Right	A				Right	_					
SB Right	4.5	0		W B	Right	A	1 - 0				
Green	45.	0				43.0	17.0				
Yellow	4.0					4.0	4.0				
All Red	1.0					1.0	1.0		100	~	
		Intersect	ion Pe	rformance	e Summ	uycie arv	e Leng	gtn:	120.	U .	secs
Appr/ Lane	A	dj Sat	Rati	os	Lane	Group	App	roac	 h		
Lane Grou	o Fl	ow Rate				-					
Grp Capad	city	(s)	v/c	g/C	Delay	LOS	Dela	y LO	S		
Fastbound		• ••• · · · · · · · · · · · · · · · · ·		· ·							
L 128'	7 3	433	0.97	0.38	54.1	D					
				••••			54.1	D			
Westbound											
L 128	7 3-	433	0.25	0.38	25.9	С					
D 567	. 1	500	0 62	0.26	<b>22 0</b>	C	30.1	C			
Northbound	T -	505	0.02	0.30	55.9	C					
T. 1221	ງ ຈ.	4 3 3	0 96	0 36	54 3	Л					
т 264	1	863	0 66	0 14	54 7	D D	44 5	n			
R 884	1	583	0.57	0.56	18.1	B		U			

Southbound 1230 3433 0.36 26.9 0.22 С 264 1863 0.58 0.14 51.3 35.8 D D

Intersection Delay = 44.2 (sec/veh) Intersection LOS = D

L

Т

Analyst: DEA Agency: URS Date: 3/15/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/US 550/CR 233
Area Type: All other areas
Jurisd:
Year : 2025 ALT 1F

N/S St: US 550/CR 233

#### SIGNALIZED INTERSECTION SUMMARY

	Eastbound		Wes	stbou	nd	No:	rthbou	und	Sou	uthbou	Ind	1	
	L	Т	R	L	т	R	L	т	R	L	т	R	I
				_1			_			_!			1
No. Lanes	2	0	0	2	0	1	2	1	1	2	1	0	ł
LGConfig	L			L		R	L	Т	R	L	Т		- 1
Volume	1165			250		330	1105	190	400	415	215		1
Lane Width	12.0			12.0		12.0	12.0	12.0	12.0	12.0	12.0		1
RTOR Vol	Ì			Ì		0	1		0	ł			1

Duration 0.25 Area Type: All other areas Signal Operations

Signal Operations												
Pha	se Combination	1	2	3	4			5	6	7	8	
EΒ	Left	A			1	NB	Left	А				
	Thru				1		Thru		A			
	Right				1		Right		А			
	Peds				1		Peds					
WB	Left	A				SB	Left	А				
	Thru				1		Thru		А			
	Right				1		Right					
	Peds				1		Peds					
NB	Right	A			1	EΒ	Right					
SB	Right					WB	Right	А				
Gre	en -	43.0						41.0	21.0			
Yel	low	4.0						4.0	4.0			
All	Red	1.0						1.0	1.0			

Cycle Length: 120.0 secs

Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rat	ios	Lane (	Group	Appro	bach	 
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	
Eastbou	ind		······································	<del>.</del>		<u> </u>	- <del>////</del>		 
L	1230	3433	1.00	0.36	63.3	E	63.3	E	
Westbou	ind								
L	1230	3433	0.21	0.36	26.8	С	32.0	C	
R	541	1583	0.64	0.34	35.9	D		-	
Northbo	ound								
L	1173	3433	0.99	0.34	63.5	Е			
Т	326	1863	0.61	0.17	49.2	D	50.5	D	
R	910	1583	0.46	0.57	15.1	В			
Southbo	und								
L	1173	3433	0.37	0.34	30.0	С			
Т	326	1863	0.69	0.17	52.7	D	37.7	D	

Intersection Delay = 49.5 (sec/veh) Intersection LOS = D

. - /

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234 Area Type: All other areas Jurisd: Year : 2025 ALT 1F - SPUI

N/S St: SH 172/CR 234

SIGNAI	IZED	INTERS	SECTIC	DN S	UMMARY

	Eas	Eastbound			stboi	ınd	Noi	rthbou	ınd	Sou	lthbou	und	1
	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
No Tanes	2			-	0	1	<u> </u>	1	1	_			-¦
LGConfig	L	Ū	R		U	R		Ť	R		T T	R	
Volume	260		325	65		70	630	55	60	50	40	255	ł
Lane Width	12.0		12.0	112.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	1
RTOR Vol	ļ		0	Ì		0	1		0			0	1
Duration	0.25		Area	Tvpe:	All	other	areas			<u> </u>			

-	-		-		~	-		-			_
	 _		 				-		*		
						S10	gna⊥	- C	perat	lions	5
						~ '	-	~			
Jurac		· ·	 5	171	ca ij	vpc.		0	CHCL.	area	
										~ ~ ~ ~ ~	

Pha	se Combination	1	2	3	4			5	6	7	8
EΒ	Left	A				NB	Left	A			
	Thru				1		Thru		A		
	Right				1		Right		A		
	Peds				ļ		Peds				
WΒ	Left	A			1	SB	Left	A			
	Thru				1		Thru		A		
	Right				ľ		Right		A		
	Peds						Peds				
NB	Right	A				EB	Right	A			
SB	Right	A				WB	Right	A			
Gre	en 2	28.0						27.0	20.0		
Yel	low '	4.0						4.0	4.0		
All	Red	1.0						1.0	1.0		

Cycle Length: 90.0 secs

Appr/	Lane	Adj Sat	Rati	los	Lane G	Group	Appr	oach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	-	
Eastbo	und				<u>.</u>	<u>,</u> ,		<u></u>		
L	1068	3433	0.26	0.31	23.3	С				
							28.9	С		
R	475	1583	0.72	0.30	33.4	С				
Westbo	und									
L	551	1770	0.12	0.31	22.3	С				
							22.8	C		
R	475	1583	0.16	0.30	23.3	С			•	
Northbo	ound									
L	1030	3433	0.64	0.30	28.7	С				
Т	414	1863	0.14	0.22	28.3	С	27.0	С		
R	932	1583	0.07	0.59	8.0	А				
Southbo	ound									
L	531	1770	0.10	0.30	22.8	С				
Т	414	1863	0.10	0.22	28.0	С	13.5	В		
R	932	1583	0.29	0.59	9.3	A				
	Intersec	tion Delay	= 24.7	(sec/v	eh) Ir	nterse	ction	LOS =	С	

Analyst: DEA Agency: URS Date: 1/26/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/SH 172-CR 234 Area Type: All other areas Jurisd: Year : 2025 ALT 1F - SPUI

N/S St: SH 172/CR 234

# SIGNALIZED INTERSECTION SUMMARY

	Eas	tbou	nd	Wes	Westbou		Not	rthbou	ind	Sou	ithbou	ind	1
	L	Т	R	L	Т	R	L	$\mathbf{T}$	R	L	Т	R	
	1			1						l			1
No. Lanes	2	0	1	1	0	1	2	1	1	1	1	1	-
LGConfig	L		R	L		R	L	Т	R	L	т	R	l
Volume	385		795	115		90	640	105	105	1135	80	405	1
Lane Width	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	I
RTOR Vol	1		0	1		0	1		0	ļ		0	1

Area Type: All other are	eas
A	rea Type: All other are

				Siç	gnal Ope	erat	ions				
Phas	se Combination	1	2	3	4			5	6 7	7 8	
EΒ	Left	A				NB	Left	А			
	Thru						Thru		A		
	Right						Right		A		
	Peds						Peds				
WB	Left	А			1	SB	Left	А			
	Thru						Thru		A		
	Right				1		Right		A		
	Peds				]		Peds				
NB	Right	А				EΒ	Right	А			
SB	Right	А			1	WВ	Right	A			
Gree	en	14.0						51.0	10.0		
Yel	low	4.0						4.0	4.0		
All	Red	1.0						1.0	1.0		
								Cycl	e Length	: 90.0	secs

		Intersec	ction Pe	erformar	ice Summa	ary				 	
Appr/	Lane	Adj Sat	Rat	ios	Lane (	Group	Appr	oach		 	
Lane	Group	Flow Rate							_		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	/ LOS			
Eastbo	und								<u></u>	 	
L	534	3433	0.76	0.16	42.6	D					
							36.9	D			
R	897	1583	0.93	0.57	34.2	С					
Westbo	und										
L	275	1770	0.44	0.16	35.6	D					
							23.9	C			
R	897	1583	0.11	0.57	9.0	А					
Northb	ound										
L	1945	3433	0.35	0.57	10.6	В					
Т	207	1863	0.54	0.11	40.6	D	15.8	В			
R	510	1583	0.22	0.32	22.4	С					
Southb	ound										
L	1003	1770	0.14	0.57	9.3	А					
Т	207	1863	0.41	0.11	38.5	D	33.0	С			
R	510	1583	0.84	0.32	39.8	D					
	Intersec	tion Delay	= 28.8	(sec/v	reh) I:	nterse	ection	LOS =	С		

Attachment E-4 2025 Grandview Section, Additional Analyses for At-Grade Options

Inter.: US 160/CR 233 Analyst: DEA Area Type: All other areas Agency: URS Date: 3/6/2005 Jurisd: Period: AM PEAK Year : 2025 ALT 1G - AT GRADE Project ID: US 160 E/W St: US 160 N/S St: CR 233 SIGNALIZED INTERSECTION SUMMARY Eastbound Westbound Northbound Southbound 1 L Т | L T R LТ R R | L Т R 2 2 2 2 1 1 2 1 1 1 1 1 No. Lanes 1 1 LGConfig Т R | L Т R | L Т R L Т R | L Volume |735 1410 355 195 1395 195 |180 60 50 145 60 555 Lane Width | 12.0 12.0 12.0 | 12.0 12.0 12.0 | 12.0 12.0 12.0 | 12.0 12.0 | 12.0 12.0 | 0 RTOR Vol 0 1 0 0 Duration 0.25 Area Type: All other areas Signal Operations Phase Combination 1 2 3 4 | 5 6 7 8 EB Left А Left Α NB Thru Thru А Α I Right Right Α А T Peds Peds 1 WB Left Α SB Left Α Thru Thru Α А Right A Right А Α Peds Peds Right A NB Right Α EΒ SB Right А Α WB Right A 27.0 53.0 10.0 10.0 Green Yellow 4.0 4.0 4.0 4.0 1.0 1.0 1.0 1.0 All Red Cycle Length: 120.0 secs Intersection Performance Summary Appr/ Lane Adj Sat Ratios Lane Group Approach Flow Rate Lane Group g/C Delay LOS Grp Capacity (s) v/c Delay LOS Eastbound 1.00 3433 0.22 79.5 Е L 772 Т 1518 3438 0.98 0.44 50.9 D 54.2 D 0.42 0.57 15.1 R 897 1583 В Westbound 0.25 0.22 38.5 398 1770 L D 43.9 3438 0.97 0.44 48.6 Т 1518 D D 0.57 13.1 R 897 1583 0.23 В Northbound 0.08 58.9 3433 0.66 Ε  $\mathbf{L}$ 286 Т 155 1863 0.41 0.08 53.9 D 52.2 D 0.10 0.35 26.3 R 554 1583 С Southbound

> 286 3433 0.53 0.08 54.7 D 1863 0.41 0.08 53.9 D 155 14.8 В 0.37 1583 1583 1.00 0.1 Α Intersection Delay = 45.1 (sec/veh) Intersection LOS = D

L Т

R

Analyst: DEA Agency: URS Date: 3/6/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 233 Area Type: All other areas Jurisd: Year : 2025 ALT 1G - AT GRADE

# N/S St: CR 233

SIGNALIZED	INTERSECTION	SUMMARY
------------	--------------	---------

	Ea:	stbou	nd	Wes	stbound		No:	Northbour		Soi	outhbound		
	L	Т	R	L	Т	R	L	Т	R	L	т	R	1
	1						_ I			1			_1
No. Lanes	2	2	1	1	2	1	2	1	1	2	1	1	
LGConfig	L	Т	R	L	Т	R	L	т	R	L	т	R	1
Volume	1720	2125	345	90	2010	190	570	85	150	250	85	930	
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	112.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol	I		0			0	1		0	1		0	1

Dura	ation	0.25		Area	Type:	All d	othe	r areas					
					Si	gnal (	Dper	ations					
Phas	se Combi	nation	1	2	3	- 4			5	6 7	8		
EΒ	Left		А				N	B Left	А				
	Thru			А				Thru		А			
	Right			А				Right	-	А			
	Peds						1	Peds					
WB	Left		А				S	B Left	A				
	Thru			A			1	Thru		А			
	Right			A			ł	Right	A	А			
	Peds						1	Peds					
NB	Right		А				E	B Right	A				
SB	Right		А	A			W	B Right	A				
Gree	€n	:	20.0	55.0					15.0	10.0			
Yell	Low		4.0	4.0					4.0	4.0			
All	Red	-	1.0	1.0					1.0	1.0			
									Сус	le Length:	120.0	secs	

		Intersed	ction Pe	rformanc	ce Summa	ary				
Appr/	Lane	Adj Sat	Rati	os	Lane G	Froup	Appro	bach		 
Lane	Group	Flow Rate							_	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	•	
Eastbou	und									 
L	572	3433	1.33	0.17	208.2	F				
Т	1576	3438	1.42	0.46	225.0	F	198.1	F		
R	989	1583	0.37	0.63	11.2	В				
Westbou	und									
L	295	1770	0.32	0.17	44.7	D				
T	1576	3438	1.34	0.46	191.0	F	170.2	F		
R	989	1583	0.20	0.63	9.8	А				
Northbo	ound									
L	429	3433	1.40	0.13	245.5	F				
Т	155	1863	0.57	0.08	58.1	E	186.4	F		
R	462	1583	0.34	0.29	33.9	С				
Southbo	ound									
L	429	3433	0.61	0.13	52.3	D				
Т	155	1863	0.57	0.08	58.1	Е	14.8	В		
R	1583	1583	0.62	1.00	0.7	А				
	Intersec	tion Delay	= 157.7	(sec/ve	h) In	terse	ction I	.OS =	F	

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160									Int Are Jur Yea N/S	er.: U a Type isd: r : 2 St: U	US 16 e: Al: 2025 J US 55	D/US 5 1 othe: ALT 1F D/CR 23	50/CR r are - AT 33	233 as GRAD	)E	
					SI	GNALIZ	ZED	INT	ERSE	CTION	SUMM	ARY				
			Eas	stbour	nd	Wes	stbo	und	L .	Noi	rthbou	und	So	uthbo	und	
			L	Т	R	L	Т		R	L	Т	R	L	т	R	
	-	ĺ				l			. <u></u>	<u> </u>			! <u></u>			
NO.	Lane	S	т 2 т	ے س	Ъ	∠   T	ے س	1	Ъ Т		1 T	T T		1 T	ц Т	1
Volu	me	ł	1180	870	650	1300	105	03	35	11120	165	480	1255	145	910	1
Lane	wid:	t.h l	12.0	12.0	12.0	112.0	12.	01	2.0	112.0	12.0	12.0	112.0	12.0	12.0	)
RTOR	. Vol				0			0				0			0	
Dura	tion		0.25		Area '	Type:	All	ot	her	areas						
Phas		 mhin	ation		2	3	Jua⊥	 	erat	ions_	5	6			8	
EB	Left			A	2	5			NB	Left	A	0	,		0	
	Thru			••	A			i i	112	Thru		А				
	Right	t			A			i		Right	:	А				
	Peds							Ì		Peds						
WB	Left			A				1	SB	Left	А					
	Thru				A			1		Thru		А				
	Right	t			A					Right	: A	А				
	Peds							ļ		Peds	-					
NB	Right	t		A	75				EB	Right						
SB	Right	C.		A 0	30 0 A			1	wв	Right	2 A 30 (	10 (	h			
Voll	11 OW			4 0	4 0						4 0	4 0	J			
	Red			1.0	1.0						1.0	1.0				
	nou			1.0							Cyc	cle Ler	ngth:	120.	0 s	ecs
				In	tersed	ction	Per	for	manc	e Summ	nary_		-			
Appr	/ 1	Lane		Adj	Sat	Ra	itio	S		Lane	Group	o App	proac	h		
Lane	C	Grou	р	Flow	Rate	,				<u> </u>						
Grp	(	Capa	city	(	S)	v/c		g/C		Delay	/ LOS	Dela	ay LO	S		
East	bound	1														
L		858		343	3	1.45		0.2	5	253.0	) F					
т		903		361	0	1.01	-	0.2	5	78.6	Е	142.	.5 F			
R		857		158	3	0.80	)	0.5	4	27.6	С					
West	bound	ł														
$\mathbf{L}$		858		343	3	0.37		0.2	5	37.4	D		_			
Т		903		361	0	1.22		0.2	5	155.6	5 F	106.	.9 F			
R		857		158	3	0.41	. 1	0.5	4	16.5	В					
NOTU	npour	10. 050		313	2	1 27		0 2	5	220 7	- - -					
ц т		155		186	ว ว	1 12		0.2	Я	164 0	ם דו (	167	8 5			
⊥ R		594		158	3	0.85		0.3	8	45.7	. <u>г</u> D	107.	.0 r			
Sout	hbour	nd		200	~				-		2					
L		858		343	3	0.31	I	0.2	5	36.8	D					
Т		155		186	3	0.99		0.0	8	123.2	F	21.3	в с			
R		158	3	1583	3	0.61		1.0	0	0.7	А					
	Intersection Delay				Delay	= 119	.2	(se	c/veł	n) I	nters	ection	1 LOS	= F		

\_

Analyst: DEA Agency: URS Date: 3/15/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/US 550/CR 233 Area Type: All other areas Jurisd: Year : 2025 ALT 1F - AT GRADE

N/S St: US 550/CR 233

				SI	GNALI	ZED I	NTERSE	ECTION	SUMM	ARY				
		Eas	stbou	nd	We	stbou	nd	Nor	thbo	und	So	uthboi	und	
		L	Т	R	L	Т	R	L	Т	R	L	Т	R	
No.	Lanes	2	2	1	2	2	1	2	1	1	2	1	1	
LGC	onfig	L	Т	R	L	т	R	L	Т	R	L	Т	RÍ	
Vol	ume	1165	1710	1390	250	1710	330	1105	190	400	415	215	1475 j	
Lan	e Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	112.0	12.0	12.0	
RTO	R Vol	J		0	1		0	j		0	Ì		0	
Dur	ation	0.25		Area	Type:	A11 0	other	areas					<u>.</u>	<u> </u>
2 4 2					Sic	gnal (	Operat	ions						
Pha	se Combi	inatior	n 1	2	3	4			5	6	7	{	3	
ΕB	Left		A				NB	Left	A					
	Thru			А			Ì	Thru		А				
	Right			A			1	Right		A				
	Peds						1	Peds						
WB	Left		А				SB	Left	А					
	Thru			A				Thru		A				
	Right			А			ļ	Right	A	A				
	Peds						1	Peds						
NB	Right		А				EB	Right	A					
SB	Right		А	A			WB	Right	A					
Gre	en		30.0	30.0					30.0	) 10.	0			
Yel	low		4.0	4.0					4.0	4.0				
All	Red		1.0	1.0					1.0	1.0				
									Сус	cle Le	ngth:	120.0	) secs	5
			Tr	terse	stion	Perfo	ormanc	e Summ	arv					

		Incersed	CION FE	riormane	e sullilla	ту				 
Appr/	Lane	Adj Sat	Rati	OS	Lane G	roup	Appro	bach		
Lane	Group	Flow Rate								
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	_	
Eastbou	ind				-					 
L	858	3433	1.43	0.25	244.8	F				
Т	903	3610	1.99	0.25	496.0	F	380.0	F		
R	857	1583	1.71	0.54	350.7	F				
Westbou	nd									
L	858	3433	0.31	0.25	36.8	D				
т	903	3610	1.99	0.25	496.0	F	376.8	F		
R	857	1583	0.40	0.54	16.5	В				
Northbo	und									
L	858	3433	1.36	0.25	212.6	F				
Т	155	1863	1.29	0.08	225.3	F	172.3	F		
R	594	1583	0.71	0.38	35.8	D				
Southbo	und									
L	858	3433	0.51	0.25	39.2	D				
Т	155	1863	1.46	0.08	293.1	F	50.4	D		
R	1583	1583	0.98	1.00	18.2	В				
	Intersec	tion Delay	= 278.3	(sec/vel	h) In	terse	ction I	os =	F	

Analyst: DEAInter.: US 160/SH 172-CR 234Agency: URSArea Type: All other areasDate: 1/26/2005Jurisd:Period: AM PEAKYear : 2025 ALT 1G/1F - AT GRADEProject ID: US 160N/S St: SH 172/CR 234

#### SIGNALIZED INTERSECTION SUMMARY

	Ea	Eastbound		Westbound			Northbound			Southbound			1
	L	Т	R	L	т	R	L	Т	R	L	Т	R	. 1
				_			_			_			_1
No. Lanes	2	2	1	1	2	1	2	1	1	1	1	1	1
LGConfig	L	Т	R	L	T	R	L	Т	R	L	т	R	1
Volume	260	1020	325	65	800	70	630	55	60	50	40	255	1
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	1
RTOR Vol	1		0	1		0	1		0	1		0	1

Dur	ation 0.2	5	Area 1	'ype: A	All ot!	her	areas				
				Sigr	nal Ope	erat	ions				
Pha	se Combinati	on 1	2	3	4			5	6	7 8	
EВ	Left	А			1	NB	Left	A			
	Thru		A		i		Thru		A		
	Right		А		1		Right		A		
	Peds				1		Peds				
WB	Left	А				SB	Left	A			
	Thru		A		1		Thru		A		
	Right		A		1		Right		A		
	Peds				1		Peds				
NB	Right	А			1	EΒ	Right	А			
SB	Right	A			1	WΒ	Rìght	А			
Gre	en	15.0	47.0					28.0	10.0		
Yel	low	4.0	4.0					4.0	4.0		
All	Red	1.0	1.0					1.0	1.0		
								Cycl	e Length	: 120.0	secs

		Intersec	ction Pe	erforman	ice Summa	ary				
Appr/	Lane	 Adj Sat	Rati	Los	Lane (	Group	Appi	roach		
Lane	Group	Flow Rate								
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	y LOS		
Eastbou	ind							<u>.</u>		 
L	429	3433	0.64	0.13	53.1	D				
Т	1347	3438	0.80	0.39	35.8	D	33.1	С		
R	1055	1583	0.32	0.67	8.7	А				
Westbou	ınd									
L	221	1770	0.31	0.13	48.6	D				
Т	1347	3438	0.63	0.39	30.3	С	29.8	С		
R	1055	1583	0.07	0.67	7.0	А				
Northbo	ound									
L	801	3433	0.83	0.23	50.9	D				
Т	155	1863	0.37	0.08	53.6	D	49.9	D		
R	396	1583	0.16	0.25	35.3	D				
Southbo	ound									
L	413	1770	0.13	0.23	36.5	D				
Т	155	1863	0.27	0.08	52.5	D	44.8	D		
R	396	1583	0.68	0.25	45.2	D				
	Intersec	tion Delay	= 36.8	(sec/v	eh) Ir	nterse	ction	LOS =	D	

Analyst: DEA	Inter.: US 160/SH 172-CR 234
Agency: URS	Area Type: All other areas
Date: 1/26/2005	Jurisd:
Period: PM PEAK	Year : 2025 ALT 1G/1F - AT GRADE
Project ID: US 160	
E/W St: US 160	N/S St: SH 172/CR 234

# SIGNALIZED INTERSECTION SUMMARY

	Eas	Eastbound		Westbound			Northbound			Southbound			
	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
			······································							_ I			{
No. Lanes	2	2	1	1	2	1	2	1	1	1	1	1	1
LGConfig	L	Т	R	L	Т	R	L	т	R	L	т	R	1
Volume	385	1345	795	115	1245	90	640	105	105	135	80	405	
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol	1		0	1		0			0	I		0	1

Duration	0.25	Area	Type:	All	other	areas	
			Sig	gnal	Operat	cions	

					- L							
Pha	se Combination	1	2	3	4			5	6	7	8	
EΒ	Left	A				NB	Left	А				
	Thru		A				Thru		A			
	Right		A				Right		A			
	Peds						Peds					
WB	Left	А				SB	Left	А				
	Thru		A				Thru		А			
	Right		A				Right		A			
	Peds						Peds					
NB	Right	A			ļ	EΒ	Right	А				
SB	Right	A			l	WB	Right	А				
Gre	en	18.0	48.0					24.0	10.0			
Yel	low	4.0	4.0					4.0	4.0			
All	Red	1.0	1.0					1.0	1.0			
								Cycl	e Lengt	h: 120.	0 se	ecs

						Cycl	.e Leng	th: 1	20.0	secs	
		Intersec	tion Pe	erforman	ce Summ	ary					
Appr/	Lane	 Adj Sat	Rat:	ios	Lane	Group	Appr	oach			_
Lane	Group	Flow Rate									
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS			
Eastbo	und	· · · · · · · · · · · · · · · · · · ·									
L	515	3433	0.79	0.15	57.1	E					
Т	1375	3438	1.03	0.40	68.2	E	52.0	D			
R	1016	1583	0.82	0.64	22.0	С					
Westbo	und										
L	266	1770	0.45	0.15	47.8	D					
т	1375	3438	0.95	0.40	49.6	D	46.8	D			
R	1016	1583	0.09	0.64	8.2	А					
Northbo	ound										
L	687	3433	0.98	0.20	77.3	E					
Т	155	1863	0.72	0.08	68.3	Ε	70.8	E			
R	435	1583	0.26	0.28	34.2	С					
Southbo	ound										
L	354	1770	0.40	0.20	42.5	D					
Т	155	1863	0.54	0.08	56.7	E	69.3	E			
R	435	1583	0.98	0.28	80.8	F					
	Intersec	tion Delay	= 55.5	(sec/v	eh) I	nterse	ction 3	LOS =	Е		

Attachment F 2025 Florida Mesa and Valley Section Highway Analyses Attachment F-1 2025 Florida Mesa and Valley Section, No Action Alternative, Highway Analyses Directional

	DIRECTIONAL TWO-LANE HIGHW	VAY SEGMENT WORKSHEET					
General Information		Site Information	ER US 160				
Analyst	DEA	From/To					
Date Performed	3/19/2005		WILLAOE				
Analysis Time Period		Analysis Year	2025 NO ACTION				
Input Data							
	Shoukler width tt						
	Lane width tt	Class	I highway				
	Lane width It	Terrain					
	Shoulder width tt	Grade Leng	ith mi Up/down				
and allow allow the allow and allow allow allow allow allow allow		Peak-hour	factor, PHF 0.95%				
Segment length	n, L <sub>1</sub> mi	% Trucks a	nd Buses, $P_{\pm}$ 5%				
		% Recreati	onal vehicles. P. 0%				
Analysis direction vol., V, 1130	veh/h	Access poi	nts/mi 8				
Opposing direction volV 935v	eh/h						
Average Travel Speed							
		Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for trucks, E	T (Exhibit 20-9 or 20-15)	1.5	1.5				
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-9 or 20-17)	1.1	1.1				
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>H</sub>	<sub>IV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.976				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	20-7 or 20-13)	0.99	0.99				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	1232	1019				
Free-Flow Speed fro	om Field Measurement	Estimated	Free-Flow Speed				
Field Measured speed <sup>3</sup> S	mi/b	Base free-flow speed <sup>3</sup> , BFFS <sub>FI</sub>	۸ 60.0 mi/h				
Chapter of volume 3	veh/h	Adj. for lane width and shoulde	r width, <sup>3</sup> f <sub>LS</sub> (Exh 20-5)  0.0 mi/h				
		Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exh	ibit 20-5) 2.0 mi/h				
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> +0.00	₩ 58.0 mm	Free-flow speed, FFS <sub>d</sub> (FSS=	BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.0 mi/h				
Adjustment for no-passing zones, f <sub>np</sub>	(Exhibit 20-19) 0.7 mi/h	Average travel speed, ATS AT	S=FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 39.9 mi/h				
Percent Time-Spent-Following							
	(Exhibit 20.40 cr 20.46)	Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for DVa. E	(Exhibit 20.10 or 20.16)	1.0	1.0				
Passenger-car equivalents for RVS, E <sub>R</sub>		1.00	1.00				
Grade adjustment factor <sup>1</sup> f- (Exhibit 20	$HV^{-17}$ (1.1.1 $T(-T^{-17})$ $R(-R^{-17})$	1.00	1.00				
Directional flow rate <sup>2</sup> v.(pc/h) v.=V./(PH	F*f(w/* fo)	1189	984				
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		89.6				
Adj. for no-passing zone, f <sub>on</sub> (%) (Exhibi	t. 20-20)		3.0				
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f an		92.6				
Level of Service and Other Performa	nce Measures						
Level of service, LOS (Exhibit 20-3 or 2	0-4)		E				
Volume to capacity ratio v/c v/c=V <sub>p</sub> / 1	,700	0.72					
Peak 15-min veh-miles of travel,VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	892					
Peak-hour vehicle-miles of travel, VMT <sub>e</sub>	<sub>30</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	3390					
Peak 15-min total travel time, TT <sub>15</sub> (veh	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		22.4				
Notes	· · · · · · · · · · · · · · · · · · ·						
1. If the highway is extended segment (le	evel) or rolling terrain, f <sub>c</sub> =1.0 2. If v <sub>i</sub>	$(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}, \text{ terminate}$	analysis-the LOS is F.				

# Directional

	DIRECTIONAL TWO-LANE HIGHWAY	AY SEGMENT WORKSHEET					
General Information		Site Information	EB US 160				
Analyst	DEA	From/To					
Date Performed	3/19/2005		VILLAGE				
Analysis Time Period	PM PEAK	Analysis Year	2025 NO ACTION				
Input Data							
	Shoulder width tt						
	Lane width ti	Class I h	ighway 🔽 Class II highway				
	Lane width tt	Terrain					
	Shoulder width 11	Grade Length	mi Up/down				
		Peak-hour fac	tor, PHF 0.95%				
Segment length	, L <sub>4</sub> mi	Short North Array % Trucks and Buses , P <sub>T</sub> 5 %					
	*	% Recreational vehicles. P. 0%					
Analysis direction vol., V, 1585	veh/h	Access points	s/mi 8				
Opposing direction vol V 1450	veh/h						
Average Travel Speed			·····				
		Analysis Direction (d)	Opposing Direction (o)				
Passenger-car equivalents for trucks, E	r (Exhibit 20-9 or 20-15)	1.5	1.5				
Passenger-car equivalents for RVs, $E_{R}$	(Exhibit 20-9 or 20-17)	1.1	1.1				
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>H</sub>	v=1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	0.976				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	0-7 or 20-13)	0.99	0.99				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	1727	1580				
Free-Flow Speed fro	m Field Measurement	Estimated Fr	ee-Flow Speed				
Field Measured speed <sup>3</sup> S	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h				
Observed volume <sup>3</sup> V	veb/h	Adj. for lane width and shoulder w	ridth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h				
	776()//f ) 58.0 mi/b	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibi	20-5) 2.0 mi/h				
riee-llow speed, rr3d rr3-3 <sub>FM</sub> +0.00	$(V_{\rm HW})$ 30.0 min	Free-flow speed, FFS <sub>d</sub> (FSS=BF	FS-f <sub>LS</sub> -f <sub>A</sub> ) 58.0 mi/h				
Adjustment for no-passing zones, f <sub>np</sub>	(Exhibit 20-19) 0.6 mi/n	Average travel speed, ATS ATS=	FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 31.8 mi/h				
Percent Time-Spent-Following		Anchusia Direction (d)					
Passenger-car equivalents for trucks, E.	-(Exhibit 20-10 or 20-16)	1.0					
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0				
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>t</sub>	<sub>+V</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	1.000				
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20	-8 or 20-14)	1.00	1.00				
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHI	F*f <sub>HV</sub> * f <sub>G</sub> )	1668	1526				
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		94.4				
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit	. 20-20)		1.1				
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np		95.4				
Level of Service and Other Performan	nce Measures						
Level of service, LOS (Exhibit 20-3 of 20	700		<u>F</u>				
Peak 15-min veh-miles of travel VMT.	(veb_mi)\/MT = 0.25L (\//PHE)		1251				
Peak-hour vehicle-miles of travel VMT	(veh-mi) VMT <sub>oo</sub> =V*L		4755				
Peak 15-min total travel time TT/veh-	h) $TT_{4r} = VMT_{4r}/ATS$	39.4					
Notes		I	······································				
1.If the highway is extended segment (le	evel) or rolling terrain, $f_{c}=1.0$ 2. If v/v	or $v_{\rm c}$ ) >=1,700 pc/h. terminate an	alvsisthe LOS is F.				
	,						

	DIRECTIONAL TWO-LANE HIC	SEGMENT WORKSHEET		
General Information	<u></u>		Highway / Direction of Travel	WBUS 160
Analyst	DEA			
Date Performed	3/19/2005		FIO(1)/10	<del>yillage</del>
Analysis Time Period	AM PEAK		Analysis Year	2025 NO ACTION
Input Data			······	
	* Shoulder width			
	Lane width	<u>+</u>	Class I	
	Shouldar wights	<u></u>	Grade Leng	IIII Level IIII Rolling
			Peak-hour fa	actor, PHF 0.95%
Somert length I mi			No-passing	zone 44
Segment length, L			Show North Arrow % Trucks ar	nd Buses, P <sub>T</sub> 5%
			% Recreational vehicles, P <sub>R</sub> 0%	
Analysis direction vol., V <sub>d</sub> 935veh/h			Access poir	its/mi 8
Opposing direction vol., V <sub>o</sub> 1130	veh/h			
Average Travel Speed				
		Analysis Direction (d)	Opposing Direction (0)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)			1.5	1.5
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)		1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))		0.976	0.976	
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)			0.99	0.99
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F <sup>*</sup> f <sub>HV</sub> * f <sub>G</sub> )		1019	1232
Free-Flow Speed fr	om Field Measurement		Estimated F	Free-Flow Speed
Field Measured speed <sup>3</sup> . Sev.	mi/h		Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h
Observed volume <sup>3</sup> V		Adj. for lane width and shoulder width, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h		
Observed volume <sup>-</sup> , $v_f$ ventrin Error Remander EES, EES, $\pm 0.00776(1/f_{\rm c})$ 58.0 mi/h		Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 2.0 mi/h		
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> +0.007/6( $V_{f}$ f <sub>HV</sub> ) 56.0 min/		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.0 mi/h		
Adjustment for no-passing zones, T <sub>np</sub>	(EXNIDIT 20-19) 0.7 h	nvn	Average travel speed, ATS ATS	≔FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 39.8 mi/h
Percent Time-Spent-Following				
			Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-10 or 20-16)			1.0	1.0
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)		1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))			1.000	1.000
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)			1.00	1.00
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )		984	1189	
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		89.7	
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		2.1		
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np			91.8	
Level of Service and Other Performa	nce Measures		1	E
Level of service, LOS (Exhibit 20-3 of 20-4)				
Volume to capacity ratio v/c $v/c = v_p/1,700$			0.00	
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)			. /38	
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>			2805	
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS			<u> </u>	18.5
Notes				

1.If the highway is extended segment (level) or rolling terrain,  $f_G$ =1.0 2. If  $v_i(v_d \text{ or } v_o)$  >=1,700 pc/h, terminate analysis--the LOS is F.

# Directional

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET					
General Information		Site Information			
Analyst	DEA	Highway / Direction of Travel	WB US 160 FLORIDA MESA &-GEM		
Agency or Company Date Performed	3/19/2005	From/10	VILLAGE		
Analysis Time Period	PM PEAK	Analysis Year	2025 NO ACTION		
Input Data					
	Shoulder width th				
	Lane width	Class I h	niohway 🔲 Class II highway		
	Lane width tt		Terrain Level Rolling		
	Lane width tt		i mi Up/down		
		Peak-hour fac	tor, PHF 0.95%		
Segment length, L mi		Show North Street % Trucks and	Buses, P <sub>T</sub> 5%		
1	I	% Recreational vehicles, Pp. 0%			
Analysis direction vol., V <sub>d</sub> 1450	veh/h	Access points/ mi 8			
Opposing direction vol., V 1585	veh/h				
Average Travel Speed					
		Analysis Direction (d)	Opposing Direction (o)		
Passenger-car equivalents for trucks, $E_T$ (Exhibit 20-9 or 20-15)		1.5	1.5		
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)		1.1	1.1		
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )		0.976	0.976		
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)		0.99	0.99		
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )		1580	1727		
Free-Flow Speed from Field Measurement		Estimated Fr	ee-Flow Speed		
Field Measured sneed <sup>3</sup> S mi/h		Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub> 60.0 mi/h			
Observed velume <sup>3</sup> V		Adj. for lane width and shoulder width, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
Underved volume <sup>2</sup> , $v_f$ verimine Erro flow errord EES EES ±0.00776()//f ) 58.0 mi/b		Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 2.0 mi/h			
$Free-flow speed, FFS_d FFS=S_{FM}+0.00776(v_{f}+_{HV})$		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.0 mi/h			
Adjustment for no-passing zones, f <sub>np</sub> (Exhibit 20-19) 0.6 mi/n		Average travel speed, ATS ATS=FFS-0.00776vp-fnp 31.8 mi/h			
Percent Time-Spent-Following		Applysis Direction (d)	Opposing Direction (a)		
Passenger.car.equivalents for trucks E (Evhibit 20-10 or 20-16)		Analysis Direction (d)			
Passenger-car equivalents for RVs. E <sub>p</sub> (Exhibit 20-10 or 20-16)		1.0	1.0		
Heavy-vehicle adjustment factor, $f_{HV}$ , $f_{HV}=1/(1+P_{T}(E_{T}-1)+P_{P}(E_{P}-1))$		1.000	1.000		
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)		1.00	1.00		
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )		1526	1668		
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		94.3			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		0.9			
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np	95.2			
Level of Service and Other Performan	nce Measures				
Volume to capacity ratio v/c $v/c=V_r/1$	,700	0.93			
P Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		1145			
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>		4350			
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		36.1			
Notes					
1.If the highway is extended segment (le	evel) or rolling terrain, $f_G = 1.0$ 2. If $v_i (v_G)$	<sub>1</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate an	alysisthe LOS is F.		

Attachment F-2 2025 Florida Mesa and Valley Section, Alternative C (Preferred Alternative) and Alternative A, Highway Analyses
URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

\_\_\_\_\_OPERATIONAL ANALYSIS\_\_\_\_\_\_

Analyst: Agency/Co:	DEA URS
Date:	3/15/2005
Analysis Period:	AM PEAK
Highway:	
From/To:	WEST OF CR 222/223
Jurisdiction:	0.005
Analysis Year:	2025
Project ID:	US 160

FR	EE-FLOW SPEED	D		
	Eastbound		westbound	
Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	2		2	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.5	mph	0.5	mph
Free-flow speed	59.5	mph	59.5	mph
· · · · · · · · · · · · · · · · · · ·	VOLUME	<u>_</u>		
Direction	1		2	
Volume. V	1130	vph	935	vph
Peak-hour factor. PHF	0.95	. Б.	0.95	• t
Peak 15-minute volume, v15	297		246	
Trucks and buses	5	8	5	0
Recreational vehicles	0 0	9	0	0
Terrain type	Rolling	-	Rolling	-
Grade	0.00	0	0.00	90
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE. ET	2.5		2.5	
Recreational vehicles PCE. FR	2.0		2.0	
Heavy vehicle adjustment, fHV	0.930		0.930	
Flow rate, vp	639	pcphpl	529	pcphpl
	RESULTS			

Direction	1		2	
Flow rate, vp	639	pcphpl	529	pcphpl
Free-flow speed, FFS	59.5	mph	59.5	mph
Avg. passenger-car travel speed, S	59.5	mph	59.5	mph
Level of service, LOS	A		A	
Density, D	10.7	pc/mi/ln	8.9	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation								
9960 Federal Drive, Suite 300 Colorado Springs, CO 80920								
Phone: E-mail:		Fa	<b>x :</b>					
OPI	ERATIO	NAL ANALYS	IS					
Analyst: DEA								
Agency/Co: URS								
Date: 3/15/2005								
Analysis Period: PM PEAK								
Highway: US 160								
From/To: WEST OF CR 22	22/223							
Jurisdiction:								
Analysis Year: 2025								
Project ID: US 160								
	FREE	-FLOW SPEE	D					
		Eastbound		Westbound				
Direction		1	<b>C</b> 1	2				
Lane width		12.0	It	12.0	it			
Lateral clearance:		<b>C O</b>	<b>5</b> +	<b>C</b> 0	e.			
Right edge		6.0	IL	6.0	IC			
Total latoral clearance		12 0	IL f+	12 0	IL f+			
Access points per mile		12.0	ΤĻ	12.0	ΤĻ			
Median type		2 Divided		L				
Free-flow speed:		Base		Base				
FFS or BFFS		60 0	mph	60 0	mph			
Lane width adjustment, FLW		0 0	mph	0 0	mph			
Lateral clearance adjustment.	FLC	0.0	mph	0.0	mph			
Median type adjustment, FM		0.0	mph	0.0	mph			
Access points adjustment, FA		0.5	mph	0.5	mph			
Free-flow speed		59.5	mph	59.5	mph			
•			-		Ĩ			
·		_VOLUME						
Direction		1		2				
Volume, V		1585	vph	1450	vph			
Peak-hour factor, PHF		0.95	-	0.95	-			
Peak 15-minute volume, v15		417		382				
Trucks and buses		5	010	5	00			
Recreational vehicles		0	ojo Ojo	0	olo .			
Terrain type		Rolling		Rolling				
Grade		0.00	90	0.00	00			
Segment length		0.00	mi	0.00	mi			
Number of lanes		2		2				
Driver population adjustment,	fP	1.00		1.00				
Trucks and buses PCE, ET		2.5		2.5				
Recreational vehicles PCE, ER		2.0		2.0				
Heavy vehicle adjustment, fHV		0.930		0.930				
Flow rate, vp		896	pcphpl	820	pcphpl			

1	2					
896	pcphpl	820	pcphpl			
59.5	mph	59.5	mph			
59.5	mph	59.5	mph			
В		В				
15.1	pc/mi/ln	13.8	pc/mi/ln			
	1 896 59.5 59.5 B 15.1	1 896 pcphpl 59.5 mph 59.5 mph B 15.1 pc/mi/ln	1       2         896       pcphpl       820         59.5       mph       59.5         59.5       mph       59.5         B       B       B         15.1       pc/mi/ln       13.8			

Overall results are not computed when free-flow speed is less than 45 mph.

Attachment G 2025 Florida Mesa and Valley Section Intersection Analyses Attachment G-1 2025 Florida Mesa and Valley Section, No Action Alternative, Intersection Analyses

	TWO	-WAY STOP	CONTR	OL SUM	MARY					
General Information	on		Site I	nformati	on					
Analyst	DEA		Interse	ection		US 160/CI	R 222/223			
Agency/Co.	URS		Jurisdi	Jurisdiction						
Date Performed	3/19/200	5	Analys	Analysis Year			ACTION			
Analysis Time Period	AM PEA	κ								
Project Description	JS 160									
East/West Street: US	160		North/S	South Stree	et: CR 22	2/CR 223				
Intersection Orientation	n: East-West		Study	Period (hrs	s): 0.25			]		
Vehicle Volumes a	and Adjustr	nents								
Major Street		Eastbound				Westbour	nd			
Movement	1	2	3		4	5		6		
						1		R		
Volume (ven/n)	30	1055	45		15	600		0		
Peak-nour factor, PHF	0.95	0.95	0.95		0.95	0.95	0.	95		
(veh/h)	31	1110	47		15	631		10		
Proportion of heavy vehicles, P <sub>HV</sub>	2	-			2					
Median type		Undivided								
RT Channelized?			0	0				0		
Lanes	0	1	1		0	0 1		0		
Configuration	LT		R		LTR					
Upstream Signal		0				0				
Minor Street		Northbound				Southbou	Ind			
Movement	7	8	3 9 10 11		11		12			
	L	T	R		L	T R				
Volume (veh/h)	200	5	15		10	10	1	35		
Peak-hour factor, PHF	0.95	0.95	0.95		0.95	0.95	0	.95		
Hourly Flow Rate (veh/h)	210	5	15		10	10	1	142		
Proportion of heavy	2	2	2		2	2		2		
Percent grade (%)		0				0				
Flared approach		N				<u>N</u>				
Storage		0				0				
RT Channelized?			0					0		
Lanes	0	1	0		0	1		0		
Configuration		LTR				LTR				
Control Delay, Queue	Length, Leve	el of Service								
Approach	EB	WB		Northboun	d	S	outhbound	4		
Movement	1	4	7	8	9	10	11	12		
Lane Configuration	LT	LTR		LTR			LTR			
Volume, v (vph)	31	15	<u>``</u>	230	1		162	1		
Capacity, c <sub>m</sub> (vph)	943	604		30	<b> </b>		236			
v/c ratio	0.03	0.02		7.67			0.69			
Queue lenath (95%)	0.10	0.08		28.07			4.44			
Control Delay (s/veh)	8.9	11.1		3257	1		48.1	1		
					1			<b> </b>		

Two-Way Stop Control

LOS	A	В	F	E
Approach delay (s/veh)			3257	48.1
Approach LOS			F	E
ricesano TM		onvright @ 2003 Universit	v of Florida All Rights Reserved	Version 4 1d

HCS2000

University of Florida, All Rights Reserve

	TWC	-WAY STOP	CONTR	OL SU	MMARY				
General Informatio	on	· · · · · · · · · · · · · · · · · · ·	Site I	nform	ation				
Analyst	DEA		Interse	ection	<u>і і і і і і і і і і і і і і і і і і і </u>	US 160/CF	222/223		
Agency/Co.	URS		Jurisd	Jurisdiction					
Date Performed	3/19/200	)5	Analy	Analysis Year			CTION		
Analysis Time Period	PM PEA	K							
Project Description L	IS 160	······································							
East/West Street: US	160		North/	South S	treet: CR 2	22/CR 223			
Intersection Orientation	: East-West	t	Study	Period (	hrs): 0.25				
Vehicle Volumes a	and Adjust	ments							
Major Street		Eastbound	Eastbound		Westbound				
Movement	- <del> </del>	$-\frac{2}{\overline{\tau}}$			<u> </u>	5		<u>6</u>	
		1220			<u> </u>	1240	_	K	
Volume (ven/h)	100	1320	105		15	1340	$-\frac{1}{2}$	05	
Hourty Flow Pote	0.95	0.95	0.95	<u> </u>	0.90	0.95		90	
(veh/h)	105	1389	173		15	1410	1	0	
Proportion of heavy vehicles, P <sub>HV</sub>	2	-			2				
Median type				Undivid	ded				
RT Channelized?			0				0		
Lanes	Ö	1	1		0	1		0	
Configuration	LT		R		LTR				
Upstream Signal	1	0				0			
Minor Street		Northbound				Southbour	nd		
Movement	7	8	9		10	11		12	
	L	Т	R		L	Т		R	
Volume (veh/h)	60	10	15		5	5		50	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95 0.95		0.95	0	.95	
Hourly Flow Rate (veh/h)	63	10	15	15 5		5		52	
Proportion of heavy vehicles, P <sub>HV</sub>	2	2	2		2	2		2	
Percent grade (%)	-	0				0	1		
Flared approach	1	N	T			N		- <u></u>	
Storage	1	0	1			0		·	
RT Channelized?	-		1 0			<u>†                                    </u>		0	
anes	0	1			0	1		0	
Configuration	- <del> </del>	LTR	+			LTR		<u> </u>	
Control Delay, Queue	Length. Lev	el of Service							
Approach	EB	WB	1	Northbo	und	Sc	outhbound	1	
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	LT	LTR	<u> </u>	LTR			LTR		
Volume, v (vph)	105	15	<u> </u>	88		1	62		
Capacity c (vph)	479	423		+		+	~~		
v/a ratio	0.22	0.04		<del> </del>					
	0.00	0.04		<u> </u>		+			
Queue length (95%)	0.83	0.11	<b> </b>	╂				<b> </b>	
Control Delay (s/veh)	14.6	13.8	1	1	1	1		1	

LOS	В	В					
Approach delay (s/veh)				-			
Approach LOS							
HCS2000 <sup>TM</sup>	(	Copyright © 2003 Unive	rsity of Florida,	All Rights Re	served	,	 Version 4.1d

flaulles/Decomposite%/20and%/20Settings/ALLISON/Local%/20Settings/Temp/u2k142.tmp 3/22/2005

Attachment G-2 2025 Florida Mesa and Valley Section, Alternative C (Preferred Alternative) and Alternative A, Intersection Analyses

#### HCS2000: Signalized Intersections Release 4.1d

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160

Inter.: US 160/CR 222/223 Area Type: All other areas Jurisd: Year : 2025

N/S St: CR 222/223

#### SIGNALIZED INTERSECTION SUMMARY

	Eastbound		nd	Westbound		nd	Northbound			Southbound			
	L	т	R	L	Т	R	L	т	R	L	Ť	R	ŀ
	1			1			<b>I</b>			1			l
No. Lanes	1	2	1	1	2	1	1	1	1	1	1	1	-
LGConfig	L	Т	R	L	т	R	L	Т	R	L	$\mathbf{T}$	R	ł
Volume	30	1055	45	15	600	10	200	5	15	110	10	135	ł
Lane Width	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	1
RTOR Vol			0	1		0	l		0	1		0	1

Dur	ation 0.2	25	Area 1	Type:	All ot	her	areas					
				Si	gnal Op	erat	ions					
Pha	se Combinati	on 1	2	3	4			5	6	7	8	
EΒ	Left	А			·	NB	Left	А				
	Thru		А		· 1		Thru		A			
	Right		А		1		Right		А			
	Peds						Peds					
WB	Left	A			1	SB	Left	A				
	Thru		А		l		Thru		A			
	Right		А				Right		A			
	Peds				1		Peds					
NB	Right	А			1	EB	Right	А				
SB	Right	А			1	WB	Right	А				
Gre	en	10.0	35.0					15.0	10.0			
Yel	low	4.0	4.0					4.0	4.0			
A11	Red	1.0	1.0					1.0	1.0			
									_			

Cycle	Length:	90.0	secs	

		Intersec	tion Pe	erforman	ce Summa	ary						
Appr/ Lane	Lane Group	Adj Sat Flow Rate	Adj Sat Ratic		Lane (	Lane Group		Lane Group Approach		oach		 
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS				
Eastbou	ind		· · · · · · · · · · · · · · · · · · ·	·····	······································	· · · · · · · · · · · · · · · · · · ·	·····			 		
L	197	1770	0.16	0.11	36.6	D						
т	1337	3438	0.83	0.39	29.4	С	28.7	С				
R	967	1583	0.05	0.61	7.0	А						
Westbou	ind											
L	197	1770	0.08	0.11	36.1	D						
Т	1337	3438	0.47	0.39	20.9	Ċ	21.0	Ċ				
R	967	1583	0.01	0.61	6.9	А						
Northbo	ound											
L	295	1770	0.72	0.17	43.5	D						
Т	207	1863	0.02	0.11	35.7	D	42.0	D				
R	440	1583	0.04	0.28	23.7	С						
Southbo	ound											
$\mathbf{L}$	295	1770	0.04	0.17	31.5	С						
Т	207	1863	0.05	0.11	35.9	D	27.2	С				
R	440	1583	0.32	0.28	26.2	С						
	Intersec	tion Delay	= 27.7	(sec/v	eh) Ir	nterse	ction	LOS =	= C			

#### HCS2000: Signalized Intersections Release 4.1d

Analyst: DEA Agency: URS 3/15/2005 Date: Period: PM PEAK Project ID: US 160 E/W St: US 160

Inter.: US 160/CR 222/223 Area Type: All other areas Jurisd: Year : 2025

N/S St: CR 222/223

#### SIGNALIZED INTERSECTION SUMMARY

	Eas	Eastbound			Westbound			Northbound			Southbound		
	L	т	R	L	Т	R	L	т	R	L	Т	R	1
							_ l						_ I
No. Lanes	1	2	1	1	2	1	1	. 1	1	1	1	1	
LGConfig	L	Т	R	L	Т	R	L	т	R	L	T	R	1
Volume	100	1320	165	115	1340	10	60	10	15	5	5	50	1
Lane Width	12.0	12.0	12.0	112.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	1
RTOR Vol	1		0	ł		0	ł		0			0	1
Duration	0.25		Area	Type:	All	other	areas						

				Sigr	nal Open	rati	lons					
Phas	se Combination	1	2	3	4			5	6	7	8	
EΒ	Left	А			1	NВ	Left	А				
	Thru		A		1		Thru		A			
	Right		A		1		Right		А			
	Peds				ł		Peds					
WB	Left	A				SB	Left	A				
	Thru		А		i		Thru		A			
	Right		A				Right		А			
	Peds				1		Peds					
NB	Right	A			H	EΒ	Right	A				
SB	Right	А			1	WВ	Right	A				
Gree	en	10.0	40.0					10.0	10.0			
Yell	Low	4.0	4.0					4.0	4.0			
A11	Red	1.0	1.0					1.0	1.0			

Cycle Length: 90.0 secs

		Intersec	ction Pe	erforman	ice Summa	ary				 
Appr/	Lane	Adj Sat	Rati	ios	Lane (	Group	Appı	coach		
Lane	Group	Flow Rate								
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	/ LOS		
Eastbo	und									
$\mathbf{L}$	197	1770	0.53	0.11	40.6	D				
Т	1528	3438	0.91	0.44	31.7	С	29.7	С		
R	967	1583	0.18	0.61	7.7	А				
Westbo	und									
L	197	1770	0.08	0.11	36.1	D				-
Т	1528	3438	0.92	0.44	33.3	С	33.1	C		
R	967	1583	0.01	0.61	6.9	A				
Northbo	ound									
L	197	1770	0.32	0.11	37.8	D				
т	207	1863	0.05	0.11	35.9	D	35.1	D		
R	440	1583	0.04	0.28	23.7	С				
Southbo	ound									
L	197	1770	0.03	0.11	35.7	D				
Т	207	1863	0.02	0.11	35.7	D	26.2	С		
R	440	1583	0.12	0.28	24.4	С				
	Intersec	tion Delay	= 31.3	(sec/v	reh) Ir	nterse	ction	LOS =	= C	

Attachment H 2025 Dry Creek and Gem Village Section Highway Analyses Attachment H-1 2025 Dry Creek and Gem Village Section, No Action Alternative, Highway Analyses

	DIRECTIONAL TWO-LANE HIGHWA	SEGMENT WORKSHEET				
General Information		Site Information				
Analyst Agency or Company	UEA URS	Highway / Direction of Travel	EB US 160 GEM VILLAGE			
Date Performed	3/19/2005	Jurisdiction				
Analysis Time Period		Analysis Year	2025 NO ACTION			
	Shoulder width tt					
-	Lane widthtt	Class I hi	ghway 🔲 Class II highway			
	Lane width 1	Terrain	Level 🔽 Rolling			
	Shoulder widthtt	Grade Length	mi Up/down			
		No-passing zo	ne 58			
Segment length	к Ц mi	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%			
Analysis direction vol., V <sub>d</sub> 750ve	h/h	% Recreationa Access points	i vehicles, P <sub>R</sub> 0% / mi 5			
Opposing direction vol., V <sub>o</sub> 925ve	eh/h					
Average Travel Speed						
		Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E	(Exhibit 20-9 or 20-15)	1.5	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-9 or 20-17)	1.1	1.1			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>H</sub>	V=1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	0-7 or 20-13)	0.99	0.99			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHI	<sup>-+</sup> f <sub>HV</sub> * f <sub>G</sub> )	817	1008			
Free-Flow Speed fro	m Field Measurement	Estimated Fre	e-Flow Speed			
Field Measured speed <sup>3</sup> . S <sub>54</sub>	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
Observed volume <sup>3</sup> V.	veh/h	Adj. for lane width and shoulder w	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
Eree-flow speed EES EES-S +0.00	776(\//f) 58.8 mi/b	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.3 mi/h			
riee-low speed, rr3d rr3-3 <sub>FM</sub> +0.00		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h				
Adjustment for no-passing zones, r <sub>np</sub> (	EXMIDIT 20-19) 0.9 mi/m	Average travel speed, ATS ATS=	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 43.7 mi/h			
Percent Time-Spent-Following						
Í	· · · · · · · · · · · · · · · · · · ·	Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E-	r(Exhibit 20-10 or 20-16)	1.0	1.0			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>H</sub>	<sub>IV</sub> ≈1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	1.000			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20	-8 or 20-14)	1.00	1.00			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	789	974			
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	ξ	36.7			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit	. 20-20)		3.9			
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np		90.7			
Level of Service and Other Performan	nce Measures					
Level of service, LOS (Exhibit 20-3 or 20	)-4)					
Volume to capacity ratio v/c v/c= $V_p$ / 1,						
Peak 15-min ven-miles of travel, VMI 15	(ven- mi)vM i <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		104			
Peak-hour vehicle-miles of travel, VMT <sub>6</sub>	<sub>0</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	4	500			
Peak 15-min total travel time, TT <sub>15</sub> (veh-	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		27.1			
Notes		······································				
<ol> <li>If the highway is extended segment (le 3. For the analysis direction only.</li> <li>Ex</li> </ol>	evel) or rolling terrain, f <sub>G</sub> =1.0 2. If v <sub>i</sub> ( hibit 20-21 provides factors a and b.	v <sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	alysisthe LOS is F.			

5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

# Page 1 of 1

DIRECTIONAL TWO-LANE HIGHWAY	DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET							
General Information	Site Information	CD LIC 460						
Analyst DEA Agency or Company URS	Fighway / Direction of Travel E	EB US 160 GEM VILLAGE						
Date Performed 3/19/2005	Jurisdiction							
Analysis Time Period PM PEAK	Analysis Year 2							
Shoulder widtht		-						
Lane widtht	Class I highway 🔛 Class II highway							
Lane width tt	Terrain	Level 🛛 Rolling						
T Shoulder width t	Grade Length Peak-hour fact	mi Up/down or, PHF 0.95% ne 58						
Segment length, L <sub>1</sub> mi	Show North Arrow % Trucks and	Buses , P <sub>T</sub> 5 %						
Analysis direction vol., V <sub>d</sub> 1010veh/h	% Recreationa Access points	l vehicles, P <sub>R</sub> 0% / mi 5						
Opposing direction vol., V <sub>o</sub> 865veh/h								
Average Travel Speed								
	Analysis Direction (d)	Opposing Direction (o)						
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.5	1.5						
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1						
Heavy-venicle adjustment factor, $T_{HV}$ $T_{HV} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.976	0.970						
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.99	0.99						
Directional flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PHF*f_{HV}*f_G)$	1101	943						
Free-Flow Speed from Field Measurement	Estimated Fre	e-Flow Speed						
Field Measured speed <sup>3</sup> , S <sub>FM</sub> mi/h	Base free-flow speed <sup>o</sup> , BFFS <sub>FM</sub>	0.0 mi/n						
Observed volume <sup>3</sup> , V <sub>€</sub> veh/h	Adj. for lane width and shoulder wi	dth, $^{\circ}$ f <sub>LS</sub> (Exh 20-5) 0.0 mi/h						
Free-flow speed, FFS_ FFS=S+0.00776(V/ f/) 58.8 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.3 mi/h						
Adjustment for no-nassing zones f (Exhibit 20-19) $0.9 \text{ mi/h}$	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h							
	Average travel speed, ATS ATS=F	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 42.0 mi/h						
Percent Time-Spent-Following								
Passenger-car equivalents for trucks. F-/Exhibit 20-10 or 20-16)	Analysis Direction (d)	1.0						
Passenger-car equivalents for RVs. $E_{\rm p}$ (Exhibit 20-10 or 20-16)	1.0	1.0						
Heavy-vehicle adjustment factor, $f_{\rm inv} = 1/(1 + P_{\rm r}(E_{\rm r}-1) + P_{\rm p}(E_{\rm p}-1))$	1.000	1.000						
Grade adjustment factor <sup>1</sup> , f <sub>c</sub> (Exhibit 20-8 or 20-14)	1.00	1.00						
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	1063	911						
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	8	38.8						
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		4.6						
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np	Ş	)3.3						
Level of Service and Other Performance Measures								
Volume to capacity ratio v/c v/c=V_/ 1.700		).65						
Peak 15-min veh-miles of travel VMT <sub>4</sub> (veh-mi)VMT <sub>4</sub> = 0.25L(V/PHF)	1	595						
Peak-hour vehicle-miles of travel, VMT <sub>en</sub> (veh- mi) VMT <sub>en</sub> =V*L,	6	060						
Peak 15-min total travel time, $TT_{15}$ (veh-h) $TT_{15}$ = VMT <sub>15</sub> /ATS		38.0						
Notes								
1.If the highway is extended segment (level) or rolling terrain, $f_c=1.0$ 2. If v.(v	d or vo) >=1,700 pc/h, terminate ana	lysis-the LOS is F.						
3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b.								
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a speed.	pecific downgrade.							

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

	DIRECTIONAL TWO-LANE H	IGHWA	SEGMENT WORKSHEET				
General Information			Site Information				
Analyst Agency or Company	URS		Highway / Direction of Travel From/To	WB US 160 GEM VILLAGE			
Date Performed	3/19/2005		Jurisdiction				
Analysis Time Period			Analysis Year	2025 NO ACTION			
			<u> </u>	······································			
1	Shoulder width	_n					
	Lane width	tt	Class I	highway 🔲 Class II highway			
	Lane width	h	Terrain	Level Rolling			
	Shoulder width	tt	Grade Lengt	h mi Up/down			
		]	Peak-hour fa	ctor, PHF 0.95%			
Segment length, L <sub>1</sub> mi			Show North Arrow % Trucks an	d Buses , P <sub>T</sub> 5 %			
Analysis direction vol., V <sub>d</sub> 925veh/h			% Recreation Access point	nal vehicles, P <sub>R</sub> 0% is/ mi 5			
Opposing direction vol., V <sub>o</sub> 750ve	h/h						
Average Travel Speed							
			Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E <sub>T</sub>	(Exhibit 20-9 or 20-15)		1.5	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub> (	Exhibit 20-9 or 20-17)		1.1	1.1			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub>	/=1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	<u></u>	0.976	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)			0.99	0.99			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF	<sup>**f</sup> HV <sup>*</sup> f <sub>G</sub> )		1008	817			
Free-Flow Speed from	m Field Measurement		Estimated F	ree-Flow Speed			
Field Measured speed <sup>3</sup> . S	mi/	'n	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
Observed volume <sup>3</sup> V	veh	/h	Adj. for lane width and shoulder	width, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
	76()//f ) 59.9	mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhib	it 20-5) 1.3 mi/h			
Free-flow speed, FFSd FFS=SFM+0.007	70(V <sub>1</sub> /1 <sub>HV</sub> ) 50.0		Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/				
Adjustment for no-passing zones, f <sub>np</sub> (I	Exhibit 20-19) 1.0	mi/h	Average travel speed, ATS ATS	=FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 43.5 mi/h			
Percent Time-Spent-Following							
			Analysis Direction (d)				
Passenger-car equivalents for trucks, ET	(Exhibit 20-10 or 20-16)		1.0	1.0			
Passenger-car equivalents for RVs, E <sub>R</sub> (	Exhibit 20-10 or 20-16)		1.0	1.0			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>H</sub>	V <sup>=1/(1+P<sub>T</sub>(E<sub>T</sub>-1)+P<sub>R</sub>(E<sub>R</sub>-1))</sup>		1.000	1.000			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-	8 or 20-14)		1.00	1.00			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> ≃V <sub>i</sub> /(PHF	<sup>**f</sup> HV <sup>*</sup> f <sub>G</sub> )		974	789			
Base percent time-spent-following <sup>4</sup> , BPT	SF(%) BPTSF=100(1-e <sup>av</sup> d	<u>')</u>	ļ	85.2			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit.	20-20)			5.9			
Percent time-spent-following, PTSF(%) P	PTSF=BPTSF+f np		<u> </u>	91.1			
Level of Service and Other Performan Level of service, LOS (Exhibit 20-3 or 20	-4)		T	E			
Volume to capacity ratio v/c $v/c=V_{p}/1.7$	700			0.59			
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (	veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		······································	1461			
Peak-hour vehicle-miles of travel, VMT <sub>60</sub>	(veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>			5550			
Peak 15-min total travel time, TT <sub>15</sub> (veh-h	n) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		· · · · · · · · · · · · · · · · · · ·	33.6			
Notes			·····				
1.If the highway is extended segment (lev	vel) or rolling terrain, f <sub>G</sub> =1.0	2. If v <sub>i</sub> (v <sub>o</sub>	1 or v <sub>o</sub> ) >=1,700 pc/h, terminate a	nalysisthe LOS is F.			
3. For the analysis direction only. 4. Exh	nibit 20-21 provides factors a ar	nd b.					

5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

DIRECTIONAL TWO-LANE HIGHWAY	Y SEGMENT WORKSHEET	
General Information	Site Information	
Analyst DEA Agency or Company URS	From/To	VB US 160 SEM VILLAGE
Date Performed 3/19/2005	Jurisdiction	
Analysis Time Period PM PEAK	Analysis Year 2	2025 NO ACTION
Shoulder widthtt	_	
Lane widtht	Class I hi	ghway 🚺 Class II highway
Lane widtht	Terrain	🖩 Level 📝 Rolling
Shoulder width It	Grade Length Peak-hour fact No-passing zo	mi Up/down or, PHF 0.95% ne 57
Segment length, L <sub>1</sub> mi	Show North Arrow % Trucks and % Recreationa	Buses , P <sub>T</sub> 5 % I vehicles , P <sub>P</sub> 0%
Analysis direction vol., V <sub>d</sub> 865veh/h	Access points/	mi 5
Opposing direction vol., V <sub>o</sub> 1010veh/h		
Average Travel Speed		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.5	1.5
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.976
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.99	0.99
Directional flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV}^*f_G)$	943	1101
Free-Flow Speed from Fleid Measurement	Estimated Fre	e-Flow Speed
Field Measured speed <sup>3</sup> , S <sub>FM</sub> mi/h	Base free-flow speeds, BFFS <sub>FM</sub>	60.0 mi/n
Observed volume <sup>3</sup> , V <sub>f</sub> veh/h	Adj. for access points <sup>3</sup> f. (Exhibit	20-5) 1.3 mi/h
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> +0.00776(V <sub>f</sub> / $f_{HV}$ ) 58.8 mi/h		20-0) 1:0 mi/h
Adjustment for no-passing zones, f <sub>np</sub> (Exhibit 20-19) 0.8 mi/h	Average travel speed, ATS ATS=F	$FS-0.00776v_{p}-f_{np}$ 42.1 mi/h
Percent Time-Spent-Following	Analysis Direction (d)	Opposing Direction (c)
Personaar oor oouivalaats far trucks E (Exhibit 20-10 or 20-16)	Analysis Direction (d)	1 0
Passenger-car equivalents for RVs E (Exhibit 20-10 or 20-10)	1.0	1.0
Heavy-vehicle adjustment factor $f = f = 1/(1 + P (F_{-1}) + P (F_{-1}))$	1,000	1 000
Grade adjustment factor <sup>1</sup> f. (Exhibit 20-8 or 20-14)	1.00	1.00
Directional flow rate <sup>2</sup> $v(nc/h) v = V/(PHF*f_m * f_m)$	911	1063
Page percent time expert following <sup>4</sup> BPTSE(%) BPTSE=100(1 $e^{ay}d^{b}$ )	8	8.5
Adi for no-passing zone f (%) (Exhibit 20-20)		3.2
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f	g	1.7
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 20-3 or 20-4)	1	E
Volume to capacity ratio v/c v/c=V <sub>p</sub> / 1,700	C	).55
Peak 15-min veh-miles of travel,VMT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	1	366
Peak-hour vehicle-miles of travel, VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	5	190
Peak 15-min total travel time, TT <sub>15</sub> (veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS	3	2.5
Notes		
1.If the highway is extended segment (level) or rolling terrain, $f_G$ =1.0 2. If $v_i(v_i)$ 3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b.	<sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate ana	lysis-the LOS is F.

5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

Attachment H-2 2025 Dry Creek and Gem Village Section, Alternative H (Preferred Alternative) and Alternative C, Highway Analyses

URS Corporation						
9960 Federal Dri Colorado Springs	ve, Suite 300 , CO 80920					
Phone: E-mail:			Fax	ζ:		
	OPI	ERATION	JAL ANALYSI	IS		
· · · · · · · · · · · · · · · · · · ·				- <u></u>		
Analyst: Agency/Co: Date: Analysis Period: Highway: From/To:	DEA URS 3/15/2005 AM PEAK US 160 CR 222/223 TC	D GEM T	/ILLAGE			
Analysis Year: Project ID:	2025 US 160					
		בים מים		<b>`</b>		
	· · · · · · · · · · · · · · · · · · ·		Eastbound		Westbound	
Tana width	Direction		1	£+	2	<i>6</i> +
Lateral clearanc	e:		12.0	LL	12.0	T.C.
Right edge	<b>.</b>		6.0	ft	6.0	ft
Left edge			6.0	ft	6.0	ft
Total lateral clearance			12.0	ft	12.0	ft.
Access points per mile			3		2	- •
Median type			Divided		- Divided	
Free-flow speed:			Base		Base	
FFS or BFFS			60.0	mph	60.0	mph
Lane width adjus	tment, FLW		0.0	mph	0.0	mph
Lateral clearance	e adiustment.	FLC	0.0	mph	0.0	mph
Median type adju	stment FM	I HO	0.0	mph	0.0	mph
Access points ad	justmont FA		0.0	mph	0.0	mph
Frontlow spood	Justmenic, FA		50 3	mph	50 5	mph
riee-itow speed			59.5	шрп	59.5	шрп
			VOLUME			
	Direction		1		2	
Volume, V			1080	vph	625	vph
Peak-hour factor	, PHF		0.95	-	0.95	•
Peak 15-minute v	olume, v15		284		164	
Trucks and buses			5	90	5	0
Recreational veh	icles		0	8	0	0
Terrain type			Rolling		Rolling	
Grade			0.00	00	0.00	O O
Segment leng	th		0.00	mi	0.00	mi
Number of lanes			2		2	
Driver population	n adjustment,	fP	1.00		1.00	
Trucks and buses	PCE, ET		2.5		2.5	
Recreational veh.	icles PCE, ER		2.0		2.0	
Heavy vehicle ad	justment, fHV		0.930		0.930	
Flow rate, vp			611	pcphpl	353	pcphpl
			RESULTS			

Direction	1		2	
Flow rate, vp	611	pcphpl	353	pcphpl
Free-flow speed, FFS	59.3	mph	59.5	mph
Avg. passenger-car travel speed, S	59.3	mph	59.5	mph
Level of service, LOS	A		A	
Density, D	10.3	pc/mi/ln	5.9	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Fax:

URS Corporation 9960 Federal Drive, Suite 300 Colorado Springs, CO 80920 Phone: E-mail: OPERATIONAL ANALYSIS Analyst: DEA Agency/Co: URS Date: 3/15/2005 Analysis Period: PM PEAK US 160 Highway: From/To: CR 222/223 TO GEM VILLAGE

Jurisdiction: Analysis Year: 2025 Project ID: US 160

FREE-FLOW SPEED									
	Eastbound		Westbound						
Direction	1		2						
Lane width	12.0	ft	12.0	ft					
Lateral clearance:									
Right edge	6.0	ft	6.0	ft					
Left edge	6.0	ft	6.0	ft					
Total lateral clearance	12.0	ft	12.0	ft					
Access points per mile	3		2						
Median type	Divided		Divided						
Free-flow speed:	Base		Base						
FFS or BFFS	60.0	mph	60.0	mph					
Lane width adjustment, FLW	0.0	mph	0.0	mph					
Lateral clearance adjustment, F	LC 0.0	mph	0.0	mph					
Median type adjustment, FM	0.0	mph	0.0	mph					
Access points adjustment, FA	0.8	mph	0.5	mph					
Free-flow speed	59.3	mph	59.5	mph					
	VOLUME			·					
			2						
Direction	1	-	2						
Volume, V	1340	vph	1365	vph					
Peak-hour factor, PHF	0.95		0.95						
Peak 15-minute volume, v15	353	_	359						
Trucks and buses	5	90	5	00					
Recreational vehicles	0	90	0	00					
Terrain type	Rolling		Rolling						
Grade	0.00	90	0.00	0					
Segment length	0.00	mi	0.00	mi					
Number of lanes	2		2						
Driver population adjustment, f	P 1.00		1.00						
Trucks and buses PCE, ET	2.5		2.5						
Recreational vehicles PCE, ER	2.0		2.0						
Heavy vehicle adjustment, fHV	0.930		0.930						
Flow rate, vp	758	pcphpl	772	pcphpl					

Direction		1		2	
Flow rate, vp		758	pcphpl	772	pcphpl
Free-flow speed, FFS		59.3	mph	59.5	mph
Avg. passenger-car travel speed,	S	59.3	mph	59.5	mph
Level of service, LOS		В		В	
Density, D		12.8	pc/mi/ln	13.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Attachment I 2025 Bayfield Section Highway Analyses Attachment I-1 2025 Bayfield Section, No Action Alternative, Highway Analyses

# Page 1 of 1

DIRECTIONAL TWO-LANE HIGHWA	Y SEGMENT WORKSHEET			
General Information	Site Information			
Agency or Company URS	From/To	Bayfield		
Date Performed 3/19/2005	Jurisdiction			
Input Data	Analysis rear	2025 NO ACTION		
		· · · · · · · · · · · · · · · · · · ·		
T Shoulder width tt				
Lane width1	Class I hi	ghway 📗 Class II highway		
Lane width tt	Terrain	Level 🕅 Rolling		
Shoulder width t	Peak-hour fac	tor, PHF 0.95%		
Command Investor I mai	No-passing zo	ne 72		
Segment rengut, 4 mi	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%		
	% Recreationa	al vehicles, P <sub>R</sub> 0%		
Analysis direction vol., V <sub>d</sub> 550ven/h	Access points	/mi 4		
Opposing direction vol., V <sub>o</sub> 615veh/h		·		
Average Travel Speed	Analysis Direction (d)	Opposing Direction (a)		
Desenger or equivalents for trucks E (Evhibit 20.0 or 20.15)				
Passenger-call equivalents for trucks, E <sub>1</sub> (Exhibit 20-9 of 20-15)	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1		
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.976		
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-7 or 20-13)	0.99	0.99		
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	599	670		
Free-Flow Speed from Field Measurement	Estimated Fre	e-Flow Speed		
Field Measured speed <sup>3</sup> , S <sub>EM</sub> mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h		
Observed volume <sup>3</sup> V. Veh/h	Adj. for lane width and shoulder w	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h		
Free flow speed EFS EFS=S $\pm 0.00776(V/f)$ 59.0 mi/b	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.0 mi/h		
Adjustment for so possing topos $f_{\rm H}$ (Evhibit 20.10) 16 mi/h	Free-flow speed, FFS <sub>d</sub> (FSS=BFI	FS-f <sub>LS</sub> -f <sub>A</sub> ) 59.0 mi/h		
Aujustment for ho-passing zones, inp (LXmot zo-19)	Average travel speed, ATS ATS=	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 47.6 mi/h		
Percent Time-Spent-Following				
	Analysis Direction (d)	Opposing Direction (o)		
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 20-10 or 20-16)	1.0	1.0		
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 20-10 or 20-16)	1.0	1.0		
Heavy-vehicle adjustment factor, $f_{HV} = f_{HV} = 1/(1 + P_T(E_T-1) + P_R(E_R-1))$	1.000	1.000		
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)	1.00	1.00		
Directional flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV}^*f_G)$	579	647		
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	7	77.1		
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)	9.4			
Percent time-spent-following, PTSF(%) PTSF=BPTSF+f np	8	36.5		
Level of Service and Other Performance Measures		E		
Volume to canacity ratio v/c v/c=V / 1 700	0.35			
Peak 15-min veh-miles of travel VMT (veh-mi)VMT= $0.251 (V/PHE)$	289			
Peak-hour vehicle-miles of travel $VMT_{-}(veh mi) = VMT_{-}=V^{+1}$	1100			
Peak 15-min total travel time $TT_{-}$ (veh-h) $TT_{-} = VMT_{-}/\Delta TS_{-}$		61		
Notes	<u> </u>			
1 If the highway is extended segment (level) or rolling terrain $f_{-}=1.0$ 2 if y/y	(, or v )>=1,700 nc/h terminate ana	alvsis-the LOS is F		
3 For the analysis direction only 4 Exhibit 20-21 provides factors a and b				

For the analysis direction only.
 Exhibit 20-21 provides factors a and b.
 Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET						
General Information		Site Information				
Analyst Agency or Company	DEA URS	Highway / Direction of Travel	3 US 160			
Date Performed	3/19/2005	Jurisdiction				
Analysis Time Period	PM PEAK	Analysis Year 2	025 NO ACTION			
		1	· · · · · · · · · · · · · · · · · · ·			
	Shoulder width 11					
	Lane width tt	Class I hig	nhway 🛛 Class II highway			
	Lane widthh	Terrain	Level 🗹 Rolling			
	Shoulder widtht	Grade Length	mi Up/down			
		No-passing zo	ne 72			
Segment length	, L <sub>l</sub> mi	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%			
8	Ĩ	% Recreationa	l vehicles, P <sub>P</sub> 0%			
Analysis direction vol., V <sub>d</sub> 755ve	eh/h	Access points/	mi 4			
Opposing direction vol., V 400ve	eh/h					
Average Travel Speed			······································			
		Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E	r (Exhibit 20-9 or 20-15)	1.5	1.9			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-9 or 20-17)	1.1	1.1			
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>H</sub>	v=1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	0.957			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	0-7 or 20-13)	0.99	0.93			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHI	F*f <sub>HV</sub> * f <sub>G</sub> )	823 473				
Free-Flow Speed fro	om Field Measurement	Estimated Fre	e-Flow Speed			
Field Measured speed <sup>3</sup> . S <sub>5</sub>	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
	veh/h	Adj. for lane width and shoulder wi	dth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
	776(1/(f)) 59.0 mi/b	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.0 mi/h			
riee-now speed, rr3d rr3-3 <sub>FM</sub> 10.00	$(\nabla_{\mathbf{r}})$ $(\nabla_$	Free-flow speed, FFS <sub>d</sub> (FSS=BFF	'S-f <sub>LS</sub> -f <sub>A</sub> ) 59.0 mi/h			
Adjustment for no-passing zones, t <sub>np</sub>	(EXNIDIT 20-19) 2.3 mi/m	Average travel speed, ATS ATS=F	FS-0.00776v <sub>p</sub> -f <sub>np</sub> 46.6 mi/h			
Percent Time-Spent-Following		Analysis Direction (d)	Opposing Direction (a)			
Passenger-car equivalents for trucks, E-	<sub>r</sub> (Exhibit 20-10 or 20-16)	1.0	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f <sub>H</sub>	<sub>+V</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20-8 or 20-14)		1.00	0.94			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHI	F*f <sub>HV</sub> * f <sub>G</sub> )	795	459			
Base percent time-spent-following <sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		77.7				
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibit. 20-20)		14.1				
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np	9	1.8			
Level of Service and Other Performan	nce Measures	·····	E			
olume to capacity ratio v/c = v/c=V_r/ 1,700		0.48				
Peak 15-min veh-miles of travel,VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)	397				
Peak-hour vehicle-miles of travel, VMT <sub>6</sub>	<sub>0</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	1510				
Peak 15-min total travel time, TT <sub>15</sub> (veh-	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		8.5			
Notes						
1.If the highway is extended segment (le	evel) or rolling terrain, $f_G = 1.0$ 2. If $v_i(v_G)$	<sub>d</sub> or v <sub>o</sub> ) >≖1,700 pc/h, terminate ana	lysisthe LOS is F.			

For the analysis direction only.
 Exhibit 20-21 provides factors a and b.
 Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

	DIRECTIONAL TWO-LANE HIGHWAY	Y SEGMENT WORKSHEET				
General Information		Site Information				
Analyst Agency of Company	URS	Highway / Direction of Travel	WB US 160 BAYFIFI D			
Date Performed	3/19/2005	Jurisdiction				
Analysis Time Period	AM PEAK	Analysis Year	2025 NO ACTION			
	Shoulder width tr					
	Lane widtht	M Class I h	ighway 🛄 Class II highway			
	Lane width t	Terrain	Level Rolling			
	Shoukder wickn I	Peak-hour fac	tor, PHF 0.95%			
Seament lengt	n la mi	No-passing zo	one 65			
J Segment renga	ч Ц шалининин III	Show North Arrow % Trucks and	Buses, P <sub>T</sub> 5%			
	ah /h	% Recreation	al vehicles, P <sub>R</sub> 0%			
Analysis direction vol., v <sub>d</sub> 615v		Access points	7 min 5			
Opposing direction vol., V <sub>o</sub> 550v	en/n	<u> </u>				
Average Traver Speed	······································	Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for trucks, E	T (Exhibit 20-9 or 20-15)	1.5	1.5			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-9 or 20-17)	1.1	1.1			
Heavy-vehicle adjustment factor,f <sub>HV</sub> f <sub>H</sub>	<sub>/V</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 2	20-7 or 20-13)	0.99	0.99			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	670 59				
Free-Flow Speed free	om Field Measurement	Estimated Fro	ee-Flow Speed			
Field Measured speed <sup>3</sup> . S <sub>EM</sub>	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
Observed volume <sup>3</sup> . V <sub>e</sub>	veh/h	Adj. for lane width and shoulder w	idth, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
Free-flow speed, FFS, FFS=S+0.00	776(V/ f) 58.8 mi/h	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	20-5) 1.3 mi/h			
Adjustment for no-passing zones $f$	(Exhibit 20-19) 1.7 mi/b	Free-flow speed, FFS <sub>d</sub> (FSS=BF	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 58.8 mi/h			
	(	Average travel speed, ATS ATS=	FFS-0.00776v <sub>p</sub> -f <sub>np</sub> 47.2 mi/h			
Percent Time-Spent-Following		Analysis Direction (d)	Opposing Direction (a)			
Passenger-car equivalents for trucks, E		1.0	1.0			
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, f <sub>HV</sub> f	<sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	1.000			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhibit 20	)-8 or 20-14)	1.00	1.00			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH	F*f <sub>HV</sub> * f <sub>G</sub> )	647	579			
Base percent time-spent-following <sup>4</sup> , BP	TSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )		76.5			
Adj. for no-passing zone, f <sub>np</sub> (%) (Exhibi	t. 20-20)		10.5			
Percent time-spent-following, PTSF(%)	PTSF=BPTSF+f np		87.0			
Level of Service and Other Performa	nce Measures	T	F			
Volume to capacity ratio v/c v/c=Vp/ 1	,700		0.39			
Peak 15-min veh-miles of travel,VMT <sub>15</sub>	(veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		324			
Peak-hour vehicle-miles of travel, VMT <sub>e</sub>	<sub>50</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	1230				
Peak 15-min total travel time, TT <sub>15</sub> (veh	h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		6.9			
Notes						
1.If the highway is extended segment (le	evel) or rolling terrain, f <sub>G</sub> =1.0 2. If v <sub>i</sub> (v	<sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate an	alysisthe LOS is F.			

For the analysis direction only.
 Exhibit 20-21 provides factors a and b.
 Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET						
General Information		Site Information	MB US 160			
Agency or Company	URS	From/To	BAYFIELD			
Date Performed	3/19/2005	Junisdiction				
Analysis Time Period	PM PEAK	Analysis Year	2025 NO ACTION			
		J				
	Shoulder width tt					
	Lane widtht	Class I hi	ighway 🔲 Class II highway			
<b>&gt;</b>	Lane width tt	Terrain	Level Rolling			
	Shoulder width ti	Grade Length	mi Up/down			
		Peak-hour fac	tor, PHF 0.95%			
Seament	enath, L mi	% Trucks and				
		Show North Arrow 70 Truck's and				
	400	% Recreation	al vehicles, P <sub>R</sub> 0%			
Analysis direction vol., V <sub>d</sub>	400ven/n	Access points	/ 111 4			
Opposing direction vol., Vo	755veh/h					
Average Travel Speed		••••••••••••••••••••••••••••••••••••••				
······································		Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for truc	ks, E <sub>T</sub> (Exhibit 20-9 or 20-15)	1.9	1.5			
Passenger-car equivalents for RVs	s, E <sub>R</sub> (Exhibit 20-9 or 20-17)	1.1	1.1			
Heavy-vehicle adjustment factor,f <sub>H</sub>	<sub>IV</sub>	0.957	0.976			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Ex	nibit 20-7 or 20-13)	0.93	0.99			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V	<sub>i</sub> /(PHF*f <sub>HV</sub> * f <sub>G</sub> )	473 823				
Free-Flow Spe	ed from Field Measurement	Estimated Fre	e-Flow Speed			
Field Measured speed <sup>3</sup> S <sub>-1</sub> ,	mi/h	Base free-flow speed <sup>3</sup> , BFFS <sub>FM</sub>	60.0 mi/h			
Field Measured Speed , S <sub>FM</sub>		Adj. for lane width and shoulder w	Adj. for lane width and shoulder width, <sup>3</sup> f <sub>LS</sub> (Exh 20-5) 0.0 mi/h			
Observed volume <sup>-</sup> , v <sub>f</sub>		Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit	Adj. for access points <sup>3</sup> , f <sub>A</sub> (Exhibit 20-5) 1.0 mi/h			
Free-flow speed, FFS <sub>d</sub> FFS=S <sub>FM</sub> ·	+0.00776(V <sub>f</sub> / f <sub>HV</sub> ) 59.0 mi/h	Free-flow speed, FFS_ (FSS=BFI	Free-flow speed, FFS <sub>d</sub> (FSS=BFFS- $f_{1,S}$ - $f_{A}$ ) 59.0 mi/h			
Adjustment for no-passing zones,	f <sub>np</sub> (Exhibit 20-19) 1.1 mi/h	Average travel speet ATS ATS=1	ES A'			
Percent Time-Spent-Following		, the lage dates speed, it is it is	re cloch or pinp			
reicent nine-opent violening		Analysis Direction (d)	Opposing Direction (o)			
Passenger-car equivalents for truc	ks, E <sub>T</sub> (Exhibit 20-10 or 20-16)	1.5	1.0			
Passenger-car equivalents for RVs	s, E <sub>R</sub> (Exhibit 20-10 or 20-16)	1.0	1.0			
Heavy-vehicle adjustment factor, f	<sub>HV</sub> f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.976	1.000			
Grade adjustment factor <sup>1</sup> , f <sub>G</sub> (Exhi	bit 20-8 or 20-14)	0.94	1.00			
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =∨	¦/(PHF*f <sub>HV</sub> * f <sub>G</sub> )	459	795			
Base percent time-spent-following	<sup>4</sup> , BPTSF(%) BPTSF=100(1-e <sup>av</sup> d <sup>b</sup> )	77.0				
Adj. for no-passing zone, f <sub>np</sub> (%) (E	xhibit. 20-20)		6.3			
Percent time-spent-following, PTS	F(%) PTSF=BPTSF+f np	1	83.2			
Level of Service and Other Performance Level of service, LOS (Exhibit 20-3	ormance Measures	Τ	Ē			
Volume to capacity ratio v/c v/c=	V <sub>p</sub> / 1,700	0.28				
Peak 15-min veh-miles of travel,VI	MT <sub>15</sub> (veh- mi)VMT <sub>15</sub> = 0.25L <sub>t</sub> (V/PHF)		211			
Peak-hour vehicle-miles of travel, '	VMT <sub>60</sub> (veh- mi) VMT <sub>60</sub> =V*L <sub>t</sub>	800				
Peak 15-min total travel time, TT <sub>15</sub>	(veh-h) TT <sub>15</sub> = VMT <sub>15</sub> /ATS		4.4			
Notes						
1.If the highway is extended segme	ent (level) or rolling terrain, $f_{C}=1.0$ 2. If $v_{i}(v_{i})$	v <sub>d</sub> or v <sub>o</sub> ) >=1,700 pc/h, terminate and	alysisthe LOS is F.			

For the analysis direction only.
 Exhibit 20-21 provides factors a and b.
 Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Copyright © 2000 University of Florida, All Rights Reserved

Version 4.1d

Attachment I-2 2025 Bayfield Section, Alternative B (Preferred Alternative) and Alternative A, Highway Analyses

# HCS2000: Multilane Highways Release 4.1d

URS Corporation					
9960 Federal Driv Colorado Springs,	re, Suite 300 CO 80920				
Phone: E-mail:		Fa	x:		
	OPERA	TIONAL ANALYS	IS		
					· · · · · · · · · · · · · · · · · · ·
Analyst:	DEA				
Agency/Co:	URS				
Date:	3/15/2005				
Analysis Period:	AM PEAK				
Highway:	CEM VIIIACE TO	BAVETETD			
Turisdiction:	GEW VILLAGE IO	DATFIELD			
Analysis Year:	2025				
Project ID:	US 160				
	F	REE-FLOW SPEE	:D		
•	<b>D 1</b>	Eastbound		Westbound	
Tama sideb	Direction		£+	12 0	<i>E</i> +
Lane width	<b></b>	12.0	LL	12.0	16
Pight edge	5.	6 0	f+	6 0	f+
Left edge		6.0	ft	6.0	ft
Total latera	al clearance	12.0	ft	12.0	ft
Access points per	mile	2		2	20
Median type		Divided		Divided	
Free-flow speed:		Base		Base	
FFS or BFFS		60.0	mph	60.0	mph
Lane width adjust	ment, FLW	0.0	mph	0.0	mph
Lateral clearance	e adjustment, FI	.C 0.0	mph	0.0	mph
Median type adjus	stment, FM	0.0	mph	0.0	mph
Access points ad	justment, FA	0.5	mph	0.5	mph
Free-flow speed		59.5	mph	59.5	mph
		VOLUME			
	Direction	1		2	
Volume V	DITECTION	750	vnh	925	wph
Peak-hour factor.	PHF	0,95	• 1211	0.95	vpn
Peak 15-minute vo	olume, v15	197		243	
Trucks and buses		5	90	5	olo
Recreational vehi	cles	0	00	0	99
Terrain type		Rolling		Rolling	
Grade		0.00	00	0.00	010
Segment lengt	h	0.00	mi	0.00	mi
Number of lanes		2		2	
Driver population	adjustment, fP	° 1.00		1.00	
Trucks and buses	PCE, ET	2.5		2.5	
Recreational vehi	CLES PCE, ER	2.0		2.0	
Heavy vehicle adj	ustment, IHV	0.930		0.930	
riow rate, vp		424	pcpnp1	323	pcpnpl

RESULTS

Direction	1		2	
Flow rate, vp	424	pcphpl	523	pcphpl
Free-flow speed, FFS	59.5	mph	59.5	mph
Avg. passenger-car travel speed, S	59.5	mph	59.5	mph
Level of service, LOS	A		A	
Density, D	7.1	pc/mi/ln	8.8	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

URS Corporation

9960 Federal Drive, Suite 300 Colorado Springs, CO 80920

Phone: E-mail: Fax:

\_OPERATIONAL ANALYSIS\_\_\_\_\_

Analyst: Agency/Co: Date: Analysis Period: Highway: From/To: Jurisdiction: Analysis Year: Project ID:	DEA URS 3/15/2005 PM PEAK US 160 GEM VILLAGE 2025 US 160	TO BAYFIELD	
		FREE-FLOW	SPEED

Direction	£	Eastbound	V	Vestbound	
Lane width		12 0	ft	12 0	f+
Lateral clearance:		12.0	I C	12.0	L C
Right edge		6.0	ft	6.0	ft
Left edge		6.0	ft	6.0	ft
Total lateral clearance		12.0	ft	12.0	ft
Access points per mile		2		2	
Median type		Divided		Divided	
Free-flow speed:		Base		Base	
FFS or BFFS		60.0	mph	60.0	mph
Lane width adjustment, FLW		0.0	mph	0.0	mph
Lateral clearance adjustment, H	FLC	0.0	mph	0.0	mph
Median type adjustment, FM		0.0	mph	0.0	mph
Access points adjustment, FA		0.5	mph	0.5	mph
Free-flow speed		59.5	mph	59.5	mph
		VOLUME			
Direction		1		2	
Volume, V		1010	vph	865	vph
Peak-hour factor, PHF		0.95	-	0.95	-
Peak 15-minute volume, v15		266		228	
Trucks and buses		5	00	5	00
Recreational vehicles		0	8	0	<b>0</b>
Terrain type		Rolling		Rolling	
Grade		0.00	00	0.00	o'o
Segment length		0.00	mi	0.00	mi
Number of lanes		2		2	
Driver population adjustment, f	ΕP	1.00		1.00	
Trucks and buses PCE, ET		2.5		2.5	
Recreational vehicles PCE, ER		2.0		2.0	
Heavy vehicle adjustment, fHV		0.930		0.930	
Flow rate, vp		571	pcphpl	489	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	571	pcphpl	489	pcphpl
Free-flow speed, FFS	59.5	mph	59.5	mph
Avg. passenger-car travel speed, S	59.5	mph	59.5	mph
Level of service, LOS	A		A	
Density, D	9.6	pc/mi/ln	8.2	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Attachment J 2025 Bayfield Section Intersection Analyses
Attachment J-1 2025 Bayfield Section, No Action Alternative, Intersection Analyses

Analyst: DEA Agency: URS Date: 3/18/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501 Area Type: All other areas Jurisd: Year : 2025 NO ACTION

# N/S St: CR 501

#### SIGNALIZED INTERSECTION SUMMARY | Westbound | Northbound Southbound Eastbound LL т R I L Т R | L Т R 1 L Т R 1 0 1 0 0 0 0 No. Lanes 1 1 1 1 1 0 Т LGConfig ΤR LTR L | L ΤR LTR 1 Volume |70 340 140 |305 455 30 195 75 255 120 140 65 |12.0 12.0 Lane Width |12.0 12.0 12.0 12.0 ł 1 RTOR Vol 0 1 0 0 ł 0 1 Duration 0.25 Area Type: All other areas Signal Operations Phase Combination 1 2 3 5 6 7 8 4 | EB Left А NB Left Α Thru А Thru Α Right А Right A Peds Peds WB Left Left Α SB Α Thru Thru Α Α Right A Right Α Peds Peds NB Right Right EΒ SB Right WB Right 1 17.0 28.0 30.0 Green 4.0 4.0 4.0 Yellow All Red 1.0 1.0 1.0 Cycle Length: 90.0 secs Intersection Performance Summary

Appr/	Lane	Adj Sat	Rati	los	Lane (	Group	Appr	oach	· · ·	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	_	
Eastbo	und		·		· · · · · · · · · · · · · · · · · · ·					
L	334	1770	0.22	0.19	31.2	С				
TR	543	1745	0.93	0.31	52.8	D	50.1	D		
Westbo	und									
L	334	1770	0.96	0.19	75.0	E				
TR	559	1796	0.91	0.31	49.5	D	59.4	Έ		
Northbo	ound									
LTR	477	1430	0.94	0.33	55.4	E	55.4	Ε		
Southbo	ound									
LTR	566	1697	0.42	0.33	23.7	C	23.7	С		
	Intersec	tion Delay	= 51.9	(sec/v	eh) In	nterse	ction	LOS =	D	

Analyst: DEA Agency: URS Date: 3/18/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501
Area Type: All other areas
Jurisd:
Year : 2025 NO ACTION

# N/S St: CR 501

## SIGNALIZED INTERSECTION SUMMARY

Eastbound			stbour	nd	Northbound   Southbound					ınd	ł
т	R	L	Т	R	L	Т	R	L	Т	R	I
					1						1
1 1	0	1	1	0	0	1	0	0	1	0	I
TR		L	TR			LTF	२		LTF	ર	
575	115	360	280	60	60	70	275	145	130	60	l
.0 12.0		12.0	12.0		ł	12.0			12.0		1
	0	}		0	]		0	1		0	ļ
	T 1 1 TR 575 .0 12.0	Eastbound T R 1 1 0 TR 575 115 .0 12.0 0	Eastbound     Westbound       T     R       I     1       TR     I       TR     I       575     115       .0     12.0       0     I	Eastbound     Westbourd       T     R     L     T       1     1     0           1     1       TR           L     TR       575     115      360     280       .0     12.0      12.0     12.0       0     j	Eastbound         Westbound         T       R       L       T       R         1       1       0               1       1       0         TR               L       TR       S75       115       360       280       60         .0       12.0        12.0       12.0       0       0       0	L       T       R       I       L       T       R       I       L         1       1       0               1       1       0               0         TR               1       1       0               0       0         TR               L       TR               0       0       0         575       115               360       280       60               60         .0               0               0               0	Eastbound         Westbound         Northbound         T       R         L       T       R         L       T         1       1       0         1       1       0       1         1       1       0         1       1       0       1         TR         L       TR         L       TR         L         575       115         360       280       60         60       70         .0       12.0       12.0       1       12.0       1       12.0	Eastbound       Westbound       Northbound         T       R       L       T       R         1       1       0       1       1       0       1       0         TR               1       1       0       1       0       1       0         TR               L       TR               LTR       LTR         575       115       360       280       60        60       70       275         .0       12.0       12.0               12.0       0               0	Eastbound       Westbound       Northbound       South         T       R       L       T       R       L       T       R       L         1       1       0               1       0               0       1       0         TR               L       TR               L       TR               0         TR               L       TR               L       L       R                 575       115               360       280       60               60       70       275               45         .0       12.0               12.0               12.0               0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

Duration	0.25	Area Typ	pe: All	other	areas	
----------	------	----------	---------	-------	-------	--

				Sigr	nal Oper	ations	3				
Pha	se Combination	1	2	3	4			5	6 7	1	8
EΒ	Left	А			N	IB Lef	Et	А			
	Thru		A		· · ·	Thr	cu	А			
	Right		А		I	Ric	ght	А			
	Peds				1	Pec	ls				
WB	Left	A			S	SB Lef	Et	А			
	Thru		А		ł	Thr	ru	A			
	Right		А		1	Ric	ght	A			
	Peds				1	Pec	ds				
NB	Right				E	B Rig	ght				
SB	Right				N I	IB Rig	ght				
Gre	en	19.0	31.0					25.0			
Yel	low	4.0	4.0					4.0			
All	Red	1.0	1.0					1.0			
								Cycle	Length	90.0	secs

		Intersec	ction Pe	erforman	ce Summa	ry				
Appr/	Lane	Adj Sat	Rati	os	Lane G	roup	Appro	bach		
Lane	Group	Flow Rate								
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS		
Eastbo	und					<u></u>				
L	374	1770	0.18	0.21	29.4	С				
TR	611	1773	1.19	0.34	129.9	F	121.3	F		
Westbo	und									
L	374	1770	1.01	0.21	85.5	F				
TR	610	1771	0.59	0.34	25.7	С	56.4	·E		
Northbo	ound									
LTR	418	1506	1.02	0.28	81.5	F	81.5	F		
Southbo	ound									
LTR	383	1378	0.64	0.28	32.3	С	32.3	C		
	Intersec	tion Delay	= 81.9	(sec/v	eh) In	terse	ction 3	LOS = H	r	

Attachment J-2 2025 Bayfield Section, Alternative B (Preferred Alternative), Intersection Analyses

Analyst: DEA Agency: URS Date: 3/15/20 Period: AM PEAD Project ID: US	005 K		Inte Area Jur: Yea:	er.: US a Type: isd: r : 20	160/ All 25 BA	CR 501 other a YFIELD	NORTH S areas B ALT.	IDE
E/W St: US 160	100		N/S	St: CF	501			
	SI	GNALIZED	INTERSE	CTION S	UMMAR	Y	C	
   _ T	T R	Westr   L I 	R R	NOFU   L  -	T	a   R   ]	Southbo L T	R
No. Lanes   LGConfig   Volume   Lane Width   RTOR Vol	0 0 0	1   L  305  12.0 	0 1 R 30 12.0 0	1   L  95 1  12.0 1	1 T .45 .2.0	0         	0 1 T 160 12.0	1   R   65   12.0   0
Duration 0.2	25 Area	Type: Al	l other	areas	·····	<u></u>		
Phase Combinat: EB Left Thru Right Peds WB Left Thru Right Peds NB Right SB Pight	ion 1 2 A A	SIGNA	4   4     NB       SB       EB   WB	Left Thru Right Peds Left Thru Right Peds Right	5 A A	6 A A A	7	8
Green Yellow All Red	A 30.0 4.0 1.0		I MB	RIGHT	15.0 4.0 1.0 Cycl	30.0 4.0 1.0 e Leng	th: 90.(	) secs
Appr/ Lane	Interse Adi Sat	ction Pe Rati	erformanc Los	e Summa Lane (	ary Group	Appr	oach	
Lane Group Grp Capacit	Flow Rate ty (s)	v/c	g/C	Delay	LOS	Delay	LOS	
Eastbound		· · · · · · · · · · · · · · · · · · ·		<u> </u>			****	
Westbound L 590	1770	0.54	0.33	25.5	С	25 0	C	
R 528	1583	0.06	0.33	20.5	С	2.5.0		
L 295 T 1035	1770 1863	0.34 0.15	0.17 0.56	33.8 9.8	C A	19.3	В	
Southbound								
T 621 R 1143 Inters	1863 1583 section Delav	0.27 0.06 = 21.0	0.33 0.72 (sec/ve	22.2 3.7 h) Ju	C A nterse	16.9 ection	B $LOS = C$	

\_\_\_\_\_

Analyst: DEA Agency: URS Date: 3/15/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501 NORTH SIDE
Area Type: All other areas
Jurisd:
Year : 2025 BAYFIELD B ALT.

#### N/S St: CR 501

## SIGNALIZED INTERSECTION SUMMARY

	I E	Eastbound				We	estk	oour	nd	Northbound					Southbound			
	L		Т	R		L	ſ	[ <sup>1</sup>	R	I	ı	Т	R	I	L	т	R	ļ
					_1_					_ !								_
No. Lanes	1	0	0	0	1	1	L	0	1	1	1	1	0		0	1	1	1
LGConfig	1				1	L			R	I		Т		ł		т	R	I
Volume	1				1:	360			60	60	)	135		I		175	60	
Lane Width	1					12.0	)		12.0	112	.0	12.0		1		12.0	12.0	ł
RTOR Vol	Ì				i				0	Ì				Í			0	Í

Duration 0.25 Area Type: All other areas Signal Operations

				Dry	nar op	CTUC	TOU2					
Pha	se Combination	1	2	3	4			5	6	7	8	
EΒ	Left				ļ	NB	Left	А				
	Thru						Thru	А	А			
	Right				ł		Right					
	Peds				1		Peds					
WB	Left	A			Ì	SB	Left					
	Thru				1		Thru		А			
	Right	A			Į		Right		A			
	Peds						Peds					
NB	Right				1	EΒ	Right					
SB	Right	А				WB	Right					
Gree	en	30.0						15.0	30.0			
Yel	low	4.0						4.0	4.0			
A11	Red	1.0						1.0	1.0			

Cycle Length: 90.0 secs

		Intersec	tion Pe	erformanc	e Summa	ary	-			
Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rati	os	Lane (	Group	Appr	oach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS		
Eastbou	ind	<u> </u>	· · · · · · · · · · · · · · · · · · ·	n i yn er en er				-		 . <u></u> .
Westbou	ind									
L	590	1770	0.64	0.33	27.8	С	26.9	C		
R	528	1583	0.12	0.33	20.9	С		Ū		
Northoo	295	1770	0 21	0 17	32 8	C				
T ,	1035	1863	0.14	0.56	9.7	A	16.8	В		
Southbo	ound									
T	621	1863	0.30	0.33	22.5	С	17.7	В		
R	1143	1583	0.06	0.72	3.6	A				
	Intersec	tion Delay	= 22.0	(sec/ve	eh) Iı	nterse	ction	LOS =	С	

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501 SOUTH SIDE
Area Type: All other areas
Jurisd:
Year : 2025 BAYFIELD B ALT.

#### N/S St: CR 501

## SIGNALIZED INTERSECTION SUMMARY

	Eas	Eastbound		Westbound   Northbound   Southbour					ind	nd					
	L	т	R	:	L	Т	R	1	L	Т	R	L	Т	R	1
				_			···	I .				_ I			<u> </u>
No. Lanes	1	0	1	1	0	0	0		0	1	1	1	1	0	
LGConfig	L		R	1				<u> </u>		Т	R	L	т		
Volume	70		140	1				1		170	255	20	445		1
Lane Width	12.0		12.0	1				1		12.0	12.0	12.0	12.0		1
RTOR Vol	ł		0	1							0	1			ł

Duration 0.25 Area Type: All other areas

				Signa	1 Op	erat	ions					
Phas	se Combination	1	2	3	4			5	6	7	8	
EΒ	Left	A			· · 1	NB	Left					
	Thru				i I		Thru		A			
	Right	А			1		Right		A			
	Peds						Peds					
WB	Left				ļ	SB	Left	А				
	Thru				ļ		Thru	А	A			
	Right				ł		Right					
	Peds				ł		Peds					
NB	Right	А			!	EΒ	Right					
SB	Right				ł	WB	Right					
Gree	en	30.0						15.0	30.0			
Yell	Low	4.0						4.0	4.0			
All	Red	1.0						1.0	1.0			

Cycle	Length:	90.0		secs
-------	---------	------	--	------

		Intersec	tion Pe	rforman	ce Summa	iry	2				
Appr/ Lane	Lane Group	Adj Sat Flow Rate	Rati	.05	Lane G	Group	Appro	bach			
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	_		
Eastbou	nd									•	
L	590	1770	0.13	0.33	21.0	С					
							21.9	С			
R	528	1583	0.28	0.33	22.3	С					
Westbou	nd										
								•			
Northbo	und										
T	621	1863	0.29	0.33	22.4	С	11.5	в			
R	1143	1583	0.23	0.72	4.3	Ā		_			
Southbo	und										
L	295	1770	0.07	0.17	31.7	С					
Т	1035	1863	0.45	0.56	12.2	В	13.0	В			
	Intersec	tion Delay	= 14.1	(sec/ve	eh) Ir	nterse	ction :	LOS =	в		

Analyst: DEA Agency: URS Date: 3/15/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501 SOUTH SIDE
Area Type: All other areas
Jurisd:
Year : 2025 BAYFIELD B ALT.

## N/S St: CR 501

## SIGNALIZED INTERSECTION SUMMARY

	Eas	tbou	nd	We	stbou	nd		No	rthbou	und	Sou	ithbou	nd	
	L	т	R	L	Т	R	ł	$\mathbf{L}$	Т	R	L	Т	R	
											_ I			
No. Lanes	1	0	1	0	0	0	1	0	1	1	1	1	0	I
LGConfig	L		R	1			1		т	R	L	т		
Volume	65		115	1			1		130	275	45	490		1
Lane Width	12.0		12.0	1			1		12.0	12.0	12.0	12.0		1
RTOR Vol	1		0	ł			l			0	ł			1

Duration 0.25 Area Type: All other areas Signal Operations

					1-						
Pha	se Combination	1	2	3	4			5	6	7	8
ΕB	Left	A				NB	Left				
	Thru				) 		Thru		A		
	Right	А					Right		A		
	Peds						Peds				
WB	Left				ļ	SB	Left	А			
	Thru				ŀ		Thru	A	A		
	Right				l		Right				
	Peds				ļ		Peds				
NB	Right	A				EΒ	Right				
SB	Right					WB	Right				
Gre	en	30.0						15.0	30.0		
Yel	low	4.0						4.0	4.0		
All	Red	1.0						1.0	1.0		

Cycle Length: 90.0 secs

		Intersec	tion Pe	erforman	ce Summa	ary				
Appr/	Lane Group	Adj Sat Flow Bate	Rat	ios	Lane G	Froup	Appro	bach		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	****	
Eastbou	nd		u	· · · · · · · · · · · · · · · · · · ·						
L	590	1770	0.12	0.33	20.9	C				
							21.5	С		
R	528	1583	0.23	0.33	21.9	С				
Westbou	nd									
Northbo	und									
T	621	1863	0.22	0.33	21.8	С	10.0-	A		
R	1143	1583	0.25	0.72	4.4	А				
Southbo	und									
L	295	1770	0.16	0.17	32.4	С				
Т	1035	1863	0.50	0.56	12.7	В	14.3	В		

Intersection Delay = 13.9 (sec/veh) Intersection LOS = B

\_....

Attachment J-3 2025 Bayfield Section, Alternative A, Intersection Analyses

Analyst: DEA Agency: URS Date: 3/15/2005 Period: AM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501 Area Type: All other areas Jurisd: Year : 2025 BAYFIELD A ALT.

## N/S St: CR 501

SIGNALIZED INTERSECTION SUMMARY

	Eas	stbou	nd	We	stbou	nd	Noi	rthbou	und	Soi	Jthbou	ınd	- }
	L	Т	R	L	Т	R	ΙL	Т	R	L	Т	R	
	l			I		<u></u>	_						_
No. Lanes	1	2	1	1	2	1	1	1	1	1	1	1	
LGConfig	L	т	R	L	Т	R	L	Т	R	L	Т	R	ļ
Volume	170	340	140	305	455	30	195	75	255	20	140	65	
Lane Width	112.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol	ļ		0	ł		0	1		0	1		0	

Dura	ation	0.25		Area	Type:	All	ot	her	areas		· · · · ·			
					Si	gnal	Op	erat	ions					
Phas	se Combin	nation	1	2	3		4			5	6	7	8	
EB	Left		А				1	NB	Left	А				
	Thru			A					Thru		A			
	Right			A			1		Right		A			
	Peds						1		Peds					
WB	Left		А				1	SB	Left	А				
	Thru			А			1		Thru		А			
	Right			А			1		Right		A			
	Peds						1		Peds					
NB	Right		А				.1	EΒ	Right	А				
SB	Right		A				1	WB	Right	A				
Gree	en -		20.0	24.0	)				-	15.0	11.0			
Yel	Low	4	4.0	4.0						4.0	4.0			
All	Red		1.0	1.0						1.0	1.0			

				-	2	Cycl	e Lengt	h: 90.0	secs
Appr/	Lane Group	Intersec Adj Sat Flow Rate	tion Pe Rat:	erforman ios	.ce Summa Lane G	ry roup	Appro	bach	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS	
Eastbo	und		······································		······				······
L	393	1770	0.19	0.22	28.6	С			
Т	917	3438	0.39	0.27	27.3	С	23.9	С	
R	774	1583	0.19	0.49	13.1	В			
Westbo	und								
L	393	1770	0.82	0.22	45.9	D			
Т	917	3438	0.52	0.27	28.7	С	34.7	C	
R	774	1583	0.04	0.49	12.0	В			
Northb	ound								
L	295	1770	0.34	0.17	33.8	С			
Т	228	1863	0.35	0.12	37.1	D	26.1	С	
R	633	1583	0.42	0.40	20.0-	В			
Southbo	ound								
L	295	1770	0.07	0.17	31.7	С			
т	228	1863	0.64	0.12	43.8	D	35.0-	С	
R	633	1583	0.11	0.40	17.0	В			
	Intersec	tion Delay	= 29.9	(sec/v	eh) In	terse	ction 1	LOS = C	

Analyst: DEA Agency: URS Date: 3/15/2005 Period: PM PEAK Project ID: US 160 E/W St: US 160 Inter.: US 160/CR 501 Area Type: All other areas Jurisd: Year : 2025 BAYFIELD A ALT.

### N/S St: CR 501

# \_SIGNALIZED INTERSECTION SUMMARY\_\_\_

T	R	L 	Т	R	L	Т	R	L	Т	R
- <u></u>					1					
1 2	-		the second second second second second second second second second second second second second second second se					_ I		
1 4	1	1	2	1	1	1	1	1	1	1
Г Т	R	L	Т	R	L	Т	R	L	Т	R
5 575	115	360	280	60	160	70	275	45	130	60
2.0 12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	0			0	1		0			0
5 2	т 575 .0 12.0	T R 575 115 .0 12.0 12.0 0	T R   L 575 115  360 .0 12.0 12.0  12.0 0	T R   L T 575 115  360 280 .0 12.0 12.0  12.0 12.0 0	T R   L T R 575 115  360 280 60 .0 12.0 12.0  12.0 12.0 12.0 0   0	T R   L T R   L 575 115  360 280 60  60 .0 12.0 12.0  12.0 12.0 12.0  12.0 0   0	T R   L T R   L T 575 115  360 280 60  60 70 .0 12.0 12.0  12.0 12.0 12.0  12.0 12.0 0   0	T       R       I       T       R       I       T       R         575       115       360       280       60       160       70       275         .0       12.0       12.0       12.0       12.0       12.0       12.0       12.0       12.0         0               0               0       0       0       0	T       R       I       T       R       I       T       R       I         575       115       360       280       60       60       70       275       145         .0       12.0       12.0       12.0       12.0       12.0       12.0       12.0       12.0         0               0               0               0	T       R       I       T       R       I       T       R       I       T         575       115       360       280       60       60       70       275       145       130         .0       12

Duration	0.25	Area	Type:	A11	other	areas	
			Si	gnal	Operat	cions	

Pha	se Combination	1	2	3	4				5	6	7	8	
ĒΒ	Left	A				1	NB	Left	A				
	Thru		A			1		Thru		А			
	Right		А			1		Right		А			
	Peds					I		Peds					
WB	Left	A					SB	Left	A				
	Thru		А			1		Thru		А			
	Right		А			1		Right		А			
	Peds					ł		Peds					
NB	Right	А				l	EB	Right	A				
SB	Right	A				1	WB	Right	A				
Gre	en	24.0	22.0						13.0	11.0			
Yel	low	4.0	4.0						4.0	4.0			
All	Red	1.0	1.0						1.0	1.0			

Cycle Length: 90.0 secs

		Intersec	ction Pe	erforman	ice Summa	ary					
Appr/	Lane	Adj Sat	Rati	ios	Lane (	Group	Appr	oach			
Lane	Group	Flow Rate							·		
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay	LOS			
Eastbo	und		., wm							<u> </u>	
L	472	1770	0.14	0.27	25.3	С					
Т	840	3438	0.72	0.24	34.2	С	30.5	С			
R	704	1583	0.17	0.44	15.2	В					
Westbo	und										
L	472	1770	0.80	0.27	40.5	D					
т	840	3438	0.35	0.24	28.4	С	33.4	C			
R	704	1583	0.09	0.44	14.5	В					
Northbo	ound										
L	256	1770	0.25	0.14	34.7	С					
Т	228	1863	0.32	0.12	36.9	D	23.3	С			
R	704	1583	0.41	0.44	17.4	В					
Southbo	ound										
L	256	1770	0.18	0.14	34.2	С					
Т	228	1863	0.60	0.12	41.8	D	33.4	С			
R	704	1583	0.09	0.44	14.5	В					
	Intersec	tion Delay	= 30.4	(sec/v	eh) Ir	nterse	ction	LOS =	С		