# **Appendix 4:**

# Existing and Projected Conditions Report



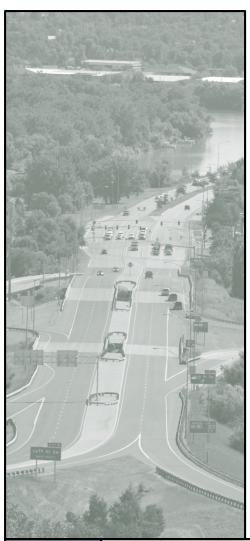






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# **EXISTING AND PROJECTED CONDITIONS**

December 31, 2014

prepared for:

**Montana Department of Transportation** 







prepared by:

Robert Peccia & Associates

Helena, Montana



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# **EXISTING AND PROJECTED CONDITIONS**

# 1.0 INTRODUCTION

This report identifies existing and projected roadway conditions and social, economic, and environmental factors that influence the Great Falls Interstate System. The analysis performed includes a planning level examination of the corridor by applying technical and environmental considerations to determine known issues, constraints, and/or areas of concern.

The analysis contained in this report is based on existing and historic traffic data, field measurements and observations, roadway as-built plans, aerial imagery, Geographical Information Systems (GIS), and publically available environmental information and demographics. The analysis was conducted for three main categories: demographics, transportation, and environment.

#### 1.1 STUDY AREA

The study area for the *I-15 Gore Hill to Emerson Junction Corridor Planning Study* includes Interstate 15 (I-15) through Great Falls, beginning southwest of the Gore Hill Interchange (I-15, Exit 277) near Reference Post (RP) 277 and ending northwest of Emerson Junction (Exit 282) near RP 284. Additionally, the study area includes Interstate 315 (I-315) and 10<sup>th</sup> Avenue South, west of the Missouri River (RP 95). **Figure 1.1** presents the study area boundary.

Within the study area, I-15 is classified as a principal arterial and is part of the National Highway System (NHS). The Interstate serves as the main north-south corridor through Montana from the Idaho state line at Monida to the Canada boundary at Sweet Grass. I-315 is an interstate spur from I-15 and is known as Business Loop I-15. I-315 transitions to 10<sup>th</sup> Avenue South, east of the intersection with Fox Farm Road.

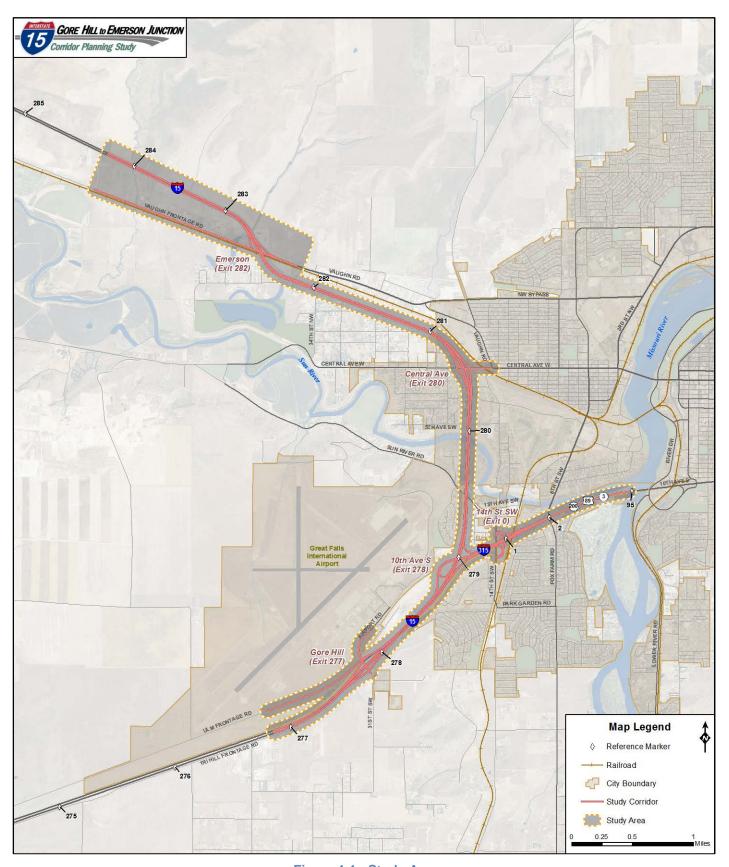


Figure 1.1: Study Area

# 1.2 PAST, CURRENT AND PLANNED PROJECTS

The Montana Department of Transportation's (MDT's) online summary of road and bridge construction projects awarded since July 23, 1987, was reviewed to identify projects previously implemented within the study area. Since 1987, MDT lists 14 completed projects along the corridor. Table 1.1 lists these projects, along with a brief description of the scope available in MDT's Program and Project Management System.

Table 1.1: MDT Projects within the Study Area Since 1987

Project Designation	Description
10 <sup>TH</sup> AVE SOUTH - WARDEN BR TO 6TH SOUTHWEST	Concrete repair, median adjustment, and diamond grinding from Warden Bridge to Fox Farm intersection
2002-10 <sup>TH</sup> AVE SOUTH/FOX FARM RD-GREAT FALLS	Roadway and Roadside Safety Improvements
BRIDGE DECKS-GREAT FALLS	Rehabilitation of I-15 bridges at Sun River and the overpass at 5 <sup>th</sup> Avenue Southwest
FOX FARM RD & 10 <sup>TH</sup> AVE SOUTH - GREAT FALLS - CASCADE COUNTY	Safety improvement project to address rear end crashes involving right turning vehicles
GREAT FALLS - CENTRAL AVE WEST BRIDGE APPROACHES - CASCADE COUNTY	Rehabilitation of the eastbound Warden Bridge
GREAT FALLS – FOX FARM RD./10 <sup>TH</sup> AVE. SO CASCADE COUNTY	Concrete resurfacing between 6 <sup>th</sup> Street Southwest / Fox Farm Road and Warden Bridge
GREAT FALLS-NORTH & SOUTH	Interstate rehabilitation
GREAT FALLS-NORTH & SOUTH CASCADE COUNTY	Interstate fence replacement and installation of cattle guards
GREAT FALLS URBAN (I-315)	Overlay of I-315 and ramps at 10 <sup>th</sup> Avenue South and exit 0
I15-BRIDGE REPAIR-GREAT FALLS	Emergency repair of beams damaged by trucks hauling high load
SF 129-GREAT FALLS WRONG WAY-PH 1	New signing to address wrong way traffic on off ramps on I-15
2002 INTERSECTION IMPVT-GF	Safety adjustments to northbound I-15 off ramp at Central Avenue West
D3 SIGNING (I-15)	Guide sign replacement
GREAT FALLS-VAUGHN	Seal and cover from Emerson Junction to the north

Source: MDT Project List accessible at http://www3.mdt.mt.gov:7782/mttplc/mttplc.tplk0007.project\_init

The Montana 2014-2018 Final Surface Transportation Improvement Program (STIP) is a federally required publication that shows funding obligations over the next five years. This program identifies improvement projects to preserve and improve Montana's transportation system. The Montana 2014-2018 Final STIP identifies the following future projects within the study area:

- Emerson Junction to Manchester: This project will be a major rehabilitation of I-15 beginning at RP 282.2 and ending at RP 285.9. It is estimated that the letting date for this project will be in 2017.
- Bridge Preservation, Great Falls IM: This project is bridge deck preservation on I-15 between RP 209.1 and 247.2 (outside of the study limits) and I-315 at RP 1.06. It is estimated that the letting date for this project will be in 2016.

# 1.3 Existing Plans and Regulations

The following provides a summary of existing planning documents and regulations associated with transportation in the area. A number of local plans exist with goals and objectives related to the transportation system. Additionally, Federal regulations would have to be adhered to should changes occur to the Interstate System.

#### **Great Falls Area Long Range Transportation Plan - 2014**

The *Great Falls Area Long Range Transportation Plan (LRTP) – 2014* is intended to offer guidance for the decision-makers in the Great Falls Area by responding to existing transportation system concerns through a menu of large and small improvements to the transportation network. The LRTP provides a blueprint for guiding transportation infrastructure investments based on system needs and associated decision-making principles.

The LRTP identified the need for an Interstate Corridor Study through the Great Falls area. The LRTP states the following:

Due to preliminary recommendations to make improvements to both the Emerson Junction and Gore Hill interchanges and other identified needs for added lanes and operational improvements on I-15 and I-315, an Interstate Corridor Study for the Great Falls area is recommended. The need for new interchanges, feasibility, and analysis of capacity and operational concerns, will assist in identifying potential locations, priorities, costs and scope for improvements. The study should include westbound movements on 10th Avenue South, east of the intersection of Fox Farm Road and 6th Street SW, for traffic that exits at "Exit 0", as well as connections with I-315 to I-15.

#### Cascade County Growth Policy Update (2014)

The Cascade County Growth Policy Update (2014) was drafted as a comprehensive plan to provide guidance on decisions regarding land development and public investments within Cascade County. The document outlines 13 goals, of which the transportation goal is most relevant:

#### Goal 6:

Promote and maintain a transportation system that provides safety, efficiency, and is cost effective.

#### Objectives:

- A. New additions to the transportation system should be compatible with the existing road system and coordinated with roads from other jurisdictions.
- B. Transportation planning for new developments should support the Cascade County Growth Policy.
- C. Ensure that all new roads, both public and private, are built to county design standards for new construction. These standards can be found within the Cascade County Subdivision Regulations.
- D. Encourage provisions for multi-modal types of transportation including: bike lanes, trails, pedestrian facilities, etc.
- E. Develop and implement road and bridge improvement standards and maintenance schedules.
- F. Develop a policy and implementation program in cooperation with developers and school districts to provide walks, bridges and pathways for children to improve safety and reduces transportation costs between residential neighborhoods, schools and stores.

- G. Develop secondary means of access, where practical, to settlements and subdivisions in order to improve safety and overall traffic circulation.
- H. Continue using Road Improvement Districts and Rural Maintenance Districts to maximize funding strategies.
- I. Coordinate transportation issues with wildfire and fire protection issues, policies and goals.

#### City of Great Falls Growth Policy Update (2013)

The *City of Great Falls Growth Policy Update (2013)* is intended to provide guidance to the local government with regard to establishing policy and a framework to guide the social, environmental, economic, and physical makeup of the city of Great Falls. The *Growth Policy* recognizes that transportation and growth go hand in hand. Furthermore, the *Growth Policy* identifies I-15 as the main regional route. Tenth Avenue South is also identified within the *Growth Policy* as being the largest road facility in the city.

#### **Great Falls International Airport Master Plan (Ongoing)**

Great Falls International Airport is currently developing a master plan to evaluate the long-term vision for its properties and adjacent areas. The Airport is primarily served by the Gore Hill Interchange. Changes to the transportation system and land use near the airport could impact the function of the Interstate System.

#### **Great Falls Transit Development Plan (2010)**

The *Great Falls Transit Development Plan (TDP)* was developed to analyze and recommend strategies that will affect the delivery of public transportation services for the Great Falls Transit District. The TDP states the following: "The mission of the Great Falls Transit District is to provide a safe, reliable, affordable and fiscally sound transportation system for the people of Great Falls and Black Eagle, Montana." Currently no fixed routes use roads within the I-15 corridor study area, with the exception of one line using the intersection of Fox Farm Road and 10<sup>th</sup> Avenue South. Furthermore, no new alternative routes were recommended within the study area.

#### **Interstate System Access Informational Guide (2010)**

The intent of the Interstate system is to provide for movement of military and civilian equipment, freight, and personnel over long distances and between and within states. The Federal Highway Administration (FHWA) is charged with administrating the Interstate System to ensure its structural and operational integrity. In 2010, FHWA published the *Interstate System Access Informational Guide* to provide guidance for both FHWA field staff and state departments of transportation (DOTs) on how and what should be addressed in requests for new or modified access to the Interstate System. The *Guide* provides information and methods for evaluating requests for new access to the Interstate System. Specifically, the *Guide* references eight policy requirements that must be met for new or modified interchanges.<sup>1</sup> The goal of the *Guide* is to provide technical and policy support for access to the Interstate System.

<sup>&</sup>lt;sup>1</sup>U.S. Department of Transportation, Federal Highway Administration, *Access to the Interstate System*, Notice of revised policy statement, <a href="http://www.gpo.gov/fdsys/pkg/FR-2009-08-27/html/E9-20679.htm">http://www.gpo.gov/fdsys/pkg/FR-2009-08-27/html/E9-20679.htm</a>

# 2.0 DEMOGRAPHICS

This section provides an overview of the socioeconomic characteristics of the study area. Historic and recent trends in area demographics help define existing conditions and aid in forecasting techniques as there is a direct correlation between motor vehicle travel and socioeconomic indicators.

Demographic and socioeconomic information was reviewed to help determine recent trends in population, age distribution, employment, economic status, and commuting for area residents. Socioeconomic data sources do, however, often lag considerably behind the actual years of interest. This analysis presents the most current data and statistics available and indicates recent and potential changes in the area.

# 2.1 Population Characteristics

A review of demographics within the study area is appropriate to gain an understanding of historical trends in population, age, race, and ethnicity. Understanding population composition is necessary, as the data may influence the types of improvements identified. For example, an aging population may indicate a need for specific types of transportation improvements such as transit services and/or non-motorized infrastructure improvements. The presence of a disadvantaged population may warrant other considerations, especially during project development activities.

**Table 2.1** shows total population and growth statistics for the city of Great Falls and Cascade County. A comparison of similar statistics for the state of Montana and the United States is also provided. Between 1990 and 2010, the population of the city of Great Falls increased at a higher rate than Cascade County during the same time. Both the city and the county experienced lower growth than the state of Montana and the United States over the same period.

**Population Population** Population **Percent Growth Current Population** Area (1990)(2000)(2010)(1990-2010) (2013 Estimate) City of Great Falls 55,097 56,690 58,505 6.2% 59,351 **Cascade County** 77,691 80,357 81,327 4.7% 82,384 State of Montana 799,065 902,195 989,415 23.8% 1,015,165 **United States** 248,709,873 281,421,906 308,745,538 24.1% 316,128,839

**Table 2.1: Current Population and Past Growth** 

Source: U.S. Bureau of the Census, Census of the Population

**Table 2.2** depicts race and ethnicity characteristics in the city of Great Falls, Cascade County, and the state of Montana at the time of the 2010 Census. The population of Great Falls is predominately white with percentages of minority populations slightly higher than for the state of Montana. The Census data show that Great Falls and Cascade County have roughly the same ethnic composition.

Race / Ethnicity City of Great Falls **Cascade County State of Montana** White 50,723 86.7% 71,100 87.4% 868,628 87.8% **Hispanic or Latino** 2,711 2.9% 1,978 3.4% 3.3% 28,565 **Black or African American** 583 1.0% 958 1.2% 3.743 0.4% **American Indian and Alaska Native** 4.0% 2,753 4.7% 3,274 59,902 6.1% Asian 505 0.9% 665 0.8% 6,138 0.6% Native Hawaiian and Other Pacific Islander 66 0.1% 78 0.1% 609 0.1% Some Other Race 45 29 0.0% 0.1% 540 0.1% Two or More Races 1,868 3.2% 2,496 3.1% 21,290 2.2% Total 58,505 81,327 989,415

**Table 2.2: Population Race and Ethnicity Data (2010)** 

Source: U.S. Bureau of the Census, Census of the Population

**Table 2.3** presents the change in total population and age for the city of Great Falls and Cascade County since 1980. Between 1980 and 2010, the percentage of county and city residents age 65 or older showed a notable increase, while the percentage of those younger than 18 decreased over the same period. The median age in the city increased from 30.6 years in 1980 to 39.0 years in 2010. The county experienced a similar increase in median age, rising from 28.6 years in 1980 to 38.9 years in 2010. These statistics point to the aging of the population and follow similar trends within Montana and across the United States.

Total Median Year < 18 Years 18-64 Years **Population** 65+ Years Age City of Great Falls 1980 15,713 27.7% 34,489 60.8% 6,523 11.5% 56,725 30.6 1990 14,325 26.0% 32,507 15.0% 59.0% 8,265 55,097 34.4 2000 14.138 24.9% 33.654 59.4% 8.898 15.7% 37.8 56.690 2010 13,161 22.5% 35,648 60.9% 9,696 16.6% 58,505 39 Change (1980 to 2010) -2,552 -16.2% 1,159 3.4% 3,173 48.6% 1,780 8.4 **Cascade County** 1980 23,544 29.2% 49,164 7,988 80,696 28.6 60.9% 9.9% 1990 21,520 27.7% 46,304 59.6% 9,867 12.7% 77,691 32.7 2000 20,912 26.0% 48,197 60.0% 11,248 14.0% 80,357 36.7 2010 18,630 22.9% 50,007 61.5% 12,690 15.6% 81,327 38.9 Change (1980 to 2010) -4,914 -20.9% 843 1.7% 4,702 58.9% 631 10.3

Table 2.3: Age Distribution (1980 to 2010)

Source: U.S. Bureau of the Census, Census of the Population

**Table 2.4** presents housing occupancy data for the city of Great Falls, Cascade County, and the state of Montana. The city of Great Falls has 26,602 housing units. Of those units, 24,660 are occupied. Cascade County has 37,260 housing units, of which 33,352 are occupied. The average household size for owner-occupied houses in the city of Great Falls, Cascade County, and the state of Montana is roughly the same at 2.45 individuals per household. For renter-occupied households, the city of Great Falls has a lower occupancy at 2.06 persons per household compared to Cascade County and the state of Montana, which both have approximately 2.20 persons per household.

2.45

2.20

127,692

2.45

2.21

11,295

Housing City of Great Falls **Cascade County State of Montana Total Housing Units** 26,602 37,260 481,401 **Occupied Housing Units** 24,660 33,352 405,508 **Owner-occupied** 277,816 15,659 22,057

2.46

2.06

9,001

**Table 2.4: Housing Occupancy and Tenure** 

Source: 2008-2012 American Community Survey 5-Year Estimates

Average Household Size

Average Household Size

Renter-occupied

**Table 2.5** portrays data for the availability of vehicles per household. This information can be used to identify alternative transportation-dependent populations. The city of Great Falls has a higher percentage of households with no vehicles available compared to Cascade County and the state of Montana with 9.3, 7.6, and 5.3 percent, respectively. Data indicate that 2,287 of the 2,536 households (90 percent) in Cascade County with no vehicle available are within the city of Great Falls.

Table 2.5: Vehicles Available

Vehicles	City of Great Falls		Cascade County		State of Montana	
Occupied Housing Units	24,660		33,352		405,508	
No Vehicles Available	2,287	9.3%	2,536	7.6%	21,329	5.3%
1 Vehicle Available	7,954	32.3%	9,856	29.6%	114,421	28.2%
2 Vehicles Available	8,904	36.1%	12,230	36.7%	153,045	37.7%
3 or More Vehicles Available	5,515	22.4%	8,730	26.2%	116,713	28.8%

Source: 2008-2012 American Community Survey 5-Year Estimates

#### 2.2 Population Projections

The Montana Department of Commerce Census and Economic Information Center provides county-level population projections. The projections were developed by Regional Economic Models, Inc. (REMI) for the state of Montana using the firm's *eREMI* model. Projections of Cascade County based on the *eREMI* model show a population increase of approximately 19 percent by 2035. In comparison, the model projects that the state of Montana's population will grow by approximately 17 percent by 2035.

**Table 2.6** shows the populations for Cascade County and the state of Montana in the 2010 Census, and it provides population estimates for key years from 2015 through 2035 based on the *eREMI* model. The projections suggest that Cascade County's population will have an average annual growth rate of approximately 0.7 percent per year.

Table 2.6: Population Projections through 2035

Area	2010	2015	2020	2025	2030	2035	Average Annual Growth Rate (2010-2035)
Cascade County	81,327	85,673	90,176	94,147	96,502	96,676	0.69%
State of Montana	989,415	1,043,653	1,094,712	1,134,324	1,156,494	1,162,253	0.65%

Source: U.S. Bureau of the Census, Census of the Population and eREMI for Montana and Counties by REMI.

# 2.3 EMPLOYMENT AND INCOME CHARACTERISTICS

**Table 2.7** presents data on the estimated number of employees (age 16 years and older) and the industries in which they are employed within the city of Great Falls, Cascade County, and the state of Montana. The data in Table 2.7, taken from the 2008-2012 American Community Survey (ACS) profile for these geographies, also include employment estimates by industry. The data show that most employment in the county and in the city of Great Falls is associated with service industries, followed by the retail trade and construction industries.

**Table 2.7: Employment by Industry** 

City of Great Cascade Industry Falls 472 1.7% 1,133 2,326 8.2% 3,156

State of Montana County Agriculture, Forestry, Fishing and Hunting, and Mining 2.9% 34,024 7.1% Construction 8.0% 39,115 8.1% Manufacturing 846 3.0% 1,282 3.2% 22,791 4.7% Wholesale Trade 814 2.9% 1,143 2.9% 12,009 2.5% **Retail Trade** 3.867 13.6% 5.171 13.0% 56.945 11.8% Transportation, Warehousing, and Utilities 1,281 4.5% 1,939 4.9% 23,871 5.0% Information 541 1.9% 609 1.5% 8.913 1.8% Finance, Insurance, Real Estate, and Rental and Leasing 8.1% 2,305 2,770 7.0% 26,526 5.5% Professional, Scientific, Management, Administrative, 2,213 7.8% 2,709 6.8% 39,353 8.2% and Waste Management Services **Educational Services, Health Care, and Social Assistance** 6.075 21.4% 8.343 21.0% 108,970 22.6% Arts, Entertainment, Recreation, Accommodation, and 3,345 11.8% 4,209 10.6% 53,023 11.0% **Food Services** Other Services, Except Public Administration 1,266 4.5% 4.3% 1,724 22,361 4.6% **Public Administration** 1,770 6.2% 2,586 6.5% 30,353 6.3% **Armed Forces** 1,228 4.3% 2,865 7.2% 3,553 0.7% **Total Employed Population 16 Years and Over** 28,349 39,639 481,807

Source: 2008-2012 American Community Survey 5-Year Estimates

Unemployment rates are represented in **Table 2.8** and are current as of July 2014. The data show an unemployment rate for Cascade County that is lower than the rate for the state of Montana (4.0 percent versus 4.4 percent) and the United States (6.5 percent). Conversely, the unemployment rate for the city of Great Falls is higher than the rate for the state of Montana (6.1 percent versus 4.4 percent).

**Labor Force** Cascade County State of Montana **United States Labor Force** 40,826 531,972 157,573,000 **Employed** 39,195 508,741 147,265,000 Unemployed 1,631 23,231 10,307,000 4.0% 4.4% **Unemployment Rate** 6.5%

**Table 2.8: Employment Status** 

Source: Montana Department of Labor and Industry, Research and Analysis Bureau - Labor Force Statistics, July 2014 (data are not seasonally adjusted).

Information about the number of workers (16 years and older) and their commuting characteristics is available from the ACS. The ACS information provided estimates of the transportation modes used by commuters. **Table 2.9** presents mode choice characteristics for workers in the city of Great Falls, Cascade County, and the state of Montana. According to the ACS, more than 90 percent of the commuting workers in Cascade County and the city of Great Falls rely on personal vehicles or carpools for transportation to work destinations. The share of workers that drove alone from both the county and the city is greater than that seen statewide.

Table 2.9: Commuting to Work Statistics

City of Great Casc

Mode Choice	City of Fa		Caso Cou		State Mont	
Workers 16 Years and Over	27,	980	39,075		470,	377
Car, Truck, or Van — Drove Alone	22,855	81.7%	31,142	79.7%	352,644	75.0%
Car, Truck, or Van — Carpooled	2,847	10.2%	4,273	10.9%	48,324	10.3%
Public Transportation (excluding taxicab)	316	1.1%	369	0.9%	4,369	0.9%
Walked	708	2.5%	1,211	3.1%	22,790	4.8%
Other means	561	2.0%	764	2.0%	11,779	2.5%
Worked at home	693	2.5%	1,316	3.4%	30,471	6.5%
Mean Travel Time to Work	14	.5	16.1		18.0	

Source: 2008-2012 American Community Survey 5-Year Estimates

**Table 2.10** presents income statistics for the city of Great Falls, Cascade County, and the state of Montana. The ACS shows estimated household incomes for the city of Great Falls and Cascade County to be \$42,085 and \$43,817, respectively. These values are below the median household income for the state of Montana, which is \$45,456. The per capita income for both the city of Great Falls (\$23,238) and Cascade County (\$23,976) is lower than that of the state of Montana (\$25,002).

**Table 2.10** also contains poverty statistics for the city of Great Falls, Cascade County, and the state of Montana. According to the 2008-2012 ACS profile, the number of residents living below the poverty line was higher for the city of Great Falls than for Cascade County and the state. About 14.8 percent of all individuals living in Montana were estimated to be below the poverty line. The ACS estimates show that 16.9 percent of individuals living in the city of Great Falls and 14.9 percent in Cascade County are living in poverty.

The ACS data also show that the county and city likely had a greater percentage of persons under the age of 18 living in poverty than the percentage for same age group in the state. The share of persons over the age of 65 living in poverty is, however, similar among the city, the county, and the state.

**Table 2.10: Income Statistics** 

Income	City of Great Falls	Cascade County	State of Montana
Median Household Income	\$42,085	\$43,817	\$45,456
Median Family Income	\$56,368	\$56,958	\$58,951
Per Capita Income	\$23,238	\$23,976	\$25,002
Persons Living in Poverty (%)	16.9%	14.9%	14.8%
Persons Under 18 Living in Poverty (%)	27.8%	24.2%	19.9%
Persons over 65 Living in Poverty (%)	8.6%	8.5%	8.4%
Families Living in Poverty (%)	13.2%	11.4%	9.8%
Families with Children under 18 Living in Poverty (%)	24.1%	20.9%	17.0%

Source: 2008-2012 American Community Survey 5-Year Estimates

# 3.0 EXISTING TRANSPORTATION SYSTEM

I-15 is functionally classified as a principal arterial on the NHS Interstate System. The Interstate serves as the main north-south corridor through Montana and connects Canada to the southern border of California. The roadway was constructed or improved at various times, beginning in 1939 and extending to 2009. I-15 is part of the Canamex Trade Corridor, which Congress designated as a "High Priority Corridor" in the 1995 *National Highway Systems Designation Act.* The corridor's main objective is to facilitate trade and strengthen the corridor's position in the global economy.

I-315 begins at the 10<sup>th</sup> Avenue South junction with I-15 (RP 279). It was opened to traffic in late 1967. The corridor is currently signed as Business Loop 15, US 89, and MT 200. I-315 is one of the shortest Interstate highways in the country at 0.828 miles, and it terminates at the intersection of Fox Farm Road and 6<sup>th</sup> Street Southwest.

Primary users of the corridors consist of all types of individuals including locals, commuters, travelers, and freight operators. Interstate highways are considered part of the principal arterial freeway system. Freeways are characterized by having fully controlled access, high design speeds, and a high level of driver comfort and safety. For these reasons, freeways have separate geometric design criteria than those of a standard principal arterial highway.

#### 3.1 Physical Features and Characteristics

This section discusses the physical features and characteristics of the study corridor. Information was gathered using publically available sources, field observations, GIS data, and MDT as-built drawings.

# 3.1.1 Hydraulics

I-15 crosses the Sun River at RP 279.35, between the 10<sup>th</sup> Avenue South Interchange and the Central Avenue West Interchange. The crossing consists of a concrete bridge structure. Additionally, a steel culvert is located along I-15 at RP 283.4 for drainage conveyance.

# 3.1.2 Bridges

MDT's Highway Bridge Program (HBP) emphasizes asset management and preservation. This emphasis promotes a "right treatment at the right time" philosophy in prioritizing and selecting projects on MDTs bridge system. MDT has defined the bridge program objectives and performance measures. The objectives and measures are intended to identify the right treatments for Montana's bridge assets, as well as promoting cost-effective bridge preservation, appropriate safety-related work, and economic growth.

MDT uses a Structure Condition Performance Measure and a Deck Performance Condition Measure. These measures categorize bridge conditions as good, fair, or poor, based on the condition rating given to the bridge deck (riding surface), superstructure (generally beams underneath the riding surface), and substructure (support structure extending into the ground). Additionally, the Structure Condition Performance Measure assigns a poor rating to a bridge that is structurally deficient.

A bridge is considered structurally deficient if load-carrying elements have deteriorated enough to be considered in "poor condition" or the adequacy of the waterway opening provided by the bridge is insufficient, causing intolerable traffic interruptions. When a bridge is classified as structurally deficient, it does not mean that it is unsafe. A structurally deficient bridge typically requires increased maintenance and repair to remain in service and eventual rehabilitation or replacement to address overall deficiencies.

The deck condition performance measure uses the National Bridge Inventory (NBI) deck rating to give an indication of the deck condition and a planning level indication of needed preservation treatment. The deck condition ranking is a general indicator of the condition of any individual deck. The rankings are useful for planning purposes on a system wide basis.

There are 17 bridges within the study area. **Table 3.1** shows the bridge locations and condition ratings. All 17 bridges have a structure condition of "good," which indicates that they are candidates for continued preservation. The bridge deck ratings include "good" (possible candidate for sealing), "fair-1" (candidate for healer/sealer), and "fair-2" (candidate for resurfacing). Detailed bridge inspection reports are available in **Appendix A**.

Table 3.1 also lists the width of each bridge within the study area. According to the MDT Bridge Design Standards, a bridge on the Interstate System is recommended to consist of 12-foot travel lanes, 4-foot inside shoulder, and 10-foot outside shoulder. This recommendation results in a total bridge width of 50 feet for three travel lanes, 38 feet for two travel lanes, and 26 feet for one travel lane. A number of bridges on the Interstate System within the study area have widths narrower than the recommended standards, as noted in the table below. However, the recommended standards are for new bridges on the Interstate System. Bridges to remain in place that do not meet the recommended width may be considered for additional signing or widening depending on further engineering analysis<sup>2</sup>.

Width Deck Year Length Structure Location Condition Condition **Feature Crossed** Built (feet) (feet) RP 279.98 (NB) Sun River 1966 28<sup>(a)</sup> 485 Good Good RP 279.98 (SB) Sun River 1966 28<sup>(a)</sup> 485 Good Good RP 280.09 (NB) 5th Ave SW 1967 37<sup>(a)</sup> Good Good 125 I-15 5th Ave SW 37<sup>(a)</sup> RP 280.09 (SB) 1967 125 Good Good RP 282.55 (NB) Vaughn Rd / BNSF RR 1967 28<sup>(a)</sup> 354 Good Fair-1 RP 282.55 (SB) Vaughn Rd / BNSF RR 1967 28<sup>(a)</sup> 359 Good Fair-1 RP 0.01 I-15 1967 45<sup>(a)</sup> 294 Good Fair-1 14th St SW 36<sup>(a)</sup> Fair-2 RP 0.34 (EB) 1967 150 Good RP 0.34 (WB) 14th St SW 1967 45<sup>(a)</sup> 145 Good Fair-1 I-315 14th St SW RP 0.34 (EB Off) 1997 23<sup>(a)</sup> 136 Good Good 45<sup>(a)</sup> RP 1.06 (EB) **BNSF RR** 1946 178 Good Fair-2 37<sup>(a)</sup> RP 1.06 (WB) **BNSF RR** 1967 208 Good Fair-2 23<sup>(a)</sup> RP 1.06 (WB Off) **BNSF RR** 1996 186 Good Good RP 0.16 (EB) **BNSF RR** 1967 27 551 Good Fair-1 **Central Ave** RP 0.16 (WB) 1967 **BNSF RR** 27 551 Good Fair-1 RP 94.61 (EB) Missouri River 1983 40 2122 Good Fair-1 10th Ave S RP 94.61 (WB) Missouri River 1951 28 2093 Good Good

**Table 3.1: Bridge Locations and Condition** 

Source: MDT Bridge Management System, 2014.

<sup>(</sup>a) Interstate bridge width does not meet existing standards.

<sup>&</sup>lt;sup>2</sup> MDT Bridge Design Standards, National Highway System (NHS) Interstate

# 3.1.3 Operations

The Interstate System within the study area is considered a Level I winter maintenance level according to the MDT *Maintenance Operations and Procedures Manual.*<sup>3</sup> A Level I roadway receives the highest level of maintenance and attention during inclement weather events. Level I routes are eligible to receive up to 24-hour-per-day coverage during storms. The primary objective is to keep at least one travel lane in each direction open to traffic and to provide intermittently bare pavement as soon as possible. Within the study area, there are additional operation controls aimed at improving the function of the transportation system.

- **Snow Fence:** There are multiple locations with snow fences at and near the 10th Avenue South Interchange. The snow fence is intended to trap and prevent snow from blowing across the roadway.
- Variable Message Sign (VMS): To address vehicle operations related to adverse weather
  conditions, portable VMSs are used to alert motorists of changes in weather conditions. The
  VMSs are commonly deployed near the Gore Hill Interchange during high wind events.
- <u>Bridges:</u> Bridges typically freeze quicker than the normal roadway surface, causing operational issues for motorists. Signing alerting motorists to watch for ice on the bridges are used during the winter months.
- <u>Detours:</u> Concerns have been noted about not having a viable detour route for the Gore Hill area. Incidents occurring near Gore Hill have resulted in closed lanes on the Interstate, as well as increases in vehicle delay and queuing.

#### 3.1.4 Pavement Condition

MDT annually tracks and measures pavement condition indices in the corridor. MDTs Pavement Management System (PvMS) is used to analyze the collected data to determine the relative performance of the pavement. Items of primary interest include the presence and degree of cracking and rutting, as well as overall ride quality. By understanding the condition of the pavement, MDT can identify the most appropriate treatments and resources needed to extend pavement life. Several pavement condition indices are monitored through MDT's PvMS. The performance measures and corresponding indices are such that the numerical value of 100 is assigned to a new pavement with no flaws, and zero is assigned to a highly degraded pavement. The following performance measures are routinely used to track pavement conditions:

- Ride Index: This is determined by using an internationally applied roughness index (IRI) in inches per mile and converting the number to a 0 to 100 scale.
- Rut Index (RI): This is calculated by converting rut depth to a 0 to 100 scale. Rut
  measurements are taken approximately every foot and averaged into one-tenth-mile reported
  depths.
- Alligator Crack Index (ACI): This is measured by combining all load-associated cracking and converting the index to a 0 to 100 scale.
- <u>Miscellaneous Cracking Index (MCI):</u> This is calculated by combining all non-load-associated cracking and converting the index into a 0 to 100 scale.
- Overall Performance Index (OPI): This is determined by combining and placing various weighting factors on the IRI, RI, ACI, and MCI figures and converting the index to a 0 to 100

**Existing and Projected Conditions** *December 31. 2014* 

<sup>&</sup>lt;sup>3</sup> MDT *Maintenance Operations and Procedures Manual*, Chapter 9, Winter Maintenance Program, December 2009, <a href="http://www.mdt.mt.gov/publications/docs/manuals/mmanual/chapt9c.pdf">http://www.mdt.mt.gov/publications/docs/manuals/mmanual/chapt9c.pdf</a>

scale. The OPI is calculated to provide a single index describing the current general health of a particular route or system.

The most important performance measure is the OPI, as this index includes all the aforementioned indices. An OPI of 80 to 100 is considered "good," 60 to 79.9 is "fair," and 0 to 59.9 is "poor." As shown in **Table 3.2**, the various pavement condition performance measures generally indicate good performance for I-15. Between RP 282.2 and RP 286.6 on I-15, however, the OPI indicates poor overall performance. A resurfacing project is planned for I-15 between RP 282.2 and RP 285.9. It is anticipated that this project would be let in 2017. Information for OPI on I-315 indicates a poor to fair pavement condition.

Flexible **Surface Thickness Begin** End Last Last Width Route RP RP Surface **Treatment** ACI MCI OPI (feet) IRI RI I-15 NB 270.5 282.2 2007 2007 0.33 99.8 100.0 38 86.2 76.5 79.7 I-15 SB 270.5 282.2 38 2007 2007 0.33 88.88 78.7 99.2 100.0 82.6 I-15 NB 282.2 286.6 38 1999 2006 0.75 49.0 64.0 69.3 95.1 43.1 I-15 SB 282.2 286.6 38 1999 2006 0.75 44.0 72.0 0.88 96.2 51.0 I-315 EB 0.0 1.4 38 1996 1996 0.34 59.3 67.0 91.3 98.3 60.5 I-315 WB 0.0 1.4 38 1996 1996 0.34 83.0 73.0 80.1 99.8 57.6

**Table 3.2: Pavement Condition** 

Source: MDT Pavement Management System, 2014

# 3.1.5 Alternative Transportation Modes

There are currently no dedicated bicycle or pedestrian facilities along the study corridor. The *Great Falls Area LRTP* identifies a recommendation for a multi-use path adjacent to the study area near the junction of 6th Street SW and I-315. Spot improvements to the Central Avenue crossing of I-15 and the railroad are also recommended in the *LRTP* to accommodate bike lanes.<sup>4</sup>

#### 3.1.6 Railroad

A service line for BNSF Railway runs within the study area. The Interstate crosses over the railroad at two locations within the study area: along I-15 Emerson Junction and along I-315 just east of 14th Street Southwest. Additionally, Central Avenue crosses over the railroad just west of Vaughn Road within the study area. More information about the bridge structures is provided in **Section 3.1.2**.

#### 3.1.7 Air Service

The Great Falls International Airport is adjacent to the study area. Access to the airport is provided by Airport Drive, which connects to the Gore Hill Interchange. While it has been categorized as a "primary commercial service" airport by the National Plan of Integrated Airport Systems, it also has a military component. The airport is home to Great Falls Air National Guard Base and the Montana Air National Guard's 120<sup>th</sup> Air Lift Wing, an Air National Guard unit employed in air defense. The airport also offers substantial infrastructure for the air cargo industry. FedEx operates a warehouse as a sorting and distribution hub for Montana. The U.S. Customs Border Patrol operates an office at the airport, which facilitates international travel.

<sup>&</sup>lt;sup>4</sup> Great Falls Area Long Range Transportation Plan – 2014, page 219.

#### 3.1.8 Utilities

I-15 in the study area includes overhead power and telephone crossings. Longitudinal occupancy of Interstate right-of-way is not permitted, and, as such, utility involvement is limited. Electric power and natural gas utilities are provided by Northwestern Energy. CenturyLink provides telecommunication services to the study area.

#### 3.2 GEOMETRIC CONDITIONS

Existing roadway geometrics were evaluated and compared to current MDT standards. Available as-built drawings were reviewed for the freeway system within the study area. Field reviews of the study corridor took place in July 2014 to confirm and supplement information contained in the as-built drawings, as well as to identify additional areas of concern within the study area.

The MDT *Road Design Manual* and *Traffic Engineering Manual* specifies general design principles and controls that determine the overall operational characteristics of the roadway. Of critical importance to determining design standards is the design speed. MDT's manuals provide guidance for design speed based on facility and operating characteristics; however, some judgment is necessary. A facility's design speed and its operating speed may differ. The design speed is a selected speed used to determine the various geometric design features of the roadway. The operating speed is the highest overall speed at which a driver may travel on a given section of roadway under favorable weather conditions and prevailing traffic conditions without at any time exceeding the safe speed as determined by the design speed. The design criteria for the study corridor are based on current MDT standards as described in the following sections.

#### 3.2.1 Mainline Interstate

The mainline Interstate is characterized as a controlled access, four-lane, divided highway with high travel speeds. The key purpose of the mainline Interstate is to carry traffic over large distances quickly. The following subsections provide the analysis of the current geometric conditions along the Interstate within the study area. The evaluation compares the existing geometrics to current design standards. Note that design standards change over time. Locations that do not meet current design standards may have met standards in place during the time of construction. Additionally, it is possible that design exceptions may have been used during the initial design process.

#### **Design Criteria**

**Table 3.3** lists current design standards for freeway (NHS-Interstate) routes according to MDT design criteria. The freeway design criteria depend on terrain and area context (i.e., urban or rural). Based on the definitions provided in MDT's *Road Design Manual*, most of I-15 within the study area appears to be of rural context with level terrain (70-miles-per-hour [mph] design speed) with some areas of rolling terrain (60-mph design speed). I-315 appears to be of urban context (50-mph design speed). For the purposes of this report, areas along I-15 that do not meet 70-mph design standards and areas along I-315 that do not meet 50-mph design standards were noted as being substandard. A final determination of design speed will ultimately be made during project development.

**Table 3.3: Geometric Design Criteria (Freeway)** 

	Design Elen	nent		Rural		Urban	
<u>s</u>	Design Forecast Yea			20 Years		20 Years	
ntro		Level		70 mph			
Design Controls	Design Speed <sup>(a)</sup>	Rolling		60 mph		50 mph	
sign		Mountainous		50 mph		·	
Des	Level of Service			В		В	
	Travel Lane Width(a)			4@12'		4@12'	
ţ	Chauldan Midth (3)	Outside Shoulder		10'		10'	
Roadway Elements	Shoulder Width <sup>(a)</sup>	Inside Shoulder		4'		4'	
Eler	Cross Clans	Travel Lane <sup>(a)</sup>		2%		2%	
vay	Cross Slope	Shoulder		2%		2%	
adv		Level		Minimum: 3	6'		
8	Median Width	Rolling		Minimum: 3	6'	Desirable: 36' Minimum: 16'	
		Mountainous		Minimum: 1	6'		
		Inslope		6:1 (Width: 6	6')	6:1 (Width: 6')	
ions	Ditch	Width	10' Min.			10'	
Earth Cut Sections		Slope	20:1	towards back	20:1 towards back slope		
S H		0' - 5'	5:1			5:1	
S	Back Slope; Cut Depth at Slope	5' - 10'	Level/Rolling: 4:1; Mountainous: 3:1			3:1	
Earl	Stake	10' - 15'	Level/Rolling: 3:1; Mountainous: 2:1			2:1	
		> 15'	Level/Rolling: 2:1; Mountainous: 1.5:1			1.5:1	
=		0' - 10'		6:1		6:1	
Earth Fill Slopes	Fill Height at Slope	10' - 20'		4:1		4:1	
Eart Slo	Stake	20' - 30'		3:1		3:1	
-		> 30'		2:1		2:1	
	DESIGN	SPEED	50 mph	60 mph	70 mph	50 mph	
	Stopping Sight Distar	nce <sup>(a)</sup>	425'	570'	730'	425'	
ıts	Minimum Radius (e=	8.0%) <sup>(a) (b)</sup>	760'	1,200'	1,820'	760'	
mer	Superelevation Rate(	a)		e <sub>max</sub> =8.0%		e <sub>max</sub> =8.0%	
E	Vertical Curvature	Crest	85	151	247	84	
Alignment Elemen	(K-Value) (a)	Sag	96	136	181	96	
ignr		Level		3%			
Ā	Maximum Grade <sup>(a)</sup>	Rolling		4%		5%	
		Mountainous		5%			
	Minimum Vertical Cle	arance <sup>(a)</sup>		17.0'		17.0'	

Source: MDT Road Design Manual, Chapter 12, Figure 12-3, "Geometric Design Criteria for Rural Principal Arterials" (National Highway System-Non-Interstate), 2008

<sup>(</sup>a) Controlling design criteria (see Section 8.8 of the MDT Road Design Manual)

<sup>(</sup>b) Super elevation rate (e)

#### **Horizontal Alignment**

Elements comprising horizontal alignment include curvature, superelevation (i.e., the bank on the road), and sight distance. These horizontal alignment elements influence traffic operation and safety and relate directly to the design speed of the corridor. MDT's standards for horizontal curves are defined in terms of curve radius, and they vary based on design speed. For a 70-mph design speed (level terrain), the minimum recommended radius is 1,810 feet with a minimum stopping sight distance (SSD) of 730 feet. The minimum recommended radius and SSD for a 60-mph design speed (rolling terrain) are 1,200 feet and 570 feet, respectively. For an urban freeway (50-mph design speed), a minimum radius of 760 feet and a minimum sight distance of 425 feet are recommended.

**Table 3.4** summarizes each horizontal curve on the Interstate roadways within the study area. A determination of whether the curve met standards was noted based on the design criteria discussed previously. The controlling design criteria for the horizontal curves are radius and SSD. Stopping sight distance for a horizontal curve is evaluated based on the ability to see through the inside of the corner. Minimum sight obstruction distances were calculated based on the criteria contained in the *Traffic Engineering Manual*. The minimum sight obstruction distance is measured from the center of the inside travel lane and defines the area that should be clear of obstructions to allow for the recommended SSD.

There are five existing horizontal curves along I-15 within the study area and two horizontal curves along I-315. Four of the five curves along I-15 meet the minimum standards for horizontal curvature based on a 70-mph design speed (level terrain). The failing curve, at RP 282.37, does not meet the minimum radius requirements at a 70-mph design speed; however, the curve does meet the radius requirements for a 60-mph design speed (rolling terrain). Along I-315, one horizontal curve does not meet urban freeway standards (50-mph speed) based on curve radius. All horizontal curves were found to have adequate SSD.

C	urve	Length	Radius	Min. Sight Obstruction	Design Speed Met	Meets	
Loca	tion (RP)	(feet)	(feet)	(feet)	(mph)	Standards	Comments
	277.2	2,557	5,730	11.6	70	YES	
	278.9	4,334	5,732	11.6	70	YES	
7.5	280.7	3,892	3,274	20.3	70	YES	
_	282.4	986	1,637	40.5	60	NO	Does not meet level terrain standards based on curve radius.
	282.9	956	1,909	34.8	70	YES	
15	0.07	350	739	30.3	45	NO	Does not meet urban freeway standards based on curve radius.
-3	0.29	250	1,146	19.6	55	YES	

**Table 3.4: Horizontal Curve Attributes** 

# Vertical Alignment

Vertical alignment is a measure of the elevation change of a roadway. The length and steepness of grades directly affect the operational characteristics of the roadway. The controlling design limits for vertical curves are SSD, vertical curvature (K-value), and maximum grade. Vertical curves can be placed into two categories: crest and sag. A crest curve is created at the top of a hill or when the grade decreases. Conversely, a sag curve occurs at the bottom of a hill or when the grade increases.

<sup>&</sup>lt;sup>5</sup> MDT *Traffic Engineering Manual*, Chapter 25, Section 25.5, Equation 25.5-1

**Table 3.5** lists the location and controlling design features for each vertical curve along the Interstate roadways within the study area. According to the *Road Design Manual*, the maximum allowable grades are 3 percent for level terrain, 4 percent for rolling terrain, and 5 percent for mountainous terrain, although grades of up to 7 percent may be provided with approval. The rate of vertical curvature is expressed in terms of the K-value. The K-value is defined as a function of the length of the curve compared to the algebraic change in grade, which comprises either a sag or a crest vertical curve. For a 70-mph design speed (level terrain), minimum K-values of 247 and 181 are recommended for crest and sag vertical curves, respectively. A minimum SSD of 730 feet is recommended for a 70-mph design speed. For sag curves, SSDs only apply where overhead structures exist. No sag curves have existing overhead obstructions within the study area.

Within the study area, there are 19 vertical curves along I-15 and 2 vertical curves on I-315. Both vertical curves along I-315 meet urban freeway standards. Of the 19 vertical curves along I-15, 15 meet existing standards for a 70-mph design speed (level terrain). Two curves have maximum grades that do not meet level terrain standards; however, they do meet standards for mountainous terrain. One curve has a K-value below standards for level terrain, while another curve does not meet level terrain standards for K-value and SSD.

**Table 3.5: Vertical Curve Attributes** 

_	urve ion (RP)	Туре	Length (feet)	Grade Back	Grade Ahead	K- value	SSD (feet)	Design Speed Met (mph)	Meets Standards	Comments
	276.2	Crest	800	0.8%	0.1%	1,188.7	2,003	70	YES	
	276.7	Crest	800	0.1%	-0.6%	1,164.5	1,971	70	YES	
	277.1	Crest	1,000	-0.6%	-1.5%	1,127.4	1,717	70	YES	
	277.3	Sag	1,000	-1.5%	-0.2%	777.0	-	70	YES	
	277.6	Crest	800	-0.2%	-0.8%	1,232.9	2,063	70	YES	
	277.9	Crest	1,100	-0.9%	-5.0%	265.1	756	50	NO	Does not meet level terrain standards based on grade.
	278.8	Sag	1,000	-5.0%	-1.0%	250.0	-	50	NO	Does not meet level terrain standards based on grade.
	279.3	Crest	1,000	-1.0%	-2.9%	540.5	1,083	70	YES	
	280.0	Sag	1,100	-2.9%	0.9%	292.6	-	70	YES	
2	280.2	Crest	1,100	0.9%	-0.8%	643.3	1,181	70	YES	
1-15	280.5	Sag	400	-0.8%	1.5%	173.9	-	60	NO	Does not meet level terrain standards based on K-value.
	280.8	Crest	600	1.5%	-0.3%	329.7	893	70	YES	
	281.7	Sag	800	-0.2%	0.2%	2,000.0	-	70	YES	
	282.3	Sag	800	0.2%	2.5%	355.6	-	70	YES	
	282.5	Crest	750	2.5%	-1.0%	220.6	690	60	NO	Does not meet level terrain standards based on K-value and SSD.
	282.7	Sag	200	-1.0%	-0.2%	250.0	-	70	YES	
	282.7	Crest	200	-1.0%	-1.1%	5,000.0	2,708	70	YES	
	283.0	Crest	200	-0.2%	-0.9%	266.7	1,539	70	YES	
	283.0	Sag	200	-1.1%	-0.9%	1,333.3	-	70	YES	
315	0.09	Crest	800	1.0%	-4.5%	145	560	50	YES	
1-31	0.28	Sag	400	-4.5%	-2.3%	180	-	50	YES	

# 3.2.2 Interchanges

The purpose of an interchange is to allow traffic to enter or exit the Interstate with minimal disturbance to its traffic stream. This is accomplished by using grade-separated intersections connected by ramps. There are four interchanges along I-15 and one interchange along I-315 within the study area. This section discusses the geometric conditions of the five interchanges.

#### **Standards**

The five interchanges within the study area were evaluated based on a variety of standards. The MDT *Road Design Manual* provides general geometric standards for horizontal and vertical curvature for interchange ramps, while the MDT *Traffic Engineering Manual* provides guidance for ramp lengths to allow for vehicle acceleration and deceleration. **Table 3.6** provides the interchange ramp standards used to evaluate the interchanges as defined by MDT.

Туре	С	Standard	
	Taper Rate	Taper Design	2 to 5 degrees
E 4.B	raper Nate	Parallel Design	215 feet
Exit Ramp	Deceleration Leng	(a)	
	Sight Distance in	1,180 feet	
	Topor Poto	Taper Design	50:1 to 70:1
	Taper Rate	Parallel Design	350 feet
Entry Ramp	Acceleration Rate	(b)	
	Horizontal Curve	1,000 feet	
Spacing	Exit - Entrance	500 feet	
ορασιτία	Entrance - Exit	2,000 feet	
Auxiliary Lane Drop (c)	Within an Intercha	500 feet to 1,000 feet	

**Table 3.6: Interchange Ramp Standards** 

Source: MDT Traffic Engineering Manual, Chapter 29, November 2007

Ensuring adequate ramp lengths and proper geometrics is necessary to provide for safe vehicle interaction at Interstate entrance and exit points. Additionally, the spacing between interchange ramps affects vehicle interactions and can influence traffic flow and safety. Ramps that are too close together can result in additional vehicle conflicts due to merging and diverging traffic. An additional concern regarding ramp spacing is vehicle lane-shifting patterns. Closely spaced interchanges and/or intersections may require vehicles to shift between lanes to reach their intended lane. Traffic flow and safety issues may result if enough length is not provided for in areas where lane shifts are necessary to enter or exit the Interstate.

#### **Horizontal Alignment**

The horizontal alignment of a ramp is controlled by the radius of any curve on the ramp, super elevation, taper angle, taper length, gap acceptance length ( $L_g$ ), and deceleration/acceleration lengths ( $L_d$ / $L_a$ ). The limiting values for these characteristics are functions of the design speed for a given ramp. For this

<sup>(</sup>a) MDT Traffic Engineering Manual, Section 29.5.1.3

<sup>(</sup>b) MDT Traffic Engineering Manual, Section 29.5.2.3

<sup>(</sup>c) An auxiliary lane should be provided where the distance between the end of the entrance terminal and the beginning of an exit terminal is less than 1,500 feet. An auxiliary lane may be dropped at an exit if properly signed and designed.

analysis, the minimum design speed was determined based on the super elevation and radius for each given curve. **Table 3.7** presents the horizontal geometric attributes for each of the ramps.

**Table 3.7: Interchange Horizontal Alignment Attributes** 

							Design		
Cur	ve Location	Radius (feet)	Super- elevation	Taper Rate	L <sub>d</sub> /L <sub>a</sub> (feet)	L <sub>g</sub> (feet)	Speed Met (mph)	Meets Standards	Comments
Cui	SB ON	2,865	0.04	50:1	1,513	300	50	NO	Does not meet standards based
≣	05 011	2,953	0.05	4°30'00"	358	-	50	YES	on acceleration length.
	SB OFF	3,773	0.03 <sup>(a)</sup>	- 30 00	-	_	45	YES	
Gore Hill		3,773	0.03	-	-	-	40	163	Does not meet standards based
O	NB ON	2,865	0.04 <sup>(a)</sup>	50:1	1,604	300	50	NO	on acceleration length.
	NB OFF	2,865	0.04	4°30'00"	323	-	50	NO	Does not meet standards based on deceleration length.
	SB ON	764	0.08	-	-	-	50	YES	
	20 ON	764	0.07	(b)	-	(b)	50	YES	
		5,730	0.03	5°00'00"	463	-	60	NO	Does not meet standards based on deceleration length.
(0	CD OFF	385	0.08	-	-	-	35	YES	3
10th Ave S	SB OFF	198	0.08	-	-	-	25	YES	
th /		358	0.08	-	-	-	35	YES	
=	WB OFF	000	0.00	4°30'00"	310	-	0.5	YES	
	NB ON	382	0.08	(b)	590 <sup>(c)</sup>	590 <sup>(c)</sup>	35	NO	Does not meet standards based on acceleration length.
	NB OFF	5,730	0.03	4°30'00"	-	-	60	YES	J
		2,339	0.03	-	740	-	35	YES	
	NB OFF	3,274	0.03 <sup>(a)</sup>	4°30'00"	1,388	-	45	YES	
ø		5,730	0.03 <sup>(a)</sup>	-	-	-	60	YES	
Central Ave	NB ON	7,640	0.02 <sup>(a)</sup>	50:1	1,491	428	55	NO	Does not meet standards based on acceleration length.
ıntra	SB ON	1,359	0.06 <sup>(a)</sup>	50:1	1,379	300	45	NO	Does not meet standards based on acceleration length.
ပိ	SB OFF	3,204	0.03 <sup>(a)</sup>	7°43'00"	1,144	-	45	NO	Does not meet standards based on taper rate.
		1,637	0.03 <sup>(a)</sup>	-	-	-	30	YES	on taper rate.
		1,433	0.05 <sup>(a)</sup>	-	-	-	40	YES	
son	NB ON	1,146	0.04 <sup>(a)</sup>	50:1	266	266	30	NO	Does not meet standards based on acceleration length.
<b>Emerson</b> Junction		1,910	0.06 <sup>(a)</sup>	4°30'00"	0	_	50	NO	Does not meet standards based
шэ	SB OFF	1,146	0.08 <sup>(a)</sup>	-	-	-	55	NO	on deceleration length.
	EB OFF	230	0.08 <sup>(a)</sup>	4°34'26"	503	-	30	YES	
	EB SHARED	246	0.06 <sup>(a)</sup>	-	-	-	30	YES	
>	EB ON	382	0.02 <sup>(a)</sup>	3°48'51"	930	790	<25	YES	
14 <sup>th</sup> St SW	WB ON	170	0.08 <sup>(a)</sup>	3°49'00"	505	305	25	NO	Does not meet standards based on acceleration and gap acceptance length.
41		170	0.08 <sup>(a)</sup>	-	-	-	25	YES	
	WD OFF	521	0.02 <sup>(a)</sup>	4°34'26"	714	-	<25	YES	
	WB OFF	382	0.07 <sup>(a)</sup>	-	-	-	35	YES	

<sup>(</sup>a) Value measured in the field.

<sup>(</sup>b) Information unavailable.

<sup>(</sup>c) Estimated based on aerial photography.

#### **Vertical Alignment**

The vertical alignment of a ramp is expressed in terms of the rate of curvature (K-value) and vertical grade. For a crest curve, the minimum curvature depends on the SSD for a given design speed. For sag curves, the minimum curvature depends on rider comfort at a given design speed. The vertical curves on the interchange ramps were evaluated based on a 50-mph design speed. The minimum K-value for a crest or sag vertical curve is 84 or 96, respectively. The maximum grade for a 50-mph design speed is 5 percent.

**Table 3.8** presents the vertical geometric design attributes of the each interchange ramp within the study area. Many of the vertical curves fail to meet the minimum curvature required for a 50-mph design speed. A lower design speed may, however, result in acceptable curvature values. The design speed met based on the K-value is shown in the table. In addition, there are some ramps with grades exceeding 5 percent.

#### **Interchange Spacing**

Providing for proper interchange spacing is necessary to accommodate vehicular maneuvers, for all signing, and to achieve optimal capacity. In urban areas such as Great Falls, interchanges are more likely to be spaced closer together than in rural areas. The recommended spacing from an exit ramp to an entrance ramp is 500 feet. Conversely, 2,000-foot spacing is recommended between an entrance ramp and an exit ramp.<sup>6</sup> These are initial recommendations, and further traffic analysis should be conducted according to procedures outlined in the *Highway Capacity Manual*. **Table 3.9** shows the interchange spacing attributes within the study area.

For locations where recommended spacing lengths are unachievable, auxiliary lanes may be used to accommodate weaving and merging/diverging traffic characteristics. Auxiliary lanes should be provided where the distance between entrance and exit ramps is less than 1,500 feet.<sup>7</sup> No auxiliary lanes are currently provided within the study area.

The 10<sup>th</sup> Avenue South and 14<sup>th</sup> Street Southwest Interchanges along I-315 are spaced closer than 1,500 feet. This location has weaving and merging/diverging characteristics that result in reduced capacity and operational concerns (**See Section 3.3.3**).

<sup>&</sup>lt;sup>6</sup> MDT *Traffic Engineering Manual*, Chapter 29, Section 29.3.6

<sup>&</sup>lt;sup>7</sup> MDT Traffic Engineering Manual, Chapter 29, Section 29.3.7

**Table 3.8: Interchange Vertical Alignment Attributes** 

Table 5.5. Interestange Vertical Augustion Attributes										
	Curve ation (RP)	Туре	Length (feet)	Grade Back	Grade Ahead	K Value	Stopping Sight Distance (feet)	Design Speed Met (mph)	Meets Standards	Comments
	SB ON	Sag	200	-1.0%	2.3%	60.4	-	40	NO	Does not meet standards based on rate of curvature.
=	SB OFF	Crest	450	-0.9%	-5.8%	93.2	448	50	NO	Does not meet standards based on grade.
Gore Hill	NB ON	Crest	300	-1.3%	-5.0%	80.4	439	45	NO	Does not meet standards based on rate of curvature.
Ō	NB OFF	Sag	300	-1.0%	3.9%	60.7	-	35	NO	Does not meet standards based on rate of curvature.
		Crest	300	3.9%	0.0%	76.5	425	45	NO	Does not meet standards based on rate of curvature.
	SB ON	Sag	700	-5.5%	1.0%	107.4	-	50	NO	Does not meet standards based on grade.
ဟ ဗ	SB OFF	Crest	300	-1.0%	-6.8%	51.7	336	40	NO	Does not meet standards based on rate of curvature and grade.
10 <sup>th</sup> Ave S		Sag	350	-6.8%	-3.2%	97.2	-	50	NO	Does not meet standards based on grade.
9	NB ON	Crest	600	2.1%	-0.2%	260.9	769	70	YES	
	NB OFF	Sag	400	-4.7%	-0.8%	102.0	-	50	YES	
	NB OIT	Crest	500	-0.8%	-5.0%	119.0	507	55	YES	
	NB OFF	Sag	300	-0.6%	3.5%	74.1	-	40	NO	Does not meet standards based on rate of curvature.
0		Crest	200	3.5%	0.0%	57.1	408	40	NO	Does not meet standards based on rate of curvature.
A	NB ON	Crest	300	-2.0%	-4.0%	150.0	690	55	YES	
Central Ave		Sag	400	-4.0%	1.3%	75.8	-	40	NO	Does not meet standards based on rate of curvature.
ŭ	SB ON	Sag	400	-1.2%	2.0%	127.0	-	55	YES	
	SB OFF	Crest	300	0.0%	-1.5%	200.0	869	65	YES	
	00 011	Sag	400	-1.5%	1.7%	123.5	-	55	YES	
	NB ON	Sag	500	-0.7%	4.3%	100.0	-	50	YES	
Emerson		Crest	400	4.3%	-1.0%	76.2	406	45	NO	Does not meet standards based on rate of curvature.
E E	SB OFF	Sag	250	0.0%	4.5%	55.6	-	35	NO	Does not meet standards based on rate of curvature.
		Crest	400	4.5%	-0.2%	84.4	428	50	YES	
	EB OFF	Crest	300	-2.3%	-3.9%	187.4	824	60	YES	
( <del>)</del>		Crest	300	-3.9%	-5.0%	271.2	1126	70	YES	
l-315 Exit 0 (14 <sup>th</sup> St)	EB SHARED	Sag	300	-5.0%	-0.4%	65.4	-	40	NO	Does not meet standards based on rate of curvature.
it 0	EB ON	Crest	400	5.0%	0.3%	85.3	430	50	YES	
5 Ex		Crest	200	0.3%	-2.0%	88.1	575	50	YES	
<u> </u>	WB ON	Crest	250	-3.1%	-5.6%	99.5	555	50	NO	Does not meet standards based on grade.
	WB OFF	Crest	500	3.0%	-4.2%	69.4	387	45	NO	Does not meet standards based on rate of curvature.

	Location	Туре	Length (feet)	Meets Standards	Comments
	Gore Hill	Exit - Entrance	2,500	YES	
m	Gore Hill to 10 <sup>th</sup> Ave S	Entrance - Exit	3,640	YES	
I-15 NB	10 <sup>th</sup> Ave S	Exit - Entrance	2,250	YES	
<u>,</u>	10 <sup>th</sup> Ave S to Central Ave	Entrance - Exit	5,960	YES	
	Central Ave	Exit - Entrance	2,475	YES	
	Central Ave	Exit - Entrance	2,440	YES	
ω	Central Ave to 10 <sup>th</sup> Ave S	Entrance - Exit	7,760	YES	
I-15 SB	10 <sup>th</sup> Ave S	Exit - Entrance	1,400	YES	
·	10 <sup>th</sup> Ave S to Gore Hill	Entrance - Exit	2,700	YES	
	Gore Hill	Exit - Entrance	2,640	YES	
l-315 EB	I-15 to 14 <sup>th</sup> St SW	Entrance - Exit	570	NO	Does not meet interchange spacing standards.
꼬罒	14 <sup>th</sup> St SW	Exit - Entrance	1,100	YES	
B 55	14 <sup>th</sup> St SW	Exit - Entrance	1,340	YES	
I-315 WB	14 <sup>th</sup> St SW to I-15	Entrance - Exit	780	NO	Does not meet interchange spacing standards.

**Table 3.9: Interchange Spacing Attributes** 

#### **Access**

The FHWA *Interstate System Access Informational Guide* provides technical and policy support for evaluating new or modified access to the Interstate System. The *Guide* provides information and methods for analyzing Interstate access to support planning, design, and safety analysis. Included in the *Guide* are eight policy requirements that must be addressed when requesting access to the Interstate. One of the policy requirements states that new or revised access points should provide for all traffic movements.<sup>8</sup> Note that the Emerson Junction is currently configured as a partial interchange. According to current policy, new construction of partial interchanges are not supported by FHWA except in extreme circumstances.

#### 3.2.3 Intersections

The placement of intersections at the termini of ramps can affect the operation of the Interstate and the crossing roadway. If the intersections were placed too close to each other, they could generate queuing issues that could back up onto the Interstate mainline. Queuing can also affect the operation of the crossroad by creating unnecessary delay. As such, intersection locations must be carefully considered to allow enough space for the necessary turn bays needed to alleviate possible queuing issues. The geometric design of an intersection can also cause unnecessary delay if large vehicles cannot make left-or right-hand turns without interfering with traffic. Interchange ramps and intersections should be designed to accommodate a standard semi-truck with a 67-foot wheelbase (WB-67).

**Table 3.10** presents the analysis of the left-turn bays, when present, at the intersections within the study area. Included in the table are values for the recommended length based on MDT standards, as well as the 95<sup>th</sup> percentile queue based on the existing peak hour traffic analysis. The 95<sup>th</sup> percentile queue is the length at which queue lengths are shorter 95 percent of the time. For example, if the 95<sup>th</sup> percentile

<sup>&</sup>lt;sup>8</sup> FHWA Interstate Access Guidelines Informational Guide, August 2010, page 6.

queue is 100 feet, queue lengths would be shorter than 100 feet 95 percent of the time and longer than 100 feet 5 percent of the time.

Intersection	Peak Hour Turning Volume (vph)	Recommended Length (feet)	95 <sup>th</sup> Percentile Queue (feet)	Existing Length (feet)	Meets Standards	Comments
14 <sup>th</sup> St SW / EB Ramps	102	70	25	300	YES	
14 <sup>th</sup> St SW / WB Ramps	638	(a)	330	115	NO	Vehicle queuing along interchange ramp.
Fox Farm Rd / 10 <sup>th</sup> Ave S (EB)	242	280	310	200	NO	Does not meet turn-bay length standards.
Fox Farm Rd / 10 <sup>th</sup> Ave S (WB)	486	325 <sup>(b)</sup>	310	350	YES	
Central Ave / NB Ramps (EB)	6	50	0	50	YES	
Central Ave / SB Ramps (WB)	230	192	20	105	NO	Does not meet turn-bay length standards.
Vaughn Road / Central Ave (EB)	71	59	10	150	YES	

Table 3.10: Left-Turn Bay Lengths

#### Gore Hill Interchange

Four intersections exist within the immediate vicinity of the Gore Hill Interchange. The southbound off-ramp terminates at a four-legged, two-way, stop controlled intersection with Airport Road and I-15 Frontage Road. Traffic turning from the off-ramp to Airport Road has a free-flowing dedicated right-turn lane. One concern at this intersection is the possibility that drivers traveling northbound on I-15 Frontage Road may travel straight and enter the southbound off-ramp traveling in the wrong direction. Another concern is the proximity of this intersection to the intersection of Airport Road and the southbound on-ramp, a distance of approximately 60 feet. Vehicles attempting to make a left turn onto the southbound on-ramp have to contend with any oncoming traffic leaving the southbound off-ramp intersection.

The intersection of Airport Road and the northbound on- and off-ramps is a typical two-way, stop-controlled intersection. This intersection is located approximately 80 feet from the intersection of Airport Road and Tri-Hill Frontage Road. Traffic performing a left-hand turn onto Tri-Hill Frontage Road has to contend with traffic making a right turn off of the northbound off-ramp, in addition to the traffic traveling southeast across the interchange. The distance between the southbound on-ramp and the northbound ramps is approximately 370 feet.

#### 14th Street Southwest Interchange

The intersections at the ramp termini at 14<sup>th</sup> Street Southwest are both four-legged signalized intersections. They are approximately 925 feet apart and appear to meet geometric spacing standards. Left-turn bays are provided at both intersections. The intersection of 14<sup>th</sup> Street Southwest and the westbound ramps has a high volume of left-turning vehicles along the east leg. During the PM peak-hour, left-turn volume exceeds the range of recommended turn bay lengths provided by MDT. Vehicle queuing was noted along the interchange ramp approaching the mainline Interstate.

<sup>(</sup>a) Outside of the range of standards.

<sup>(</sup>b) Existing dual-turn lanes

#### Fox Farm Road

The intersection of Fox Farm and 10<sup>th</sup> Avenue South is a four-legged, stop-controlled intersection. This intersection is at the terminus of I-315. A single left-turn bay is provided along the eastbound leg, and dual left-turn lanes are provided along the westbound leg. The left-turn bay along the eastbound leg does not appear to meet existing standards. During the on-site evaluation, observers noted that the queue length from the eastbound left-turn lane often exceeded available storage during the PM peak hour.

#### **Central Avenue Interchange**

The Central Avenue Interchange is a diamond interchange with stop-controlled intersections at the ramp terminals and raised medians to provide protected turn-bays. The intersections are spaced approximately 450 feet apart, and they appear to meet geometric design standards. Both on-ramps include channelized right-turn lanes, which require vehicles to merge at the entrance to the ramp.

The intersection along the northbound ramps includes an eastbound left-turn bay that appears to meet minimum length standards. The southbound ramp intersection has a dedicated westbound left-turn lane for vehicles accessing the Interstate. The existing turn-bay length does not appear to meet existing standards; however, minimal vehicle queuing was shown by the traffic analysis.

The southbound off-ramp has a channelized right-turn lane and a dedicated receiving lane along Central Avenue. However, a stop sign requires vehicles to stop before entering Central Avenue. At the intersection of the southbound off-ramp and Central Avenue, three westbound lanes merge to a single lane within approximately 300 feet. There does not appear to be proper signage and/or markings indicating the dropping of two travel lanes.

#### **Emerson Junction**

The intersections located at Emerson Junction are both three-legged, unsignalized intersections and are spaced approximately 750 feet apart. The northbound on-ramp intersection with Vaughn Road has a right-turn slip lane for traffic traveling westbound on Vaughn Road. Eastbound traffic has a 40-foot, left-turn storage area between Vaughn Road and the northbound on-ramp. The southbound off-ramp has a single lane serving both left- and right-turning traffic. The southbound off-ramp intersection is scheduled for reconstruction, which will result in a shift to the northwest to provide a more standard "T" intersection.

#### 3.3 Traffic Characteristics

An evaluation of traffic characteristics was completed using available data provided by MDT, as well as field-collected data. Peak-hour, turning-movement counts were conducted at 12 intersections within the study area. Mainline traffic volume counts were also completed at nine locations along the Interstate. Additional traffic information for vehicle speeds, driving patterns, and lane-changing interactions was also documented at various locations along the corridor. The following sections provide details about the existing traffic characteristics of the corridor. Detailed data is included in the **Appendices B**, **C**, and **D**. **Figure 3.1** shows the existing traffic conditions of the study area.

#### 3.3.1 Traffic Volumes

MDT administers annual traffic count data at 12 locations within the study area. MDT, the city of Great Falls, or Cascade County conducts the annual traffic counts, which are adjusted to represent yearly averages for traffic. In addition, an automatic traffic recorder (ATR) is located outside of the study area approximately 3 miles to the northwest of Emerson Junction. The ATR collects traffic data year-round

from sensors embedded in the roadway. Data from the other traffic count sites are collected annually at limited times by using pneumatic tube counters.

In addition to existing conditions, MDT provided historic data for the traffic count sites within the study area. The average annual daily traffic (AADT) on I-15 ranges from 5,950 vehicles per day (vpd) north of Central Avenue, to as high as 14,670 vpd north of Gore Hill. Volumes on I-315 approach 25,000 vpd west of Fox Farm Road. The AADT on the non-interstate roads ranges from 4,555 vpd on the Vaughn Frontage Road to 29,800 vpd on 10th Avenue South. **Table 3.11** shows the growth rates experienced within the study area over various time intervals.

Lo	cation	2013 AADT	1994-2013	2000-2013	2007-2013
I-15	S of Gore Hill	6,370	1.4%	0.4%	0.1%
I-15	N of Gore Hill	14,670	1.6%	1.3%	-0.1%
I-15	N of 10 <sup>th</sup> Ave	10,550	1.5%	1.3%	0.3%
I-15	N of Central Ave	5,950	1.2%	0.5%	-1.8%
I-15	N of Emerson	9,090	0.9%	0.1%	-1.2%
I-315	W of 14th St SW	15,140	(a)	(a)	0.8%
I-315	W of Fox Farm	24,680	4.2%	1.8%	0.1%
31st St SW	S of Interchange	8,360	5.6%	4.7%	-0.8%
Airport Dr	N of Interchange	3,640	-0.1%	0.7%	2.3%
10 <sup>th</sup> Ave S	Warden Bridge	29,800	1.5%	1.5%	0.4%
Central Ave	E of Interchange	12,514	0.0%	0.5%	3.0%
Central Ave	W of Interchange	7,746	0.6%	1.5%	4.4%
Vaughn Rd	E of Interchange	6,530	0.0%	-0.4%	1.5%
Vaughn Rd	W of Interchange	4,555	0.4%	0.7%	7.4%

**Table 3.11: Historic Average Annual Growth Rates** 

Source: MDT Data and Statistics Bureau, Traffic Data Collection Section, 2014

<sup>(a)</sup> Data unavailable

# 3.3.2 Mainline Operation

The operational condition of a mainline Interstate highway is often characterized by the level of service (LOS). LOS is a qualitative description of a driver's experience on a highway or facility, as defined in the 2010 Highway Capacity Manual (HCM). LOS of a mainline freeway segment is affected by geometric and traffic characteristics. LOS is determined based on the traffic density of the highway in terms of passenger cars per mile per lane (pc/mi/ln). The inputs used to calculate traffic density include traffic volume, free-flow speed, percentage of trucks and busses, driver population, peak-hour factors, number of travel lanes, and the terrain. LOS can range from A to F with A representing free flow conditions and F representing heavily congested conditions. Analysis of I-15 was performed using Highway Capacity Software (HCS) 2010. The LOS was evaluated during AM and PM peak hour conditions. **Table 3.12** shows the results of the LOS analysis.

**AM Peak Hour PM Peak Hour** Density **Density** Location **Direction** LOS (pc/mi/ln) LOS (pc/mi/ln) Northbound Α 2.1 2.1 Α South of Gore Hill Southbound Α 2.3 Α 3.3 Northbound Α 4.8 Α 7.3 North of Gore Hill Southbound Α Α 4.7 6.0 Α Northbound 3.0 Α 4.6 I-15 South of Central Ave Southbound Α 3.0 Α 4.5 Northbound Α 3.2 Α 3.0 North of Central Ave Α 2.0 Α Southbound 3.2 Northbound Α 2.8 Α 5.9 North of Emerson Junction Southbound Α 5.0 Α 4.3 Eastbound 5.7 7.5 Α Α West of 14th St SW Westbound 5.6 6.5 Α Α I-315 Eastbound 10.7 Α 10.9 Α East of 14th St SW Westbound 6.0 12.4 В

Table 3.12: Mainline Level of Service

The MDT *Traffic Engineering Manual* states that a LOS of B or better is recommended for both urban and rural freeways. I-15 is shown to operate at LOS A during the existing peak hours within the study area. I-315 also operates at LOS A, with the exception of the westbound lane east of 14<sup>th</sup> Street Southwest, which operates at LOS B during the PM peak hour.

#### **Vehicle Speeds**

Vehicle speed data was collected along the I-15 southbound mainline between the 10<sup>th</sup> Avenue South and Gore Hill Interchanges. This location has a steep upgrade, and it has been noted to have speed differentials between the left and right travel lanes in the southbound direction. The speed data were collected over 24 hours in July 2014. The existing speed limit at this location is 65 mph.

**Table 3.13** shows the results of the speed data collection. Included in the table are the 85<sup>th</sup> percentile speed, the average speed, and the pace. The primary speed data factor for determining the validity of the posted speed limit is the 85<sup>th</sup> percentile speed. The 85<sup>th</sup> percentile speed is that speed at or below which 85 percent of vehicles are traveling. For example, if the 85<sup>th</sup> percentile speed is 65 mph, it means that 85 percent of vehicles are traveling 65 mph or below. The pace is also an important factor, and it represents the 10-mph range within which most vehicles travel.

Speed 85th Limit **Percentile** Average Location Volume (mph) Speed (mph) Speed Pace (mph) Right Lane 7,039 65 68.2 59.9 60 - 7049% I-15 SB Left Lane 855 65 74.4 60.6 65 - 75 57%

**Table 3.13: Vehicle Speed Data** 

As shown in the table, it appears that vehicles are generally traveling at higher speeds in the left lane than in the right lane. The 85<sup>th</sup> percentile speed for the right lane is more than 6 mph lower than the left lane. The pace of the left lane is also shown to be higher than in the right lane. Due to the steep upgrade

and the mix of vehicle types, there are often slow-moving vehicles mixed with faster ones at this location. A higher percentage of vehicles in the pace represents fairly even travel speeds, while a lower percent within the pace may point to high-speed variations. At this location, the percentage of vehicles within the pace is relatively low. This is an indicator of large distribution of vehicle speeds. The varying vehicle speeds is likely a result of a mixture of slower moving heavy truck traffic combined with faster moving passenger vehicles.

# 10th Avenue South / Gore Hill Origin-Destination

An origin-destination (OD) study was conducted between the 10<sup>th</sup> Avenue South and Gore Hill Interchanges. The intent of the study was to evaluate the travel patterns between the 10<sup>th</sup> Avenue South and Gore Hill Interchanges in the southbound direction. The study found that during the AM peak hour approximately 65 percent of vehicles that enter the Interstate at 10<sup>th</sup> Avenue South immediately exit at Gore Hill. During the PM peak hour, this percentage was found to be approximately 48 percent.

# 3.3.3 Interchange Ramps

Connection between the mainline Interstate highway and local roads is provided by a dedicated ramp road. Similar to the Interstate mainline, the performance of the interchange ramps can be evaluated for LOS. As with traditional roadways, interchange ramps are impacted by the amount of traffic congestion present. For on-ramps, the capacity of the ramp roadway is rarely an issue due to generally free-flowing conditions with no traffic control. For off-ramps, however, congestion on the ramp can cause queuing that may cause failure at the ramp-to-freeway junction. **Table 3.14** provides the results of the LOS analysis for the interchange ramps.

As with the Interstate mainline, a LOS of B or better is recommended for the interchange ramps. Each of the ramps along I-15 within the study area is shown to function at LOS A and appear to have available capacity. All ramps along I-315 function at LOS B or better during the peak hours.

**AM Peak Hour PM Peak Hour Density Density** LOS Location (pc/mi/ln) LOS (pc/mi/ln) NB On-ramp Α 3.9 Α 8.7 NB Off-ramp Α 3.7 Α 3.7 **Gore Hill** 0.0 SB On-ramp Α 0.0 Α Α SB Off-ramp Α 6.2 7.1 NB On-ramp Α 6.5 Α 8.6 Α 2.9 Α 5.7 NB Off-ramp 10th Ave S SB On-ramp Α 3.2 Α 4.7 SB Off-ramp Α 3.4 Α 5.1 EB On-ramp В 13.5 В 12.9 EB Off-ramp Α 5.1 Α 6.9 14th St SW WB On-ramp Α 8.3 Α 9.2 WB Off-ramp Α В 10.1 3.4 0.2 NB On-ramp Α 0.0 Α NB Off-ramp Α 0.0 Α 0.0 **Central Ave** Α SB On-ramp Α 1.5 3.6 SB Off-ramp Α Α 0.0 0.0

**Table 3.14: Interchange Ramp Level of Service** 

#### I-315 Interchanges

**Emerson Junction** 

The I-315 Interstate has unique urban traffic characteristics. The Interstate mainline is less than a mile long and begins at the 10<sup>th</sup> Avenue South Interchange. The 14<sup>th</sup> Street Southwest Interchange is located close to the 10<sup>th</sup> Avenue South Interchange, which causes traffic flow issues related to vehicle weaving and merging/diverging. A video of the I-315 Interstate was recorded during the peak hours to evaluate the influence of traffic movements to the area. From the video, traffic movement volumes were counted during the peak hours.

Α

Α

2.8

6.8

Α

Α

8.0

5.9

NB On-ramp

SB Off-ramp

**Table 3.15** shows the peak hour volumes along the influencing ramps, as well as the destination of the vehicles expressed as a percentage. For example, during the AM peak hour, 338 vehicles traveled along the I-15 northbound off-ramp at the 10<sup>th</sup> Avenue South Interchange. Of those 338 vehicles, 10 percent exited at 14<sup>th</sup> Street Southwest, 58 percent stayed on I-315 in the right lane, and 32 percent merged to the left lane on I-315.

	Location	AM Peak Hour	PM Peak Hour
	I-15 NB Off	338	436
	14 <sup>th</sup> St SW Off	10%	22%
	I-315 Right Lane	58%	57%
10 <sup>th</sup> Ave S	I-315 Left Lane	32%	21%
10" Ave 3	I-15 SB Off	192	239
	14 <sup>th</sup> St SW Off	12%	35%
	I-315 Right Lane	10%	10%
	I-315 Left Lane	78%	55%
	I-315 EB On	498	523
	I-315 Right Lane	48%	55%
	I-315 Left Lane	52%	45%
14 <sup>th</sup> St SW	I-315 WB On	122	161
	I-15 NB On	62%	49%
	I-15 SB On, Right Lane	33%	46%
	I-15 SB On, Left Lane	5%	5%

Table 3.15: I-315 Interchange Volumes

#### 3.3.4 Intersections

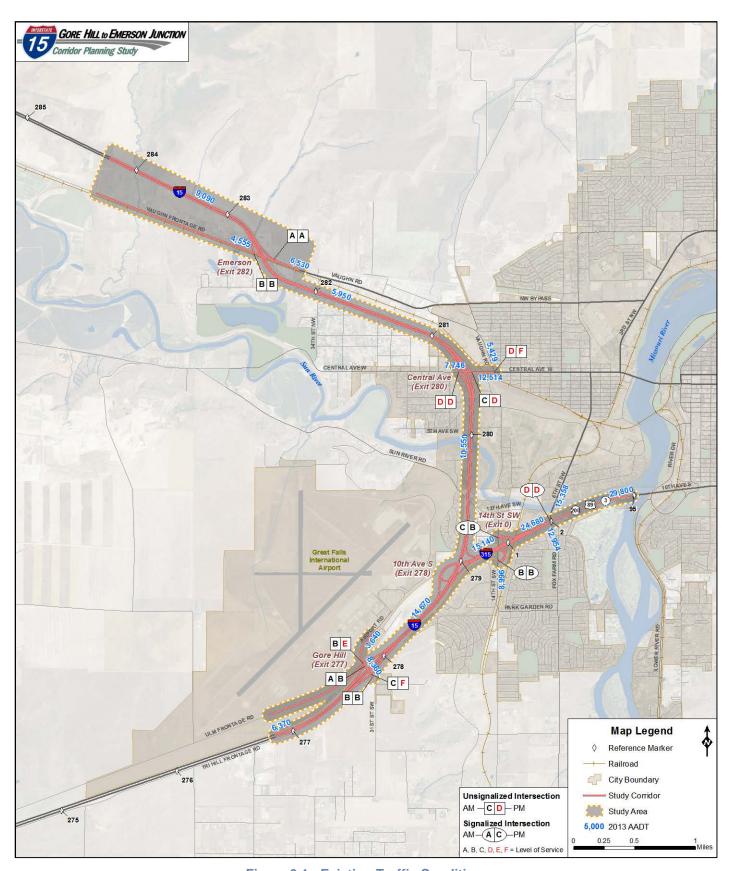
A LOS analysis was performed at 12 intersections within the study area. The LOS analysis was completed using PTV Vistro software during the AM and PM peak hours. For intersections, LOS is based on vehicle delay, which is influenced by the number of stops, available gaps, and impediments caused by other vehicles. A LOS of A represents little to no delay, while a LOS of F represents substantial delay. A LOS of C or better is generally recommended. The results of the peak-hour, intersection LOS analysis are shown in **Table 3.16**.

For signalized intersections, the LOS is based on the average stopped delay per vehicle. The procedures used to evaluate signalized intersections are based on detailed information on geometry, lane-use, signal timing, peak-hour volumes, arrival types, and other parameters. This information is then used to calculate delays and determine the capacity of each intersection.

LOS for two-way, stop-controlled intersections is based on the delay experienced by each movement within the intersection, rather than on the overall stopped delay per vehicle at the intersection. LOS is defined by the movement with the highest amount of delay. As a result, the intersection LOS may not accurately reflect the performance of the intersection as a whole. For example, a single, left-turning vehicle along the minor, stop-controlled approach may experience high amounts of delay due to a lack of available gaps. This movement may, however, only represent a small portion of the total intersection volume.

**Table 3.16: Intersection Level of Service** 

		AM Peak Hour		PM Peak	Hour
		Delay		Delay	
Intersection Name	<b>Control Type</b>	(s/veh)	LOS	(s/veh)	LOS
Tri Hill and Frontage Airport Rd	Two-way stop	13.5	В	14.5	В
I-15 NB and Airport Rd	Two-way stop	16.9	С	55.4	F
I-15 SB On and Airport Rd	Two-way stop	8.6	Α	11.0	В
I-15 SB Off and Airport Rd	Two-way stop	12.7	В	35.3	E
14th St SW and I-315 EB	Signalized	14.4	В	13.0	В
14th St SW and I-315 WB	Signalized	23.0	С	19.4	В
Fox Farm and I-315	Signalized	45.3	D	38.5	D
Central Ave and I-15 SB	Two-way Stop	28.0	D	42.0	E
Central Ave and I-15 NB	Two-way Stop	19.9	С	29.1	D
Central Ave and Vaughn Rd	Two-way Stop	27.1	D	65.0	F
Vaughn Rd and I-15 SB	Two-way Stop	10.1	В	10.1	В
Vaughn Rd and I-15 NB	Two-way Stop	7.3	Α	7.3	Α



**Figure 3.1: Existing Traffic Conditions** 

## 3.4 SAFETY

The MDT Traffic and Safety Bureau provided crash data for all of Cascade County from January 1, 2009, to December 31, 2013. Crash data for the study area were selected using GIS. Records show 525 crashes occurring within the study area during the crash analysis period. Four crashes resulted in fatalities, eight crashes resulted in incapacitating injuries, 41 crashes produced non-incapacitating evident injuries, and 71 crashes resulted in possible injuries. An incapacitating injury is defined as an injury, other than a fatality, which prevents the injured person from walking, driving, or normally continuing the activities the person was capable of performing before injury. **Figure 3.2** presents the spatial distribution of the crash data for the five-year analysis period.

**Table 3.17** provides a comparison of the crash rate, crash severity index, and crash severity rate within the study area. The crash data presented in the table are based on crashes occurring from calendar year 2009 through 2013. Crash rates are defined as the number of crashes per million vehicle miles of travel. The crash severity index is the ratio of the sum of the level of crash degree to the total number of crashes. Crash severity rate is determined by multiplying the crash rate by the crash severity index.

Between 2008 and 2012, the statewide average rural crash rate, severity index, and severity rate for the Interstate system was 0.90, 1.83, and 1.65, respectively. For urban Interstates during this same time period, the statewide average crash rate, severity index, and severity rate was 1.21, 1.72, and 2.08, respectively.

							AADT 3-			
		Begin	End	#	#	Total	year	Crash	Severity	Severity
	Segment	RP	RP	Fatal	Incap	Crashes	Average	Rate	Index	Rate
	Southwest of Gore Hill	270.4	277.8	0	0	18	6,360	1.55	1.00	1.55
	Northeast of Gore Hill	277.8	278.9	1	2	70	13,474	2.85	1.16	3.29
-15	10th Ave South to Central Ave	279.9	280.5	0	1	32	9,786	1.79	1.06	1.90
	Central Ave to Emerson Junction	280.5	282.5	0	0	48	6,486	4.06	1.00	4.06
	North of Emerson Junction	282.5	286.5	2	1	43	9,470	2.49	1.37	3.41
വ	10 <sup>th</sup> Ave South to 14 <sup>th</sup> St Southwest	0	0.3	0	0	13	15,890	0.45	1.00	0.45
1-31	14 <sup>th</sup> St Southwest to Fox Farm	0.3	1.4	0	2	114	25,870	2.41	1.04	2.50
	East of Fox Farm	94.4	95.7	0	0	137	30,890	2.43	1.00	2.43

Table 3.17: Crash Statistics

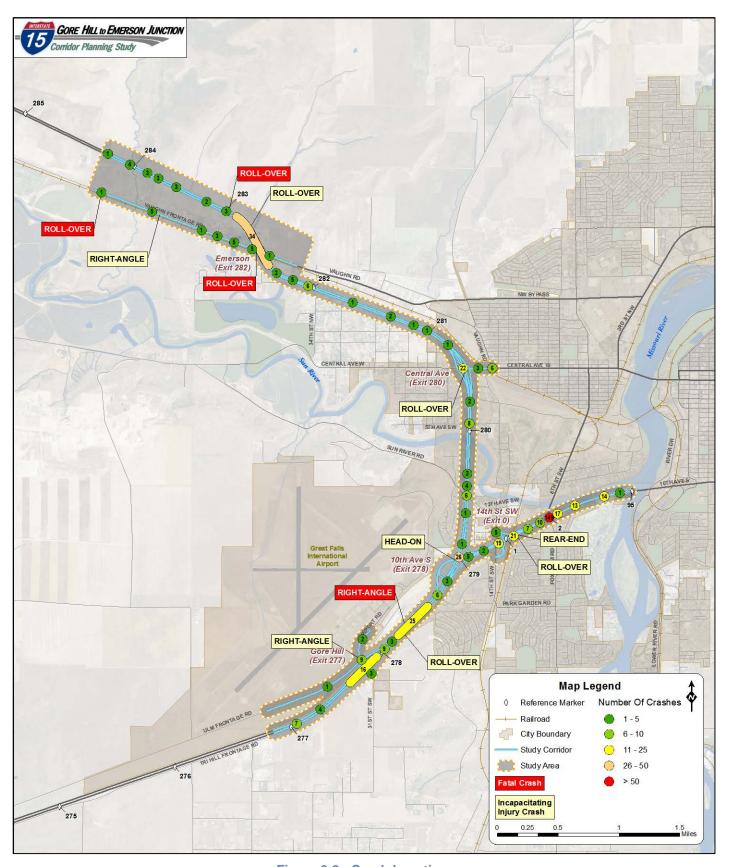


Figure 3.2: Crash Locations

## 3.4.1 Safety Trends, Contributing Factors, and Crash Clusters

On average, approximately 105 crashes occurred each year during the crash analysis period. Multivehicle crashes accounted for nearly 53 percent of crashes, with approximately 62 percent of all crashes occurring in dry conditions. Furthermore, 61 percent of crashes occurred during daylight. Approximately 38 percent of crashes during the analysis period happened when roads were icy, snowy, or wet. The primary contributing factors listed in crashes during the analysis period included careless driving (32 percent of crashes), driving too fast for conditions (21 percent of crashes), disregarding traffic markings/signs/signals (16 percent of crashes), and driving under the influence of alcohol/drugs (14 percent of crashes).

Of the vehicles involved in a crash, 92 percent were passenger vehicles (automobiles, pickups, SUVs, etc.). Records show 15 crashes involving motorcycles, 38 crashes involving heavy trucks with trailers, and 2 crashes involving buses.

The main observed crash trends are rear-end collisions (178) followed by fixed-object collisions (138). Of the fixed-object collisions, 90 of the collisions list contact with guardrails, median barriers, bridge rails, or impact attenuators as the first harmful event. Rear-end collisions are clustered on I-315 and 10<sup>th</sup> Avenue South. Clusters of fixed-object collisions are present between the Gore Hill and 10<sup>th</sup> Avenue South Interchanges (11 crashes), I-15 underpass of Sun River Road (7 crashes), I-15 bridge over the Sun River (5 crashes), Central Avenue Interchange (7 crashes), Emerson Junction Interchange (15 crashes), and I-315 from RP 0 to RP 1 (21 crashes).

Approximately 8 percent of reported crashes resulted in rollovers (44 crashes). Two clusters were identified between the Gore Hill and 10<sup>th</sup> Avenue South Interchanges (7 crashes) and at the Emerson Junction Interchange (10 crashes). Each of the seven rollover crashes between the Gore Hill and the 10<sup>th</sup> Avenue South Interchanges occurred with dry road conditions.

The road condition was listed as icy or snow-covered in 138 crashes. These crashes appear to be clustered between the Gore Hill and 10<sup>th</sup> Avenue South Interchanges (12 crashes), I-15 underpass of Sun River Road (6 crashes), Emerson Junction Interchange (19 crashes), and I-315 between 14<sup>th</sup> Street Southwest Interchange and Fox Farm (60 crashes).

## 4.0 PROJECTED TRANSPORTATION SYSTEM

Projected transportation conditions were analyzed to estimate how traffic patterns and characteristics may change compared to existing conditions. The analysis was based on known existing conditions and anticipated land development expected to occur out to 2035. The travel demand model developed for the *Great Falls Area LRTP – 2014* was used to determine growth rates for the study area. **Table 4.1** shows the average annual growth rate (AAGR) up to 2035, as defined by the traffic demand model. The AAGR values were applied to known traffic count locations to project 2035 AADT volumes.

		2013	Traffic Model	2035 Projected
_	cation	AADT	Projected AAGR (a)	AADT
I-15	S of Gore Hill	6,370	0.9%	7,681
I-15	N of Gore Hill	14,670	1.9%	22,358
I-15	N of 10 <sup>th</sup> Ave	10,550	2.1%	16,693
I-15	N of Central Ave	5,950	0.6%	6,804
I-15	N of Emerson	9,090	0.9%	10,998
I-315	W of 14th St SW	15,140	0.8%	17,979
I-315	W of Fox Farm	24,680	0.7%	28,546
31st St SW	S of Interchange	8,360	2.3%	13,678
Airport Dr	N of Interchange	3,640	4.6%	9,887
10 <sup>th</sup> Ave S	Warden Bridge	29,800	0.7%	34,630
Central Ave	E of Interchange	12,514	2.4%	21,270
Central Ave	W of Interchange	7,746	0.1%	7,974
Vaughn Rd	E of Interchange	6,530	1.4%	8,835
Vaughn Rd	W of Interchange	4,555	1.1%	5,762

**Table 4.1: Projected Traffic Volumes** 

The growth rates from the travel demand model were used to project Interstate mainline peak hour volumes. A LOS analysis was conducted for the Interstate under projected 2035 conditions. **Table 4.2** presents the resulting LOS values for both the AM and PM peak hours. As indicated in the table, all segments along I-15 and I-315 are projected to remain at a LOS B or better under 2035 conditions.

The traffic volumes along the interchange ramps were similarly projected to 2035 using growth rates defined in the travel demand model. The projected LOS of the interchange ramps is presented in **Table 4.3**. All of the interchange ramps are projected to remain within the acceptable bounds of LOS B put forth by MDT.

<sup>&</sup>lt;sup>(a)</sup> AAGRs were calculated from the traffic model developed for the Great Falls Area LRTP – 2014.

**Table 4.2: Projected Mainline LOS** 

			AM I	Peak Hour	PM P	eak Hour
				Density		Density
	Location	Direction	LOS	(pc/mi/ln)	LOS	(pc/mi/ln)
	South of Gore Hill	Northbound	Α	2.6	Α	2.6
	South of Gore Filli	Southbound	Α	3.1	Α	4.0
	North of Gore Hill	Northbound	Α	7.4	В	11.3
	Notifi of Gole fill	Southbound	Α	7.2	Α	9.3
I-15	South of Central Ave	Northbound	Α	4.8	Α	7.4
1-13	South of Central Ave	Southbound	Α	4.8	Α	7.2
	North of Central Ave	Northbound	Α	3.7	Α	3.4
	Notifi of Certifal Ave	Southbound	Α	2.4	Α	3.7
	North of Emerson Junction	Northbound	Α	3.4	Α	6.5
	North of Emerson Junction	Southbound	Α	6.1	Α	5.2
	West of 14 <sup>th</sup> St SW	Eastbound	Α	6.7	Α	8.9
I-315	WEST OF 14" ST 200	Westbound	Α	6.3	Α	7.3
1-313	East of 14th St SW	Eastbound	Α	10.9	В	12.5
	Last 01 14 St SVV	Westbound	Α	6.7	В	13.8

**Table 4.3: Projected Interchange Ramp LOS** 

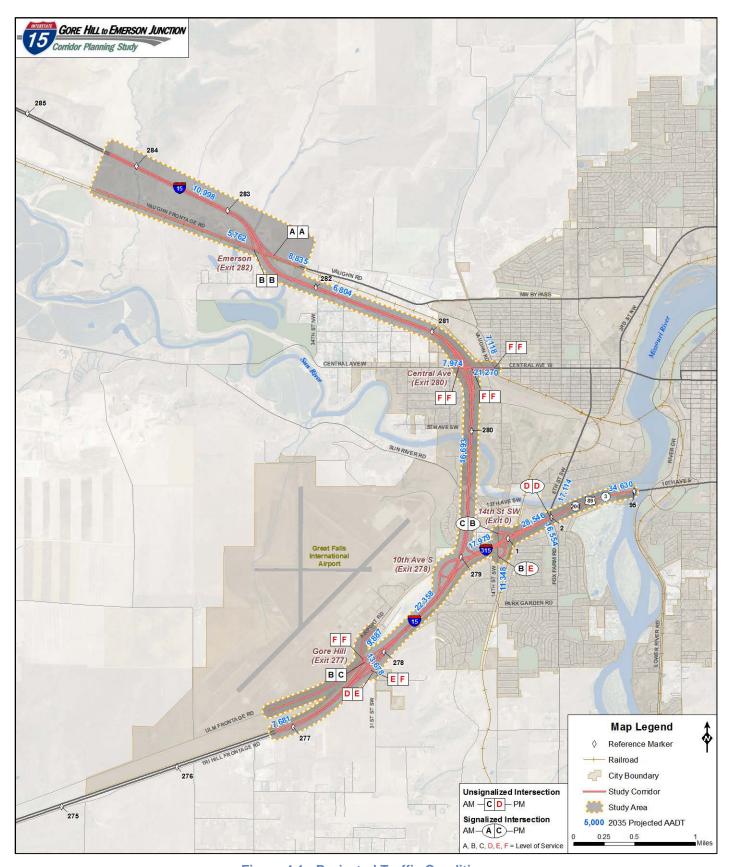
	AM P	eak Hour	PM P	eak Hour	
Locati	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	
		A	9.3	B	17.5
	NB On-Ramp		*.*		
Gore Hill	NB Off-Ramp	Α	5.7	Α	5.6
	SB On-Ramp	Α	0.3	Α	1.2
	SB Off-Ramp	Α	9.1	В	11.5
	NB On-Ramp	Α	8.4	В	11.5
10 <sup>th</sup> Ave S	NB Off-Ramp	Α	5.9	В	10.3
10 AVE 3	SB On-Ramp	Α	6.2	Α	8.3
	SB Off-Ramp	Α	6.5	Α	9.7
	EB On-Ramp	В	16.1	В	15.4
14 <sup>th</sup> St SW	EB Off-Ramp	Α	6.1	Α	8.2
14 31 31	WB On-Ramp	Α	9.1	В	10.1
	WB Off-Ramp	Α	4.0	В	11.4
	NB On-Ramp	Α	0.0	Α	1.3
Central Ave	NB Off-Ramp	Α	0.0	Α	0.0
Ociliai Ave	SB On-Ramp	Α	6.3	В	10.1
	SB Off-Ramp	Α	0.0	Α	0.0
Emerson Junction	NB On-Ramp	Α	3.7	В	10.3
Emerson Junction	SB Off-Ramp	Α	8.0	Α	7.0

Intersection volumes were projected to 2035 by applying growth rates along each intersection approach leg as defined by the travel demand model. The projected intersection LOS results are presented in **Table 4.4**. Similar to the existing LOS, many of the poor-performing intersections are two-way, stop-controlled intersections. All intersections on Central Avenue are projected to operate at a LOS of F if no changes are made before 2035. At Gore Hill, all but the southbound on-ramp intersections are expected to operate at a poor LOS. The three signalized intersections are projected to continue operating at levels similar to their current performance.

**Table 4.4: Projected Intersection LOS** 

		AM Peak Hour		PM Peal	( Hour
Intersection Name	Control Type	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Tri Hill and Frontage Airport Rd	Two-way stop	27.3	D	43.7	E
I-15 NB and Airport Rd	Two-way stop	44.2	E	(a)	F
I-15 SB On and Airport Rd	Two-way stop	10.4	В	23.5	С
I-15 SB Off and Airport Rd	Two-way stop	121.8	F	3138.9	F
14th St SW and I-315 EB	Signalized	13.3	В	12.4	В
14th St SW and I-315 WB	Signalized	22.2	С	19.6	В
Fox Farm and I-315	Signalized	39.0	D	35.6	D
Central Ave and I-15 SB	Two-way Stop	178.9	F	314.9	F
Central Ave and I-15 NB	Two-way Stop	113.1	F	445.2	F
Central Ave and Vaughn Rd	Two-way Stop	406.0	F	1422.7	F
Vaughn Rd and I-15 SB	Two-way Stop	11.0	В	11.0	В
Vaughn Rd and I-15 NB	Two-way Stop	7.3	Α	7.4	Α

<sup>(</sup>a) Outside the bounds of the software.



**Figure 4.1: Projected Traffic Conditions** 

## 5.0 ENVIRONMENTAL SETTING

This section provides a summary of the *Environmental Scan* developed by MDT.<sup>9</sup> The primary objective of the *Environmental Scan* is to determine potential constraints and opportunities within the study area. As a planning-level scan, the information is obtained from various publicly available reports, websites, and other documentation, as well as a "windshield survey" conducted by MDT staff. This scan is not a detailed environmental investigation. Refer to the MDT *Environmental Scan* for more detailed information.

## 5.1 PHYSICAL ENVIRONMENT

The following subsections present an overview of items related to the physical environment.

## 5.1.1 Soil Resources and Prime Farmland

Information obtained on soils is used to determine the presence of prime and unique farmland in the study area to demonstrate compliance with the Farmland Protection Policy Act. Farmland includes prime farmland, some prime if irrigated farmland, unique farmland, and farmland (other than prime or unique farmland) that is of statewide or local importance. Prime farmland soils are those that have the best combination of physical and chemical characteristics for producing food, feed, and forage; the area must also be available for these uses. Prime farmland can be either non-irrigated or lands that would be considered prime if irrigated. Farmland of statewide importance is defined as follows: land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops.

Soil surveys of the study area are available from the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS). NRCS indicates that prime if irrigated farmlands and farmlands of statewide importance are present in this corridor. Land from approximately RP 278.8 to 279.0 and 280.5 to 284.3 is considered prime if irrigated farmland. The approximate location of farmlands of statewide importance is from RP 266.8 to 278.0, 279.5 to 280.5, and 282.5 to 284.3.

If a federally funded improvement option forwarded from the study will require acquisition of lands from these areas, MDT will have to complete a CPA-106 Farmland Conversion Impact Rating Form for Linear Projects and coordinate with NRCS. NRCS will use information from that form to keep an inventory of the prime and important farmlands within the state. Some areas designated as prime farmland have previously been developed. Previously developed land designated as prime farmland is no longer subject to the Farmland Protection Policy Act and should not be an impact to future improvement options.

## **5.1.2 Geologic Resources**

Information on the geology and seismicity in the area of the corridor study was obtained from several published sources. Geologic mapping was reviewed for rock types, the presence of unconsolidated material, and fault lines. The seismicity and potential seismic hazards were also reviewed. This geologic information can help determine potential design and construction issues related to embankments and road design.

<sup>&</sup>lt;sup>9</sup> MDT Environmental, *I-15 Gore Hill to Emerson Junction Corridor Study – Environmental Scan*, August 2014

Hillside slopes between the uplands and valley floor appear to be marginally stable at a maximum approximate slope of 2H:1V. There are numerous visible signs of instability, but most are relatively small and presently inactive. MDT exerted considerable effort stabilizing the cuts through Gore Hill in the 1980s; several landslides required regrading, and a substantial network of pipes and drains was installed. Appropriate cut slope and drainage design will minimize the risk of destabilizing these hillside slopes again.

Settlement of embankment fills on valley floor deposits poses some risk through the proposed corridor. This risk may be mitigated by using a combination of methods, which include preloading embankments, lowering fill heights, and using wick drains to speed settlement.

Improvements brought forward from the study will be subject to a more detailed analysis of the above-mentioned geotechnical risk factors. Part of this detailed analysis may involve taking advance borings to evaluate soil characteristics at exact project locations. This is standard procedure for most MDT road projects. The design of any improvements should consider specific requirements that come from the detailed analysis.

## 5.1.3 Surface Waters

Maps and GIS data were reviewed to identify the location of surface water bodies within the study area, including rivers, streams, lakes, or reservoirs. The Sun River is the main surface water in the corridor. Additionally, various surface waters, including streams, natural drainages, and wetlands, are also present in the area, but in small numbers. Impacts on these surface waters may occur from project improvements such as culverts under the roadway or rip rap armoring of banks. Effects on those water bodies will have to be identified and coordinated with applicable agencies during any future project design.

Much of the study area is also located within the Great Falls Municipal Separate Storm Sewer System (MS4) area. Under the Small MS4 General Permit, new development or redevelopment projects greater than or equal to 1 acre must implement, when practicable, low-impact development (LID) practices that infiltrate, evapo-transpire, or capture for reuse the runoff generated from the first half-inch of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation. MS4 issues, including potential applicability of LID requirements, will have to be further evaluated during any future project design.

## **Total Maximum Daily Load Information**

Section 303, subsection d (303d) of the Clean Water Act requires the state of Montana to develop a list, subject to U.S. Environmental Protection Agency (EPA) approval, of water bodies that do not meet water quality standards. When water quality fails to meet state standards, the Montana Department of Environmental Quality (DEQ) determines the causes and sources of pollutants in a subbasin assessment and sets maximum pollutant levels, called total maximum daily load (TMDL).

A TMDL sets maximum pollutant levels in a watershed. The TMDLs become the basis for implementation plans to restore the water quality to a level that supports its designated beneficial uses. The implementation plans identify and describe pollutant controls and management measures (such as best management practices), the mechanisms by which the selected measures are to be put into action, and the individuals and entities responsible for implementation projects.

The study corridor travels through the Sun River Watershed. The Sun River crosses I-15 under a bridge within the study area and runs parallel to, and north of, 10th Avenue South on the eastern edge of the corridor. In this segment of the Sun River, bank erosion and channel alterations decrease the quality of the instream habitat. Water coming from Muddy Creek upstream of the corridor augments flows in the

Sun River during the irrigation season; the Muddy Creek water is high in nutrients and suspended sediments.

According to a 2014 DEQ report, the Sun River fully supports the beneficial use of drinking water. The creek does not support aquatic life (cold-water fishery and warm water fishery) use based on numerous reports indicating severe impairment. Macroinvertebrate and periphyton sampling results indicate moderate to severe impairment. Aquatic life habitat is severely impaired due to siltation, flow alteration, bank erosion, and habitat degradation. Aquatic life chemistry is severely impaired due to high nutrient concentrations, turbidity, and temperatures. Agricultural uses are severely impaired due to relatively high total dissolved solids that decrease suitability for irrigation. The lack of support for recreation use is due to high amounts of nutrients that increase the risk of nuisance algal blooms.

The 2014 Integrated 303(d)/305(b) Water Quality Report for Montana by DEQ lists the Sun River watershed as impaired. The water bodies within the Sun River watershed that are located in the study area are Category 4A. Category 4A water bodies are waters where one or more applicable beneficial uses are impaired, threatened, or not supported, and a TMDL has been completed and approved to address the factors causing the impairment or threat. Any construction practices will have to comply with the requirements set forth in the TMDL plan.

## Wild and Scenic Rivers

The Wild and Scenic Rivers Act Congress created in 1968 provided for the protection of certain selected rivers, as well as their immediate environments, that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. At this time, neither the Sun River, nor any of its tributaries, carries the wild and scenic designation. The Missouri River at the east terminus of the corridor study also does not carry the wild and scenic designation.

## 5.1.4 Groundwater

There are currently 6,105 wells on record in Cascade County; some of these wells exist within the study area. There are three State Monitoring Network wells and 28 public water supply wells in Cascade County. The wells in Cascade County have many different uses, the most common being domestic use. The typical setback for a public water supply well is a 100-foot isolation zone in which no source of pollutant should be inside, making a public well an item of avoidance. If either a private or public well is to be impacted, standard right-of-way procedures would need to be followed. Impacts on existing wells should be considered if a project is forwarded from this study.

#### 5.1.5 Wetlands

The U.S. Army Corps of Engineers (COE) defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Formal wetland delineations according to standard COE- and MDT-defined procedures will have to be conducted during the project development process. Additionally, impacts on wetlands will have to be avoided and minimized to the greatest extent possible through conscientious project design. Documentation of avoidance and minimization measures will have to be included in the project development. Unavoidable wetland impacts will have to be mitigated in accordance with COE regulations and Executive Order 11990: Protection of Wetlands. During any project development process,

evaluation of potential stream impacts according to COE's May 2013 Stream Mitigation Procedure (or revised version) will be necessary.

## 5.1.6 Floodplains and Floodways

Executive Order 11988, Floodplain Management, requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions:

- Acquiring, managing, and disposing of federal lands and facilities
- Providing federally undertaken, financed, or assisted construction and improvements
- Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities

Federal-Aid Policy Guide, 23 CFR 650, Bridges, Structures, and Hydraulics, provides "policies and procedures for the location and hydraulic design of highway encroachments on flood plains, including direct Federal highway projects administered by the FHWA." This document defines the "Base Flood" as the "flood or tide having a 1 percent chance of being exceeded in any given year" and the "Base Flood Plain" as the "area subject to flooding by the base flood."

Federal Emergency Management Agency Issued Flood Maps for Cascade County indicate that the Zone AE 100-Year Flood with base flood elevations exists along only two small portions of the study area. The remainder of the study area is Zone X, which is the 500-Year Flood, or is not within a floodplain at all. Forwarding of improvement options from the study that result in the placement of fill within the regulatory floodplain will require identifying and evaluating impacts on the floodplains. Project development could require coordination with Cascade County and the City of Great Falls to minimize floodplain impacts and obtain necessary floodplain permits for project construction.

## 5.1.7 Irrigation

Irrigated grazing land exists within the study area. Depending on the improvement option(s) proposed, there is a potential to impact irrigation facilities. Project development may require redesigning, modifying existing, and/or constructing new irrigation canals, ditches, or pressurized systems in consultation with the owners to minimize impacts on agricultural operations. Additional expenses may occur if impacts on irrigation facilities will occur based on study findings.

## 5.1.8 Air Quality

EPA designates communities that do not meet National Ambient Air Quality Standards (NAAQS) as "non-attainment areas." States are then required to develop plans to control source emissions and ensure future attainment of NAAQS. Great Falls was designated non-attainment for carbon monoxide (CO) in 1980, and eventually the limits of the non-attainment area were mapped as the 10<sup>th</sup> Avenue South Corridor. In 2002, Great Falls received designation to attainment status for carbon monoxide. Great Falls is now under a December 2000 Carbon Monoxide Limited Maintenance Plan (CO LMP). The Montana DEQ submitted an updated Great Falls CO LMP in 2011, and revisions to the State Implementation Plan that would include some alternative CO monitoring strategies were laid out in the 2011 LMP. However, until EPA acts on these submittals, the December 2000 CO LMP is the controlling

document for current air quality conformity determinations. The former non-attainment area is not located within the study area, so no further transportation conformity analysis will be necessary.

Depending on the scope of the project under consideration along this corridor, an evaluation of mobile source air toxics (MSATs) may be required. MSATs are compounds emitted from highway vehicles and off-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. The expectation that special air-quality design considerations will be required is low when considering future project design.

### 5.1.9 Hazardous Substances

The Natural Resource Information System database was searched for underground storage tank (UST) sites, leaking underground storage tank (LUST) sites, abandoned mine sites, remediation response sites, landfills, National Priority List sites, hazardous waste, crude oil pipelines, and toxic release inventory sites within the study area.

#### **USTs and LUSTs**

There is a cluster of UST and LUST sites at the Airport Interchange and numerous tank sites along Terminal Drive with facilities associated with the airport. None of these sites is likely to result in added cost or resources to any project that is forwarded from the study, however.

There is one unresolved LUST site near 34<sup>th</sup> St Southwest, referred to as the Ruth Graham Property, and two other LUST sites along the Northwest Bypass both east and west of 34<sup>th</sup> St Northwest. Both of those sites are also currently unresolved. One is the Yellowstone Truck Stop, and the other is N&H Transportation. Construction near these leaking tank sites may result in handling and disposal of contaminated soils, which will increase costs.

## Water Quality Act/State Superfund Sites (Comprehensive Environmental Cleanup and Responsibility Act)

There are four Water Quality Act (WQA) or State Superfund Sites listed in DEQ's on-line database; only one of the four is active. The active site, Western by Products, is located near the north end of the study area between I-15 and Vaughn Road. Information available for this site indicates that it is currently an "Active" site; however, a No Further Action status was issued in 1984. If a project encroaches onto this facility, there may be additional costs associated with contaminated soil and groundwater. Efforts should be made to avoid impacts on this site if possible as it is still listed on the WQA Ranking list.

## 5.2 BIOLOGICAL ENVIRONMENT

The following information applies to natural resources within the study area and reflects a baseline natural resource condition. Depending on the level of detail available through the high-level baseline scan, some of the information is presented at the county level, some at the study-area level, and some at the corridor level.

### 5.2.1 Mammals

Wildlife species inhabiting or traversing the project study area are typical of those that occur in developed and disturbed areas of central Montana. Most species habituate to disturbed areas and, as a result, are predominately generalist species.

Common mammals occupying habitats in, traversing, or having a distribution range that overlaps the study area are white-tail deer, mule deer, and coyote. Other common mammals potentially occurring in the project area include, but are not limited to, porcupine, raccoon, striped skunk, badger, bobcat, red fox, muskrat, Richardson's ground squirrel, deer mouse, and meadow vole.

A review of the MDT Maintenance Animal Incident Database for from January 2004 through December 2013 shows 39 records of animal carcasses within the study area. With the exception of only a few other animals, white-tail deer and mule deer account for most of the recorded wildlife mortality within the study area. One elk, one pronghorn antelope, one mountain lion, and two coyotes comprise the other records. The majority of the carcass pickups were located around the bridge over the Sun River and to the north, from RP 279.5 to RP 284.

#### **5.2.2 Birds**

Trees or structures that will be impacted by any project resulting from this corridor study should be removed outside of the nesting season (typical nesting season is from April 15 to August 15) or when active nests are not present. Any projects forwarded from this study will have to include consideration of potential constraints that may result from nesting times of migratory birds.

No bald eagle or golden eagle nests were identified within one-half mile of the study area. Review of the corridor for eagle nests will have to occur during project design and before construction to verify that no new nests are present.

## 5.2.3 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) maintains the federal list of threatened and endangered species. Species on this list receive protection under the Endangered Species Act. An "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future. USFWS also maintains a list of species that are candidates or proposed for possible addition to the federal list. According to USFWS, five threatened, endangered, or candidate species are listed as occurring in Cascade County (see **Table 5.1**).

Common Name	Status
Canada Lynx	Threatened
Red Knot	Proposed
Wolverine	Proposed*
Sprague's Pipit	Candidate
Whitebark Pine	Candidate

**Table 5.1: Threatened and Endangered Species in Cascade County** 

The Montana Natural Heritage Program - Natural Heritage Map Viewer (report generated May 15, 2014) database records and maps documents observations of species in a known location. According to the database (report generated May 15, 2014), there are no records of any threatened, endangered, proposed, or candidate species within the boundaries of the corridor study.

As the federal status of protected species changes over time, reevaluation of the listing status and a review for the potential occurrence of these species in the project area should take place before issuing a determination of effect relative to potential project impacts. If a project moves forward from this study,

<sup>\*</sup>Note that the wolverine has since been removed as a proposed threatened and endangered species.

completion of an evaluation of potential effects on any of the species listed above has to occur during the project development process.

## 5.2.4 Species of Concern

Montana Species of Concern (SOCs) are native animals breeding in the state that are considered to be at risk due to declining population trends, threats to their habitats, and/or restricted distribution. Designation of a species as an SOC is not a statutory or regulatory classification. Instead, these designations provide a basis for resource managers and decision-makers to direct limited resources to priority data collection needs and to address conservation needs proactively.

According to the Montana Natural Heritage Program - Natural Heritage Map Viewer (report generated May 15, 2014) database, which records and maps documented observations of SOCs in a known location, there is one historic record of many-headed sedge within the study area. This record is from 1891, and there is no expectation for this species to occur within the study area due to development of Great Falls since 1891.

Conducting a reevaluation for the presence of SOCs is important during the project design phase. If present, developers should consider adding special conditions to the project design and/or construction documents to avoid or minimize impacts to these species.

## 5.2.5 Vegetation

According to the Montana National Heritage Program Landcover Report, the dominate land cover near the study area is developed land consisting of major roads, including the Interstate, residential, and commercial land. Outside the developed land in the city of Great Falls are some cultivated crops, including hay land south of the Gore Hill Interchange and north of the Emerson Junction, as well as a minor amount of grassland, wetlands, and riparian habitat near the Sun River crossing. All land types in the project area are disturbed to some extent. If forwarding a project from the study, following practices outlined in Standard Specification 201 and any related supplemental specifications will help minimize adverse impacts on vegetation.

#### 5.2.6 Fisheries Information

Montana Fish, Wildlife, and Parks (FWP) listed the Sun River as a substantial fishery resource value and manages the Sun River as a trout water. I-15 crosses the Sun River within the study area. According to the Montana Fisheries Information System (MFISH) database (report generated May 15, 2014), fish species commonly occurring within the Sun River within the study area are as follows:

- Brown trout
- Longnose sucker
- Longnose dace
- Stonecat
- Walleye
- White sucker

Rare fish species within the study area include the following:

- Mottled sculpin
- Rainbow trout
- Mountain whitefish

- Burbot
- Common carp
- Flathead chub
- Northern pike

FWP listed the Missouri River as a substantial fishery resource value and manages the Missouri River as a non-trout water. 10<sup>th</sup> Avenue South crosses the Missouri River at the east terminus of the study area.

Forwarding any projects that affect the Sun River or Missouri River will likely require incorporation of design measures to facilitate aquatic species passage. Notification to FWP is necessary for impacts on the Sun River aquatic resources.

#### 5.2.7 Noxious Weeds

Noxious weeds can degrade native vegetative communities, choke streams, compete with native plants, create fire hazards, degrade agricultural and recreational lands, and pose threats to the viability of livestock, humans, and wildlife. Areas with a history of disturbance, like highway rights-of-way, are at particular risk of weed encroachment. The Invaders Database System lists 28 exotic plant species and 10 noxious weed species documented in Cascade County, some of which may be present within the study area.

Seeding disturbed areas with desirable plant species will reduce the spread and establishment of noxious weeds and allow reestablishing permanent vegetation. If forwarding a project from the study, field surveys for noxious weeds should begin before any ground disturbance.

## 5.2.8 Crucial Areas Planning System

The Crucial Areas Planning System (CAPS) is a resource intended to provide useful and non-regulatory information during the early planning stages of development projects, conservation opportunities, and environmental review. The finest data resolution within CAPS is at the square-mile section scale or water body. Use of these data layers at a more localized scale is not appropriate and may lead to inaccurate interpretations since the classification may or may not apply to the entire square-mile section. This scale is too broad for use during MDT's assessment of potential impacts at the project level. The CAPS system provides a general overview of the study area. CAPS results are presented in the *Environmental Scan*.

CAPS provides general recommendations and recommendations specific to transportation projects for both terrestrial and aquatic species and habitat. These recommendations of the CAPS system can have a generic application to possible project locations moving forward from the study. Coordination with the FWP wildlife biologist should occur during project development.

## 5.3 SOCIAL AND CULTURAL ENVIRONMENT

The following subsections present an overview the social and cultural environment within the study area.

## **5.3.1 Demographic and Economic Conditions**

Under the National and Montana Environmental Policy Acts and associated implementing regulations, state and federal agencies must assess potential social and economic impacts resulting from proposed actions. FHWA guidelines recommend consideration of impacts on neighborhoods and community cohesion, social groups including minority populations, and local and/or regional economies, as well as growth and development induced by transportation improvements. **Section 2.0** presents demographic

and economic information to assist in identifying human populations that improvements may affect within the study area.

Title VI of the U.S. Civil Rights Act of 1964, as amended (USC 2000(d)) and Executive Order 12898 require that no minority, or, by extension, low-income person shall be disproportionately adversely impacted by any project receiving federal funds. For transportation projects, this means that no particular minority or low-income person may be disproportionately isolated, displaced, or otherwise subjected to adverse effects. If forwarding a project from the improvement option(s) occurs, an Environmental Justice evaluation will have to occur during the project development process.

## 5.3.2 Land Ownership and Land Use

Ownership of the land within the study area is a mix of private and public. MDT and State Trust are the only holders of public land within the corridor. Most of the public land is in the form of right-of-way or state parklands. Most of the land in the study area is either residential rural and/or urban. The other land uses within the corridor are commercial, industrial, agricultural, and recreational.

Additional research and coordination will be required to ascertain the specific encumbrances associated with particular parcels of land. Any projects that move forward from this study will have to consider adjacent land use.

## 5.3.3 Recreational Resources

The intent of Section 4(f) is to protect publically owned parks, recreation areas, wildlife and waterfowl refuges, and public and private historic sites of local, state, and national significance. Transportation projects using federal funds cannot use properties that are protected by Section 4(f) unless there are no feasible and prudent avoidance alternatives and all possible planning to minimize harm has occurred.

Various recreational resources exist within and near the study area. A green belt on the northeast corner of 10<sup>th</sup> Avenue South and 6<sup>th</sup> St SW, owned by MDT, is not protected under Section 4(f) per 23CFR774.13(H)(2014). According to the Montana FWP resources list, there are two state-owned parks inside the study area, Westside Viaduct Park and West Hill Park. Currently the only development on either of these two parks is a lift station in West Hill Park. The remainder of this parkland is undeveloped and not currently available for public use. There is also one City of Great Falls park located, Community Hill Park, within the study area. The Community Hill Park is currently being used as a community garden / orchard that has standard access hours, outside of which it is locked preventing access by the public.

If a project is forwarded that may impact these parks, a reevaluation should take place to determine what the parks availability for use by the public is at that time. If these parks become available for full time public use in the future, additional investigation and coordination with the officials having jurisdiction over the parks will be necessary to determine whether the parks are "significant" and protected by Section 4(f) of the U.S. Department of Transportation Act.

Section 6(f) of the National Land and Water Conservation Fund Act is another federal measure intended to preserve, develop, and assure the quality and quantity of outdoor recreation resources. Section 6(f) protection applies to all projects that impact recreational lands purchased or improved with land and water conservation funds. At this time, there are no Section 6(f) resources identified in the study area. If a project were to be developed outside of the study area, reevaluation of 6(f) resources would have to occur, as they exist close to the study area limits. Avoiding impacts on 6(f) resources is a priority. Approval for a 6(f) use is a lengthy process involving rigorous mitigation requirements and approvals from several resource agencies.

## 5.3.4 Cultural Resources

If a project is federally funded, MDT will conduct a cultural resource survey of the area of potential effect for this project, as specified in Section 106 of the National Historic Preservation Act (36 CFR 800). Section 106 requires federal agencies to "take into account the effects of their undertakings on historic properties." The purpose of the Section 106 process is to identify historic and archaeological properties that could be affected by the undertaking, assess the effects of the project, and investigate methods to avoid, minimize, or mitigate any adverse effects on historic properties. Special protections for these properties are also afforded under Section 4(f) of the Transportation Act.

A file search of the study area through the Montana State Historic Preservation Office revealed one historic property located within 0.15 mile of the existing alignment, the Missouri River/Warden Bridge. In addition, five National Registry of Historic Places (NRHP) listed historic districts and properties are located within a mile of the study corridor, but are outside the study area (see **Table 5.2**). An examination of the Montana Cadastral Survey information indicates that at least 33 historic age properties are located within 0.2 mile of the existing corridor. The study area contains many cultural resources, all of which consist of historic sites. Cultural resources will not likely be a substantial issue, but the issue is important to address as planning progresses.

Site	Site No.	NRHP Eligibility
Missouri River/Warden Bridge	24CA0401	Listed
Cascade County Courthouse	24CA0233	Listed
Great Falls Central Business District	24CA0977	Listed
C.M. & St. P. Passenger Depot	24CA0271	Listed
Great Falls Railroad Historic District	24CA0335	Listed
Great Falls West Bank Historic District	24CA1527	Listed

**Table 5.2: Historic Properties** 

If a project is forwarded from the study, a cultural resource survey for unrecorded historic, pre-historic, and archaeological properties within the area of potential effect will be completed during the project development process. Flexibility in design will be important to avoid and/or minimize impacts on historically significant sites.

## **5.3.5** Noise

Traffic noise may have to be evaluated for planned improvements to the study corridor. Noise analysis is necessary for "Type I" projects. If the roadway improvements are limited (e.g., the horizontal and vertical alignments are not changed, and the highway remains a two-lane facility), then the project would not be considered a Type I project.

If the improvements planned for the road would include a substantial shift in the horizontal or vertical alignments, increasing the number of through-lanes, passing lanes, or turning lanes, or increasing the traffic speed and volume, then the project would be considered a Type I project, which would require a detailed noise analysis. The analysis would include measuring ambient noise levels at selected receivers and modeling design-year noise levels using projected traffic volumes.

Noise abatement measures would be considered for the project if noise levels would approach or substantially exceed the noise abatement criteria. The noise abatement measures must be considered

reasonable and feasible before implementation. If noise abatement measures were deemed necessary, they could increase costs of proposed future Type I roadway improvements.

### 5.3.6 Visual Resources

The visual resources of an area include landforms, vegetation, water features, and physical modifications caused by human activities that give the landscape its visual character and aesthetic qualities. Visual resources are typically assessed based on the landscape character (what is seen), visual sensitivity (human preferences and values regarding what is seen), scenic integrity (degree of intactness and wholeness in landscape character), and landscape visibility (relative distance of seen areas) of a geographically defined view shed. The study area is a blended landscape that has been developed with islands of natural beauty persevering. An evaluation of the potential effects on visual resources may be necessary, depending on the improvement options forwarded from this study.

# 6.0 AREAS OF CONCERN AND CONSIDERATION SUMMARY

This section provides a list and description of areas of concern and consideration within the study area. These areas were identified through review of as-built drawings, field review, public databases, and other resources. More discussion has been provided in the previous sections, and it is reiterated here as appropriate. **Figure 6.1** provides a graphical summary of the areas of concern.

## **6.1 Transportation System**

## **Bridges**

 Bridges along the Interstate within the study area have surface widths that do not meet current standards.

## **Operations**

- The Interstate System is considered a Level I winter maintenance level.
- Snow fence and VMS are currently used to address vehicle operations related to adverse weather conditions.

## **Pavement Condition**

- A segment of I-15 currently has poor surfacing conditions. A resurfacing project is planned for this location in 2017.
- I-315 had poor to fair surfacing conditions.

## Railroad

• The Interstate crosses over the railroad at two locations within the study area.

## Air Service

• The Great Falls International Airport is adjacent to the study area and is accessed primarily by the Gore Hill Interchange.

#### **Mainline Interstate**

- One location on I-15 has a vertical grade that does not meet current standards.
- Two vertical curves on I-15 do not meet current standards.
- One horizontal curve on I-15 and one horizontal curve on I-315 do not meet current standards.

#### **Interchanges**

- Seven of eight interchange on-ramps do not appear to meet current standards for acceleration length.
- Three of seven interchange off-ramps do not appear to meet current standards for deceleration length.

- Spacing between the 10<sup>th</sup> Avenue South and 14<sup>th</sup> Street SW Interchanges does not appear to meet current standards.
- Emerson Junction is a partial interchange and does not support full vehicle movements.

#### **Intersections**

 Six of the twelve intersections evaluated have a LOS of D or worse during one or both peak hours.

## Safety

- Four fatal crashes and eight incapacitating injury crashes occurred during the five-year analysis period.
- A trend of fixed-object collisions was noted occurring along the Interstate.

## **6.2 Environmental Considerations**

## **Physical Environment**

- Areas of prime farmland if irrigated and farmlands of statewide importance exist within the study area.
- There are signs of instability and past landslides near the Gore Hill area.
- Much of the study area is located within the Great Falls MS4 area.
- I-15 crosses over the Sun River.

## **Biological Environment**

- Thirty-nine animal carcasses were recorded over the past ten years.
- Five threatened, endangered, or candidate species are listed within Cascade County.
- Seven rare fish species are listed within the study area.
- Twenty-eight exotic plant species and ten noxious weed species are documented within Cascade County.

### **Social and Cultural Environment**

- Two 4(f) resources are located within the study area.
- The Missouri River/Warden Bridge is listed as a historic property.

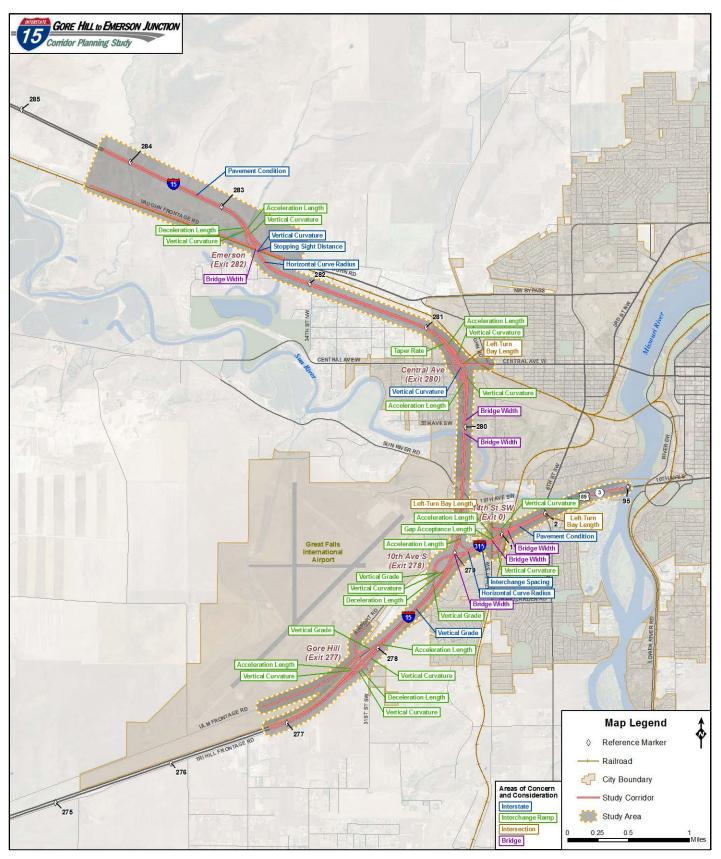
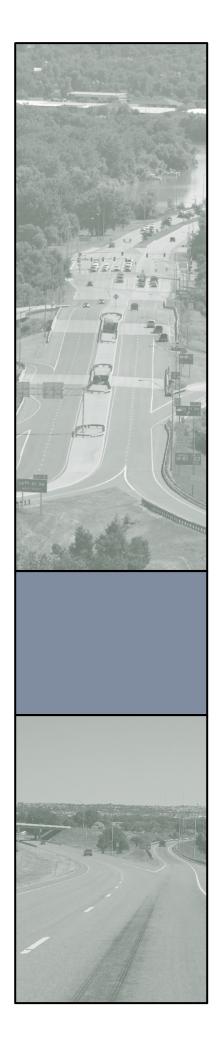


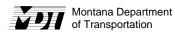
Figure 6.1: Areas of Concern and Consideration





## **APPENDIX A**

**Bridge Inspection Reports** 



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## Printing Date: Thursday, May 22 2014

100015279+09761 **Location: GREAT FALLS Structure Name:** 

**General Location Data** 

District Code, Number, Location: 03 **GREAT FALLS**  MDT Maintenance Section: 31-01 Great Falls

Division Code, Location:31

**GREAT FALLS** 

County Code, Location: 013 **CASCADE** 

City Code, Location: 32800 Signed Route Number: 00015 **GREAT FALLS** 

Kind fo Hwy Code, Description: 1 Str Owner Code, Description: 1

1 Interstate Hwy State Highway Agency

Maintained by Code, Description:1

Kilometer Post, Mile Post:

**State Highway Agency** 

Intersecting Feature: SUN RIVER

Latitude: 47°29'58"

450.57 km

279.97

Structure on the State Highway System:

Structure on the National Highway System:

Longitude: 111°20'34"

Percent Trucks:

Construction Project Number: I 15-5(22)273

Construction Station Number: 589+50.00

Str Meet or Exceed NBIS Bridge Length:

Construction Drawing Number: 6903

Construction Year: 1966

**Construction Data** 

**Traffic Data** Current ADT: 9,150

ADT Count Year: 2009

2 % Reconstruction Year:

## Structure Loading, Rating and Posting Data

## Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	33.5 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data :	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	58.32		

## Structure, Roadway and Clearance Data

## Structure Deck, Roadway and Span Data:

Structure Length: 147.83 m

> Deck Area: 1,442.00 m sq

8.53 m Deck Roadway Width: 11.28 m Approach Roadway Width:

Median Code, Description: 0 No median

## Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

N Feature not hwy or RR Reference Feature for Vertical Clearance:

0.00 m Vertical Clearance Under the Structure:

N Feature not hwy or RR Reference Feature for Lateral Underclearance:

0.00 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

#### Span Data

#### Main Span

Number Spans: 5

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type: 0 None Deck Membrain Type: 0 None

## Approach Span

Number of Spans: 0 Material Type Code, Description: Span Design Code, Description:

> 9.75 m (52) Out-to-Out Width: (50A) Curb Width: (50B) Curb Width: 0.00 m 0.00 m Skew Angle: 15°

## Structure Vertical and Horizontal Clearance Data Inventory Route:

	Over / Under Direction	Inventory	South, W	est or Bi-directio	nal Travel	North or East Travel			
	Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
Ī	Route On Structure	I00015	N/A			North	99.99 m	8.53 m	
Ī	I-15 NB								



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**Inspection Data** 

Inspection Due Date : 19 December 2014

Next Under Water Insp : 15 Nov 2016

Sufficiency Rating: 78.5 (91) Inspection Frequency (months): 24 Under Water Insp Type: Type II
Structure Status: Func Obs - Elg Rehab

**NBI Inspection Data** 19 December 2012 Charles Pepos - 107 Last Inspected By (90) Date of Last Inspection: (90) Inspection Date Inspected By (62) Culvert Rating : N (58) Deck Rating: 7 (36A) Bridge Rail Rating: (68) Deck Geometry: 3 (59) Superstructure Rating: (61) Channel Rating: 6 (36B) Transition Rating: (67) Structure Rating : 6 (71) Waterway Adequacy (60) Substructure Rating : 6 (36C) Approach Rail Rating (69) Under Clearance: N (36D) End Rail Rating (113) Scour Critical: 5 (72) App Rdwy Align : 7 (41) Posting Status **Unrepaired Spalls:** 0 m sq 1.00 in Deck Surfacing Depth: **Inspection Hours** Snooper Required : N Crew Hours for inspection: Snooper Hours for inspection Helper Hours: 0 Flagger Hours Special Crew Hours: 0 Special Equipment Hours: Effected Scope of Covered **Inspection Work Candidates Priority Status** Structure Work Action Condition Candidate ID Unit States Requested

Late Reason:

Inspection Date: 12/19/2012



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## **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 22 - P Conc Deck/Rigid Ov X 3 1441 sq.m. 100 % % Previous Inspection Notes: 12/19/2012 - Random, tight cracks in all of the Spans. Minor studded tire wear in the wheel paths. 12/27/2010 - 9.75 \* 147.83 = 1441.34 Deck had 1" milled off and then placed 2" of silica fume concrete in 2010. Deck looks Good today. Some cracking near Abutment 1 that were sealed during construction. Inspection Notes: Element 109 - P/S Conc Open Girder 739 100 % % Previous Inspection Notes: 12/19/2012 - Good condition. Spall is unchanged in Span 5 and no new hits were observed. 12/27/2010 - Good condition. Small spall on the Right girder in Span 5 has not changed. 12/02/2008 - Good Condition. Same on the Right most girder in Span 5. 11/02/2006 - Right girder in Span 5 has been hit by overheight equipment and caused a small spalled area. No cracking or visible strands in this 10/18/2002 - 147.83 \* 5 = 739.15m No change. Inspection Notes: Element 210 - R/Conc Pier Wall Piers 2 thru 5 3 41 m. 90 % % % Previous Inspection Notes: 12/19/2012 - Some tight vertical cracking. Small spalls along the backside of the ice breakers. Small delamination on the face of Pier 4 near the waterline. Some surface scale on the Pierwalls near the waterline. 12/27/2010 - Tight mapping cracks in the Pierwall faces. Some small spalls along the ice breakers. Some small delaminated areas observed during last snooper inspection in the worst cracked areas. There are no additional comments from the underwater inspection by Infrastructure Engineers on 11/15/2011. CRH 12/02/2008 - Small spalls, Condition State 2, and some small delaminations, Condition State 3. 11/02/2006 - Minor concrete spall at the waterline near the Pier noses. Several areas of tight mapping cracks in all (4) Pier walls. Ice breakers painted this past summer. Per Infrastructure Engineers August 22, 2006 underwater inspection, the substructure units are in good condition. There are no significant structural defects below the high waterline. There are vertical cracks up to 1/16" wide with light efflorescence on both the north face and south face of pier 3 starting at the waterline and extending up 10 feet. 10/18/2002 - 10.14 \* 4 = 40.56m Same as snooper inspection of 05-29-2001. 04/13/1998 - Snooper Inspection of 5-29-2001: Some minor section loss at the water line from debris and ice. Some drift at the nose of the pier shafts. Ice breakers could be painted. 02/01/1994 - None Inspection Notes:

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\* \* \* \* \* \* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 215 - R/Conc Abutment 1 and 6 27 m. 90 % Previous Inspection Notes: 12/19/2012 - Left corner of Abutment 6 is delaminated. Small spalls at the backwall to cap area. 12/27/2010 - Delaminations on Left end of Abutment 6's cap. A couple of small surface spalls in the backwalls near girder embedments. Tight shrinkage cracks in both backwalls. 12/02/2008 - Abutment 6 has a small delminaiton on the Left end of the cap; Condition State 3. Tight cracks in both backwalls; Condition State 2. None are a problem. 11/02/2006 - Minor and tight cracks in both Abutments. Both backwalls have a couple of small spalls near the bearings where girder are 10/18/2002 - (10.14 \* 2) (4 \* 17.75) = 27.28 m okInspection Notes: Element 234 - R/Conc Cap Piers 2 thru 5 41 90 m. % % % % Previous Inspection Notes: 12/19/2012 - Small delamination on the Right end and Span 4 side of Pier 5's cap. Small spalls in random areas along the edges of the caps; none are a problem. Bird debris on tops of the caps. 12/27/2010 - Small delamination on the Span 4 side of Bent 5's cap. Some minor spalls. Bird debris on the caps. 12/02/2008 - Small spalls and some cracks; Condition State 2. A couple of small delaminations; Condition State 3. 11/02/2006 - Staining from past leaking joints. Some small areas where there is shallow and rusty tie wire which is causing some small surface spalling. 10/18/2002 - Change Env. State to a "1" as the leaky joints have been removed. Rest is the same as last several reports. Inspection Notes: Element 303 - Assembly Joint/Seal Pier 2 and 5 - New in 2010 3 20 100 m. % % Previous Inspection Notes: 12/19/2012 - Sanding material is packed in the joint glands. Steel sound solid when tapped on. 12/27/2010 - All of the steel looks Good. Ends of the joints area at the curb shows sloppy workmanship pathces. 12/02/2008 - Steel sounds solid when tapped on. Some small spalls along the stell. Gland is full of sanding material. No leakage observed. 11/02/2006 - Joint area is packed full of sanding material. Some spalling along the joint steel. Steel sounds soild when tapped on. No leaking is apparent from either joint. 10/18/2002 - 10.14 \* 2 = 20.28m Replaced all (4) sliding plates with 303's. Full of sanding material. Inspection Notes:

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Element Des	•	_								
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311	- Moveable Be	aring								
	1	2	25	ea.		90	10	0		
						%	%	%	%	9,
Previous Ins	pection Notes :	1				I				
12/19/2012 -	Alignment is o	k. Spot rus	st, paint loss, ar	nd faded	d paint.					UZGZ
	Spot rust, pain									ZBDZ
	Some spot rus									DZGZ
11/02/2006 -	Blown off and	overcoat pa	ainted in 2006.							CKDP
10/18/2002 -	No change.									VZJZ
04/13/1998 -	Snooper inspe	ction of 5-2	29-2001: Some	rust, pi	tting, and mi	nor paint loss; m	nostly on the north	n most pier.		RHGY
02/01/1994 -										REFI
Inspection N	lotes:									
порссион і	10103.									
Element 313	- Fixed Bearing	α								
Lieilieili 313			0.5			00	4.0			
	1	2	25	ea.		90	10	0		
						%	%	%	%	(
Previous Ins	pection Notes :									
12/19/2012 -	Spot rust, pain	it loss, and	faded paint.							UZGZ
12/27/2010 -	Spot rust and p	paint loss.	Bird debris.							ZBDZ
12/02/2008 -	Some spot rus	t and bird o	debris.							DZGZ
11/02/2006 -	Blown off and	overcoat pa	ainted in 2006.							CKDP
10/18/2002 -	No change fro	m last repo	rt.							VZJZ
Inspection N	lotes:									
<u> </u>										
Element 331	- Conc Bridge	Railing								
	1	3	296	m.		95	5	0	0	
					_	%	%	%	%	Q
Duarria va Jaar	ti Nistaa .					70	70	70	70	
	pection Notes :		D			-112	-1-1-1		D	-11707
	•			nrinkage	e cracks. Sp	alling on the bac	ckside of the barri	ier where the W-	-Beam bolts up.	UZGZ
	Unchanged fro				h			de a la acción de	0	ZBDZ
			s and add that t ace spall near th			upgraded to new	rail shoes since	tne last inspecti	on. Curbs under t	he DZGZ
11/02/2006 -	Minor and rand	dom verrtica	al cracks along			ome cracks also	along the rebar i	n random spots	on the backside o	f the CKDP
	ubs and scrape 147.83 * 2 = 29			acks an	d scrapes. F	Rail was placed i	in front of the met	al bridge rail in	1999.	VZJZ
		23.00111 111			_ 00.ap00. 1	Has placed i		2.1.0g0 10ii iii		
Inspection N	NOTES:									



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Element Des	scription									
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 334	- Metal Rail Co	ated Steel	Posts and Top	Round	Pipe No	w behind the Co	ncrete Rail		'	
	1	3	296	m.		90	10	0	0	
						%	%	%	%	
Previous Ins	pection Notes :									
	· · Rusty spots, pa	aint loss, ai	nd scale on the	rail pos	ts and top p	pipe tube.				UZGZ
							on the posts and	d top rail.		ZBDZ
12/02/2008 -	Rust, paint pee	el, some su	rface pitting, ar	nd expos	sed base co	eat.				DZGZ
11/02/2006 - throughout.	Rusty, pitting, f	aded paint	, peeling paint,	and sor	me prime co	oat visible on the	rail psots and top	rail pipe. W-be	am has rusty spots	CKDP
10/18/2002 -	147.83 * 2 = 29	95.63m R	ust, pitting, and	paint lo	ss througho	out.				VZJZ
04/13/1998 -	None									RHGY
02/01/1994 -	None									REFI
Inspection I	- Deck Crackin	a SmFlaa								
X	1	3	1	ea.	X	100	0	0	0	
	•	•	·	ou.		%	%	%	%	
						70	70	70	70	
	pection Notes :									
	Some reflective	Ŭ								UZGZ
	Milled off 1" an				me concrete	е.				ZBDZ
12/02/2008 -	Due to quantity	and need	to start tracking	g.						DZGZ
Inspection I	Notes:									

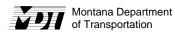


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## 100015279+09761

Continue

General Inspection Notes	
12/19/2012 - Good markers on both sides of Abutment 1 today.	UZGZ
12/27/2010 - NBI 72, roadway alignment, rated a "7" as bridge is narrower than the approach roadway. Good markers on Left and Right corners of Abutment 1. 12/02/2008 - Good markers on the approach section.	ZBDZ DZGZ
11/02/2006 - Markers on both side of the approach and they are in Good condition.  Steel bridge rail could be removed as it is not serving any purpose. Deck will be needing periodic patching and would be a Good candidate for a re-hab.	CKDP
Per Infrastructure Engineers August 22, 2006 underwater inspection, the substructure units are in good condition. There are no significant structural defects below the high waterline. There is no significant local or general scour present. There are no significant restrictions in the channel that will adversely impact flow. There is light timber debris at the upstream nose of pier 3. The channel bottom consists of mud/silt, and riprap. NBI ITEM 61 CHANGED PER INFRASTRUCTURE ENGINEERS UNDERWATER INSPECTION.	VZJZ
04/13/1998 - 5-29-2001: Snooper inspection this pm. Should remove the trees that are going up near and under the bridge on both ends.	RHGY
02/01/1994 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/11/97 10:44:28 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:15:02	REFI
09/01/1991 - Updated with tape 1994	NB94
02/01/1990 - Updated with tape 1991	NB91
02/01/1988 - Updated with tape 1989	NB89
02/01/1986 - Updated with tape 1987	NB87
01/01/1984 - Updated with tape 1985	NB85
08/01/1981 - Updated with tape 1984	NB84
03/01/1979 - Updated with tape 1980	NB80



**General Location Data** 

## **INITIAL ASSESSMENT FORM FOR STRUCTURE:**

**Location: GREAT FALLS Structure Name:** 

100015279+09762

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** 

Percent Trucks:

County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** 

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00015

State Highway Agency **State Highway Agency** Str Owner Code, Description: 1 Maintained by Code, Description:1

Intersecting Feature: SUN RIVER Kilometer Post, Mile Post: 450.57 km 279.97

2 %

Structure on the State Highway System: Latitude: 47°29'58"

Structure on the National Highway System: Longitude: 111°20'35"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number: I 15-5(22)273 Construction Station Number: 589+50.00

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Printing Date: Thursday, May 22 2014

Construction Drawing Number: 6903

Construction Year: 1966 Reconstruction Year: 1977

## Structure Loading, Rating and Posting Data

## Loading Data:

**Traffic Data** 

Current ADT: 9,150

	Design Loading:		5 MS 18 (HS 20)
ĺ	Inventory Load, Design:	32.6 mton	A LFD Assigned
ĺ	Operating Load, Design:	33.5 mton	A LFD Assigned
ĺ	Posting :		5 At/Above Legal Loads

ADT Count Year: 2009

Rating Data:	Operating	Inventory	Posting	
Truck 1 Type 3:				
Truck 2 Type 3-S3:				
Truck 3 Type 3-3 :	58.32			

## Structure, Roadway and Clearance Data

## Structure Deck, Roadway and Span Data:

Structure Length: 147.83 m Deck Area: 1,442.00 m sq

8.53 m Deck Roadway Width: 11.28 m Approach Roadway Width:

Median Code, Description: 0 No median

## Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

N Feature not hwy or RR Reference Feature for Vertical Clearance:

0.00 m Vertical Clearance Under the Structure:

N Feature not hwy or RR Reference Feature for Lateral Underclearance:

0.00 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

#### Span Data

#### Main Span

Number Spans: 5

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type: 0 None Deck Membrain Type: 0 None

## Approach Span

Number of Spans: 0 Material Type Code, Description: Span Design Code, Description:

> 9.75 m (52) Out-to-Out Width: (50A) Curb Width: (50B) Curb Width: Skew Angle: 15°

## Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	North or East Travel		
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	100015	South	99.99 m	8.53 m	N/A		
I-15 SB							



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### 100015279+09762 Continue

**Inspection Data** 

Inspection Due Date: 19 December 2014 (91) Inspection Frequency (months): 24

Next Under Water Insp : 17 Nov 2016

Under Water Insp Type : Type II

Sufficiency Rating : Structure Status : <b>Fu</b>		(91) Inspect	ion Frequenc	y (months) : <b>24</b>		Under Water	Insp Type : Type II
NBI Inspection D	ata						
(90) Date of Last Ins	spection : 19 December	er 2012		La	st Inspected By: Charles Pe	pos - 107	
(90) Inspection Date :					Inspected By :		
(58) Deck Rating : 7		(68) Deck Geo	metry : 3	(36A) I	Bridge Rail Rating : 1	(62) Culvert Rating : N	
(59) Superstructure	Rating: 7	(67) Structure F	Rating: 6	(36B)	Transition Rating : 1	(61) Chann	el Rating : 6
(60) Substructure Rating : 6				(36C) Ap	proach Rail Rating :1	(71) Waterway Adequacy :8	
(72) App Rdwy Align : <b>7</b>		(69) Under Clearance : N (41) Posting Status : A		(360	D) End Rail Rating : 1	(113) Scour Critical : 5	
	Unrepaired Sp	palls: 0 m	sq	=	Deck Surfacing	Depth:	.00 in
<b>Inspection Hours</b>	· · ·				·	,	
Crew Hours for inspe	ction: 2		Snoo	pper Required :	N		
Helper H	lours : 0	Sı	nooper Hours	for inspection :	0		
Special Crew H	lours : 0		ı	Flagger Hours :	0		
Special Equipment H	lours : 0					<u> </u>	
Inspection Wor	k Candidates			Effected	Scope of		Covered
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work	Action	Condition States
D31-FY2007-000037	26 December 2006	Approved	High	M Main	334 Metal Rail Coated	Repl Paint	
Clean and paint the rail Approved. DRC	and posts.						
D31-FY2013-000018	20 December 2012	Not Approved	Medium	M Main	210 R/Conc Pier Wall	Min Repair	
Remove the drift at the	nose of Pier 3.						

Late Reason:

Inspection Date: 12/19/2012



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## **Element Inspection Data**

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 22 - P Conc Deck/Rigid Ov Silica Fume Concrete oOverlay in 2010 3 1441 sq.m. 100 % % Previous Inspection Notes: 12/19/2012 - Some minor studded tire wear in the wheel paths. Some reflective cracking. 12/27/2010 - 9.75 \* 147.83 = 1441.34 Deck had 1" milled off and then placed 2" of silica fume concrete in 2010. Deck looks Good today. Some cracking near Abutment 1 that were sealed during construction. Inspection Notes: Element 109 - P/S Conc Open Girder 739 100 % % Previous Inspection Notes: 12/19/2012 - Good condition. 12/27/2010 - Good condition. 12/02/2008 - Good condition. Same on the scrapes in Span 5. 11/02/2006 - No problems observed. A couple of the girders in Span 5 have scrapes on their bottoms from overheight equipment. 10/18/2002 - 5 \* 147.83 = 739.15m Inspection Notes: Element 210 - R/Conc Pier Wall Piers 2 thru 5 3 42 m. % % Previous Inspection Notes: 12/19/2012 - Small spalls behind the ice breakers. Pier 4 has a small delaminated area in the underwater inspection; photo. Tight cracks in the 12/27/2010 - Unchanged from previous inspections. The 11/15/2011 underwater inspection by Infrastructure Engineers shows that this element is in the same condition with the same minor defects noted in the 2006 inspection. CRH 12/02/2008 - Condition State 3 for shallow surface delaminations and Condition State 2 for minor spalls and cracking. Wear at the waterline. 11/02/2006 - Minor wear/scaling of the concrete at the waterline and behind the ice breakers. Some areas of tight mapping cracks in the Pier walls sides. Patched areas appear to be holding up well, but some delamiantion also noted. Ice breakers overcoat painted in 2006. Per Infrastructure Engineers August 22, 2006 underwater inspection, the substructure units are in good condition. There are no significant structural defects below the high waterline. Pier 3 and 4 have light concrete scale up to 1/32" deep and light algae growth. 10/18/2002 - 4 \* 10.14 = 40.56m Same as previous reports. 04/13/1998 - Snooper Inspection of 5-29-2001: Some of the repaired areas are ok, some are questionable in their attachment to the existing concrete. Some wear and minor deterioration at the water line. Some drift at the nose of the peir shafts. 02/01/1994 - None Inspection Notes:

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### 100015279+09762 Continue

Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 215 - R/Conc Abutment 1 and 6 27 m. 95 % Previous Inspection Notes: 12/19/2012 - Small spalls by some of the girder embedments and along the cap to backwall area. 12/27/2010 - Small spalls near girder embedments. Abutment 1 has some plywood on the chamfered area from past construction. 12/02/2008 - Some tight cracks in both backwalls and small spalls near the girder embedments. 11/02/2006 - Both backwalls have a small spall near the bearings where the ends of the girders are embedded. Both caps have a couple of tight cracks that are not a problem. 10/18/2002 - 10.14 \* 2) (4 \* 1.75) = 27.28Inspection Notes: Element 234 - R/Conc Cap Piers 2 thru 5 1 41 m. 90 % % Previous Inspection Notes: 12/19/2012 - Small spall on the Left end of Pier 2's cap. Some staining from past joint leakage. Some bird nests/debris on top of the caps. Small spall on the caps of Pier 3 and 5. 12/27/2010 - Unchanged from previous inspections. Pier 2 and 5 were cleaned off this past summer. 12/02/2008 - Cap at Bent 2 has a small spall and delaminated area. Some cracks; none are a problem. 11/02/2006 - Stained from prior leaky joints. Some tight cracking under the girders and a couple of shallow tie wires are visible. Some CZDP delaminated patched areas also found. 10/18/2002 - Dropped Env. State as no longer un leaky joints; YET. 4 \* 10.14 = 40.56m No change from previous reports. Inspection Notes: Element 303 - Assembly Joint/Seal Pier 2 and 4 - New in 2010 3 100 % % % % Previous Inspection Notes: 12/19/2012 - Joint is packed with sanding material today. No apparent leakage. Steel is solid when tapped on. 12/27/2010 - Underside of deck at curbs shows poor workmanship in construction patches. 12/02/2008 - Steel sounds solid when tapped on. Small spalls along the joint edge. Full of sanding material. No leaking observed. 11/02/2006 - Joint gland is full of sanding material. No apparent leaking. Joint steel sounds solid when tapped on. Some spalling and delamiantion concrete along the joint steel. 10/18/2002 - 2 \* 10.14 = 20.28m Mostly full of sanding material. Inspection Notes:



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## 100015279+09762 Continue

\*\*\*\*\*\* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \*

						-	-			
Element Des	•									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311	- Moveable Be	aring								
	1	1	25	ea.		90	10	0		
						%	%	%	%	Q.
Previous Ins	pection Notes :									
 12/19/2012 -	- Alignment is G	ood. Paint	loss, spot rust,	and bir	rd debris.					UZGZ
	Spot rust, pain									ZIDZ
	Spot rust and I									DZGZ
	Blown off and									CZDP
				r a leak	cy joint; YET	. Rest is the san	me as the last sev	reral reports.		VCKA
			J		,, ,			•		
Inspection I	Notes.									
Elomont 212	3 - Fixed Bearing	~								
Eleffielit 313			0.5			20	4.0			
	1	1	25	ea.		90	10	0		
						%	%	%	%	o,
Previous Ins	pection Notes :						·			
12/19/2012 -	Paint loss, spo	t rust, and	birde debris.							UZGZ
12/27/2010 -	Spot rust, pain	it loss, and	bird debris.							ZIDZ
12/02/2008 -	Spot rust and I	bird debris.								DZGZ
11/02/2006 -	Blown off and	overcoat pa	ainted in 2006.							CZDP
10/18/2002 -	Dropped Env.	State as no	Inger under a	leaky jo	int; YET. Re	est is the same a	as previous report	S.		VCKA
Inspection I	Notes:									
Element 331	- Conc Bridge	Railing								
	1	3	296	m.		95	5	0	0	
	·		200			%	%	%		Q
						70	70	70	%	
	pection Notes :									
12/19/2012 - to barrier co		Right barrie	at Abutment 6	looks (	Good and is	holding up well.	Some random sh	rinkage cracks.	Spalls at the W-B	eam UZGZ
	· Unchanged fro	m previous	inspections.							ZIDZ
				acks. E	nds have be	en updated sinc	e the past inspec	tions for new gu	ardrail. Both curbs	s look DZGZ
	mall surface spa			and organ	king on hoth	sides with the h	ackside at some	of the rober less	tions	CZDP
	_	·			•				110115.	
10/16/2002 -	· 147.65 " Z = 25	93.00m S	ome umgs and	scrapes	s with some	verticai shrinkag	e cracks througho	Jul.		VCKA
Inspection I	Notes:									



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#### 100015279+09762 Continue

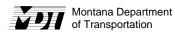
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 334	- Metal Rail Co	ated Steel	Posts w\ Rour	nd Top F	Rail behind th	ne Concrete Rail				
	1	3	296	m.		90	10	0	0	
						%	%	%	%	
Previous Inst	pection Notes :									
	Rusty spots, pa	aint loss a	nd some scale	on the n	nosts and ton	nine rail				UZGZ
	, , ,			•	•	• •	nn nine W-Rea	m removed in 20	10	ZIDZ
	Rusty spots, pe					•	op pipo. W Bod	101110464 111 20	10.	DZGZ
		٠.			•	· ·	nd top pine rail	W-Beam has rus	sty snots	CZDP
	147.83 * 2 = 29					Trans ran poole a	nd top pipo raii.	TV Boarn nao ra	ory oporo.	VCKA
			, ,	•		an the 5th post of	on the right, bac	k from the pier ha	as spalled concrete a	
	nt point to the d				m the last op	ari, tilo otil poot (	ori tilo rigilit, bao	k nom the plet he		REFI
Inspection N	iotes:									
Element 358	- Deck Cracking	g SmFlag								
Element 358	- Deck Cracking	g SmFlag	1	ea.	X	100	O	0	0	
			1	ea.	X	100	0	0	0	
X			1	ea.	Х					
X Previous Insp	1 Dection Notes :	3	1 throughout the			%				
X Previous Insp 2/19/2012 -	1	3 e cracking		overlay	in all the Spa	% ans.				UZGZ ZIDZ
X Previous Insp 2/19/2012 - 2/27/2010 -	1 Dection Notes : Some reflective Milled off 1" an	3 e cracking to	d with 2" of silic	overlay ca fume	in all the Spa	% ans.	%	%		UZGZ



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#### 100015279+09762 Continue

General Inspection Notes	
12/19/2012 - Good markers on both sides of Abutment 6.	UZGZ
12/27/2010 - NBI 72, roadway alignment, rated a "7" as bridge is narrower than the approach roadway. Good markers on both sides of Abutment 6. 12/02/2008 - Good markers on the approach corners.	ZIDZ DZGZ
11/02/2006 - Markers on the Left and Right sides of the approach end and in Fair to Good condition.  Steel bridge rail could be removed as it is not serving any purpose. Bridge deck has had some patched spalls and will be needing more. This would be a Good candidate for a deck re-hab.  Per Infrastructure Engineers August 22, 2006 underwater inspection, the substructure units are in good condition. There are no significant structural defects below the high waterline. There is no significant local or general scour present. There are no significant restrictions in the channel that will adversely impact flow. NBI 61 CHANGED PER INFRASTRUCTURE ENGINEERS UNDERWATER INSPECTION.  10/18/2002 - NBI 36 is now up to current standards; 36A upgraded to concrete barrier rail now.	CZDP
04/13/1998 - 5-29-2001: Snooper inspection this am. Should clean out the trees & brush that is going next to and underneath the structure.	RHGN
02/01/1994 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/11/97 10:44:28 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:15:03	REFI
09/01/1991 - Updated with tape 1994	NB94
02/01/1990 - Updated with tape 1991	NB91
02/01/1988 - Updated with tape 1989	NB89
02/01/1986 - Updated with tape 1987	NB87
01/01/1984 - Updated with tape 1985	NB85
08/01/1981 - Updated with tape 1984	NB84
03/01/1979 - Updated with tape 1980	NB80



### MENT FORM FOR OTROC

**Location: GREAT FALLS Structure Name:** 

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100015280+00941

General Location Data

MDT Maintenance Section : 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location: 013 CASCADE City Code, Location: 32800 GREAT FALLS

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number:00015

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: SEP 5TH AVE SW Kilometer Post, Mile Post: 450.76 km 280.09

Structure on the State Highway System : X Latitude : 47°30'04"

Structure on the National Highway System : X Longitude : 111°20'34"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number : **IG 15-5(27)274**Construction Station Number : **595+55.00** 

Construction Drawing Number: 7092

Construction Year: 1967

Current ADT: 9,150 ADT Count Year: 2009 Percent Trucks: 2 % Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	36.2 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data :	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	83.84		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 38.10 m

Deck Area: 455.00 m sq

Deck Roadway Width: 11.35 m
Approach Roadway Width: 11.89 m

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

Reference Feature for Vertical Clearance: H Hwy beneath struct

Vertical Clearance Under the Structure: 4.60 m

Reference Feature for Lateral Underclearance : H Hwy beneath struct

Minimum Lateral Under Clearance Right : 3.66 m

Minimum Lateral Under Clearance Left : 0.00 m

#### Span Data

#### Main Span

Number Spans: 3

Material Type Code, Description : 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type : **0 None**Deck Membrain Type : **0 None** 

#### Approach Span

Number of Spans: **0**Material Type Code, Description:
Span Design Code, Description:

(52) Out-to-Out Width: 11.95 m

(50A) Curb Width: (50B) Curb Width: 0.05 m

Skew Angle: °

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	North or East Travel		
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
One Route Under	L07544	Both	4.60 m	10.36 m	N/A		
5TH AVE. SW							
Route On Structure	100015	N/A			North	99.99 m	11.35 m
I - 15 NB	1						



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#### 100015280+00941 Continue

**Inspection Data** 

Sufficiency Rating: 96.6 Structure Status: Not Deficient Inspection Due Date: 15 October 2014
(91) Inspection Frequency (months): 24

Structure Status : Not	Deficient							
NBI Inspection Da								
(90) Date of Last Insp	pection : 15 October 2	2012		Lá	ast Inspected By:	Charles Per	oos - 107	
(90) Inspection	n Date :				Inspected By :			
(58) Deck F	Rating : 7	(68) Deck Geor	metry : 5	(36A)	Bridge Rail Rating	ı : <mark>1  </mark>	(62) Culver	t Rating : N
(59) Superstructure F	Rating : 7	(67) Structure R	tating : 7	(36B	) Transition Rating	ı : 1	(61) Channe	Rating : N
(60) Substructure F	Rating : 7			(36C) Ap	proach Rail Ratin	g : <b>1</b>	(71) Waterway A	dequacy :N
(72) App Rdwy Align : 8 (69) Under Clearance : 6 (41) Posting Status : A			(36)	D) End Rail Rating	1: 1	(113) Scour	Critical : N	
	Unrepaired S	palls: 0 m s	sq		De	ck Surfacing	Depth: 1.0	00 in
nspection Hours			Cana					
Crew Hours for inspec				per Required			$\neg$	
Helper Ho		Sr	•	for inspection	O			
Special Crew Ho			ŀ	Flagger Hours	0			
Special Equipment Ho	ours :							
Inspection Work	Candidates	<b>.</b>		Effected	Scope			Covered
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work		Action	Condition States
D31-FY2004-000064	28 January 2004	Approved	Medium	All Spans	Bridg	е	Spot Paint (flex)	
lean around bearings a	and repaint.							
pproved. DRC								

Late Reason:

Inspection Date: 10/15/2012



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#### 100015280+00941 Continue

#### **Element Inspection Data**

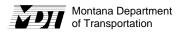
\* \* \* \* \* \* \* \* \* \* Span : Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 22 - P Conc Deck/Rigid Ov 455 X 100 3 sq.m. % Previous Inspection Notes: 10/15/2012 - Minor wear in the wheel paths. Tight transverse cracks over both Bent 2 and 3. Random cracking in Span 1. 10/18/2010 - 11.95 \* 38.10 = 455.30 1" milled off, A and B repairs done, and 2" overlay then placed. Good condition today. Inspection Notes: Element 109 - P/S Conc Open Girder 191 100 m. % % Previous Inspection Notes: 10/15/2012 - Unchanged from past inspections and generally in Good condition. 10/18/2010 - Generally Good condition. Minor rubs from overheight loads and some minor cracking on ends of the girders noted at Bents 2 and 3. 10/15/2008 - Good condition. Some minor rubs and scrapes from overheight loads. 10/24/2006 - Good condition. Minor cracks from backside of the embedded bearing plate to the ends of several of the girders. 10/08/2002 - 38.10 \* 5 = 190.5m Inspection Notes: Element 205 - R/Conc Column Bent 2 and 3 ea. % % % Previous Inspection Notes: 10/15/2012 - All (4) are generally in Good condition with a small spall on the Right column of Bent 3. 10/18/2010 - Good condition. Minor and tight surface shrinkage cracks. 10/15/2008 - Generally Good condition. Some tight surface shrinkage cracks. 10/24/2006 - Tight surface shrinkage cracks. 10/08/2002 - ok Inspection Notes:

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#### 100015280+00941 Continue

Continue

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 215 - R/Conc Abutment 1 and 4 2 30 m. 95 % Previous Inspection Notes: 10/15/2012 - Tight cracks in both of the backwalls and caps. Small spalls on the cap to backwall connection area and a couple of the embedded bearings. 10/18/2010 - Minor and tight cracks in both backwalls. Small spalls near a couple of the girder embedded bearings. 10/15/2008 - Small spall near the bearings in the backwalls. Tight cracks in both of the backwalls and caps. 10/24/2006 - Damp at the backwall to cap joint and around the bearings. A couple of small spalls where the girders are embedded in the backwalls. 10/08/2002 - (11.95 1.50 1.50) \* 2 = 29.90m Minor, tight cracks in backwalls. Env. State 2 due to wet soil in median near the bridge ends. 04/13/1998 - None 02/01/1994 - None Inspection Notes: Element 234 - R/Conc Cap Bent 2 and 3 90 1 24 m. % % % % Previous Inspection Notes : 10/15/2012 - Small delaminations on the Right ends of both of the Bent caps. Minor surface spalls on the underside of both caps from rebar chair feet. Stains from past joint leakage. 10/18/2010 - Same comments as past inspections. Small delamination on Right ends of Bent 2 and 3's caps. Very minor surface distress in these 10/15/2008 - Left end of the cap at Bent 2 has a small delaminated area, 6" x 14"; Condition State 3. Tight cracks at the steps. Small surface spall on the underside of the caps from exposed rebar chair feet. 10/24/2006 - Minor surface spalls on the underside of the caps from exposed/rusty rebar chairs. 10/08/2002 - 11.95 \* 2 = 23.90m Minor stains from exposed rebar chairs. Underside of left end of cap at Bent 3 has minor popouts along rebar chairs. Inspection Notes: Element 313 - Fixed Bearing Bent 2 and 3 1 1 20 90 10 ea. % % % % Previous Inspection Notes : 10/15/2012 - Spot rust, paint loss, and some debris. 10/18/2010 - Spot rust and paint loss. 10/15/2008 - Spot rust and paint loss. 10/24/2006 - Spot rust throughout. Bents 2 and 3's have pigeon debris around them. 10/08/2002 - Rusty spots throughout. Inspection Notes:



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#### 100015280+00941 Continue

									cription	Element Des
Pct Stat 5	Pct Stat 4	Pct Stat 3	Pct Stat 2	Pct Stat 1	Insp Each	Units	Quantity	Env	Scale Factor	Smart Flag
						osts	eam w\ Steel Po	ated W-Be	- Metal Rail Co	Element 334
	0	5	10	85		m.	76	3	1	
	%	%	%	%						
									ection Notes :	Previous Insp
QZHZ	sts show rusty	ed blocks. Rail	Loose and twist	ear Abutment 1	t rail is bent n	es. Left	ubs on both side	lings and ru		
	,					ion.	in Good conditi	Curbs are	and paint loss.	spots, scale,
SODZ	ent area.		Left rail near A					•		
QZGZ			. Curbs are in G				•			
ZZGZ	1.		areas. Curbs are							
IZDK		•	Rust on the posts	nout both rails.	rapes throug	and sc	y spots, pitting,	20m Rust		
RHGR										)4/13/1998 -
REFI									None	)2/01/1994 -
									otes:	Inspection N
								Notes	nspection N	General I
QZHZ			Ave. SW.	travellers on 5th	ne bridge for	les of th	gns on both sid		<u>-</u>	
SODZ		d.	o retro-fit" neede	eau's policy of "r	e Bridge Bure	eets the	ed a "1" as if m	e rail, is rat	NBI 36A, bridge	0/18/2010 -
			andha anda af ii	oncrete in 2010.						
		ne girders.	on the ends of t	and tight crack			to rubs on the bidsides of the brid			
QZGZ					e structure fo	es of the	gns on both side	erheight sig	Good 14'-2" ove	0/15/2008 -
							nt testing of the			
				<b>3.</b>	sents 2 and 3	over B	to wide cracks		ск cracкing sm: utment bearing.	
ZZGZ							due to wear and	ated a "6" o	NBI 58, deck, ra	0/24/2006 -
0	rebar chairs. Als	om exposed/rus	Bents 2 and 3 fi	ide of the caps a			small surface s girders are eml			
							or 5th Ave. SW	nce signs fo	14' - 2" clearar	Posted with a
IZDK	curbs tapers on	proach section a	n rail, Bridge app	ce. 36B, transiti	o the curb fac	ed out to	W-beam blocke	O" as rail is	NBI 36A to a "0 Is of the structu	0/08/2002 -
							rehab project.		was removed d	
RHGR							. ,	Ü		)4/13/1998 -
REFI							ation Accepted b			
				1	9/97 14:15:04	4 at 2/19	d by ops\$u9004	on Accepted	ating Calculatio	Sufficiency R
NB94								ape 1994	Updated with ta	1/01/1992 -
NB91								ape 1991	Updated with ta	3/01/1990 -
NB89								ape 1989	Updated with ta	2/01/1988 -
NB88								ape 1988	Updated with ta	2/01/1986 -
NB85									Updated with ta	
NB84									Updated with ta	
NB80									Updated with ta	



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#### 100015280+00942

**Location: GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location: 013 CASCADE City Code, Location: 32800 GREAT FALLS

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number:00015

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: SEP 5TH AVE SW Kilometer Post, Mile Post: 450.76 km 280.09

Structure on the State Highway System : X Latitude : 47°30'04" Construction Data

Structure on the National Highway System : X Longitude : 111°20'35"

Str Meet or Exceed NBIS Bridge Length:

Construction Project Number : IG 15-5(27)274

Construction Station Number: 595+55.00

Construction Drawing Number : **7092**Construction Year : **1967** 

Current ADT: 9,150 ADT Count Year: 2009 Percent Trucks: 2 % Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	34.4 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3 :	83.84		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 38.10 m

Deck Area: 455.00 m sq adway Width: 11.35 m

Deck Roadway Width: 11.35 m

Approach Roadway Width: 11.89 m

Median Code, Description: 0 No median

### Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure: 99.99 m

Reference Feature for Vertical Clearance: H Hwy beneath struct

Vertical Clearance Under the Structure: 4.57 m

Reference Feature for Lateral Underclearance : H Hwy beneath struct

Minimum Lateral Under Clearance Right : 3.66 m

Minimum Lateral Under Clearance Left : 0.00 m

#### Span Data

#### **Main Span**

Number Spans : 3

Material Type Code, Description : 5 Prestressed concrete

Span Design Code, Description : 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type : **0 None**Deck Membrain Type : **0 None** 

#### Approach Span

Number of Spans: **0**Material Type Code, Description:
Span Design Code, Description:

(52) Out-to-Out Width : 11.95 m

(50A) Curb Width : (50B) Curb Width : 0.05 m

Skew Angle : °

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	N	orth or East Trav	vel
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
One Route Under	L07544	Both	4.57 m	10.36 m	N/A		
5TH AVE. SW							
Route On Structure	I00015	South	99.99 m	11.35 m	N/A		
I - 15 SB							



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#### 100015280+00942 Continue

**Inspection Data** 

Sufficiency Rating: 96.6

Inspection Due Date: 15 October 2014 (91) Inspection Frequency (months): 24

Structure Status : Not	t Deficient						
NBI Inspection Da	ata						
(90) Date of Last Insp	pection : 15 October :	2012		La	ast Inspected By: Charles	Pepos - 107	
(90) Inspection	(90) Inspection Date :						
(58) Deck	Rating : 7	(68) Deck Geo	ometry : 5	(36A)	Bridge Rail Rating : 1	(62) Culver	t Rating : N
(59) Superstructure	(59) Superstructure Rating : 7 (67) Str			(36B	) Transition Rating : 1	(61) Channe	el Rating : N
(60) Substructure Rating: 7			, ,	(36C) Ap	pproach Rail Rating :1	(71) Waterway A	dequacy :
(72) App Rdwy Align : 8 (69) Under Cle				(36	D) End Rail Rating : 1	(113) Scour	r Critical : N
	Unrepaired S	palls: 0 m	sq	一	Deck Surface	cing Depth : 1.0	00 in
Inspection Hours					_		
Crew Hours for inspec	tion: 2		Sno	oper Required	: N		
Helper Ho	ours : C	s	nooper Hours	for inspection	. 0		
Special Crew Ho	ours :			Flagger Hours	0		
Special Equipment Ho	ours :						
Inspection Worl	k Candidates	Status	Drievity	Effected	Scope of Work	Action	Covered Condition
Candidate ID	Date Requested	Status	Priority	Structure Unit	WORK	Action	States
D31-FY2004-000065	28 January 2004	Approved	Medium	All Spans	Bridge	Spot Paint (flex)	
Clean around bearings a	and repaint.						
Approved. DRC							

Late Reason:

Inspection Date: 10/15/2012



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#### 100015280+00942 Continue

#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 22 - P Conc Deck/Rigid Ov X 100 3 455 sq.m. % % Previous Inspection Notes: 10/15/2012 - Minor wear in the hweel paths. Random cracking on the Left side of the deck near Abutment 4 in Span 3. 10/18/2010 - 11.95 \* 38.10 = 455.30 Milled off 1", Class A and B repair, and then placed a 2" Silica Fume Concrete overlay in 2010. Good condition today. Inspection Notes: Element 109 - P/S Conc Open Girder 191 100 m. % % Previous Inspection Notes : 10/15/2012 - Unchanged from past inspections and in Good condition. 10/18/2010 - Gernally Good condition. Minor scrapes and rubs from overheight loads on the bottom of the girders. Tight cracks on the ends of the girders at Bent 2 and 3. 10/15/2008 - Generally in Good condition. Minor scrapes to the Left two girders from overheight loads. 10/24/2006 - Minor scrape to the Left girder in Span 2 from overheight load. Several of the girders have minor cracks from the backside of the embedded bearing plate to the ends of the girders. 10/08/2002 - 38.10 \* 5 = 190.5mInspection Notes: Element 205 - R/Conc Column Bent 2 and 3 1 95 ea. % Previous Inspection Notes: 10/15/2012 - All are generally in Good condition with small spalls on (2) columns from construction activity. 10/18/2010 - Good condition. 10/15/2008 - Good condition. Small scrape on the Left column of Bent 2. 10/24/2006 - No major probelms noted with minor and tight surface shrinkage cracks. 10/08/2002 - Minor, tight shrinkage cracks. Inspection Notes:

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#### 100015280+00942 Continue

\*\*\*\*\*\*\* Span : Main-0 - (cont.) \*\*\*\*\*\*\*

Element Description  Smart Flag   Scale Factor   Env   Quantity   Units   Insp Each   Pct Stat 1   Pct Stat 2   Pct Stat 3   Pct Stat 4    Element 215 - R/Conc Abutment 1 and 4  1	Pct Stat 5
Element 215 - R/Conc Abutment 1 and 4  1 2 30 m. 95 5 0 0  % % % %	
1 2 30 m. 95 5 0 0 0 % % % % %	
% % % %	
Previous Inspection Notes :	9
10/15/2012 - Tight cracks in both of the backwalls and caps. Small spalls near the cap to backwall connections and at a couple of the embed	lded QZHZ
bearings. 10/18/2010 - Generally Good condition. Tight cracks in both backwalls.	SZDZ
10/15/2008 - Same as prior inspection and add some tight cracks in both caps and backwalls of the Abutments.	QZGZ
10/13/2006 - Same as phormspection and add some tight cracks in both caps and backwalls of the Abduments.  10/24/2006 - Minor seepage at the bearings and along the cap to backwall joint. A couple of small spalls where the girders are embedded in the Abduments.	
to/24/2000 - Millor seepage at the bearings and along the cap to backwall joint. A couple of small spalls where the girders are embedded in the backwalls.	lile ZOGZ
10/08/2002 - (11.95 - 1.50 - 1.50) * 2 = 29.90m Env. State 2 as some moisture coming from between the backwall to cap connection on this cand wet soil in median area.	date ISDL
03/13/1998 - None	RHGT
02/01/1994 - None	REFI
Inspection Notes:	
maposition recion.	
Element 234 - R/Conc Cap Bent 2 and 3	
1 1 24 m. 90 5 5 0	
Previous Inspection Notes :	
10/15/2012 - Minor surface spalls on the underside of both caps from rebar chair feet. Right end of Bent 3's cap has a small surface delamina and both caps show tight cracking on their ends. Spall with exposed rebar on the Left end of Bent 2's cap.	
10/18/2010 - Minor surface spalls on the underside of both caps. Spall with exposed rebar ends on the Left end of Bent 2's cap.	SZDZ
10/15/2008 - Surface spalls on the underside of both caps. Tight cracks on the ends of both caps.	QZGZ
10/24/2006 - Minor and small surface spalls where rebar chairs are exposed on the underside of the caps. Staining from leakage in the past.	
10/08/2002 - 2 * 11.95 = 23.90m Minor staining from areas where the rebar chairs are exposed.	ISDL
Inspection Notes:	
Element 313 - Fixed Bearing Bent 2 and 3	
1 1 20 ea. 90 10 0	
% % % %	(
Previous Inspection Notes :	
10/15/2012 - Spot rust, paint loss, and some debris.	QZHZ
10/18/2010 - Spot rust and paint loss.	SZDZ
	QZGZ
10/15/2008 - Spot rust and paint loss.	
	ZCGZ
10/24/2006 - Spot rust on the bearings. Pigeon debris on the bearings at Bents 2 and 3.	ZCGZ ISDL
10/15/2008 - Spot rust and paint loss.  10/24/2006 - Spot rust on the bearings. Pigeon debris on the bearings at Bents 2 and 3.  10/08/2002 - Rusty spots throughout.	
10/24/2006 - Spot rust on the bearings. Pigeon debris on the bearings at Bents 2 and 3.	



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#### 100015280+00942 Continue

\*\*\*\*\*\* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* \*

			****	****	* Span : ı	Main-0 - (cont	t.) * * * * * * * *	* * *		
Element Des	cription									
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 334	- Metal Rail Co	ated W-B	eam w\ Steel P	osts					·	
	1	3	76	m.		90	10	0	0	
						%	%	%	%	
Previous Ins	pection Notes :									
10/15/2012 -	Curbs are in G	ood condit	ion with some r	ninor sp	alls and crad	ckina. Rustv spo	ots. paint loss. ar	nd scale on the ra	ail posts. W-Bean	n has QZHZ
rubs and din	gs on both sides	S.		·		n Good condition				SZDZ
10/15/2008 -	Rusty spots on	the rail po	sts and W-Bea	m. Righ	nt curb has b	peen repaired. C	Curbs are now in	Good condition.		QZGZ
Right side at	Abutment 4.					hit in a couple o		nt post and broke	en curb concrete o	on the ZCGZ
03/13/1998 -				·			·			RHG <sup>-</sup>
02/01/1994 -	None									REFI
Inspection N	Notes:									
Canaral	Inonaction N	Motos								
	Inspection I		inna an bath air	41.			- 014			0711
			ŭ		ŭ	traffic on 5th Av		a d		QZHZ SZDZ
NBI 58, deck NBI 59, supe Good 14' - 2'	rated a "8" due rstructure, rated clearance sign	e to new or d a "7" due ns on both :	verlay. Overlaid to rubs on the sides of the brid	d with S bottom dge for 5	ilica Fume C of the girder oth Ave. SW	Concrete in 2010 s and tight crack	s on the ends of			
Consultant's Close to a de 10/24/2006 - NBI 60, subs where girder	crew doing chlo eck cracking sm NBI 58, deck, r	oride conte lart flag du rated at a " a "7" due to d in both A	nt testing of the e to wide crack: 6" due to wear o minor spalls o butments.	structu s over B in the w	re's deck ye ents 2 and heel paths a	3. and some spallin	g/delamiantions.		irs. Also small sp	QZGZ ZCGZ alls
10/08/2002 - section/curb	NBI 36A is a "0 taper are on the - These were re	)" because e approach	rail is W-beam end of the stru	cture or	ıly.	the face of the c	urbs. 36B-Trans	sition rail and brid	ge approach	ISDL RHG
	Sufficiency Rat	ting Calcul	ation Accontad	by one	u5062 at 2/	11/07 10:44:20				REF
	Rating Calculation									
01/01/1992 -	Updated with ta	ape 1994								NB94
03/01/1990 -	Updated with ta	ape 1991								NB91
02/01/1988 -	Updated with ta	ape 1989								NB89
02/01/1986 -	Updated with ta	ape 1988								NB88
01/01/1984 -	Updated with ta	ape 1985								NB85
08/01/1981 -	Updated with ta	ape 1984								NB84
03/01/1979 -	Updated with ta	ape 1980								NB80



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#### 100015282+05471

Location: 1M N GREAT FALLS Structure Name:

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location: 013 CASCADE City Code, Location: 32800 GREAT FALLS

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00015

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: INT EMERSON, BNSF RR Kilometer Post, Mile Post: 454.70 km 282.54

Structure on the State Highway System : X Latitude : 47°31'17"

Structure on the National Highway System : X Longitude : 111°22'45"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number : **IG 15-5(27)274**Construction Station Number : **724+45.00** 

Construction Drawing Number: 7104

Construction Year: 1967

Current ADT: 9,280 ADT Count Year: 2009 Percent Trucks: 2 % Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Design Loading:		5 MS 18 (HS 20)
Inventory Load, Design :	32.6 mton	A LFD Assigned
Operating Load, Design:	34.4 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	63.18		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 107.90 m

Deck Area: 1,052.00 m sq

Deck Roadway Width: 8.55 m
Approach Roadway Width: 11.58 m

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

Reference Feature for Vertical Clearance: H Hwy beneath struct

Vertical Clearance Under the Structure: 6.76 m

Reference Feature for Lateral Underclearance : H Hwy beneath struct

Minimum Lateral Under Clearance Right : 2.75 m

Minimum Lateral Under Clearance Left : 0.00 m

#### Span Data

#### Main Span

Number Spans : 6

Material Type Code, Description : 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type: **0 None**Deck Membrain Type: **0 None** 

#### Approach Span

Number of Spans: **0**Material Type Code, Description:
Span Design Code, Description:

(52) Out-to-Out Width: 9.75 m

(50A) Curb Width: (50B) Curb Width: 0.00 m

Skew Angle: 30°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction Inventory		South, W	est or Bi-direction	nal Travel	North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
One Route Under	N00123	Both	6.76 m	9.14 m	N/A			
VAUGHN ROAD								
Route On Structure	I00015	N/A			North	99.99 m	8.55 m	
I-15 NB / EMERSON JCT								



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Continue

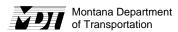
**Inspection Data** Inspection Due Date: 19 December 2014 (91) Inspection Frequency (months): 24 Sufficiency Rating: 76.4

Structure Status : Func Obs - Elg Rehab

NBI Inspection Da	ata								
(90) Date of Last Ins	spection: 19 December	er 2012		La	st Inspected By: Charles Pe	epos - 107			
(90) Inspection	on Date :				Inspected By :				
(58) Deck		(68) Deck Geo	metry : 3	, ,	Bridge Rail Rating : 1		(62) Culvert Rating : N		
(59) Superstructure	Rating : 7	(67) Structure F	Rating : 7	(36B)	Transition Rating : 1	(61) Channe			
(60) Substructure	Rating: 7	(69) Under Clear	ance:4	(36C) Ap	proach Rail Rating :1	(71) Waterway A	dequacy : N		
(72) App Rdw	y Align : <b>7</b>	(41) Posting S	Status : A	(360	D) End Rail Rating : 1	(113) Scoul	Critical:		
	Unrepaired Sp	palls: 0 m	sq		Deck Surfacir	ng Depth : 0.0	00 in		
Inspection Hours									
Crew Hours for inspec				oper Required					
Helper H		) Si	•	for inspection	O O				
Special Crew H				Flagger Hours	0				
Special Equipment H	lours :								
Inspection Wor	k Candidates	Status	Drianitus	Effected	Scope of Work	Action	Covered Condition		
Candidate ID	Date Requested	Status	Priority	Structure Unit	WORK	Action	States		
D31-FY2007-000030	27 November 2006	Approved	Medium	M Main	Bridge	Spot Paint (flex)			
Clean and spot paint be	earings.								
pproved. DRC									
D31-FY2007-000029	27 November 2006	Approved	High	M Main	300 Strip Seal Exp Joint	Min Repair	I		
Clean sanding material		Approved	підіі	IVI IVIAIII	300 Strip Sear Exp Joint	IVIIII Repail			
approved. DRC									
D31-FY2011-000025	11 January 2011	Not Approved	Low	M Main	334 Metal Rail Coated	Repl Paint			
Clean and spot paint ra	il.								

Late Reason:

Inspection Date: 12/19/2012



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#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck X 100 3 1052 sq.m. 0 % % Previous Inspection Notes: 12/19/2012 - Wider and open cracks over the un-jointed Bents. Random and mapping cracks in all of the Spans. Small surface spalls and delaminations along the edges of the joint steel. 12/27/2010 - Small surface spalls and delaminations along joint steel. Wear in the wheel paths and mapping cracks in all Spans. Wider transverse cracks over Bent that are without joints. 11/19/2008 - Placed into Condition State 2 as a couple of small delaminations were observed with chain drag near the joints/guard angles. Wear in the wheel paths. Wider transverse cracks over the unjointed Bents. Some mapping cracks also. 11/02/2006 - Open transverse cracks over the Bents without joints. Minor wear in the wheel paths. Some very minor flaking of latex concrete paste at the joint steel, but none delamianted or spalling. 10/07/2002 - 107.90 \* 9.75 = 1052.03 Deck was hydromilled and the removed material was replaced with latex concrete. The deck has some transverse cracks over the Bents that do not have expansion joints. 04/14/1998 - None 02/01/1994 - None Inspection Notes: Element 109 - P/S Conc Open Girder 519 100 1 1 m. % Previous Inspection Notes : 12/19/2012 - No problems observed. 12/27/2010 - Good condition. 11/19/2008 - Generally Good condition. 11/02/2006 - Minor tight cracks from the backside of the embedded bearing plate to the ends of the girders on several of the girders; none are a problem 10/07/2002 - (6 \* 19.8) (4 \* 40.8) (5 \* 47.3) = 518.5m Minor cracking of the concrete near the beam seat on a couple of girders; not a problem. Inspection Notes: Element 205 - R/Conc Column 2 thru 6 10 ea. 90 % % Previous Inspection Notes : 12/19/2012 - Small surface delaminations near the ground on the construction joints. Shallow surface spalls on a couple of the columns. Generally in Good condition. 12/27/2010 - Some small delaminated sack patches at construction joints near groundline on a couple of the columns. Small surface spalls along shallow tie wire. 11/19/2008 - Condition State 2 due to shallow tie wire and surface spalls. Condition State 3 for delaminations that have not popped off. Some cracks and small delaminations on the webwalls. 11/02/2006 - Tight surface shrinkage cracks. Some areas where shallow tie wire is on the surface. Wire is rusty and causing small surface spalls. 10/07/2002 - Minor, tight random cracks on several coulmns. Inspection Notes:

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## 100015282+05471

Continue

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 215 - R/Conc Abutment 1 and 7 29 m. 95 % Previous Inspection Notes: 12/19/2012 - Good condition. Small spalls along the cap to backwall area. Erosion at the corners of the wingwalls. Some missing fill under Abutment 1's cap. Tight surface shrinkage cracks. 12/27/2010 - Small spalls along a couple of the embedded bearings. Minor and tight cracks under G2 and G3 in Abutment 1's cap. 11/19/2008 - Same as last comments. 11/02/2006 - Both caps have minor and tight cracks. A couple of small spalls where girders ends are embedded in the backwall. 10/07/2002 - (11.48 1.40 1.40) \* 2 = 28.56m Minor cracking in Abutment backwalls. Minor erosion at wingwalls. Inspection Notes: Element 234 - R/Conc Cap Bents 2 thru 6 57 m. % % Previous Inspection Notes : 12/19/2012 - Bent 4's cap has a small delamination under G4 on the Span 3 side. Shallow surface spalls and delaminations on the underside of the caps from rebar chair feet. 12/27/2010 - Small delamination under G4 on the Span 3 face of Bent 4's cap. Mostly in Good condtion. Some staining. Shallow surface spalls on under of caps from rebar chair feet. 11/19/2008 - Condition State 3 for surface delaminations and Condition State 2 for cracks and small surface spalls. Staining form past joint leakage 11/02/2006 - Most all of the undersides of the Bent caps have small surface spalls with rust staining from shallow rebar chairs. 10/07/2002 - 5 \* 11.48 = 57.40m Bottom side of cap at Bent 3-Right has some minor spalling concrete around exposed rebar chairs. Inspection Notes: Element 300 - Strip Seal Exp Joint 3 23 m. 95 % Previous Inspection Notes: 12/19/2012 - Lots of sanding material is packed into the gland area. No obvious leaking. Steel portions sound solid when tapped on. Small surface spalls and paste delaminations along the joint steel. 12/27/2010 - Steel sounds solid when tapped on. Small surface spalls and delaminations along edges of the steel. Both joints are full of sanding material. No leakage observed. 11/19/2008 - Steel sounds solid when tapped on. Small spalls and delamianations along the joint edges. Gland is pushed down from debris, but no tears or leakage was observed. 11/02/2006 - Joint steel is solid when tapped on. Joints are full of debris/sanding material which is pushing on the gland. No apparent leaking 10/07/2002 - 11.48 \* 2 = 22.96m Joints are filled with sanding material/debris. Gland is in Good condition with no tears or leaking evident. Inspection Notes:

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\*\*\*\*\*\*\* Span : Main-0 - (cont.) \*\*\*\*\*\*\*

Element Des	scription									
Smart Flag		Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311	- Moveable Bea	aring								
	1	1	25	ea.		90	10	0		
						%	%	%	%	%
Previous Ins	pection Notes :									
l 12/19/2012 -	- Spot rust, scale	e, faded pa	int, and some r	oaste fro	om the hydo-	demolition. Alig	nment is ok.			UZGZ
	- Spot rust, paint	•			·	, and the second se				ZZDZ
	- Spots of rust, p			rete pas	te from past	hydomilling.				TZDT
	- Rusty spots, pa									CODN
	- Rusty spots wit		_							IZHP
Inspection I	Notes:									
moposiism										
Element 313	3 - Fixed Bearing	1								
	1	1	29	ea.		90	10	0		
	·	·		ou.		%	%	%	%	9/
D	and a Ninter					70	76	76	70	
	pection Notes :									11707
	Spot rust, paint		faded paint.							UZGZ
	Spot rust and p									ZZDZ
	- Spots of rust, p		and some conc	rete pas	te from past	hydomilling.				TZDT
	- Minor spot rust									CODN
10/07/2002 -	- Minor rusty spo	ots with pitt	ing.							IZHP
Inspection I	Notes:									
Element 331	- Conc Bridge I	Railing								
	1	3	216	m.		95	5	0	0	
						%	%	%	%	9
Previous Ins	pection Notes :					I	I	I		
12/19/2012 -	- Random shrink	age cracks	s. Minor surfac	e spalls	near the dec	ck line. Spalls o	n the backside of	the W-Beam bol	t-up.	UZGZ
12/27/2010 -	- Unchanged fro	m past insp	ections.							ZZDZ
11/19/2008 -	- Same commen	its as the p	ast inspections	and ad	d some surfo	ce spalls of the o	riginal curb near	the deck line.		TZDT
11/02/2006 -	- Minor cracks al	long the rel	bar lines in a co	ouple of	the areas. S	Some minor and	random vertical of	cracking.		CODN
							ect a barrier rail w		f the curb.	IZHP
Inspection I	Notes:									



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#### 100015282+05471 Continue

	cription									
Ilomont 224	Scale Factor	Env	Quantity		Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat
Liemenii 334	- Metal Rail Co	ated Singl	le W-Beam and	Steel F	Round Handr	ail w∖ Steel Post	S			
	1	3	216	m.		85	10	5	0	
						%	%	%	%	
revious Ins	pection Notes :									
2/19/2012 -	Rusty spots, pa	aint loss. fa	iding of the pair	nt. and r	minor surface	e pitting to the po	osts near the curb	o line.		UZ
									p of the curb aga	
ne rail posts		a 1000, a.		200	αα ροσιο	. Come canamy	a.oa. o.ag	to zama ap on to	,p or and oand ago	TZ
1/02/2006 -	W-beam, steel	posts, and	l handrail are ru	isted an	d pitted. So	me paint is peeli	ng also. All com	ponenets are be	hind the concrete	rail. CC
0/07/2002 -	107.90 * 2 = 21	15.80m R	usty and pitting	through	nout the rail a	and posts. The r	metal rail is behin	d the concrete b	arrier now.	ΙZ
Inspection N	Notes:									
lement 358	- Deck Crackin	g SmFlag								
Х	1	3	1	ea.	X	0	100	0	0	
						%	%	%	%	
						/6	70	/6	70	
<u>'</u>	pection Notes :									
	Unchanged fro									UZ
							oping cracks in a	ll Spans.		Z.Z
1/19/2008 -	Open cracks or	ver the unjo	ointed Bents an	id need	to start track	ting it.				TZ
Inspection N	Notes:									
General !	Inspection I	Notes								
2/19/2012 -	Fair markers a	t the Abutm	nent 1 corners.							1.15
2/27/2010 -	Fair markers of	n the Right		of Abutn	nent 1.					UZ
Frasian on a	II (4) corners with		and Left side of	,, ,,						ZZ
			corner being the	worse.		aldered to the endered				ZZ
11/19/2008 -	NBÍ 58, deck, r	ated a "6"	corner being the due to small de	worse. Iaminat	ions and cra	cking in the deck	surface.			
11/19/2008 - Markers on th	NBI 58, deck, r he Right and Le	ated a "6" of	corner being the due to small de Abutment 1 and	worse. laminat d in Fair	ions and cra		s surface.	air condition.		ZZ
1/19/2008 - Markers on the 1/02/2006 -	NBI 58, deck, r he Right and Le	rated a "6" of sides of on and off o	corner being the due to small de Abutment 1 and of the structure.	e worse. laminat d in Fair Marker	ions and cra condition. s on the app	proach end of the		air condition.		ZZ TZ
1/19/2008 - Markers on tl 1/02/2006 -	NBÍ 58, deck, r he Right and Le Minor bumps o Markers on bot	rated a "6" of sides of on and off o	corner being the due to small de Abutment 1 and of the structure.	e worse. laminat d in Fair Marker	ions and cra condition. s on the app	proach end of the		air condition.		ZZ TZ CC
1/19/2008 - Markers on the 1/02/2006 - 0/07/2002 - 0/4/14/1998 - 0/2/01/1994 -	NBI 58, deck, r he Right and Le Minor bumps o Markers on bot None Sufficiency Rat	rated a "6" eft sides of on and off of the side of the ting Calculating	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ
1/19/2008 - Markers on the 1/02/2006 - 0/07/2002 - 0/4/14/1998 - 0/2/01/1994 -	NBI 58, deck, r he Right and Le Minor bumps o Markers on bot None	rated a "6" eft sides of on and off of the side of the ting Calculating	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RF
1/19/2008 - Aarkers on tl 1/02/2006 - 0/07/2002 - 04/14/1998 - 02/01/1994 - Sufficiency R	NBI 58, deck, r he Right and Le Minor bumps o Markers on bot None Sufficiency Rat	eated a "6" of the sides of the side on Accepte	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RF
1/19/2008 - Markers on the control of the control o	NBI 58, deck, r he Right and Le Minor bumps o Markers on bot None Sufficiency Rat Rating Calculation	rated a "6" of sides of on and off of the side on Accepte ape 1994	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RF R
1/19/2008 - // Arkers on the street of the s	NBI 58, deck, r he Right and Le Minor bumps o Markers on bot None Sufficiency Rat Rating Calculatio	rated a "6" of sides of on and off of the side on Accepte ape 1994 ape 1991	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RF RI
1/19/2008 - Aarkers on tl 1/02/2006 - 0/07/2002 - 4/14/1998 - 2/01/1994 - Gufficiency R 1/01/1992 - 3/01/1990 - 2/01/1988 -	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate Rating Calculation Updated with ta	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RH RI NI
1/19/2008 - Aarkers on tl 1/02/2006 - 0/07/2002 - 4/14/1998 - 2/01/1994 - Sufficiency R 1/01/1992 - 3/01/1990 - 2/01/1988 - 2/01/1986 -	NBI 58, deck, rhe Right and Leadinor bumps of Markers on both None Sufficiency Ratating Calculation Updated with tath Updated with Updated	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RF R NI
1/19/2008 - Aarkers on til 1/02/2006 - 0/07/2002 - 4/14/1998 - 2/01/1994 - Sufficiency R 1/01/1992 - 3/01/1990 - 2/01/1986 - 1/01/1984 -	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate Rating Calculation Updated with the Updated with the	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RH RI NI NI
1/19/2008 - Aarkers on ti 1/02/2006 - 0/07/2002 - 4/14/1998 - 2/01/1994 - Sufficiency R 1/01/1990 - 2/01/1988 - 2/01/1986 - 1/01/1984 - 8/01/1981 -	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate ating Calculation Updated with tau Update	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZZ TZ CC IZ RI RI NI NI NI NI
1/19/2008 - Markers on the control of the control o	NBI 58, deck, rhe Right and Lea Minor bumps of Markers on both None Sufficiency Ratating Calculation Updated with tature Updat	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZ TZ CC IZ RH RI NI NI NI
1/19/2008 - Aarkers on ti 1/02/2006 - 0/07/2002 - 4/14/1998 - 2/01/1994 - Sufficiency R 1/01/1990 - 2/01/1988 - 2/01/1986 - 1/01/1984 - 8/01/1981 -	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate ating Calculation Updated with tau Update	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZZ TZ CC IZ RI RI NI NI NI NI
1/19/2008 - Markers on the control of the control o	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate ating Calculation Updated with tau Update	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZZ TZ CC IZ RI RI NI NI NI NI
1/19/2008 - flarkers on the online of the original origi	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate ating Calculation Updated with tau Update	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZZ TZ CC IZ RI RI NI NI NI NI
1/19/2008 - flarkers on til 1/02/2006 - 0/07/2002 - 4/14/1998 - 2/01/1994 - sufficiency R 1/01/1990 - 2/01/1988 - 2/01/1986 - 1/01/1984 - 8/01/1981 -	NBI 58, deck, rhe Right and Le Minor bumps of Markers on both None Sufficiency Rate ating Calculation Updated with tau Update	rated a "6" of sides of and off of the side of the sid	corner being the due to small de Abutment 1 and fithe structure. The approach of ation Accepted	e worse. laminat d in Fair Marker the brid by ops\$	ions and cra condition. s on the app ge and in Go	proach end of the pod condition.		air condition.		ZZZ TZ CC IZ RI RI NI NI NI NI



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#### 100015282+05472

Location: 1M N GREAT FALLS Structure Name:

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location: 013 CASCADE City Code, Location: 32800 GREAT FALLS

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00015

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: INT EMERSON, BNSF RR Kilometer Post, Mile Post: 454.70 km 282.54

Structure on the State Highway System : X Latitude : 47°31'17"

Structure on the National Highway System : X Longitude : 111°22'47"

Str Meet or Exceed NBIS Bridge Length:

Construction Data

Construction Project Number : **IG 15-5(27)274**Construction Station Number : **724+45.00** 

Construction Drawing Number: 7104

Construction Year: 1967

Current ADT: 9,280 ADT Count Year: 2009 Percent Trucks: 2 % Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	34.4 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3 :	63.18		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 109.42 m

Deck Area: 1.067.00 m sq

Deck Area : 1,067.00 m sc

Deck Roadway Width : 8.55 m

pproach Roadway Width : 11.58 m

Approach Roadway Width: 11.58 m

Median Code, Description: 0 No median

### Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : 99.99 m

Reference Feature for Vertical Clearance: H Hwy beneath struct

Vertical Clearance Under the Structure: 6.76 m

Reference Feature for Lateral Underclearance : H Hwy beneath struct

Minimum Lateral Under Clearance Right : 2.75 m

Minimum Lateral Under Clearance Left : 0.00 m

#### Span Data

#### **Main Span**

Number Spans : 6

Material Type Code, Description : 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type: **0 None**Deck Membrain Type: **0 None** 

#### Approach Span

Number of Spans: **0**Material Type Code, Description:
Span Design Code, Description:

(52) Out-to-Out Width: 9.75 m

(50A) Curb Width: (50B) Curb Width: 0.00 m

Skew Angle: 30°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
One Route Under	N00123	Both	6.76 m	9.14 m	N/A			
VAUGHN ROAD								
Route On Structure	I00015	South	99.99 m	8.55 m	N/A			
I-15 SB / EMERSON JCT								



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**Inspection Data** 

Inspection Due Date : 19 December 2014

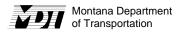
Sufficiency Rating: 76.4

Structure Status : Func Obs - Elg Rehab

(91) Inspection Frequency (months) : **24** 

<b>NBI Inspection Da</b>	ata						
(90) Date of Last Ins	pection : 19 Decembe	er 2012		La	ast Inspected By: Charles	Pepos - 107	
(90) Inspection	on Date :				Inspected By :		
(58) Deck (59) Superstructure (60) Substructure (72) App Rdwy  Inspection Hours Crew Hours for inspection Helper H	Rating: 7  Rating: 7  y Align: 7  Unrepaired Spection: 2  ours: 0  ours: 0	Sr	Rating: 7 ance: 4 Status: A Solution	(36B)	: 0	(61) Channe (71) Waterway A (113) Scoul	, ,
Inspection Worl	<u></u>	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
D31-FY2007-000032	27 November 2006	Approved	Medium	M Main	Bridge	Spot Paint (flex)	
Paint the rail. Approved. DRC							
	27 November 2006	Approved	Medium	M Main	300 Strip Seal Exp Joi	nt Min Repair	
Clean debris/sanding m 11-19-2008 Full. Approved. DRC	aterial from the joints.						
D31-FY2011-000026	11 January 2011	Not Approved	Low	M Main	Bridge	Spot Paint (flex)	
Paint the bearings.							
Late Reason:	0010						

Inspection Date: 12/19/2012



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#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck X 100 3 1067 sq.m. 0 % % Previous Inspection Notes: 12/19/2012 - Open cracks over the un-jointed Bents. Minor studded tire wear in the wheel paths. Small surface spalls and delaminations along the edges of the joint's steel. Random and mapping cracks in all of the Spans. 12/27/2010 - A couple of small surface delaminations along the joint steel. Minor wear in the wheel paths. Open cracks over the Bents without a joint. Wider mapping cracks in all Spans. 11/19/2008 - A couple of small delaminations near the joints. Wear in the wheel paths. Wide transverse cracks over the unjointed Bents. Mapping cracks in most of the Spans. 11/02/2006 - Transverse cracks over the Bents without joints. Wear in the wheel paths. Minor scale/flaking of latex paste at the joint steel, but no delaminations or spalling observed. 10/07/2002 - 109.42 \* 9.76 = 1066.85 Deck was hydromilled and the removed material was replaced with latex concrete. The deck has transverse cracks over all the Bents that don't have expansion joints. 04/14/1998 - None 02/01/1994 - None Inspection Notes: Element 109 - P/S Conc Open Girder 526 100 1 1 m. % Previous Inspection Notes: 12/19/2012 - Good condition. 12/27/2010 - Good condition. 11/19/2008 - No problems observed. 11/02/2006 - Girders are in Good condition. Some minor cracks from the backside of the embedded bearing plate to the ends of the several of the girders; not a problem. 10/07/2002 - (4 \* 40.8) (6 \* 19.8) (5 \* 48.8) = 526.0m Some girders have minor cracks near beam seats. Inspection Notes: Element 205 - R/Conc Column 2 thru 6 10 ea. 90 % % Previous Inspection Notes : 12/19/2012 - Small areas of surface delaminations near the groundline at the cold joints. Right column of Bent 5 has a small spalled area. 12/27/2010 - Small delaminations to sack patches at construction joint near groundline with the Left column of Bent 4 being the worse. Some small scrapes and surface spalls on the web ties from construction. 11/19/2008 - Condition State 3 for small delamiantions observed in the Left column at Bent 4. Some small scrapes/spalls from construction acivities and the webwalls for Bents 3 and 4 show some cracks and delaminations. 11/02/2006 - Tight surface shrinkage cracks. Several small areas where tie wire is exposed and rusting. Some small surface spalling along the exposed tie wire. 10/07/2002 - Minor, tight cracks on several columns. Inspection Notes:

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Continue

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 215 - R/Conc Abutment 1 and 7 1 29 m. 95 % Previous Inspection Notes: 12/19/2012 - Small spalls along the cap to backwall area. Tight vertical crack under G2 at Abutment 1 and under G2 and G3 at Abutment 7. Erosion at all (4) wingwalls. 12/27/2010 - Small spalls near a couple of the girders in the backwalls. Vertical crack under G2 at Abutment 1 and G2 and G3 at Abutment 7 in their caps. 11/19/2008 - Unchanged from past inspections. 11/02/2006 - Tight vertical cracks in both caps witth Abutment 1's being the worse. A couple of small spalls along the ends of the girders where they are embedded in the backwalls. 10/07/2002 - (11.48 1.40 1.40) \* 2 = 28.56m Minor, vertical cracks under girders at Abutment 1. Erosion at all (4) wingwalls. Inspection Notes: Element 234 - R/Conc Cap 2 thru 6 90 57 m. % % % % Previous Inspection Notes : 12/19/2012 - Small surface spalls on the faces of (3) caps near the outer anchors. Small delaminations on Span 4 face of Bent 4 under G5. Small surface spalls and delaminations on the underside of the caps from rebar chair feet. 12/27/2010 - Unchanged for small delamination under G5 on Span 4 side of Bent 4's cap. Several small surface spalls on the cap faces near outer most anchors. Some shallow surface spalls on underside of the caps. 11/19/2008 - Condition State 3 for small surface delaminations and Condition State 2 for cracks and minor spalling. Small spall on Bent 4's cap under G5 on the Span 4 side. 11/02/2006 - Underside of the caps show surface spalling from exposed and rusty rebar chairs. Also some staining around the chairs. 10/07/2002 - 5 \* 11.48 = 57.40m Minor stains where construction rebar chairs are exposed. Minor, tight cracks on most caps. Inspection Notes: Element 300 - Strip Seal Exp Joint 1 3 23 95 m. % Previous Inspection Notes: 12/19/2012 - Joints are packed full of sanding material today. No apparent leakage. Steel portions sound solid when tapped on and there are small spalls/delaminations along the edges of the joint's steel. 12/27/2010 - Full of sanding material today. Steel portions of the joints sound solid when tapped but do have some shallow spalls and surface delaminations along their edges. 11/19/2008 - Steel sounds solid when tapped on. A couple of small spalls and delaminations along the steel edges. Gland is pushed down from debris with no obvious tears or leakage. 11/02/2006 - Joint steel sounds solid when tapped on. Joint area is full of debris/sanding material which is pushing down on the gland. No leaking was noted 10/07/2002 - 11.48 \* 2 = 22.96m Joints are full of sanding material. Gland doesn't appear to be torn anyplace and not leaking. Inspection Notes:

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\*\*\*\*\*\*\* Span : Main-0 - (cont.) \*\*\*\*\*\*\*

					-	waiii-u - (COIII	-,			
Element Des	scription									
_	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311	- Moveable Be	aring								
	1	1	25	ea.		90	10	0		
						%	%	%	%	9
Previous Ins	pection Notes :									
	Spot rust, cond		. scale. and fad	ed pain	t. Alianment	is ok.				UIGZ
	Paint loss, spo				9					ZWDZ
				paste f	rom past hvo	dromilling operati	ons.			TEDU
	Spot rust, pain				, ,	0 1				CXDN
	Minor rust spo									IZHQ
Inspection I	Notes.									
Flormant 242	L Fixed Peerin	~								
Element 313	- Fixed Bearing						1			
	1	1	33	ea.		90	10	0		
						%	%	%	%	9,
Previous Ins	pection Notes:				_					
12/19/2012 -	Paint loss, spo	t rust, and	faded paint.							UIGZ
12/27/2010 -	Paint loss and	spot rust.	Some bird debi	ris.						ZWDZ
11/19/2008 -	Spot rust, pain	t loss, and	some concrete	paste f	rom past hyd	dromilling operati	ons.			TEDU
11/02/2006 -	Spot rust, pain	t loss, and	some debris.							CXDN
10/07/2002 -	Minor rust spo	ts and mind	or pitting.							IZHQ
Inspection I	Notes:									
Element 331	- Conc Bridge	Railing								
	1	3	219	m.		95	5	0	0	
	·		210	••••				<u> </u>		9/
						%	%	70	%	
	pection Notes :									
12/19/2012 - along the de		ce shrinkag	je cracks. Spal	lls on th	e backside o	of the barriers at	the rail bolt-ups.	Small surface s	palls and deteriora	ation UIGZ
	· Vertical crackii	ng through	out. A couple o	f small	scrapes.					ZWDZ
11/19/2008 -	Unchanged. S	Small areas	of surface dete	erioratio	n on the orig	inal curbs near t	he deck line.			TEDU
	_				_	m vertical cracks				CXDN
		•						s added on top of	of the existing curb	s, IZHQ
Inspection I						•		•		
moperion i	10153.									

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100015282±05472

100015282+05472 Continue

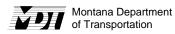
\* \* \* \* \* \* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 334 - Metal Rail Coated Singe W-Beam with Round Steel Handrail w\ Steel Posts 3 219 m. 85 10 % % Previous Inspection Notes: 12/19/2012 - Faded paint, spot rust, and paint loss. Minor surface pitting on the rail posts near the curb line. 12/27/2010 - Paint loss, minor surface pitting, and scale on the W-Beam and posts. Sanding material starting to build up behind the barrier on the top of the curb and against the rail posts. 11/19/2008 - No significant change. 11/02/2006 - Rust, pitting, paint peel, and exposed prime coat on the rail posts and top handrail pipe. W-Beam has some rusty spots throughout. 10/07/2002 - 109.42 \* 2 = 218.84m Rusty spots with pitting throughout rail and posts. The metal rail and posts are now behind a concrete barrier rail. 04/14/1998 - None 02/01/1994 - None Inspection Notes: Element 358 - Deck Cracking SmFlag Χ 3 Х 0 100 ea. % % % Previous Inspection Notes : 12/19/2012 - Unchanged from previous inspections. 12/27/2010 - Wide cracks over un-jointed Bents. Some wider mapping cracks in all Spans. 11/19/2008 - Condition State 2 due to size of the cracks and nearing the density limit also. Inspection Notes:



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#### 100015282+05472 Continue

General Inspection Notes	
12/19/2012 - Good markers on the corners of Abutment 7.	UIGZ
12/27/2010 - Good markers on both sides of Abutment 7 for approaching traffic.	ZWDZ
Minor erosion on all (4) corners.  11/19/2008 - NBI 58, deck, rated a "6" due to small delamiantions and cracking.  Bumps on and off of the structure. Markers on both corners of Abutment 7, approach roadway, and in Fair condition.	TEDU
11/02/2006 - Minor bumps on and off of the structure. There are markers on the Right and Left approach rail into the bridge and in Fair to Good condition.	CXDN
10/07/2002 - Markers on North end of the structure, approach side, and in Good condition.	IZHQ
04/14/1998 - None	RHHJ
02/01/1994 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/11/97 10:44:30 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:15:07	REFI
01/01/1992 - Updated with tape 1994	NB94
03/01/1990 - Updated with tape 1991	NB91
02/01/1988 - Updated with tape 1989	NB89
02/01/1986 - Updated with tape 1988	NB88
01/01/1984 - Updated with tape 1985	NB85
08/01/1981 - Updated with tape 1984	NB84
03/01/1979 - Updated with tape 1980	NB80



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#### 100015284+00001

**Location: 1M N EMERSON JCT Structure Name:** 

**General Location Data** MDT Maintenance Section: 31-01 Great Falls District Code, Number, Location: 03 **GREAT FALLS GREAT FALLS** Division Code, Location:31 County Code, Location: 013 **CASCADE** City Code, Location: 00000 **RURAL AREA** Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00015 State Highway Agency State Highway Agency Str Owner Code, Description: 1 Maintained by Code, Description:1 Intersecting Feature: DRAINAGE 457.10 km Kilometer Post, Mile Post: 284.03 Structure on the State Highway System: Latitude: 47°31'54" **Construction Data** Structure on the National Highway System: Longitude: 111°24'06" Construction Project Number: I 15-5(9)275 Str Meet or Exceed NBIS Bridge Length: Construction Station Number: 862+50.00 Construction Drawing Number: **Traffic Data** Construction Year: 1960 Current ADT: 9,280 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year:

#### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design :	32.6 mton	B ASD Assigned
Operating Load, Design:	32.6 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	48.6		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 3.86 m

Deck Area : 0.00 m sq
Deck Roadway Width : 0.00 m

Approach Roadway Width : 23.16 m

Median Code, Description: 0 No median

### Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure: 99.99 m

Reference Feature for Vertical Clearance: N Feature not hwy or RR

0.00 m

Skew Angle: "

(50B) Curb Width:

0.00 m

Vertical Clearance Under the Structure: 0.00 m

Reference Feature for Lateral Underclearance : N Feature not hwy or RR

Minimum Lateral Under Clearance Right : 0.00 m

Minimum Lateral Under Clearance Left : 0.00 m

(52) Out-to-Out Width:

#### Span Data

#### Main Span

Number Spans: 1

Material Type Code, Description: 3 Steel

Span Design Code, Description: 19 Culvert (includes frame culverts)

Deck

Deck Structure Type: N Not applicable

Deck Surfacing Type: N Not Applicable (applies only to strutures with no dec

Deck Protection Type: N Not applicable (applies only to structures with no de

 $\label{eq:decomposition} \mbox{Deck Membrain Type}: \ \ \mbox{\bf N Not applicable (applies only to structures with no de}$ 

# Approach Span

Number of Spans: 0

Material Type Code, Description:

Span Design Code, Description:

(50A) Curb Width:

0.00 m

### Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Inventory			South, W	est or Bi-direction	nal Travel	North or East Travel				
	Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal		
ſ	Route On Structure	100015	Both	99.99 m	12.10 m	N/A				
Γ	I - 15									

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### 100015284+00001

Continue

**Inspection Data** 

Sufficiency Rating: 80

Inspection Due Date: 28 April 2016 (91) Inspection Frequency (months): 24

#### Structure Status: Not Deficient **NBI Inspection Data** 28 April 2014 Charles Pepos - 107 (90) Date of Last Inspection: Last Inspected By (90) Inspection Date Inspected By (58) Deck Rating: (62) Culvert Rating: 6 (36A) Bridge Rail Rating : N (68) Deck Geometry: 9 (59) Superstructure Rating : N (61) Channel Rating: (36B) Transition Rating (67) Structure Rating: 6 (71) Waterway Adequacy :8 (60) Substructure Rating : N (36C) Approach Rail Rating (69) Under Clearance: (36D) End Rail Rating (113) Scour Critical: 8 (72) App Rdwy Align : 8 (41) Posting Status Unrepaired Spalls: 0 m sq 0.00 in Deck Surfacing Depth: **Inspection Hours** Snooper Required: Crew Hours for inspection: Snooper Hours for inspection Helper Hours: 0 Flagger Hours Special Crew Hours: 0 Special Equipment Hours: Effected Covered **Inspection Work Candidates** Scope of **Status Priority** Structure Work Action Condition Candidate ID Date Unit States Requested D31-FY2006-000196 240 Steel Culvert Rehab Elem 03 May 2006 High M Main **Approved** Clean debris from inlet and outlet of the pipe and back to R/W. Also complete the outlet drainage ditch so as to drain the standing water in the pipe. 05-03-2010 Lots of tumbleweeds at both ends today. Pipe was clean today. Ditch needs to be taken past R/W to get rid of standing water. 04-28-2014 Inlet is full of tumbleweeds today and outlet needs to be cleaned up. Approved. DRC

Late Reason:

Inspection Date: 04/28/2014



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### 100015284+00001

Continue

#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 240 - Steel Culvert 3 65 m. 85 10 % % Previous Inspection Notes: 04/28/2014 - Area under SB lanes has rust, scale, and pin holes in the roof area in random spots. Concrete in the invert looks Good. (2) small holes in the roof about 30' in from the inlet. 05/07/2012 - Pipe was clean today with knee deep water standing in the outlet. Rust, scale, and surface pitting on the invert. Some small pin holes in the invert. Holes 30 ft. in from the inlet end are unchanged. A concrete liner was placed in this pipe during 2013 construction project. This took care of the problems on the invert of the pipe. 05/03/2010 - Same comments as the last inspections. Lots of tumbleweeds in the inlet and outlet of the pipe today. 04/24/2008 - No change on the 4" x 4" holes, 30 ft in from the inlet. 5 percent in Condition State 3 as a couple of small holes in the invert and because of loss of shape. Rusty spots, scale, and pitting on the bottom 1 ft of the pipe. Outlet is bouncy as hollow under the last 10 ft of the pipe. 04/18/2006 - 64.62 \* 1 = 64.62m Plans say it is a 13'-0" SSPP but field measurements show it to be 12'-8"(S) x 13'-9"(R). Concrete slope protection and cutoff wall added on the Right-Inlet end after initial construction. Pipe is dry at the inlet, 1' deep standing water at outlet and 2' of standing water under the SB Inae. Pipe has some rust spots and light scale on the invert. Hollow under the first 6 ft of the outlet of the pipe with no cut off wall or slope protection in place. Pipe end bounces when jumped on. About 30 ft in from the inlet is a 4" x 4" hole in the top-Left portion of the pipe. This hole does not appear to be a problem. Inspection Notes: **General Inspection Notes** 04/28/2014 - Outlet ditch needs to be worked on as still about 1-1/2' of water backed up in the inlet of the pipe for about 40'. 05/07/2012 - Outlet end of the pipe is hollow under the pipe; back 15 ft. Pipe's shape is Fair with some egg shape to it from construction activity. 05/03/2010 - Hollow area under outlet is unchanged. Mid-thigh deep at outlet today to ankle deep at inlet. 04/24/2008 - Scour hole at outlet and shallow stream bed 50 ft from the pipe has water standing 2 ft deep back into the pipe. 04/18/2006 - Cutoff wall and slope protection on Right end added in a construction project that also cleaned out the pipe. Guardrail for I-15 at the pipe due to slope steepness and is up to current standards.



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#### 100015284+02351

Location: 6M S VAUGHN Structure Name:

**General Location Data** MDT Maintenance Section: 31-01 Great Falls District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** City Code, Location: 00000 County Code, Location: 013 **CASCADE RURAL AREA** Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00015 Str Owner Code, Description: 1 State Highway Agency State Highway Agency Maintained by Code, Description:1 Intersecting Feature: JR GRADE SEP Kilometer Post, Mile Post: 457.42 km 284.23 Structure on the State Highway System: Latitude: 47°31'60" **Construction Data** Structure on the National Highway System: Longitude: 111°24'23" Construction Project Number: I 15-5(9)275 Str Meet or Exceed NBIS Bridge Length: Construction Station Number: 0+00.00 Construction Drawing Number: 4209 **Traffic Data** Construction Year: 1960 Current ADT: 9,280 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year: 1974

#### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design :	32.6 mton	B ASD Assigned
Operating Load, Design:	54.4 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting		
Truck 1 Type 3:					
Truck 2 Type 3-S3:					
Truck 3 Type 3-3 :	120.29				

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 5.49 m

> Deck Area: 210.00 m sq

38.30 m Deck Roadway Width: 22.00 m Approach Roadway Width:

Median Code, Description: 0 No median

### Span Data

#### Main Span

Number Spans: 1

Material Type Code, Description: 1 Concrete Span Design Code, Description: 1 Slab

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 6 Bituminous Deck Protection Type: 0 None Deck Membrain Type: 0 None

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

N Feature not hwy or RR Reference Feature for Vertical Clearance:

3.58 m Vertical Clearance Under the Structure:

N Feature not hwy or RR Reference Feature for Lateral Underclearance:

0.00 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

#### Approach Span

Number of Spans: 0 Material Type Code, Description: Span Design Code, Description:

> 38.30 m (52) Out-to-Out Width: (50A) Curb Width: (50B) Curb Width: 0.00 m 0.00 m Skew Angle: "

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	on Inventory South, West or Bi-directional Travel				N	orth or East Trav	rel el
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	100015	South	99.99 m	11.00 m	North	99.99 m	11.00 m
I - 15 NB AND SB							



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#### 100015284+02351 Continue

**Inspection Data** 

Sufficiency Rating: 96.6 Structure Status: Not Deficient Inspection Due Date : 06 August 2014 (91) Inspection Frequency (months) : 24

Structure Status . No	Dencient						
NBI Inspection Da	ata						
(90) Date of Last Ins	pection: 06 August 2	012		La	ast Inspected By: Charles Pe	epos - 107	
(90) Inspection	on Date :				Inspected By :		
(58) Deck	, <u> </u>	(68) Deck Geor	metry : 9		Bridge Rail Rating : 1	`	ert Rating : N
(59) Superstructure		(67) Structure R	ating : 6	(36B)	) Transition Rating : 0		el Rating : N
(60) Substructure	Rating : 6	(69) Under Clear	ance : N	(36C) Ap	proach Rail Rating :1	(71) Waterway A	Adequacy : N
(72) App Rdwy	y Align : 8	(41) Posting S	Status : A	(361	D) End Rail Rating : 0	(113) Scot	ur Critical : N
	Unrepaired S	palls: 0 m s	sq		Deck Surfacir	ng Depth : 4	.00 in
Inspection Hours Crew Hours for inspec			Snoo	oper Required	· N		
Helper He		Sr		for inspection		$\neg$	
Special Crew H			•	Flagger Hours	0	_	
Special Equipment He					U		
Inspection World	k Candidates	_		Effected	Scope of		Covered
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work	Action	Condition States
D31-FY2004-000066	28 January 2004	Approved	Low	M Main	215 R/Conc Abutment	Min Repair	
Clean material away fro Approved. DRC	m the backwall drains	S.					
D31-FY2005-000030	07 October 2004	Approved	Low	M Main	39 Unp Conc Slab/AC Ovi	Min Repair	
Seal cracks between the	e deck slabs and the	• •	etween the s	lab and aspha	It surfacing. Some done, 8-6		
Approved. DRC							

Late Reason:

Inspection Date: 08/06/2012



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## 100015284+02351

Continue

#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 39 - Unp Conc Slab/AC Ovl X 3 210 sq.m. 100 0 % % % Previous Inspection Notes: 08/06/2012 - Minor rutting in wheel paths. Roadway is smooth over structure. 08/09/2010 - No change from the previous inspections. 07/10/2008 - Chip seal in the past years. Minor ruts in the wheel paths, but surfacing is generally Good. Small section of exposed rebar on the underside of the slab at the Right edge of Abutment 1. 06/08/2006 - Crack at centerline under the NB lanes that has efflorescence. Minor rutting in the aspahlt surfacing. 09/21/2004 - Same as previous report. Joints at the median slabs to NB and SM slabs are leaking. 10/07/2002 - Mapping cracks on slab over the median with efflorescence on most cracks. 08/02/2000 - 38.30 \* 5.49 = 210.27 Seperation at the joints. 04/14/1998 - None 12/01/1995 - None 02/01/1994 - None Inspection Notes: Element 215 - R/Conc Abutment 2 90 101 m. % % % % Previous Inspection Notes: 08/06/2012 - Some small delaminated areas near cracks with effloresence. Still partially buried backwall drains. On both abutments worse cracks are from corners of spalls under traveled lanes. 08/09/2010 - No change from the previous inspections. 07/10/2008 - 5 percent in Condition State 3 for a small delmainated areas. 5 percent in Condition State 2 for cracks with efflorescence. Left wingwall at Abutment 1 has a slight seperation from the backwall. Some backwall drains are partially buried. 06/08/2006 - Same as previously reported plus some spalled patch, 4" x 10", on the Right end of Abutment 1 just under the deck. 09/21/2004 - Cracking from the corners of lane slabs with efflorescence on the cracks. Wingwalls are tight to the backwalls. 10/07/2002 - Same as previous report. Add weep drains along both backwalls are either buried or partially covered. 08/02/2000 - (38.3 \* 2) + (4 \* 6.10) = 101.00mCracks with some water marking at the joints of the median section to the sections under the roadway. Slight seperation on the left end at the wingwalls to the backwall joint. 04/14/1998 - None 12/01/1995 - None 02/01/1994 - None Inspection Notes:

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#### 100015284+02351 Continue

\*\*\*\*\*\* \* \* \* \* Span : Main-0 - (cont.) \* \* \* \* \* \* \* \* \*

Element Des	cerintion		****	* * * *	* Span : ı	Main-0 - (cont	:. <b>)</b> * * * * * * * *	* *		
	Scale Factor	Env	Quantity	Linita	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	- Metal Rail Co		,	Units		PCI SIAI I	PCI SIAI 2	PCI SIAI 3	PCI Stat 4	PCI SIAI 5
Terrierit 554	1	3	11		313	95	5	0	0	
	<u>'</u>	3	11	m.						
						%	%	%	%	
Previous Ins	pection Notes :									
8/06/2012 -	Some spot rus	t and fadeo	d paint on rail p	osts. So	me sanding	material in lowe	r post webs near	bases.		HZG.
8/09/2010 -	No change from	m the previ	ous inspections	S.						JZD
7/10/2008 -	Spot rust on th	e W-Beam	rail and top ha	If of the	posts. Pain	it loss and surfac	e pitting on the lo	ower portions of t	he webs and base	es. KZC
6/08/2006 -	Unchanged.									IZDU
9/21/2004 -	Spot rust on th	e rail posts	and W-Beam	rail.						VUL
10/07/2002 -	Minor rusty spo	ots to both	posts and rail.							
08/02/2000 -	5.49 * 2 = 10.9	8m								GHJ)
Some rust a 04/14/1998 -										RHH
12/01/1995 -	None									YDN
02/01/1994 -	None									REF
Inspection I	Votes:									
Пороспол	10100.									
General	Inspection I	Notes								
08/06/2012 -	Area under brid	dge was dr	y today as was	all of th	e exposed b	backwall drains.				HZG
				ets the "	no retro-fit n	needed" policy of	the Bridge Burea	au.		JZD
	d shoe is lapped Median barrier			ndition.						KZC
					d cracks in t	he asphalt surfa	cina.			IZDI
NBI 59, supe Small deline	erstructure, rated ators on the rail	d a "7" due blocks.	to minor crack	ing on th	ne underside	e of the deck slal		alcanad out		VUL
	·								Lucata	
				tandard	s. 36A is pa	art of continuous	run and is only V	v-beam with stee	o posts.	IFHF
	New seal and	cover in 19	99.							GHJ
04/14/1998 -										RHH
	Sufficiency Rat Rating Calculation									YDN
ĺ	, and the second	on Accepte	a by opoquooo	+ at 2/10	707 14.10.0	,0				
)2/01/1994 -										REF
)1/01/1992 -	Updated with to	ape 1994								NB9
	Updated with to									NB9
02/01/1988 -	Updated with ta	ape 1989								NB8
02/01/1986 -	Updated with ta	ape 1988								NB8
01/01/1984 -	Updated with ta	ape 1985								NB8
08/01/1981 -	Updated with ta	ape 1984								NB8



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## Printing Date: Thursday, May 22 2014

100315000+00001 **Location: GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** 

County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** 

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00315

Str Owner Code, Description: 1 State Highway Agency **State Highway Agency** Maintained by Code, Description:1

Intersecting Feature: INT I-15 Kilometer Post, Mile Post: 0.02 km 0.01

Structure on the State Highway System: Latitude: 47°29'06" Construction Data Structure on the National Highway System:

Longitude: 111°20'42" Construction Project Number: I 15-5(26)271 Str Meet or Exceed NBIS Bridge Length: Construction Station Number: 536+44.00

Construction Drawing Number: 6792 **Traffic Data** 

Construction Year: 1967 Current ADT: 15,040 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading:		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	36.2 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3 :	72.91		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 89.61 m

Deck Area: 1,475.00 m sq

13.72 m Deck Roadway Width: 15.00 m Approach Roadway Width:

Median Code, Description: 2 Closed median (no barrier)

#### Span Data

#### Main Span

Number Spans: 5

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 5 Epoxy Overlay

Deck Protection Type: 0 None Deck Membrain Type: 0 None

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

H Hwy beneath struct Reference Feature for Vertical Clearance:

5.48 m Vertical Clearance Under the Structure:

H Hwy beneath struct Reference Feature for Lateral Underclearance:

3.55 m Minimum Lateral Under Clearance Right: 6.70 m Minimum Lateral Under Clearance Left:

#### Approach Span

Number of Spans: 0 Material Type Code, Description: Span Design Code, Description:

> 16.46 m (52) Out-to-Out Width: (50A) Curb Width: (50B) Curb Width: 0.00 m 0.00 m Skew Angle: 30°

### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	· · · · · · · · · · · · · · · · · · ·			North or East Travel		
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
One Route Under	I00015	South	6.75 m	11.58 m	North	5.48 m	11.58 m
I-15 NB AND SB							
Route On Structure	100315	West	99.99 m	8.53 m	East	99.99 m	4.88 m
10TH AVE. SOUTH INT.							



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#### 100315000+00001 Continue

**Inspection Data** 

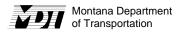
Sufficiency Rating: 88.4
Structure Status: Not Deficient

Inspection Due Date: 05 December 2014 (91) Inspection Frequency (months): 24

NBI Inspection D									
(90) Date of Last Inspection : 05 December 2012					Last Inspected By: Charles Pepos - 107				
(90) Inspection Date :					Inspected By :				
(58) Deck Rating: 6 (59) Superstructure Rating: 7 (60) Substructure Rating: 6 (72) App Rdwy Align: 7 Unrepaired Sp		(68) Deck Geor (67) Structure R (69) Under Clear (41) Posting S palls : 0 m s	Rating: 6 ance: 5 Status: A	(36B)	Bridge Rail Rating:  Transition Rating:  pproach Rail Rating:  Deck Surfaci	(62) Culvert Rating: N (61) Channel Rating: N (71) Waterway Adequacy: N (113) Scour Critical: N			
Crew Hours for inspe			Snoo	oper Required	: N				
Special Craw Hours									
Special Equipment H			·	i lagger i louis	. 0				
Inspection Wor	k Candidates			Effected	Scope of		Covered		
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work	Action	Condition States		
D31-FY2003-000158	13 November 2002	Approved	High	All Spans	300 Strip Seal Exp Joint	Min Repair			
Clean the sanding mate	erial out of the rubber (	gland.							
D31-FY2004-000074	28 January 2004	Approved	Low	All Spans	Bridge	Spot Paint (flex)			
Clean and paint bearing Approved. DRC	js.								
<b>D31-FY2011-000022</b> Repair spalling / delami	28 December 2010 inations on the Right c	Not Approved olumn of Bent 4.	Low	M Main	205 R/Conc Column	Min Repair			

Late Reason:

Inspection Date: 12/05/2012



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#### 100315000+00001 Continue

#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 22 - P Conc Deck/Rigid Ov 1475 X 100 3 sq.m. 0 % % Previous Inspection Notes: 12/05/2012 - Mapping cracks in all Spans. Surface delaminations along the guard angles and joint steel. Studded tire wear in the wheel paths. 12/06/2010 - Mapping cracks in most of the Spans with 4 and 5 being the worse. Wear in the wheel paths. Small delaminations along the joint 11/17/2008 - Wear in the wheel paths. Transverse cracks over the Bents w\o joints. EB lane has mapping cracks in all of the Spans. 11/02/2006 - Small delaminations along the joint over Bent 4. Wear in the wheel paths. Transverse cracking over the unjointed Bents. 10/16/2002 - 16.46 \* 89.61 = 1474.98 Same on cracks with some delamination and transverse cracking also; quick chain drag. 06/03/1998 - Numerous small, tight mapping cracks throughout the wear surface of the new overlay. A seal coat was applied in 1995 after the 1-1/2" rigid overlay. 19.19 \* 89.61 02/01/1994 - None Inspection Notes: Element 109 - P/S Conc Open Girder 781 100 m. % % % % Previous Inspection Notes : 12/05/2012 - Girders are in Good condition. 12/06/2010 - Good conditions with no hits observed. 11/17/2008 - Genreally in Good condition. 11/02/2006 - Generally in Good condition. Some minor cracks from the back of the embedded bearing plate to the ends of the girders on several of the girders. None of these are a problem. 10/16/2002 - (7 \* 28.12) (10 \* 43.5864) (8 \* 18.5166) Inspection Notes: Element 205 - R/Conc Column Bent 2, 3, 4, and 5 2 ea. 90 % Previous Inspection Notes : 12/05/2012 - Right column of Bent 4 shows spalls, delaminations, and deteriorated concrete on its' SE corners; photo. Tight surface shrinkage cracks. Columns of Bent 4 have some staining from joint leakage. 12/06/2010 - All look Good except the Right column at Bent 4 which has delaminations and spalling that is getting worse; photo. 11/17/2008 - Right column at Bent 4 has delaminations and spalling for Condition State 3 and 2 respectively; photo. Tight surface shrinkage cracks throughout. 11/02/2006 - Very minor spalling on a couple of the columns and none are a problem. A couple of the tie wires are exposed, but not a problem. 10/16/2002 - Most noticeable on the south column at Bent 4. 06/03/1998 - Some spalling of concrete on a couple of the columns. 02/01/1994 - None Inspection Notes:

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#### 100315000+00001 Continue

\*\*\*\*\*\*\*\*\* Span : Main.0 \_ (cont ) \*\*\*\*\*\*\*

				Spail.	Main-0 - (COII	L. <i>)</i>			
Element Description									
Smart Flag Scale Fact		Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 215 - R/Conc A	butment 1 an	d 6							
1	1	45	m.		95	5	0	0	
					%	%	%	%	%
Previous Inspection Note	es:								
12/05/2012 - Abutments backwall by G3 and G6. 12/06/2010 - Generally 0							(2) small spalls in	n Abutment 4's	GZFZ GAEZ
11/17/2008 - (1) small sp		` '			· ·				RZDZ
11/02/2006 - Minor and to of Abutment 1, SW corner 10/16/2002 - (19.19 1.6)	tight shrinkage er.		_	<b>'</b>		der embedment a	it Abutment 1. Ei	rosion on the Rig	ht side CXDO QZCJ
Inspection Notes:									
Element 234 - R/Conc C									
1	1	77	m.		90				
Previous Inspection Note	es :								
12/05/2012 - Spall on the	e Left end of E	Bent 3's cap had	not cha	anged. Ben	t 4's cap is staine	ed and has surfa	ce spalls and del	aminations on its	d' GZFZ
bottom at rebar chair fee 12/06/2010 - Spall on the	et.	·		_	·		·		
on the surface of the cap	bottoms from	shallow rebar of	chair fee	et.					
11/17/2008 - Spall on Be and exposed rebar chair		s not gotten any	worse.	Surface de	laminations and	spalls on the un	derside of the cap	os from shallow t	ie wire RZDZ
11/02/2006 - Underside	of the caps ha				rebar chairs are	e exposed. Also	staining around t	he spalls. Left e	nd of CXDO
the cap at Bent 3 has a s 10/16/2002 - 19.19 * 4 =		e Span z side be	aring, s	see prioto.					QZCJ
Inspection Notes:									
Element 300 - Strip Seal	Exp Joint								
1	3	19	m.		95	5	0		
					%	%	%	%	%
Previous Inspection Note	es:								<u> </u>
12/05/2012 - Joint is pac joint's steel.									g the GZFZ
12/06/2010 - Lots of dirt									GAEZ
11/17/2008 - Full of dirt.		•					•	_	
11/02/2006 - Joint steel : delaminations along the 10/16/2002 - Full of sand	joint steel.	vhen tapped on.	Packe	ed with dirt/s	anding material.	No apparent are	eas of leakage. S	Some minor	CXDO QZCJ
06/03/1998 - Need to cle	Ŭ	nding material th	nat is in	the joint.					QFBC
19.19 * 1 02/01/1994 - None									REFI
Inspection Notes:									

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#### I00315000+00001 Continue

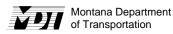
Element Description									
Smart Flag Scale Fa		Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311 - Moveab	e Bearing Be	nt 4							
1	2	20	ea.		90	10	0		
					%	%	%	%	
Previous Inspection No	tes:	I				L			
2/05/2012 - Alignmen	is Good. Rus	st, paint loss, stai	ining, ar	nd bird debri	S.				GZF.
12/06/2010 - Alignmen	is Good. Rus	st, dirt, paint loss	, and bi	rd debris.					GAE
1/17/2008 - Rusty, pa	nt loss, and d	ebris. Also staini	ing from	n prior joint.					RZD
11/02/2006 - Rusty, pa	nt loss, dirt, a	nd bird debris.							CXD
10/16/2002 - Add and	ome paint los	S.							QZC
06/03/1998 - Some rus	t & pitting.								QFB
02/01/1994 - None									REF
Inspection Notes:									
Element 313 - Fixed B									
		1							
1	1	64	ea.		90	10	0		
					%	%	%	%	
					/9	70	,,		
Previous Inspection No	tes:				70	70			
12/05/2012 - Bent 2, 3	and 5 show fa		oot rust.	. Abutment b				g, and debris. Ou	uter GZF.
12/05/2012 - Bent 2, 3 bearings at the Abutme	and 5 show fa	orst.	oot rust.	. Abutment b				g, and debris. Ou	
12/05/2012 - Bent 2, 3 pearings at the Abutmo 12/06/2010 - Rust, dirt	and 5 show fa nts are the wo paint loss, an	orst. d bird debris.			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE
12/05/2012 - Bent 2, 3 pearings at the Abutmo 12/06/2010 - Rust, dirt 1/17/2008 - Spot rust	and 5 show fa nts are the wo paint loss, an on the Bent be	orst. d bird debris. earings with paint			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE. RZD.
Previous Inspection No. 12/05/2012 - Bent 2, 3 pearings at the Abutmo 12/06/2010 - Rust, dirt 11/17/2008 - Spot rust 11/02/2006 - Some min 10/16/2002 - No change	and 5 show fa nts are the wo paint loss, an on the Bent be nor spot rust an	orst. d bird debris. earings with paint			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE. RZD. CXD
12/05/2012 - Bent 2, 3 pearings at the Abutmo 12/06/2010 - Rust, dirt 11/17/2008 - Spot rust 11/02/2006 - Some mi 10/16/2002 - No chang	and 5 show fa nts are the wo paint loss, an on the Bent be nor spot rust an	orst. d bird debris. earings with paint			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE. RZD. CXD
12/05/2012 - Bent 2, 3 pearings at the Abutme 12/06/2010 - Rust, dirt 11/17/2008 - Spot rust 11/02/2006 - Some mi	and 5 show fa nts are the wo paint loss, an on the Bent be nor spot rust an	orst. d bird debris. earings with paint			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE. RZD. CXD
2/05/2012 - Bent 2, 3 pearings at the Abutmo 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang	and 5 show fa nts are the wo paint loss, an on the Bent be nor spot rust an	orst. d bird debris. earings with paint			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE. RZD. CXD
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:	and 5 show fa nts are the wo paint loss, an on the Bent be or spot rust an e.	orst. d bird debris. earings with paint			pearings have pa	aint loss, rust, mir	nor surface pittin	g, and debris. Ou	GAE. RZD.
2/05/2012 - Bent 2, 3 bearings at the Abutmo 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No change Inspection Notes:	and 5 show fa nts are the wo paint loss, an on the Bent be for spot rust are.	orst.  d bird debris. earings with paint and bird debris.	t loss ar		pearings have pa	aint loss, rust, mir	nor surface pittin		GAE. RZD. CXD
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:	and 5 show fa nts are the wo paint loss, an on the Bent be or spot rust an e.	orst. d bird debris. earings with paint	t loss ar		pearings have pa	aint loss, rust, mir the Abutment be	nor surface pittin earings.	0	GAE. RZD. CXD
2/05/2012 - Bent 2, 3 bearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No change Inspection Notes:	and 5 show fa nts are the wo paint loss, an on the Bent be for spot rust are.	orst.  d bird debris. earings with paint and bird debris.	t loss ar		pearings have pa	aint loss, rust, mir the Abutment be	nor surface pittin	0	GAE. RZD. CXD
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:	and 5 show farnts are the working paint loss, and on the Bent before spot rust are.	orst. d bird debris. earings with paint and bird debris.	t loss ar	nd surface pi	pearings have pa	aint loss, rust, mir the Abutment be	earings.	0 %	GAE. RZD. CXD. QZC
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No change Inspection Notes:    Conc. Bit	and 5 show fants are the worpaint loss, an on the Bent before spot rust are.  dge Railing  3  tes:	orst. d bird debris. earings with paint and bird debris.  180  Spalls at the bolt	m.	and surface pi	pearings have patting on some of 95%	aint loss, rust, mir the Abutment be	or surface pitting earings.	0 % erally in Good con	GAE: RZD. GXD. QZC.
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:  Element 331 - Conc Br  2/05/2012 - Rubs on 2/05/2010 - Generally	and 5 show far the work paint loss, and on the Bent before spot rust are.  dge Railing  3 tes:  ooth barriers.  Good condition	orst. d bird debris. earings with paint and bird debris.  180  Spalls at the bolt on. Rubs and scr	m. holes or	and surface pi	pearings have patting on some of 95%	aint loss, rust, mir the Abutment be	or surface pitting earings.	0 % erally in Good con	GAE. RZD. CXD. QZC
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:  Element 331 - Conc Br 1 Previous Inspection Note 2/05/2012 - Rubs on 2/06/2010 - Generally 1/17/2008 - Unchang	and 5 show far and 5 show far and 5 show far and the work paint loss, and on the Bent before spot rust and e.  dge Railing  dge Railing  3 tes:  ooth barriers.  Good conditions defined with some r	orst. d bird debris. earings with paint and bird debris.  180  Spalls at the bolt on. Rubs and scrubs and scrapes	m. holes of rapes of noted.	and surface pi	pearings have partiting on some of 95 % de of the barrier side of the barrier	aint loss, rust, mir the Abutment be  5 % s. Some shrinak er has spalls nea	oner surface pitting parings.  O  %  ge cracks. Generate ends arour	o % erally in Good con	GAE. RZD. CXD. QZC.  ddition. GZF. GAE. RZD.
2/05/2012 - Bent 2, 3 bearings at the Abutmo 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No change Inspection Notes:	and 5 show far and 5 show far the work paint loss, and on the Bent before spot rust and e.  dge Railing  dge Railing  dge Railing  dge Railing  a stes:  a Good conditions and with some restricted cracks	orst. d bird debris. earings with paint and bird debris.  180  Spalls at the bolt on. Rubs and scrubs and scrapes	m. holes of rapes of noted.	and surface pi	pearings have partiting on some of 95 % de of the barrier side of the barrier	aint loss, rust, mir the Abutment be  5 % s. Some shrinak er has spalls nea	oner surface pitting parings.  O  %  ge cracks. Generate ends arour	o % erally in Good con	GAE RZD CXD QZC  adition. GZF. GAE RZD mm CXD
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:  Element 331 - Conc Bi 2/05/2012 - Rubs on 2/05/2012 - Rubs on 2/06/2010 - Generally 1/17/2008 - Unchang 1/02/2006 - Numerous Irilling/construction ac 0/16/2002 - ok	and 5 show far the work paint loss, and on the Bent before spot rust and e.  dge Railing  dge Railing  dge Railing  dge Railing  des :  south barriers.  Good conditioned with some reserved with some reserved in the conditioned with some reserved in the conditioned with some reserved.	sporst.  In display the bold of the bold o	m. holes of noted.	and surface pi	pearings have partiting on some of 95 % de of the barrier side of the barrier	aint loss, rust, mir the Abutment be  5 % s. Some shrinak er has spalls nea	oner surface pitting parings.  O  %  ge cracks. Generate ends arour	o % erally in Good con	GAE RZD CXD QZC  Idition. GZF GAE RZD Im CXD
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No chang Inspection Notes:  Element 331 - Conc Br 2/05/2012 - Rubs on 2/05/2012 - Rubs on 2/06/2010 - Generally 1/17/2008 - Unchang 1/02/2006 - Numerou drilling/construction ac	and 5 show far the work paint loss, and on the Bent before spot rust and e.  dge Railing  dge Railing  dge Railing  dge Railing  des :  south barriers.  Good conditioned with some reserved with some reserved in the conditioned with some reserved in the conditioned with some reserved.	sporst.  In display the bold of the bold o	m. holes of noted.	and surface pi	pearings have partiting on some of 95 % de of the barrier side of the barrier	aint loss, rust, mir the Abutment be  5 % s. Some shrinak er has spalls nea	oner surface pitting parings.  O  %  ge cracks. Generate ends arour	o % erally in Good con	GAE RZD CXD QZC  dition. GZF GAE RZD m CXD QZC
2/05/2012 - Bent 2, 3 pearings at the Abutme 2/06/2010 - Rust, dirt 1/17/2008 - Spot rust 1/02/2006 - Some min 0/16/2002 - No change Inspection Notes:    Concept	and 5 show far the work paint loss, and on the Bent before spot rust and e.  dge Railing  dge Railing  dge Railing  dge Railing  des :  south barriers.  Good conditioned with some reserved with some reserved in the conditioned with some reserved in the conditioned with some reserved.	sporst.  In display the bold of the bold o	m. holes of noted.	and surface pi	pearings have partiting on some of 95 % de of the barrier side of the barrier	aint loss, rust, mir the Abutment be  5 % s. Some shrinak er has spalls nea	oner surface pitting parings.  O  %  ge cracks. Generate ends arour	o % erally in Good con	GAE. RZD. CXD. QZC.  ddition. GZF. GAE. RZD.



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					<b>-</b>	, ( <b>33</b> 111	· <i>/</i>			
Element Des	•									
•	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 358	3 - Deck Crackin	ng SmFlag								
Х	1	1	1	ea.	X	0	100	0	0	
						%	%	%	%	1
Previous Ins	pection Notes :									
2/05/2012 -	Due to size an	d quantity.	Spans 4 and 5	ā are the	e worst. Little	to no sealer left				GZFZ
	Lots of mappin									GAEZ
		-				nderside of the d	leck looks ok.			RZDZ
							ndition State 1 as	sealed in 1995.		CXDO
	No change.		,		·					QZCJ
)6/03/1998 -	Small, tight ma	aping crack	s throughout th	ie new r	igid overlay.	Sealed with a se	ealer during 1995	also.		QFBC
Increation I	Notos:									
Inspection I	votes:									
General	Inspection I	Notes								
	End shoes at A									GZFZ
Slope protection of the contract of the contra		as slid dow	nhill into the co	olumns a	at Bent 2 and	I is causing some	e cracking and sp	alling in the slop	e protection cond	
	End shoes still			the NE	and SE corne	ers.				GAEZ
NE and SE r	<ul> <li>Approaches ovali ail end shoes a</li> <li>Slope protection</li> </ul>	re lapped a	against traffic.	ows sor	ne minor sett	tlement and crac	kina.			RZDZ CXDO
10/16/2002 -							3			QZCJ
06/03/1998 -										QFBC
02/01/1994 -	Sufficiency Ra									REFI
) 01/01/1992 -	- Updated with t	ape 1994								NB94
	Updated with t	•								NB91
	Updated with t	•								NB89
	Updated with t	•								NB87
JZ/U1/1986 -	- Updated with t	ape 1987								NBC



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### 100315000+03421

**Location: GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** 

County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** 

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00315

State Highway Agency **State Highway Agency** Str Owner Code, Description: 1 Maintained by Code, Description:1

Intersecting Feature: FAU 5225-14TH STREET SW Kilometer Post, Mile Post: 0.55 km 0.34

Structure on the State Highway System: Latitude: 47°29'13"

Structure on the National Highway System: Longitude: 111°20'17"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number: IG 315-5(3)272 Construction Station Number: 21+65.00

Construction Drawing Number: 6813

Construction Year: 1967 Reconstruction Year: 1995

**Traffic Data** Current ADT : 25,500

ADT Count Year: 2009 2 % Percent Trucks:

## Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	35.3 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	83.84		

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 45.72 m

> Deck Area: 546.00 m sq

10.96 m Deck Roadway Width: 10.96 m Approach Roadway Width:

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

H Hwy beneath struct Reference Feature for Vertical Clearance:

5.26 m Vertical Clearance Under the Structure:

H Hwy beneath struct Reference Feature for Lateral Underclearance:

1.70 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

#### Span Data

#### Main Span

Number Spans: 3

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: 0 None Deck Membrain Type: 0 None Number of Spans: 0

Approach Span

Material Type Code, Description:

Span Design Code, Description:

11.95 m (52) Out-to-Out Width:

(50A) Curb Width:

(50B) Curb Width:

0.00 m

0.00 m

Skew Angle: 25°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
One Route Under	U05225	Both	5.26 m	9.14 m	N/A			
14TH STREET SW								
Route On Structure	100315	N/A			North	99.99 m	10.96 m	
I - 315 EB								



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**Inspection Data** 

Sufficiency Rating: 93

Inspection Due Date: 05 December 2014 (91) Inspection Frequency (months): 24

Structure Status : No	t Deficient							
NBI Inspection Da	ata							
(90) Date of Last Ins	pection: 05 December	er 2012		La	Last Inspected By: Charles Pepos - 107			
(90) Inspection	on Date :				Inspected By :			
(58) Deck	Rating : 5	(68) Deck Geo	metry : 4	(36A) I	Bridge Rail Rating : 1	(62) Culver	t Rating : N	
(59) Superstructure	9) Superstructure Rating : 8 (67) Structure		Rating : 7	(36B)	Transition Rating : 1	(61) Channe	l Rating : N	
(60) Substructure	(60) Substructure Rating : 7		rance: 4	(36C) Ap	oroach Rail Rating :1	(71) Waterway A	dequacy : N	
(72) App Rdw	y Align : 8	(41) Posting S	•	(360	) End Rail Rating : 1	(113) Scour	Critical : N	
	Unrepaired S	palls: 0 m	sq		Deck Surfacir	ng Depth : 0.0	00 in	
Inspection Hours								
Crew Hours for inspec	ction : 2			per Required :				
Helper H	ours :	S	nooper Hours		0			
Special Crew H	ours :		F	lagger Hours :	0			
Special Equipment H	ours :							
Inspection Wor	k Candidates	<b>a.</b> .		Effected	Scope of		Covered	
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work	Action	Condition States	
D31-FY2004-000075	28 January 2004	Approved	Low	All Spans	Bridge	Spot Paint (flex)		
Clean and paint bearing	js.							
Approved. DRC								
D31-FY2007-000039	26 December 2006	Approved	Medium	M Main	12 Bare Concrete Deck	Min Repair		
Patch any spalled areas	s in the surfacing.							
Approved. DRC								
				<u> </u>				

Late Reason:

Inspection Date: 12/05/2012



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#### I00315000+03421 Continue

#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck X 100 3 546 sq.m. 0 % % Previous Inspection Notes: 12/05/2012 - Transverse cracks with some spalls and delaminations over Bents 2 and 3. Small delaminations along the guard angles. Wear from studded tires in the wheel paths. 12/06/2010 - Spalls, delaminations, and transverse cracks over Bent 2 and 3. Wear in the wheel paths. 2 percent or less delaminations in the deck surface. 11/17/2008 - Open transverse cracks over Bent 2 and 3. Some delaminations in all (3) Spans with an estimated 2 percent or less from a quick chain drag. Wear in the wheel paths. 11/02/2006 - Wear in the wheel paths. Transverse cracks over Bent 2 and 3 with some spalls over Bent 3 also noted. 10/10/2002 - 11.95 \* 45.72 = 546.35 Add slightly open cracks over both Bents. Some minor cracking throughout. 06/03/1998 - 13.15 \* 45.72= Studded tires have left an almost exposed aggregate finish in both traffic lanes. 02/01/1994 - None Inspection Notes: Element 109 - P/S Conc Open Girder 229 1 100 m. % % % Previous Inspection Notes : 12/05/2012 - Good condition. 12/06/2010 - Good condition. 11/17/2008 - Same as prior and in Good condition. 11/02/2006 - No problems observed. Some girders have minor cracks from the backside of the embedded bearing plate to the ends of the girders. 10/10/2002 - 5 \* 45.72 = 228.60m Inspection Notes: Element 205 - R/Conc Column Bent 2 and 3 ea. % Previous Inspection Notes : 12/05/2012 - (2) small spall on the Right column of Bent 3. Tight surface shrinkage cracks in all (4) columns. Columns are in Good condition. 12/06/2010 - Tight surface shrinkage cracks in all (4) columns. (2) small spalls on the Right column of Bent 3; patch has popped off. Generally in Good condition. 11/17/2008 - Generally in Good condition. Small delamianted patch on the Right column of Bent 3 for Condition State 3 and a small spall near the sidewalk line on the same column for Condition State 2. 11/02/2006 - Tight surface shrinkge cracks. Right/South Column at Bent 3 has a small chipped area near the sidewalk and some delamianted areas of the patch at its construction joint to the cap. 10/10/2002 - Some minor wear, weathering, and shrinkage cracks. Inspection Notes:

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#### I00315000+03421 Continue

Element Des	scription									
_	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 215	- R/Conc Abut	ment								
	1	2	33	m.		95	5	0	0	
						%	%	%	%	C
Previous Ins	pection Notes :									
2/05/2012 -	Small spalls al	ong the car	o to backwall ar	ea and	(1) small spa	all at the G3 emb	edment in Abutn	nent 1's backwal	l.	GIFZ
		-				rface shrinkage				GZEV
	Unchanged. C				·					RCDZ
1/02/2006 -	Tight surface s	shrinakge cı	racks in both ca	aps and	some small	spalls where the	girders are emb	edded in the bad	ckwalls.	CZDO
	Add some eros									KLKZ
06/03/1998 -	(13.15 * 2) 1.	80 1.60	1.50 1.70 So	me sma	all, tight crack	ks with minor wa	ter staining.			QFKU
02/01/1994 -	None									REFI
Inspection I	Notes:									
lement 234	- R/Conc Cap	Bent 2 and	13							
	1	1	26	m.		100	0	0	0	
	•	'	20	111.			%			
						%	%	%	%	
	pection Notes :									
	Good condition		_							GIFZ
	Good condition		_							GZEV
	Good condition		_	_						RCDZ
	_		steps in the cap	s. Lots	of staining f	rom pigeon debr	is on tops of the	caps.		CZDO
10/10/2002 -	13.15 * 2 = 26	.30m								KLKZ
Inspection I	Notes:									
Element 313	- Fixed Bearing	g								
	1	1	30	ea.		85	15	0		
						%	%	%	%	· ·
Previous Ins	pection Notes :									
			n the bearings a	at Bents	s 2 and 3. Be	earings at both o	f the Abutments I	nave paint loss.	minor pitting, and	d GIFZ
neavy rust.				20		5ag5 at 25a 5		м го раши 1000,	g, a	
	Rusty spots, p									GZEV
	Rust, paint los									RCDZ
				n debris	on the beari	ngs at Bents 2 a	nd 3.			CZDO
10/10/2002 -	· Add some pair	nt loss and l	bird debris.							KLKZ
	Viotes.									
Inspection I	VOICO.									
Inspection I	10103.									



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#### 100315000+03421 Continue

Smart Flag	ription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 331 -	Conc Bridge I	Railing		•			<u> </u>		<u>.</u>	
	1	3	91	m.		95	5	0	0	
						%	%	%	%	
Previous Insp	ection Notes :									
•		inkage crad	eks Cracks on	the had	ckside of the	harrier show effl	orescence in area	as Ends shoe a	t Ahutment 1 are	GIF.
apped agains	t traffic.									
2/06/2010 - \$ raffic flow.	Scrapes and di	ings to both	n barriers. Ver	tical shr	inkage crack	s for the length o	of the rails. End s	shoes at Abutmei	nt 1 are lapped a	gainst GZE
	Some scrapes	and dings	on both rails.	Γight ve	rtical crackin	g, random, throu	ghout.			RCD
1/02/2006 - L	Jnchanged fro	m previous	reports.							CZD
10/10/2002 - 4	15.72 * 2 = 91.	44m Mino	or dings, scrape	es, and	vertical crack	ing.				KLK
06/03/1998 - 1	New Cast-in-Pl	lace concre	ete rail in 1995.							QFK
02/01/1994 <b>- N</b>	None									REF
Inspection No	otes:									
Element 358 -	Deck Crackin	g SmFlag								
Х	1	3	1	ea.	X	0	0	100	0	
^	•			04.		%	%	%	%	
						70	70	70	70	
·	ection Notes :									
			· ·				laminations in the	e cracked areas.		GIF.
			v spaling starti	_	small delamii	nations.				GZE
11/17/2008 - N	Nide cracks wi	ith spalling	over Bents 2 a	nd 3.						RCD
Inspection No	otes:									
General I	nspection I	Notes								
			ap was not wo	rking to	day. Minor b	umps on and off	of the structure.			GIF
	_		off of the bride	_	•	·				GZE
	New approach									
Both of the rai	I end shoes at	Approach	1 are lapped a							
	•	s to the roa	idway approac	hes. St	ill minor bum	ps on and off of	the structure.			CZD
10/10/2002 - 0										KLK
06/03/1998 - N										QFK
										REF
02/01/1994 - S		on Alooopic	a by opoquooo	- ut 2/ 1	0,07 14.10.0	9				
Sufficiency Ra	ŭ									
Sufficiency Ra 01/01/1992 - U	Jpdated with ta									
Sufficiency Ra 01/01/1992 - U 01/01/1990 - U	Jpdated with ta Jpdated with ta	ape 1991								NBS
Sufficiency Ra 01/01/1992 - L 01/01/1990 - L 02/01/1988 - L	Jpdated with ta Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9 NB9 NB8
Sufficiency Ra 01/01/1992 - L 01/01/1990 - L 02/01/1988 - L	Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9
Sufficiency Ra 01/01/1992 - L 01/01/1990 - L 02/01/1988 - L	Jpdated with ta Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9 NB8
Sufficiency Ra 01/01/1992 - L 01/01/1990 - L 02/01/1988 - L	Jpdated with ta Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9 NB8
Sufficiency Ra 01/01/1992 - L 01/01/1990 - L 02/01/1988 - L	Jpdated with ta Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9 NB8
Sufficiency Ra 01/01/1992 - U 01/01/1990 - U 02/01/1988 - U	Jpdated with ta Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9 NB8
Sufficiency Ra 01/01/1992 - U 01/01/1990 - U 02/01/1988 - U	Jpdated with ta Jpdated with ta Jpdated with ta	ape 1991 ape 1989								NB9 NB8



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#### 100315000+03422

**Location: GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** 

County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** 

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00315

State Highway Agency **State Highway Agency** Str Owner Code, Description: 1 Maintained by Code, Description:1

Intersecting Feature: FAU 5225-14TH STREET SW Kilometer Post, Mile Post: 0.55 km 0.34

Structure on the State Highway System: Latitude: 47°29'13" **Construction Data** 

Structure on the National Highway System: Longitude: 111°20'18" Construction Project Number: IG 315-5(3)272 Str Meet or Exceed NBIS Bridge Length:

Construction Drawing Number: 6813 **Traffic Data** 

Construction Year: 1967 Current ADT : 25,500 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year: 1995

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	A LFD Assigned
Operating Load, Design:	35.3 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	83.84		

Construction Station Number: 21+65.00

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 44.20 m

> Deck Area: 639.00 m sq

13.65 m Deck Roadway Width: 14.00 m Approach Roadway Width:

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

H Hwy beneath struct Reference Feature for Vertical Clearance:

5.20 m Vertical Clearance Under the Structure:

H Hwy beneath struct Reference Feature for Lateral Underclearance:

1.70 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

Number of Spans: 0

Material Type Code, Description:

Span Design Code, Description:

#### Span Data

#### Main Span Approach Span

Number Spans: 3 Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: 0 None Deck Membrain Type: 0 None

14.46 m (52) Out-to-Out Width: (50A) Curb Width: (50B) Curb Width: 0.00 m 0.00 m Skew Angle: 25°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
One Route Under	U05225	Both	5.20 m	9.14 m	N/A			
14TH STREET SW	]							
Route On Structure	100315	West	99.99 m	13.65 m	N/A			
I - 315 WB								



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#### 100315000+03422 Continue

**Inspection Data** 

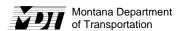
Sufficiency Rating: 96
Structure Status: Not Deficient

Inspection Due Date: 06 December 2014 (91) Inspection Frequency (months): 48

Structure Status : No	t Deficient							
NBI Inspection Da	ata							
(90) Date of Last Ins	pection : 06 December	er 2010		La	Last Inspected By: Charles Pepos - 107			
(90) Inspection	on Date :				Inspected By :			
(58) Deck	Rating : 6	(68) Deck Geo	metry : 9	(36A) I	Bridge Rail Rating : 1	(62) Culver	t Rating : N	
(59) Superstructure	) Superstructure Rating : 8 (67) Structure		Rating : 7	(36B)	Transition Rating : 1	(61) Channe	l Rating : N	
(60) Substructure	(60) Substructure Rating : 7		rance: 4	(36C) App	oroach Rail Rating :1	(71) Waterway A	dequacy : N	
(72) App Rdw	y Align : 8	(41) Posting S	•	(360	) End Rail Rating : 1	(113) Scour	Critical : N	
	Unrepaired S	palls: 0 m	sq		Deck Surfacir	ng Depth : 0.0	00 in	
Inspection Hours								
Crew Hours for inspec	ction: 2		Snoo	per Required :	N			
Helper H	ours : C	S	nooper Hours	for inspection :	0			
Special Crew H	ours :		F	lagger Hours :	0			
Special Equipment H	_							
Inspection Wor	k Candidates			Effected	Scope of		Covered	
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work	Action	Condition States	
D31-FY2004-000076	28 January 2004	Approved	Low	All Spans	Bridge	Spot Paint (flex)		
Clean and paint bearing	js.							
Approved. DRC								
D31-FY2007-000041	26 December 2006	Approved	Medium	M Main	12 Bare Concrete Deck	Min Repair		
Patch any spalled areas	s in the deck, very sm	all at this time.						
Approved. DRC								
					<u> </u>			

Late Reason:

Inspection Date: 12/06/2010

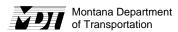


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#### I00315000+03422 Continue

#### **Element Inspection Data**

Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 12 - Bare Concrete Deck X 3 639 sq.m. 0 100 % % Previous Inspection Notes: 12/06/2010 - Wear in the wheel paths. Tight cracks over Bents 2 and 3. Some random cracking in all (3) Spans. 11/02/2006 - Wear in the wheel paths. Cracking does not appear to be any worse or opening up. Put into Condition State 2 as there was (1) small, 1" x 2", area of delamination near Abutment 4 in the Left lane of traffic. 10/10/2002 - 14.46 \* 44.20 = 639.13 Numerous, small and tight, transverse and mapping cracks throughout; very noticeable of the repaired areas. Maybe a smart flag for deck cracking the next report. 06/03/1998 - 44.20 \* 16.35 Deck was repaired, sealed only and widened in 1995. 02/01/1994 - None Inspection Notes: Element 109 - P/S Conc Open Girder 265 100 m. % % % % Previous Inspection Notes: 12/06/2010 - Good condition. 11/02/2006 - Good condition. A couple of the girders have tight cracks from the backside of the embedded bearing plates to the ends of the airders 10/10/2002 - Some scrapes to the bottom flange, but no dings or spalled concrete. Inspection Notes: Element 205 - R/Conc Column Bent 2 and 3 95 ea. % % % Previous Inspection Notes: 12/06/2010 - Surface shrinkage cracks. Generally in Good condition. 11/02/2006 - Tight surface shrinkage cracks. Left two(2) columns on the newer portion of the bridge have some loose/spalled patches over the construction joint to the cap. 10/10/2002 - Some wear, weathering, shrinkage cracks. Inspection Notes: Element 215 - R/Conc Abutment 1 and 4 m. % % Previous Inspection Notes: 12/06/2010 - (1) small spall near girder embedment at Abutment 4. Some tight shrinkage cracks. 11/02/2006 - Minor and tight cracks in both caps with one small spalleed area in the backwall where the girders are embedded. 10/10/2002 - A little more erosion and weathering of the concrete. Inspection Notes:



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### I00315000+03422 Continue

Continue

			****	***	* Span : I	Main-0 - (cont	t.) * * * * * * * * *			
Element Des	cription									
1 "	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 234	- R/Conc Cap	Bent 2 and	13							
	1	1	33	m.		100	0	C	0	
						%	%	%	%	Ċ
Previous Insp	ection Notes :								<u> </u>	
12/06/2010 -	Some tight sur	face shrink	age cracks. Re	ebar cha	air feet show	some rust on th	e underside of bo	oth caps. Minor	staining from bird	GZEW
debris.	Staining from r	oigeon deb	ric Somo tight	oracke	at the stone	in the cape and	none are a proble	om		CZDO
	16.35 * 2 = 32.	_	ns. Some light	CIACKS	at the steps	in the caps and	none are a proble	em.		KYKZ
		.70111								KIKZ
Inspection N	lotes:									
Floment 242	Fixed Decrine	~								
Element 313	- Fixed Bearing	_	0.0			00	4.0			
	1	1	36	ea.		90				
						%	%	%	%	
Previous Insp	ection Notes :									
	Rust spots, pa									GZEW
11/02/2006 -	Rusty spots an	nd paint los	s. Lots of piged	on debri	s on both of	the Bent caps.				CZDO
10/10/2002 -	Add some pair	nt loss and	bird debris.							KYKZ
Inspection N	lotes:									
Element 331	- Conc Bridge	Railing								
	1	3	88	m.		95	5	C	0	
						%	%	%	%	·
Previous Insp	ection Notes :								<u>l</u>	
12/06/2010 -	Same as past	inspections	S.							GZEW
11/02/2006 -	Left/North rail I	has a coup	le of patches ar	eas on	its backside.	. Not a problem	, only an aestheti	c thing.		CZDO
10/10/2002 -	Some dings, se	crapes, and	d vertical cracki	ng.						KYKZ
06/03/1998 -	New in 1995 a	nd was Ca	st-in-Place.							QFIX
44.20 * 2.										
02/01/1994 -	None									REFI
Inspection N	lotes:									
Element 358	- Deck Crackin	g SmFlag								
Х	1	3	1	ea.	Х	0	100	C	0	
						%	%	%	%	
Previous Inst	pection Notes :									
			amount of tight	mannin	a cracks not	ed: especially w	hen the surface is	s damn		GZEW
		2 2 440 10 6	aount or tight	арріп	9 010010 11011	ou, copolially W		o wampi		- OZEVV
Inspection N	iotes.									
	<u> </u>		·			<u> </u>				



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#### 100315000+03422 Continue

General Inspection Notes	
12/06/2010 - Minor bumps on and off of the bridge.	GZEW
11/02/2006 - Recent patches on the East approach to the structure and still a minor bump on and off of the structure.	CZDO
10/10/2002 - None	KYKZ
06/03/1998 - None	QFIX
02/01/1994 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/11/97 10:45:04 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:15:34	REFI
01/01/1992 - Updated with tape 1994	NB94
01/01/1990 - Updated with tape 1991	NB91
02/01/1988 - Updated with tape 1989	NB89
02/01/1986 - Updated with tape 1988	NB88

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#### 100315000+03423

**Location: GREAT FALLS Structure Name:** 

**General Location Data** MDT Maintenance Section: 31-01 Great Falls District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** Kind fo Hwy Code, Description: 8 8 Other (incl toll rds) Signed Route Number: 00315 State Highway Agency **State Highway Agency** Str Owner Code, Description: 1 Maintained by Code, Description:1 Intersecting Feature: FAU 5225-14TH STREET SW Kilometer Post, Mile Post: 0.55 km 0.34 Structure on the State Highway System: Latitude: 47°29'12" **Construction Data** Structure on the National Highway System: Longitude: 111°20'17" Construction Project Number: IR 315-5(12)1F Str Meet or Exceed NBIS Bridge Length: Construction Station Number: 5+63.00 Construction Drawing Number: 15883 **Traffic Data** Construction Year: 1997 Current ADT : 25,500 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading:		5 MS 18 (HS 20)
Inventory Load, Design :	32.6 mton	A LFD Assigned
Operating Load, Design:	34.6 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3 :	48.6		

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 41.45 m

> Deck Area: 333.00 m sq

7.11 m Deck Roadway Width: 7.32 m Approach Roadway Width:

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

Reference Feature for Vertical Clearance: H Hwy beneath struct

5.71 m Vertical Clearance Under the Structure:

H Hwy beneath struct Reference Feature for Lateral Underclearance:

Minimum Lateral Under Clearance Right: 1.90 m 0.50 m Minimum Lateral Under Clearance Left:

#### Span Data

#### Main Span

Number Spans: 3

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: 1 Epoxy Coated Reinforcing

Deck Membrain Type: 0 None

#### Approach Span

Number of Spans: 0

Material Type Code, Description:

Span Design Code, Description:

8.03 m (52) Out-to-Out Width:

(50A) Curb Width: (50B) Curb Width: 0.00 m 0.00 m Skew Angle: 15°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction			est or Bi-direction	nal Travel	North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
One Route Under	U05225	Both	5.71 m	9.14 m	N/A			
14TH ST SW/BRIDGE ST	]							
Route On Structure	100315	N/A			East	99.99 m	7.11 m	
I-315 EB OFF RAMP	]							



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#### 100315000+03423 Continue

**Inspection Data** 

Inspection Due Date : 16 June 2015

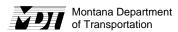
Sufficiency Rating: 96
Structure Status: Not Deficient

(91) Inspection Frequency (months): 48

pproved. DRC								
lean and spot paint the		.,				·		
D31-FY2007-000143	Date Requested 02 July 2007	Approved	Medium	Unit M Main	313 Fixed Beari	ng Rehab	Elem	States
Inspection Work		Status	Priority	Effected Structure	Scope of Work	А	ction	Covered Condition
Special Equipment Ho	ours :							
Special Crew Ho	ours :		I	Flagger Hours	0			
Helper Ho	ours :	Sr	nooper Hours	for inspection	: 0			
nspection Hours Crew Hours for inspec	tion :		Snoo	oper Required	: N			
noncotion House	Unrepaired S	palls: 0 m s	sq		Deck Surfacing Depth : 0.00 in			
(72) App Rdwy	Align : 7	(41) Posting S		(361	D) End Rail Rating : 1		(113) Scour Cr	ritical : N
(59) Superstructure Rating : 7 (60) Substructure Rating : 7		(69) Under Clear	ance:4	(36C) Ap	(36B) Transition Rating : 1 (36C) Approach Rail Rating :1		Waterway Adeo	quacy :N
		(67) Structure R	tating : 7	(36B)			61) Channel R	ating : N
(58) Deck F	Rating : 7	(68) Deck Geor	metry : 6	(36A)	Bridge Rail Rating : 1		(62) Culvert Ra	ating : N
(90) Inspectio	n Date :				Inspected By :			
(90) Date of Last Insp	pection : 16 June 201	l1 		La	ast Inspected By : Cha	rles Pepos - 107		
NBI Inspection Da					_			

Late Reason:

Inspection Date: 06/16/2011



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### I00315000+03423 Continue

#### **Element Inspection Data**

\* \* \* \* \* \* \* \* \* \* \* Span : Main-0 - -1 \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 26 - Conc Deck/Coatd Bars X 100 3 333 sq.m. % % Previous Inspection Notes: 06/16/2011 - Transverse and mapping cracks over both Bents. Minor wear in the wheel paths from studded tire wear 05/31/2007 - Minor wear from studded tires. Transverse cracking over Bents 2 and 3 with the worse area at Bent 2. Not enough for a smart flag 05/04/2005 - Some wear in the wheel paths. Transverse cracking over both of the Bents. (8.03 \* 40.93 (brg to brg) = 328.67m NMS) 04/30/2003 - Deck has tight mapping cracks throughout the driving surface. Studded tire wear in the wheel paths with some exposed aggregate. 08/27/2001 - 8.03 \* 41.45 = 332.8 Slightly open cracks at the two bents. Numerous small, tight tansverse &/or mapping cracks throughout the driving surface. 12/23/1998 - None Inspection Notes: Element 109 - P/S Conc Open Girder 166 100 m. % % Previous Inspection Notes: 06/16/2011 - Generally in Good condition. Small nick on bottom of G1S1 has not changed. 05/31/2007 - Small nick on the Left side of the Bottom flange of G1 in Span 1, but not a problem. 05/04/2005 - Unchanged from previous reports. (4 \* 40.93 = 163.72 NMS) 04/30/2003 - There is a small nick in the outside-left girder near Abutment 1. No problem with the nick or with any of the other girders noted. Graffti painted on girders near the Abutments. 08/27/2001 - 4 \* 41.45 = 165.8m 12/23/1998 - None Inspection Notes: Element 205 - R/Conc Column Bents 2 and 3 ea. % Previous Inspection Notes : 06/16/2011 - Generally in Good condition with some small area where small sacked patches are peeling off. Small spall on the Right column of Bent 3 from construction. 05/31/2007 - Placed 5 percent into Condition State 2 as sacked patches are loose and peeling off of the columns. None of these areas are a problem. 05/04/2005 - Same on the small popouts. 04/30/2003 - No problems noted. A couple of small popouts in areas that were sacked during construction. 08/27/2001 - None 12/23/1998 -Inspection Notes:

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### 100315000+03423 Continue

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - -1 (cont.) \* \* \* \* \* \* \* \* \*

Element Des	scription									
	•									
_	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 215	- R/Conc Abutr	ment 1 an	nd 4							
	1	1	20	m.		95	5	0	0	
						%	%	%	%	
Previous Insp	pection Notes :	ı				L.			L	
06/16/2011 -	Generally in G	ood conditi	ion. Small spal	l on cor	struction joir	nt of backwall to	cap area of Abut	ment 1.		RZGE
5/31/2007 -	Minor spall at t	the cap to b	oackwall constr	uction jo	oint at Abutm	ent 1. Generally	y in Good condition	on.		EZHZ
5/04/2005 -	Minor and tight	t cracks in	both of the back	kwalls.	Erosion at t	he NW corners is	s worse. (Bent 1	= 9.62m Bent 4	1 = 10.67) = 20.29	9m EIFR
erosion probl	Abutments are lems, so raised Erosion at the	to all in St	ate 1.		erosion on th	ne NW corner of	the structure. C	an't rate the elen	nent done due to	BPHZ NHC(
12/23/1998 -		ieit willigwa	all of Abdilletit	# I.						KBG
										RDGI
Inspection N	Notes:									
lement 234	- R/Conc Cap									
	1	1	16	m.		100	0	0	0	
						%	%	%	%	
revious Inst	pection Notes :	•	•		_	'	,			
	Good condition	٦.								RZGI
6/16/2011 -			racks. Some lo	ose sa	cked patches	s at the connection	ons to the columi	ns.		
)6/16/2011 - )5/31/2007 -	Tight surface s	hrinkage c				at the connection (7.92 * 2 = 15.		ns.		EZH
06/16/2011 - 05/31/2007 - 05/04/2005 -	Tight surface s	shrinkage cooted other	than tight surfa	ce shrir	nkage cracks			ns.		EZHZ EIFR
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 -	Tight surface s	shrinkage conted other age cracking	than tight surfa	ce shrir	nkage cracks			ns.		EZHZ EIFR BPHZ
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 -	Tight surface s No problems n Surface shrinks 8.03 * 2 = 16.0	shrinkage conted other age cracking	than tight surfa	ce shrir	nkage cracks			ns.		EZHZ EIFR BPHZ NHC0
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 -	Tight surface s No problems n Surface shrink 8.03 * 2 = 16.0 None	shrinkage conted other age cracking	than tight surfa	ce shrir	nkage cracks			ns.		EZHZ EIFR BPHZ NHC0
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 -	Tight surface s No problems n Surface shrink 8.03 * 2 = 16.0 None	shrinkage conted other age cracking	than tight surfa	ce shrir	nkage cracks			ns.		EZHZ EIFF BPHZ NHC(
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 -	Tight surface s No problems n Surface shrink 8.03 * 2 = 16.0 None	shrinkage conted other age cracking	than tight surfa	ce shrir	nkage cracks			ns.		EZH. EIFF BPH: NHC
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 - Inspection N	Tight surface s No problems n Surface shrink 8.03 * 2 = 16.0 None	shrinkage c oted other age crackii 16m	than tight surfa	ce shrir	nkage cracks			ns.		EZHZ EIFR BPHZ NHC0
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 - Inspection N	Tight surface s No problems n Surface shrinka 8.03 * 2 = 16.0 None Notes:	shrinkage c oted other age crackii 16m	than tight surfa	ce shrir	nkage cracks			ns. 0		EZHZ EIFF BPHZ NHC(
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 12/23/1998 - Inspection N	Tight surface s No problems n Surface shrink 8.03 * 2 = 16.0 None Notes:	shrinkage coted other age cracking 6m	than tight surfa	ce shrir	nkage cracks	. (7.92 * 2 = 15. 95	84m NMS)	0		RZGE EZHZ EIFR BPHZ NHCC KBGF
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 - Inspection N	Tight surface s No problems n Surface shrink 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing	shrinkage cooted other age cracking 6m	than tight surfa	ce shrir	nkage cracks	. (7.92 * 2 = 15.	84m NMS) 5			EZHZ EIFF BPHZ NHC(
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 - Inspection N	Tight surface s No problems n Surface shrink: 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1 pection Notes :	shrinkage cooted other age cracking 6m	than tight surfa	ce shrir	nkage cracks	. (7.92 * 2 = 15. 95	84m NMS) 5	0		EZH. EIFF BPH. NHC KBG
16/16/2011 - 15/31/2007 - 15/31/2007 - 15/04/2005 - 16/30/2003 - 16/27/2001 - 2/23/1998 - 16/16/2011 - 16/16/2011 - 16/16/2011 - 16/16/2011 - 16/16/2011 - 16/31/2007 - 16/31/	Tight surface s No problems n Surface shrinks 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes:	chrinkage cooted other age cracking the second of the seco	than tight surfang; no problems	ea.	and 3 with so	95 %	84m NMS) 5	0 %	%	EZH. EIFF BPH. NHC KBG
06/16/2011 - 05/31/2007 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 2/23/1998 - Inspection N	Tight surface s No problems n Surface shrink: 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes: Dirt and bird de	chrinkage cooted other age cracking 6m 1 1 ebris on be Abutment b	than tight surfaing; no problems  16  Parings of both Expearings as they	ea.  Bents 2	and 3 with so	95 % ome spot rust.	84m NMS)  5 % olts . Bent beari	0 % ngs have spot ru	% st and lots of debr	EZH. EIFF BPH NHC KBG  RZG ris on EZH.
06/16/2011 - 05/31/2007 - 05/31/2003 - 04/30/2003 - 08/27/2001 - 2/23/1998 - 1. Inspection N Element 313 Previous Inspection S	Tight surface s No problems n Surface shrinks 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes:  Dirt and bird de Removed the A	chrinkage cooted other age cracking from 1 1 ebris on be Abutment be eport. Bea	than tight surfaing; no problems  16  tarings of both Epearings as they arings at Bents 2	ea.  Bents 2 / are no	and 3 with so	95 % ome spot rust. to the anchor b ered by nesting	84m NMS)  5 % olts . Bent beari	0 % ngs have spot ru 8 4 = 24 NMS)	% list and lots of debr	EZH. EIFF BPH NHC KBG  RZG ris on EZH.
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 02/23/1998 - 10spection No. Element 313  Previous Inspection No. 05/31/2007 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 05/04/2005 - 04/30/2003 - 05/05/04/2005 - 05/05/05/05/05/05/05/05/05/05/05/05/05/0	Tight surface s No problems n Surface shrinks 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes:  Dirt and bird de Removed the A	chrinkage cooted other age cracking from 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	than tight surfaing; no problems  16  earings of both Expearings as they arings at Bents 2 ne bearings. Pi	ea.  Bents 2 / are no	and 3 with so	95 % ome spot rust. to the anchor b ered by nesting	84m NMS)  5 % olts . Bent beari	0 % ngs have spot ru 8 4 = 24 NMS)	% st and lots of debr	EZH. EIFF BPH. NHC KBG  RZG ris on EZH. EIFF rom BPH.
06/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 08/27/2001 - 12/23/1998 - 12/23	Tight surface s No problems n Surface shrink: 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes:  Dirt and bird de Removed the A Same as last re Rusty spots the Nowe of the N	chrinkage cooted other age cracking from 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	than tight surfaing; no problems  16  earings of both Expearings as they arings at Bents 2 ne bearings. Pi	ea.  Bents 2 / are no	and 3 with so	95 % ome spot rust. to the anchor b ered by nesting	84m NMS)  5 % olts . Bent beari	0 % ngs have spot ru 8 4 = 24 NMS)	% list and lots of debr	EZH. EIFF BPH. NHC KBG  RZG ris on EZH.
206/16/2011 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 02/23/1998 - 05/04/2005 - 05/31/2007 - 05/31/2007 - 05/04/2005 - 04/30/2003 - 05/04/2005 - 04/30/2003 - 05/04/2001 - 05/0	Tight surface s No problems n Surface shrink: 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes:  Dirt and bird de Removed the A Same as last n Rusty spots the Notes the NW wingwall. Some debris a	chrinkage cooted other age cracking from 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	than tight surfaing; no problems  16  earings of both Expearings as they arings at Bents 2 ne bearings. Pi	ea.  Bents 2 / are no	and 3 with so	95 % ome spot rust. to the anchor b ered by nesting	84m NMS)  5 % olts . Bent beari	0 % ngs have spot ru 8 4 = 24 NMS)	% list and lots of debr	EZH. EIFF BPH NHC KBG  RZG ris on EZH. EIFF rom BPH NHC
16/16/2011 - 15/31/2007 - 15/04/2005 - 16/30/2003 - 18/27/2001 - 2/23/1998 - 16/16/2011 - 15/31/2007 - 16/16/2011 - 15/31/2007 - 16/16/2015 - 16/30/2003 - 16/30/2003 - 16/30/2003 - 16/30/2003 - 16/30/2001 - 16/8/27/2001 - 16/30/2001 - 16/3	Tight surface s No problems n Surface shrink: 8.03 * 2 = 16.0 None Notes:  - Fixed Bearing 1  pection Notes:  Dirt and bird de Removed the A Same as last n Rusty spots the Notes the NW wingwall. Some debris a	chrinkage cooted other age cracking from 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	than tight surfaing; no problems  16  earings of both Expearings as they arings at Bents 2 ne bearings. Pi	ea.  Bents 2 / are no	and 3 with so	95 % ome spot rust. to the anchor b ered by nesting	84m NMS)  5 % olts . Bent beari	0 % ngs have spot ru 8 4 = 24 NMS)	% list and lots of debr	EZH. EIFF BPH NHC KBG  RZG ris on EZH. EIFF rom BPH NHC



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#### I00315000+03423 Continue

\*\*\*\*\*\*\* Span : Main-0 - -1 (cont.) \* \* \* \* \* \* \* \*

EL D					- СР с		,			
Element Des			Ougatitus	Lloito	Inon Foob	Dot Ctot 1	Dot Ctot 2	Dot Stat 2	Dot Stot 4	Dot Ctot F
Smart Flag	- Conc Bridge	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Licincii 33 i	1	_	0.2			0.5	E	0	0	
	1	3	83	m.		95	5	0		
						%	%	%	%	%
Previous Ins	pection Notes :									
06/16/2011 -	Generally in G	ood conditi	ion with some ti	ght shrii	nkage crack	s. Small chips o	n the Right barrie	er in Span 3.		RZGB
05/31/2007 -	Rest of the cor	mments fro	m prior reports	still app	ly.					EZHZ
05/04/2005 -	Same as last r	eport and a	add some small	nicks o	ut of the top	of the barrier in	Span 3 - Right si	ide. (40.93 * 2 =	81.86 NMS)	
04/30/2003 -	<ul> <li>Vertical cracking</li> </ul>	ng, mostly t	tight, throughou	t both b	arriers. A c	ouple of small po	pouts in concret	e surface of the	oarriers.	BPHZ
08/27/2001 -	41.45 * 2 = 82.	.90m								NHCO
12/23/1998 -	- None									KBGR
Inspection I	Notes:									
Element 358	B - Deck Crackin	g SmFlag								
X	1	3	1	ea.	X	0	100	0	0	
						%	%	%	%	%
Dravious Inc	pection Notes :					,,	,,,		, and the second	
	•								in size. Mostly to	start RZGB
Gonoral	Inspection I	Notos								
	<u> </u>		ot roted a "7" o	o dook	io oliabtly na	arrower than the	annragah raadwa	y and it is an a	NIP (O	DZCP
						arrower than the a	• •	ay and it is on a t	curve.	RZGB EZHZ
NBI 60, subs	structure, rated	a "7" due to	small delamina	ations ir		es on the columns				EZNZ
	been repaired of				se with some	e erosion to the fi	Il under the wind	wall This could	become a proble	em if EIFR
	der the concrete					e erosion to the n	in drider the wing	gwaii. Triis could	become a proble	IIIII LIFK
04/30/2003 - toe-nailes.	- Same commer	nts as 08-2	001 report. Blo	cking or	n approach	sections of the gu	uardrail are loose	e and need to be	tightened down a	and BPHZ
08/27/2001 -									Bent with W-beam nd do meet curre	
12/23/1998 -	- None									KBGR



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### 100315001+00691

**Location: GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location: 013 CASCADE City Code, Location: 32800 GREAT FALLS

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00315

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: BNSF RAILROAD Kilometer Post, Mile Post: 1.71 km 1.06

Structure on the State Highway System : X Latitude : 47°29'16" Construction Data

Structure on the National Highway System : Longitude : 111°20'07"

Longitude : 111°20'07"

Construction Project Number : IR 315-5(12)1F

Str Meet or Exceed NBIS Bridge Length: Construction Station Number: 29+60.00

Construction Drawing Number: 1852

Traffic Data

Current ADT: 25,500 ADT Count Year: 2009 Percent Trucks: 2 %

Construction Year: 1946

Reconstruction Year: 1996

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	B ASD Assigned
Operating Load, Design:	52.6 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data :	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	120.29		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 54.21 m

Deck Area : **786.00 m sq** 

Deck Roadway Width: 13.59 m

Approach Roadway Width: 13.59 m

Median Code, Description: 0 No median

### Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : 99.99 m

Reference Feature for Vertical Clearance : R Railroad beneath struc

Vertical Clearance Under the Structure: 6.63 m

Reference Feature for Lateral Underclearance : R Railroad beneath struc

Minimum Lateral Under Clearance Right : 3.96 m

Minimum Lateral Under Clearance Left : 0.00 m

Number of Spans: 0

Material Type Code, Description:

#### Span Data

#### Main Span Approach Span

Number Spans : 3

Material Type Code, Description : 4 Steel continuous

Span Design Code, Description : 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: **0 None**Deck Membrain Type: **0 None** 

Span Design Code, Description :

st-in-Place | (52) Out-to-Out Width :

(52) Out-to-Out Width: 14.50 m

(50A) Curb Width: (50B) Curb Width: 0.00 m

Skew Angle:

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	South, West or Bi-directional Travel			North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal		
Route On Structure	100315	N/A			East	99.99 m	13.59 m		
I-315 - EXIT 0 - EB									



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#### 100315001+00691 Continue

**Inspection Data** 

Inspection Due Date : 28 June 2014

Sufficiency Rating: 75.4

(91) Inspection Frequency (months): 24

Structure Status : Func Obs - Elg Rehab

NBI Inspection Da									
(90) Date of Last Ins	pection : 28 June 201	2		La	Last Inspected By: Charles Pepos - 107				
(90) Inspection	on Date :				Inspected By :				
(58) Deck Rating : 5  (59) Superstructure Rating : 7  (60) Substructure Rating : 7  (72) App Rdwy Align : 8		(68) Deck Geo (67) Structure F (69) Under Clear (41) Posting S	Rating: 7	(36B)	Bridge Rail Rating : 1  ) Transition Rating : 1  pproach Rail Rating : 1  D) End Rail Rating : 1	(61) Chann (71) Waterway A	rt Rating : N el Rating : N Adequacy : N ir Critical : N		
nspection Hours Crew Hours for inspec Helper H Special Crew H	ction : 5 ours : C		Snoo nooper Hours	oper Required for inspection Flagger Hours	3	cing Depth : 0.	.00 in		
Inspection Wor				Effected	Scope of		Covered		
Candidate ID	Date Requested	Status	Priority	Structure Unit	Work	Action	Condition States		
D31-FY2004-000080	28 January 2004	Approved	Medium	All Spans	215 R/Conc Abutment	Min Repair			
epair the erosion at the 6-28-2012 Partially re pproved. DRC		icture.							
D31-FY2005-000241	13 July 2005	Approved		M Main	234 R/Conc Cap	Min Repair			
ix/repair the small dela 6-28-2012 Also (1) or pproved. DRC	aminated area on the In the Span 1 side of E	Span 2 of Bent 2's of Bent 2's and on (1) of	cap. on the Span 3	side of Bent 3	'S.				

Late Reason:

Inspection Date: 06/28/2012



Continue

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Inspection Notes:

**Element Inspection Data** Span: Main-0 - \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck X 100 3 787 sq.m. 0 % % Previous Inspection Notes: 06/28/2012 - Spalling and delaminations in all (3) Spans. Lots of cracking in all of the Spans. Poor skid resistance on the older portion of the deck. 05/07/2010 - No change from the previous inspections. 06/16/2008 - Delamiantions/spalls in all (3) spans, but mostly in the newer portion of the deck. About 1/3 of 1 lane is mostly delamiantated as found in a quick chain drag. Old deck surface has little skid resistance remaining. 05/31/2007 - None 05/04/2005 - Wear in the wheel paths. Some cracking throughout. Newer portion appears to be cracking over the rebar, transverse, on 6" to 8" centers. Placed in Condition State 2 as there are a couple of delaminated areas. Same on the low skid resistance. 04/30/2003 - Minor areas of efflorescence on the underside of the deck. Tight transverse cracks throughout the deck; more evident over Bents 2 and 3. Wear in the wheel paths with exposed aggregate. Very low skid resistance. 08/06/2001 - 54.25 \* 14.50 = 786.63 Studded tire wear in the wheel paths. 01/14/1999 - Small tight transverse cracks in deck surface. Minor efflorescence on underside of deck. 04/01/1996 - None 02/01/1994 - None Inspection Notes: Element 107 - Paint Stl Opn Girder 380 85 m. % % % Previous Inspection Notes: 06/28/2012 - Some fading of the paint on the newer girders and the Right side of the Left most older girder. Some rust, scale, and surface pitting of the older girders. 05/07/2010 - No change from the previous inspections. 06/16/2008 - Newer girders show minor fading of the coating system on the Outer-Right side of the Right most girder. Older portion of the structure's girders has some rusty spots, scale, and surface pitting; especially under open joints. Numerous broken welds on the attached blast plate. 05/31/2007 - None 05/04/2005 - Rusty spots, scale, minor paint loss, and smoke on the lower flange and lower portions of the web area on the older girders. New girders have no problems noted as of now. 04/30/2003 - Some spot rust on the original girders. Worse rust spots are under leaking joints. No paint on the back side of bolts used for connecting diaphragms to old girders and they are rusted. Some pack rust noted in the bottom flange area over both Bents. 08/06/2001 - 7 \* 54.25 = 379.75m01/14/1999 - Very minor rust on original painted steel beams. 04/01/1996 - None 02/01/1994 - None

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#### I00315001+00691 Continue

						•	<u> </u>			
Element Des	<u> </u>									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 205	- R/Conc Colu		2 and 3							
	1	1	8	ea.		90	5	5	0	
						%	%	%	%	Q
Previous Ins	pection Notes :		l				<u>l</u>		<u> </u>	
06/28/2012 -	(1) small delan	nination on	Bent 3's - 2nd	from the	e Left columi	n. Spall on the L	eft column at Be	nt 2.		ZRGZ
	No change from									HZMS
06/16/2008 -	Left column at	Bent 2 has	a small surfac	e spall f	rom expose	d rebar chair; Co	ondition State 2.			RZDZ
05/31/2007 -										EVHZ
05/04/2005 -	Minor and tight	t shrinkage	cracks. Tight	cracks a	at the cap to	column construc	ction joint.			FZDZ
04/30/2003 -	Some surface	shrinkage (	cracks.							ZHEB
08/06/2001 -	None									NHGN
01/14/1999 -										
04/01/1996 -	None									YDNF
02/01/1994 -										REFI
										IXEIT
Inspection I	Notes:									
Element 215	- R/Conc Abuti	ment 1 an	d 4							
	1	1	35	m.		95	5	C	0	
						%	%	%	%	Q
Previous Ins	pection Notes :						L			
06/28/2012 -	Tight cracks in	both backy	walls. The wor	se area	s are on the	older portion of t	the bridge. Spall	on the Left wing	wall of Abutment	1. ZRGZ
05/07/2010 -	No change from	m the previ	ous inspections	s and in	mostly Good	d condition.				HZMS
06/16/2008 -	Same on tight	cracks. Le	ft end of Abutn	nent 1 h	as a small sp	palled area at the	e wingwall.			RZDZ
05/31/2007 -	None									EVHZ
05/04/2005 -	Both of the bad	ckwalls hav	e cracks.							FZDZ
04/30/2003 -	Minor and tight	t cracks in	areas where gi	rder end	ds are embed	dded in the Abut	ment backwalls.	Some erosion a	t the NE corner.	ZHEB
08/06/2001 -	(14.50 * 2) + (4	1 * 1.60) = 3	35.40m							NHGN
01/14/1999 -	None									
04/01/1996 -	None									YDNF
02/01/1994 -	None									REFI
Inspection I	Notes:									

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#### 100315001+00691 Continue

Element Des Smart Flag							•			
	•	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
_	4 - R/Conc Cap			Office	пор Едоп	1 of Oldt 1	1 of Olar 2	1 of Otal o	1 of Olat 4	1 of old o
	1	1	29	m.		90	5	5	0	
					_	%	%	%		
Provious Inc	spection Notes :					70	70	70	, , , ,	
	<u> </u>	aa a dalam	iontod orog und	dor C0 a	n the Coen t	) face and Dant	Ola haa a amall d	alamination on t	ha Chan I face al	lana 700
vith a small	spalled area.  No change from				·		2s nas a small d	elamination on t	he Span 2 face al	long ZRG2 HZM3
	•		·		·		e caps show som	e minor surface	spalls from expos	
	bar chair feet.		·		·		·			EVHZ
5/04/2005 -	- Same on the o	ld to new o	construction join	it. Sma	II delamiante	d area on the S	pan 2 side of Ben	it 2's cap.		FZDZ
4/30/2003 -	- Minor and tigh	t cracks wit	th some minor o	concrete	popouts wh	ere old portion a	and newer portion	of the caps are	joined together.	ZHE
8/06/2001	- 2 * 14.50 = 29.	.00m								NHGI
1/14/1999 -	- None									
4/01/1996	- None									YDN
2/01/1994	- None									REF
Inspection I	Notes:									
lement 301	1 - Pourable Joir	nt Seal Be	nts 2 and 3							
iement oo i	1	3	20	m.		90	10	0		
	'	3	20	111.						
						%	%	%	%	
revious Ins	spection Notes :									
lo sealant i	n the joints.	·					n. Delaminations	and spalls alon	g the edge of the	
lo sealant ii 5/07/2010 -	n the joints. - No change fro	m the previ	ious inspections	s and in	mostly Good	I condition.		and spalls alon	g the edge of the	HZMS
lo sealant ii 5/07/2010 - 6/16/2008 -	n the joints. - No change fro - Joints leak. Sp	m the previ	ious inspections	s and in	mostly Good	I condition.		and spalls alon	g the edge of the	HZMS RZD2
No sealant ii 05/07/2010 - 06/16/2008 - 05/31/2007 - 05/04/2005 -	n the joints.  No change from Joints leak. Sp None  10.21 * 2 = 20.	m the previ	ious inspections the steel guard	and in angles.	mostly Good	I condition.	en tapped on.	·	g the edge of the	HZM: RZD2 EVH2
No sealant ii 05/07/2010 - 06/16/2008 - 05/31/2007 - 05/04/2005 -	n the joints.  No change from Joints leak. Sp None  10.21 * 2 = 20. of the joints.	m the previ	ious inspections the steel guard	and in angles.	mostly Good	I condition.	en tapped on.	·		HZM: RZD2 EVH2
No sealant in 5/07/2010 - 16/16/2008 - 15/31/2007 - 15/04/2005 - 15/04/2000 - 15/04/2000 - 15/04/2000 - 15/04/2000 - 15/04	n the joints.  No change from Joints leak. Sp None  10.21 * 2 = 20. of the joints.	m the previ	ious inspections the steel guard	and in angles.	mostly Good	I condition.	en tapped on.	·		HZM: RZD2 EVH2
o sealant ii 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation	n the joints.  No change from Joints leak. Sp None  10.21 * 2 = 20. of the joints.	m the previ	ious inspections the steel guard	and in angles.	mostly Good	I condition.	en tapped on.	·		HZM: RZD2 EVH2
No sealant in 15/07/2010 - 16/16/2008 - 15/31/2007 - 15/04/2005 - 15/0	n the joints.  No change from Joints leak. Sp None  10.21 * 2 = 20. of the joints.	m the previ palls along 42m Dou	ious inspections the steel guard ble guard angle	s and in angles.	mostly Good The steel s ints in the old	I condition.	en tapped on.	·		HZM: RZD2 EVH2
lo sealant in 15/07/2010 - 16/16/2008 - 15/31/2007 - 15/04/2005 - 15/04/2000 - 15/04/2000 - 15/04/2000 - 15/04/2000 - 15/0	n the joints No change from - Joints leak. Sp - None - 10.21 * 2 = 20. of the joints. Notes:	m the previ palls along 42m Dou	ious inspections the steel guard ble guard angle	s and in angles.  type joent 2 and	mostly Good The steel s ints in the old	I condition.	en tapped on.	·	added, there was	HZM: RZD2 EVH2
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation Inspection I	n the joints.  No change from Joints leak. Sp. None  10.21 * 2 = 20. of the joints.  Notes:	m the previousless along 42m Dou Bearing Ne	ious inspections the steel guard ble guard angle ew girders at Be	s and in angles.  type joent 2 and	mostly Good The steel s ints in the old	I condition.  ounds solid whe	en tapped on. ne deck. When n	ewer deck was	added, there was	HZM: RZD2 EVH2
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - continuation Inspection I	n the joints No change from - Joints leak. Sp None - 10.21 * 2 = 20. of the joints.  Notes:  0 - Elastomeric E	m the previousless along 42m Dou Bearing Ne	ious inspections the steel guard ble guard angle ew girders at Be	s and in angles.  type joent 2 and	mostly Good The steel s ints in the old	I condition.  ounds solid whe	en tapped on. ne deck. When n	ewer deck was	added, there was	HZM: RZD2 EVH2
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation Inspection Ins	n the joints No change from - Joints leak. Sp - None - 10.21 * 2 = 20. of the joints. Notes:  0 - Elastomeric E  1	m the previously along 42m Dou	ious inspections the steel guard ble guard angle ew girders at Be	s and in angles.  e type joent 2 and ea.	mostly Good The steel s ints in the old	l condition. ounds solid whe	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation Inspection Ins	n the joints No change from - Joints leak. Sp - None - 10.21 * 2 = 20. of the joints. Notes:  0 - Elastomeric E  1  spection Notes:	m the previously along 42m Dou	the steel guard ble guard angle ew girders at Be	e type jo	mostly Good The steel s ints in the old	l condition. ounds solid whe der portions of the 100 % bearings.	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ ZRGZ
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation Inspection Ins	n the joints No change from - Joints leak. Sp - None - 10.21 * 2 = 20. of the joints.  Notes:  D - Elastomeric E  1  spection Notes: - Rubber portion - No change from	m the previously along the pre	the steel guard ble guard angle ew girders at Be Spot rust on the	ent 2 and ea.	mostly Good The steel s ints in the old d 3 cortion of the Good condit	l condition. ounds solid whe der portions of the 100 % bearings.	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ ZRGZ HZMS
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation Inspection Ins	n the joints No change from - Joints leak. Sp - None - 10.21 * 2 = 20. of the joints. Notes:  0 - Elastomeric E  1 spection Notes : - Rubber portion - No change from - Unchanged. Se	m the previously along the pre	the steel guard ble guard angle ew girders at Be Spot rust on the	ent 2 and ea.	mostly Good The steel s ints in the old d 3 cortion of the Good condit	l condition. ounds solid whe der portions of the 100 % bearings.	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ  ZRGZ HZMS RZDZ
lo sealant in 5/07/2010 - 6/16/2008 - 5/31/2007 - 5/04/2005 - ontinuation Inspection Ins	n the joints No change from - Joints leak. Sp - None - 10.21 * 2 = 20. of the joints. Notes:  0 - Elastomeric E  1  spection Notes : - Rubber portion - No change from - Unchanged. Sp - None	m the previously along A2m Dou Bearing Ne 1 1 is Good. m the previously for the previously are the previously for the previousl	the steel guard ble guard angle ew girders at Be  Spot rust on the ious inspections in the steel portion	e type jo ent 2 and ea. e steel ps and in ons and	mostly Good The steel s ints in the old d 3 cortion of the Good condit	l condition. ounds solid whe der portions of the 100 % bearings.	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ ZRGZ HZMS RZDZ
Previous Ins 16/28/2012 - 16/16/2008 - 15/31/2007 - 15/04/2005 - 15/04/2005 - 15/04/2005 - 16/28/2012 - 15/07/2010 - 16/16/2008 - 15/31/2007 - 15/04/2005 -	n the joints No change froit - No change froit - Joints leak. Spin - None - 10.21 * 2 = 20. The joints.  Notes:  D - Elastomeric Elements - Rubber portion - No change froit - Unchanged. Sein - None - Spot rust on the	Bearing Ne 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sious inspections the steel guard ble guard angle ble guard angle bew girders at Be was girders at Be spot rust on the steel portion in the steel portions of the bear	ent 2 and in ea.  e steel ps and in ons and rings.	mostly Good The steel s ints in the old d 3  cortion of the Good condit bird debris s	l condition. ounds solid when der portions of the  100 % bearings. ion. tarting to build to	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ  ZRGZ HZMS RZDZ EVHZ
No sealant in 15/07/2010 - 15/07/2010 - 15/07/2010 - 15/04/2005 - 15/07/2010 - 15/0	n the joints No change from the joints leak. Spons in the joints None - 10.21 * 2 = 20 of the joints Notes:  - Consider the joints.  - Consider the joints Rubber portion in the joints No change from the joints None - Spot rust on the joints.	m the previously along 42m Dou Bearing New 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ble guard angle  we girders at Be  Spot rust on the ious inspections in the steel portion ions of the bear ming on the steel	ent 2 and in ea.  e steel ps and in ons and rings.	mostly Good The steel s ints in the old d 3  cortion of the Good condit bird debris s	l condition. ounds solid when der portions of the  100 % bearings. ion. tarting to build to	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ ZRGZ HZMS RZDZ EVHZ FZDZ ZHEE
No sealant in 15/07/2010 - 15/07/2010 - 15/07/2010 - 15/04/2005 - 15/07/2010 - 15/0	n the joints No change froit - No change froit - Joints leak. Spin - None - 10.21 * 2 = 20. The joints.  Notes:  D - Elastomeric Element - 1  Spection Notes: - Rubber portion - No change froit - Unchanged. Sein - None - Spot rust on the - Some minor spin - Bent #2 & #3 Leak.	m the previously along 42m Dou Bearing New 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ble guard angle  we girders at Be  Spot rust on the ious inspections in the steel portion ions of the bear ming on the steel	ent 2 and in ea.  e steel ps and in ons and rings.	mostly Good The steel s ints in the old d 3  cortion of the Good condit bird debris s	l condition. ounds solid when der portions of the  100 % bearings. ion. tarting to build to	en tapped on. ne deck. When n	ewer deck was	added, there was	HZMS RZDZ EVHZ no FZDZ  ZRGZ HZMS RZDZ EVHZ

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\*\*\*\*\*\*\* Span : Main-0 - (cont.) \*\*\*\*\*\*

Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 311 - Moveable Bearing Bent 2 and 3 under Older Girders 90 10 ea. 10 % % Previous Inspection Notes: 06/28/2012 - Alignment was Good today. Some rust, paint loss, and debris. 05/07/2010 - No change from the previous inspections and in mostly Good condition. 06/16/2008 - Spot rust from leakage. Alignment is Good. 05/31/2007 - None 05/04/2005 - Some rusty spots and scale. 04/30/2003 - Rusty spots as these joints are leaking some. Also dirt and pack rust between bottom of the rocker and bottom plate of the bearings. 08/06/2001 - Bent #2 & #3 under the original girders. Some rust and pitting. 01/14/1999 - None 04/01/1996 - None 02/01/1994 - None Inspection Notes: Element 331 - Conc Bridge Railing 108 m. % % Previous Inspection Notes: 06/28/2012 - Right barrier has a spalled section in Span 2. Retro-fitted barrier on the Left curb is in Good condition with some shrinkage cracks. 05/07/2010 - No change from the previous inspections and in mostly Good condition. 06/16/2008 - Minor and tight surface shrinkage cracks. Left rail sets on top of older curb. 05/31/2007 - None 05/04/2005 - Same as previously reported. 04/30/2003 - Vertical cracks throughout both rails. Some minor scrapes to rails and a few small popouts of the rail concrete. 08/06/2001 - 54.25 \* 2 = 108.50m 01/14/1999 - None 04/01/1996 - None 02/01/1994 - None Inspection Notes:



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#### I00315001+00691 Continue

\*\*\*\*\*\*\* Span : Main-0 - (cont.) \*\*\*\*\*\*\*

						main-u - (Corit	,			
Element Des										
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	- Deck Crackin	g SmFlag								
X	1	1	1	ea.	X	0	0	100	0	
						%	%	%	%	9
Previous Ins	pection Notes :	1			•		-		<u> </u>	
06/28/2012 -	The worse area	as of crack	ing are showing	g lots of	spalling and	d delaminated are	eas.			ZRGZ
05/07/2010 -	No change.									HZMS
06/16/2008 -	Many of the cra	acks are wi	der, 0.5 to 1.0r	nm, and	are open.	Some of the crac	cks have scaling a	along their edges		RZDZ
05/31/2007 -	None									EVHZ
05/04/2005 -	Add some crac	king over t	he rebar in Spa	an 2 to t	he previous	reports.				FZDZ
04/30/2003 -	Tight transvers	e and map	ping cracks thr	oughou	t. Mostly on	the older portion	of the deck.			ZHEB
08/06/2001 -	No change.									NHGN
01/14/1999 -	Small, tight tran	nverse crad	cking throughou	ut the de	eck.					
Inspection N	lotes:									
Conoral	nonaction N	Notoo								
	nspection N		dae due te ere	oion on	d fanana					ZRGZ
05/07/2010 -	Access is tough	וו מנינווס טוו	age due to ero	Sion and	i leffices.					HZMS
	Deck is getting	worso								RZDZ
Some aspha 05/31/2007 -	t placed in the	erosion at t	the NE corner of	of the br	idge.					EVHZ
05/04/2005 -	NBI 58, deck, r	ated at a "	6" due to delam	ninations	s and minor	spalling.				FZDZ
04/30/2003 -	NBI 60, substru	ucture, rate	d at a "7" due t	o some	cracking in	the substructure	concrete.			ZHEB
08/06/2001 -	None									NHGN
01/14/1999 -	None									
	Sufficiency Rat ating Calculation					11/97 10:45:05 35				YDNF
02/01/1994 -										REFI
08/01/1992 -	Updated with ta	ape 1994								NB94
01/01/1991 -	Updated with ta	ape 1992								NB92
	Updated with ta									NB91
	Updated with ta									NB89
	Updated with ta									NB86
	•									



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#### 100315001+00692

**Location: GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 **GREAT FALLS GREAT FALLS** Division Code, Location:31

Percent Trucks:

County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** 

Kind fo Hwy Code, Description: 1 1 Interstate Hwy Signed Route Number: 00315

State Highway Agency State Highway Agency Str Owner Code, Description: 1 Maintained by Code, Description:1

Intersecting Feature: BNSF RAILROAD Kilometer Post, Mile Post: 1.71 km 1.06

2 %

Structure on the State Highway System: Latitude: 47°29'17" **Construction Data** 

Structure on the National Highway System: Longitude: 111°20'07"

Str Meet or Exceed NBIS Bridge Length:

Construction Project Number: IR 315-5(12)1F Construction Station Number: 29+98.00

Construction Drawing Number: 6825

Construction Year: 1967 Reconstruction Year: 1996

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Current ADT : 25,500

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	B ASD Assigned
Operating Load, Design:	33.5 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

ADT Count Year: 2009

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	78.98		

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 63.40 m

Deck Area: 767.00 m sq

11.18 m Deck Roadway Width: 11.18 m Approach Roadway Width:

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

R Railroad beneath struc Reference Feature for Vertical Clearance:

6.93 m Vertical Clearance Under the Structure:

R Railroad beneath struc Reference Feature for Lateral Underclearance:

3.96 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

#### Span Data

Main Span

Approach Span Number Spans: 1

Material Type Code, Description: 3 Steel

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: 0 None Deck Membrain Type: 0 None Number of Spans: 4

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

12.09 m (52) Out-to-Out Width:

(50A) Curb Width:

(50B) Curb Width:

0.00 m

0.00 m

Skew Angle: 30°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	N	orth or East Tra	vel
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	100315	West	99.99 m	11.18 m	N/A		
I-315 AT EXIT 0 - WB							

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**Inspection Data** 

Inspection Due Date : 16 June 2015

Sufficiency Rating: 93.8 Structure Status: Not Deficient (91) Inspection Frequency (months) : **24** 

NBI Inspection Da							
(90) Date of Last Insp	pection : 17 June 201	3		La	ast Inspected By: Charles P	epos - 107	
(90) Inspection	on Date :				Inspected By :		
(58) Deck	Rating : 5	(68) Deck Geor	metry : 5	(36A)	Bridge Rail Rating : 1	(62) Culve	rt Rating : N
(59) Superstructure	Rating : 7	(67) Structure R	ating : 6	(36B)	) Transition Rating :	(61) Channe	el Rating : N
(60) Substructure	Rating : 6	(69) Under Clear	ance · 5	(36C) Ap	proach Rail Rating :1	(71) Waterway A	Adequacy : N
(72) App Rdwy	y Align : 8	(41) Posting S		(361)	D) End Rail Rating : 1	(113) Scou	r Critical : N
	Unrepaired Sp	oalls: 0 m s	q		Deck Surfacion	ng Depth : 0.	00 in
Inspection Hours Crew Hours for inspection Helper He	ours: 4	<del></del>	ooper Hours	oper Required for inspection	2		
Special Crew Ho				Flagger Hours	. 0		
Special Equipment Ho							
Inspection Worl	k Candidates  Date  Requested	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
D31-FY2003-000437	27 June 2003	Approved	High	All Spans	301 Pourable Joint Seal	Min Repair	
Approved. DRC							
D31-FY2003-000436	27 June 2003	Approved	Low	A Approach	12 Bare Concrete Deck	Min Repair	
Repair pot hole starting 05/31/2007 Add repairs 06/15/2011 More starti Approved. DRC	s to the spalls and de	erline over Bent 4. lamiantions also.					
<b>D31-FY2004-000081</b> Clean pigeon debris fror 05/31/2007 Some done	m caps. Re-paint ste	Approved el as needed. inspection.	Low	All Spans	Bridge	Spot Paint (flex)	
Approved. DRC							
D31-FY2006-000003	18 October 2005	Approved	Low	A Approach	109 P/S Conc Open Girde	r Min Repair	
Clean dirt/debris from al 06/15/2011 Some work		n Span 5.					
Approved. DRC							

Late Reason:

Inspection Date: 06/17/2013



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#### **Element Inspection Data**

\* Span: Main-0 - STEEL WF - SPAN 3 \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck X 100 3 190 sq.m. 0 0 % % % Previous Inspection Notes: 06/17/2013 - Cracking with delaminations and spalling in this Span. Some patching done, but the patches are starting to fail. 10-2013 deck sourvy found 7.2 percetn spalls/delaminations. 06/16/2011 - More of the delaminations are starting to spall and leaving potholes. Some patching has been done since the last inspection. 06/30/2009 - Wear in wheel paths to the aggregate. Poor skid resistance. Spalls throught span and estimate greater than 3 percent delamination. 05/31/2007 - Wear to the concrete surface. Left in Condition State 2 as estimated less than 2 percent of the surface showing spalls/distress. Some asphalt patching done on the spalls, but blowing out again. 05/04/2005 - Tight mapping cracks in the deck surface. 1 m2 delamination and spall near centerline at Bent 4. Wear in the wheel paths from studded tires. (12.09 \* 15.70 = 189.81) Nate. 04/30/2003 - Tight cracking throughout the deck. Studded tire wear in the wheel paths with exposed aggregate. There is a section of delamination and a pothole on the centerline near Bent 4, 1 sq m. 08/06/2001 - 12.09 \* 15.85 = 191.62 Some small, tight transverse cracking throughout. No brooming left for low skid resistance. Exposed aggregate surface in the wheel paths from studded tire wear. 01/14/1999 - None 04/01/1996 - None 02/01/1994 - None Inspection Notes: Element 107 - Paint Stl Opn Girder 79 85 m. % % % % % Previous Inspection Notes: 06/17/2013 - Rust blisters with minor surface pitting under the worst rust blisters. Girders are dirty and grimey where de-icer has sat on them. Faded paint and peeling paint in the rust blister areas where mositure can collect. 06/16/2011 - Rust, scale, and surface pitting to girders under areas that leak. Rust blisters on the lower flanges where water can collect. Paint is faded. 06/30/2009 - Same comments as past inspection and add rust blisters under areas that leak and minor surface pitting under the rust blisters. Some spot painting done during snooper inspection. 05/31/2007 - Areas on the ends of the girders under joints show the worse rusty spots and loss of paint system. Ends at Bent 3 show pitting and are rusty with paint system failure. The diaphragm vertical stiffener from the new girder, G1, to the older girder is welded solid across the top of the bottom flange; no problems observed and G2 has a hole where added diaphragm bracket was mis-drilled; photos. 05/04/2005 - Minor rust and paint loss. Mostly near the leaking joints and the original girders. (5 \* 15.70 = 78.50) Nate. 04/30/2003 - Minor spot rust with some paint loss; especially under leaking joint areas and where there is pigeon debris. 08/06/2001 - 5 \* 15.85 = 79.25m No change from the last report. 01/14/1999 - Minor rust on the surface. 04/01/1996 - MINOR SURFACE RUST ON ORIGINAL BEAMS 02/01/1994 - None Inspection Notes:

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· · · · · · · · · · · · · · · · · · ·	
Element Description	
Smart Flag   Scale Factor   Env   Quantity   Units   Insp Each   Pct Stat 1   Pct Stat 2   Pct Stat 3   Pct Stat 4	Pct Stat 5
Element 205 - R/Conc Column Bents 3 and 4	
1 1 6 ea. 95 5 0	0
% % %	% %
Previous Inspection Notes :	
06/17/2013 - Some tight surface shrinkage cracks and a couple have small spalls on the corners from construction activity.	RZEV
06/16/2011 - Generally in Good condition. Small spall on a couple of the columns.	RMGH
06/30/2009 - Tight surface shrinkage cracks. Some staining of the concrete from leakage and bird debris.	ZZDZ
05/31/2007 - Right column at Bent 3 has a small surface spall at a rebar chair foot. Tight surface shrinkage cracks noted.	EZHZ
05/04/2005 - A couple of the columns have tight cracks at the connection area with the cap.	FZMK
04/30/2003 - Surface shrinkage cracks.	ZZEB
08/06/2001 - None	NHGO
01/14/1999 - None	DCHF
04/01/1996 - None	YDNF
02/01/1994 - None	REFI
Inspection Notes:	
Element 234 - R/Conc Cap Bents 3 and 4	
1 1 24 m. 90 5 5	0
% % %	%
Previous Inspection Notes :	
06/17/2013 - Small delamination on the Span 3 face of Bent 4's cap. Lots of staining from joint leakage. Small surface spalls in the under	side of RZEV
the cap from rebar chair feet. 06/16/2011 - Photo of delaminations on Bent 4's cap. Staining from leakage. Some tight shrinkage cracks. Small spall on the surface nea	ar the RMGH
rebar chair feet.	
06/30/2009 - 5 percent in stste 3 for small delaminationon bent 4 cap. Staining from bird debris and leakage on cap. Several small surface near exposed reinforcing chair feet.	spalls ZZDZ
05/31/2007 - Same as past inspections and add minor surface spalls on the underside of the older portion of the caps from rebar chair feet 4's cap has (2) spalls/delaminated areas on the Span 4 edge at the top.	t. Bent EZHZ
05/04/2005 - Tight surface shrinkage cracks. Construction joint between the new to old cap has some minor cracking with minor loose are along the crack edge; very minor.	as FZMK
04/30/2003 - Tight surface shrinkage cracks. Staining of concrete due to leaking joints.	ZZEB
08/06/2001 - 12.09 * 2 = 24.19m	NHGO
2444422	DCHF
04/01/1996 - None	YDNF
01/14/1999 - None 04/01/1996 - None 02/01/1994 - None	
04/01/1996 - None	YDNF
04/01/1996 - None 02/01/1994 - None	YDNF

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Continue

Span: Main-0 - STEEL WF - SPAN 3 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 301 - Pourable Joint Seal Bents 3 and 4 3 20 24 m. 60 20 % % % Previous Inspection Notes: 06/17/2013 - Sealant is pulling loose and/or is missing in some areas along the joint; photo. Spalling along the joint edges. Material that makes up the headers appears to be sound. 06/16/2011 - Loose and missing sealant. Header material of the joints is in Good condition. Deck spalls just off of the joint headers. 06/30/2009 - More small spalls along joint edges. Some sealant is loose with lakage evident at both bents. 05/31/2007 - Joint is sound except where gland is torn or missing. Minor spall along the edges of the joint over Bent 4. 05/04/2005 - Spalls along both sides of the joint at Bent 4. Some areas where the sealant has failed and leaking is evident. Most of the sanding material is cleaned out in the traffic lanes. 04/30/2003 - Both joints are leaking with the gland falling out. Concrete along the joints is mostly sound except near centerline of Bent 4 where there is some spalling. 08/06/2001 - 2 \* 12.09 = 24.18m 01/14/1999 - None 04/01/1996 - None 02/01/1994 - None Inspection Notes: Element 310 - Elastomeric Bearing Under New Girders ea. 95 % Previous Inspection Notes: 06/17/2013 - Rubber portion of the bearings is in Good condition with some tight surface rust and faded paint on the steel portions. 06/16/2011 - Spot rust on the steel portions of the bearings. Rubber areas are Good. 06/30/2009 - Unchanged from prior reports. Some spot rust on steel portions with spot painting done during snooper inspection. 05/31/2007 - Minor spot rust and faded paint on the steel portions. A minor tear in the rubber of the bearing at Bent 3; see photo. 05/04/2005 - Some spot rust and minor paint loss. 04/30/2003 - One slotted and one fixed(Bent 4). Some spot rust on steel portions of the bearings. 08/06/2001 - Under the new girder; left most. 01/14/1999 - None 04/01/1996 - None 02/01/1994 - None Inspection Notes:

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				оран .	Walli-0 - 51	EEL WF - SPA	14 3 (COIII.)			
Element Des					T '	5				
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311	- Moveable Bea	aring Bent	3							
	1	3	4	ea.		90	10	0		
						%	%	%	%	Ç
Previous Ins	pection Notes :									
06/17/2013 -	Bearing alignm	ent was Go	ood as mostly	plumb; 7	70F. Staining	g from joint leak	age with rust, sca	lle, and paint los	s also.	RZEV
	Good alignmer						_	•		RMGH
	_		-			_	ring snooper insp	ection.		ZZDZ
	Alignment look		_	_						EZHZ
	Rusty spots, so				-					FZMK
					-		lue to leaking join	t.		ZZEB
		000 00		o Doann	90		iae te lealing jeni			
Inspection I	Notes:									
=										
Element 313	- Fixed Bearing									
	1	1	2	ea.		90	10	0		
						%	%	%	%	
Previous Ins	pection Notes :									
06/17/2013 -	Rust, scale, de	bris, peelin	g paint, and fa	ided pai	nt.					RZEV
06/16/2011 -	Spot rust, some	e debris, ar	nd scale on the	e bearing	gs.					RMGH
06/30/2009 -	Rusty areas, di	irt, debris, a	and scale on st	teel port	ions. Some s	spot painting do	ne.			ZZDZ
05/31/2007 -	Unchanged wit	th lots of ne	w nests. Som	e areas	blew off and	spot overcoat p	painted.			EZHZ
	Spot rust, mind									FZMK
	Some rust and									ZZEB
Inspection I										
inspection i	voies.									
Flament 331	- Conc Bridge I	Railing								
LICITION 001	1	3	31	1 m		95	5	0	0	
		3	3	l m.						
						%	%	%	%	
Previous Ins	pection Notes :									
06/17/2013 -	Generally in Go	ood condition	on. Left side h	as a sm	all spall on it	ts' backside. Ra	andom shrinakge	cracks.		RZEV
06/16/2011 -	Generally in Go	ood condition	on with some r	andom	vertical crack	king throughout.				RMGH
06/30/2009 -	Generally good	d condition.	Some crackin	g betwe	en chamfere	d areas on both	side of structure.			ZZDZ
05/31/2007 -	Minor popouts	and tight si	urface shrinka	ge crack	S.					EZHZ
05/04/2005 -	No change from	m previous	reports. (15.7	0 * 2 = 3	31.40) Nate.					FZMK
04/30/2003 -	Vertical cracks	throughou	t both rails. So	ome min	or popouts ir	n the concrete o	f the rails.			ZZEB
08/06/2001 -	15.85 * 2 = 31.	70m								NHGC
01/14/1999 -	None									DCHF
04/01/1996 -	None									YDNF
02/01/1994 -	None									REFI
Inspection I	Notes:									
ii ispection i	10100.									

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\*\*\*\*\*\* \* \* \* \* Span : Main-0 - STEEL WF - SPAN 3 (cont.) \* \* \* \* \* \* \* \* \*

		* * *	*****	Span :	Main-0 - S1	TEEL WF - SPAI	N 3 (cont.) * *	* * * * * * * *		
Element Des	•									
-	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	- Deck Cracking									
Х	1	3	1	ea.	X	0	0	100	0	
						%	%	%	%	9
Previous Ins	pection Notes :					'	I.	'	1	
06/17/2013 -	Unchanged from	m previous	report.							RZEV
06/16/2011 -	Numerous crac	ks in the d	elaminated are	as with	spalling at th	ne wider cracks.				RMGH
Inspection I	Notes:									
		* * *	******	pan :	Appr-1 - P/S	S CONC SPANS	5 - 1,2,4,and 5 * *	******		
Element Des	cription			<u>'</u>	••					
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 12 -	Bare Concrete	Deck			1			1		
	1	3	569	sq.m.	X	0	0	100	0	
						%	%	%	%	9,
Previous Ins	pection Notes :				_	l	I.	L		
06/17/2013 -	Mapping cracks	s, wear, de	laminations, ar	nd spalli	ng in some s	spots. Some exp	posed rebar in the	e deepest spalls.		RZEV
06/16/2011 -	Wear from stud	lded tires.	Some of the de	elamina	ted areas ar	e stating to spall	and need patchi	ng.		RMGH
				tance. S	Small spalls	and delamination	ns in all spans. Ti	ght transverse cr	acking over unjoir	nted ZZDZ
	ate 3 percent de Poor skid resis			with exr	oosed aggre	gate look on the	surface. Left in (	Condition State 2	2 as estimated at 2	2 EZHZ
percent or le	ss distressed/de	elaminated	areas.	·						
	1 ight mapping 7.09 * 12.09 = 50			delamı	nated area is	s starting to spall	I near Centerline	of Bent 4. Very I	little skid resistand	e FZMK
04/30/2003 -	Tight cracking t	throughout	the deck. Stud	ded tire	e wear in the	wheel paths wit	th exposed aggre	gate. Very little	skid resistance lef	t. ZZEB
	e and delaminat 47.55 * 12.09 =		enterline at Ber	nt 4.						NHGO
Small & tight	transverse crac	king throu	ghout. No broo	m mark	s left for poo	or skid resistance	e. Studded tire w	ear in the wheel	paths.	
	Spans #1, 2, 4,	& 5								DCHF
04/01/1996 -	_									YDNF
Inspection I	Notes:									

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	escription			T						
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 109	9 - P/S Conc Op	en Girder								
	1	1	235	m.		95	5	0	0	
						%	%	%	%	
revious Ins	spection Notes :					l.	1		l	
6/17/2013	- Generally in G	ood conditi	on. Diagonal o	rack/spa	all on G2 and	d G3 at Bent 3 h	as not changed.			RZE
hanged.	- G2 at Bent 3 h - Same commer	_		he bear	ing and has	not changed sin	ce the last inspec	ction. Spall on G	3 has also not	RMG ZZD
		·	· ·	a at Ber	nt 3 has a dia	agonal crack at 4	5 degrees in the	direction of she	ar at the Span side o	
ne sole plat 5/04/2005	ite; photo to Hele - Minor and tight	na-D. Crun t cracks on	nley. G3 at Be the ends of the	nt 3 is s e girders	palled on the near both A	Span side behi butments; girde	nd the sole Plates s are embedded	; photos to Heler in the backwalls		e FZM
	ed. No cracks vis							instruction activit	ies when the structo	
4/30/2003	- Some minor cr	acking on t	he ends of the	girders.	Graffiti on g	girders near the	Abutments.			ZZE
8/06/2001	- 47.55 * 5 = 23 <sup>7</sup>	7.75m								NHG
1/14/1999	- None									DCF
	- None - INCLUDES SF	PANS 1,2,4	,5							
1/14/1999 14/01/1996 12/01/1994 Inspection	- INCLUDES SF - None	PANS 1,2,4	.5							YDN
4/01/1996 2/01/1994 Inspection	- INCLUDES SF - None									YDN
4/01/1996 2/01/1994 Inspection	- INCLUDES SF - None Notes:			ea.		95	5	0	0	DCH YDN REF
4/01/1996 2/01/1994 Inspection	- INCLUDES SF - None Notes: 5 - R/Conc Colum	mn Bents 2	2 and 5	ea.		95	5 %	0 %	0 %	YDN
14/01/1996 12/01/1994 Inspection Element 209	- INCLUDES SF - None Notes: 5 - R/Conc Colum	mn Bents 2	2 and 5	ea.						YDN
4/01/1996 2/01/1994 Inspection Element 209 Previous Ins 6/17/2013	- INCLUDES SF - None Notes:  5 - R/Conc Colui  1  spection Notes: - Generally in G	mn Bents 2	2 and 5 €		kge cracks ar	%	%	%		YDN REF
4/01/1996 2/01/1994 Inspection Ilement 209 Previous Ins 6/17/2013 " x 6" spall	- INCLUDES SF - None Notes: 5 - R/Conc Colui 1 spection Notes :	mn Bents 2	2 and 5 6 on. Some tigh	t shrinak	ŭ .	% nd some small s	% palls along the so	%	%	YDN REF
4/01/1996 2/01/1994 Inspection Element 208 Previous Ins 6/17/2013 " x 6" spall 6/16/2011	- INCLUDES SF - None Notes:  5 - R/Conc Colui  1  spection Notes: - Generally in G I on the back-Lef	nn Bents 2	2 and 5  6  on. Some tighton. Same on s	t shrinak mall spa	all on center of	% and some small so	% palls along the so	%	%	YDN REF
4/01/1996 2/01/1994 Inspection lement 209 revious Ins 6/17/2013 " x 6" spall 6/16/2011 6/30/2009	- INCLUDES SF - None Notes:  5 - R/Conc Column 1 spection Notes: - Generally in G I on the back-Lef - Generally in G	nn Bents 2  1  ood conditient toorner. ood conditient condition.	2 and 5  on. Some tighton. Same on s  One small spa	t shrinak mall spa all on ce	all on center on ter column	% and some small should be some at Bent 2 at bent 2.	% palls along the so	%	%	YDN REF a RZE RMG ZZD
4/01/1996 2/01/1994 nspection lement 209 revious Ins 6/17/2013 " x 6" spall 6/16/2011 6/30/2009 5/31/2007	- INCLUDES SF - None Notes:  5 - R/Conc Column  1  spection Notes:  - Generally in Good on the back-Lef - Generally in Good on the back-Lef - Generally good on the spection Same as past	ood condition to condition dispections	on. Some tighton. Same on some small spanard a couple	t shrinak mall spa all on ce of small	all on center on ter column surface spal	% and some small s column at Bent 2 at bent 2. I from rebar chai	% palls along the so	% crapes. Bent 2's	%	A RZE RMG ZZD EZH
4/01/1996 2/01/1994 nspection lement 209 revious Ins 6/17/2013 " x 6" spall 6/16/2011 6/30/2009 5/31/2007 5/04/2005	- INCLUDES SF - None Notes:  5 - R/Conc Column  1  spection Notes:  - Generally in Good on the back-Lef - Generally in Good on the back-Lef - Generally good on the spection Same as past	ood condition to condition to condition.	on. Some tighton. Same on some small spand a couple tracks on all of tracks.	t shrinak mall spa all on ce of small	all on center on ter column surface spal	% and some small s column at Bent 2 at bent 2. I from rebar chai	% palls along the so	% crapes. Bent 2's	% middle column has	A RZE RMG ZZD EZH
4/01/1996 2/01/1994 Inspection Ilement 209 Previous Ins 6/17/2013 " x 6" spall 6/16/2011 6/30/2009 5/31/2007 5/04/2005 4/30/2003	- INCLUDES SF - None Notes:  5 - R/Conc Column  1  spection Notes: - Generally in Good of the back-Lef - Generally in Good of the spection of the specific of	ood condition to condition to condition.	on. Some tighton. Same on some small spand a couple tracks on all of tracks.	t shrinak mall spa all on ce of small	all on center on ter column surface spal	% and some small s column at Bent 2 at bent 2. I from rebar chai	% palls along the so	% crapes. Bent 2's	% middle column has	A RZE RMG ZZD EZH
4/01/1996 2/01/1994 Inspection Element 209 Previous Ins 6/17/2013 " x 6" spall 6/16/2011 6/30/2009 5/31/2007 5/04/2005 4/30/2003 8/06/2001	- INCLUDES SF - None Notes:  5 - R/Conc Column  1  spection Notes:  - Generally in Good on the back-Lef - Generally in Good on the back-Lef - Generally in Good on the back-Lef - Generally surface soon on the surface soon of th	ood condition to condition to condition.	on. Some tighton. Same on some small spand a couple tracks on all of tracks.	t shrinak mall spa all on ce of small	all on center on ter column surface spal	% and some small s column at Bent 2 at bent 2. I from rebar chai	% palls along the so	% crapes. Bent 2's	% middle column has	A RZE  RMG ZZC  EZH  FZM ZZE  NHG
Previous Ins 16/17/2013 " x 6" spall 16/16/2011 16/30/2009 15/31/2005 14/30/2003	- INCLUDES SF - None Notes:  5 - R/Conc Column  1  spection Notes:  - Generally in G I on the back-Lef - Generally in G - Generally good - Same as past - Tight surface s - Tight surface s - Bent #2 & 5 None	ood condition to condition to condition.	on. Some tighton. Same on some small spand a couple tracks on all of tracks.	t shrinak mall spa all on ce of small	all on center on ter column surface spal	% and some small s column at Bent 2 at bent 2. I from rebar chai	% palls along the so	% crapes. Bent 2's	% middle column has	A RZE RMG ZZD EZH FZM ZZE

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\*\*\* \* \* \* \* \* \* \* Span : Appr-1 - P/S CONC SPANS - 1,2,4,and 5 (cont.) \* \* \* \* \* \* \* \*

Ü	scription									
lement 21	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	5 - R/Conc Abuti	ment 1 and	16			'				
	1	1	35	m.		95	5	0	0	
						%	%	%	%	
Previous Inc	spection Notes :									
	·		C	حالحمد ال	-4 4h - h1		-ti			D.7.E
	•			·	at the back	wall to cap conne	ection area.			RZE
	- Same commer		•							RMG
		·	•			area. Tight crack	ding in both abut	ment caps.		ZZD
	- Tight surface s	_	_							EZH
		_				r the SE corner o				FZN
near the Abi				walls. V	ery minor e	rosion near the S	E corner that is	allowing dirt/deb	ris to get on the g	irder ZZE NHG
01/14/1999		,								DCF
04/01/1996										YDN
02/01/1994										REF
Inspection	Notes:									
1	4 D/Cara Car	Danta O a								
ement 234	4 - R/Conc Cap					0.0		_		
	1	1	24	m.		90	5			
						%	%	%	%	
Previous Ins	spection Notes :									
						nation on Bent 5'	s cap near the c	onnections to the	columns. Small	RZE
	<ul><li>Ils on the bottom</li><li>Unchanged an</li></ul>				t.					RMG
	· ·									
					pent 5 cap a	nd along constru	ction joints at co	lumns. Several s	mall surface spal	ls on ZZD
	sty rebar chair fe	et. Bird nes	sts and debris	on all ca	ps.	ŭ	•		mall surface spal	
05/31/2007 cap from ex	<ul> <li>Minor delamia</li> <li>posed rebar cha</li> </ul>	et. Bird nes ntion on the air feet.	sts and debris on Span 5 side of Spa	on all ca	ps.	ŭ	•		mall surface spal	of the EZF
05/31/2007 cap from ex 05/04/2005	<ul> <li>Minor delamia</li> <li>posed rebar cha</li> <li>Unchanged from</li> </ul>	eet. Bird nes ntion on the air feet. om the last	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH
05/31/2007 cap from ex 05/04/2005	<ul> <li>Minor delamian</li> <li>posed rebar cha</li> <li>Unchanged from</li> <li>Tight crack at the</li> </ul>	eet. Bird nes ntion on the air feet. om the last	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	·	of the EZH
05/31/2007 cap from ex 05/04/2005 04/30/2003 he Span 5 s	<ul> <li>Minor delamian</li> <li>posed rebar cha</li> <li>Unchanged from</li> <li>Tight crack at the</li> </ul>	et. Bird nesontion on the air feet. om the last the new to a	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH
05/31/2007 cap from ex 05/04/2005 04/30/2003 he Span 5 s 08/06/2001	- Minor delamian posed rebar cha - Unchanged fro - Tight crack at the side of it. - 12.09 * 2 = 24.	et. Bird nesontion on the air feet. om the last the new to a	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH FZW 5 on ZZE
05/31/2007 cap from ex 05/04/2005 04/30/2003 he Span 5 s 08/06/2001 01/14/1999	- Minor delamian posed rebar cha - Unchanged fro - Tight crack at the side of it. - 12.09 * 2 = 24.	et. Bird nesontion on the air feet. om the last the new to a	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH FZM 5 on ZZE NHG
25/31/2007 cap from ex 25/04/2005 24/30/2003 the Span 5 s 28/06/2001 21/14/1999	- Minor delamian posed rebar cha - Unchanged fro - Tight crack at the side of it. - 12.09 * 2 = 24.	et. Bird nesontion on the air feet. om the last the new to a	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH FZM 5 on ZZE NHG
25/31/2007 cap from ex 25/04/2005 24/30/2003 the Span 5 s 28/06/2001 21/14/1999	- Minor delamian posed rebar cha - Unchanged fro - Tight crack at the side of it. - 12.09 * 2 = 24.	et. Bird nesontion on the air feet. om the last the new to a	sts and debris of Span 5 side of span 5 side of the control of the	on all ca f Bent 5	ps. 's cap. Alsc	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH FZM 5 on ZZE NHG
05/31/2007 cap from ex 05/04/2005 04/30/2003 he Span 5 s 08/06/2001 01/14/1999 Inspection	- Minor delamian posed rebar char - Unchanged from - Tight crack at the side of it. - 12.09 * 2 = 24.	et. Bird nes ntion on the air feet. om the last of the new to	ests and debris of Span 5 side of Sp	on all ca	ps 's cap. Also	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH FZM 5 on ZZE NHG
05/31/2007 cap from ex 05/04/2005 04/30/2003 the Span 5 s 08/06/2001 01/14/1999 Inspection	- Minor delamiar posed rebar cha - Unchanged fro - Tight crack at the side of it. - 12.09 * 2 = 24.  Notes:	et. Bird nes ntion on the air feet. om the last of the new to	ests and debris of Span 5 side of Sp	on all ca of Bent 5 in the ca	ps 's cap. Also	some minor sur	face spalls on th	e bottom side of	the older portion	of the EZH FZM 5 on ZZE NHG
05/31/2007 cap from ex 05/04/2005 04/30/2003 the Span 5 s 08/06/2001 01/14/1999 Inspection	- Minor delamian posed rebar char - Unchanged from - Tight crack at the side of it. - 12.09 * 2 = 24. - Notes:	et. Bird nes ntion on the air feet. om the last of the new to .18m	ests and debris of Span 5 side of Sp	on all ca of Bent 5 in the ca	ps 's cap. Also	e shrinkage crac	face spalls on the	e bottom side of Some delamination	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH
05/31/2007 cap from ex 05/04/2005 04/30/2003 he Span 5 s 08/06/2001 01/14/1999 Inspection	- Minor delamian posed rebar char char char char char char char ch	et. Bird nes ntion on the air feet. om the last of the new to .18m	ests and debris of Span 5 side of Sp	on all ca of Bent 5 in the ca	ps 's cap. Also	e shrinkage crac	face spalls on the state of the spalls on the spalls on the state of the spalls on	e bottom side of Some delamination	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH
25/31/2007 cap from ex 25/04/2005 04/30/2003 he Span 5 s 28/06/2001 01/14/1999 Inspection	- Minor delamian posed rebar character - Unchanged from Tight crack at the side of it 12.09 * 2 = 24 Notes:  0 - Elastomeric E	eet. Bird nesonation on the last of the new to the new	ests and debris of Span 5 side of Preports.  Find the connection of the span 5 and 5 - Ur	on all ca f Bent 5 in the ca der Nev	ps 's cap. Also aps. Surface	e shrinkage crac	face spalls on the state of the spalls on the spalls on the state of the spalls on the spalls of the spalls on the spalls on the spalls on the spalls on the spalls of the spalls on the spalls of the sp	e bottom side of Some delamination	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH
25/31/2007 cap from ex 25/04/2005 04/30/2003 he Span 5 s 08/06/2001 01/14/1999 Inspection Element 310 Previous Ins	- Minor delamian posed rebar char char char char char char char ch	et. Bird nes ntion on the air feet. om the last i the new to a .18m  Bearing Be	ests and debris of Span 5 side of reports.  Find the connection of	on all ca f Bent 5 in the ca der Nev ea.	ps. 's cap. Also aps. Surface ver Girder he steel por	e shrinkage crac	face spalls on the state of the spalls on the spalls on the state of the spalls on the spalls of the spalls on the spalls on the spalls on the spalls on the spalls of the spalls on the spalls of the sp	e bottom side of Some delamination	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH
25/31/2007 cap from ex 25/04/2005 04/30/2003 the Span 5 s 28/06/2001 01/14/1999 Inspection Element 310 Previous Ins 26/17/2013	- Minor delamian posed rebar char char char char char char char ch	eet. Bird nes ntion on the air feet. om the last if the new to if a.18m  Bearing Be 1  n. Rubber if the steel port	sts and debris of Span 5 side of reports.  old connection  nt 3 and 5 - Ur  2  s Good. Spot titons. Rubber	on all ca of Bent 5 in the ca der Nev ea.	yer Girder  he steel por are Good.	e shrinkage crace 95 %	face spalls on the state of the spalls on the spalls on the state of the spalls on the spalls of the spalls on the spalls on the spalls on the spalls of the spalls on the spalls of the spalls on the spalls of the spalls on the sp	e bottom side of Some delamination	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH
25/31/2007 cap from ex 25/04/2005 24/30/2003 the Span 5 s 26/06/2001 201/14/1999 Inspection Element 310 Previous Ins 26/17/2013 26/16/2011 26/30/2009	- Minor delamian posed rebar char char char char char char char ch	Bearing Bearing Bearing on Rubber in Rubber in Staining on	sts and debris of Span 5 side of Paper 5 side	on all ca of Bent 5 in the ca der Nev ea.	yer Girder  he steel por are Good.	95 % tions of the bearing unchanged and	face spalls on the state of the spalls on the s	e bottom side of Some delamination 0 %	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH  RZE RMG ZZD
25/31/2007 cap from ex 25/04/2005 24/30/2003 he Span 5 s 26/06/2001 201/14/1999 Inspection Element 310 26/17/2013 26/16/2011 26/30/2009 205/31/2007	- Minor delamian posed rebar char char char char char char char ch	Bearing Bearing Bearing on Rubber in Staining on the steel portestaining of	sts and debris of Span 5 side of reports.  old connection  nt 3 and 5 - Ur  s Good. Spot tions. Rubber steel portions. tions. Minor te	on all ca of Bent 5 in the ca der Nev ea.	yer Girder  he steel por are Good.	95 % tions of the bearing unchanged and	face spalls on the state of the spalls on the s	e bottom side of Some delamination 0 %	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH  RZE RMG ZZD
25/31/2007 cap from ex 15/04/2005 24/30/2003 25/04/30/2003 25/04/30/2001 25/04/30/2001 25/04/30/2001 25/04/30/2001 25/04/30/2013 25/04/30/2009 25/31/2007 25/04/30/2007 25/04/30/2007 25/04/30/2007	- Minor delamian posed rebar char char char char char char char ch	Bearing Bearing Bearing on Rubber in the steel portot gotten are steel gotten are stee	sts and debris of Span 5 side of reports.  old connection  nt 3 and 5 - Ur  s Good. Spot tions. Rubber steel portions. tions. Minor teny worse.	on all ca of Bent 5 in the ca der Nev ea.	yer Girder  he steel por are Good. ear on pad is eouter edge	95 whitions of the bearing and a of the pads as r	face spalls on the state of the spalls on the s	oper inspection, I	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH RZE RMG ZZD
25/31/2007 rap from ex ps/04/2005 ps/04/2003 ne Span 5 sp/06/2001 ps/06/2001 ps/06/2001 ps/06/2001 ps/06/2001 ps/06/2001 ps/06/2001 ps/06/2001 ps/06/30/2009 ps/06/30/2009 ps/06/30/2007 ps/06/30/2005	- Minor delamian posed rebar char char char char char char char ch	et. Bird nesonation on the last of the new to of the steel portot gotten all paint loss of the new to of the new t	ests and debris of Span 5 side of reports.  Fold connection of the state of the sta	on all ca f Bent 5 in the ca der Nev ea.	yer Girder  he steel por are Good. ear on pad is eouter edge	95 whitions of the bearing and a of the pads as r	face spalls on the state of the spalls on the s	oper inspection, I	the older portion on noted at Bent 5	of the EZH FZM 5 on ZZE NHG DCH RZE RMG ZZD

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#### I00315001+00692 Continue

\* \* \* \* \* \* \* \* \* \* Span : Appr-1 - P/S CONC SPANS - 1,2,4,and 5 (cont.) \* \* \* \* \* \* \* \*

Element Des	crintion		•				•	,		
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	- Fixed Bearing		Quartity	Ormo	mop Lacin	r or orar r	. or orar 2	1 01 0141 0	1 01 0141 1	. or orar o
	1	1	38	ea.		90	10	0		
	•	•		ou.		%	%	%		%
						70	70	70	70	70
	pection Notes :									
06/17/2013 - Rust, scale, debris, and paint loss.								RZEV		
	06/16/2011 - Rust, paint loss, scale, and debris.								RMGH	
06/30/2009 - Spot rust, paint fade, and some debris. The worst paint loss is on abutment bearings.							ZZDZ			
05/31/2007 - Spot rust, paint loss, and pigeon debris on the bearings. Left Abutment bearings in the quantity as (1) anchor bolt per bearing is visible. Blown off and spot overcoat painted if they were dry. 05/04/2005 - Minor rust, paint loss, and pigeon debris.							EZHZ FZMK			
	Spot rust on the		. •	from bir	ds. etc.					ZZEB
	Minor rust and	_	222		,					NHGO
01/14/1999 -		P9.								DCHF
04/01/1996 -								YDNF		
	_									
Inspection I	votes.									
FI	O Daide I	D - 111								
Element 331	- Conc Bridge I						_		_	
	1	3	94	m.		95	5	0	0	
						%	%	%	%	%
Previous Ins	pection Notes :		,		_					
06/17/2013 -	Generally in Go	ood conditi	on. Small spall	s on the	e backside o	f the barrier at b	olt-ups to the W-I	Beam. Random	shrinkage cracking	g. RZEV
06/16/2011 -	Generally in Go	ood conditi	on. Random ve	ertical c	racks throug	jhout.				RMGH
06/30/2009 -	Tight surface s	hrinkage c	racks throughou	ut. Sma	ll surface po	pouts and vertic	al cracking in all	spans. Generally	good condition.	ZZDZ
05/31/2007 - Minor popouts and tight shrinkage cracks.							EZHZ			
05/04/2005 - Same as previous reports. (47.09 * 2 = 94.18) Nate.							FZMK			
04/30/2003 - Vertical cracks throughout both rails with some minor concrete popouts.							ZZEB			
08/06/2001 - 47.55 * 2 = 95.10m							NHGO			
01/14/1999 - None						DCHF				
04/01/1996 -	_									YDNF
Inspection I	Notes:									



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#### 100315001+00692 Continue

General Inspection Notes	
06/17/2013 - End shoes at East Abutment, 6, are lapped against traffic flow.	RZEV
Homeless person living under Span 5. Wasn't happy about the intrusion during the inspection. 06/16/2011 - End shoes on the W-Beam at the bridge ends are lapped against traffic on the East end of the structure. Homeless household along with a fire pit near Abutment 6.	RMGH
06/30/2009 - NBI 58, deck, rated at "5" due to increasing delaminations and spalling in deck surface. W-beam end shoes at abutment 6 are lapped against traffic flow.	ZZDZ
05/31/2007 - NBI 59, superstructure, rated a "6" due to rust, scale, and minor pitting of the steel girders in the main span.  Areas under the joints were very wet from overnight rain and could not be cleaned and overcoat painted very well.	EZHZ
05/04/2005 - NBI 58, deck, rated at a "6" due to delamination, minor potholes, and wear to the surface.  NBI 60, substructure, rated at a "7" due to minor cracking at the construction joints and small popouts in the bottoms of the caps from exposed rebar chairs.	FZMK
04/30/2003 - None	ZZEB
08/06/2001 - None	NHGO
01/14/1999 - None	DCHF
04/01/1996 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/11/97 10:45:05 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:15:35	YDNF
02/01/1994 -	REFI
08/01/1992 - Updated with tape 1994	NB94
01/01/1991 - Updated with tape 1992	NB92
03/01/1989 - Updated with tape 1991	NB91
04/01/1987 - Updated with tape 1989	NB89
09/01/1984 - Updated with tape 1986	NB86



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#### 100315001+00693

**Location: GREAT FALLS Structure Name:** 

**General Location Data** MDT Maintenance Section: 31-01 Great Falls District Code, Number, Location: 03 **GREAT FALLS** Division Code, Location:31 **GREAT FALLS** County Code, Location: 013 **CASCADE** City Code, Location: 00000 **RURAL AREA** Kind fo Hwy Code, Description: 8 8 Other (incl toll rds) Signed Route Number: 00315 State Highway Agency State Highway Agency Str Owner Code, Description: 1 Maintained by Code, Description:1 Intersecting Feature: BNSF RAILROAD Kilometer Post, Mile Post: 1.71 km 1.06 Structure on the State Highway System: Latitude: 47°29'18" **Construction Data** Structure on the National Highway System: Longitude: 111°20'06" Construction Project Number: IR 315-5(12)1F Str Meet or Exceed NBIS Bridge Length: Construction Station Number: 6+55.00 Construction Drawing Number: 15924 **Traffic Data** Construction Year: 1996 Current ADT : 25,500 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design :	32.6 mton	A LFD Assigned
Operating Load, Design:	32.6 mton	A LFD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting	
Truck 1 Type 3:				
Truck 2 Type 3-S3:				
Truck 3 Type 3-3 :	48.6			

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 56.69 m

> Deck Area: 456.00 m sq

7.11 m Deck Roadway Width: 7.20 m Approach Roadway Width:

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

R Railroad beneath struc Reference Feature for Vertical Clearance:

6.98 m Vertical Clearance Under the Structure:

R Railroad beneath struc Reference Feature for Lateral Underclearance:

Minimum Lateral Under Clearance Right: 1.70 m 0.00 m Minimum Lateral Under Clearance Left:

#### Span Data

#### Main Span

Number Spans: 5

Material Type Code, Description: 5 Prestressed concrete

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: 1 Epoxy Coated Reinforcing

Deck Membrain Type: 0 None

### Approach Span

Number of Spans: 0

Material Type Code, Description:

Span Design Code, Description:

8.05 m (52) Out-to-Out Width:

(50A) Curb Width: (50B) Curb Width: 0.00 m 0.00 m Skew Angle: 33°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, We	est or Bi-direction	nal Travel	North or East Travel		
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	100315	West	99.99 m	7.11 m	N/A		
-315 AT EXIT 0-WB OFF RAM							



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#### 100315001+00693 Continue

**Inspection Data** 

Inspection Due Date : 16 June 2015

Sufficiency Rating: 94

Structure Status : Functionally Obsolete

(91) Inspection Frequency (months): **48** 

NBI Inspection Da	ata										
(90) Date of Last Insp	pection : 16 June 201	11		La	st Inspected By:	harles Pep	os - 107				
(90) Inspectio	n Date :				Inspected By :						
(58) Deck I	Rating : 7	(68) Deck G	eometry : 6	(36A)	Bridge Rail Rating :	1	(62) Culv	ert Ra	ating :	N	
(59) Superstructure I	Rating : 8	(67) Structure	e Rating : 7	(36B)	Transition Rating :	1	(61) Chanr	nel Ra	ating :	N	
(60) Substructure I	Rating: 7	(69) Under Cle		(36C) Ap	proach Rail Rating	1	(71) Waterway	Adeq	uacy	N	
(72) App Rdwy	/ Align : <b>7</b>	` '	g Status : A	(360	0) End Rail Rating :	1	(113) Sco	ur Cr	itical :	N	
	Unrepaired S	palls: 0	m sq		Deck	Surfacing	Depth :	0.00 ii	n		
<b>Inspection Hours</b>											
Crew Hours for inspec	tion : 2	2	Sno	oper Required							
Helper Ho	ours :		Snooper Hours	for inspection	0						
Special Crew Ho	ours :			Flagger Hours							
Special Equipment Ho	ours :						_				
Inspection World	k Candidates	Status	Priority	Effected Structure	Scope of Work	f	Action			ered	
Candidate ID	Date Requested	Status	Filolity	Unit	WOIK		Action			ites	
D31-FY2003-000401	09 May 2003	Approved	High	M Main	300 Strip Seal E	xp Joint	Min Repair	X	X   :	X X	X
Clean dirt and debris ou 06/16/2011 Full of sand Approved. DRC		nent 1.									
Late Reason:	2011										

Inspection Date: 06/16/2011



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#### 100315001+00693 Continue

### **Element Inspection Data**

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - Spans 1,2,3,4,&5 \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 26 - Conc Deck/Coatd Bars X 100 3 456 sq.m. % % Previous Inspection Notes: 06/16/2011 - Wear in the wheel paths from studded tires. Small and shallow surface spalls in the concrete past the edge of the joint steel. 05/31/2007 - Minor stuudded tire wear. Good skid resistance. Wider cracks over the Bents; 0.5mm 05/04/2005 - Studded tire wear in the wheel paths. Small loose concrete along portions of the joint at Abutment 1. Wider cracks over all of the Bents. 04/30/2003 - Same comments as previous report and add studded tire wear in the wheel paths with exposed aggregate. 08/06/2001 - Transverse cracks at all (4) bents. Transverse cracks, mostly small & tight, in the west half with some minor efflorescence underneath. 12/23/1998 - 56.69 \* 8.05 = 456.35 Inspection Notes: Element 109 - P/S Conc Open Girder 1 227 100 m. % % Previous Inspection Notes: 06/16/2011 - Good condition. 05/31/2007 - No problems observed. 05/04/2005 - No problems noted. (55.40 \* 4 = 221.60 NMS) **EZFQ** 04/30/2003 - No problems noted. Some graffiti on girders near the Abutments. 08/06/2001 - None 12/23/1998 - 56.69 \* 4 = 226.76m Inspection Notes: Element 205 - R/Conc Column Bents 2, 3, 4, and 5 ea. 95 % Previous Inspection Notes : 06/16/2011 - One small spall on the Left column at Bent 3 for Condition State 2. Several peeling sack patches at the construction joints. 05/31/2007 - Tight surface shrinakge cracks. Placed 5 percent into Condition State 2 as sacked patches are delaminated or peeling where installed. None are a problem. 05/04/2005 - Minor surface shrinkage cracks. 04/30/2003 - Minor surface shrinkage cracks. No problems noted. 08/06/2001 - None 12/23/1998 - None Inspection Notes:

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100315001+00693

#### 100315001+0069 Continue

Span: Main-0 - Spans 1,2,3,4,&5 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 215 - R/Conc Abutment 1 and 6 1 24 m. 95 % % Previous Inspection Notes: 06/16/2011 - Generally in Good condition. Some tight cracking in both Backwalls and one small spall on Abutment 1's backwall. 05/31/2007 - Same as prior inspection reports. 05/04/2005 - Tight cracks in both of the backwalls. Worse crack is on the Right end of Abutment 1. Minor erosion and mostly on the Right side of Abutment 6. 04/30/2003 - Some tight cracks in both Abutment backwalls. Still some minor erosion at the wingwalls. 08/06/2001 - No change from the last report. 12/23/1998 - 11.58 + 12.34 = 23.92mSome erosion around three(3) of the wingwalls. Inspection Notes: Element 234 - R/Conc Cap Bents 2, 3, 4, and 5 37 95 m. % Previous Inspection Notes : 06/16/2011 - Generally in Good condition. One small spall in sack patch at Bent 4. Some tight vertical cracks at steps in the caps. 05/31/2007 - Minor and tight cracks at the construction joint to the column. Placed 5 percent into Condition State 2 due to sacked patches showing minor delaminations and/or peeling. None are a problem. 05/04/2005 - Minor and tight cracks at the cap to column connections. 04/30/2003 - Minor surface shrinkage cracks. No problems noted. 08/06/2001 - Dropped caps at the abutments. 9.14 \* 4 = 36.56m12/23/1998 - (9.14 \* 4) + (2 \* 8.69) = 53.94mInspection Notes: Element 300 - Strip Seal Exp Joint 3 m. % Previous Inspection Notes : 06/16/2011 - Joint steel sounded solid when tapped on. Rubber gland is full of sanding material. Wet spot from apparent leaking near centerline. 05/31/2007 - Full of debris today. Damp near cneterline on the cap, so may have a slight leak there. Steel portions sound solid when tapped on. 05/04/2005 - Same as previously reported. Full of sanding material today. 04/30/2003 - Full of dirt/sanding material/ May be a small tear near centerline. Added cleaning as a work element. 08/06/2001 - Full of dirt and sanding material. 12/23/1998 - 8.05 \* 1 = 8.05m Inspection Notes:

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\* \* \* \* \* \* \* \* \* \* Span : Main-0 - Spans 1,2,3,4,&5 (cont.) \* \* \* \* \* \* \* \*

			•		•				
Element Description		<b>.</b> 1			5 : 0: : 1	5 : 0: : 0			
Smart Flag   Scale Factor   E Element 310 - Elastomeric Bearin	nv	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
					122				
1	1	4	ea.		100	0	0		
					%	%	%	%	o,
Previous Inspection Notes :				_					
06/16/2011 - Good condition. Sc	me fadi	ing of the pain	t on the	steel portio	ns.				RZGM
05/31/2007 - No problems observ	ved.								EZHZ
05/04/2005 - Same as last report	í <b>.</b>								EZFQ
04/30/2003 - Minor spot rust form	ning on	painted surfac	es. Sp	ots rub off w	vith some effort. I	Not a problem as	of yet.		BDHZ
08/06/2001 - At Abutment #6.									NHGO
12/23/1998 - None									AHBS
Inspection Notes:									
-1									
Element 313 - Fixed Bearing									
	1	36	ea.		95	5	0		
					%	%	%	%	(
Daniela de la constitución de la					76	76	76	76	
Previous Inspection Notes :									57014
06/16/2011 - Spot rust and some									RZGM
05/31/2007 - Minor spot rust on the		_		ebris starting	g to build up.				EZHZ
05/04/2005 - Minor spot rust and									EZFQ
04/30/2003 - Minor spot rust form	ning on I	painted surfac	es.						BDHZ
08/06/2001 - None									NHGO
12/23/1998 - None									AHBS
Inspection Notes:									
Element 331 - Conc Bridge Railir	ng								
1	3	113	m.		95	5	0	0	
					%	%	%	%	(
Previous Inspection Notes :									
06/16/2011 - Minor popouts and	scrapes	on both barrie	ers. Ra	andom vertic	al cracking through	ahout.			RZGM
05/31/2007 - Minor popouts and						5· · - · · ·			EZHZ
05/04/2005 - Same as last report	_			-					EZFQ
04/30/2003 - Vertical cracking thi		ıt: mostly verv	tiaht. S	Some minor	popouts on rails	concrete surface:	S.		BDHZ
08/06/2001 - None	ougou	,			popositio en railo		<b>-</b> .		NHGO
12/23/1998 - 56.69 * 2 = 113.38n	n								AHBS
									ANDO
Inspection Notes:									



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### 100315001+00693 Continue

General Inspection Notes	
06/16/2011 - Rail end shoes on the approach sections of the guardrail at the bridge ends are lapped against traffic.	RZGM
05/31/2007 - NBI 60, substructure, rated a "7" due to tight shrinkage cracks in the columns and caps.	EZHZ
05/04/2005 - Trasnsition rail at outlet doesn't have curb taper or doubled approach section, but probably doesn't warrant it either.	EZFQ
04/30/2003 - No major problems noted today.	BDHZ
08/06/2001 - None	NHGO
12/23/1998 - None	AHBS



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**GREAT FALLS** 

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#### U05210000+01601

**Location: GREAT FALLS Structure Name:** 

**General Location Data** 

Kind fo Hwy Code, Description: 2

MDT Maintenance Section: 31-01 Great Falls

Signed Route Number: 00103

District Code, Number, Location: 03 **GREAT FALLS GREAT FALLS** Division Code, Location:31

County Code, Location: 013 **CASCADE** City Code, Location: 32800

2 U.S. Numbered Hwy

State Highway Agency State Highway Agency Str Owner Code, Description: 1 Maintained by Code, Description:1

Intersecting Feature: CITY ST, BNSF RAILROAD Kilometer Post, Mile Post: 0.26 km 0.16

Structure on the State Highway System: Latitude: 47°30'28"

Structure on the National Highway System: Longitude: 111°20'26"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number: IG 15-5(28)274 Construction Station Number: 21+54.00

Construction Drawing Number: 7789

Construction Year: 1967 Reconstruction Year:

**Traffic Data** 

Current ADT: 11,330 ADT Count Year: 2009 2 % Percent Trucks:

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	B ASD Assigned
Operating Load, Design:	32.6 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data :	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	85		

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 167.94 m Deck Area: 2,684.00 m sq

8.32 m Deck Roadway Width: 8.32 m Approach Roadway Width:

Median Code, Description: 0 No median

### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

R Railroad beneath struc Reference Feature for Vertical Clearance:

5.16 m Vertical Clearance Under the Structure:

R Railroad beneath struc Reference Feature for Lateral Underclearance:

Minimum Lateral Under Clearance Right: 1.52 m 0.00 m Minimum Lateral Under Clearance Left:

#### Span Data

#### Main Span

Number Spans: 4

Material Type Code, Description: 4 Steel continuous

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type: 0 None Deck Membrain Type: 0 None

#### Approach Span

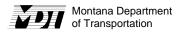
Number of Spans: 2 Material Type Code, Description: 3 Steel

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

15.98 m (52) Out-to-Out Width: (50A) Curb Width: (50B) Curb Width: 0.00 m 1.52 m Skew Angle: 45°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, We	est or Bi-direction	nal Travel	N	orth or East Trav	rel .
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
One Route Under	-1	Both	5.16 m	7.32 m	N/A		
GAULT AVE.							
Route On Structure	N00103	N/A			East	99.99 m	8.32 m
CENTRAL AVE WEST - EB							



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# U05210000+01601

Continue

**Inspection Data** 

Inspection Due Date: 12 September 2014 (91) Inspection Frequency (months): 24

Sufficiency Rating: 91.4

Structure Status : Functionally Obsolete

Next Other Insp Due Date: 23 Aug 2016

Other Insp Type: Pin and Hanger

						Other map Type	. I ili alia Haligei
NBI Inspection Da	ata						
(90) Date of Last Insp	pection : 12 Septemb	er 2012		La	ast Inspected By: Charle	s Pepos - 107	
(90) Inspection	on Date :				Inspected By :		
(58) Deck	Rating : 6	(68) Deck Geo	metry : 3	(36A)	Bridge Rail Rating : 1	(62) Culver	rt Rating : N
(59) Superstructure	Rating : 6	(67) Structure F	Rating : 6	(36B)	Transition Rating : 1	(61) Channe	el Rating : N
(60) Substructure	Rating : 6	(69) Under Clear		(36C) Ap	proach Rail Rating :1	(71) Waterway A	dequacy :N
(72) App Rdwy	y Align : <b>7</b>	(41) Posting S	_	(361	D) End Rail Rating :	(113) Scou	r Critical : N
	Unrepaired S			<del></del>	Deck Sur	facing Depth : 0.	00 in
Inspection Hours	·			<u> </u>			
Crew Hours for inspec				oper Required			
Helper He		/		s for inspection	9		
Special Crew Ho	10			Flagger Hours	0		
Special Equipment Ho	10			_			
Inspection World	k Candidates	Status	Priority	Effected Structure	Scope of Work	Action	Covered Condition
Candidate ID	Date Requested	Otatas	linonty	Unit	Work	Action	States
D31-FY2005-000060 Clean and paint bearing	15 October 2004	Approved	Low	All Spans	Bridge	Spot Paint (flex)	
Approved. DRC							
D31-FY2005-000061	15 October 2004	Approved	High	All Spans	301 Pourable Joint S	eal Min Repair	
Reseal the joints.							
Approved. DRC							
D31-FY2011-000150	07 February 2011	Not Approved	Medium	All Spans	107 Paint Stl Opn Gir	der Min Repair	
Clean and paint girders. 10-12-2006: Some spot		the girders			·		
10 12 2000. Come spor	t overseat painting or	uno girdoro.					
D31-FY2011-000151	07 February 2011	Not Approved	Medium	All Spans	334 Metal Rail Coate	ed Repl Paint	
Clean and paint rail.							
D31-FY2012-000086	13 September 2012	Not Approved	Medium	All Spans	234 R/Conc Cap	Rehab Elem	
Repair spalls/delaminate					33		
Late Reason:							

Inspection Date: 09/12/2012



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Continue

#### **Element Inspection Data**

Span: Main-0 - Steel Girder over RR - Spans 3 thru 6 \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 12 - Bare Concrete Deck Latex Surface X 3 2293 sq.m. 0 100 % % Previous Inspection Notes: 09/12/2012 - Wear in wheel paths from studded tires. Cracking in all spans. Small delaminations and spalls along edges of joint steel. 09/20/2010 - Wear in the wheel paths has reduced depth of traction grooves to "0" in areas. Small surface delaminations and small spalls along joint steel. Lots of cracking in all Spans. 09/24/2008 - Wear in the wheel paths. Small spalls and delaminations along edges of the joint steel. Transverse and mapping cracks in all of the 07/25/2006 - Wear in the wheel paths. Small delamiantions along the expansion joint steel. Some mapping cracks in the latex in all of the spans. 09/29/2004 - Put deck into Condition State 2 due to small delaminations along the joints. 10/21/2002 - (79.40 \* 15.98) [(15.98 18.40)/2 \* 32.8] (18.40 \* 25.0) = 2292.6 Put deck back to a "12" as hydromilled and replace material with Latex concrete to original deck elevations. Also Class B repairs. Transverse cracking in all spans. May need to address the cracking on next inspection. 08/30/2000 - (79.40\*15.98) [(15.98 18.40) / 2 \* 32.8] )18.40 \* 25.0) = 2292.6 Repair of delaminated areas in 1999 with hydrodemolition. Replaced with latex concrete and an overlay of the entire structure with latex concrete/ 06/03/1998 - Numerous small, tight transverse cracking thoughout the deck with some small areas of delamination when it was checked several years ago. Studded tires have left a fairly smooth wear surface. 12/01/1995 - None Inspection Notes: Element 107 - Paint Stl Opn Girder 607 85 m. % % % % Previous Inspection Notes: 09/12/2012 - Lower flange tops in areas that collect water are rusted and some surface pitting under rust blisters. Faded and chalking paint. diagonal bracing between G2 and G3 where removed in 2012 and intersecting welds drilled in reversal areas. Girders are dirty from train exhaust. 09/20/2010 - Crack on G3S4L Gusset is unchanged. Lots of debris and grime on the girders. Rust blisters with minor surface pitting. Lots of pigeon nests along the girder connections. 09/24/2008 - G3S4L near pin connection has a crack on the gusset weld for the diagonal brace. Rusty spots, scale, paint loss, and minor surface pitting in areas where water can sit on the girders. 07/25/2006 - Rust spots, pitting, some pack rust, and paint loss; especially under the joints. Left two(2) girders have some missing bolts in the bearings to girders connection. Outer girders have rust blisters on the lower flange tops and lower portion of the webs and near leaky joints. Bolts on a diagonal bracing was missing and replaced during snooper inspection. 09/29/2004 - Some rust spots, peeling paint and pitting of the girders, especially under the joints and on the lower portions of the web/lower flange. 2nd girder from the right in Span 3 is very rusty with paint peeling for 20 feet. 10/21/2002 - Minor rusty spots under leaking joints and along the bottom flange/web area. 08/30/2000 - (4 \* 137.20) + 32.8 + 25.0 = 606.6mSome rust and pitting. 06/03/1998 - Some early signs of rust & pitting. 12/01/1995 - None 02/01/1994 - None Inspection Notes:

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lement Des										
Smart Flag	Scale Factor	Env	Quantity		Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 161				<u> </u>	mblies plus (	<u>'</u>	onnection Pins			
	1	3	3	ea.		95	5	0	0	
						%	%	%	%	
revious Ins	pection Notes :								I	
9/12/2012 -	Pins and hange	ers where I	UT tested in Au	ugust 20	12. No seriou	ıs problems obs	served (see Collir	ns Engineering re	eport).	MWH
spection w	Still Good pain ith little to no we Will be UT'd th	ear also no	ted.				s Engineering. N	lo "noteables" we	ere fond in the UT	WZB YQC
							ting in 2005 show	ed no significant	wear or problems.	NZD
9/29/2004 -	Ends of the pin	ns, nuts, an	d hangers sho	wing soi	me minor rus	t where they we	ere cleaned in 200	01 for UT testing.		ZZIC
0/21/2002 -	See 2001 NDT	report. So	ome minor wea	ar of sev	eral pins.					VIKO
8/30/2000 -	Some minor ru	st and pitti	ng.							
6/03/1998 -	Some minor ru	ıst & pitting	. Eight(8) sets	of the p	ins have bee	n UDT'ed and v	were ok.			XKG
2/01/1995 -	None									YDN
2/01/1994 -	None									REF
lement 205	- R/Conc Colur	mn (2) at E	Bent 3, 4, 5, an	d (3) at	6					
	1	1	9	ea.		90	5	5	0	
						%	%	%	%	
revious Ins	pection Notes :									
					ng corners ar	nd areas are de	laminated. Some	spall/scrapes on	columns. Shallow	tie MWF
	sed surface spa Bent 3's Right				and cracking:	photo. Some t	ight cracks and s	mall surface spa	lls from shallow tie	WZB
rire.				_						
	ŭ		•				edges. Some pai		· ·	YQC
ent 6 has s	ome spalls from	n being hot	from campfires	s.					Middle column at	
	n at Bent 3. Tig Small, tight shr					arted by homel	ess people under	the structure.	, and the second se	VIK
8/30/2000 -	No change.									
	Como bairlina	tight crack	s in the concre	te.						XKG
	Some namine,	tigrit crack								
		tigitt crack								

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	scription				I					
۰	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
ement 215	- R/Conc Abutr									
	1	1	26	m.		95	5	0	0	
						%	%	%	%	
evious Ins	pection Notes :		1							
ots of soot	from homeless of	campfires.						·	I near G3 embedmouple of the bearing	
ouple of the	girders in the A	butment c	ар.		·	Il spalls along the	•	nbedded girders	. Tight cracks unde	era YQC NZDI
	Tight cracks in						Tino baokwan.			ZZIC
	Minor, tight cra					3 . 3				VIKO
8/30/2000 - o change.	14.60 + 1.55 +	9.70 = 25.	80 East abutn	nent onl	ly.					
	Some minor er	osion @ th	e wingwalls.							XKG
2/01/1995 -										YDN
2/01/1994 -	None									REF
•		Rents 3 th	oru 6							
•	- R/Conc Cap	Bents 3 th	ıru 6	m.		85	10	5	0	
•	- R/Conc Cap			m.						
	- R/Conc Cap 1			m.		85 %	10	5	0 %	
ement 234	- R/Conc Cap 1 pection Notes :	1	61		vooced rustv	%	%	%	%	n MW/
revious Ins 0/12/2012 -	- R/Conc Cap  1  pection Notes : Undersides shoboto). Those un	1 ow surface	spalls, staining areas show sta	, and e ining.		% chair feet. Face	% of Bent 3 cap or	% span 2 side has	% s large delaminatio	
revious Ins 0/12/2012 - nd spalls (p 0/20/2010 -	pection Notes : Undersides should be undersided and promine the undersided and grown leaky join	ow surface ider leaky a reas. Craci	spalls, staining areas show sta king and minor	, and e ining. spalls;	photo of Ber	% chair feet. Face	% of Bent 3 cap or ce spalls and del	% span 2 side has aminations due	%	WZE
revious Ins 9/12/2012 - nd spalls (p 9/20/2010 - ome stainir 9/24/2008 -	pection Notes : Undersides shoboto). Those undersided and from leaky joi. Unchanged. S	ow surface der leaky a reas. Crace nts.	spalls, staining areas show sta king and minor	g, and e ining. spalls; started	photo of Ber	chair feet. Face	of Bent 3 cap or ce spalls and del	% span 2 side has aminations due ebar chair feet.	% s large delaminatio to rebar chair feet.	WZE YQC
revious Ins 3/12/2012 - and spalls (p 3/20/2010 - bome staining 3/24/2008 - 7/25/2006 - ith some st	pection Notes: Undersides shothoto). Those undersides and from leaky joinunchanged. Surface spalls and in the area	ow surface der leaky areas. Craconts. ome of the under leak.	spalls, staining areas show sta king and minor dedelaminations erside of the ca	y, and e ining. spalls; started aps fron	photo of Ber to spall on the	chair feet. Face at 3's cap. Surface the shallow tie wire ar chairs. Bent 3	of Bent 3 cap or ce spalls and del re and exposed r 3's cap has some	span 2 side has aminations due ebar chair feet.	% s large delamination to rebar chair feet.	WZE YQC side NZD
ement 234 evious Ins 1/12/2012 - 1/12/2010 - 1/12/2008 - 1/25/2006 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 - 1/12/2004 -	pection Notes: Undersides shothoto). Those undersides and from leaky joinunchanged. Surface spalls aining in the area Minor rusty spondebris/nests.	ow surface der leaky areas. Craconts. ome of the under t	spalls, staining areas show stacking and minor edelaminations erside of the call spalls from e	y, and e ining. spalls; started aps fron exposed	photo of Ber to spall on the shallow reb	chair feet. Face at 3's cap. Surface shallow tie win ar chairs. Bent 3's ebar chairs on the	of Bent 3 cap or ce spalls and del re and exposed r 3's cap has some e bottom of the c	span 2 side has aminations due ebar chair feet.	% s large delaminatio to rebar chair feet.	WZE YQC side NZE ZZI
evious Ins lower insumant in the serious insumant in the serious insumant in the serious interest in the serious in the serious in the serious in the serio	pection Notes: Undersides sho hoto). Those un Delaminated an g from leaky joi Unchanged. S Surface spalls aining in the are Minor rusty spon debris/nests. Same as previo	ow surface deer leaky areas. Crace onts. ome of the on the under onts with smoots with smoots report.	spalls, staining areas show stacking and minor delaminations erside of the call spalls from a Add some sta	y, and e ining. spalls; started aps fron exposed	photo of Ber to spall on the shallow reb	chair feet. Face at 3's cap. Surface the shallow tie wire ar chairs. Bent 3	of Bent 3 cap or ce spalls and del re and exposed r 3's cap has some e bottom of the c	span 2 side has aminations due ebar chair feet.	% s large delamination to rebar chair feet.	WZI YQC side NZE ZZI VIK
ement 234 evious Ins 0/12/2012 - 1d spalls (p 1/20/2010 - 10 me stainin 1/24/2008 - 1/25/2006 - 1th some st 1/29/2004 - 10 me pigeon 1/21/2002 - 1/30/2000 - 10 change p	pection Notes: Undersides shothoto). Those undersides and from leaky joinunchanged. Surface spalls a aining in the area in Minor rusty spondebris/nests. Same as previous (3 * 14.60)+ 17 olus also noted significant in the second descriptions.	ow surface der leaky areas. Crace onts. ome of the under leak with smoots with smoots report.	spalls, staining areas show stacking and minor edelaminations derside of the call spalls from edelaminations all spalls from edelaminations are stated of the call spalls from edelaminations are st	g, and e ining. spalls; started aps from exposed ining of	photo of Ber to spall on the shallow reb d and rusty re the concrete	chair feet. Face at 3's cap. Surface shallow tie win ar chairs. Bent 3's ebar chairs on the	of Bent 3 cap or ce spalls and del re and exposed r 3's cap has some e bottom of the c	span 2 side has aminations due ebar chair feet.	% s large delamination to rebar chair feet.	WZE YQC side NZE ZZI VIK FIL
ement 234 evious Ins 0/12/2012 - 10 spalls (p 1/20/2010 - 10 me stainin 1/24/2008 - 1/25/2006 - 1th some st 1/29/2004 - 10 me pigeon 1/21/2002 - 1/3/30/2000 - 10 change p 1/3/30/1998 -	pection Notes: Undersides sho hoto). Those un Delaminated an grom leaky joi Unchanged. S Surface spalls aining in the are Minor rusty spon debris/nests. Same as previo (3 * 14.60)+ 17 blus also noted s Some sanding	ow surface der leaky areas. Crace onts. ome of the under leak with smoots with smoots report.	spalls, staining areas show stacking and minor edelaminations derside of the call spalls from edelaminations all spalls from edelaminations are stated of the call spalls from edelaminations are st	g, and e ining. spalls; started aps from exposed ining of	photo of Ber to spall on the shallow reb d and rusty re the concrete	chair feet. Face at 3's cap. Surface shallow tie win ar chairs. Bent 3's ebar chairs on the	of Bent 3 cap or ce spalls and del re and exposed r 3's cap has some e bottom of the c	span 2 side has aminations due ebar chair feet.	% s large delamination to rebar chair feet.	WZI YQQ Side NZI ZZI VIK FIL
ement 234 revious Ins 0/12/2012 - nd spalls (p 0/20/2010 - ome stainin 0/24/2008 - r/25/2006 - th some st 0/29/2004 - ome pigeon 0/21/2002 - 0/30/2000 - 0/20 change p	pection Notes:  Undersides showhoto). Those undersides showhoto). Those undersides showhoto. Those undersides showhoto. Those undersides under the area of the are	ow surface der leaky areas. Crace onts. ome of the under leak with smoots with smoots report.	spalls, staining areas show stacking and minor edelaminations derside of the call spalls from edelaminations all spalls from edelaminations are stated of the call spalls from edelaminations are st	g, and e ining. spalls; started aps from exposed ining of	photo of Ber to spall on the shallow reb d and rusty re the concrete	chair feet. Face at 3's cap. Surface shallow tie win ar chairs. Bent 3's ebar chairs on the	of Bent 3 cap or ce spalls and del re and exposed r 3's cap has some e bottom of the c	span 2 side has aminations due ebar chair feet.	% s large delamination to rebar chair feet.	WZE YQC side NZE ZZI VIK

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Incinioni Doc	scription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat
lement 301	- Pourable Join	it Seal								
	1	3	29	m.		60	25	15		
						%	%	%	%	
revious Ins	pection Notes :					I			<u>l</u>	
9/12/2012 -	Steel portion so	ounds solid	when tapped	on. Mor	e sealant has	s pulled out and f	ailed.			MV
9/20/2010 -	Some missing	sealant, so	me loose seal	ant, and	steel portion	sounds solid wh	nen tapped on.			WZ
9/24/2008 -	Steel portions	are sound.	Sealant has lo	ost bond	l in several a	reas and debris i	s pushing sealan	t down.		
7/25/2006 -	Unchanged fro	m previous	reports.							NZ
9/29/2004 -	Several areas	where the j	oint sealant ha	as lost ad	dhesion and	is pulling away fr	om the guard an	gles. Dirt/debris	s in portions of the	e joint. Zz
0/21/2002 -	Dirt and debris	in joints. S	Some material	has bee	n pushed ou	t by the dirt and	debris. Joints lea	aking in these ar	reas.	
	2 * 14.60 = 29.	20 "Dow o	corning" sytle.							
ome mater 6/03/1998 -	ial is missing.									Xk
	- Assm Jt w/o S		20	D		ad	10	0		
·		Seal 3	32	2 m.		90	10	0		
lement 305	- Assm Jt w/o S		32	2 m.		90	10	0		
lement 305	- Assm Jt w/o \$ 1 pection Notes :	3			n portions so	%	%	%	%	
lement 305	- Assm Jt w/o \$  1  pection Notes : Some spalling	3			p portions so	%	%	%		
revious Ins 9/12/2012 - suching slig 9/20/2010 -	- Assm Jt w/o S  1  pection Notes : Some spalling htty. Good finger ali	3 on undersi	de of deck at jo	oints. To	ments on und	wound solid when the deciside of the decision in the decision	% tapped on. Finge	% r alignment is go	ood with some fin	ngers MV
revious Ins 9/12/2012 - puching slig 9/20/2010 - 9/24/2008 - pint. Rusty	- Assm Jt w/o S  1  pection Notes : Some spalling htly. Good finger alignme and scale on the	on undersion and is mostly a lower por	de of deck at jound of the deck at jound of the joint the joint of the joint deck at j	pints. To	ments on und es slightly too l.	ound solid when the declared of the declared of the declared specific some specific	% tapped on. Finge ck in this area stipalling of the hear	r alignment is go Il apply. der concrete on	ood with some fin	ngers MV WZ the YC
revious Ins 9/12/2012 - suching slig 9/20/2010 - 9/24/2008 - sint. Rusty 7/25/2006 -	- Assm Jt w/o S  1  pection Notes: Some spalling htty. Good finger alignme and scale on the Finger alignme	on undersion of undersion on un	de of deck at jour decision of the join of the join of the join of the jour decisions of the jour decision of the	points. To ion commone edge int's stee is solid wh	ments on und es slightly too l. hen tapped o	ound solid when the derived of the decurrence of the decurrence of the span. A couple of span is a span in the spa	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin the underside of the joint's edge.	ngers MW WZ the YC
Previous Ins 9/12/2012 - buching slig 9/20/2010 - 9/24/2008 - bint. Rusty 7/25/2006 - 9/29/2004 -	- Assm Jt w/o S  1  pection Notes: Some spalling htly. Good finger alignme and scale on the Finger alignme Joints are solid	on undersion of undersion on un	de of deck at jour decided of deck at jour decided of the join of the join of the jour decided on. A coup decided on. A coup	points. To some edge ont's stee s solid whole of ve	ments on und es slightly too l. hen tapped o ry small dela	ound solid when the derside of the decuching. Some spon. A couple of siminated areas o	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin	ngers MW WZ the YC NZ nt. ZZ
revious Ins 9/12/2012 - buching slig 9/20/2010 - 9/24/2008 - bint. Rusty 7/25/2006 - 9/29/2004 - 0/21/2002 -	pection Notes: Some spalling htly. Good finger alignme and scale on the Finger alignme. Joints are solid Rusty spots. B	on undersing gnment and its mostly be lower por not its Good.	de of deck at jour deprior inspecting Good with so tions of the join. Steel sounds deed on. A couple eak as this is to	points. To sion community and the sisted with the solid with the solid with the s	ments on undes slightly tools. I. hen tapped or small delate of these types.	ound solid when the derside of the decuching. Some spon. A couple of suminated areas of pes of joints.	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin the underside of the joint's edge.	ngers MV  WZ the YC  NZ nt. ZZ
revious Ins 9/12/2012 - buching slig 9/20/2010 - 9/24/2008 - bint. Rusty 7/25/2006 - 9/29/2004 - 0/21/2002 - 8/30/2000 -	- Assm Jt w/o S  1  pection Notes: Some spalling htly. Good finger alignme and scale on the Finger alignme Joints are solid	on undersion on un	de of deck at jour decrease of deck at jour decrease of the join. Steel sounds deed on. A couple eak as this is to the finger and the decrease of decr	points. To some edge ont's stee s solid whole of ve the natured one(1)	ments on undes slightly tools. I. hen tapped cory small delate of these tyles sliding plate	ound solid when the derside of the decuching. Some spon. A couple of suminated areas of pes of joints.	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin the underside of the joint's edge.	ngers MW WZ the YC NZ nt. ZZ
Previous Ins 9/12/2012 - buching slig 9/20/2010 - 9/24/2008 - bint. Rusty 7/25/2006 - 9/29/2004 - 0/21/2002 - 8/30/2000 - 5 ome rust an	pection Notes: Some spalling htly. Good finger alignme and scale on the Finger alignme. Joints are solid Rusty spots. B	on undersion on un	de of deck at jour	points. To ion comi ome edge nt's stee s solid whole of ve the nature d one(1)	ments on unces slightly tool. I. hen tapped corry small delate of these types sliding plate teel below the	ound solid when the derside of the decuching. Some spon. A couple of suminated areas of pes of joints.	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin the underside of the joint's edge.	ngers MV WZ the YC NZ nt. ZZ
revious Ins 9/12/2012 - buching slig 9/20/2010 - 9/24/2008 - bint. Rusty 7/25/2006 - 9/29/2004 - 0/21/2002 - 8/30/2000 - ome rust an	pection Notes: Some spalling htly. Good finger alignme and scale on the Finger alignme. Joints are solid Rusty spots. B. 14.60 + 17.19 and pitting and all	on undersion on un	de of deck at jour	points. To ion comi ome edge nt's stee s solid whole of ve the nature d one(1)	ments on unces slightly tool. I. hen tapped corry small delate of these types sliding plate teel below the	ound solid when the derside of the decuching. Some spon. A couple of suminated areas of pes of joints.	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin the underside of the joint's edge.	ngers MV WZ the YC NZ nt. ZZ VI FI
lement 305 revious Ins 9/12/2012 - buching slig 9/20/2010 - 9/24/2008 - bint. Rusty 7/25/2006 - 9/29/2004 - 0/21/2002 - 8/30/2000 - bome rust an	pection Notes: Some spalling htly. Good finger alignme and scale on the Finger alignme. Joints are solid Rusty spots. B. 14.60 + 17.19 and pitting and all Some rust & pi	on undersion on un	de of deck at jour	points. To ion comi ome edge nt's stee s solid whole of ve the nature d one(1)	ments on unces slightly tool. I. hen tapped corry small delate of these types sliding plate teel below the	ound solid when the derside of the decuching. Some spon. A couple of suminated areas of pes of joints.	tapped on. Finge ck in this area sti palling of the hear mall delamination	r alignment is go Il apply. der concrete on ns/spalls along t	ood with some fin the underside of the joint's edge.	ngers MV WZ the YC NZ nt. ZZ VI FI

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\* \* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \*

Smart Flag   Scale Factor   Env   Quantity   Units   Insp Each   Pct Stat 1   Pct Stat 2   Pct Stat 3   Pct Stat Element 311 - Moveable Bearing   1   3   14   ea.   85   15   0   %   %   %   %   %   %   %   %   %	% MW WZ YQ: per NZI
Previous Inspection Notes:  09/12/2012 - Bearings are towards expansion at 75 degrees F and tolerable. Lots of debris and spot rust on bearings.  09/20/2010 - Bearings are towards expansion today; 55F. Debris, rust, and paint loss.  09/24/2008 - Some slight alignment towards expansion today; 40F. Some dirt and debris. Some overcoat painting done.  07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection.  09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints.  08/30/2000 - No change.  06/03/1998 - Some rust & pitting.  12/01/1995 - None	MW WZ YQ per NZI e bearings. ZZ VIII FIL
Previous Inspection Notes:  09/12/2012 - Bearings are towards expansion at 75 degrees F and tolerable. Lots of debris and spot rust on bearings.  09/20/2010 - Bearings are towards expansion today; 55F. Debris, rust, and paint loss.  09/24/2008 - Some slight alignment towards expansion today; 40F. Some dirt and debris. Some overcoat painting done.  07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection.  09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints.  08/30/2000 - No change.  06/03/1998 - Some rust & pitting.	MW WZ YQ per NZI e bearings. ZZ VIII FIL
Previous Inspection Notes:  09/12/2012 - Bearings are towards expansion at 75 degrees F and tolerable. Lots of debris and spot rust on bearings.  09/20/2010 - Bearings are towards expansion today; 55F. Debris, rust, and paint loss.  09/24/2008 - Some slight alignment towards expansion today; 40F. Some dirt and debris. Some overcoat painting done.  07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection.  09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints.  08/30/2000 - No change.  06/03/1998 - Some rust & pitting.  12/01/1995 - None	MW WZ YQ per NZI e bearings. ZZ VIII FIL
09/12/2012 - Bearings are towards expansion at 75 degrees F and tolerable. Lots of debris and spot rust on bearings. 09/20/2010 - Bearings are towards expansion today; 55F. Debris, rust, and paint loss. 09/24/2008 - Some slight alignment towards expansion today; 40F. Some dirt and debris. Some overcoat painting done. 07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection. 09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting.	WZ YQ: per NZI e bearings. ZZ VIII FIL XKI
09/20/2010 - Bearings are towards expansion today; 55F. Debris, rust, and paint loss. 09/24/2008 - Some slight alignment towards expansion today; 40F. Some dirt and debris. Some overcoat painting done. 07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection. 09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting. 12/01/1995 - None	WZ YQ: per NZI e bearings. ZZ VIII FIL XKI
09/24/2008 - Some slight alignment towards expansion today; 40F. Some dirt and debris. Some overcoat painting done.  07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection.  09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints.  08/30/2000 - No change.  06/03/1998 - Some rust & pitting.  12/01/1995 - None	yQ per NZI e bearings. ZZ VII FIL XK
07/25/2006 - Rusty spots, debris, scale and paint loss. Alignment is tolerable today. Blew off and spot overcoat painted during snoop inspection. 09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting. 12/01/1995 - None	per NZI bearings. ZZ VIII FIL XK
inspection. 09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting. 12/01/1995 - None	e bearings. ZZ VIP FIL XK
09/29/2004 - Rusty spots, scale, paint peel, and pitting on those under the leaking joints. Some pigeon debris/nests near some of the 10/21/2002 - Rusty and pitting as these are under the leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting. 12/01/1995 - None	VII FIL XK
10/21/2002 - Rusty and pitting as these are under the leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting. 12/01/1995 - None	VII FIL XK
06/03/1998 - Some rust & pitting. 12/01/1995 - None	XK
12/01/1995 - None	
	YD
02/01/1994 - None	
	RE
Inspection Notes:	
Element 313 - Fixed Bearing  1 2 14 ea. 90 10 0 % % %	%
Previous Inspection Notes :	
09/12/2012 - Dirt, debris, and spot rust on bearings.	MW
09/20/2010 - Debris, dirt, spot rust, and faded paint.	WZ
09/24/2008 - Some cleaning and overcoat painting done. Lots of debris and dirt. Rusty spots and paint loss. 07/25/2006 - Same as past inspsections and blew off/spot overcoat painted during snooper inspection.	YQ: NZI
09/29/2004 - Spot rust, paint loss, and minor pitting. Some pigeon debris near some of the bearings.	ZZ
10/21/2002 - Minor rust and pitting.	VIŁ
08/30/2000 - No change.	FIL
06/03/1998 - Some rust & pitting.	XK
12/01/1995 - None	YDI
02/01/1994 - None	RE
Inspection Notes:	

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U05210000+01601

#### U05210000+01601 Continue

\* Span: Main-0 - Steel Girder over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 331 - Conc Bridge Railing 3 270 m. 95 % Previous Inspection Notes: 09/12/2012 - Vertical cracks and some mapping cracks on backs of barriers. Spalls where top hand rail was removed. 09/20/2010 - Unchanged from prior inspections comments. 09/24/2008 - Vertical cracks in the relief cuts. Small spalls in some areas on the Right rail where the handrail on top was removed. 07/25/2006 - Same as past inspections. 09/29/2004 - Vertical cracking between the relief cuts. Surface shrinkage cracks. A couple of small areas of fracture concrete along the tops of the barrier where the handrail was removed. 10/21/2002 - Pedestrian hand rail removed my Maintenance. Minor, vertical cracks and shrinkage cracks throughout. 08/30/2000 - Replaced steel rail with concrete barrier rail in 1999. 06/03/1998 - Some rust & pitting of the rail and posts. 12/01/1995 - None 02/01/1994 - None Inspection Notes: Element 334 - Metal Rail Coated W-Beam, Pipe Handrail, and Guard Fence w\ Steel Posts 1 3 137 m. 80 20 0 % % % Previous Inspection Notes: 09/12/2012 - Rust, scale, and paint loss on rail posts and pipes. Gaurd fence and fabric has a bend where a luminare pole fell into it. 09/20/2010 - Rust, scale, and paint loss to the posts and pipe. Guard fence posts and fabric are in Good condition. 09/24/2008 - Some rust, scale, and paint loss on the rail posts and pipes. The guard fence is in Good condition. 07/25/2006 - Same as past inspections. 09/29/2004 - Rusty spots on the rail posts and pipes. Guard fence is in Good condition. 10/21/2002 - Rusty spots and pitting throughout. Guard fence is in Good condition. 08/30/2000 - 137.2x1=137.2 Sidewalk has existing metal rail and guard fence was added during 1999 construction. Minor rust on existing rail and posts. Inspection Notes: Element 357 - Sup Pack Rust SmFlag Χ 2 Χ 100 ea. % % Previous Inspection Notes : . 09/12/2012 - Swelling and cracking of welds on diaphragms lower members where water can get to them. 09/20/2010 - Unchanged from prior inspections comments. 09/24/2008 - Diaphragms under leaky joints show pack rust with swelling and cracking of welds. Inspection Notes:

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# U05210000+01601 Continue

	cription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	- Deck Cracking			4			400		0	
Х	1	3		l ea.	Х	0	100	0	0	
						%	%	%	%	
revious Insp	pection Notes :									
	Both size and o	, , , ,	•							MWH
	Unchanged from									WZB
9/24/2008 -	Lots of wider ci	racks, near	1.0mm, in all	Spans a	ind some are	as were density	comes into play.			YQC
nspection N	lotes:									
		* * *	*****	Span	: Appr-1 - St	teel Girder - Spa	ans 1 and 2 * * *	*****		
lement Des	•				I					
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 12 -	Bare Concrete						100	ء ا		
	1	3	49	sq.m.	Х	0	100	0	0	
						%	%	%	%	
raviaue Inci	pection Notes :									
ievious iris	Dection Notes .									
		ear in whee	el paths. Spalls	s/delamii	nations along	g edges of joint s	teel. Random cra	cking in both sp	ans.	MWF
9/12/2012 -	Studded tire we				_	, ,	teel. Random cra alls and delamina			
9/12/2012 - 9/20/2010 -	Studded tire we Transverse and	d mapping	cracks. Wear	in the w	heel paths.	Small surface sp		ations along the	joint steel.	WZB
9/12/2012 - 9/20/2010 - 9/24/2008 -	Studded tire we Transverse and	d mapping se and map	cracks. Wear	in the w	heel paths.	Small surface sp	alls and delamina	ations along the	joint steel.	WZB YQC
9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 -	Studded tire we Transverse and Some transvers Same as past i	d mapping se and map	cracks. Wear oping cracks.	in the w Small sp	heel paths. Spalls and dela	Small surface sp aminations along	alls and delamina	ations along the lges. Wear in th	joint steel.	WZB YQC NZD
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9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling nspection N  lement 107  revious Insp 9/12/2012 - lose near A 9/20/2010 -	Studded tire we Transverse and Some transverse and Some transverse Same as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Decction Notes:  Steel is in good butment 1 from Some rust blist	d mapping se and map nspections state 2 = 491.23 Cair. Numer	cracks. Wear oping cracks.  due to small of the crows, transvers  123  Some rust bli s of the bottom	in the w Small sp  delamina ent backs se cracks  m.  sters wit flanges	heel paths. Spalls and delations along to to a "12", as that may not be the minor surfate.	Small surface spaminations along the joints. Some Latex concrete ed to be re-evaled when the second	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next	ations along the liges. Wear in the in both spans. e same elevation inspection; small 5%.	joint steel. e wheel paths. n it was prior to urt flag.	WZB YQC NZD ZZIC VIKC
9/12/2012 - 9/20/2010 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling nspection N  lement 107  revious Insp 9/12/2012 - lose near A 9/20/2010 - nalky paint v	Studded tire we Transverse and Some transverse and Some transverse and Some transverse and Some as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Dection Notes:  Steel is in good butment 1 from Some rust blist with some spot	d mapping se and map nspections state 2 = 491.23 Cair. Numer	cracks. Wear oping cracks.  due to small of the countries of the bottom majority of are	in the w Small sp delamina ent backs se cracks m. sters wit flanges ea.	heel paths. Spalls and delations along to to a "12", as that may not be the minor surfations where moist	Small surface spaminations along the joints. Some Latex concrete ed to be re-eval when the joints is Latex concrete and the joints i	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next  5 % s of bottom flang Minor surface pit	ations along the liges. Wear in the in both spans. e same elevation inspection; small 5%.	joint steel. e wheel paths. n it was prior to art flag.  0 % nalky paint. Smoke	WZE YQC NZD ZZIC VIKC
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9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling Inspection N  Dement 107  revious Inspection S  1/2/2012 - 0/20/2010 - 0/20/2010 - 0/20/2010 - 0/24/2008 - 0/24/2008 - 0/25/2006 - 0/25/2006 - 0/25/2006 -	Studded tire we Transverse and Some transverse and Some transverse and Some transverse and Some as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Dection Notes:  Steel is in good butment 1 from Some rust blist with some spot Paint loss, rust of dirt/grime or	d mapping se and map nspections state 2 = 491.23 Cair. Numer disconsisted and service and fires ers on tops rust on the y spots, su aint loss and the girder.	cracks. Wear oping cracks.  due to small of the countries of the bottom majority of are face pitting, and pitting in are s. Lower flanges.	in the w Small sp delamina ent backs se cracks m.  sters wit flanges ea. nd very as unde	heel paths. Soalls and delations along to to a "12", as is that may not the minor surfative where moist dirty girders. It leaky joints sticky from delations and the sticky from delations	Small surface spaminations along the joints. Some Latex concrete and to be re-eval to be re-eval to be re-eval to be concrete.  Deicer drips in the concrete can collect.  Water runs backericer.	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next  5 % s of bottom flang Minor surface pit	ations along the liges. Wear in the liges. Wear in the in both spans. It is same elevation inspection; small small spection; small specific speci	joint steel. e wheel paths. n it was prior to rt flag.  0 % nalky paint. Smoke	WZE YQC NZD ZZIC VIKC
9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling Inspection N  Idement 107  Idement 107	Studded tire we Transverse and Some transverse and Some transverse and Some transverse and Some as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Dection Notes:  Steel is in good butment 1 from Some rust blist with some spot Paint loss, rust Rusty spots, paid of dirt/grime or Lower flange/w	d mapping se and map nspections sion State 2 = 491.23 Cair. Numer discondition. Camp fires ers on tops rust on the y spots, su aint loss an the girder reb portions	cracks. Wear oping cracks.  due to small of the country of are face pitting, and pitting in ares. Lower flangs show rusty s	in the w Small sp delamina ent backse cracks  m.  sters wit flanges ea. nd very as unde ges are s pots, per	heel paths. Soalls and delations along to a "12", as that may not so that may	Small surface spaminations along the joints. Some Latex concrete and to be re-eval where the period of the control of the cont	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next  5 % s of bottom flang Minor surface pit many areas. ck towards Abutn	ations along the liges. Wear in the liges. Wear in the in both spans. It is same elevation inspection; small small spectron; spectron; small s	joint steel. e wheel paths. n it was prior to rt flag.  0 % nalky paint. Smoke	WZB YQC NZD ZZIC VIKC VIKC VICO XZE VICO XZE
9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling nspection N  Ilement 107  revious Insp 9/12/2012 - 10se near A 10/20/2010 - 10alky paint 109/24/2008 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 - 17/25/2006 -	Studded tire we Transverse and Some transverse and Some transverse and Some transverse and Some as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Dection Notes:  Steel is in good butment 1 from Some rust blist with some spot Paint loss, rust and cidr/grime or Lower flange/w Rusty and pittir	d mapping se and map nspections sion State 2 = 491.23 Cair. Numer directions of the series on tops rust on the y spots, su aint loss and the girder seb portions on under less than the girder seb portions of the girder	cracks. Wear oping cracks.  due to small of the country of are face pitting, and pitting in ares. Lower flangs show rusty s	in the w Small sp delamina ent backse cracks  m.  sters wit flanges ea. nd very as unde ges are s pots, per	heel paths. Soalls and delations along to a "12", as that may not so that may	Small surface spaminations along the joints. Some Latex concrete and to be re-eval to be re-eval to be re-eval to be concrete.  Deicer drips in the concrete can collect.  Water runs backericer.	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next  5 % s of bottom flang Minor surface pit many areas. ck towards Abutn	ations along the liges. Wear in the liges. Wear in the in both spans. It is same elevation inspection; small small spectron; spectron; small s	joint steel. e wheel paths. n it was prior to rt flag.  0 % nalky paint. Smoke	MZE YQC NZD ZZIC VIKC  WZE YQC NZD ZZIC VIKC
9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling Inspection N  Ilement 107  Irevious Insp 9/12/2012 - nose near A 9/20/2010 - halky paint 9/24/2008 - 7/25/2006 - iriders. Lots 9/29/2004 - 0/21/2002 - 8/30/2000 -	Studded tire we Transverse and Some transverse and Some transverse and Some transverse and Some as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Dection Notes:  Steel is in good butment 1 from Some rust blist with some spot Paint loss, rust with some spot of dirt/grime or Lower flange/w Rusty and pittir 4 * 30.74 = 122	d mapping se and map nspections sion State 2 = 491.23 Cair. Numer	cracks. Wear oping cracks.  due to small of the country of are face pitting, and pitting in ares. Lower flangs show rusty s	in the w Small sp delamina ent backse cracks  m.  sters wit flanges ea. nd very as unde ges are s pots, per	heel paths. Soalls and delations along to a "12", as that may not so that may	Small surface spaminations along the joints. Some Latex concrete and to be re-eval where the period of the control of the cont	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next  5 % s of bottom flang Minor surface pit many areas. ck towards Abutn	ations along the liges. Wear in the liges. Wear in the in both spans. It is same elevation inspection; small small spectron; spectron; small s	joint steel. e wheel paths. n it was prior to rt flag.  0 % nalky paint. Smoke	WZB YQC NZD ZZIC VIKC VIKC VICO XZE VICO XZE
9/12/2012 - 9/20/2010 - 9/24/2008 - 7/25/2006 - 9/29/2004 - 0/21/2002 - ydromilling nspection N  lement 107  revious Insp 9/12/2012 - nose near A 9/20/2010 - nalky paint v 9/24/2008 - 7/25/2006 - irders. Lots 9/29/2004 - 0/21/2002 - 8/30/2000 - ome areas	Studded tire we Transverse and Some transverse and Some transverse and Some transverse and Some as past i Put into Condit 15.98 * 30.74 = and class B replotes:  - Paint Stl Opn  1  Dection Notes:  Steel is in good butment 1 from Some rust blist with some spot Paint loss, rust and cidr/grime or Lower flange/w Rusty and pittir	d mapping se and map nspections sion State 2 = 491.23 Cair. Numer discondition. Camp fires ers on tops rust on the y spots, su aint loss and the girden reb portions and the girden reb portions and under less 2.96 ang.	cracks. Wear oping cracks.  due to small of the cours, transverse	in the w Small sp delamina ent backse cracks  m.  sters wit flanges ea. nd very as unde ges are s pots, per	heel paths. Soalls and delations along to a "12", as that may not so that may	Small surface spaminations along the joints. Some Latex concrete and to be re-eval where the period of the control of the cont	alls and delamina the joint steel ed mapping cracks was placed to the uated at the next  5 % s of bottom flang Minor surface pit many areas. ck towards Abutn	ations along the liges. Wear in the liges. Wear in the in both spans. It is same elevation inspection; small small spectron; spectron; small s	joint steel. e wheel paths. n it was prior to rt flag.  0 % nalky paint. Smoke	MZE YQC NZD ZZIC VIKC  WZE YQC NZD ZZIC VIKC

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Continue

Span: Appr-1 - Steel Girder - Spans 1 and 2 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 161 - Paint Stl Pin/Hanger Bent 3 - End Girder Connection Pins ea. 95 % % Previous Inspection Notes: 09/12/2012 - Pins were UT tested in August 2012 and no significant problems were observed (see Collins Engineering report). 09/20/2010 - Still Good paint where re-painted by UT inspectors. Refer to report by Collins Engineering. No "noteables" were fond in the UT inspection with little to no wear also noted. 09/24/2008 - Ut'd recently. See report. Some minor rust showing. 07/25/2006 - No problems found in 2005 UT inspection. Spot rust on the ends of the pins. Wired brushed and re-painted. 09/29/2004 - Paint is worn off the areas that were cleaned for UT inspections in 2001 with some surface rust. 10/21/2002 - See NDT report from 2001. No problems noted. Inspection Notes: Element 205 - R/Conc Column Bent 2 95 ea. % Previous Inspection Notes: 09/12/2012 - Tight surface shrinkage cracks and small surface spall from tie wire. 09/20/2010 - Tight surface shrinakge cracks. Some shallow surface staining and spalls from tie wire. 09/24/2008 - Tight shrinake cracks in areas. Columns have been painted to cover graffiti. 07/25/2006 - Same on tight cracks. Graffiti has been painted over. 09/29/2004 - Tight shrinkage surface cracks. Tight cracking on the construction joints. 10/21/2002 - Some tight, shrinkage cracks throughout. 08/30/2000 - None 06/03/1998 - \_ Inspection Notes: Element 215 - R/Conc Abutment 1 - West 1 20 m. 95 % Previous Inspection Notes: 09/12/2012 - Smokey and sooted from homeless campfires. Some tight cracks in backwall and a small spall near G2 embedded bearing. 09/20/2010 - Some tight vertical cracks near centerline of roadway and a small spalled area near G2's bearing. One tent and campfire going today. 09/24/2008 - Same as past comments. Generally in Good condition. 07/25/2006 - Same with one small area spalled where G2 is embedded. 09/29/2004 - Tight vertical cracks on the backwall concrete. Some cracks have minor efflorescence. 10/21/2002 - Tight, vertical cracks in the backwall concrete. 08/30/2000 - 15.98 + 1.30 + 2.80 = 20.08m06/03/1998 - None Inspection Notes:

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Smart Flag	cription									
		Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 234	- R/Conc Cap	Bent 2								
	1	1	16	m.		90	5	5	0	
						%	%	%	%	
revious Ins	pection Notes :						L			
9/12/2012 -	Spalled areas	with expose	ed rusty rabar a	ınd chair	feet. Shallo	w surface delam	ination.			MWH
9/20/2010 -	Same as previ	ious inspec	ion comments.							WZB
9/24/2008 -	Condition Stat	e 3 due to d	lelaminations.	Cracks a	at the steps	and lots of dirt/de	ebris.			YQC
7/25/2006 -	Surface spalls	where reba	ar chairs are ex	posed or	n the bottom	of the caps.				NZDI
9/29/2004 -	Minor rust stai	ns with sma	all spalled secti	ons on th	ne areas who	ere the rebar cha	irs are exposed;	mainly on the be	ottom of the caps.	ZZIC
10/21/2002 -	ok									VIKC
08/30/2000 -	15.98 * 1 = 15	.98m								FILC
06/03/1998 -	None									XKG
Inspection I	Notes:									
lement 30F	- Assm Jt w/o	Seal								
	1	3	16	m		90	10	0		
	'	3	10	m.					0.4	
						%	%	%	%	
Previous Ins	pection Notes :									
)9/12/2012 -	Steel portions	sound solic	when tapped	on. Mino	r spalling on	underside of ded	ck at joint. Small	spalls/delaminate	tions along joint ste	eel. MWH
					spalls and o	lelaminations in t	he concrete alor	ng the joint's edg	e. Minor spalling	and WZB
	e header concr Steel sounds s				and delami	nations along the	ioint edaes. So	me spalling and	staining of the hea	ader YQC
concrete on	the underside o	of the deck i	n the header a	ea.					, and the second	
			•			led area along th	e joint.			NZDI
	Joint leaks. Si			_						ZZIC
10/21/2002 -	Minor rust spo		•	the nati	ure of these	joints.				VIKC
	15.98 * 1 = 15	.98m Slic	ling plate.							FILG
08/30/2000 -										XKG
	_									
08/30/2000 - .eaking. 06/03/1998 -										
08/30/2000 - eaking. 06/03/1998 -										
08/30/2000 - .eaking. 06/03/1998 -										
08/30/2000 - Leaking. 06/03/1998 - Inspection I	Notes:	earing Ben	t 2 and 3							
08/30/2000 - Leaking. 06/03/1998 - Inspection I	Notes: - Moveable Be			ea		90	10	0		
08/30/2000 - Leaking. 06/03/1998 - Inspection I	Notes:	earing Ben	t 2 and 3	ea.		90	10	0	Q/	
08/30/2000 - Leaking. 06/03/1998 - Inspection I	Notes:  - Moveable Be	3		ea.		90	10	0 %	%	
18/30/2000 - eaking. 16/03/1998 - Inspection	Notes:  - Moveable Be  1  pection Notes :	3	8			%	%		%	
08/30/2000 - eaking. 16/03/1998 - Inspection I	- Moveable Be  1  pection Notes: Bearings are to	3 owards epa	8 nsion but tolera	able 75 c	-	% pot rust, stained,	% and debris.		%	
98/30/2000 - eaking. 16/03/1998 - Inspection	- Moveable Be  1  pection Notes: Bearings are to	3 owards epa	nsion but tolera	able 75 d	spot rust, di	% pot rust, stained, rt, and debris on	% and debris.	%	%	
18/30/2000 - eaking. 16/03/1998 - Inspection I Element 311 Previous Ins 19/12/2012 - 19/20/2010 - 19/24/2008 -	- Moveable Be  1  pection Notes: Bearings are to Bearings in slight rotation	owards epa	nsion but tolera erate expansion pansion; 55F w	able 75 d . Some hen und	spot rust, di er the area.	% pot rust, stained,	% and debris.	%	%	WZB YQC
8/30/2000 - eaking. 6/03/1998 - Inspection I Element 311 Previous Ins 9/12/2012 - 9/20/2010 - 9/24/2008 -	- Moveable Be  1  pection Notes: Bearings are to	owards epa	nsion but tolera erate expansion pansion; 55F w	able 75 d . Some hen und	spot rust, di er the area.	% pot rust, stained, rt, and debris on	% and debris.	%	%	WZB YQC
18/30/2000 - eaking. 16/03/1998 - Inspection	- Moveable Be  1  pection Notes:  Bearings are to Bearings in slight rotation Same as past	owards epa ght to mode towards ex inspections	nsion but tolera erate expansior pansion; 55F w and alignment	able 75 c . Some hen und is Good	spot rust, di er the area.	% pot rust, stained, rt, and debris on	and debris. the bearings. painting and clea	%	%	WZB YQC NZDI
28/30/2000 - Leaking. 16/03/1998 - Leaking. 16/03/199/19/2012 - 16/03/199/20/2010 - 16/03/199/20/2006 - 16/03/199/2006 - 16/03/199/20004 - 16/03/199/20004 - 16/03/199/20/20/20/20/20/20/20/20/20/20/20/20/20/	- Moveable Be  1  pection Notes:  Bearings are to Bearings in slight rotation Same as past	owards epa ght to mode towards ex inspections pitting from	nsion but tolera erate expansion pansion; 55F w and alignment leaking joint.	able 75 c . Some hen und is Good	spot rust, di er the area.	pot rust, stained, rt, and debris on Some overcoat	and debris. the bearings. painting and clea	%	%	WZB YQC NZDI ZZIC
28/30/2000 - Leaking. 16/03/1998 - Linspection II Element 311 Previous Ins 19/12/2012 - 19/20/2010 - 19/24/2008 - 10/25/2006 - 19/29/2004 - 10/21/2002 - 10/21/20	- Moveable Be  1  pection Notes:  Bearings are to Bearings in slight rotation Same as past Spot rust and	owards epa ght to mode towards ex inspections pitting from ing under le	nsion but tolera erate expansion pansion; 55F w and alignment leaking joint.	able 75 c . Some hen und is Good	spot rust, di er the area.	pot rust, stained, rt, and debris on Some overcoat	and debris. the bearings. painting and clea	%	%	MWH WZB, YQC; NZDI ZZIC VIKC FILG
8/30/2000 - eaking. 16/03/1998 - Inspection I Element 311 Previous Ins 19/12/2012 - 19/20/2010 - 19/24/2008 - 17/25/2006 - 19/29/2004 - 0/21/2002 - 18/30/2000 -	Potes:  - Moveable Be 1  pection Notes: Bearings are to Bearings in slight rotation Same as past Spot rust and past Rusty and pitti	owards epa ght to mode towards ex inspections pitting from ng under le	nsion but tolera erate expansion pansion; 55F w and alignment leaking joint.	able 75 c . Some hen und is Good	spot rust, di er the area.	pot rust, stained, rt, and debris on Some overcoat	and debris. the bearings. painting and clea	%	%	WZB YQC NZD ZZIC VIKC



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Continue

\* \* \* \* \* \* \* \* \* Span : Appr-1 - Steel Girder - Spans 1 and 2 (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Quantity Element 313 - Fixed Bearing Abutment 1 2 ea 90 10 % % Previous Inspection Notes: 09/12/2012 - Spot rust, staining, faded paint, and some debris. 09/20/2010 - Spot rust, debris, and faded paint. 09/24/2008 - No change. 07/25/2006 - Same as past inspections. 09/29/2004 - Spot rust and pitting on the bearings. Some pigeon debris/nests on and around the bearings. 10/21/2002 - Some rust and scale on Abutment bearings. 08/30/2000 - Some rust and pitting. 06/03/1998 - Some rust & pitting. Inspection Notes: Element 321 - R/Conc Approach Slab 1 3 ea. 100 % Previous Inspection Notes : 09/12/2012 - Bump onto bridge from settlement in approach slab and roadway. 09/20/2010 - Same as previous inspection comments. 09/24/2008 - Settlement of the slab is allowing a big bump onto the structure. Sealant in the joint between the slab and bridge end is leaking and loose in areas 07/25/2006 - Put into condition State 2 due to settlement of the slab. 09/29/2004 - Minor settlement. Joint between the slab and the structure is leaking as adhesion of the sealant is broken. 10/21/2002 - Minor settlement. 08/30/2000 - None 06/03/1998 - \_ Inspection Notes: Element 331 - Conc Bridge Railing 3 61 m. 95 % % % Previous Inspection Notes: 09/12/2012 - Vertical and mapping cracks. Spalls on tops of barrier where hand rail was removed. 09/20/2010 - Same as previous inspection comments. 09/24/2008 - Vertical cracks at the relief cuts. Some spalls on the top where the Right handrail was removed. 07/25/2006 - Same as last inspection. 09/29/2004 - Vertical cracking between the relief cuts. Some minor pieces of concrete were fracutured from when the metal handrail was removed from the top of the barrier. 10/21/2002 - Vertical cracking and shrinkage cracks throughout. 08/30/2000 - 30.74 \* 2 = 61.48m New concrete rail in 1999. 06/03/1998 - 30.74 \* 2 = 61.48Some rust & pitting of the rail posts and bridge rail. Inspection Notes:



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\*\*\*\*\*\* Cnon : Annu 4 Steel Circles Chang 4 and 2 (cont ) \*\*\* \*\*\*

<u> </u>	cription			1.	1			1	
element 334	Scale Factor	Env	Quantity	Units Insp		Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
					ard Fence w\ Steel Pos				
	1	3	31	m.	80	20	С		
					%	%	%	%	
revious Insp	pection Notes :					1			
9/12/2012 -	Rust, scale, pa	int loss, ar	nd scrapes on p	ipe and posts	s. Gaurd fence is in goo	od condition.			MWHF
	Rust, scale, pa	int loss, ar	nd minor surface	e pitting to the	e posts, W-Beam rail, a	ind handrail. Gua	ard fence posts a	and fabric are in Goo	od WZBZ
ondition.	Rust naint loss	s scale ar	nd fading of the	coating syste	em on the rail posts and	I nines guard fei	nce is in Good c	rondition	YQCZ
	Same as last in		id idding of the	oodiing by bio		pipes. guara lei	100 10 111 0000 0	orialion.	NZDN
		•	some snot rust	throughout '	The guard fence is in p	lace and in Good	condition		ZZIO
	Rusty and pittir		•	· ·			condition.		VIKC
		ŭ			uard fence was added	during 1999 con-	struction Minor	rus on existing rail a	
osts.	01.7421-00.74	Ciacwaii	That existing m	otal rall aria g	dara rerioe was added	during 1000 00m	Struction: Willion	ras on existing rail e	ilia i ilia
Inspection N	lotes:								
Canaral	Inanastian N								
	Inspection I		( b 1) - 2			-1 d*d *		<b>(</b> '	B 4) 0 / L LE
9/12/2012 -	Area under eas	st abutmen	it nas a smail vi	lage of nome	eless people. Lots of so	ot on underside i	n area from carr	np fires.	MWHI
					ed by Collins Engineers	s. CRH			
	Lots of camper		•						WZBZ
					e bearings at Bent 6.				YQCZ
	NBI 58, deck, r				ns. portions of the girders.				NZDN
	tructure, rated a								
	Deck cracking								ZZIO
					e traffic control island w	as placed on the	strucure. Unsu	re if extra dead load	has VIKC
					roblems to worsen guard fence that was	placed in 1999.			
06/03/1998 -		опоорс		,	guara romos unas mas	p.a.coa coc.			FILO
		ina Calcul		hy onceu506					FILQ
	ating Calculation	ing Calcul	ation Accepted		3 at 3/11/07 10·45·45				XKG
		on Accepte			3 at 3/11/97 10:45:45 4:25:13				
Sufficiency R		on Accepte							XKG. YDNF
Sufficiency R 02/01/1994 -	l lodoto d with t	·							XKG. YDNF REFI
Sufficiency R 02/01/1994 - 08/01/1992 -	Updated with to	ape 1994							XKG. YDNF REFI NB94
Sufficiency R 02/01/1994 - 08/01/1992 - 01/01/1991 -	Updated with ta	ape 1994 ape 1992							XKGJ YDNF REFI NB94 NB92
Sufficiency R 02/01/1994 - 08/01/1992 - 01/01/1991 - 04/01/1989 -	Updated with ta	ape 1994 ape 1992 ape 1991							XKGJ YDNF REFI NB94 NB92 NB91
Sufficiency R 12/01/1994 - 18/01/1992 - 11/01/1991 - 14/01/1989 - 14/01/1987 -	Updated with ta Updated with ta Updated with ta	ape 1994 ape 1992 ape 1991 ape 1989							XKG. YDNF REFI NB94 NB92 NB91 NB89
Sufficiency R 12/01/1994 - 18/01/1992 - 11/01/1991 - 14/01/1989 - 14/01/1987 - 19/01/1984 -	Updated with ta Updated with ta Updated with ta Updated with ta	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986							XKGJ YDNF REFI NB94 NB92 NB91 NB89
Sufficiency R 02/01/1994 - 08/01/1992 - 01/01/1991 - 04/01/1989 - 04/01/1987 - 09/01/1984 - 07/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
Sufficiency R 12/01/1994 - 18/01/1992 - 11/01/1991 - 14/01/1989 - 14/01/1987 - 19/01/1984 - 17/01/1981 -	Updated with ta Updated with ta Updated with ta Updated with ta	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89
Sufficiency R 12/01/1994 - 18/01/1992 - 11/01/1991 - 14/01/1989 - 14/01/1987 - 19/01/1984 - 17/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
Sufficiency R 12/01/1994 - 18/01/1992 - 11/01/1991 - 14/01/1989 - 14/01/1987 - 19/01/1984 - 17/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
Sufficiency R 02/01/1994 - 08/01/1992 - 01/01/1991 - 04/01/1989 - 04/01/1987 - 09/01/1984 - 07/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
Sufficiency R 02/01/1994 - 08/01/1992 - 01/01/1991 - 04/01/1989 - 04/01/1987 - 09/01/1984 - 07/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
Sufficiency R 02/01/1994 - 08/01/1992 - 01/01/1991 - 04/01/1989 - 04/01/1987 - 09/01/1984 - 07/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
Sufficiency R 12/01/1994 - 18/01/1992 - 11/01/1991 - 14/01/1989 - 14/01/1987 - 19/01/1984 - 17/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKGJ YDNF REFI NB94 NB92 NB91 NB89 NB86 NB86
2/01/1994 - 8/01/1992 - 1/01/1991 - 4/01/1989 - 4/01/1987 - 9/01/1984 - 7/01/1981 -	Updated with to Updated with Updated W	ape 1994 ape 1992 ape 1991 ape 1989 ape 1986 ape 1984							XKG. YDNF REFI NB94 NB92 NB91 NB88 NB86

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**Location : GREAT FALLS Structure Name:** 

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location : 013 CASCADE City Code, Location : 32800 GREAT FALLS

Kind fo Hwy Code, Description: 3 3 State Hwy Signed Route Number: 00103

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: CITY ST, BNSF RAILROAD Kilometer Post, Mile Post: 0.26 km 0.16

Structure on the State Highway System : X Latitude : 47°30'29"

Structure on the National Highway System : X Longitude : 111°20'27"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number : **IG 15-5(28)274**Construction Station Number : **21+54.00** 

Construction Drawing Number: 7789

Construction Year: 1967

Current ADT: 11,330 ADT Count Year: 2009 Percent Trucks: 2 % Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Design Loading:		5 MS 18 (HS 20)
Inventory Load, Design :	32.6 mton	B ASD Assigned
Operating Load, Design:	32.6 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	85		

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 167.94 m

Deck Area: 1,781.00 m sq

Deck Roadway Width: 8.32 m

Approach Roadway Width: 9.14 m

Median Code, Description: 0 No median

### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure : 99.99 m

Reference Feature for Vertical Clearance : R Railroad beneath struc

Vertical Clearance Under the Structure: 5.11 m

Reference Feature for Lateral Underclearance : R Railroad beneath struc

Minimum Lateral Under Clearance Right : 1.50 m

Minimum Lateral Under Clearance Left : 0.00 m

#### Span Data

#### **Main Span**

Number Spans: 4

Material Type Code, Description: 4 Steel continuous

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type : **0 None**Deck Membrain Type : **0 None** 

#### Approach Span

Number of Spans : 2

Material Type Code, Description : 3 Steel

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

(52) Out-to-Out Width: 10.61 m

(50A) Curb Width: (50B) Curb Width: 1.52 m

Skew Angle: 45°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-directior	nal Travel	North or East Travel		
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
One Route Under	-1	N/A	5.11 m	7.32 m	N/A		
GUALT AVE							
Route On Structure	N00103	Both	99.99 m	8.32 m	N/A		
CENTRAL AVE. WEST - WB							

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**Inspection Data** 

Inspection Due Date: 13 September 2014 (91) Inspection Frequency (months): 24

Sufficiency Rating: 76.3

Structure Status : Func Obs - Elg Rehab

Next Other Insp Due Date : 22 Aug 2016

Other Insp Type: Pin and Hanger

						71 -	
NBI Inspection Da	ata						
(90) Date of Last Ins	pection : 13 Septemb	er 2012		La	ast Inspected By: Charles Pe	pos - 107	
(90) Inspection	on Date :				Inspected By :		
, , ,					, ,		
(58) Deck	Rating : 6	(68) Deck Ge	ometry: 3	(36A)	Bridge Rail Rating :	(62) Culvert Rating : N	
(59) Superstructure	Rating : 6	(67) Structure	Rating : 6	(36B)	(36B) Transition Rating : 1 (61) Channel F		
(60) Substructure	Rating: 6	(3		(36C) Ap	proach Rail Rating :1	(71) Waterway A	dequacy : N
(72) App Rdw	(72) App Rdwy Align : <b>7</b>		Status : A	(361	D) End Rail Rating : 1	(113) Scour Critical : N	
	Unrepaired Sp	oalls: 0 m	n sq		Deck Surfacin	a Depth : 0.0	00 in
<b>Inspection Hours</b>							
Crew Hours for inspec	ction : 7		Sno	oper Required	: <b>Y</b>		
Helper H			Snooper Hours	for inspection	5		
Special Crew H	ours : 13.5			Flagger Hours			
Special Equipment H					<u> </u>		
Inspection Wor	k Candidates			Effected	Scope of		Covered
Candidate ID	Date	Status	Priority	Structure Unit	Work	Action	Condition States
D31-FY2005-000058	Requested 15 October 2004	Approved	Low	All Spans	Bridge	Spot Paint (flex)	
Clean and paint Girders		Approved	LOW	All Oparis	Diluge	oport ant (nex)	
2006 - Some overcoat p	painting and cleaning	done.					
D31-FY2005-000059	15 October 2004	Approved	High	All Spans	301 Pourable Joint Seal	Min Repair	I
Reaseal these joints.	13 October 2004	Approved	Iligii	Дії Орапо	3011 Odrabie John Gear	IVIII Repair	
Approved. DRC							
D31-FY2011-000152		Not Approved	Medium	All Spans	Bridge	Spot Paint (flex)	
Clean and paint Bearing 2006 - Some overcoat p	gs. painting and cleaning	done.					
D31-FY2011-000153	07 February 2011	Not Approved	Low	All Spans	334 Metal Rail Coated	Repl Paint	
Clean and paint Rail Po		•					
· ·							
Late Reason:							

Inspection Date: 09/13/2012



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#### **Element Inspection Data**

Span: Main-0 - Steel Girders over RR - Spans 3 thru 6 \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 12 - Bare Concrete Deck X 3 2003 sq.m. 0 100 % % Previous Inspection Notes: 09/13/2012 - Studded tire wear in wheel paths. Spalls/Delaminations along edges of joint steel. Mapping cracks in all spans. 09/21/2010 - Lots of tight mapping cracks. Wear in the wheel paths. Small spalls and delaminations along joint steel. 09/23/2008 - Wear in the wheel paths. Transverse and mapping cracks in areas. Small spalls and surface delaminations along the joint edges. 10/13/2006 - Wear in the wheel paths. Right lane has more mapping cracks in it. Spalls/Delaminations along the joint achorage's steel. 09/29/2004 - Put the deck into Condition State 2 as there are some small areas of delamination along the joint edges. 10/21/2002 - 14.60 \* 137.20 = 2003.12 Deck element changed to a "12" as the Latex concrete was placed back to the original depths after the 1999 hydromill and Class B repair operations. Cracks in latex where sealed in 1999 with HMWM. Many tight transverse deck cracks. MDT Maintenance is spraying the deck with freeze guard. Cracks are soaking ip the freeze guard. 08/30/2000 - New Latex concrete overlay in 1999 with some transverse cracking(small and tight). Cracks sealed with HMWM before construction was completed. Delaminated areas were removed by hydrodemolition and replaced with latex concrete. 06/03/1998 - 14.60 \* 137.20 = 2003.12. Numerous small, tight transverse cracking throughout with small areas of delamination when it was checked several years ago. Studded tires have left a fairly smooth wear surface. 12/01/1995 - None 02/01/1994 - None Inspection Notes: Element 107 - Paint Stl Opn Girder 549 80 15 m. % % % % % Previous Inspection Notes: 09/13/2012 - Rust blisters, minor surface pitting, and paint loss on tops of lower girder flanges where water and debris has collected. Diagonals between G2 and G3 were removed and intersecting welds in tension reversal zones were drilled early in 2012 under statewide steel rehab job. 09/21/2010 - Dirty, grime, bird debris, and rust blisters on top of the bottom flanges. Some surface pitting under rust blisters. Faded and chalky 09/23/2008 - Rust, scale, paint loss, and some surface pitting under rust blisters. Outer girders and areas under leaky joints are the worse. Very dirty from diesel smoke, bird debris, and de-icer. 10/13/2006 - Rust, scale, pitting and paint loss. Most notiable under joints, outside girders, and where piegon nest/debris are built-up. Pulled most of this stuff off. 09/29/2004 - Rusty, scale, peeling paint, and minor pitting; mostly under the joints and on the lower flange/web areas. 10/21/2002 - Rusty spots throughout and some pitting. Mostly under leaking joints and on the bottom flange/lower web area. 08/30/2000 - No Change; mainly under the joints. 06/03/1998 - 4 \* 137.20 = 548.80. Show some signs of early rust & pitting. 12/01/1995 - None 02/01/1994 - None Inspection Notes:

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\* Span: Main-0 - Steel Girders over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Quantity Element 161 - Paint Stl Pin/Hanger (4) Pin and Hanger Assemblies plus (4) End Girder Connection Pins 3 12 ea. 95 0 % % % % Previous Inspection Notes: 09/13/2012 - Pins and hangers were UT tested in August 2012 and no excessive wear was noted (see Collins Engineering reports). 09/21/2010 - Still Good paint where re-painted by UT inspectors. Refer to report by Collins Engineering. No "noteables" were fond in the UT inspection with little to no wear also noted. 09/23/2008 - 2005 UT showed no problems. Some minor rust on the pins and hangers. 10/13/2006 - Showed ok in 2005 UT testing. 09/29/2004 - Ends of the pins, nuts, and hangers are showing some minor rust where the paint was removed for UT testing. No major wear or problems noted in UT inspection in 2001. 10/21/2002 - See Bills report from 2001. 08/30/2000 - No Change; mainly under the joints. 06/03/1998 - Some minor rusting and pitting. Eight(8) pins have been UDT'ed and are ok. 12/01/1995 - None 02/01/1994 - None Inspection Notes: Element 205 - R/Conc Column Bent 3, 4, 5, 6, and 7 ea. 90 % Previous Inspection Notes: 09/13/2012 - Shallow surface delaminations near tiewire or reinforcing chair feet. Some columns have tight vertical cracks near their corners. Scrapes and shallow spalls on some. 09/21/2010 - Tight surface shrinkage cracks with some cracking on the edges. Some surface spalls from shallow tie wire. 09/23/2008 - Tight cracking in most of the columns. Some surface spalls and small delaminations from shallow tie wire or exposed feet of the rebar chairs. Right column at Bent 3 has not gotten any worse. 10/13/2006 - Same as past inspections with surface spalling where rebar chairs are exposed. Bent 3's Right column has a small spall on the edge with some staining. 5 percent in Condition State 3 is probably pushing it for the staining and spalls. 09/29/2004 - Tight cracks and shrinkage cracks on most of the columns. Tight cracks near construction joints to the caps. Some rust stains from exposed rebar chairs and/or wire. 10/21/2002 - Some tight cracks throughout. Graffti and smoked areas from homeless people under the structure. 08/30/2000 - No Change. 06/03/1998 - Some hairline, tight cracking in the concrete. 12/01/1995 - None 02/01/1994 - None Inspection Notes:

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\* Span: Main-0 - Steel Girders over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 215 - R/Conc Abutment East Abutment (7) 2 26 m. 95 % Previous Inspection Notes: 09/13/2012 - Some tight cracking in backwall and cap. Small spall near embedded bearings and along cap/backwall connection. Lots of belongings of homeless people stacked on backwalls. 09/21/2010 - Tight cracks in the backwall and under G3. A couple of small spalls near bearing embedments. One camper between G2 and G3 09/23/2008 - Some tight cracks in the backwall and cap. Small spalls along the edges of the girders where they are embedded into the backwalls. 10/13/2006 - Unchanged from previous inspections. 09/29/2004 - Minor spalling and deteriorated concrete where the girders meet the backwalls. Minor erosion at the Left wingwall. 10/21/2002 - (14.060 1.55 9.70 = 25.80m Minor erosion at wingwall. Some minor concrete deterioration where girders meet the backwalls. Inspection Notes: Element 234 - R/Conc Cap Bent 3, 4, 5, 6, and 7 2 58 85 10 m. % Previous Inspection Notes: 09/13/2012 - Bent 3 cap has a delamination on Span 2 face along with some spalling (photo). Surface spalls/delaminations on underside of caps from reinforcing chair feet. 09/21/2010 - Staining from mositure and rebar chair feet. Delaminated and cracked areas on most of the caps. Some surface spalls and delaminations from shallow tie wire. 09/23/2008 - Spalls, cracking, and delaminations in most of the caps. Underside of the caps show surface spalls/delaminations from exposed rebar chair feet. Some staining on the Right end of Bent 3's cap at delamination under G4S2 side. 10/13/2006 - Caps show surface spalls from shallow rebar chairs. Some minor staining in delaminated areas. 5 percent in Condition State 3 is maybe alittle strong. 09/29/2004 - Some minor spalled areas on bottoms of the caps where rebar chairs are exposed and rusting. Some minor cracking under the beam seats. 10/21/2002 - Same as previous report. Some staining in areas where joints leak. 08/30/2000 - 4 \* 14.60 = 58.40m Env. #2 as some under leaking joints. 06/03/1998 - 5 \* 14.60. Some sanding material on some of the caps. 12/01/1995 - None 02/01/1994 - None Inspection Notes:

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\* Span: Main-0 - Steel Girders over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 301 - Pourable Joint Seal 25 3 29 m. 60 15 % % % Previous Inspection Notes: 09/13/2012 - Steel portions sound solid when tapped on. Minor spalling and deterioration on underside of deck and joints. Sealant is loose, torn, and missing in joints. Small delaminations/spalls along edge of joint steel. 09/21/2010 - Several areas of loose and pushed down sealant. Some small areas of torn sealant. 09/23/2008 - Leaky, sanding material pushed in, and loose sealant along the joints edges. Some small surface mortar spalls/delaminations along the steel edges. 10/13/2006 - Unchanged from previous rpeorts. 09/29/2004 - Several areas where the sealant has lost contact and is pulling away. Joints are leaking. Some debris/dirt in the joints and this is putting prressure on the sealant. 10/21/2002 - Sanding material and debris in joints. Some areas where Dow Corning has pulled away or been forced open from debris in the 08/30/2000 - 14.60 \* 2 = 29.20m "Dow corning" Some missing material and sanding material in the joint. Inspection Notes: Element 305 - Assm Jt w/o Seal 10 1 3 29 m. 90 % % Previous Inspection Notes: 09/13/2012 - Steel sounds solid when tapped on and finger alignment is good. Small spalls/delaminations along edge of joint steel. Minor spalling and deterioration on underside of deck at joint area. 09/21/2010 - Good alignment on the fingers. Small spalls and surface delaminations along the joint edges. Steel sounds solid when tapped on. Minor deterioration and spalling of the deck concrete on the bottom side under the steel. 09/23/2008 - Steel sounds solid when tapped on. Finger alignment is Good. Some cracking and small spalls along the underside of the deck edges at the joints. 10/13/2006 - Steel portions of the joints sound solid when tapped on. Some delaminations/spalls along the steel. Finger alignment is Good this 09/29/2004 - West most sliding plate has a small section of delamination on its' edge, 8 to 12". Finger joint alignment is Good. 10/21/2002 - Minor rusty spots. Joints are in good alignment. 08/30/2000 - No Change. 06/03/1998 - 14.60 \* 2. Some rust and pitting. (1) Finger & (1) Sliding Plate Joints. 12/01/1995 - None 02/01/1994 - None Inspection Notes:

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Element Dec			Span . IV	iaiii-0 -	Steel Girde	is over KK - Sp	ans 3 thru 6 <b>(C</b> 0	Jiii.)		
Element Des	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
-	- Moveable Be				mop _uen				. 5. 5.4.	
	1	3	12	ea.		85	10	Ę	5	
						%	%	%	%	
Previous Ins	pection Notes :									
		anchor bo	Its at Bent 3. Be	earings	near maximu	un expansion (70	) dearees F). Ru	stv spots, scale.	paint loss, and de	ebris NLGQ
at bearings.				_			,			
09/21/2010 - bearings.	inear maximun	n movemer	nt in expansion	at Bent	3; 50F. Rus	ty spots, dirt, an	a some peeling p	paint. Lots of pig	geons nesting nea	ar the WZBZ
	Rusty spots, dovement; 48F for			ne over	coat painting	done. Alignmer	nt of the bearings	at Bent 2 are in	expansion and no	ear YZCZ
				cent in (	Condition Sta	ate 3 for the aligi	nment of rockers	at Bent 3; still to	olerable. Clean ar	nd NADO
overcoat pair 09/29/2004 -		Some scale	e, peeling paint.	and pit	tina. Piaeon	nest and debris	near the bearing	IS.		ZAIP
	Minor rusting s			aa p	ggee			,		VZKC
08/30/2000 -		•								FIKL
06/03/1998 -	Some rust & pi	itting.								MHIL
12/01/1995 -	None									YDNF
02/01/1994 -										REFI
Inspection N										
mapection										
Element 313	- Fixed Bearing	g								
	1	3	12	ea.		95	5	(		
						%	%	%	%	
Previous Ins	pection Notes :									
09/13/2012 -	Spot rust and f	ading pain	t.							NLGQ
09/21/2010 -	Some dirt and	grime. Pai	int still looks Go	od with	only some s	pot rust.				WZBZ
09/23/2008 -	Some spot rus	t. Cleaned	and overcoat	spot pai	nted.					YZCZ
10/13/2006 -	Same as previ	ous reports	s. Clean and ov	/ercoat	painted.					NADO
09/29/2004 -	Rust spots and	d pitting. P	igeon nest arou	ınd som	e of the bear	rings.				ZAIP
10/21/2002 -	Minor rusting s	pots and p	its.							VZKC
08/30/2000 -	No change.									FIKL
06/03/1998 -	Some rust & pi	itting.								MHIL
12/01/1995 -	None									YDNF
02/01/1994 -	None									REFI
Inspection N	lotes:									

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Continue

\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girders over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 331 - Conc Bridge Railing 274 95 3 m. % Previous Inspection Notes: 09/13/2012 - Random shrinkage cracks. Top of barrier has some spalls where hand rail was removed. 09/21/2010 - Unchanged from past inspection comments. 09/23/2008 - Vertical cracks at relief cuts. Small surface spalls where hand rail was removed from the top of the Left rail. 10/13/2006 - Same as past inspection reports. 09/29/2004 - Minor vertical cracking between relief cuts. Some areas of fractured concrete where the hand rail was removed from the top of the barrier rail. 10/21/2002 - Some vertical cracks and mapping/shrinkage cracks. 08/30/2000 - Changed from metal rail to concrete rail in 1999. 06/03/1998 - 137.20 \* 2 = 274.4. Some rust & ptting of the rail & rail posts. 12/01/1995 - None 02/01/1994 - None Inspection Notes: Element 334 - Metal Rail Coated W-Beam and Round Steel Pipe w\ Guard Fence and Steel Posts 1 3 137 80 20 m. % % % % Previous Inspection Notes: 09/13/2012 - Rust, scale, paint loss, and peeling paint on posts and pipe rail. Gaurd fence and fabric in good condition. 09/21/2010 - Spot rust, scale, peeling paint, and faded paint on the posts and pipe rail. Guard fence posts and fabric are in Good condition. 09/23/2008 - Same comments as past inspections. 10/13/2006 - Paint system is pitted, flaking, and rusty throughout. W-Beam has some spot rust. Guard fence is in Good condition. 09/29/2004 - Rust spots on the rail posts and pipe. Some spot rust on the W-Beam rail. Guard fence is in Good condition. 10/21/2002 - Rusty spots with some pitting. Guard fence is in Good condition. /ZKC 08/30/2000 - Rail along sidewalk is metal rail and new guard fence added during 1999 construction. Some minor rust on posts and existing w-Inspection Notes: Element 357 - Sup Pack Rust SmFlag Χ 1 Χ 100 ea. % % % Previous Inspection Notes: 09/13/2012 - Lower angles on diaphragms show spreading and cracked welds from pack rust. 09/21/2010 - Unchanged from past inspection comments. 09/23/2008 - Added due to pack rust at the diaphragms under leaky joints. Some swelling has cracked welds; photo. Inspection Notes:

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\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girders over RR - Spans 3 thru 6 (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 358 - Deck Cracking SmFlag X 100 3 ea. 0 % Previous Inspection Notes: 09/13/2012 - Due to size and density. 09/21/2010 - Unchanged from past inspection comments and not yet in Condition State 3. 09/23/2008 - Added due to the size of some of the cracks, 1.00mm, and density of the cracks in some areas. Inspection Notes: \* \* \* \* \* \* \* \* \* \* Span : Appr-1 - Steel Girders - Span 1 and 2 \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck 449 100 sq.m. Χ % % % % % Previous Inspection Notes: 09/13/2012 - Studded tire wear in wheel paths. Mapping cracks in both spans. Shallow spalls/delaminations along joint steel. 09/21/2010 - Tight mapping cracks. Minor spalls and delaminations along joint edges. Wear in the wheel paths. 09/23/2008 - Wear in the wheel paths. Transverse and mapping cracks in areas. Small spalls/delaminations along the joint edges. 10/13/2006 - Same comments as past inspections. 09/29/2004 - Had to move to Condition State 2 due to small delaminations along the joints. Some mapping cracks in the spans. 10/21/2002 - 14.60 \* 30.74 = 448.8 Changed Element to "12" as the Latexx concrete was only placed to the existing levels after hydromiliing and Class B repairs. Inspection Notes: Element 107 - Paint Stl Opn Girder 2 123 m. % % % % Previous Inspection Notes : 09/13/2012 - Rust blisters with some surface pitting on tops of bottom flange where moisture collects. Girders are dirty and have faded paint. 09/21/2010 - Dirty, grimey, and faded paint. Minor rust blisters with surface pitting. 09/23/2008 - Rust, scale, minor surface pitting, and paint loss; worse in areas that the deicer and water collects. Girders are dirty. 10/13/2006 - Rust, scale, peeling paint, paint loss, and pitting; mainly in areas under/near leaky joints. 09/29/2004 - Unchanged from previous reports. 10/21/2002 - Rusty spots with some minor pitting under joints and on the bottom flange/lower web area. 08/30/2000 - No Change. 06/03/1998 - 4 \* 30.74 = 122.96. Some areas of rust & pitting. Inspection Notes:

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Span : Appr-1 - Steel Girders - Span 1 and 2 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Quantity Element 161 - Paint Stl Pin/Hanger Bent 3 - Pins Only 3 ea. 100 % % Previous Inspection Notes: NLGQ 09/13/2012 - Pins were UT tested in August 2012 and no significant wear was observed. 09/21/2010 - Still Good paint where re-painted by UT inspectors. Refer to report by Collins Engineering. No "noteables" were fond in the UT inspection with little to no wear also noted. 09/23/2008 - Cleaned and re-painted after UT testing this summer. See report for findings. 10/13/2006 - UT testing in 2005 showed no problems. 09/29/2004 - Minor rust where paint has weathered off of the pins from whre they were cleaned for UT inspection. 10/21/2002 - Girder to Girder connection. No problems noted when inspected/NDT'd in 2001. Inspection Notes: Element 205 - R/Conc Column Bent 2 95 ea. % Previous Inspection Notes: 09/13/2012 - Tight surface shrinkage cracks and a small shallow spall from tie wire. 09/21/2010 - Some tight surface shrinkage cracks. Left column has tight cracks on the Left-Back corners of the column. 09/23/2008 - Both columns show tight shrinkage cracks. Generally in Good condition. 10/13/2006 - No change exept that the graffiti has been painted over. 09/29/2004 - Tight shrinkage cracks. Tight cracks at the construction joint near the caps. Graffiti on both columns. 10/21/2002 - Minor shrinkage cracks throughout. Some graffti from homeless village/camp under the structure. 08/30/2000 - None 06/03/1998 - \_ Inspection Notes: Element 215 - R/Conc Abutment Abutnment 1 - West 1 1 19 m. 95 % Previous Inspection Notes: 09/13/2012 - Generally good condition. Some tight cracks and few small spalls near cap/backwall connection and near embedded bearings. 09/21/2010 - Unchanged from past inspection comments. Good condition. Fence on the Left end of the Abutment is broken over by homeless traffic. 09/23/2008 - Tight cracks in the backwall and under a couple of the girders in the cap. Small spalls at a couple of the girders edges where embedded in the backwall. 10/13/2006 - Minor delaminations where the girdrs are embedded in the backwalls. Some tight cracks between the girders. Still minor erosion at the corners. 09/29/2004 - Same as previous report. 10/21/2002 - Minor concrete popouts and deterioration where girders are embedded in backwall. Minor erosion at wingwall. 08/30/2000 - No change. 06/03/1998 - 14.60 + 1.30 + 2.80 = 18.7. Some erosion @ the wingwalls. Inspection Notes:

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Continue

Span : Appr-1 - Steel Girders - Span 1 and 2 (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Quantity Element 234 - R/Conc Cap Bent 2 15 m. 90 % Previous Inspection Notes: 09/13/2012 - Spall with exposed rebar and some shallow surface delaminations. 09/21/2010 - Small delaminations and spalls on the cap. Surface spall from tie wire and rebar chair feet. 09/23/2008 - Shallow surface delaminations; Condition State 3. Some small surface spalls from shallow tie wire and rebar chair feet; Condition State 2. 10/13/2006 - Surface spalls on the underside of the cap from shallow rebar chairs. Cap is stained from leaky joint above. 09/29/2004 - Minor rust stains and spalling where chairs are exposed on the bottom side of the cap. Staining from leaking joint. 10/21/2002 - ok 08/30/2000 - 14.60 \* 1 = 14.60m 06/03/1998 - 14.60 \* 2 = 29.2 Inspection Notes: Element 305 - Assm Jt w/o Seal 3 15 m. 90 10 % Previous Inspection Notes: 09/13/2012 - Steel sounds solid when tapped on. Some delaminations/spalls along edges of joint steel. 09/21/2010 - Small spalls along the joint steel edge. Steel sounds solid when tapped on. 09/23/2008 - Steel sounds solid when tapped on. Some small surface spalls and delaminations along the joint edges. 10/13/2006 - Steel all sounds solid when tapped on. Small spots of delaminated concrete and small spalls in a couple of areas along the joint's 09/29/2004 - Small spot of delamination on the joint edge, 4". Leaky also. 10/21/2002 - Minor rusty spots. Leaking as normal for a sliding plate joint. 08/30/2000 - Leaking. 06/03/1998 - Sliding Plate. Inspection Notes: Element 311 - Moveable Bearing 3 95 ea. % Previous Inspection Notes: 09/13/2012 - Bearings are towards slight expansion (65 degeers F). Paint is faded, dirty, and has spot rust. 09/21/2010 - Slight expansion; 50F. Some spot rust and debris. 09/23/2008 - Good to Fair alignment today as slightly in expansion; 48F. Some cleaning and overcoat painting done. 10/13/2006 - Rust, scale, and some paint loss. Alignment is Good. 09/29/2004 - Spot rust and pitting from leaking joint. 10/21/2002 - Minor rusty spots with some pitting under leaking joints. 08/30/2000 - No change. 06/03/1998 - Some rust & pitting. Inspection Notes:

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# U05210000+01602

Continue

Span : Appr-1 - Steel Girders - Span 1 and 2 (cont.) \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 313 - Fixed Bearing Abutment 1 2 ea 95 % Previous Inspection Notes: 09/13/2012 - Spot rust and faded paint. 09/21/2010 - Spot rust and some soot from campfires on G1 and G2 bearing areas. 09/23/2008 - Some overcoat painting has been done. 10/13/2006 - Some rust, paint loss, amd flaking paint where visible. 09/29/2004 - Same as previous report. 10/21/2002 - Rusty spots where visible. 08/30/2000 - No change. 06/03/1998 - Some rust & ptting. Inspection Notes: Element 321 - R/Conc Approach Slab West - Abutment 1 1 3 100 ea. Previous Inspection Notes: 09/13/2012 - Slab shows settlement and a bump. Sealant between slab and bridge end is torn most of length. 09/21/2010 - Torn and loose sealant in the joint between the slab and bridge end. Settlement in the slab and approach roadway. 09/23/2008 - Same as past inspections. 10/13/2006 - Put into Condition State 2 due to settlement. Joint between the slab and bridge is leaking into the approach fill. 09/29/2004 - Big bump for the off going traffic. Joint between the slab and bridge is leaking. Some of the sealant has lost its' bond to the guard angles 10/21/2002 - Bump going off of the structure due to settlement of approach slab. 08/30/2000 - None 06/03/1998 -Inspection Notes: Element 331 - Conc Bridge Railing 1 3 61 m. 95 % Previous Inspection Notes: 09/13/2012 - Tight shrinkage cracking. Small spalls where hand rail was removed. 09/21/2010 - Unchanged from past inspection comments. 09/23/2008 - Vertical cracking along the relief cuts. Small spalls where handrail was removed on the Left rail. 10/13/2006 - Same as past reports. 09/29/2004 - Vertical cracking between the relief cuts. Some fractured concrete where the hand rail was removed. 10/21/2002 - Minor vertical cracks and some shrinkage cracks throughout. 08/30/2000 - Replaced matel rail with concrete barrier in 1999. 06/03/1998 - 30.74 \* 2 = 61.48. Some rust & pitting of the rail posts & bridge rail. Inspection Notes:



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Pct Stat 5
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**General Location Data** 

### INITIAL ASSESSMENT FORM FOR STRUCTURE:

Location: GREAT FALLS Structure Name: GF Warden Br-WB

P00060094+08281

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 **GREAT FALLS GREAT FALLS** Division Code, Location:31

County Code, Location: 013 **CASCADE** City Code, Location: 32800 **GREAT FALLS** 

2 U.S. Numbered Hwy Kind fo Hwy Code, Description: 2 Signed Route Number: 00089

State Highway Agency State Highway Agency Str Owner Code, Description: 1 Maintained by Code, Description:1

Intersecting Feature: MISSOURI RV, U5205, BNSF Kilometer Post, Mile Post: 152.60 km 94.82

Structure on the State Highway System: Latitude: 47°29'37"

Structure on the National Highway System: Longitude: 111°18'41"

Str Meet or Exceed NBIS Bridge Length:

**Traffic Data** 

Current ADT: 37,380 ADT Count Year: 2009 2 % Percent Trucks:

**Construction Data** 

Construction Project Number: F 60-2(5)92 1 2 Construction Station Number: 46+06.00

Construction Year: 1983

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Printing Date: Thursday, May 22 2014

Construction Drawing Number: 12646

Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	B ASD Assigned
Operating Load, Design:	32.6 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3 :	48.6		

### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 646.79 m

Deck Area: 10,192.00 m sq

12.10 m Deck Roadway Width: 12.19 m Approach Roadway Width:

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

H Hwy beneath struct Reference Feature for Vertical Clearance:

6.46 m Vertical Clearance Under the Structure:

H Hwy beneath struct Reference Feature for Lateral Underclearance:

7.40 m Minimum Lateral Under Clearance Right: 0.00 m Minimum Lateral Under Clearance Left:

Number of Spans: 14

#### Span Data

### Main Span

Number Spans: 6

Material Type Code, Description: 4 Steel continuous

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 1 Monolithic concrete (concurrently placed with struct

Deck Protection Type: 0 None Deck Membrain Type: 0 None

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

Material Type Code, Description: 5 Prestressed concrete

15.76 m (52) Out-to-Out Width:

(50A) Curb Width:

(50B) Curb Width:

2.74 m

0.00 m

Approach Span

Skew Angle: 45°

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, W	est or Bi-direction	nal Travel	N	orth or East Trav	vel .
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
One Route Under	U05205	Both	6.46 m	7.32 m	N/A		
RIVER ROAD							
Route On Structure	P00060	West	99.99 m	12.10 m	N/A		
10TH AVE SOUTH WB							



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Continue

**Inspection Data** 

Sufficiency Rating: 96.3

Inspection Due Date: 19 September 2014 (91) Inspection Frequency (months): 24

Next Under Water Insp : 15 Nov 2016

Under Water Insp Type : Type II

Structure Status : <b>No</b>	t Deficient						
NBI Inspection Da	ata						
(90) Date of Last Ins	spection : 19 Septemb	per 2012		La	ast Inspected By: Charles Pe	pos - 107	
(90) Inspection	on Date :				Inspected By :		
(58) Deck (59) Superstructure (60) Substructure (72) App Rdw	Rating : 6	(68) Deck Geo (67) Structure F (69) Under Clear (41) Posting S palls: 0 m	Rating : 6 ance : 7 Status : A	(36B)	Bridge Rail Rating: 1 ) Transition Rating: 1 oproach Rail Rating: 1 D) End Rail Rating: 1	(61) Channe (71) Waterway A (113) Scou	
Inspection Hours						9 - 0 - 1	
Crew Hours for inspec Helper H Special Crew H Special Equipment H	lours : C	Sı		poper Required s for inspection Flagger Hours	12		Coursed
Inspection Wor Candidate ID	Date Requested	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
D31-FY2004-000264	02 February 2004	Approved	Low	All Spans	Bridge	Spot Paint (flex)	
Approved. DRC  D31-FY2004-000263	02 February 2004	Approved	Low	All Spans	12 Bare Concrete Deck	Min Repair	
Clean Drains throughou 2003-08-05: Cleaned d Approved. DRC	ıt.		Low	y iii Opuno	12 Bare Control Book	уштторан	
D31-FY2005-000076	18 October 2004	Approved	Low	All Spans	334 Metal Rail Coated	Rehab Elem	I
Clean and spot paint the Approved. DRC	e rail posts and rail tu	bes on the right bar	rier and Outs	side-Right edge	of the structure.		
D31-FY2008-000120 Patch spalled areas.	14 July 2008	Approved	Low	All Spans	12 Bare Concrete Deck	Min Repair	
Approved. DRC							
D31-FY2011-000131	07 February 2011	Not Approved	Low	All Spans	12 Bare Concrete Deck	Min Repair	
Repair damaged downs	spouts.						
D31-FY2011-000132	07 February 2011	Not Approved	High	All Spans	305 Assm Jt w/o Seal	Rehab Elem	

Clean the finger joint troughs. 2003-08-05: Cleaned left half of the finger toughs today. W.A.Lay



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# Continue

Inspection World	k Candidates	- Status	Priority	Effected Structure	Scope of Work	Action	Covered Condition
Candidate ID	Date Requested	Status	Thomy	Unit	WOIK	Action	States
D31-FY2013-000004	02 October 2012	Not Approved	High	A Approach	305 Assm Jt w/o Seal	Rehab Elem	
epair the loose finger j	oint at Bent 8 on the	Left side of the bridg	je.				
D31-FY2013-000005	02 October 2012	Not Approved	High	All Spans	Bridge	Rehab (flex)	

Late Reason:

Inspection Date: 09/19/2012

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#### P00060094+08281 Continue

### **Element Inspection Data**

Inspection Notes:

Span: Main-0 - Steel Girder Spans 14 - 19 \* \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Element 12 - Bare Concrete Deck X 3 4618 sq.m. 0 100 0 % % % Previous Inspection Notes: 09/19/2012 - Random spalled areas in most of the Spans and delaminations along the joint edges. Some cracked areas with delaminations in Spans 15 thru 17. Some spalls have been patched with the velocity patcher. 09/27/2010 - Small spalls and delaminations along the joint edges. Steel sounds solid when tapped on. 06/20/2008 - Same as past inspections and add some spalling and delamiantions along the joint edges. 08/17/2006 - None 10/06/2004 - Transverse cracking throughout with some cracks that are wider and open. Spalling along joint edges. Some areas of mapping cracks, mostly in the Left lane. Some wear in the wheel paths. 10/21/2002 - Same as last report and add some minor delamination noted with a small spalled area at one joint. 08/23/2000 - 293 \* 15.76 = 4617.68 No change from previous report plus some delaminations noted on spot checks near the joints. 12/11/1997 - Deck has mapping cracks throughout. 10/01/1995 - None 09/01/1992 - None Inspection Notes: Element 107 - Paint Stl Opn Girder 2 1465 90 10 m. % % Previous Inspection Notes: 09/19/2012 - Minor peeling paint in areas. Rust blisters with minor surface pitting near joints that leak. Faded and dirty paint throughout the 09/27/2010 - Rust blisters, scale, and minor paint loss on tops of the lower flanges of the outer girders. Wose areas are where water can leak onto the girders from joints or drains. 06/20/2008 - Rust, scale, and paint loss on the lower web and bottom flanges; especially near leaky joints and downspouts. 08/17/2006 - None 10/06/2004 - Spot rust and some paint fade on the lower portions of the web and bottom flanges; especially near leaking joints. 10/21/2002 - Some paint loss along the under side of the girders near drains, more so on G5. Some speckled rust starting on the left side of the web and bottom flange of G1. A 4" x 1"(h) 1' back of Pier 19 for G1S18R. 08/23/2000 - 293 \* 5 = 1465.0m Some rust and pitting. 12/11/1997 - None 10/01/1995 - None 09/01/1992 - None

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### P00060094+08281 Continue

		* * * *	* * * * * Sp	an : <b>M</b>	ain-0 - Steel	Girder Spans	14 - 19 (cont.) *	* * * * * * * *	*	
Element Des	•			1						
۰	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 205	5 - R/Conc Colu									
	1	3	2	ea.		90	5	5	0	
						%	%	%	%	
Previous Ins	pection Notes :									
09/19/2012 -	Right column a	at Pier 16 h	nas a small dela	aminated	d area.					ZZJO
	· ·					xposed rebar fe	et. Rust on lower	r portions of the i	ce breakers.	EZJZ
	Same as past	•			·	•	01. 11001 011 101101	portione or the i	oo broakere.	OZKZ
08/17/2006 -	·	mopeonom	s, but offactiva	101 11 1110	ty be unicien					TZCZ
		vor portion	of the ice bree	koro T	iaht ahrinkaa	o orooko on mor	ot columna Mina	r anat rust stains	fron ovnogod robo	
chair legs. S	Some scale belo	ow the norr	nal waterline.		Ĭ	lce breakers nee		r spot rust stains	fron exposed reba	r GIDZ IZHX
	Env. #3 as alw	-	J		Ŭ		·			FIAS
	· (4) columns ea	•	s 14 - 19 and <i>(</i> 3	R) colum	ns at Bent 20	)				FKAR
10/01/1995		.5.1 401	o i i io ana (c	, coluiti	at Dont 20					YDNF
09/01/1993 ·										REFI
J9/U1/1992 ·	None									KEFI
Inspection I	Notes:									
Element 220	- R/C Sub Pile	Cap/Ftg	Pier 15 thru 19	)						
	1	3		ea.		100	0	0	0	
					_	%	%	%	%	
Duardaria Inc	ti N-t					70	,,	70	,,	
	pection Notes :									
09/19/2012 -	- None									ZZJC
09/27/2010	Per the 2011 u	ınderwater	inspection by I	nfrastru	cture Engine	ers there is no c	change to the con-	dition of this eler	nent. CRH	EZJZ
06/20/2008 -	See latest Und	derwater II	report.							OZK2
The pier 3 s	ubfooting is now	covered b	y sand and riv	er rock.	The pier 4 s	ubfooting is exp	osed 10 inches hi		at the upstream no am nose and is in g	
	imber formwork · Unchanged, bı					ce of the pier 5	footing.			GIDZ
		ut check th	e iasiesi uriuei	water re	port.					
10/21/2002			745/00/0					•.•		IZHX
08/23/2000 -	· LW underwa	iter Inspec	tion 7/15/98 (G	uthrie D	iving Co) A	III exposed footii	ngs in good condi	ition.		FIAS
Inspection I	Notes:									
Element 227	' - R/C Submer	ged Pile I	Pier 15 thru 19							
	1	3	20	ea.		90	10	0	0	
					_	%		%	%	
						/0	/0	/0	/0	
	pection Notes :									
09/19/2012 -	None									ZZJC
09/27/2010	Per the 2011 u	ınderwater	inspection by I	nfrastru	cture Engine	ers there is no c	change in the con-	dition of this eler	nent. CRH	EZJZ
06/20/2008 -	See latest Und	lerwwater l	II report.							OZKZ
							s vertical cracking	present on piers	s 4 thru 7. The vert	ical TZCZ
	enerally 1/32" to					the cap.				CID
	Unchanged, bu	ut check th	e iasiesi under	water re	φυι.					GIDZ
10/21/2002			=1:=1::::::::::::::::::::::::::::::::					. 5.	4 (0.01)	IZHX
	<ul> <li>LW Underw significant deter</li> </ul>			dthrie [	Diving Co)	All have light sc	aling below water	line. Piers have	1/32" vertical cracks	s. FIAS
Inspection I		indiamon or	diotrood.							
	.5.00.									

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#### P00060094+08281 Continue

\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder Spans 14 - 19 (cont.) \* \* \* \* \* \* \* \*

	scription									
-	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 234	- R/Conc Cap									
	1	1	156	m.		90	5	5	0	
						%	%	%	%	
revious Ins	pection Notes :				<u>-</u>			1	1	
et on the u 9/27/2010 - ight cracks	nderside of the Staining on ca at steps in the	caps. Cap ps under le caps. Dirt a	s at Pier 15 an aky joints. Sor and debris in a	d 16 ha ne sma reas.	ve small surf Il surface spa	ace delamination	ns on their Right side of the caps f	ends. rom exposed/rus	pouts from rebar of ty rebar chair feet le of the caps show	EZJ
	hair feet with m			J			·		·	TZC
racks under	the bearings.								nts. Some tight ve	rtical GID2
		Ŭ	nkage cracks t	hrougho	out. Dirt and o	debris on top of the	he cap at Pier 17	under the finger	joint.	IZH.
	7 * 22.29 = 150	63.03m								FIA
2/11/1997 -										FKA
0/01/1995 -	None									YDN
9/01/1992 -	None									REF
nspection N	Notes:									
	- Assm Jt w/o				Sliding Plate	at Bent 14 and P				
		Seal Finge	r Joint at Pier 1		Sliding Plate	90	10	0		
lement 305	- Assm Jt w/o				Sliding Plate			0 %	%	
lement 305	- Assm Jt w/o	3			Sliding Plate a	90	10		%	
lement 305	- Assm Jt w/o :  1 pection Notes : Spalling along	the edges	60 of the steel. St	m.		90 %	10	%	% dirt and debris wit	h ZZJ
lement 305 revious Ins 9/19/2012 - ome areas 9/27/2010 -	- Assm Jt w/o s  1  pection Notes : Spalling along of the troughs s	the edges of showing dark	of the steel. St	m. reel sou	nds solid who	90 % en tapped on. Ti	10 % roughs under the	% joints are full of		
revious Insp 9/19/2012 - ome areas 9/27/2010 - oint edges. 6/20/2008 - one downspo	pection Notes: Spalling along of the troughs are further than the spalling along of the troughs are further than the spalling and the spalling are plugged to the spalling	the edges chowing dar	of the steel. St nage. oris. Good alig	m. reel sou nment o	nds solid who	90 % en tapped on. Ti teel sounds solid when tapped on	10 % roughs under the	% joints are full of n. Some small sp	dirt and debris wit	the EZJ
revious Ins 9/19/2012 - ome areas 9/27/2010 - int edges. 6/20/2008 - e downspo 8/17/2006 -	- Assm Jt w/o sign of the troughs are further plugged None	the edges of showing dar all of dirt/det gnment at Fd. Small sp	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination	m. reel sou nment c	nds solid who on fingers. S sounds solid ng the joint ed	90 % en tapped on. To teel sounds solid when tapped on dges.	roughs under the I when tapped or I. Trough under	% joints are full of n. Some small sp	dirt and debris wit palled areas along sanding material a	the EZJ and OZk
revious Ins 9/19/2012 - ome areas 9/27/2010 - int edges. 6/20/2008 - e downspo 8/17/2006 - 0/06/2004 - dges.	pection Notes: Spalling along of the troughs are further point aliquits are plugged. None	the edges of showing dar all of dirt/det gnment at Fd. Small sp	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination	m.  reel sou  nment c  . Steel ons alor	nds solid who on fingers. S sounds solid ng the joint ed	90 % en tapped on. To teel sounds solid when tapped on dges.	roughs under the when tapped or . Trough under Trough under	% joints are full of n. Some small sp	dirt and debris wit	the EZJ and OZK TZC GID
ement 305 revious Ins 0/19/2012 - 0me areas 0/27/2010 - 0int edges. 6/20/2008 - e downspo 6/17/2006 - 0/06/2004 - dges. 0/21/2002 -	pection Notes: Spalling along of the troughs are further plugged None Troughs uinde	the edges of showing dar all of dirt/det gnment at Fd. Small sport the joints at the finger j	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination	m.  reel sou  nment c  . Steel ons alor	nds solid who on fingers. S sounds solid ng the joint ed	en tapped on. To teel sounds solid when tapped on dges.	roughs under the when tapped or . Trough under Trough under	% joints are full of n. Some small sp	dirt and debris wit palled areas along sanding material a	the EZJ and OZk TZC GID
revious Insp 0/19/2012 - ome areas (6)/27/2010 - int edges. 6/20/2008 - 6/20/2006 - 0/06/2004 - 0/06/2002 - 0/21/2002 - 8/23/2000 -	pection Notes: Spalling along of the troughs are further plugged by the troughs are plugged. Troughs uinde to the troughs uinde	the edges of showing darnill of dirt/det gnment at F d. Small sp r the joints at the finger j	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination are full of dirt a ioint is full of sa 2m	m. reel sou nment o . Steel ons alor and sand	nds solid who on fingers. S sounds solid ng the joint ed ding material.	en tapped on. To teel sounds solid when tapped on dges.	roughs under the when tapped or . Trough under unment is Good. parrier rail.	% joints are full of n. Some small specifies the joint is full of Minor spalled sp	dirt and debris wit palled areas along sanding material a	the EZJ and OZK TZC GID IZH FIA
revious Ins 3/19/2012 - ome areas 9/27/2010 - int edges. 6/20/2008 - e downspo 3/17/2006 - 0/06/2004 - dges. 0/21/2002 - 3/23/2000 - 2/11/1997 -	pection Notes: Spalling along of the troughs are further foughs are further form. Finger joint aliquits are plugged None Troughs uinde No change but 15.76 + (2 * 22 Sliding plate jo	the edges of showing darnill of dirt/det gnment at F d. Small sp r the joints at the finger j	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination are full of dirt a ioint is full of sa 2m	m. reel sou nment o . Steel ons alor and sand	nds solid who on fingers. S sounds solid ng the joint ed ding material.	90 % en tapped on. To teel sounds solid when tapped on dges. Finger joint align oth ends by the book seems.	roughs under the when tapped or . Trough under unment is Good. parrier rail.	% joints are full of n. Some small specifies the joint is full of Minor spalled sp	dirt and debris wit palled areas along sanding material a	the EZJ and OZF TZC GID IZH FIA
revious Insp 9/19/2012 - ome areas 6/27/2010 - int edges. 6/20/2008 - ee downspo 0/06/2004 - dges. 0/21/2002 - 8/23/2000 -	pection Notes: Spalling along of the troughs are further foughs are further formal for	the edges of showing darnill of dirt/det gnment at F d. Small sp r the joints at the finger j	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination are full of dirt a ioint is full of sa 2m	m. reel sou nment o . Steel ons alor and sand	nds solid who on fingers. S sounds solid ng the joint ed ding material.	90 % en tapped on. To teel sounds solid when tapped on dges. Finger joint align oth ends by the book seems.	roughs under the when tapped or . Trough under unment is Good. parrier rail.	% joints are full of n. Some small specifies the joint is full of Minor spalled sp	dirt and debris wit palled areas along sanding material a	the EZJ and OZF TZC GID IZH FIA FKA YDN
revious Ins 30/19/2012 - ome areas 9/27/2010 - int edges. 6/20/2008 - e downspo 8/17/2006 - 0/06/2004 - dges. 0/21/2002 - 8/23/2000 - 2/11/1997 - 0/01/1995 -	pection Notes: Spalling along of the troughs are further from the plugged None Troughs uinde No change but 15.76 + (2 * 22 Sliding plate jo None None	the edges of showing darnill of dirt/det gnment at F d. Small sp r the joints at the finger j	of the steel. St mage. oris. Good alig Pier 17 is Good alls/delamination are full of dirt a ioint is full of sa 2m	m. reel sou nment o . Steel ons alor and sand	nds solid who on fingers. S sounds solid ng the joint ed ding material.	90 % en tapped on. To teel sounds solid when tapped on dges. Finger joint align oth ends by the book seems.	roughs under the when tapped or . Trough under unment is Good. parrier rail.	% joints are full of n. Some small specifies the joint is full of Minor spalled sp	dirt and debris wit palled areas along sanding material a	the EZJ and OZK TZC

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\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder Spans 14 - 19 (cont.) \* \* \* \* \* \* \* \*

			96.			i Girder Spans	(551111)				
Element Des	cription										
	Scale Factor	Env	Quantity		Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Sta	at 5
Element 311	- Moveable Be	aring Pier	14, 15, 17(doub	oles), 18	, and 20						
	1	2	30	ea.		85	10	5	D. C.		
						%	%	%	%		(
Previous Insp	pection Notes :										
also broken. 09/27/2010 -	Spot rust, stair Spot rust and o	ning, and d debris on s	ebris at the leal ome of the bear	ky joints rings. A	lignment is	ok today. Same	on previously re	ported broken a	r bolts for G5S17 nchor bolts. se anchor bolts,, b		ZZJO EZJZ OZKZ
	pearings as pre								paint loss on other	s.	TZCZ
10/06/2004 -	Rust spots, pitt	ting and so	me paint loss o	n the be	arings. Un	changed from pr	evious reports when	hen viewed by b	inoculars.		GIDZ
	Loose anchor b	bolts but tig	ght in their holes	at Pier	18 for G4L	, G3L and R, and	d G2R. Some rus	st, pitting, minor	paint loss and de	bris at	IZHX
all bearings. 08/23/2000 -	Env. #2 as und	der joints.	Some rust and p	oitting.							FIAS
	5 shoes each a			_	es), Pier 15	and Bent 14					FKAR
10/01/1995 -	None										YDNF
09/01/1992 -	None										REFI
Element 313	- Fixed Bearing										
	1	1	10	ea.		95	5	(			
						%	%	%	%		
Previous Insp	pection Notes :	•	1								
09/19/2012 -	Spot rust, pain	t loss, and	some debris.							Ā	ZZJO
09/27/2010 -	Spot rust with s	some dirt/d	ebris.								EZJZ
06/20/2008 -	Overcoat paint	ed some, b	out still some ru	st and p	aint loss to	others.					OZKZ
08/17/2006 -											TZCZ
	•		· ·		•	•	en viewed by bind	oculars.			GIDZ
	Some rust, pitti		paint loss and c	lebris at	all bearing	S.					IZHX
	Some rust and										FIAS
	Fixed shoes at	Piers 16 a	na 19.								FKAR
10/01/1995 - 09/01/1992 -											YDNF REFI
										'	KLII
Inspection N	NOIG9.										

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\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder Spans 14 - 19 (cont.) \* \* \* \* \* \* \* \* \*

	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 331	- Conc Bridge I									
	1	3	586	m.		90	5	5	0	
						%	%	%	%	
ovious las	naction Notes					70	70	70	70	
	pection Notes :									
				_			ace shrinkage cra			ZZJ(
inor delam	inations on barr	ier in spots					and scaling alon and some spalled		ondition State 3 de	ue to EZJ. OZK
B/17/2006 ·						an dolan matod	aa 000 0pa00	. 4. 545.		TZC
	- Tight vertical c	racks even	/ 3 to 4 feet							GID
	- Minor shrinkag		, 0 10 1 10011							IZH)
	- 293 * 2 = 586m									FIAS
			MENT WAS AD	DED 6/	16/2000 NF	EED TO VERIEY	CONDITION ST	ATE(S)		FKA
		IG II. EEEI	WEITT WAS AD	DLD 0/	10/2000. 141	LED TO VEIGHT	CONDITION OF	A12(0).		1104
nspection	Notes:									
lement 334	I - Metal Rail Co	ated								
	1	3	293	m.		90	10	0	0	
						%	%	%	%	
revious Ins	pection Notes :	l				l.				
9/19/2012	- Spot rust, expo	sed base	coat, and faded	paint th	roughout. C	Chainlink fabric is	s in Good condition	on.		ZZJ(
	- Spot rust, expo			•	Ŭ					EZJ.
	- Rsuty spots, pa				_					OZK
8/17/2006		,								TZC
	- Rusty spots on	the rail po	sts and tubes.							GID
	- Add some scra			nout.						IZH
	- Some rust and									FIAS
	- Pedestrian rail		ide of bridge							FKA
0/01/1995		On North o	ide of bridge.							YDN
9/01/1992										REF
										INLI
Inspection	Notes:									
Пороспол										
Поросион										
	3 - Deck Crackin	g SmFlag								
	3 - Deck Crackin 1	g SmFlag	1	ea.	X	0	100	0	0	
lement 358			1	ea.	Х	0 %	100	0	0	
Element 358			1	ea.	X					
lement 358  X revious Ins	1 pection Notes :	3	1 ne into plav	ea.	Х					
X Previous Ins	pection Notes :	3 density con				%				ZZJ( EZJ
revious Ins 9/19/2012	pection Notes : - Both size and o	3 density con				%				
X Previous Ins 9/19/2012 9/27/2010 6/20/2008	pection Notes : - Both size and of the cracking - Unchanged.	3 density con				%				EZJ. OZK
Previous Ins 9/19/2012 9/27/2010 6/20/2008 8/17/2006	pection Notes : - Both size and c - Lots of cracking - Unchanged None	3 density con	e small delamin	ations i	n the worse	% areas.	%	%	%	EZJ OZK TZC
Previous Ins 9/19/2012 9/27/2010 6/20/2008 8/17/2006 0/06/2004	pection Notes : - Both size and c - Lots of cracking - Unchanged None	3 density cong with some	e small delamin	ations i	n the worse	% areas.	%	%		EZJ OZK TZC

\* \* \* \* \* \* \* \* \* Span : Appr-1 - P/S Concrete Spans 1 thru 13 and 20 \* \* \* \* \* \* \* \*

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\* \* \* \* \* \* \* \* \* Span : Appr-1 - P/S Concrete Spans 1 thru 13 and 20 (cont.) \* \* \* \* \* \* \* \*

	scription				I					
٥	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 12 -	Bare Concrete	Deck								
	1	3	5576	sq.m.	X	0	100	0	0	
						%	%	%	%	
Previous Ins	pection Notes :									
9/19/2012 -	Spalls and dela	aminations	along joint stee	el. Som	e random de	laminations in m	ost of the Spans	with some potho	oles/spalls starting.	ZZJ
							he worse cracke			
6/20/2008 -	Wear is probab	oly a little w	orse and the re	est of the	e comments	still apply.				OZK
8/17/2006 -	None									TZC
0/06/2004 -	Transverse cra	cking throp	oughout with so	me of th	ne cracks wid	der and open; se	e photos. Spallir	ng along joint ed	ges. Some areas o	of GID
	cks; mainly in th					e: roet ie uneban	ged from previou	is roports		IZH:
	No change.	alions and v	very small spail	eu area	is at the joint	s, rest is unicrian	ged from previou	is reports.		
	· No change. · Deck has mino	r cracking t	throughout							FKA
0/01/1997 -		i cracking i	illoughout.							YDN
	· 353.79 * 15.76	EE7E 70								REF
nspection N										
lamont 100	D/C Cone One	an Cirdar								
Element 109	- P/S Conc Ope	en Girder	2209	m.		95	5	O	0	
Element 109			2209	m.		95	5	0	0 %	
			2209	m.				Ĭ		
revious Ins	1 pection Notes :	1			ral of the gir	%		%		ZZJ
revious Ins 9/19/2012 -	pection Notes :	1 nd surface	spalls on ends	of seve	•	% ders. Mostly on	%	% bisture on them.	%	ZZJ EZJ
Previous Ins 19/19/2012 - 19/27/2010 -	pection Notes :	1 nd surface	spalls on ends	of seve	•	% ders. Mostly on	% those that get mo	% bisture on them.	%	EZJ
Previous Ins 9/19/2012 - 9/27/2010 - 6/20/2008 -	pection Notes : Minor cracks at Generally Good No change.	1 nd surface	spalls on ends	of seve	•	% ders. Mostly on	% those that get mo	% bisture on them.	%	EZJ OZk
Previous Ins 199/19/2012 - 199/27/2010 - 196/20/2008 - 198/17/2006 -	pection Notes : Minor cracks at Generally Good No change.	1 nd surface d condition	spalls on ends	of seve	nd cracking o	ders. Mostly on on ends of sever	those that get mo	oisture on them.	%	EZJ OZŁ TZC
Previous Ins 19/19/2012 - 19/27/2010 - 16/20/2008 - 18/17/2006 - 0/06/2004 -	pection Notes : Minor cracks and Generally Good No change. None Same on the gi	nd surface d condition	spalls on ends . Some minor s	of seve spalls an	nd cracking of	ders. Mostly on on ends of sever urder at Bent 12.	those that get mo al of the girders t	oisture on them. hat have now ex	% rposed strands.	EZ. OZŁ TZC rs. GID
Previous Ins 19/19/2012 - 19/27/2010 - 16/20/2008 - 18/17/2006 - 0/06/2004 - 0/21/2002 - howing.	pection Notes : Minor cracks and Generally Good No change. None Same on the gits	nd surface d condition	spalls on ends . Some minor s	of seve spalls an	nd cracking of	ders. Mostly on on ends of sever urder at Bent 12.	those that get mo al of the girders t	oisture on them. hat have now ex	% posed strands.	EZJ OZK TZC rs. GID d IZH
Previous Ins 19/19/2012 - 19/27/2010 - 16/20/2008 - 18/17/2006 - 0/06/2004 - 0/21/2002 - howing. 18/23/2000 -	pection Notes: Minor cracks at Generally Good No change. None Same on the gi	nd surface d condition	spalls on ends . Some minor s	of seve spalls an	nd cracking of	ders. Mostly on on ends of sever urder at Bent 12.	those that get mo al of the girders t	oisture on them. hat have now ex	% posed strands.	EZJ OZk TZC rs. GID
Previous Ins 19/19/2012 - 19/27/2010 - 16/20/2008 - 18/17/2006 - 0/06/2004 - 0/21/2002 - howing. 18/23/2000 - 2/11/1997 -	pection Notes: Minor cracks at Generally Good No change. None Same on the gi End of G2S12L None None	nd surface d condition	spalls on ends . Some minor s	of seve spalls an	nd cracking of	ders. Mostly on on ends of sever urder at Bent 12.	those that get mo al of the girders t	oisture on them. hat have now ex	% posed strands.	EZJ OZH TZC rs. GID d IZH
Previous Ins 9/19/2012 - 9/27/2010 - 6/20/2008 - 8/17/2006 - 0/06/2004 - 0/21/2002 - howing. 8/23/2000 - 2/11/1997 - 0/01/1995 -	pection Notes: Minor cracks at Generally Good No change. None Same on the gi End of G2S12L None None	nd surface d condition irder ends a _ at Bent 12	spalls on ends . Some minor s at Bent 11 and 2 and several g	of seve spalls and left end irder en	of the left gu	ders. Mostly on on ends of sever urder at Bent 12.	those that get mo al of the girders t	oisture on them. hat have now ex	% posed strands.	EZJ OZŁ TZC rs. GID d IZH FIA
Previous Ins 19/19/2012 - 19/27/2010 - 19/20/2008 - 19/6/20/2006 - 0/06/2004 - 0/21/2002 - 19/20/2000 - 19/20/2000 - 2/11/1997 - 0/01/1995 -	pection Notes: Minor cracks at Generally Good No change. None Same on the gite End of G2S12L None None None None (6 * 321) (7 * 3	nd surface d condition irder ends a _ at Bent 12	spalls on ends . Some minor s at Bent 11 and 2 and several g	of seve spalls and left end irder en	of the left gu	ders. Mostly on on ends of sever urder at Bent 12.	those that get mo al of the girders t	oisture on them. hat have now ex	% posed strands.	EZ. OZF TZC rs. GIC d IZH FIA

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	scription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 205	5 - R/Conc Colur	mn Bents 2	2 thru 13							
	1	2	28	ea.		90	5	5	0	
						%	%	%	%	
revious Ins	pection Notes :							I		
9/19/2012 · racks.	- Staining from jo	oint leakag	e on some. Cr	acks on	the columns	of Bent 2 and 3	3 with a small dela	aminated area.	Tight surface shrir	nkage ZZJ
ost everyth	<ul> <li>Staining on tho ning is superficia</li> <li>Same as previous</li> </ul>	al and prob	ably caused by				n noted in the wor	se areas of crac	king. Observed to	hat EZJ OZK
3/17/2006	- None	·								TZC
0/06/2004	- Sides of severa	al columns	have small spa	alling se	ction with eit	ner rebar chair f	eet or shallow reb	par; causing som	ne rust stains. Sm	nall GID
	several columns - Minor scrapes									IZH.
8/23/2000	- None									
2/11/1997	- None									FKA
0/01/1995	- None									YDN
9/01/1992	- (4) locations wi	ith 3 colum	ns and (8) loca	tions wi	th 2 columns					REF
		ment Abut	ment 1 and 22							
nspection	Notes:  5 - R/Conc Abutr	ment Abuti	ment 1 and 22	m.		95	5	0	0	
	5 - R/Conc Abutr			m.		95	5 %	0	0	
lement 215	5 - R/Conc Abutr 1			m.						
lement 215	5 - R/Conc Abutr 1 spection Notes :	1	52		(2) girders	%	%	%	%	rings 77
revious Ins	5 - R/Conc Abutr 1 spection Notes : - Abutment 1 hand of the bearings	s a crack b	52 between the Rig	ht most	`, 0	% Small spalls at	%	%		, and the second
revious Ins 3/19/2012 teel portion	5 - R/Conc Abutr 1 spection Notes : - Abutment 1 had not the bearings - Generally Good	s a crack be are rusty.	etween the Rig	tht most	previous insp	% Small spalls at opections.	% the cap/backwall	% area and near th	% ne embedded bea	EZJ
revious Ins 9/19/2012 teel portior 9/27/2010 6/20/2008 oted on the	5 - R/Conc Abutr 1 spection Notes : - Abutment 1 had of the bearings - Generally Good - Same as past is	s a crack b are rusty. d condition	etween the Rig . Same common. Crack at Abu	tht most	previous insp	% Small spalls at opections.	% the cap/backwall	% area and near th	%	EZJ oss OZk
revious Ins 3/19/2012 teel portion 9/27/2010 6/20/2008 oted on the 3/17/2006	5 - R/Conc Abutr 1 spection Notes : - Abutment 1 had of the bearings - Generally Good - Same as past is a visible portion of	s a crack b s are rusty. d condition inspections of the beari	etween the Rig . Same common. Crack at Abuings.	tht most ents as atment 1	previous insp	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	ne embedded bea	EZJ oss OZK TZC
revious Ins 0/19/2012 eel portior 0/27/2010 6/20/2008 oted on the 0/06/2004 nbedded in	5 - R/Conc Abutr  1  spection Notes: - Abutment 1 had of the bearings - Generally Good - Same as past is visible portion of None - None - Both Abutment hackwall concil	s a crack be are rusty. d condition inspections of the bearing taps have	etween the Rig . Same common. Crack at Abuings.	ght most ents as utment 1 racks w	previous inspondent between three ith effloresce	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	% ne embedded bea	EZJ oss OZK TZC
ement 215 revious Ins 8/19/2012 eel portion 9/27/2010 6/20/2008 oted on the 8/17/2006 0/06/2004 nbedded in	5 - R/Conc Abutr 1 spection Notes : - Abutment 1 had of the bearings - Generally Good - Same as past is a visible portion of the concerning of the conc	s a crack be are rusty. d condition inspections of the bearing taps have	etween the Rig . Same common. Crack at Abuings.	ght most ents as utment 1 racks w	previous inspondent between three ith effloresce	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	ne embedded bea	EZJ oss OZK TZC e GID
revious Ins 20/19/2012 deel portion 20/27/2010 6/20/2008 oted on the 8/17/2006 0/06/2004 mbedded in 0/21/2002	5 - R/Conc Abutr  1 spection Notes: - Abutment 1 han of the bearings - Generally Good - Same as past is exisible portion of None - None - Both Abutment of backwall conciling to the backwall conciling the concilin	s a crack be are rusty. d condition inspections of the bearing taps have	etween the Rig . Same common. Crack at Abuings.	ght most ents as utment 1 racks w	previous inspondent between three ith effloresce	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	ne embedded bea	EZJ oss OZK TZC e GID IZH FIA
revious Ins 9/19/2012 teel portion 9/27/2010 6/20/2008 bited on the 8/17/2006 0/06/2004 mbedded in 0/21/2002 8/23/2000 2/11/1997	5 - R/Conc Abutr  1  spection Notes: - Abutment 1 had of the bearings - Generally Good - Same as past is visible portion of None - Both Abutment backwall concrete ok - None - None	s a crack be are rusty. d condition inspections of the bearing taps have	etween the Rig . Same common. Crack at Abuings.	ght most ents as utment 1 racks w	previous inspondent between three ith effloresce	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	ne embedded bea	EZJ oss OZK TZC e GID IZH FIA FKA
revious Ins 9/19/2012 teel portion 9/27/2010 6/20/2008 oted on the 8/17/2006 0/06/2004 mbedded in 0/21/2002 8/23/2000 2/11/1997	5 - R/Conc Abutr  1  spection Notes: - Abutment 1 had of the bearings - Generally Good - Same as past is visible portion of None - Both Abutment backwall concrete ok - None - None	s a crack be are rusty. d condition inspections of the bear t caps have rete. Minor	etween the Rig . Same common. c. Crack at Aburings. e tight vertical correrosion on the	ght most ents as atment 1 racks w	previous inspondent between three ith effloresce	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	ne embedded bea	EZJ OSS OZK TZC GID IZH FIA FKA YDN
revious Ins 9/19/2012 teel portion 9/27/2010 6/20/2008 oted on the 8/17/2006 0/06/2004 mbedded in 0/21/2002 8/23/2000 2/11/1997	pection Notes: - Abutment 1 had of the bearings - Generally Good - Same as past is visible portion of None - Both Abutment backwall concrete None - None - None - None - None - None - None	s a crack be are rusty. d condition inspections of the bear t caps have rete. Minor	etween the Rig . Same common. c. Crack at Aburings. e tight vertical correrosion on the	ght most ents as atment 1 racks w	previous inspondent between three ith effloresce	% Small spalls at to pections. Right (2) girder	the cap/backwall	% area and near th ter in 2006. Som	ne embedded bea	EZJ oss OZK TZC e GID

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Smart Flag	scription									
_	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
ement 234	- R/Conc Cap	Bents 2 th	ıru 13							
	1	1	215	m.		90	5	5	0	
						%	%	%	%	
revious Ins	pection Notes :									
Small delan 9/27/2010 - igeon nests 6/20/2008 - hair feet. V 8/17/2006 - 0/06/2004 -	ninations on Ber Tight cracks ne and debris on to Tight vertical so Vorse rusty stair None Tight vertical co	nts 2, 3, and ear steps of tops of the tress riser of his and spal racks unde	d 8's caps. In the caps. Lor caps. Cracks at the st I are under the r several of the	ts of sur eps in t leaky jo	face spalls che caps. Un bint caps.	on the underside dersides of the c and swallows are	of the caps from aps show surface	exposed rebar of expansion	joints. Dirt and deb hair feet. Lots of posed and rusty reba nining under leaking	EZ. ar OZŀ TZC
						exposed rebar chat Bent 11 from G			S.	IZH
8/23/2000 -		o o	ŭ		·					
2/11/1997 -	- None									FKA
0/01/1995 -	- None									YDY
0/04/4000										RE
Inspection I										NL.
nspection I	Notes: 5 - Assm Jt w/o S	Seal Finge	r Joints - 5, 8, a			0.0				IVE.
Inspection I	Notes:					80	10	10		IVE
Inspection I	Notes: 5 - Assm Jt w/o \$	Seal Finge	r Joints - 5, 8, a			80 %	10	10	%	NL
Inspection I	Notes: 5 - Assm Jt w/o S	Seal Finge	r Joints - 5, 8, a						%	NE.
element 305 Previous Ins	Notes:  5 - Assm Jt w/o S  1  pection Notes : - Joint at Bent 8	Seal Finge 3	r Joints - 5, 8, a 67 e section in the	m.			%	%		ZZ
lement 305 revious Ins 9/19/2012 - 9-26-2012. 9/27/2010 -	Notes:  5 - Assm Jt w/o S  1  pection Notes : - Joint at Bent 8 Fixed loose se - Full and some	Seal Finge  3  has a loosection of the damage to	r Joints - 5, 8, 67 67 e section in the joint at Bent 8 the troughs. 6	m. Left lai	eft lane.	%	% niantions along th	% ne edges of the j	oints.	ZZ、
lement 305 revious Ins 9/19/2012 - 9-26-2012. 9/27/2010 - palls/delam	Notes:  5 - Assm Jt w/o S  1  Depection Notes:  - Joint at Bent 8  Fixed loose se  - Full and some sinations along the second se	Seal Finge  3  has a loose ction of the damage to he joint ste	r Joints - 5, 8, 8 67 e section in the joint at Bent 8 the troughs. Cel.	m. Left lai	eft lane.	% palling and delan	% niantions along th	% ne edges of the j	oints.	ZZ、
Previous Ins 9/19/2012 - 9-26-2012. 9/27/2010 - palls/delam 6/20/2008 -	Notes:  1  Spection Notes:  Joint at Bent 8 Fixed loose se Full and some inations along the	Seal Finge  3  has a loose ction of the damage to he joint ste	r Joints - 5, 8, 8 67 e section in the joint at Bent 8 the troughs. Cel.	m. Left lai	eft lane.	% palling and delan	% niantions along th	% ne edges of the j	oints.	ZZ. EZ: OZI
Previous Ins 9/19/2012 - 9-26-2012 - 9/27/2010 - palls/delam 6/20/2008 - 8/17/2006 -	Notes:  5 - Assm Jt w/o S  1  pection Notes:  - Joint at Bent 8  Fixed loose se - Full and some hinations along the - Same as past if - None	Seal Finge  3  has a loose ction of the damage to he joint sterminspection of the damage to he joint sterminspecti	e section in the joint at Bent 8 the troughs. Cel. comments.	m. Left lar in the L Good ali	Left lane. gnment on fi	palling and delar	niantions along the	% ne edges of the j apped on and so	oints. ome small	ZZ. EZ. OZ! TZ(
Previous Ins 9/19/2012 - 9-26-2012. 9/27/2010 - palls/delam 6/20/2008 - 8/17/2006 - 0/06/2004 -	Notes:  5 - Assm Jt w/o S  1  Pection Notes:  - Joint at Bent 8  Fixed loose se  - Full and some inations along the Same as past in the None  - Minor spalling in the Same in	has a loose ction of the damage to he joint sterinspection of along the joint sterinspectic sterinspection of along the joint sterinspection of along the joint sterinspection o	e section in the joint at Bent 8 the troughs. Cel. comments.	m.  Left lar in the L Good ali	Left lane. gnment on fi	% palling and delan	niantions along the	% ne edges of the j apped on and so	oints. ome small	ZZ. EZ. OZI TZ( GIE
Previous Ins 9/19/2012 - 99-26-2012. 9/27/2010 - palls/delam 6/20/2008 - 8/17/2006 - 0/06/2004 - 0/21/2002 -	Notes:  1  Spection Notes:  Joint at Bent 8 Fixed loose se Full and some inations along the Same as past in None Minor spalling in Also add that be	has a loose ction of the damage to he joint sterinspection of along the joint sterinspectic sterinspection of along the joint sterinspection of along the joint sterinspection o	e section in the joint at Bent 8 the troughs. Cel. comments.	m.  Left lar in the L Good ali	Left lane. gnment on fi	palling and delar	niantions along the	% ne edges of the j apped on and so	oints. ome small	ZZ. EZ. OZI TZ( GIE IZI-
Previous Ins 9/19/2012 - 9-26-2012 - 9/27/2010 - 9/27/2010 - 9/27/2010 - 0/20/2008 - 8/17/2006 - 0/06/2004 - 0/21/2002 - 8/23/2000 -	Notes:  5 - Assm Jt w/o S  1  1  1  1  1  1  1  1  1  1  1  1  1	has a loosection of the damage to damage to inspection of along the jooth ends a	e section in the joint at Bent 8 the troughs. Comments.	m.  Left lar in the L Good ali ger alig	eft lane. gnment on fi nment is Goo rial.	palling and delar ngers. Steel sou od. Troughs are	niantions along the nds solid when to either plugged of	% ne edges of the j apped on and so r missing on all o	oints.  ome small  of the joints.	ZZ. EZ. OZI TZ. GIE IZ. FIA
Previous Ins 9/19/2012 - 9-26-2012 - 9/27/2010 - p/21/2008 - 8/17/2006 - 0/06/2004 - 0/21/2002 - 8/23/2000 - 2/11/1997 -	Notes:  5 - Assm Jt w/o S  1  Spection Notes:  - Joint at Bent 8 Fixed loose se - Full and some interventions along the same as past in the same a	has a loosection of the damage to damage to inspection of along the jooth ends a	e section in the joint at Bent 8 the troughs. Comments.	m.  Left lar in the L Good ali ger alig	eft lane. gnment on fi nment is Goo rial.	palling and delar ngers. Steel sou od. Troughs are	niantions along the nds solid when to either plugged of	% ne edges of the j apped on and so r missing on all o	oints. ome small	ZZ. EZ. OZI TZ( GII IZH FIA S FK/
Previous Ins 9/19/2012 - 9-26-2012 - 9/27/2010 - palls/delam 6/20/2008 - 8/17/2006 - 0/06/2004 - 0/21/2002 - 8/23/2000 - 2/11/1997 - nto the cap 0/01/1995 -	Notes:  5 - Assm Jt w/o S  1  Spection Notes:  - Joint at Bent 8 Fixed loose se - Full and some interventions along the same as past in the same a	has a loosection of the damage to he joint sterinspection of along the jooth ends at Bents 5, 8	e section in the joint at Bent 8 the troughs. Cel. comments.	m.  Left lar in the L Good ali ger alig	eft lane. gnment on fi nment is Goo rial.	palling and delar ngers. Steel sou od. Troughs are	niantions along the nds solid when to either plugged of	% ne edges of the j apped on and so r missing on all o	oints.  ome small  of the joints.	ZZ. EZ. OZ. TZ. GIC IZ. FIA

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\* \* \* \* \* \* \* \* \* Span : Appr-1 - P/S Concrete Spans 1 thru 13 and 20 (cont.) \* \* \* \* \* \* \* \*

Element Des	scription		'			· ·	10 13 and 20 (CC			
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311	- Moveable Bea	aring Bent	s 5, 8, 11, 14, a	nd Pier	20				1	
	1	2	49	ea.		80	20	0		
						%	%	%	%	9/
Previous Ins	pection Notes :									
09/19/2012 -	Alignment was	ok. Dirt, d	lebris, and bird	nest on	the bearing	s. Rust, scale, p	paint loss, and sta	nining.		ZZJO
09/27/2010 -	Fair to Good al	ignment. I	_ots of debris or	n the be	arings. Stai	ining from leaky	joints above. Ru	st, scale, and pa	int loss.	EZJZ
06/20/2008 -	Rusty spots, pa	aint loss, a	nd debris. Aligr	nment a	ppeared to b	be Good.				OZKZ
08/17/2006 -	None									TZCZ
10/06/2004 -	Bent anchor bo	olts. Rusty	spots, scale, ar	nd pittin	g on most o	f the bearings. I	Rest is from previ	ous reports whe	n viewed by binoc	ulars. GIDZ
	All have bent a	nchor bolts	s except at Pier	20. All	show some	rust and minor	paint loss with the	ose at Bent 11 bu	uried in sanding	IZHX
material. 08/23/2000 -	Env. State 2 as	s under lea	kv ioints. Rust	and pitt	ina: rest is u	ınchanged.				FIAS
			• •			•	bent over due to	excessive move	ement - see photos	
10/01/1995 -		ŭ							·	YDNF
09/01/1992 -	(12) each at Be	ents 5, 8, a	nd 11 plus (6) a	t Bent 1	14 plus (7) a	t Pier 20.				REFI
Inspection I	lotes:									
Element 313	- Fixed Bearing 1	9 Bent 2, 3	120		13	90		0		9
Previous Ins	pection Notes :									
	Spot rust, paint									ZZJO
	Rust, paint loss									EZJZ
	Rusty spots, pa	aint loss, ai	nd debris. Drop	ped Ab	utment bear	rıngs.				OZKZ
08/17/2006 -		L = 101 - = = 0	and the state of the	a tha ha		a de Cardo al ada de aCardo a de c	and the state of the state of			TZCZ
	·				Ŭ	n bird debris whe	en viewed by bind	oculars.		GIDZ
	Some rust, pitti	•	nor paint loss ti	nrougno	out.					IZHX
12/11/1997 -	Some rust and	pitting								FIAS FKAR
12/11/1997 - 10/01/1995 -										YDNF
		t 1, (7)at A	butment 21, plu	ıs (15) a	at Bent 2, (18	8) at Bent 3. (15	) at Bent 4, (12) a	at Bent 6, 7, 9, 10	), 12, and 13	REFI
Inspection I	,	, ( )	,			, , , , , ,	, , , , , ,	, , , , ,	· •	
-1										

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\* \* \* \* \* \* \* \* \* Span : Appr-1 - P/S Concrete Spans 1 thru 13 and 20 (cont.) \* \* \* \* \* \* \* \*

Element Des	cription							<u> </u>		
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 331	- Conc Bridge I	Railing Let	t and Right veh	icle rail						
	1	3	708	m.		90	5	5	0	
						%	%	%	%	Q
Previous Insp	pection Notes :									
09/19/2012 -	Small spalls, de	elaminatior	ns, and popouts	through	hout. Barrie	r has a lot of sur	rface shrinkage c	racks.		ZZJO
delamination	s on barrier in s	pots.		-					tate 3 due to small	EZJZ OZKZ
08/17/2006 -		S every 5 t	0 4 IL WILLI IIIANIY	or the	CIACKS SHOW	nng sman spans	or delaminated a	ireas.		TZCZ
		vertical cr	acks every 3 to	4 feet						GIDZ
			I shrinkage crac							IZHX
08/23/2000 -	•		ago orac							FIAS
12/11/1997 -										FKAR
10/01/1995 -	None									YDNF
09/01/1992 -	353.79 * 707.5	8m								REFI
Element 334	- Metal Rail Co	ated Right	t Pedestrian Ra	il m.		90	10	O	0	
	'	3	304	111.						
Drovious Inc	pection Notes :					%	%	%	%	o d
<u> </u>		and have	and fadad	naint th	roughout (	Shainlink fahria i	s in Good condition	22		ZZJO
			r coat, and pain	•			s III Good condition	511.		EZJZ
			nd prime coat vi		-					OZKZ
08/17/2006 -		,			a.g a					TZCZ
		box beams	s show rust spot	s. Han	d rail on top	of the barrier ra	il has rust spots.			GIDZ
10/21/2002 -	Add some scra	pes and m	inor paint loss.		·		·			IZHX
08/23/2000 -	Some rust and	pitting.								FIAS
12/11/1997 -	None									FKAR
10/01/1995 -	None									YDNF
09/01/1992 -	Pedestrian rail	on the righ	t outside of the	bridge.	353.79 * 1	= 353.79m				REFI
Inspection N	Notes:									



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General Inspection Notes	
•	77 10
09/19/2012 - David Crumley was notified about the finger joint failing at Bent 8 on 09-18-2012. He set up a check for 09-21-2012 in the am with 31-01 and Bill Lay. He and 31-01's crew with Charlie and Henry repaired the joint on 09-26-2012.	ZZJO EZJZ
From the 2011 underwater inspection by Infrastructure Engineers there is no change to the channel or scour conditions at this bridge. There is ight timber debris at the upstream nose of Piers 3 and 4. CRH	
06/20/2008 - NBI 59, superstructure, rated a "6" due to broken or loose anchor bolts in the Main span.	OZKZ
08/17/2006 - Per Infrastructure Engineers August 24, 2006 underwater inspection, There are no significant defects present below the high vaterline. There is no significant local or general scour present at the bridge site. There are no significant restrictions in the channel that will adversely impact flow. There is a local scour cone 5 feet in diameter by 3 feet deep at the upstream nose of pier 6. Construction debris at the upstream nose of pier 5 and the downstream nose of pier 4. Debris consists of rebar protruding from the mudline 3 feet high with a 55 gallon parrel along side of it. ITEM 61 CHANGED PER INFRASTRUCTURE ENGINEERS UNDERWATER INSPECTION.	TZCZ
0/06/2004 - NBI 58, deck, rates at a "6" due to cracking in all spans and spalls along the joint edges.	GIDZ
NBI 60, substructure, rated at a "6" due to minor spalls on the underside of some caps and minor/tight cracks in the columns.	IZHX
08/23/2000 - None	FIAS
2/11/1997 - None	FKAR
0/01/1995 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/11/97 10:45:22 Sufficiency Rating Calculation Accepted by ops\$u5963 at 2/26/97 10:59:10 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:23:33	YDNF
09/01/1992 -	REFI
01/01/1991 - Updated with tape 1993	NB93
05/01/1989 - Updated with tape 1991	NB91
04/01/1987 - Updated with tape 1989	NB89
0/01/1984 - Updated with tape 1986	NB86



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#### P00060094+08282

Location: GREAT FALLS Structure Name: GF Warden-EB

**General Location Data** 

MDT Maintenance Section: 31-01 Great Falls

District Code, Number, Location: 03 Dist 3 GREAT FALLS Division Code, Location: 31 GREAT FALLS

County Code, Location: 013 CASCADE City Code, Location: 32800 GREAT FALLS

Kind fo Hwy Code, Description: 2 2 U.S. Numbered Hwy Signed Route Number: 00089

Str Owner Code, Description: 1 State Highway Agency Maintained by Code, Description: 1 State Highway Agency

Intersecting Feature: MISSOURI RV, U5205, BNSF Kilometer Post, Mile Post: 152.60 km 94.82

Structure on the State Highway System : X Latitude : 47°29'37"

Structure on the National Highway System : X Longitude : 111°18'39"

Str Meet or Exceed NBIS Bridge Length:

**Construction Data** 

Construction Project Number : **FGU 388 1 2**Construction Station Number : **45+89.00** 

Construction Drawing Number: 2926

Construction Year: 1951

Current ADT: 37,380 ADT Count Year: 2009 Percent Trucks: 2 % Reconstruction Year:

### Structure Loading, Rating and Posting Data

#### Loading Data:

**Traffic Data** 

Design Loading :		5 MS 18 (HS 20)
Inventory Load, Design:	32.6 mton	B ASD Assigned
Operating Load, Design:	32.6 mton	B ASD Assigned
Posting :		5 At/Above Legal Loads

Rating Data :	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3:	86		

#### Structure, Roadway and Clearance Data

#### Structure Deck, Roadway and Span Data:

Structure Length: 637.90 m

Deck Area: 6,960.00 m sq

Deck Roadway Width : 8.53 m
Approach Roadway Width : 10.90 m

Median Code, Description: 0 No median

#### Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure : 99.99 m

Reference Feature for Vertical Clearance: H Hwy beneath struct

Vertical Clearance Under the Structure: 5.49 m

Reference Feature for Lateral Underclearance : H Hwy beneath struct

Minimum Lateral Under Clearance Right : 3.50 m

Minimum Lateral Under Clearance Left : 0.00 m

#### Span Data

#### **Main Span**

Number Spans : 6

Material Type Code, Description : 4 Steel continuous

 $Span\ Design\ Code,\ Description: \textbf{3}\quad \textbf{Girder}\ \ \textbf{and}\ \ \textbf{Floorbeam}\ \ \textbf{System}$ 

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

Deck Surfacing Type: 3 Latex Concrete or similar additive

Deck Protection Type : **0 None**Deck Membrain Type : **0 None** 

#### Approach Span

Number of Spans: 21

Material Type Code, Description: 4 Steel continuous

Span Design Code, Description: 2 Stringer/Multi-beam or Girder

(52) Out-to-Out Width: 10.91 m

(50A) Curb Width: (50B) Curb Width: 1.19 m

Skew Angle: °

#### Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, West or Bi-directional Travel			North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
One Route Under	U05205	Both	5.49 m	7.92 m	N/A			
RIVER ROAD / U05205								
Route On Structure	P00060	N/A	99.99 m	8.53 m	East			
10TH AVE. SOUTH - EB								



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**Inspection Data** 

Sufficiency Rating: 75.7

Structure Status : Func Obs - Elg Rehab

Inspection Due Date : 05 September 2015

(91) Inspection Frequency (months) : **24**Next Fracture Critical Due Date : **05 Sep 2015** 

Next Under Water Insp : **15 Nov 2016**Under Water Insp Type : **Type II** 

Fracture Critical Detail: 1 or 2 Stl-girder systms **NBI Inspection Data** 05 September 2013 Charles Pepos - 107 (90) Date of Last Inspection: Last Inspected By (90) Inspection Date Inspected By (62) Culvert Rating : N (58) Deck Rating: 7 (36A) Bridge Rail Rating: (68) Deck Geometry: 3 (59) Superstructure Rating : 6 (36B) Transition Rating (61) Channel Rating: (67) Structure Rating: (71) Waterway Adequacy (60) Substructure Rating : 6 (36C) Approach Rail Rating (69) Under Clearance: (36D) End Rail Rating (113) Scour Critical: 5 (72) App Rdwy Align : 7 (41) Posting Status: **Unrepaired Spalls:** 0 m sq 0.00 in Deck Surfacing Depth:

**Inspection Hours** 

msp <del>e</del> ction mours		
Crew Hours for inspection :	35	Snooper Required : Y
Helper Hours :	0	Snooper Hours for inspection : 17
Special Crew Hours :	12	Flagger Hours :
Special Equipment Hours :	-1	

Openial Olew I	12	1 1		. lagger rieure			
Special Equipment H	ours: -1					<del></del>	
Inspection Wor	k Candidates  Date Requested	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
D31-FY2006-000012	19 October 2005	Approved	Medium	All Spans	Bridge	Spot Paint (flex)	
Clean and paint the bea 18/27/2007 Blew off an 19/06/2011 Did this ag approved. DRC	nd overcoat painted be	earings on Main Spa	an during sno	ooper inspection	n.		
D31-FY2006-000014	19 October 2005	Approved	High	M Main	305 Assm Jt w/o Seal	Rehab Elem	
Repair the drain trough	under the linger joint	at bent 21.					
Approved. DRC							
пррготса. Впо							
D31-FY2006-000011	19 October 2005	Approved	Medium	A Approach	205 R/Conc Column	Min Repair	
Repair spalling/delamin	atad concrete on Cali			11111111			
Kepali Spalling/delamin	aled concrete on Coll	allilis at Delits 3 alit	ı 4.				
Approved DBC							
Approved. DRC							
D31-FY2011-000135	07 February 2011	Not Approved	Medium	All Spans	107 Paint Stl Opn Girder	Min Repair	
Clean and paint the gird	•						
Slean and paint the girt	deis as fieeded.						
D31-FY2011-000134	07 February 2011	Not Approved	Medium	All Spans	334 Metal Rail Coated	Repl Paint	
				III		110111111111111111111111111111111111111	
Clean and paint the brid	ige rall.						

Late Reason:

Inspection Date: 09/05/2013



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### **Element Inspection Data**

\* \* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder - Spans 21 thru 26 \* \* \* \* \* \* \* \*

Smart Flag	cription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 12 -	Bare Concrete	Deck 201	1 Mill and Over	lay w∖ S	Silica Fume	1			<u> </u>	
	1	3	3226	sq.m.	X	100	0	0	0	
						%	%	%	%	
revious Ins	pection Notes :					I				
9/05/2013 -	Mapping crack	s reflecting	up through the	2011 o	verlay. No	delaminations fo	und during chain	ing in the closed	Right lane.	FPDZ
9/06/2011 -	Removed and	replaced 2'	of the existing	surface	with Silica	Fume Concrete i	in June 2011.			GCC'
y Helena ea 8/27/2007 - nore through 6/28/2005 - se nearing th 17/24/2003 -	arlier this summer Quick chain drant evaluation. Do Tight mapping the 2 percent lim	er and their ag showed elaimantion cracks in a hit for Condous report.	r report is on file delaminations on ns/spalls concre Il spans with so ition State 2. V Some delamin	e in Hele or spalls ete at the ome area 'ery little	ena. s every 20 to e joint ancho as that are o e ski resistar	o 30 ft or less that orages. Rest of the delaminated. So nce remaining. (	an 10 percent for he previous com me areas of spal 295.66 * 10.91 =	Condition State ments still apply. ling along the ed 3225.65) Nate	Deck was evaluated 3; may be more with ges of the joints. In undeside od the december 2.	h a ZZBZ Nay SZM
9/27/2001 - rith effloresc		= 3346.64 der side of	Tight mapping the deck. Wea				Minor spalling at	all the joints. So	ome cracks are wid	e NIBL GKLI
		oks unoug	nout the dook.							
9/01/1992 -	None									REF
		Giraei								
	- Paint Stl Opn									
	1	2	591	m.		75	15	5	5	
	1		591	m.		75 %	15	5 %	5 %	
revious Ins	1 pection Notes :		591	m.						
9/05/2013 -	pection Notes :	2 y paint. Ru			itting under	%	%	%		e FPD.
9/05/2013 - ince the 201	pection Notes : Faded and dirty	y paint. Runab.	ıst blisters w∖ su	urface p	ŭ	% the blisters. Wo	% orst areas are und	%	%	
9/05/2013 - ince the 201 9/06/2011 -	pection Notes : Faded and dirt 11 deck/joint reh No change fror	y paint. Runab.	ıst blisters w∖ su	urface p	tle more pai	% the blisters. Wo	% orst areas are und	% der leaking joints.	% Not much leakage	GCC
9/05/2013 - ince the 20° 9/06/2011 - 8/25/2009 - iting under t 8/27/2007 -	pection Notes: Faded and dirty 11 deck/joint reh No change fror Paint is faded, the blisters. Bot G2 at Pier 26 h	y paint. Runab. In previous dirty, peeliitom flange has some d	inspections exc inspections exc ng, and scaling top side is stick eep surface col	urface p cept alitt in areas key from rrosion,	tle more pair s that moiston the deicer 1/8 ", at the	the blisters. Wo  nt loss and rust rure can get to the placed on the de	% orst areas are und noted. e girders. Lots of eck. tudinal stiffner.	%  der leaking joints.  heavy rust bliste  Dutside of the gir	%	GCC face ZQD
9/05/2013 - nce the 20' 9/06/2011 - 8/25/2009 - iting under the 8/27/2007 - ints show the 6/28/2005 - ave pack ru	Paction Notes: Faded and dirty 11 deck/joint ref No change fror Paint is faded, the blisters. Bot G2 at Pier 26 th ne worse paint I Rust, pack rust ast blisters, mos	y paint. Runab. In previous dirty, peelii tom flange has some doss and rut, pitting, pa	ist blisters w\ su inspections exc ng, and scaling top side is stick eep surface col st. Paint is very aint loss, and pa	urface p cept alitt in areas key from rrosion, / dirty ir aint peel	tle more pair s that moiston the deicer of 1/8 ", at the a areas that l; especially	the blisters. Wo nt loss and rust r ure can get to the placed on the de lower web longi mag. chloride/sa under or near le	wrst areas are unconcted. e girders. Lots of eck. tudinal stiffner. (anding material heaky joints. Some	der leaking joints.  heavy rust bliste  Dutside of the gir as accumulated. e area on the low	% Not much leakage	GCC face ZQD ky ZZB. veb SZM
9/05/2013 - noce the 20' 9/06/2011 - 8/25/2009 - ting under to 8/27/2007 - ints show to 6/28/2005 - ave pack ru 591.32) Na 7/24/2003 - spections.	Faded and dirty 11 deck/joint ref No change fror Paint is faded, the blisters. Bot G2 at Pier 26 h ne worse paint I Rust, pack rust st blisters, most tte. Rusty spots wit	y paint. Runab. In previous dirty, peelintom flange has some doss and rutt, pitting, pattly still tight th pack rus	inspections exc inspections exc ing, and scaling top side is stick eep surface col st. Paint is very aint loss, and pa c, on them. Mag	urface p cept aliti in areas key from rrosion, y dirty in aint peel g chloric	tle more pair s that moistun the deicer 1/8", at the n areas that l; especially de/dirt laying	the blisters. Wo nt loss and rust r ure can get to the placed on the de lower web longi mag. chloride/sa under or near le g on the outside of	orst areas are unconoted. e girders. Lots of eck. tudinal stiffner. Canding material hasky joints. Some of the girders on	der leaking joints.  heavy rust bliste  Dutside of the gir as accumulated. e area on the low	Not much leakage rs in areas with sur ders and under lea er portions of the w tom flange. (295.6	GCC face ZQD ky ZZB reb SZM 6 * 2
9/05/2013 - ince the 20' 9/06/2011 - 8/25/2009 - iting under 18/27/2007 - 6/28/2005 - ave pack ru 591.32) Na 7/24/2003 - spections. 9/27/2001 - Rusty spots	Faded and dirty 11 deck/joint reh No change from Paint is faded, the blisters. Both G2 at Pier 26 hand the worse paint I Rust, pack rust ist blisters, most te.  Rusty spots with 306.75 * 2 = 61 ander all the joint in the point	y paint. Runab. In previous dirty, peelintom flange has some doss and rutt, pitting, pattly still tight th pack rus	inspections exc inspections exc ng, and scaling top side is stick eep surface cor st. Paint is very aint loss, and pa c, on them. Mag t and minor sec	urface p cept aliti in areas key from rrosion, y dirty in aint peel g chloric	tle more pair s that moistun the deicer 1/8", at the n areas that l; especially de/dirt laying	the blisters. Wo nt loss and rust r ure can get to the placed on the de lower web longi mag. chloride/sa under or near le g on the outside of	orst areas are unconoted. e girders. Lots of eck. tudinal stiffner. Canding material hasky joints. Some of the girders on	der leaking joints.  heavy rust bliste  Dutside of the gir as accumulated. e area on the low the top of the bot	Not much leakage rs in areas with sur ders and under lea er portions of the w tom flange. (295.6	GCC face ZQD ky ZZB reb SZM 6 * 2 YAD
9/05/2013 - ince the 20' 9/06/2011 - 8/25/2009 - iting under to 8/27/2007 - io 6/28/2005 - ave pack ru 591.32) Na 7/24/2003 - aspections. 9/27/2001 -	Paction Notes: Faded and dirty 11 deck/joint ref No change fror Paint is faded, the blisters. Bot G2 at Pier 26 h ne worse paint I Rust, pack rust st blisters, most te. Rusty spots wit 306.75 * 2 = 61 under all the join	y paint. Runab. In previous dirty, peelintom flange has some doss and rutt, pitting, pattly still tight th pack rus	inspections exc inspections exc ng, and scaling top side is stick eep surface cor st. Paint is very aint loss, and pa c, on them. Mag t and minor sec	urface p cept aliti in areas key from rrosion, y dirty in aint peel g chloric	tle more pair s that moistun the deicer 1/8", at the n areas that l; especially de/dirt laying	the blisters. Wo nt loss and rust r ure can get to the placed on the de lower web longi mag. chloride/sa under or near le g on the outside of	orst areas are unconoted. e girders. Lots of eck. tudinal stiffner. Canding material hasky joints. Some of the girders on	der leaking joints.  heavy rust bliste  Dutside of the gir as accumulated. e area on the low the top of the bot	Not much leakage rs in areas with sur ders and under lea er portions of the w tom flange. (295.6	GCC face ZQD ky ZZB yeb SZM 6*2 YAD NIBL
9/05/2013 - 9/06/2011 - 9/06/2011 - 8/25/2009 - iting under t 8/27/2007 - ioints show ti 6/28/2005 - ave pack ru 591.32) Na 7/24/2003 - aspections. 9/27/2001 - lusty spots t 9/02/1998 -	Faded and dirty 11 deck/joint ref No change fror Paint is faded, the blisters. Bot G2 at Pier 26 h ne worse paint I Rust, pack rust sts blisters, most tte. Rusty spots wit 306.75 * 2 = 61 under all the join None None	y paint. Runab. In previous dirty, peelintom flange has some doss and rutt, pitting, pattly still tight th pack rus	inspections exc inspections exc ng, and scaling top side is stick eep surface cor st. Paint is very aint loss, and pa c, on them. Mag t and minor sec	urface p cept aliti in areas key from rrosion, y dirty in aint peel g chloric	tle more pair s that moistun the deicer 1/8", at the n areas that l; especially de/dirt laying	the blisters. Wo nt loss and rust r ure can get to the placed on the de lower web longi mag. chloride/sa under or near le g on the outside of	orst areas are unconoted. e girders. Lots of eck. tudinal stiffner. Canding material hasky joints. Some of the girders on	der leaking joints.  heavy rust bliste  Dutside of the gir as accumulated. e area on the low the top of the bot	Not much leakage rs in areas with sur ders and under lea er portions of the w tom flange. (295.6	GCC face ZQD ky ZZB2 veb SZM
9/05/2013 - nce the 20' 9/06/2011 - 8/25/2009 - ting under to 8/27/2007 - info show to 6/28/2005 - ave pack ru 591.32) Na 7/24/2003 - spections. 9/27/2001 - usty spots to 9/02/1998 -	Faded and dirty 11 deck/joint ref No change fror Paint is faded, the blisters. Bot G2 at Pier 26 h ne worse paint I Rust, pack rust sts blisters, most tte. Rusty spots wit 306.75 * 2 = 61 under all the join None None	y paint. Runab. In previous dirty, peelintom flange has some doss and rutt, pitting, pattly still tight th pack rus	inspections exc inspections exc ng, and scaling top side is stick eep surface cor st. Paint is very aint loss, and pa c, on them. Mag t and minor sec	urface p cept aliti in areas key from rrosion, y dirty in aint peel g chloric	tle more pair s that moistun the deicer 1/8", at the n areas that l; especially de/dirt laying	the blisters. Wo nt loss and rust r ure can get to the placed on the de lower web longi mag. chloride/sa under or near le g on the outside of	orst areas are unconoted. e girders. Lots of eck. tudinal stiffner. Canding material hasky joints. Some of the girders on	der leaking joints.  heavy rust bliste  Dutside of the gir as accumulated. e area on the low the top of the bot	Not much leakage rs in areas with sur ders and under lea er portions of the w tom flange. (295.6	GCC face ZQD ky ZZB. yeb SZW 6*2 YAD NIBI

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\*\*\*\*\* \* Span : Main-0 - Steel Girder - Spans 21 thru 26 (cont.) \* \* \* \* \* \* \* \*

Element Desc	cription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 113	- Paint Stl Strin	ger								
	1	1	887	m.		90	10	C	0	
						%	%	%	%	
revious Insp	ection Notes :									
9/05/2013 -	Some paint los	s and peel	ing paint in area	as. Ger	nerally in Go	od paint system	. Stringers are di	irty.		FPD
	·	·	•		·	nt loss and rust i	•	•		GCC
8/25/2009 -	Paint is genera	lly in good	condition. Som	e rust a	nd scale in a	area near joints.				ZQD
8/27/2007 -	Same as past of	comments	on rust at the d	eck to s	tringer flang	e area.				ZZB
						meet the concre	te deck. Some r	usty spots and s	staining where the	SZM
ringers are i	in the area of le	eaking joint	s. (295.66 * 3 :	= 886.98 • flanges	8 s: mainly nea	ar concrete conr	nections under an	ıd near leaking i	nints	YAD
172 172000				nango	s, manny mod			ia rioar ioaning j	J. 1.0.	NIBI
9/27/2001 -		7U 25M								
linor rust spe	ots; mostly at the		ge to concrete o	connecti	on and unde	er the joints.				
linor rust spi 9/02/1998 - Inspection N	ots; mostly at th	ne top flanç	ge to concrete o	connecti	on and unde	er the joints.				GKL
linor rust spi 9/02/1998 - Inspection N	ots; mostly at th	ne top flanç	ge to concrete d	connecti	on and unde	er the joints.				
Minor rust spi 9/02/1998 - Inspection N	ots; mostly at th	ne top flanç	ge to concrete o		on and unde	er the joints.	10		5	
linor rust spi 9/02/1998 - Inspection N	ots; mostly at the lotes: - Paint Stl Floo	r Beam			on and unde	,	10	£ 5%		
linor rust spo 9/02/1998 - nspection N lement 152	ots; mostly at the lotes: - Paint Stl Floo	r Beam			on and unde	80				
linor rust spi 9/02/1998 - nspection N lement 152	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes :	r Beam	458	m.		80		%	%	
Ainor rust spending rust rust spending rust	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes:	r Beam  2 y paint, rus	458 t blisters, and s	m. surface į	Ditting in thos	80	% leakage and whe	%	%	GKL
finor rust spo 9/02/1998 - Inspection N Element 152 Previous Insp 9/05/2013 - 9/06/2011 - 8/25/2009 -	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes: Faded and dirty No change fror Floorbeams sh	r Beam 2 y paint, rus	458 t blisters, and s inspections exc	m. surface p	pitting in those	80 % se areas of past nt loss and rust i	leakage and whe	% ere water can ga	%	GKL FPD GCC
Previous Inspection No. 100 (100 (100 (100 (100 (100 (100 (100	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes: Faded and dirty No change from Floorbeams shose rivot.	r Beam  2 y paint, rus n previous ow dirty pa	458 t blisters, and s inspections exi	m. surface p cept aliti	pitting in those the more pair rust blisters	80 % se areas of past nt loss and rust i on those under	leakage and whenoted. the leaky joints.	ere water can ga	wither.	FPD GCC from ZQD
Pinor rust spending rust rust spending rust	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes: Faded and dirty No change fror Floorbeams shose rivot. Floorbeams unspan 24 has (1)	r Beam  2 y paint, rus n previous ow dirty pa der leaky j loose rive	t blisters, and s inspections exi int, some peeli oints show rust t; not a problem	m. surface p cept alitt ng, and blisters	pitting in those the more pair rust blisters	80 % se areas of past nt loss and rust i on those under nt loss, and mind	leakage and whenoted. the leaky joints. It	ere water can ga  No change on 3i  open rust blister	wither.  In the floor beam back for the floor back for the floor back floor beam back for the floor back floor back floor back floor beam back floor back floo	FPD GCC from ZQD pack ZZB
linor rust spe 9/02/1998 - nspection N lement 152 revious Insp 9/05/2013 - 9/06/2011 - 8/25/2009 - ier 25 on loc 8/27/2007 - f Pier 25 in s 6/28/2005 -	ots; mostly at the lotes:  - Paint Stl Flootection Notes: Faded and dirty No change from Floorbeams shose rivot. Floorbeams unspan 24 has (1) Same commen	r Beam  2 y paint, rus n previous ow dirty pa der leaky j loose rive ats with pair	t blisters, and s inspections exi int, some peeli oints show rust t; not a problem nt loss, pitting a	m. surface p cept alitt ng, and blisters h. und som	pitting in those the more pair rust blisters , pitting, pair se tight pack	se areas of past nt loss and rust on those under nt loss, and minor rust also noted	leakage and whenoted. the leaky joints. It or section loss in and mostly near the section loss in the sect	ere water can ga  No change on 3i  open rust blister  the leaking joints	wither.  In the state of the st	FPD GCC from ZQD pack ZZB SZM
linor rust spe 9/02/1998 - nspection N lement 152 revious Insp 9/05/2013 - 9/06/2011 - 8/25/2009 - ier 25 on loc 8/27/2007 - f Pier 25 in s 6/28/2005 - 7/24/2003 - ome minor r	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes: Faded and dirty No change fror Floorbeams shose rivot. Floorbeams un span 24 has (1) Same commen Rusty spots thrust blisters and	r Beam  2 y paint, rus n previous ow dirty pa der leaky j loose rive its with pain	t blisters, and s inspections exi int, some peeli oints show rust t; not a problem t loss, pitting a e floorbeams. at connections.	m. surface p cept alitt ng, and blisters n. and som Worse i	pitting in those the more pair rust blisters, pitting, pair te tight pack rust is in area	se areas of past nt loss and rust on those under rust also noted as under leaking	leakage and whenoted. the leaky joints. It or section loss in and mostly near the section loss in the sect	ere water can ga  No change on 3i  open rust blister  the leaking joints	wither.  In the floor beam back for the floor back for the floor back floor beam back for the floor back floor back floor back floor beam back floor back floo	FPD GCC from ZQD pack ZZB SZM
Previous Insp 9/02/1998 - Inspection N Element 152 Previous Insp 9/05/2013 - 9/06/2011 - 8/25/2009 - ier 25 on loc 8/27/2007 - f Pier 25 in s 6/28/2005 - 7/24/2003 - ome minor r 9/27/2001 -	ots; mostly at the lotes:  - Paint Stl Floo  1  Dection Notes: Faded and dirty No change fror Floorbeams shose rivot. Floorbeams un span 24 has (1) Same commen Rusty spots thr rust blisters and 10.91 * 42 = 45	r Beam  2 y paint, rus n previous ow dirty pa der leaky j loose rive its with pail roughout th	t blisters, and s inspections exi int, some peeli oints show rust t; not a problem t loss, pitting a e floorbeams. at connections. I are in contact	m. surface p cept alitt ng, and blisters n. nd som Worse n with the	poitting in those the more pair rust blisters, pitting, pair te tight pack rust is in arease steel string	se areas of past nt loss and rust on those under rust also noted as under leaking ers.	leakage and whenoted. the leaky joints. It or section loss in and mostly near the section loss in the sect	ere water can ga  No change on 3i  open rust blister  the leaking joints	wither.  In the state of the st	FPD GCC from ZQD pack ZZB SZM
Previous Insp 9/02/1998 - Inspection N Element 152 Previous Insp 9/05/2013 - 9/06/2011 - 9/06/2011 - 9/06/2011 - 9/06/2007 - 9/06/2007 - 9/06/2007 - 9/06/2007 - 9/06/2007 - 9/06/2007 - 9/06/2007 -	ots; mostly at the lotes:  - Paint Stl Flootheams Structure Floorbeams Structure Floorbeams University Same comment Rusty spots thrust blisters and 10.91 * 42 = 45 especially under lotes:	r Beam  2 y paint, rus n previous ow dirty pa der leaky j loose rive its with pail roughout th	t blisters, and s inspections exi int, some peeli oints show rust t; not a problem t loss, pitting a e floorbeams. at connections. I are in contact	m. surface p cept alitt ng, and blisters n. nd som Worse n with the	poitting in those the more pair rust blisters, pitting, pair te tight pack rust is in arease steel string	se areas of past nt loss and rust on those under rust also noted as under leaking ers.	leakage and whenoted. the leaky joints. It or section loss in and mostly near the section loss in the sect	ere water can ga  No change on 3i  open rust blister  the leaking joints	wither.  In the state of the st	FPD GCC from ZQD pack ZZB SZM V YAD



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	cription									
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
٠,	- R/Conc Colun	1					. 0. 0.0		· or orac	
	1	3	8	ea.		90	5	5	0	
						%	%	%	%	
rovious Inc	pection Notes :	<u> </u>				70	70	70	70	
·				l * l.		al Taki asala	· · · · · · · · · · · · · · · · · · ·		D' 00 1 00	EDD:
	•		0 0	ne ice c	oreaker's stee	ei. Tignt cracks	from corners of ic	e breakers steel	on Pier 22 and 23.	FPD2
	No change from	•	•							GCC
reaker steel	l.	-					small delamination ice breaker. Rus		nd scale on ice out the ice breakers.	ZQD2 ZZB2
eparating from	om the concrete	e at piers 3	and 7.			ers August 24, 2 n the upstream i		nspection, the ste	eel ice breakers are	SZM YADZ
	ŭ				•	•	or with a boat to	get closer to the	m	NIBL
	Two columns a					·	or with a boat to	get ologer to the		GKL
		t Don't Z7 (	Tomor opani,	J110 0010		21 20.				Orter
nspection N	Notes:									
	D (0 0 1 D)	O /F: 1	D: 04 LOE							
lement 220	- R/C Sub Pile									
	1	3	2	ea.		100	0	0	0	
						%	%	%	%	
revious Ins	pection Notes :				_				•	
9/05/2013 -	Refer to UW IN	spection.								FPD
	Per the 2011 u	nderwater	inspection repo	rt by Inf	rastructure E	Engineers there i	s no change to th	is element since	the 2006 inspection	n. GCC
:RH 8/25/2009 -	Information is in	n latest un	derwater insned	rtion						ZQD
	Check on the la		·							ZZB
			•		Par Infrastr	ucture Engineer	s August 24, 2006	S underwater incr	paction there is	SZN
nsuffiecient (		osing seco	ndary rebar at t	he top o	of the footing	on the west side		o underwater msp	dection, there is	YAD
9/27/2001 -	None									NIBL
9/02/1998 -	LW - Piers 4 &	5 Underwa	ater Inspection	7/15/98	(Guthrie Div	ing Co) Expos	ed footings in goo	od condition		GKL
Inspection N	Notes:									
lement 227	- R/C Submerg	ed Pile F	Pier 22 thru 26							
	1	3	5	ea.		90	10	0	0	
						%	%	%	%	
rougious la s	naction Natar	<u> </u>				/0	/0	/0	70	
revious insp	pection Notes :									
0/05/55:	Refer to UW IN	•								FPD
	Per the 2011 u		ers are separati	ing from	the concrete	ers spalling is pro e at Piers 3 and		rete and steel ice	breaker interfaces	of GCC ZQD
9/06/2011 - ne substruct			underwater ins							
9/06/2011 - ne substruct 8/25/2009 -	tures. The steel	on the past		•						
9/06/2011 - ne substruct 8/25/2009 - 8/27/2007 -	tures. The steel Information is on Check on the la	on the past atest Unde	rwater II report.		Condition	states changed F	er Infrastructure	Engineers Augus	t 24. 2006 underwa	
9/06/2011 - ne substruct 8/25/2009 - 8/27/2007 - 6/28/2005 - nspection.	tures. The steel Information is on Check on the language Unchanged unto Spalling is prese	on the past atest Unde til the next ent at the co	rwater II report. underwater insoncrete/steel in	pection.	of the subst		er Infrastructure	Engineers Augus	t 24, 2006 underwa	iter SZN
9/06/2011 - ne substruct 8/25/2009 - 8/27/2007 - 6/28/2005 - nspection. \$ 7/24/2003 -	tures. The steel Information is of Check on the last Unchanged unto Spalling is present Information from	on the past atest Unde til the next ent at the co	rwater II report. underwater insoncrete/steel in	pection.	of the subst		er Infrastructure	Engineers Augus	t 24, 2006 underwa	ter SZM YAD
9/06/2011 - ne substruct 8/25/2009 - 8/27/2007 - 6/28/2005 - nspection. \$ 7/24/2003 -	tures. The steel Information is of Check on the late Unchanged unto Spalling is present Information from None	on the past atest Unde til the next ent at the com Guthrie l	rwater II report. underwater ins oncrete/steel in Diving Co.'s und	pection. terfaces derwate	s of the subst r report.	tructures.				YAD NIB
9/06/2011 - ne substruct 8/25/2009 - 8/27/2007 - 6/28/2005 - spection. \$7/24/2003 - 9/27/2001 - 9/02/1998 -	tures. The steel Information is of Check on the late Unchanged unto Spalling is present Information from None	on the past atest Unde til the next ent at the co m Guthrie I	underwater insponderwater insponderwater insponderwater Inspenderwater Inspenderw	pection. terfaces derwate	s of the subst r report.	tructures.	er Infrastructure l			iter SZM YAD

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\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder - Spans 21 thru 26 (cont.) \* \* \* \* \* \* \* \*

	cription									
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
lement 234	- R/Conc Cap	Pier 21 thr	ru 26				<u>.</u>			
	1	2	65	m.		90	5	5	0	
						%	%	%	%	
revious Ins	pection Notes :									
9/05/2013 -	Spall with expo	sed rebar	on centerline of	f Pier 23	3's cap. Son	ne delaminations	s noted on all of th	ne caps; mostly s	small surface type.	FPDZ
9/06/2011 -	No change from	m previous	inspections. B	lown of	f during the s	snooper inspecti	ons.			GCC'
				with a c	ouple more o	of the caps show	ving some diagona	al cracks. Caps a	also have some	ZQDZ
	leaking deck o Cap at Pier 24			rebar o	n the Top-Le	ft side on the un	derside of the car	o. Cap at Pier 2	3 has a diagonal cr	ack ZZBZ
om G1 to th	e column conn	ectiona are	a; digital photo	2115.	·		·	'	J	
	Tight and mind			•	ag of concret	e under leaking	iointo			SZM YADZ
	6 * 10.91 = 65.	•	Topons. Some	o otali ili	ig or concret	o under leaking	jonits.			NIBL
linor crackir	ng on hammer h	neads. Nee		at with	snooper.					
9/02/1998 -	Some cracking	, but minor	at this time.							GKLI
										REF
99/01/1992 - Inspection N		nt Seal Pie	er 22, 23, 25, ar	nd 26						REF
Inspection N	Notes:	nt Seal Pie	er 22, 23, 25, aı 44			95	5	0		REF
Inspection N	lotes: - Pourable Joir					95	5 %	0 %	%	REF
Inspection N	lotes: - Pourable Joir								%	REF
lement 301 Irevious Insp	- Pourable Joir 1 Dection Notes :	3	44	m.	nall area of P	%	%	%	% s sound solid when	REF
lement 301  Irevious Insp 9/05/2013 -	- Pourable Joir 1 Dection Notes :	3 erally in Go	44 od condition w	m.	nall area of P	%	%	%		
Previous Inspection No. 19/05/2013 - apped on. 19/06/2011 -	- Pourable Joir 1 Dection Notes: Sealant is generally sealant in	erally in Go	44 od condition w	m. ith a sm		% ier 23's where th	%	% s. Steel portions		FPD:
revious Inspection N 9/05/2013 - apped on. 9/06/2011 - 8/25/2009 - 8/27/2007 -	- Pourable Joir  1 Dection Notes: Sealant is generated the sealant in Torn and missing All have torn or the sealant in the sea	erally in Go June 2011 ing sealant r missing se	od condition wi . in all joints. So	m. ith a sm me spa	lling and dela	% ier 23's where th	% ne sealant is loose	%. Steel portions	s sound solid when	FPD. GCC ZQD
Previous Inspection No. 19/05/2013 - apped on. 19/06/2011 - 18/25/2009 - 18/27/2007 - anchorages. 16/28/2005 -	Pourable Joir  1 Dection Notes: Sealant is generated with the sealant in Torn and missing All have torn on Some nicks to Loose and torn.	erally in Go June 2011 ing sealant r missing se the guard a sealant in	od condition wind all joints. So ealant with leak angles.	m. ith a sm me spa age no	lling and delated undernea	% ier 23's where th amination along ath. All have sor	ne sealant is loose the edges of the me delamiantions	%. Steel portions ioint steel. /spalls in the cor	s sound solid when	FPD GCC ZQD ZZB;
Previous Inspection No. 19/05/2013 - apped on. 19/06/2011 - 19/25/2009 - 19/25/2007 - 19/25/2005	Pourable Joir  1  Dection Notes:  Sealant is generated with the sealant in Torn and missing All have torn on Some nicks to	erally in Go June 2011 ing sealant r missing se the guard a sealant in ider the joir	od condition wind all joints. So ealant with leak angles.	m. ith a sm me spa age no	lling and delated undernea	% ier 23's where th amination along ath. All have sor	ne sealant is loose the edges of the me delamiantions	%. Steel portions ioint steel. /spalls in the cor	s sound solid when	FPD: GCC ZQD: ZZB: pint SZM
Previous Inspection No. 2011 - 2012 -	Pourable Joir  1  Dection Notes: Sealant is generated to seal and the seal and the seal and torreages. Caps units and the seal and torreages. Caps units and the seal and torreages.	erally in Go June 2011 ing sealant r missing se the guard a n sealant in ider the join eport. 64m	od condition wince and in all joints. So ealant with leak angles. all (4) joints. So tts are wet from	m.  me spa  sage no  some di  n an ove	lling and delated underneart/debris in sernight rain.	% ier 23's where th amination along ath. All have sor	ne sealant is loose the edges of the me delamiantions	%. Steel portions ioint steel. /spalls in the cor	s sound solid when	FPD: GCC ZQD: ZZB:

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Continue

	·		O .::	111.74		5 . 0	5 4 04 4 0	5 4 04 4 0	5 . 0	5 . 6
•	Scale Factor  3 - Assembly Join	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Hemeni 30					Bent Zi	0.5				
	1	3	22	m.		95	5	0		
						%	%	%	%	
revious Ins	spection Notes :									
9/05/2013	<ul> <li>Small portion o</li> </ul>	n the Left s	side of the joint	at Pier	24's has bro	ken off. Gland a	ppears to be in G	Good condition.		FPDZ
9/06/2011	- New joints in J	une 2011.								GCCY
8/25/2009	- Tears in the gla	and in area	s, leakage, and	d some r	minor damag	ge to the joint sys	tem. Small delan	ninations and spa	alls along the edg	es. ZQDZ
08/27/2007 oted.	- Tears and dam	age to the	joints themselv	ves. And	chorage con	crete has delami	antions or spalls.	Nicks to the me	etal anchorages a	lso ZZBZ
6/28/2005 hights rain.			spalling along t	the joint	anchorages.	. Some areas wh	nere gland is pus	hed down. Leak	age evident after	
7/24/2003	- Same as last re	eport.								YADZ
	<ul> <li>2 * 10.91 =21.8</li> <li>se anchorage pl</li> </ul>			long the	anaharagas					NIBL
ileas oi loo	se anchorage pr	ates. Cont	Jiele spailing a	liong the	anchorages	<b>).</b>				
Inspection		Seal Finge	r Joint at Pier 3	01						
•	5 - Assm Jt w/o S					00	10	0		
•		Seal Finge	r Joint at Pier 2			90	10	0	Q/	
Element 30	5 - Assm Jt w/o S 1					90	10	0	%	
Element 309	5 - Assm Jt w/o S 1 spection Notes :	3	11	m.		%	%	%		FDD7
Previous Ins	5 - Assm Jt w/o S  1  spection Notes : - Some spalling	3 on the und	11 erside of the de	m.	e joint. Stee		%	%		FPDZ
Previous Ins 19/05/2013	5 - Assm Jt w/o S  1  spection Notes : - Some spalling - No change fror	on the und	erside of the de inspections.	m. eck at th	·	% el sounds solid w	% hen tapped on. F	% Finger alignment	looks Good.	FPDZ GCCY
Previous Ins 9/05/2013 9/06/2011 18/25/2009 Frough under	5 - Assm Jt w/o S  1  spection Notes : - Some spalling - No change fror - Good alignmer er joint is torn up	on the under the previous at on the fin and needs	erside of the de inspections.	m. eck at th	d when tapp	%	% hen tapped on. F	% Finger alignment	looks Good.	FPDZ GCCY
Previous Ins 19/05/2013 19/06/2011 18/25/2009 1 rough und 18/27/2007	5 - Assm Jt w/o S  1  spection Notes: - Some spalling - No change from - Good alignment or joint is torn up - No change from	on the und in previous at on the fin and needs in the previous	erside of the de inspections.  ngers, steel sous some repair/nous reports.	m. eck at th unds soli nodificat	d when tapp ions.	% sounds solid wheel on, and some	% hen tapped on. F	% Finger alignment aminations along	looks Good.	GCCY ZQDZ ZZBZ
Previous Ins 9/05/2013 9/06/2011 8/25/2009 Prough und 8/27/2007 6/28/2005	5 - Assm Jt w/o S  1  spection Notes: - Some spalling - No change from - Good alignment or joint is torn up - No change from	on the under previous and needs and delami	erside of the de inspections. Ingers, steel sous some repair/nous reports. Ination along the	m. eck at th unds soli	d when tapp ions. dges. Finge	% el sounds solid w	% hen tapped on. F	% Finger alignment aminations along	looks Good.	FPDZ GCCY ZQDZ ZZBZ SZMI
Previous Ins 9/05/2013 9/06/2011 8/25/2009 rough und 8/27/2007 6/28/2005 7/24/2003	5 - Assm Jt w/o S  1  spection Notes: - Some spalling - No change fror - Good alignmer er joint is torn up - No change fror - Minor spalling	on the under previous and needs in the previous and delaminain system	erside of the de inspections. Ingers, steel sous some repair/nous reports. Ination along the	m. eck at th unds soli	d when tapp ions. dges. Finge	% sounds solid wheel on, and some	% hen tapped on. F	% Finger alignment aminations along	looks Good.	FPDZ GCCY ZQDZ ZZBZ
Previous Ins 19/05/2013 19/06/2011 18/25/2009 17/09/28/2005 17/24/2003 19/27/2001	5 - Assm Jt w/o S  1  spection Notes: - Some spalling - No change fror - Good alignmer er joint is torn up - No change fror - Minor spalling - Trough and dra - 10.91 * 1 = 10 Some spalling	on the und in previous at on the fin and needs in the previous and delamitation system 91m	erside of the de inspections.  ngers, steel sous some repair/nous reports.  ination along the is in need of clean	m. eck at th unds soli	d when tapp ions. dges. Finge	% sounds solid wheel on, and some	% hen tapped on. F	% Finger alignment aminations along	looks Good.	FPDZ GCCY ZQDZ ZZBZ SZMI YADZ NIBL
revious Ins 9/05/2013 9/06/2011 8/25/2009 rough und 8/27/2007 6/28/2005 7/24/2003 9/27/2001 tusty areas	5 - Assm Jt w/o S  1  spection Notes: - Some spalling - No change fror - Good alignmer - Joint is torn up - No change fror - Minor spalling: - Trough and dra - 10.91 * 1 = 10 Some spalling:	on the und in previous at on the fin and needs in the previous and delamitation system 91m	erside of the de inspections.  ngers, steel sous some repair/nous reports.  ination along the is in need of clean	m. eck at th unds soli	d when tapp ions. dges. Finge	% sounds solid wheel on, and some	% hen tapped on. F	% Finger alignment aminations along	looks Good.	FPDZ GCCY ZQDZ ZZBZ SZMI YADZ

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Element Description  Smart Flag   Scale Factor									
Smart Flag Scale Factor									
Siliait i lag Scale i actor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 311 - Moveable Be	aring								
1	3	12	ea.		90	10	0		
					%	%	%	%	
Previous Inspection Notes :		<u> </u>							
լ 09/05/2013 - Spot rust and լ	paint loss.	Bearing alignm	ent was t	to expansio	n slightly today;	85F.			FPDZ
09/06/2011 - No change fro				·			pection.		GCCY
08/25/2009 - Bearings were	cleaned so	ome and spot p	ainted. B	earings at I	Bent 27 tower sp	an, are rocked to	wards expansio	n. Remaining bear	ing ZQDZ
allignments are good. 08/27/2007 - Bearings were	blown off	and averaget no	nintad du	ring the end	oper inspection	Alignment was	talarable aveant	for those at Bont	ZZBZ
27/Tower Span. These are								ioi tilose at belit	2202
06/28/2005 - Rusty, pitting,	pack rust-ti	ight, and paint l	oss.						SZMI
07/24/2003 - Rusty with son	ne debris fr	om bird nests a	and sandi	ng material	. Some cleaning	g done when sno	oper inspection v	vas done.	YADZ
09/27/2001 - Env. State #3 ( Debris from bird nests and s		0,	ara visibl	a Need to	verify numbers	and condition who	en snoonered		NIBL
09/02/1998 - None	some samu	ng matenai wii	ere visibil	e. Need to	verily fluffibers a	and condition with	en snoopered.		GKLH
09/01/1992 - None									REFI
Element 313 - Fixed Bearing	g								
1	1	4	ea.		95	5	0		
					%	%	%	%	
Previous Inspection Notes :					%	%	%	%	
·		ome faded and	missing p	paint with sp		%	%	%	FPDZ
09/05/2013 - Steel portion is	s Good. So				pot rust.			%	FPDZ GCCY
09/05/2013 - Steel portion is 09/06/2011 - No change fro	s Good. So m previous	inspections. B	slown off	and overco	oot rust. at painted during			%	
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and s	s Good. So m previous scale. Bear	inspections. B rings were spot	Blown off a	and overco	oot rust. at painted during			%	GCCY
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and s 08/27/2007 - Blown off and	s Good. So m previous scale. Bear overcoat pa	inspections. B rings were spot ainted as neede	Blown off a	and overco	oot rust. at painted during			%	GCCY ZQDZ
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and s 08/27/2007 - Blown off and 06/28/2005 - Some rust, pitt	s Good. Some previous scale. Bear overcoat pating, and pating, and pating.	inspections. Brings were spot ainted as neede aint loss.	Blown off a painted v	and overco	oot rust. at painted during to get at.	g the snooper ins	pection.		GCCY ZQDZ ZZBZ
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and s 08/27/2007 - Blown off and 06/28/2005 - Some rust, pitt 07/24/2003 - Some minor ru 09/27/2001 - Rusty spots. N	s Good. Som previous scale. Bear overcoat pating, and pating, and pating, approximately spots a	inspections. Brings were spot ainted as neede aint loss.	slown off a painted weed.	and overco	pot rust. at painted during to get at. me cleaning was	g the snooper ins	pection.		GCCY ZQDZ ZZBZ SZMI YADZ NIBL
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and stands 08/27/2007 - Blown off and 06/28/2005 - Some rust, pitt 07/24/2003 - Some minor ru 09/27/2001 - Rusty spots. No	s Good. Som previous scale. Bear overcoat pating, and pating, and pating, approximately spots a	inspections. Brings were spot ainted as neede aint loss.	slown off a painted weed.	and overco	pot rust. at painted during to get at. me cleaning was	g the snooper ins	pection.		GCCY ZQDZ ZZBZ SZMI YADZ NIBL GKLH
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and stands 08/27/2007 - Blown off and 06/28/2005 - Some rust, pitt 07/24/2003 - Some minor ru 09/27/2001 - Rusty spots. No	s Good. Som previous scale. Bear overcoat pating, and pating, and pating, approximately spots a	inspections. Brings were spot ainted as neede aint loss.	slown off a painted weed.	and overco	pot rust. at painted during to get at. me cleaning was	g the snooper ins	pection.		GCCY ZQDZ ZZBZ SZMI YADZ NIBL
Previous Inspection Notes: 09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and some of the control of the co	s Good. Som previous scale. Bear overcoat pating, and pating, and pating, approximately spots a	inspections. Brings were spot ainted as neede aint loss.	slown off a painted weed.	and overco	pot rust. at painted during to get at. me cleaning was	g the snooper ins	pection.		GCCY ZQDZ ZZBZ SZMI YADZ NIBL GKLH
09/05/2013 - Steel portion is 09/06/2011 - No change from 08/25/2009 - Spot rost and s 08/27/2007 - Blown off and 06/28/2005 - Some rust, pitt 07/24/2003 - Some minor ru 09/27/2001 - Rusty spots. N 09/02/1998 - None	s Good. Som previous scale. Bear overcoat pating, and pating, and pating, approximately spots a	inspections. Brings were spot ainted as neede aint loss.	slown off a painted weed.	and overco	pot rust. at painted during to get at. me cleaning was	g the snooper ins	pection.		GCCY ZQDZ ZZBZ SZMI YADZ NIBL GKLH

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\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder - Spans 21 thru 26 (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Fnv Quantity Element 334 - Metal Rail Coated 3 591 m. 60 25 10 % % Previous Inspection Notes: 09/05/2013 - Rusty spots, thin paint, exposed base paint, rusted post webs at the curb line with section loss to the webs. On-going repairs to the rails. Delaminated and spalling on the curbs. 09/06/2011 - No change from previous inspections. Reapired some rail on the Left side in June 2011. Noted seveal posts and panels damaged over the Labor Day Weekend on the Rigth side near the West Abutment. 08/25/2009 - Same comments as past inspections. Several post have been repaired where webs have been rotted away. 08/27/2007 - 5th post from Pier 26 on the Right/Median side is broken loose from the concrete. One bent post in Span 23 on the Right side. Lots of rust in the lower rail post webs causing section loss. Posts have been hit and bent over as web crumples. Most of the top coat of paint is faded to the primer coat. 2007/09/10. Bent posts straightened and fixed today. 06/28/2005 - Faded paint and rust spots where paint is chipped off. Red primer coat is coming through in most of the rail. A couple of areas rattle under traffic. (295.66 \* 2 = 591.32) Nate 07/24/2003 - Same as last report. 09/27/2001 - 306.75 \* 2 = 613.50m Paint is chaulky and pitted from sanding material. Rusty spots throughout. Rattling with some loose areas noted when traffic is crossing. 09/02/1998 - Minor areas of rust throughout. 09/01/1992 - None Inspection Notes: Element 357 - Sup Pack Rust SmFlag none Χ 3 Χ 100 ea. % % % % Previous Inspection Notes: 09/05/2013 - Swelling between connection plates. No distress visible to the rivets. 09/06/2011 - No change from previous inspections. 08/25/2009 - Minor swelling between some of the conection plates exists. Inspection Notes: Element 358 - Deck Cracking SmFlag none X 3 Χ 100 ea. % % % Previous Inspection Notes: 09/05/2013 - Mapping cracks in all Spans. Condition State 2 due to quantity. 09/06/2011 - Removed and replaced 2" of the existing surface with Silica Fume Concrete in June 2011. 08/25/2009 - Added due to the quantity and size of cracking in this deck. Inspection Notes:

Inspection Notes:

### **INITIAL ASSESSMENT FORM FOR STRUCTURE:**

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Continue

\* \* \* \* \* \* \* \* \* Span : Main-0 - Steel Girder - Spans 21 thru 26 (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 359 - Soffit Smart Flag X 100 1 ea. 0 0 % % % Previous Inspection Notes: 09/05/2013 - Spalling and deteriorated concrete throughout. Exposed and rusty rebar under post areas with delaminated concrete. 09/06/2011 - No change from previous inspections, but continueing to get worse. 08/25/2009 - Outlets on the drains show deteriorated and crumbling concrete with exposed and rusty reiforcing steel. Spalling and delaminated areas throughout underside of the curbs. 08/27/2007 - Same and lots of it throughout the bridge; see photos. 06/28/2005 - Unchanged from last report or maybe slightly more deterioration/spalling. 07/24/2003 - The outlets of the drain scuppers are deteriorating with some exposed and rusting reinforcing steel. Some deteriorating concrete is falling off and/or is loose. Inspection Notes: \* \* \* \* \* \* \* \* \* Span : Appr-1 - Steel Girders - Spans 1 thru 20 \* \* \* \* \* \* \* \* Element Description Smart Flag | Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck 3 3609 Χ 100 sq.m. 0 % % % % % Previous Inspection Notes : 09/05/2013 - (1) small delamination found along Bent 5 and Bent 9's joints. Deck looks Good with minor wear in the wheel paths. Lots of mapping cracks. 09/06/2011 - Removed and replaced 2" of the existing surface with Silica Fume Concrete in June 2011. 08/25/2009 - Poor skid resistance, and wear from studded tires. Helena did an indepth scan of delamination and spalling in the deck this past summer and their report is in Helena. 08/27/2007 - Quick chain drag showed delaminations or spalls every 30 to 40 ft or less than 10 percent for Condition State 3; may be more with a more through evaluation. Delaimantions/spalls concrete at the joint anchorages. Rest of the previous comments still apply. 06/28/2005 - Mapping cracks throughout all spans with some small areas of delamination and spalling; probably less than 2 percent. Very little skid resistance with wear in the wheel paths. (330.83 \* 10.91 = 3609.36) Nate. 07/24/2003 - Same on deck comments and on scuppers. Wear on deck with some exposed aggregate. Tight mapping cracks throughout the deck. Soffitt smart flag for popouts around scuppers. 09/27/2001 - 331.12 \* 10.91 = 3613.39 Cracking throughout. Some concrete is poping out under all drain scuppers with some exposed reinforcing steel. Some concrete popouts along the top flange of the main girders. 09/02/1998 - minor cracking throughout.

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Continue

\* \* \* \* \* \* \* \* \* Span : Appr-1 - Steel Girders - Spans 1 thru 20 (cont.) \* \* \* \* \* \* \* \* Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 107 - Paint Stl Opn Girder 2 1323 m. 80 10 0 % % % Previous Inspection Notes: 09/05/2013 - Bottom flanges have rust blisters and minor pitting on their tops. Areas near the joints have heavy rust and paint loss from past leakage. Faded and dirty paint. 09/06/2011 - No change from previous inspections with a little more paint loss and rust noted. 08/25/2009 - Rust blisters with some minor surface pitting on the tops of the bottom flanges in areas that moisture is collecting. Rust and some cracking of the welds on the bottom cover plates in areas that water has gotten between the cover and bottom flange. 08/27/2007 - Spots of rust on the bottom flanges of the outside girders; especially where the drains are dumping water onto them. Rust blisters show surface pitting when cleaned off. Also the same as previous comments. 06/28/2005 - Rust and scale along the underside of the deck where the top flange is against the concrete. Areas under leaky joints are the worse. (4 \* 330.83 = 1323.32) Nate. 07/24/2003 - Rusty spots along the upper flanges to concrete area. Ends of girders under leaking joints show some minor blistering rust. 09/27/2001 - 4 \* 331.2m = 1324.8m Rusty spots under the joints with some rust spots at the top flange to concrete connection. 09/02/1998 -Inspection Notes: Element 178 - Painted Trans Girder Bent 21 3 11 80 15 m. % % Previous Inspection Notes : 09/05/2013 - Heavy rust, scale, rust blisters, and surface pitting where water can sit. 09/06/2011 - No change from previous inspections with a little more paint loss and rust noted. 08/25/2009 - Dirty. rust, scale and some acctive corrsion in areas that moisture is collecting. 08/27/2007 - Dirty, stained, and some rusty spots. 06/28/2005 - Same as last report. 07/24/2003 - Step up girder to make up difference in girder heights. (4) girders on top and supported by (2) bearings. Some areas of rust 09/27/2001 - 10.91 \* 1 = 10.91m Env. State #3 as under an open joint. Rusty spots at the connections. Inspection Notes:

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\* \* \* \* \* \* \* \* \* Span : Appr-1 - Steel Girders - Spans 1 thru 20 (cont.) \* \* \* \* \* \* \* \*

	0 1 5 1		A	1 1 1		D + O+ + 4	D + O+ + 0	D + O+ + 0	5 . 0	
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
iement 205	- R/Conc Colur									
	1	2	23	ea.		85	10	5	0	
						%	%	%	%	
revious Insp	pection Notes :							l		
nose under l				Vertical	cracking ald	ong edges on so	me. Surface spal	lls from shallow	tie wire. Staining o	on FPC GCC
	ŭ	•	•	tun Se	veral with sn	mall snalls and s	taining on those tl	hat have some l	eakage from above	
							par and rust at Be		-	ZZE
lelamianted :	areas. Bent 9's	s column ha	as a spall on th	e Left co	orner.	·	se areas. Same			SZN
			•					· ·	olumns from vehicle	
ctivity under	r the structure. Minor cracking						5o oo.ap oo o a			NIB
	Ŭ	Ŭ		Ŭ						
nspection N	lotes:			with 1 co	olumn per =	23				GKL
Inspection N	Notes:	ment Abuti	ment 1-East		olumn per =					GKL
Inspection N	lotes:				olumn per =	95	5	0	0	GKL
Inspection N	Notes:	ment Abuti	ment 1-East		olumn per =		5 %	0	0 %	GKL
Inspection N	Notes:	ment Abuti	ment 1-East		olumn per =	95				GKL
Inspection N Element 215 Previous Insp	- R/Conc Abutr  1  Dection Notes : Generally Good	ment Abuti	ment 1-East 15 . Some tight cr	m.		95 %	%	%		
Inspection No.	- R/Conc Abutr 1 Dection Notes :	ment Abuti 2 d condition the ground	ment 1-East 15 1. Some tight cidline.	m.		95 %	%	%	%	
Element 215 Previous Insp 09/05/2013 - on the Left wi	- R/Conc Abutr  1 Dection Notes: Generally Goodignwall edge at No change from	ment Abuti 2 d condition the ground previous	ment 1-East  15  . Some tight cidline. inspections.	m.	the backwal	95 % I concrete. Wate	%	% the backwall to	%	spall FPD
Previous Insp 9/05/2013 - In the Left wi 19/06/2011 - 18/25/2009 -	- R/Conc Abutr  1  Dection Notes: Generally Goodignwall edge at No change from Tight cracks in	ment Abuti 2 d condition the ground m previous abutment	ment 1-East  15  Some tight cidline. inspections. backwalls and area is damp. I	m. racks in wingwal	the backwal	95 % I concrete. Wate amp from leakag	% er leaking through	% the backwall to	%	spall FPC GCC ZQC
Previous Insp 9/05/2013 - n the Left wi 9/06/2011 - 8/25/2009 - 8/27/2007 - some moders	- R/Conc Abutr  1 Dection Notes: Generally Gooignwall edge at No change fror Tight cracks in leaking at Abutate erosion fror	d condition the ground previous abutment tament has an under the	ment 1-East  15  Some tight cidline. inspections. backwalls and varea is damp. It is damp.	m. racks in wingwal Lots of services	the backwal	95 % I concrete. Wate amp from leakag	er leaking through le. All prior remarl Tight cracks in th	% the backwall to	% cap areas. Small	spall FPC GCC ZQC
Previous Inspection No. 215 Previous Inspection Servious Inspection No. 215 Previous I	- R/Conc Abutr  1 Dection Notes: Generally Gooignwall edge at No change fror Tight cracks in leaking at Abut ate erosion fror Same as last resident to the second control of the	d condition the ground previous abutment tas an under the eport and a	ment 1-East  15  Some tight cidline. inspections. backwalls and varea is damp. It is a continuous towards some small	m. racks in wingwal Lots of s rards Be	the backwal  Is. Area is da anding mate int 2. where the gir	95 % I concrete. Wate amp from leakag erial on the cap. rders are embed	er leaking through le. All prior remarl Tight cracks in th	% the backwall to ks still apply.  The Abutment's base in the still apply.	% cap areas. Small	spall FPD GCC ZQD alls. ZZB
Previous Inspection No. 215 Pr	- R/Conc Abutr  1  Dection Notes:  Generally Gooignwall edge at No change fror Tight cracks in leaking at Abut at eerosion fror Same as last ro Minor and tight 14.81 * 1 = 14.  Ing in the Abutm	d condition the ground previous abutment the ment has a ment and a tracking in 81m.	ment 1-East  15  Some tight cidline. inspections. backwalls and area is damp. It is a companied toward and some small in Abutment back	m. racks in wingwal Lots of s rards Be	the backwal  Is. Area is da anding mate int 2. where the gir	95 % I concrete. Wate amp from leakag erial on the cap. rders are embed	er leaking through e. All prior remarl Tight cracks in th	% the backwall to ks still apply.  The Abutment's base in the still apply.	% cap areas. Small	spall FPE GCC ZQE alls. ZZE SZM YAE NIB
Previous Insp 9/05/2013 - on the Left wi 19/06/2011 - 18/25/2009 - 18/25/2009 - 18/25/2005 - 18/28/2005 - 17/24/2003 - 19/27/2001 -	- R/Conc Abutr  1  Dection Notes:  Generally Gooignwall edge at No change fror Tight cracks in leaking at Abut at eerosion fror Same as last ro Minor and tight 14.81 * 1 = 14.  Ing in the Abutm	d condition the ground previous abutment the ment has a ment and a tracking in 81m.	ment 1-East  15  Some tight cidline. inspections. backwalls and area is damp. It is a companied toward and some small in Abutment back	m. racks in wingwal Lots of s rards Be	the backwal  Is. Area is da anding mate int 2. where the gir	95 % I concrete. Wate amp from leakag erial on the cap. rders are embed	er leaking through e. All prior remarl Tight cracks in th	% the backwall to ks still apply.  The Abutment's base in the still apply.	% cap areas. Small	spall FPD GCC ZQD alls. ZZE SZN YAD



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Element Des	orintion		· · · · · Span	: Appı	r-1 - Steel G	irders - Spans	1 thru 20 (CONt.	) ^ ^ ^ ^ ^ ^ ^ ^ ^		
	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
	- R/Conc Cap		,	Onno	mop Edon	r or orar r	r or orar 2	. or orar o	1 or orac 1	
	1	2	219	m.		85	10	5	0	
						%	%	%	%	%
Previous Inst	pection Notes :									
			d leaking deck i	ninte (	Snalling from	shallow rehar o	hairs and tie wire	Cracks with eff	lorescence on end	ds of FPDZ
some of the o		ations on B	ent 6, 9, and 15		Spannig Iron	i sitaliow repair o	nans and tie wire	. Oracks with on	oresective of ene	GCCY
08/25/2009 -	Same commer	nts as prior	inspections.							ZQDZ
side's Left co delamianted	rner. Bent 6 ha area near cent	as a 2'(w) x erline on th	1'(h) delamina	tion und	der G1Ś6. B	ent 15's cap has	s a 1' x 1' spall on	the underside of	a spall on the Spa the Right end and Lots of staining un	da
06/28/2005 -	Same as previ	ous reports			d of the caps	under the beari	ngs at Bents 3 an	d 4 show some o	cracking and spalli	ing SZMI
	ning from leaki Same as previ		ld that the south	n end of	f the cap at E	Bent 2 is cracked	d with delaminated	d concrete. Som	e minor delaminat	ions YADZ
also noted at		n the colum	nn to cap conne							NIBL
Minor cracks	at ends of seve	eral caps.	Need to look at	with sn	ooper for co	ndition state.				
09/02/1998 -	Some cracking	g, but minoi	Ī							GKLH
Element 301	- Pourable Joir	nt Seal Be	ents 3(skewed),	5(Skev	ved), 6, 9, 12	2, 15, and 18				
	1	3	82	m.		95	5	0		
						%	%	%	%	%
Previous Insp	ection Notes :	1	I							
	Generally in G	ood conditi	on. A couple o	f small	tears in the s	sealant at Bents	3, 6, and 12. Sea	alant looks adher	ed in most of the a	areas FPDZ
of the joints. 09/06/2011 -	New Silicone s	sealant and	joints in June 2	2011.						GCCY
08/25/2009 -	Torn and miss	ing joint ma	aterial. Spalling	and de	laminations a	along edges of jo	oint steel. Most of	the steel sounde	ed solid when it wa	s ZQDZ
	Some loose or	missing jo	int material. So	me del	aminated co	ncrete along the	joint anchorages	, but the steel so	unds solid when	ZZBZ
tapped on. 06/28/2005 - edges.	These joints co	ould be con	npression joint	glands.	Same as pr	revious reports w	vith loose materia	l and dealaminat	ions along the join	t SZMI
	Leaking. Area	s of loose j	oint material. N	/linor sp	alling and d	elaminations alo	ng the joint ancho	orages.		YADZ
						are perpendicu is spalled along	lar. both sides of the	anchorages.		NIBL
09/02/1998 -	Sliding Plate J	oints at Be	nts 11, 14, 17, 2	20, 23, 2	24 & 26.					GKLH
Inspection N	lotes:									

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\*\*\*\*\* \* \* \* \* \* Span : Appr-1 - Steel Girders - Spans 1 thru 20 (cont.) \* \* \* \* \* \* \* \*

	Scription Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
٥	- Moveable Bea		Quantity	Office	пор Едоп	1 of Otal 1	1 of Oldi 2	1 of Olar o	1 01 0141 4	1 of Olar o
	1	3	56	ea.		80	15	5		
						%	%	%	%	(
Previous Ins	pection Notes :					• •				
		earings are	at maximum m	novemer	nt with bendi	ng of the anchor	holts: 90F Dehr	ris faded naint r	ust, and scale on t	he FPDZ
earings.	· No change from			10 1011101	it with bond.		2010, 001 . 2021	io, idaoa paint, i	dot, and codic on t	GCCY
8/25/2009	Some cleaning	and spot p	painting was do	ne durir	ng the snoop	er inspection. Le	eft 5 percent in sta	ate 3 for allignme	ent.	ZQDZ
	•					•	ted. Several of th	ne bearings are a	at maximum mover	ment ZZBZ
	of the pins at G Areas of rust, p			nments	on attached	paperwork.				SZMI
7/24/2003 -	Still need to ve	rify numbe	rs with next sno	ooper in	spection.					YADZ
9/27/2001 -	Rusty with som	ne debris.	Verify numbers	and co	ndition with s	snooper.				NIBL
9/02/1998 -	·_									GKLH
Inspection I	Notes:									
Inspection I	Notes:  - Fixed Bearing	3								
·		3	56	ea.		90	10	0		
	s - Fixed Bearing	,	56	ea.		90	10	0 %	%	
Element 313	s - Fixed Bearing	,	56	ea.					%	
lement 313	s - Fixed Bearing 1	2		ea.					%	
Previous Ins	- Fixed Bearing 1 pection Notes :	2 at loss, and	scale.	ea.					%	FPDZ
Previous Ins 9/05/2013	1 pection Notes: Dirty, rust, pain	2 at loss, and m previous	scale.		ng and spot	%		%	%	FPDZ GCCY
Previous Ins 19/05/2013 19/06/2011 18/25/2009 18/27/2007 ome of the	pection Notes : Dirty, rust, pain No change fror Dirty, some rus 5 percent in Cobearings.	at loss, and m previous st, debris, a	scale. inspections. and scale. Some	e cleanii	•	% painting was dor	% ne during the snoo	% oper inspection.	% overcoat painting	FPDZ GCCY ZQDZ of ZZBZ
Previous Ins 9/05/2013 9/06/2011 8/25/2009 8/27/2007 ome of the 6/28/2005	pection Notes: Dirty, rust, pain No change fror Dirty, some rus 5 percent in Cobearings. Areas of rust, p	at loss, and m previous st, debris, a pondition Sta	scale. inspections. and scale. Somete 3 due to ruse	e cleanii	tting. Some	% painting was dor	% ne during the snoo	% oper inspection.		FPDZ GCCY ZQDZ of ZZBZ SZMI
Previous Ins 9/05/2013 9/06/2011 8/25/2009 8/27/2007 ome of the 6/28/2005	pection Notes: Dirty, rust, pain No change fror Dirty, some rus 5 percent in Cobearings. Areas of rust, p Still need to ve	at loss, and m previous st, debris, a paint loss, a rify numbe	scale. inspections. and scale. Some ate 3 due to rus and debris. rs with next sno	e cleanii t and pit	spection.	% painting was dor dirt and debris a	% ne during the snoo	% oper inspection.		FPDZ GCCY ZQDZ of ZZBZ SZMI YADZ
Previous Ins 9/05/2013 9/06/2011 8/25/2009 8/27/2007 ome of the 6/28/2005 7/24/2003	pection Notes: Dirty, rust, pain No change fror Dirty, some rus 5 percent in Cobearings. Areas of rust, p Still need to ve	at loss, and m previous st, debris, a paint loss, a rify numbe	scale. inspections. and scale. Some ate 3 due to rus and debris. rs with next sno	e cleanii t and pit	spection.	% painting was dor	% ne during the snoo	% oper inspection.		FPDZ GCCY ZQDZ of ZZBZ SZMI YADZ NIBL
Previous Ins 9/05/2013 9/06/2011 8/25/2009 8/27/2007 ome of the 6/28/2005	pection Notes: Dirty, rust, pain No change fror Dirty, some rus 5 percent in Cobearings. Areas of rust, p Still need to ve	at loss, and m previous st, debris, a paint loss, a rify numbe	scale. inspections. and scale. Some ate 3 due to rus and debris. rs with next sno	e cleanii t and pit	spection.	% painting was dor dirt and debris a	% ne during the snoo	% oper inspection.		FPDZ GCCY ZQDZ of ZZBZ SZMI YADZ

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Continue

	scription									
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 334	I - Metal Rail Co	ated		1		· ·		1	1	
	1	3	662	m.		60	25	10	5	
						%	%	%	%	9
revious Ins	spection Notes :									
rails. Delam 09/06/2011 08/25/2009 still has rust the web in tl 08/27/2007	ninated and spall No change from Sanding materi minor paint loss ne rotted areas.	ing on the man previous ial packed s, and top on the lower ra	curbs. inspections. R in the posts we coat worn dowr	Replaced ebs near to n to a fade	rail posts a the curbs ha led primer c	nd panels in (2) a as rusted and we oat. Some posts	areas in June 20° akened the posts that were bent o	11. s. This span is in ver have been re	n-going repairs to the best condition epaired by reinforce les. Most of the to	GCCY n, but ZQDZ cing
06/28/2005 330.83 * 2 : 07/24/2003 09/27/2001 Rusty spots	- Faded paint an = 661.66) Nate. - Same as previo - 331.2 * 2 = 662 . Chaulky paint v	d rust whe ous report. 2.4m with some	re paint is chip	on the N	lorth side of	•			e Right rail near Be	YADZ NIBL
06/28/2005 (330.83 * 2 : 07/24/2003 09/27/2001 Rusty spots	- Faded paint an = 661.66) Nate. - Same as previo - 331.2 * 2 = 662 Chaulky paint to - Some rusing th	d rust whe ous report. 2.4m with some	re paint is chip	on the N	lorth side of	•			•	YADZ
06/28/2005 (330.83 * 2 : 07/24/2003 09/27/2001 Rusty spots 09/02/1998	- Faded paint an = 661.66) Nate. - Same as previo - 331.2 * 2 = 662 Chaulky paint to - Some rusing th	d rust whe ous report. 2.4m with some iroughout.	re paint is chip	on the N	orth side of	the structure bea	ar Bent 2 under h	neavy loads in th	•	YADZ NIBL
06/28/2005 (330.83 * 2 07/24/2003 09/27/2001 Rusty spots 09/02/1998	- Faded paint an = 661.66) Nate. - Same as previd - 331.2 * 2 = 662 . Chaulky paint v - Some rusing th Notes:	d rust whe ous report. 2.4m with some iroughout.	re paint is chip	on the N	orth side of	•	ar Bent 2 under h	neavy loads in th	•	YADZ NIBL
06/28/2005 (330.83 * 2 07/24/2003 09/27/2001 Rusty spots 09/02/1998 Inspection	- Faded paint an e 661.66) Nate Same as previor - 331.2 * 2 = 662. Chaulky paint - Some rusing the Notes:	d rust whe ous report. 2.4m with some troughout.	re paint is chip	on the Noint system  Span:	lorth side of n. Appr-2 - T	the structure beautiful to the structure beautif	ar Bent 2 under h	neavy loads in th	e left traffic lane.	YADZ NIBL GKLH
06/28/2005 330.83 * 2 07/24/2003 09/27/2001 Rusty spots 09/02/1998 Inspection	- Faded paint an e 661.66) Nate Same as previor 331.2 * 2 = 662. Chaulky paint to Some rusing the Notes:	d rust whe ous report. 2.4m with some roughout.  * *	re paint is chip	on the Noint system  Span:	orth side of	the structure bea	ar Bent 2 under h	neavy loads in th	•	YADZ NIBL
06/28/2005 330.83 * 2 07/24/2003 09/27/2001 Rusty spots 09/02/1998 Inspection	- Faded paint an e 661.66) Nate Same as previorable as a specific control of the control of t	d rust whe bus report. 2.4m with some iroughout.  * *	re paint is chipped Rail is rattling chips in the paint	on the Notint system  Span:	n.  Appr-2 - T	Tower Abutment  Pct Stat 1	ar Bent 2 under h	*****  Pct Stat 3	e left traffic lane.  Pct Stat 4	YADZ NIBL GKLH
06/28/2005 330.83 * 2 07/24/2003 09/27/2001 Rusty spots 09/02/1998 Inspection	- Faded paint an e 661.66) Nate Same as previor 331.2 * 2 = 662. Chaulky paint to Some rusing the Notes:	d rust whe ous report. 2.4m with some roughout.  * *	re paint is chipped Rail is rattling chips in the paint	on the Noint system  Span:	lorth side of n. Appr-2 - T	the structure bea	ar Bent 2 under h	neavy loads in th	e left traffic lane.	YADZ NIBL GKLH

08/27/2007 - 11.30 \* 10.91 = 123.28 Some wear in the wheel paths with reduced skid resistance. Some delamianted concrete along the joint.

09/06/2011 - Removed and then replaced top 2" with Silica Fume Concrete in June 2011. 08/25/2009 - Wear from studded tires. Small delaminated area near the guard angle.

Some tight mapping cracks throughout.

Inspection Notes:

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\* \* \* \* \* \* \* \* \* Span : Appr-2 - Tower Abutment - Span 27 (cont.) \* \* \* \* \* \* \* \*

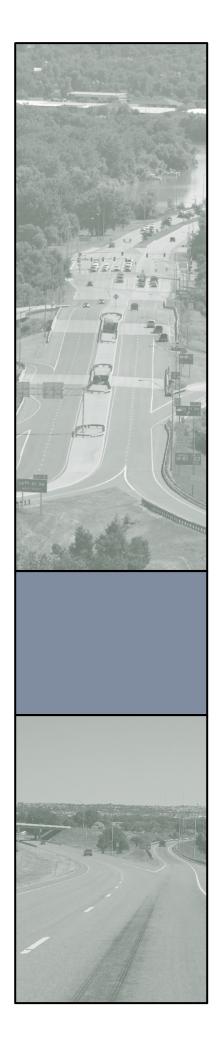
Element Description	1							
Smart Flag   Scale Factor   Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 215 - R/Conc Abutment Abu	tment 27							
1 2	33	3 m.		95	5	0	0	
				%	%	%	%	
Previous Inspection Notes :					ļ.			
09/05/2013 - Some tight cracking in a	reas near the er	nd posts	. Face of the	e backwall has s	ome tight cracks.			FPD
09/06/2011 - No change from previou					J			GCC
08/25/2009 - Minor and tight cracking area of the bearings.		ckwall. S	Some graffti ı	painted on the b	ackwall and girde	er ends. Some di	irt and debris sitting	j ZQD
08/27/2007 - No change with some sa	anding material a	around t	he bearings.					ZZB
06/28/2005 - Same as previous repor	ts. No major pro	oblems r	noted.					SZM
07/24/2003 - 11.38	3.38m Abutme	ent face	and u-style v	wingwalls. Tight	shrinkage cracks	on the Abutme	nt backwall face.	YAD
09/27/2001 - 11.38 * 1 = 11.38m								NIBI
09/02/1998 - None								GKL
09/01/1992 - None								REF
Inspection Notes:								
Inspection Notes:  Element 334 - Metal Rail Coated								
Inspection Notes:	22	2 m.		70	25	5	0	
Inspection Notes:	22	2 m.		70 %	25 %	5		
Inspection Notes:  Element 334 - Metal Rail Coated  1 3	22	2 m.						
Inspection Notes:  Element 334 - Metal Rail Coated			ed post web	%	%	%	%	rom FPD
Inspection Notes:  Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  09/05/2013 - Rusty spots, thin paint, 6	exposed base pa		ed post web	%	%	%	%	rom FPD.
Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  09/05/2013 - Rusty spots, thin paint, epast traffic hits.	exposed base pass inspections.	aint, rust		% s at the curb line	% with section loss	% s to the webs. S	%	
Inspection Notes:  Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  09/05/2013 - Rusty spots, thin paint, element shifts.  09/06/2011 - No change from previous of the part of the pa	exposed base pass inspections. If in the posts well in the posts w	aint, rust ebs near	the curbs. C	s at the curb line Concrete end pos as rusted and we	with section loss	% s to the webs. S	% crapes and dings fr	GCC ZQD
Inspection Notes:  Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  19/05/2013 - Rusty spots, thin paint, exact traffic hits.  19/06/2011 - No change from previous pays traffic hits.  19/06/2017 - Sanding material packets still has rust, minor paint loss, and 16/28/2005 - Concrete end posts have the steel in areas. (10.82 * 2 = 21.64)	exposed base pass inspections.  If in the posts we top coat worn coat worn coat ight shrinkage Nate.	eint, rust ebs near ebs near	the curbs. Contact the curbs had a faded prime	s at the curb line Concrete end pos as rusted and we ler coat.	% with section loss sts are in good coeakened the post	% s to the webs. Sondition.  s. This span is i	% crapes and dings fi	GCC ZQD n, ZZB le on SZM
Inspection Notes:  Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  19/05/2013 - Rusty spots, thin paint, element traffic hits.  19/06/2011 - No change from previous past traffic hits.  19/06/2017 - Sanding material packed by 19/25/2007 - Sanding material packed by 19/25/2007 - Sanding material packed by 19/25/2007 - Concrete end posts have the steel in areas. (10.82 * 2 = 21.64)	exposed base pass inspections.  If in the posts we top coat worn coat worn coat ight shrinkage Nate.	eint, rust ebs near ebs near	the curbs. Contact the curbs had a faded prime	s at the curb line Concrete end pos as rusted and we ler coat.	% with section loss sts are in good coeakened the post	% s to the webs. Sondition.  s. This span is i	% crapes and dings fi	GCC ZQD n, ZZB
Inspection Notes:  Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  19/05/2013 - Rusty spots, thin paint, expective traffic hits.  19/06/2011 - No change from previous of the part o	exposed base pass inspections.  If in the posts we top coat worn determined by the coat worn determined by the coat word and the coat word of	ebs near ebs near down to e cracks.	the curbs. Control the curbs has a faded prime. Rust and fa	s at the curb line Concrete end pos as rusted and we ler coat.	% with section loss sts are in good coeakened the post	% s to the webs. Sondition.  s. This span is i	% crapes and dings fi	GCC ZQD n, ZZB le on SZM YAD
Inspection Notes:  Element 334 - Metal Rail Coated  1 3  Previous Inspection Notes:  19/05/2013 - Rusty spots, thin paint, opast traffic hits.  19/06/2011 - No change from previous 108/25/2009 - Sanding material packed 108/25/2007 - Sanding material packed 108/25/2005 - Concrete end posts have the steel in areas. (10.82 * 2 = 21.64) 107/24/2003 - Same as previous report 109/27/2001 - 11.3 * 2 = 22.6m	exposed base pass inspections.  If in the posts we top coat worn determined by the coat worn determined by the coat word and the coat word of	ebs near ebs near down to e cracks.	the curbs. Control the curbs has a faded prime. Rust and fa	s at the curb line Concrete end pos as rusted and we ler coat.	% with section loss sts are in good coeakened the post	% s to the webs. Sondition.  s. This span is i	% crapes and dings fi	GCC ZQD n, ZZB le on SZM



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General Inspection Notes	
09/05/2013 - Snooper truck used on the River Spans and Havre bucket truck on the ground Spans.	FPDZ
09/06/2011 - None	GCCY
08/25/2009 - Paul from Helena Bridge and Crew checked this deck for delaminatin with groung penetrating radar and chain dragging this past summer.	ZQDZ
Watch the alignmnet or any more movement of the bearings on the West end as nearly touching the Tower Abutment wall. 08/27/2007 - None	ZZBZ
06/28/2005 - NBI 58, deck, rated at a "5" due to delaminations and spalling of the deck surface; especially at the joints.  NBI 60, substructure, rated at a "6" due to spalling and deteriorating concrete at columns for Bents 3 and 4. Also some spalling under bearings at Left-Outside of Bents 3 and 4. Per Infrastructure Engineers August 24, 2006 underwater inspection, the inspected substructure units are in satisfactory condition. There is no significant local or general scour present at the bridge site. There are no significant restrictions in the channel that will adversely impact flow. ITEM 61 CHANGED PER INFRASTRUCTURE ENGINEEERS UNDERWATER INSPECTION.  07/24/2003 - Some photos of rust blisters and section loss on the main span girder webs taken during FC inspection.	SZMI YADZ
09/27/2001 - Studded tire wear in the wheel paths.	NIBL
09/02/1998 - None	GKLH
09/01/1992 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 2/26/97 11:10:39 Sufficiency Rating Calculation Accepted by ops\$u9004 at 2/19/97 14:23:34	REFI
01/01/1991 - Updated with tape 1994	NB94
05/01/1989 - Updated with tape 1991	NB91
04/01/1987 - Updated with tape 1989	NB89
10/01/1984 - Updated with tape 1986	NB86
02/01/1981 - Updated with tape 1984	NB84





# **APPENDIX B**

**Traffic Data Collection** 



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 1

### **Turning Movement Data**

						j iviovcinc	in Data						
		Airpo	rt Rd			Tri Hill I	Frontage		Airport Rd				
0		South	bound			North	bound			East	bound		
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
7:00 AM	15	13	0	28	4	41	0	45	11	2	0	13	86
7:15 AM	16	15	0	31	1	34	0	35	16	4	0	20	86
7:30 AM	22	29	0	51	2	54	0	56	20	10	0	30	137
7:45 AM	24	26	0	50	4	53	0	57	16	2	0	18	125
Hourly Total	77	83	0	160	11	182	0	193	63	18	0	81	434
8:00 AM	26	19	0	45	2	36	0	38	19	2	0	21	104
8:15 AM	25	14	0	39	1	46	0	47	28	5	0	33	119
8:30 AM	31	13	0	44	0	34	0	34	15	5	0	20	98
8:45 AM	26	6	0	32	0	50	0	50	8	2	0	10	92
Hourly Total	108	52	0	160	3	166	0	169	70	14	0	84	413
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	50	26	0	76	3	48	0	51	21	2	0	23	150
4:15 PM	37	16	0	53	1	43	0	44	11	5	0	16	113
4:30 PM	61	18	0	79	1	50	0	51	14	1	0	15	145
4:45 PM	45	12	0	57	2	41	0	43	16	1	0	17	117
Hourly Total	193	72	0	265	7	182	0	189	62	9	0	71	525
5:00 PM	46	21	0	67	3	31	0	34	33	1	0	34	135
5:15 PM	55	19	0	74	3	38	0	41	12	4	0	16	131
5:30 PM	57	16	0	73	4	38	0	42	12	2	0	14	129
5:45 PM	51	19	0	70	2	35	0	37	14	5	0	19	126
Hourly Total	209	75	0	284	12	142	0	154	71	12	0	83	521
Grand Total	587	282	0	869	33	672	0	705	266	53	0	319	1893
Approach %	67.5	32.5	-	-	4.7	95.3	-	-	83.4	16.6	-	-	-
Total %	31.0	14.9	-	45.9	1.7	35.5	-	37.2	14.1	2.8	-	16.9	-
Motorcycles	17	2	-	19	0	14	-	14	1	1	-	2	35
% Motorcycles	2.9	0.7	-	2.2	0.0	2.1	-	2.0	0.4	1.9	-	0.6	1.8
Cars	325	168	-	493	13	343	-	356	154	15	-	169	1018
% Cars	55.4	59.6	-	56.7	39.4	51.0	-	50.5	57.9	28.3	-	53.0	53.8
Light Goods Vehicles	102	87	-	189	11	112	-	123	80	25	-	105	417
% Light Goods Vehicles	17.4	30.9	-	21.7	33.3	16.7	-	17.4	30.1	47.2	-	32.9	22.0
Buses	4	1	-	5	0	5	-	5	0	2	-	2	12
% Buses	0.7	0.4	-	0.6	0.0	0.7	-	0.7	0.0	3.8	-	0.6	0.6
Single-Unit Trucks	33	19	-	52	6	45	-	51	29	7	-	36	139
% Single-Unit Trucks	5.6	6.7	-	6.0	18.2	6.7	-	7.2	10.9	13.2	-	11.3	7.3
Articulated Trucks	105	5	-	110	0	153	-	153	2	3	-	5	268
% Articulated Trucks	17.9	1.8	-	12.7	0.0	22.8	-	21.7	0.8	5.7	-	1.6	14.2
Bicycles on Road	1	0	-	1	3	0	-	3	0	0	-	0	4
% Bicycles on Road	0.2	0.0	-	0.1	9.1	0.0	-	0.4	0.0	0.0	-	0.0	0.2

Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	_	-	-	-	-	-	-	-



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 3

	Airport Rd [N]  Out In Total  15 19 34  497 493 990  192 189 381  5 5 5 10  229 163 392  938 869 1807  2 17 0  168 325 0  87 102 0  1 4 0  24 139 0  282 587 0  R T P	
Alpont Rd (W)  Out In Total  2 2 2 4  181 198 380  98 105 380  98 105 319 624  74 74  315 319 624  0 25 0  0 53 266  P R L	07/16/2014 7:00 AM Ending AI  07/16/2014 6:00 PM Motorcycles Care Care Light Goods Vehicles Buses Other	Fake Approach (E)  Out In Total  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0
	L T P 0 14 0 13 343 0 11 112 0 0 5 0 9 198 0 33 672 0 14 32 340 356 696 127 123 250 6 5 111 149 207 356 640 705 1345 Out In Total Tri Hill Frontage [S]	

Turning Movement Data Plot



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

				i airiii ig i	VIOVCITICI	it i can i ic	on Data (	(1.307)					
		Airpo	ort Rd	·		Tri Hill F	Frontage						
Start Time		South	bound			North	bound			Easth	oound		
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
7:30 AM	22	29	0	51	2	54	0	56	20	10	0	30	137
7:45 AM	24	26	0	50	4	53	0	57	16	2	0	18	125
8:00 AM	26	19	0	45	2	36	0	38	19	2	0	21	104
8:15 AM	25	14	0	39	1	46	0	47	28	5	0	33	119
Total	97	88	0	185	9	189	0	198	83	19	0	102	485
Approach %	52.4	47.6	-	-	4.5	95.5	-	-	81.4	18.6	-	-	-
Total %	20.0	18.1	-	38.1	1.9	39.0	-	40.8	17.1	3.9	-	21.0	-
PHF	0.933	0.759	-	0.907	0.563	0.875	-	0.868	0.741	0.475	-	0.773	0.885
Motorcycles	1	0	-	1	0	0	-	0	0	0	-	0	1
% Motorcycles	1.0	0.0	-	0.5	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.2
Cars	56	56	-	112	3	91	-	94	34	5	-	39	245
% Cars	57.7	63.6	-	60.5	33.3	48.1	-	47.5	41.0	26.3	-	38.2	50.5
Light Goods Vehicles	15	26	-	41	4	44	-	48	31	9	_	40	129
% Light Goods Vehicles	15.5	29.5	-	22.2	44.4	23.3	-	24.2	37.3	47.4	-	39.2	26.6
Buses	0	1	-	1	0	0	-	0	0	1	-	1	2
% Buses	0.0	1.1	-	0.5	0.0	0.0	-	0.0	0.0	5.3	_	1.0	0.4
Single-Unit Trucks	8	3	-	11	2	14	-	16	17	3	-	20	47
% Single-Unit Trucks	8.2	3.4	-	5.9	22.2	7.4	-	8.1	20.5	15.8	-	19.6	9.7
Articulated Trucks	17	2	-	19	0	40	-	40	1	1	_	2	61
% Articulated Trucks	17.5	2.3	-	10.3	0.0	21.2	-	20.2	1.2	5.3	-	2.0	12.6
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Pedestrians	-	<u>-</u>	0	-	-	-	0	-	-	<u>-</u>	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 5

	Airport Rd [N]  Out In Total  0 1 1  125 112 237  75 41 116  0 1 1  72 30 102  272 185 457  0 1 0 0  56 56 0  26 15 0  1 0 0  5 25 0  88 97 0  R T P	
Author Rd [WI]  Out   In   Total  Out   In   Total  So 39 98 59 39 98 77 22 23 77 22 23 97 102 199  0 0 0 0 0 1 0 0 0 1 19 83 PR I. L	Peak Hour Data  O7/16/2014 7:30 AM Ending At O7/16/2014 8:30 AM Motorcycles Cars Cars Ligo Goods Vehicles Buses Other	Fake Approach [E]  Out In Total  O
	L T P 0 0 0 0 3 91 0 4 44 0 0 0 0 0 2 54 0 9 188 0 1 0 1 61 94 155 24 48 72 1 0 1 29 56 85 116 198 314 Out In Total Tri Hill Frontage [S]	

Turning Movement Peak Hour Data Plot (7:30 AM)



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 6

Turning Movement Peak Hour Data (4:30 PM)

				i unining i	VIOVCITICI	il Fear I ic	iui Dala (	(T.30 i ivi)					
		Airpo	ort Rd			Tri Hill F	Frontage			Airpo	ort Rd		
Start Time		South	bound		Northbound					East	oound		
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
4:30 PM	61	18	0	79	1	50	0	51	14	1	0	15	145
4:45 PM	45	12	0	57	2	41	0	43	16	. 1	0	17	117
5:00 PM	46	21	0	67	3	31	0	34	33	1	0	34	135
5:15 PM	55	19	0	74	3	38	0	41	12	4	0	16	131
Total	207	70	0	277	9	160	0	169	75	7	0	82	528
Approach %	74.7	25.3	-	-	5.3	94.7	-	-	91.5	8.5	-	-	-
Total %	39.2	13.3	_	52.5	1.7	30.3	_	32.0	14.2	1.3	-	15.5	-
PHF	0.848	0.833	-	0.877	0.750	0.800	-	0.828	0.568	0.438	-	0.603	0.910
Motorcycles	10	0	-	10	0	3	-	3	0	0	-	0	13
% Motorcycles	4.8	0.0	_	3.6	0.0	1.9	_	1.8	0.0	0.0	-	0.0	2.5
Cars	115	42	-	157	5	88	-	93	53	3	-	56	306
% Cars	55.6	60.0	-	56.7	55.6	55.0	-	55.0	70.7	42.9	-	68.3	58.0
Light Goods Vehicles	42	17	_	59	2	14	_	16	20	4	-	24	99
% Light Goods Vehicles	20.3	24.3	-	21.3	22.2	8.8	-	9.5	26.7	57.1	-	29.3	18.8
Buses	1	0	-	1	0	1	-	1	0	0	-	0	2
% Buses	0.5	0.0	_	0.4	0.0	0.6	_	0.6	0.0	0.0	_	0.0	0.4
Single-Unit Trucks	8	9	-	17	2	14	-	16	2	0	-	2	35
% Single-Unit Trucks	3.9	12.9	-	6.1	22.2	8.8	-	9.5	2.7	0.0	-	2.4	6.6
Articulated Trucks	31	2	_	33	0	40	_	40	0	0	_	0	73
% Articulated Trucks	15.0	2.9	-	11.9	0.0	25.0	-	23.7	0.0	0.0	-	0.0	13.8
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	0	-	-	<u>-</u>	0	-	-	-	0	-	-
% Pedestrians	ı	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 7

		Airport Rd [N] Out In Total 3 10 13 141 157 298 34 59 93 1 1 2 56 50 106 235 277 512  0 10 0 42 115 0 17 42 0 0 1 0 11 39 0 70 207 0 R T P	
Atroor Rd [W]  Out   n   Total  0   0   0  47   56   103  19   24   43  0   0   0  13   2   15  14   2   15	<del></del>	Peak Hour Data  O7/16/2014 4:30 PM Ending At 07/16/2014 5:30 PM Motorcycles Cars Light Goods Vehicles Buses Other	Fake Approach [E]  Out In Total  0 0 0 0  0 0 0  0 0 0  0 0 0  0 0 0  0 0 0  0 0 0  0 0 0  0 0 0
		L T P 0 3 0 5 88 0 2 14 0 0 1 0 2 54 0 9 160 0 10 3 13 118 93 211 46 16 62 1 1 2 39 56 95 214 169 383 Out In Total Tri Hill Frontage [S]	

Turning Movement Peak Hour Data Plot (4:30 PM)



Count Name: 01-TriHillFrontage\_AirportRd TMC Site Code: TMC-01 Start Date: 07/16/2014 Page No: 8



Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 1

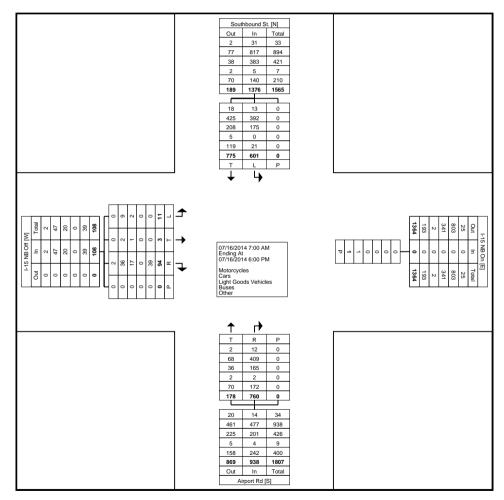
# Turning Movement Data

		South	ound St. bound				ort Rd nbound			NB On			I-15 NB Off Eastbound			
Start Time	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	23	16	0	39	44	8	0	52	1	0	6	0	2	0	8	99
7:15 AM	28	16	0	44	42	8	0	50	0	0	2	1	1	0	4	98
7:30 AM	48	16	0	64	64	9	0	73	0	0	4	0	1	0	5	142
7:45 AM	47	12	0	59	54	15	0	69	0	0	3	0	2	0	5	133
Hourly Total	146	60	0	206	204	40	0	244	1	0	15	1	6	0	22	472
8:00 AM	43	28	0	71	47	8	0	55	0	0	2	0	0	0	2	128
8:15 AM	35	23	0	58	57	17	0	74	0	0	4	0	1	0	5	137
8:30 AM	33	17	0	50	40	10	0	50	0	0	8	0	1	0	9	109
8:45 AM	29	19	0	48	44	13	0	57	0	0	3	0	0	0	3	108
Hourly Total	140	87	0	227	188	48	0	236	0	0	17	0	2	0	19	482
*** BREAK ***	-		-	-	-		_	-	-	-	-	-		-	-	-
4:00 PM	68	107	0	175	60	8	0	68	0	0	8	0	0	0	8	251
4:15 PM	46	50	0	96	47	9	0	56	0	. 0	9	1	. 0	0	10	162
4:30 PM	68	111	0	179	47	17	0	64	0	0	10	1	1	0	12	255
4:45 PM	54	39	0	93	43	13	0	56	0	0	4	0	1	0	5	154
Hourly Total	236	307	0	543	197	47	0	244	0	. 0	31	2	2	0	35	822
5:00 PM	63	53	0	116	55	8	0	63	0	0	5	0	0	0	5	184
5:15 PM	66	44	0	110	39	12	0	51	0	0	7	0	1	0	8	169
5:30 PM	65	29	0	94	39	11	0	50	0	0	7	0	0	0	7	151
5:45 PM	59	21	0	80	38	12	0	50	0	0	12	0	0	0	12	142
Hourly Total	253	147	0	400	171	43	0	214	0	0	31	0	1	0	32	646
Grand Total	775	601	0	1376	760	178	0	938	1	0	94	3	. 11	0	108	2422
Approach %	56.3	43.7	-	-	81.0	19.0	-	-	-	-	87.0	2.8	10.2	-	-	-
Total %	32.0	24.8	-	56.8	31.4	7.3	-	38.7	-	0.0	3.9	0.1	0.5	-	4.5	-
Motorcycles	18	13	-	31	12	2	-	14	-	0	2	0	0	-	2	47
% Motorcycles	2.3	2.2	-	2.3	1.6	1.1	-	1.5	-	-	2.1	0.0	0.0	-	1.9	1.9
Cars	425	392	-	817	409	68	-	477	-	0	36	2	9	-	47	1341
% Cars	54.8	65.2	-	59.4	53.8	38.2	-	50.9	-	-	38.3	66.7	81.8	-	43.5	55.4
Light Goods Vehicles	208	175	-	383	165	36	-	201	-	0	17	1	2	-	20	604
% Light Goods Vehicles	26.8	29.1	-	27.8	21.7	20.2	-	21.4	-	-	18.1	33.3	18.2	-	18.5	24.9
Buses	5	. 0	-	5	2	2	-	4	-	0	0	0	0	-	0	9
% Buses	0.6	0.0	-	0.4	0.3	1.1	-	0.4	-	-	0.0	0.0	0.0	-	0.0	0.4
Single-Unit Trucks	45	13	-	58	78	17	-	95	-	0	8	0	0	-	8	161
% Single-Unit Trucks	5.8	2.2	-	4.2	10.3	9.6	-	10.1	-	-	8.5	0.0	0.0	-	7.4	6.6
Articulated Trucks	72	. 8	-	80	94	53	-	147	-	0	31	0	0	-	31	258
% Articulated Trucks	9.3	1.3	-	5.8	12.4	29.8	-	15.7	-	-	33.0	0.0	0.0	-	28.7	10.7
Bicycles on Road	2	0	-	2	0	0	-	0	-	0	0	0	0	-	0	2
% Bicycles on Road	0.3	0.0		0.1	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	-	0.0	0.1

Pedestrians	-	-	0	-	-	-	0	-	1	-	-	-	-	0	-	-
% Pedestrians	_	_	-	_	_	_	_	_	100.0	_	_	_	_	_		_



Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



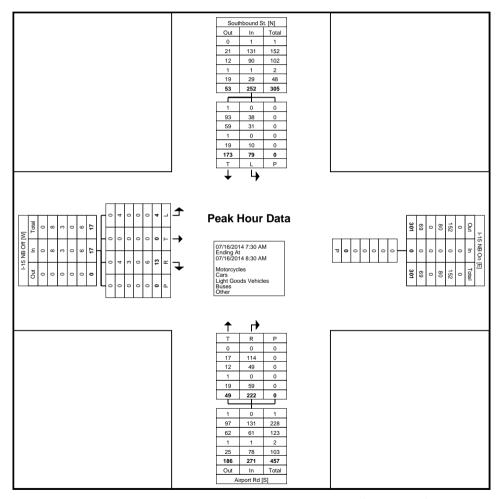
Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

· ·					I GITTIII IŞ	g ivioveii	ilonit i o	ak i loui į	Jala (1.	00700						
		Southbo	ound St.			Airpo	ort Rd		I-15	NB On			I-15 NB Off			
Q. 1.T.		South	bound			North	bound		Wes	tbound			Eastbound			
Start Time	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:30 AM	48	16	0	64	64	9	0	73	0	0	4	0	1	0	5	142
7:45 AM	47	12	0	59	54	15	0	69	0	0	3	0	2	0	5	133
8:00 AM	43	28	0	71	47	8	0	55	0	0	2	0	0	0	2	128
8:15 AM	35	23	0	58	57	17	0	74	0	0	4	0	1	0	5	137
Total	173	79	0	252	222	49	0	271	0	0	13	0	4	0	17	540
Approach %	68.7	31.3	-	-	81.9	18.1	-	-	-	-	76.5	0.0	23.5	-	-	-
Total %	32.0	14.6	-	46.7	41.1	9.1	-	50.2	-	0.0	2.4	0.0	0.7	-	3.1	-
PHF	0.901	0.705	-	0.887	0.867	0.721	-	0.916	-	0.000	0.813	0.000	0.500	-	0.850	0.951
Motorcycles	1	0	-	1	0	0	-	0	-	0	0	0	0	-	0	1
% Motorcycles	0.6	0.0	-	0.4	0.0	0.0	-	0.0	-	-	0.0	-	0.0	-	0.0	0.2
Cars	93	38	-	131	114	17	-	131	-	0	4	0	4	-	8	270
% Cars	53.8	48.1	-	52.0	51.4	34.7	-	48.3	-	-	30.8	-	100.0	-	47.1	50.0
Light Goods Vehicles	59	31	-	90	49	12	-	61	-	0	3	0	0	-	3	154
% Light Goods Vehicles	34.1	39.2	-	35.7	22.1	24.5	-	22.5	-	-	23.1	-	0.0	-	17.6	28.5
Buses	1	0	-	1	0	1	-	1	-	0	0	0	0	-	0	2
% Buses	0.6	0.0	-	0.4	0.0	2.0	-	0.4	-	-	0.0	-	0.0	-	0.0	0.4
Single-Unit Trucks	12	4	-	16	33	5	-	38	-	0	1	0	0	-	1	55
% Single-Unit Trucks	6.9	5.1	-	6.3	14.9	10.2	-	14.0	-	-	7.7	-	0.0	-	5.9	10.2
Articulated Trucks	7	6	-	13	26	14	-	40	-	0	5	0	0	-	5	58
% Articulated Trucks	4.0	7.6	-	5.2	11.7	28.6	-	14.8	-	-	38.5	-	0.0	-	29.4	10.7
Bicycles on Road	0	0	-	0	0	0	-	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	-	-	0.0	-	0.0	-	0.0	0.0
Pedestrians	-	-	0	-	-	_	0	-	0	-	1	-	-	0	-	-
% Pedestrians	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-



Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



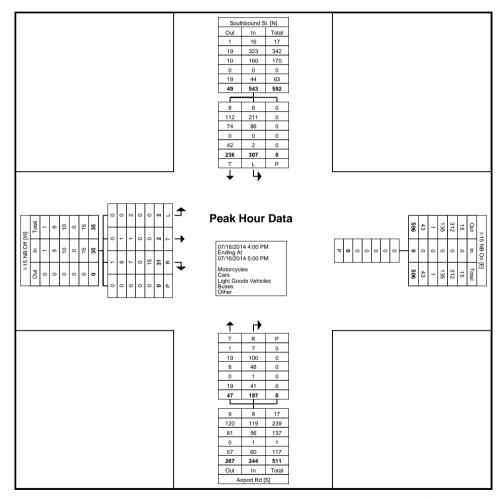
Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 6

Turning Movement Peak Hour Data (4:00 PM)

i					ı anınış	g iviovoi	iloilt i o	ak i loui i	Julu (+.	.00 1 111)						1
		Southbo	ound St.			Airpo	ort Rd		I-15	NB On			I-15 NB Off			1
Otant Time		South	bound			North	bound		Wes	tbound			Eastbound			
Start Time	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
4:00 PM	68	107	0	175	60	8	0	68	0	0	8	0	0	0	8	251
4:15 PM	46	50	0	96	47	9	0	56	0	0	9	1	0	0	10	162
4:30 PM	68	111	0	179	47	17	0	64	0	0	10	1	1	0	12	255
4:45 PM	54	39	0	93	43	13	0	56	0	0	4	0	1	0	5	154
Total	236	307	0	543	197	47	0	244	0	0	31	2	2	0	35	822
Approach %	43.5	56.5	-	-	80.7	19.3	-	-	-	-	88.6	5.7	5.7	-	-	-
Total %	28.7	37.3	-	66.1	24.0	5.7	-	29.7	-	0.0	3.8	0.2	0.2	-	4.3	-
PHF	0.868	0.691	-	0.758	0.821	0.691	-	0.897	-	0.000	0.775	0.500	0.500	-	0.729	0.806
Motorcycles	8	8	-	16	7	1	-	8	-	0	1	0	0	-	1	25
% Motorcycles	3.4	2.6	-	2.9	3.6	2.1	-	3.3	-	-	3.2	0.0	0.0	-	2.9	3.0
Cars	112	211	-	323	100	19	-	119	-	0	8	1	0	-	9	451
% Cars	47.5	68.7	-	59.5	50.8	40.4	-	48.8	-	-	25.8	50.0	0.0	-	25.7	54.9
Light Goods Vehicles	74	86	-	160	48	8	-	56	-	0	7	1	2	-	10	226
% Light Goods Vehicles	31.4	28.0	-	29.5	24.4	17.0	-	23.0	-	-	22.6	50.0	100.0	-	28.6	27.5
Buses	0	0	-	0	1	0	-	1	-	0	0	0	0	-	0	1
% Buses	0.0	0.0	_	0.0	0.5	0.0	-	0.4	-	-	0.0	0.0	0.0	-	0.0	0.1
Single-Unit Trucks	12	2	-	14	13	5	-	18	-	0	2	0	0	-	2	34
% Single-Unit Trucks	5.1	0.7	-	2.6	6.6	10.6	-	7.4	-	-	6.5	0.0	0.0	-	5.7	4.1
Articulated Trucks	29	0	-	29	28	14	-	42	-	0	13	0	0	-	13	84
% Articulated Trucks	12.3	0.0	-	5.3	14.2	29.8	-	17.2	-	-	41.9	0.0	0.0	-	37.1	10.2
Bicycles on Road	1	0	-	1	0	0	-	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.4	0.0	-	0.2	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	-	0.0	0.1
Pedestrians	-	<u>-</u>	0	-	-	-	0	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-



Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 7



Turning Movement Peak Hour Data Plot (4:00 PM)



Count Name: 02-I15NB\_AirportRd TMC Site Code: TMC-02 Start Date: 07/16/2014 Page No: 8



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 1

# Turning Movement Data

Start Time			Airport Rd Southbound		3		Airpo Northi				SB On tbound	
Start Time	Right	Thru	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Peds	App. Total	Int. Total
7:00 AM	0	41	0	0	41	5	5	0	10	0	0	51
7:15 AM	1	44	0	0	45	4	5	0	9	0	0	54
7:30 AM	1	63	0	0	64	5	5	0	10	0	0	74
7:45 AM	1	61	0	0	62	9	9	0	18	0	0	80
Hourly Total	3	209	0	0	212	23	24	0	47	0	0	259
8:00 AM	0	72	0	0	72	2	6	0	8	0	0	80
8:15 AM	4	55	0	0	59	7	12	0	19	0	. 0	78
8:30 AM	1	55	1	0	57	6	5	0	11	0	0	68
8:45 AM	2	48	0	0	50	8	5	0	13	0	0	63
Hourly Total	7	230	1	0	238	23	28	0	51	0	. 0	289
*** BREAK ***	-		<u>-</u>	-	-	-	<del>-</del>	-	-	-	<u>-</u>	-
4:00 PM	5	175	0	0	180	4	3	0	7	0	0	187
4:15 PM	3	94	0	0	97	4	5	0	9	0	0	106
4:30 PM	2	182	0	0	184	6	10	0	16	0	0	200
4:45 PM	4	91	0	0	95	7	7	0	14	0	0	109
Hourly Total	14	542	0	0	556	21	25	0	46	0	0	602
5:00 PM	0	117	0	0	117	2	6	0	8	0	0	125
5:15 PM	2	108	0	0	110	4	9	0	13	0	0	123
5:30 PM	4	96	0	0	100	3	6	0	9	0	0	109
5:45 PM	1	78	0	0	79	2	9	0	11	0	0	90
Hourly Total	7	399	0	0	406	11	30	0	41	0	0	447
Grand Total	31	1380	1	0	1412	78	107	0	185	0	0	1597
Approach %	2.2	97.7	0.1	-		42.2	57.8	-	-	-	-	-
Total %	1.9	86.4	0.1	-	88.4	4.9	6.7	-	11.6	-	0.0	-
Motorcycles	0	32	0	-	32	1	1	-	2	-	0	34
% Motorcycles	0.0	2.3	0.0	-	2.3	1.3	0.9	-	1.1	-	-	2.1
Cars	20	765	1	-	786	43	25	-	68	-	0	854
% Cars	64.5	55.4	100.0	-	55.7	55.1	23.4	-	36.8	-		53.5
Light Goods Vehicles	9	432	0	-	441	22	21	-	43	-	0	484
% Light Goods Vehicles	29.0	31.3	0.0	-	31.2	28.2	19.6	-	23.2	-	-	30.3
Buses	0	2	0	-	2	0	0	-	0	-	0	2
% Buses	0.0	0.1	0.0	-	0.1	0.0	0.0	-	0.0	-		0.1
Single-Unit Trucks	1	61	0	-	62	5	10	-	15	-	0	77
% Single-Unit Trucks	3.2	4.4	0.0	-	4.4	6.4	9.3	-	8.1	-	-	4.8
Articulated Trucks	1	85	0	-	86	7	49	-	56	-	0	142
% Articulated Trucks	3.2	6.2	0.0	-	6.1	9.0	45.8	-	30.3	-		8.9
Bicycles on Road	0	3	0	-	3	0	1	-	1	-	0	4
% Bicycles on Road	0.0	0.2	0.0	-	0.2	0.0	0.9	-	0.5	-		0.3

Pedestrians	-	-	-	0	-	-	-	0	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 3

	Airport Rd [N]  Out   In   Total  1   32   33  43   786   829  22   441   463  0   2   2  12   151   163  78   1412   1490  0   32   0   0  20   765   1   0  9   432   0   0  0   2   0   0  2   149   0   0  31   1380   1   0  R   T   L   P	
1-15 589 On WI Out In Cotal Oct	07/16/2014 7:00 AM Ending At 07/16/2014 6:00 PM Motorcycles Cars Light Goods Vehicles Buses Other	Fake Approach (E)  Out In Total  0 0 0 1  0 0 0 0  0 0 0 0  1 0 0 0  0 0 0 0  1 0 0 0  1 0 0 0 0
	L T P 1 1 0 25 43 0 21 22 0 0 0 0 0 60 12 0 107 78 0 L J J 32 2 34 765 68 833 432 43 475 2 0 2 149 72 221 1380 185 1865 Out In Total Airport Rd [S]	

Turning Movement Data Plot



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 4

## Turning Movement Peak Hour Data (7:30 AM)

			Airport Rd				•	ort Rd		I-15	SB On	
Start Time			Southbound				North	bound		Eas	tbound	
Start Time	Right	Thru	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Peds	App. Total	Int. Total
7:30 AM	1	63	0	0	64	5	5	0	10	0	0	74
7:45 AM	1	61	0	0	62	9	9	0	18	0	0	80
8:00 AM	0	72	0	0	72	2	6	0	8	0	0	80
8:15 AM	4	55	0	0	59	7	12	0	19	0	0	78
Total	6	251	0	0	257	23	32	0	55	0	0	312
Approach %	2.3	97.7	0.0	-	-	41.8	58.2	-	-	-	-	-
Total %	1.9	80.4	0.0	-	82.4	7.4	10.3	-	17.6	-	0.0	-
PHF	0.375	0.872	0.000	-	0.892	0.639	0.667	-	0.724	-	0.000	0.975
Motorcycles	0	1	0	-	1	0	0	-	0	-	0	1
% Motorcycles	0.0	0.4	-	-	0.4	0.0	0.0	-	0.0	-	-	0.3
Cars	4	102	0	-	106	13	7	-	20	-	0	126
% Cars	66.7	40.6	-	-	41.2	56.5	21.9	-	36.4	-	-	40.4
Light Goods Vehicles	1	113	0	-	114	5	10	-	15	-	0	129
% Light Goods Vehicles	16.7	45.0	-	-	44.4	21.7	31.3	-	27.3	-	-	41.3
Buses	0	0	0	-	0	0	0	-	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	-	0.0
Single-Unit Trucks	1	17	0	-	18	2	3	-	5	-	0	23
% Single-Unit Trucks	16.7	6.8	-	-	7.0	8.7	9.4	-	9.1	-	-	7.4
Articulated Trucks	0	18	0	-	18	3	11	-	14	-	0	32
% Articulated Trucks	0.0	7.2	-	-	7.0	13.0	34.4	-	25.5	-	-	10.3
Bicycles on Road	0	0	0	-	0	0	1	-	1	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	3.1	-	1.8	-	-	0.3
Pedestrians	-	-	-	0	-	-	-	0	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 5

	Airport Rd [N]  Out In Total  0 1 1  13 106 119  5 114 119  0 0 0 0  5 36 41  23 257 280  0 1 0 0 0  4 102 0 0  1 113 0 0  0 1 1 35 0 0  6 251 0 0  R T L P	
145 SB On [W]  Out In Total  11 0 0 0  11 0 0 11  11 0 0 11  16 0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0	Peak Hour Data  O7/16/2014 7:30 AM Ending At O7/16/2014 8:30 AM Motorcycles Cars Light Goods Vehicles Buses Other	Fake Approach [E]  Out In Total   0
	L T P 0 0 0 0 7 13 0 10 5 0 0 0 0 15 5 0 32 23 0 1 1 0 1 102 20 122 113 15 128 0 0 0 0 35 20 55 251 55 306 Out In Total Airport Rd [S]	

Turning Movement Peak Hour Data Plot (7:30 AM)



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 6

## Turning Movement Peak Hour Data (4:00 PM)

			Airport Rd Southbound	Ü			Airpo	ort Rd bound			SB On	
Start Time	Right	Thru	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Peds	App. Total	Int. Total
4:00 PM	5	175	0	0	180	4	3	0	7	0	0	187
4:15 PM	3	94	0	0	97	4	5	0	9	0	0	106
4:30 PM	2	182	0	0	184	6	10	0	16	0	0	200
4:45 PM	4	91	0	0	95	7	7	0	14	0	0	109
Total	14	542	0	0	556	21	25	0	46	0	0	602
Approach %	2.5	97.5	0.0	-	-	45.7	54.3	-	-	-	-	-
Total %	2.3	90.0	0.0	-	92.4	3.5	4.2	-	7.6	-	0.0	-
PHF	0.700	0.745	0.000	-	0.755	0.750	0.625	-	0.719	-	0.000	0.753
Motorcycles	0	16	0	-	16	0	1	-	1	-	0	17
% Motorcycles	0.0	3.0	-	-	2.9	0.0	4.0	-	2.2	-	-	2.8
Cars	9	331	0	-	340	10	6	-	16	-	0	356
% Cars	64.3	61.1	-	-	61.2	47.6	24.0	-	34.8	-	-	59.1
Light Goods Vehicles	5	154	0	-	159	7	2	-	9	-	0	168
% Light Goods Vehicles	35.7	28.4	<u>-</u>	-	28.6	33.3	8.0	-	19.6	-	-	27.9
Buses	0	0	0	-	0	0	0	-	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0	-	-	0.0
Single-Unit Trucks	0	17	0	-	17	1	5	-	6	-	0	23
% Single-Unit Trucks	0.0	3.1	-	-	3.1	4.8	20.0	-	13.0	-	-	3.8
Articulated Trucks	0	23	0	-	23	3	11	_	14	-	0	37
% Articulated Trucks	0.0	4.2	-	-	4.1	14.3	44.0	-	30.4	-	-	6.1
Bicycles on Road	0	1	0	-	1	0	0	-	0	-	0	1
% Bicycles on Road	0.0	0.2		_	0.2	0.0	0.0	_	0.0	-	-	0.2
Pedestrians	-	<u>-</u>	<u>-</u>	0	-	-	<u>-</u>	0	-	0	<u>-</u>	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 7

	Airport Rd [N] Out In Total 0 16 16 10 340 350 7 159 166 0 0 0 0 4 41 45 21 556 577  0 16 0 0 0 9 331 0 0 5 154 0 0 0 0 0 0 0 41 0 0 14 542 0 0 R T L P	
1-15 SSB On MVI Out in Total 1 0 15 7 0 7 7 0 0 16 99 0 39	Peak Hour Data  O7/16/2014 4:00 PM Ending At O7/16/2014 5:00 PM Motorcycles Cars Light Goods Vehicles Buses Other	Fake Approach [E] Out In Total O 0 0 0 O 0 0 O 0 0 O 0 0 O 0 0 O 0 0 O 0 0 O 0 0
	L T P 1 0 0 6 10 0 2 7 0 0 0 0 16 4 0 25 21 0 16 1 17 331 16 347 154 9 163 0 0 0 41 20 61 542 46 588 Out In Total Airport Rd [S]	

Turning Movement Peak Hour Data Plot (4:00 PM)



Count Name: 03-I15SBOn\_AirportRd TMC Site Code: TMC-03 Start Date: 07/16/2014 Page No: 8



Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 1

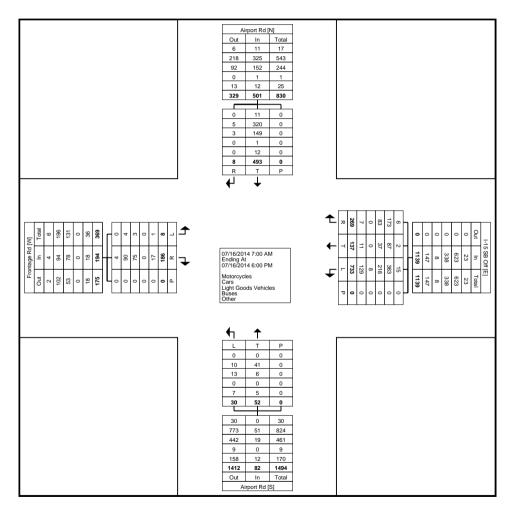
# Turning Movement Data

Chart Time			ort Rd bound				ort Rd abound	5			I-15 SB Off Westbound					age Rd bound		
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
7:00 AM	0	13	0	13	5	0	0	5	47	4	. 22	0	73	5	0	0	5	96
7:15 AM	1	9	0	10	4	0	0	4	34	13	31	0	78	5	1	0	6	98
7:30 AM	0	9	0	9	3	2	0	5	18	13	43	0	74	12	0	0	12	100
7:45 AM	1	9	0	10	4	5	0	9	28	15	49	0	92	6	3	0	9	120
Hourly Total	2	40	0	42	16	7	0	23	127	45	145	0	317	28	4	0	32	414
8:00 AM	2	13	0	15	1	1	0	2	16	13	36	0	65	21	1	0	22	104
8:15 AM	0	12	0	12	3	4	0	7	8	13	33	0	54	15	1	0	16	89
8:30 AM	1	13	0	14	2	5	0	7	13	2	36	0	51	7	0	0	7	79
8:45 AM	1	11	0	12	6	2	0	8	17	10	23	0	50	16	2	0	18	88
Hourly Total	4	49	0	53	12	12	0	24	54	38	128	0	220	59	4	0	63	360
*** BREAK ***	-	-	_	-	-		-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	101	0	101	2	3	0	5	13	4	61	0	78	19	0	0	19	203
4:15 PM	0	44	0	44	3	1	0	4	10	7	37	0	54	14	0	0	14	116
4:30 PM	1	105	0	106	5	3	0	8	7	6	65	0	78	14	0	0	14	206
4:45 PM	0	36	0	36	5	1	0	6	17	9	54	0	80	8	0	0	8	130
Hourly Total	1	286	0	287	15	8	0	23	47	26	217	0	290	55	0	0	55	655
5:00 PM	0	40	0	40	2	0	0	2	8	13	57	0	78	21	0	0	21	141
5:15 PM	1	37	0	38	3	1	0	4	10	5	65	0	80	7	0	0	7	129
5:30 PM	0	25	0	25	3	1	0	4	7	4	65	0	76	11	0	0	11	116
5:45 PM	0	16	0	16	1	1	0	2	16	6	56	0	78	5	0	0	5	101
Hourly Total	1	118	0	119	9	3	0	12	41	28	243	0	312	44	0	0	44	487
Grand Total	8	493	0	501	52	30	0	82	269	137	733	0	1139	186	8	0	194	1916
Approach %	1.6	98.4	-	-	63.4	36.6	-	-	23.6	12.0	64.4	-	-	95.9	4.1	-	-	-
Total %	0.4	25.7	-	26.1	2.7	1.6	-	4.3	14.0	7.2	38.3	-	59.4	9.7	0.4	-	10.1	-
Motorcycles	0	11	-	11	0	0	-	0	6	2	15	-	23	4	0	-	4	38
% Motorcycles	0.0	2.2	-	2.2	0.0	0.0	-	0.0	2.2	1.5	2.0	-	2.0	2.2	0.0	-	2.1	2.0
Cars	5	320	-	325	41	10	-	51	173	87	363	-	623	90	4	-	94	1093
% Cars	62.5	64.9	-	64.9	78.8	33.3	-	62.2	64.3	63.5	49.5	-	54.7	48.4	50.0	-	48.5	57.0
Light Goods Vehicles	3	149	-	152	6	13	-	19	83	37	218	-	338	75	3	-	78	587
% Light Goods Vehicles	37.5	30.2	-	30.3	11.5	43.3	-	23.2	30.9	27.0	29.7	-	29.7	40.3	37.5	-	40.2	30.6
Buses	0	1	-	1	0	0	-	0	0	0	8	-	8	0	0	-	0	9
% Buses	0.0	0.2	-	0.2	0.0	0.0	-	0.0	0.0	0.0	1.1	-	0.7	0.0	0.0	-	0.0	0.5
Single-Unit Trucks	0	6	-	6	3	2	-	5	4	2	46	-	52	7	0	-	7	70
% Single-Unit Trucks	0.0	1.2	-	1.2	5.8	6.7	-	6.1	1.5	1.5	6.3	-	4.6	3.8	0.0	-	3.6	3.7
Articulated Trucks	0	3	-	3	2	5	-	7	3	7	83	-	93	10	1	-	11	114
% Articulated Trucks	0.0	0.6	-	0.6	3.8	16.7	-	8.5	1.1	5.1	11.3	-	8.2	5.4	12.5	-	5.7	5.9
Bicycles on Road	0	3	-	3	0	0	-	0	0	2	0	-	2	0	0	-	0	5
% Bicycles on Road	0.0	0.6		0.6	0.0	0.0	-	0.0	0.0	1.5	0.0	-	0.2	0.0	0.0	-	0.0	0.3

Pedestrians	-	-	0	-	-	-	0	-	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	_	_	-	-	-	-	-	-	-



Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



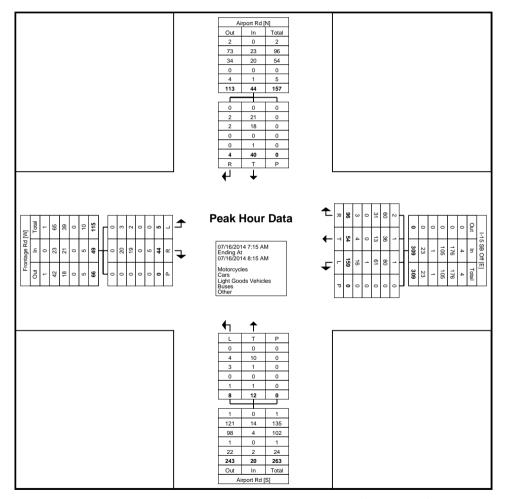
Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 4

## Turning Movement Peak Hour Data (7:15 AM)

		Airpo Southl				Airpo				•	I-15 SB Off Westbound	,			Fronta	age Rd oound		
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
7.45.454	Right			- ''	Iniu			App. Total	Ü		-		- ''		Leit			
7:15 AM	1	9	0	10	4	0	0	4	34	13	31	0	78	5		. 0	6	98
7:30 AM	0	9	0	9	3	2	0	5	18	13	43	0	74	12	0	0	12	100
7:45 AM	1	9	0	10	4	5	0	9	28	15	49	0	92	6	3	0	9	120
8:00 AM	2	13	0	15	1	1	0	2	16	13	36	0	65	21	1	0	22	104
Total	4	40	0	44	12	8	0	20	96	54	159	0	309	44	5	0	49	422
Approach %	9.1	90.9	-	-	60.0	40.0	-	-	31.1	17.5	51.5	-	-	89.8	10.2	-	-	-
Total %	0.9	9.5	-	10.4	2.8	1.9	-	4.7	22.7	12.8	37.7	-	73.2	10.4	1.2	-	11.6	-
PHF	0.500	0.769	-	0.733	0.750	0.400	-	0.556	0.706	0.900	0.811	-	0.840	0.524	0.417	-	0.557	0.879
Motorcycles	0	0	-	0	0	0	-	0	2	1	1	-	4	0	0	-	0	4
% Motorcycles	0.0	0.0	-	0.0	0.0	0.0	-	0.0	2.1	1.9	0.6	-	1.3	0.0	0.0	-	0.0	0.9
Cars	2	21	-	23	10	4	-	14	60	36	80	-	176	20	3	-	23	236
% Cars	50.0	52.5	-	52.3	83.3	50.0	-	70.0	62.5	66.7	50.3	-	57.0	45.5	60.0	-	46.9	55.9
Light Goods Vehicles	2	18	-	20	1	3	-	4	31	13	61	-	105	19	2	-	21	150
% Light Goods Vehicles	50.0	45.0	-	45.5	8.3	37.5	-	20.0	32.3	24.1	38.4	-	34.0	43.2	40.0	-	42.9	35.5
Buses	0	0	-	0	0	0	-	0	0	0	1	-	1	0	0	-	0	1
% Buses	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.6	-	0.3	0.0	0.0	-	0.0	0.2
Single-Unit Trucks	0	0	-	0	0	0	-	0	1	0	6	-	7	3	0	-	3	10
% Single-Unit Trucks	0.0	0.0	-	0.0	0.0	0.0	-	0.0	1.0	0.0	3.8	-	2.3	6.8	0.0	-	6.1	2.4
Articulated Trucks	0	1	-	1	1	1	-	2	2	4	10	-	16	2	0	-	2	21
% Articulated Trucks	0.0	2.5	-	2.3	8.3	12.5	-	10.0	2.1	7.4	6.3	-	5.2	4.5	0.0	-	4.1	5.0
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	0	-	-	-	0	-	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-



Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 5



Turning Movement Peak Hour Data Plot (7:15 AM)



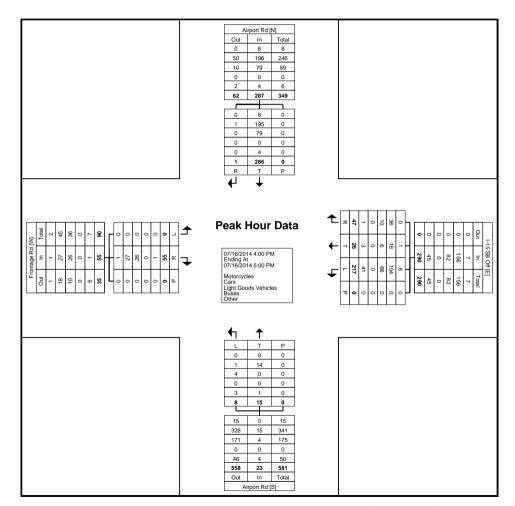
Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 6

## Turning Movement Peak Hour Data (4:00 PM)

		Airpo Southl				Airpo North				`	I-15 SB Off Westbound	,			Fronta Eastb	•		
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
4:00 PM	0	101	0	101	2	3	0	5	13	4	61	0	78	19	0	0	19	203
4:15 PM	0	44	0	44	3	1	0	4	10	7	37	0	54	14	0	0	14	116
4:30 PM	1	105	0	106	5	3	0	8	7	6	65	0	78	14	0	0	14	206
4:45 PM	0	36	0	36	5	1	0	6	17	9	54	0	80	8	0	0	8	130
Total	1	286	0	287	15	8	0	23	47	26	217	0	290	55	0	0	55	655
Approach %	0.3	99.7	-	-	65.2	34.8	-	-	16.2	9.0	74.8	-	-	100.0	0.0	-	-	-
Total %	0.2	43.7	-	43.8	2.3	1.2	-	3.5	7.2	4.0	33.1	-	44.3	8.4	0.0	-	8.4	-
PHF	0.250	0.681	-	0.677	0.750	0.667	-	0.719	0.691	0.722	0.835	-	0.906	0.724	0.000	-	0.724	0.795
Motorcycles	0	8	-	8	0	0	-	0	0	1	6	-	7	1	0	-	1	16
% Motorcycles	0.0	2.8	-	2.8	0.0	0.0	-	0.0	0.0	3.8	2.8	-	2.4	1.8	-	-	1.8	2.4
Cars	1	195	-	196	14	1	-	15	36	16	104	-	156	27	0	-	27	394
% Cars	100.0	68.2	-	68.3	93.3	12.5	-	65.2	76.6	61.5	47.9	-	53.8	49.1	-	-	49.1	60.2
Light Goods Vehicles	0	79	-	79	0	4	-	4	10	6	66	-	82	26	0	-	26	191
% Light Goods Vehicles	0.0	27.6	-	27.5	0.0	50.0	-	17.4	21.3	23.1	30.4	-	28.3	47.3	-	-	47.3	29.2
Buses	0	0	-	0	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Buses	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	2	-	2	1	0	-	1	0	1	15	-	16	0	0	-	0	19
% Single-Unit Trucks	0.0	0.7	-	0.7	6.7	0.0	-	4.3	0.0	3.8	6.9	-	5.5	0.0	-	-	0.0	2.9
Articulated Trucks	0	1	-	1	0	3	-	3	1	2	26	-	29	1	0	-	1	34
% Articulated Trucks	0.0	0.3	-	0.3	0.0	37.5	-	13.0	2.1	7.7	12.0	-	10.0	1.8	-	-	1.8	5.2
Bicycles on Road	0	1	-	1	0	0	-	0	0	0	0	-	0	0	0	-	0	1
% Bicycles on Road	0.0	0.3	-	0.3	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	0.0	0.2
Pedestrians	-	<u>-</u>	0	-	-	_	0	-	-	-	<u>-</u>	0		-	-	0	-	-
% Pedestrians	-		-	-	-		-	-	-	-		-	-	-	-	-	-	-



Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 7



Turning Movement Peak Hour Data Plot (4:00 PM)



Count Name: 04-I15SBOff\_AirportRd\_Frontage TMC Site Code: TMC-04 Start Date: 07/16/2014 Page No: 8



Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 1

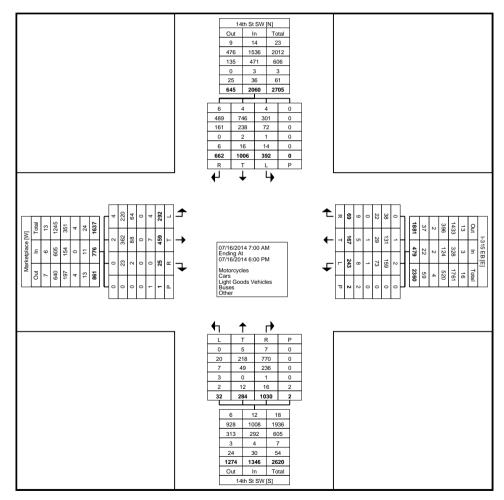
## **Turning Movement Data**

Start Time			14th St SW Southbound					14th St SW Northbound	J				I-315 EB Westbound					Marketplace Eastbound			
-	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	15	18	26	0	59	52	15	2	0	69	1	4		0	. 8	0	6	. 4	0	10	146
7:15 AM	15	15	31	0	61	66	15	11	0	82	2	5	9	1	16	0	15	6	0	21	180
7:30 AM	21	25	41	0	87	75	21	4	0	100	0	4	2	1	6	1	22	12	0	35	228
7:45 AM	14	27	46	0	87	90	21	0	0	111	2	9	. 5	0	16	1	17	16	0	34	248
Hourly Total	65	85	144	0	294	283	72	7	0	362	5	22	19	2	46	2	60	38	0	100	802
8:00 AM	10	24	24	0	58	55	9	2	0	66	1	12	4	0	17	1	15	10	0	26	167
8:15 AM	19	38	16	0	73	47	16	. 1	0	64	4	3	9	0	16	0	15	12	0	27	180
8:30 AM	25	36	19	0	80	59	19	1	0	79	6	9	10	0	25	0	13	8	0	21	205
8:45 AM	37	48	22	0	107	55	16	0	0	71	4	6	17	0	27	0	20	8	0	28	233
Hourly Total	91	146	81	0	318	216	60	4	0	280	15	30	40	0	85	1	63	38	0	102	785
*** BREAK ***	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-		-
4:00 PM	51	80	11	0	142	79	17	2	1	98	3	22	23	0	48	3	46	26	0	75	363
4:15 PM	67	97	16	0	180	48	16	0	0	64	4	11	23	0	38	4	48	29	1	81	363
4:30 PM	69	92	26	0	187	75	24	5	1	104	7	17	27	0	51	2	37	22	0	61	403
4:45 PM	77	97	24	0	198	70	28	2	0	100	6	10	21	0	37	4	51	30	0	85	420
Hourly Total	264	366	77	0	707	272	85	9	2	366	20	60	94	0	174	13	182	107	1	302	1549
5:00 PM	58	90	26	0	174	46	11	3	0	60	12	7	36	0	55	2	47	26	0	75	364
5:15 PM	58	117	19	0	194	69	19	3	0	91	6	16	18	0	40	2	33	29	0	64	389
5:30 PM	56	104	26	0	186	72	15	1	0	88	3	18	21	0	42	2	42	32	0	76	392
5:45 PM	70	98	19	0	187	72	22	5	0	99	8	14	15	0	37	3	32	22	0	57	380
Hourly Total	242	409	90	0	741	259	67	12	0	338	29	55	90	0	174	9	154	109	0	272	1525
Grand Total	662	1006	392	0	2060	1030	284	32	2	1346	69	167	243	2	479	25	459	292	1	776	4661
Approach %	32.1	48.8	19.0	-	-	76.5	21.1	2.4	-	-	14.4	34.9	50.7	-	-	3.2	59.1	37.6	-	-	-
Total %	14.2	21.6	8.4	-	44.2	22.1	6.1	0.7	-	28.9	1.5	3.6	5.2	-	10.3	0.5	9.8	6.3	-	16.6	-
Motorcycles	6	4	4	-	14	7	5	0	-	12	0	1	2	-	3	0	2	4	-	6	35
% Motorcycles	0.9	0.4	1.0	-	0.7	0.7	1.8	0.0	-	0.9	0.0	0.6	0.8	-	0.6	0.0	0.4	1.4	-	0.8	0.8
Cars	489	746	301	-	1536	770	218	20	-	1008	38	131	159	-	328	23	362	220	-	605	3477
% Cars	73.9	74.2	76.8	-	74.6	74.8	76.8	62.5	-	74.9	55.1	78.4	65.4	-	68.5	92.0	78.9	75.3	-	78.0	74.6
Light Goods Vehicles	161	238	72	-	471	236	49	7	-	292	22	29	73	-	124	2	88	64	-	154	1041
% Light Goods Vehicles	24.3	23.7	18.4	-	22.9	22.9	17.3	21.9	-	21.7	31.9	17.4	30.0	-	25.9	8.0	19.2	21.9	-	19.8	22.3
Buses	0	2	1	-	3	1	0	3	-	4	0	1	1	-	2	0	0	0	-	0	9
% Buses	0.0	0.2	0.3	-	0.1	0.1	0.0	9.4	-	0.3	0.0	0.6	0.4	-	0.4	0.0	0.0	0.0	-	0.0	0.2
Single-Unit Trucks	6	14	10	-	30	9	8	2	-	19	8	4	5	-	17	0	7	3	-	10	76
% Single-Unit Trucks	0.9	1.4	2.6	-	1.5	0.9	2.8	6.3	-	1.4	11.6	2.4	2.1	-	3.5	0.0	1.5	1.0	-	1.3	1.6
Articulated Trucks	0	1	4	-	5	7	3	0	-	10	1	1	3	-	5	0	0	1	-	1	21
% Articulated Trucks	0.0	0.1	1.0	-	0.2	0.7	1.1	0.0	-	0.7	1.4	0.6	1.2	-	1.0	0.0	0.0	0.3	-	0.1	0.5
Bicycles on Road	0	1	0	-	1	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	2

% Bicycles on Road	0.0	0.1	0.0	-	0.0	0.0	0.4	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	2	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



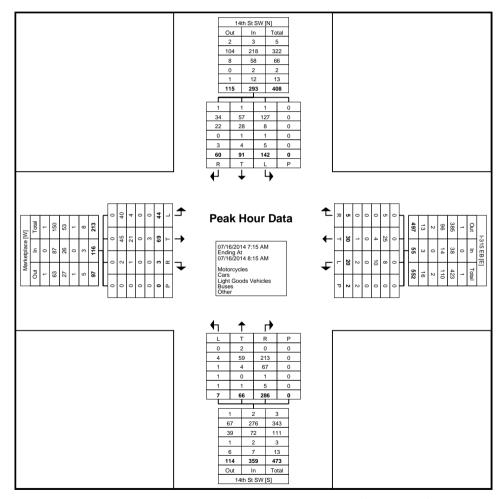
Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 4

## Turning Movement Peak Hour Data (7:15 AM)

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			14th St SW					14th St SW					I-315 EB					Marketplace			1
Start Time			Southbound					Northbound					Westbound					Eastbound			1
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:15 AM	15	15	31	0	61	66	15	1	0	82	2	5	9	1	16	0	15	6	0	21	180
7:30 AM	21	25	41	0	87	75	21	4	0	100	0	4	2	1	6	1	22	12	0	35	228
7:45 AM	14	27	46	0	87	90	21	0	0	111	2	9	5	0	16	1	17	16	0	34	248
8:00 AM	10	24	24	0	58	55	9	2	0	66	1	12	4	0	17	1	15	10	0	26	167
Total	60	91	142	0	293	286	66	7	0	359	5	30	20	2	55	3	69	44	0	116	823
Approach %	20.5	31.1	48.5	-	-	79.7	18.4	1.9	-		9.1	54.5	36.4	-	-	2.6	59.5	37.9	-	-	-
Total %	7.3	11.1	17.3	-	35.6	34.8	8.0	0.9	-	43.6	0.6	3.6	2.4	-	6.7	0.4	8.4	5.3	-	14.1	-
PHF	0.714	0.843	0.772	-	0.842	0.794	0.786	0.438	-	0.809	0.625	0.625	0.556	-	0.809	0.750	0.784	0.688	-	0.829	0.830
Motorcycles	1	1	1	-	3	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	5
% Motorcycles	1.7	1.1	0.7	-	1.0	0.0	3.0	0.0	-	0.6	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.6
Cars	34	57	127	-	218	213	59	4	-	276	5	25	8	-	38	2	45	40	-	87	619
% Cars	56.7	62.6	89.4	-	74.4	74.5	89.4	57.1	-	76.9	100.0	83.3	40.0	-	69.1	66.7	65.2	90.9	-	75.0	75.2
Light Goods Vehicles	22	28	8	-	58	67	4	1	-	72	0	4	10	-	14	1	21	4	-	26	170
% Light Goods Vehicles	36.7	30.8	5.6	-	19.8	23.4	6.1	14.3	-	20.1	0.0	13.3	50.0	-	25.5	33.3	30.4	9.1	-	22.4	20.7
Buses	0	1	1	-	2	1	0	1	-	2	0	0	0	-	0	0	0	0	-	0	4
% Buses	0.0	1.1	0.7	-	0.7	0.3	0.0	14.3	-	0.6	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.5
Single-Unit Trucks	3	4	3	-	10	5	1	1	-	7	0	0	2	-	2	0	3	0	-	3	22
% Single-Unit Trucks	5.0	4.4	2.1	-	3.4	1.7	1.5	14.3	-	1.9	0.0	0.0	10.0	-	3.6	0.0	4.3	0.0	-	2.6	2.7
Articulated Trucks	0	0	2	-	2	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	1.4	-	0.7	0.0	0.0	0.0	-	0.0	0.0	3.3	0.0	-	1.8	0.0	0.0	0.0	-	0.0	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	_	-	0	-	-		-	2	-	-	-	_	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
	•											•									



Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 5



Turning Movement Peak Hour Data Plot (7:15 AM)



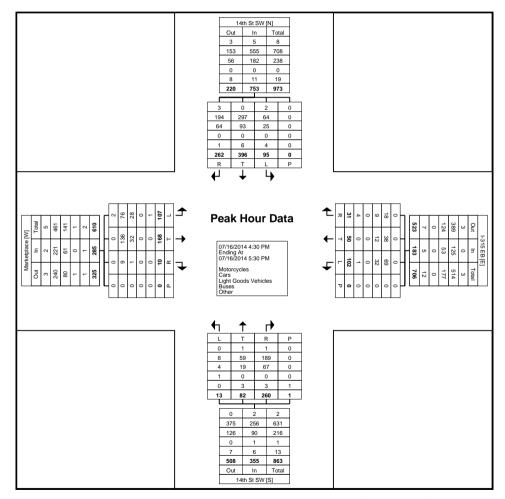
Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 6

#### Turning Movement Peak Hour Data (4:30 PM)

	i				i	•	٠	,		· oan i		αια <sub>(</sub>	00 1 111	,	i						i .
			14th St SW					14th St SW					I-315 EB					Marketplace			1
Start Time			Southbound					Northbound					Westbound					Eastbound			1
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
4:30 PM	69	92	26	0	187	75	24	5	1	104	7	17	27	0	51	2	37	22	0	61	403
4:45 PM	77	97	24	0	198	70	28	2	0	100	6	10	21	0	37	4	51	30	0	85	420
5:00 PM	58	90	26	0	174	46	11	3	0	60	12	7	36	0	55	2	47	26	0	75	364
5:15 PM	58	117	19	0	194	69	19	3	0	91	6	16	18	0	40	2	33	29	0	64	389
Total	262	396	95	0	753	260	82	13	1	355	31	50	102	0	183	10	168	107	0	285	1576
Approach %	34.8	52.6	12.6	-	-	73.2	23.1	3.7	-	-	16.9	27.3	55.7	-	-	3.5	58.9	37.5	-	-	-
Total %	16.6	25.1	6.0	-	47.8	16.5	5.2	0.8	-	22.5	2.0	3.2	6.5	-	11.6	0.6	10.7	6.8	-	18.1	-
PHF	0.851	0.846	0.913	-	0.951	0.867	0.732	0.650	-	0.853	0.646	0.735	0.708	-	0.832	0.625	0.824	0.892	-	0.838	0.938
Motorcycles	3	0	2	-	5	1	1	0	-	2	0	0	0	-	0	0	0	2	-	2	9
% Motorcycles	1.1	0.0	2.1	-	0.7	0.4	1.2	0.0	-	0.6	0.0	0.0	0.0	-	0.0	0.0	0.0	1.9	-	0.7	0.6
Cars	194	297	64	-	555	189	59	8	-	256	18	38	69	-	125	9	136	76	-	221	1157
% Cars	74.0	75.0	67.4	-	73.7	72.7	72.0	61.5	-	72.1	58.1	76.0	67.6	-	68.3	90.0	81.0	71.0	-	77.5	73.4
Light Goods Vehicles	64	93	25	-	182	67	19	4	-	90	9	12	32	-	53	1	32	28	-	61	386
% Light Goods Vehicles	24.4	23.5	26.3	-	24.2	25.8	23.2	30.8	-	25.4	29.0	24.0	31.4	-	29.0	10.0	19.0	26.2	-	21.4	24.5
Buses	0	0	0	-	0	0	0	1	-	1	0	0	0	-	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	0.0	0.0	0.0	7.7	-	0.3	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1
Single-Unit Trucks	1	4	3	-	8	1	2	0	-	3	4	0	1	-	5	0	0	1	-	1	17
% Single-Unit Trucks	0.4	1.0	3.2	-	1.1	0.4	2.4	0.0	-	0.8	12.9	0.0	1.0	-	2.7	0.0	0.0	0.9	-	0.4	1.1
Articulated Trucks	0	1	1	-	2	2	0	0	-	2	0	0	0	-	0	0	0	0	-	0	4
% Articulated Trucks	0.0	0.3	1.1	-	0.3	0.8	0.0	0.0	-	0.6	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.3
Bicycles on Road	0	1	0	-	1	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.3	0.0	-	0.1	0.0	1.2	0.0	-	0.3	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1
Pedestrians	-	-	_	0	-	-	-	-	1	-	-	-	_	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	_	-	100.0	-	-	-	-	-	-	-	_	-	-	-	-



Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 7



Turning Movement Peak Hour Data Plot (4:30 PM)



Count Name: 05-14thStSW\_I315EB TMC Site Code: TMC-05 Start Date: 07/16/2014 Page No: 8



Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 1

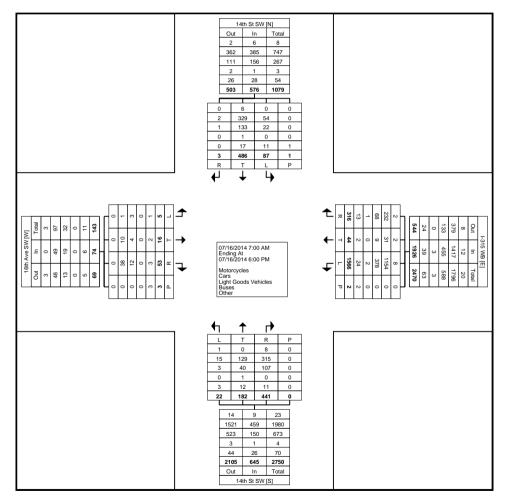
# Turning Movement Data

			14th St SW					14th St SW	Ū				I-315 WB					16th Ave SW			
			Southbound					Northbound		İ			Westbound					Eastbound			i
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	0	29	6	0	35	15	4	1	0	20	9	0	25	0	34	2	0	0	0	2	91
7:15 AM	0	31	7	0	38	19	5	1	0	25	12	1	28	1	41	3	0	0	0	3	107
7:30 AM	0	49	5	0	54	24	5	0	0	29	9	2	37	1	48	3	2	0	0	5	136
7:45 AM	0	45	13	0	58	28	5	7	0	40	13	5	38	0	56	5	2	0	0	7	161
Hourly Total	0	154	31	0	185	86	19	9	0	114	43	8	128	2	179	13	4	0	0	17	495
8:00 AM	0	24	7	0	31	14	6	1	0	21	10	5	31	0	46	2	1	0	0	3	101
8:15 AM	0	18	1	0	19	24	1	3	0	28	6	4	56	0	66	5	2	0	1	7	120
8:30 AM	0	23	6	0	29	24	11	0	0	35	6	0	53	0	59	4	1	1	0	6	129
8:45 AM	0	23	4	0	27	18	8	0	0	26	11	0	80	0	91	3	1	0	0	4	148
Hourly Total	0	88	18	0	106	80	26	4	0	110	33	9	220	0	262	14	5	1	1	20	498
*** BREAK ***	-			-	_	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	18	4	0	22	33	10	2	0	45	20	3	121	0	144	1	1	0	0	2	213
4:15 PM	0	30	2	0	32	33	14	0	0	47	25	6	145	0	176	2	1	0	0	3	258
4:30 PM	0	37	5	0	42	29	21	2	0	52	24	3	156	0	183	2	0	1	0	3	280
4:45 PM	1	41	5	0	47	38	22	2	0	62	32	9	148	0	189	2	3	1	1	6	304
Hourly Total	1	126	16	0	143	133	67	6	0	206	101	21	570	0	692	7	5	2	1	14	1055
5:00 PM	0	28	3	0	31	37	20	2	0	59	41	1	161	0	203	6	1	0	0	7	300
5:15 PM	1	27	8	0	36	32	21	1	0	54	40	0	159	0	199	4	0	2	0	6	295
5:30 PM	0	35	6	0	41	39	13	0	0	52	29	2	170	0	201	7	1	0	0	8	302
5:45 PM	1	28	5	1	34	34	16	0	0	50	29	3	158	0	190	2	0	0	1	2	276
Hourly Total	2	118	22	1	142	142	70	3	0	215	139	6	648	0	793	19	2	2	1	23	1173
Grand Total	3	486	87	1	576	441	182	22	0	645	316	44	1566	2	1926	53	16	5	3	74	3221
Approach %	0.5	84.4	15.1	-	-	68.4	28.2	3.4	-	-	16.4	2.3	81.3	-	-	71.6	21.6	6.8	-	-	-
Total %	0.1	15.1	2.7	-	17.9	13.7	5.7	0.7	-	20.0	9.8	1.4	48.6	-	59.8	1.6	0.5	0.2	-	2.3	-
Motorcycles	0	6	0	-	6	8	0	. 1	-	9	2	2	8	-	12	0	0	0	-	0	27
% Motorcycles	0.0	1.2	0.0	-	1.0	1.8	0.0	4.5	-	1.4	0.6	4.5	0.5	-	0.6	0.0	0.0	0.0	-	0.0	0.8
Cars	2	329	54	-	385	315	129	15	-	459	232	31	1154	-	1417	38	10	1	-	49	2310
% Cars	66.7	67.7	62.1	-	66.8	71.4	70.9	68.2	-	71.2	73.4	70.5	73.7	-	73.6	71.7	62.5	20.0	-	66.2	71.7
Light Goods Vehicles	1	133	22	-	156	107	40	3	-	150	68	9	378	-	455	12	4	3	-	19	780
% Light Goods Vehicles	33.3	27.4	25.3	-	27.1	24.3	22.0	13.6	-	23.3	21.5	20.5	24.1	-	23.6	22.6	25.0	60.0	-	25.7	24.2
Buses	0	1	0	-	1	0	1	0	-	1	1	0	2	-	3	0	0	0	-	0	5
% Buses	0.0	0.2	0.0	-	0.2	0.0	0.5	0.0	-	0.2	0.3	0.0	0.1	-	0.2	0.0	0.0	0.0	-	0.0	0.2
Single-Unit Trucks	0	10	8	-	18	8	9	3	-	20	11	2	22	-	35	2	2	1	-	5	78
% Single-Unit Trucks	0.0	2.1	9.2	-	3.1	1.8	4.9	13.6	-	3.1	3.5	4.5	1.4	-	1.8	3.8	12.5	20.0	-	6.8	2.4
Articulated Trucks	0	5	1	-	6	3	2	0	-	5	2	0	2	-	4	1	0	0	-	1	16
% Articulated Trucks	0.0	1.0	1.1	-	1.0	0.7	1.1	0.0	-	0.8	0.6	0.0	0.1	-	0.2	1.9	0.0	0.0	-	1.4	0.5
Bicycles on Road	0	2	2	-	4	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	5

% Bicycles on Road	0.0	0.4	2.3	-	0.7	0.0	0.5	0.0	-	0.2	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.2
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	2	-	-	-	-	3	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



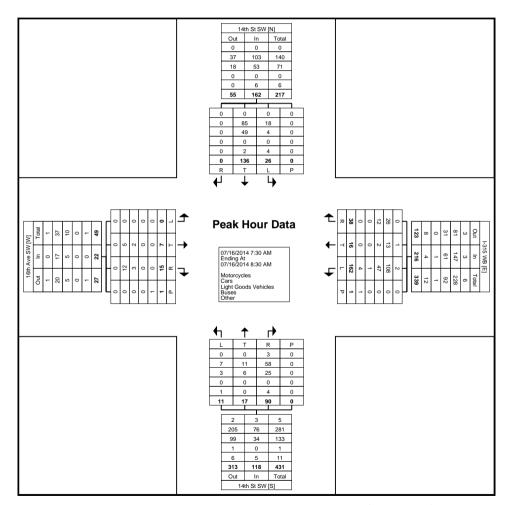
Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 4

#### Turning Movement Peak Hour Data (7:30 AM)

1							unnig	IVIOVE	HICHI	Peak F	ioui D	aia (1.	JU AIVI	,	1						1
			14th St SW					14th St SW					I-315 WB					16th Ave SW			
Start Time			Southbound					Northbound					Westbound					Eastbound			
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:30 AM	0	49	5	0	54	24	5	0	0	29	9	2	37	1	48	3	2	0	0	5	136
7:45 AM	0	45	13	0	58	28	5	7	0	40	13	5	38	0	56	5	2	0	0	7	161
8:00 AM	0	24	7	0	31	14	6	1	0	21	10	5	31	0	46	2	1	0	0	3	101
8:15 AM	0	18	1	0	19	24	1	3	0	28	6	4	56	0	66	5	2	0	1	7	120
Total	0	136	26	0	162	90	17	11	0	118	38	16	162	1	216	15	7	0	1	22	518
Approach %	0.0	84.0	16.0	-	-	76.3	14.4	9.3	-	-	17.6	7.4	75.0	-	-	68.2	31.8	0.0	-	-	-
Total %	0.0	26.3	5.0	-	31.3	17.4	3.3	2.1	-	22.8	7.3	3.1	31.3	-	41.7	2.9	1.4	0.0	-	4.2	-
PHF	0.000	0.694	0.500	-	0.698	0.804	0.708	0.393	-	0.738	0.731	0.800	0.723	-	0.818	0.750	0.875	0.000	-	0.786	0.804
Motorcycles	0	0	0	-	0	3	0	0	-	3	0	1	2	-	3	0	0	0	-	0	6
% Motorcycles	-	0.0	0.0	-	0.0	3.3	0.0	0.0	-	2.5	0.0	6.3	1.2	-	1.4	0.0	0.0	-	-	0.0	1.2
Cars	0	85	18	-	103	58	11	7	-	76	26	13	108	-	147	12	5	0	-	17	343
% Cars	-	62.5	69.2	-	63.6	64.4	64.7	63.6	-	64.4	68.4	81.3	66.7	-	68.1	80.0	71.4	-	-	77.3	66.2
Light Goods Vehicles	0	49	4	-	53	25	6	3	-	34	12	2	47	-	61	3	2	0	-	5	153
% Light Goods Vehicles	-	36.0	15.4	-	32.7	27.8	35.3	27.3	-	28.8	31.6	12.5	29.0	-	28.2	20.0	28.6	-	-	22.7	29.5
Buses	0	0	0	-	0	0	0	0	-	0	0	0	1	-	1	0	0	0	-	0	1
% Buses	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.6	-	0.5	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	2	2	-	4	3	0	1	-	4	0	0	4	-	4	0	0	0	-	0	12
% Single-Unit Trucks	-	1.5	7.7	-	2.5	3.3	0.0	9.1	-	3.4	0.0	0.0	2.5	-	1.9	0.0	0.0	-	-	0.0	2.3
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Articulated Trucks	-	0.0	0.0	-	0.0	1.1	0.0	0.0	-	0.8	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	2	-	2	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	2
% Bicycles on Road	-	0.0	7.7	-	1.2	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.4
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	_	_			_	-				_	_			100.0	-	-			100.0	-	



Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



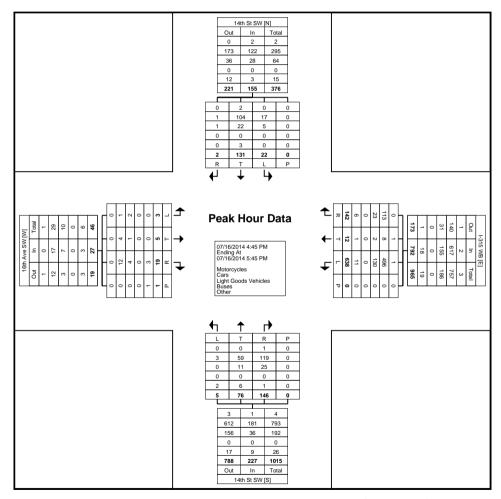
Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 6

## Turning Movement Peak Hour Data (4:45 PM)

	i				i		~ <u>.</u>	,		· oan i		~.~ (		٠,	i						1
			14th St SW					14th St SW					I-315 WB					16th Ave SW	'		1
Start Time			Southbound					Northbound					Westbound					Eastbound			1
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
4:45 PM	1	41	5	0	47	38	22	2	0	62	32	9	148	0	189	2	3	1	1	6	304
5:00 PM	0	28	3	0	31	37	20	2	0	59	41	1	161	0	203	6	1	0	0	7	300
5:15 PM	1	27	8	0	36	32	21	1	0	54	40	0	159	0	199	4	0	2	0	6	295
5:30 PM	0	35	6	0	41	39	13	0	0	52	29	2	170	0	201	7	1	0	0	8	302
Total	2	131	22	0	155	146	76	5	0	227	142	12	638	0	792	19	5	3	1	27	1201
Approach %	1.3	84.5	14.2	-	-	64.3	33.5	2.2	-	-	17.9	1.5	80.6	-	-	70.4	18.5	11.1	-	-	-
Total %	0.2	10.9	1.8	-	12.9	12.2	6.3	0.4	-	18.9	11.8	1.0	53.1	-	65.9	1.6	0.4	0.2	-	2.2	-
PHF	0.500	0.799	0.688	-	0.824	0.936	0.864	0.625	-	0.915	0.866	0.333	0.938	-	0.975	0.679	0.417	0.375	-	0.844	0.988
Motorcycles	0	2	0	-	2	1	0	0	-	1	0	1	1	-	2	0	0	0	-	0	5
% Motorcycles	0.0	1.5	0.0	-	1.3	0.7	0.0	0.0	-	0.4	0.0	8.3	0.2	-	0.3	0.0	0.0	0.0	-	0.0	0.4
Cars	1	104	17	-	122	119	59	3	-	181	113	8	496	-	617	12	4	1	-	17	937
% Cars	50.0	79.4	77.3	-	78.7	81.5	77.6	60.0	-	79.7	79.6	66.7	77.7	-	77.9	63.2	80.0	33.3	-	63.0	78.0
Light Goods Vehicles	1	22	5	-	28	25	11	0	-	36	23	2	130	-	155	4	1	2	-	7	226
% Light Goods Vehicles	50.0	16.8	22.7	-	18.1	17.1	14.5	0.0	-	15.9	16.2	16.7	20.4	-	19.6	21.1	20.0	66.7	-	25.9	18.8
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Single-Unit Trucks	0	2	0	-	2	1	5	2	-	8	4	1	10	-	15	2	0	0	-	2	27
% Single-Unit Trucks	0.0	1.5	0.0	-	1.3	0.7	6.6	40.0	-	3.5	2.8	8.3	1.6	-	1.9	10.5	0.0	0.0	-	7.4	2.2
Articulated Trucks	0	1	0	-	1	0	0	0	-	0	2	0	1	-	3	1	0	0	-	1	5
% Articulated Trucks	0.0	0.8	0.0	-	0.6	0.0	0.0	0.0	-	0.0	1.4	0.0	0.2	-	0.4	5.3	0.0	0.0	-	3.7	0.4
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	1.3	0.0	-	0.4	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.1
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-
					-							•	•							•	



Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 7



Turning Movement Peak Hour Data Plot (4:45 PM)



Count Name: 06-14thStSW\_I315WB TMC Site Code: TMC-06 Start Date: 07/16/2014 Page No: 8



Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 1

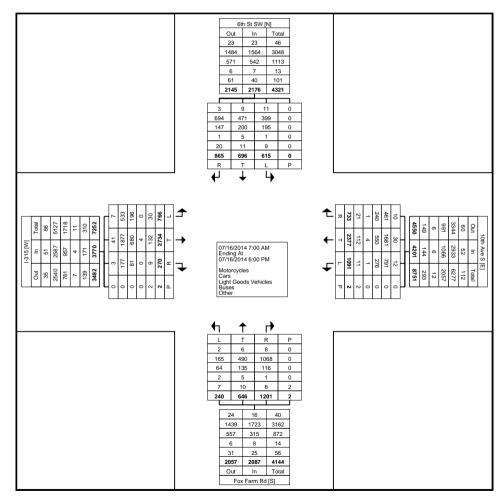
Turning Movement Data

			6th St SW					Fox Farm Rd	Ŭ				10th Ave S					I-315			İ
			Southbound					Northbound					Westbound					Eastbound			İ
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	17	15	21	0	53	79	33	12	0	124	20	78	14	0	112	8	140	32	0	180	469
7:15 AM	24	14	45	0	83	77	33	7	0	117	41	79	22	0	142	15	155	47	0	217	559
7:30 AM	22	15	36	0	73	103	58	16	0	177	28	99	21	0	148	15	211	45	0	271	669
7:45 AM	32	19	63	0	114	145	81	16	0	242	49	81	24	0	154	10	244	50	0	304	814
Hourly Total	95	63	165	0	323	404	205	51	0	660	138	337	81	0	556	48	750	174	0	972	2511
8:00 AM	26	33	37	0	96	93	38	5	0	136	26	70	24	0	120	9	128	43	0	180	532
8:15 AM	41	23	36	0	100	96	42	13	0	151	33	85	32	0	150	11	149	23	0	183	584
8:30 AM	36	22	37	0	95	82	45	15	0	142	26	97	25	0	148	15	147	30	0	192	577
8:45 AM	45	27	38	0	110	99	39	9	0	147	34	129	36	0	199	8	156	44	0	208	664
Hourly Total	148	105	148	0	401	370	164	42	0	576	119	381	117	0	617	43	580	140	0	763	2357
*** BREAK ***	-		-	-	_	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
4:00 PM	54	52	39	0	145	31	26	16	0	73	54	188	95	0	337	17	223	53	1	293	848
4:15 PM	77	68	43	0	188	63	24	26	1	113	64	164	85	0	313	21	160	52	0	233	847
4:30 PM	79	46	33	0	158	50	37	18	0	105	52	244	121	0	417	34	216	61	1	311	991
4:45 PM	101	64	38	0	203	49	36	15	1	100	55	166	95	0	316	23	163	69	0	255	874
Hourly Total	311	230	153	0	694	193	123	75	2	391	225	762	396	0	1383	95	762	235	2	1092	3560
5:00 PM	69	79	44	0	192	54	43	18	0	115	63	217	105	1	385	22	184	53	0	259	951
5:15 PM	76	85	38	0	199	74	39	20	0	133	80	247	165	0	492	24	143	59	0	226	1050
5:30 PM	84	74	40	0	198	58	34	18	0	110	60	217	94	1	371	13	166	53	0	232	911
5:45 PM	82	60	27	0	169	48	38	16	0	102	48	216	133	0	397	25	149	52	0	226	894
Hourly Total	311	298	149	0	758	234	154	72	0	460	251	897	497	2	1645	84	642	217	0	943	3806
Grand Total	865	696	615	0	2176	1201	646	240	2	2087	733	2377	1091	2	4201	270	2734	766	2	3770	12234
Approach %	39.8	32.0	28.3	-	-	57.5	31.0	11.5	-	-	17.4	56.6	26.0	-	-	7.2	72.5	20.3	-		-
Total %	7.1	5.7	5.0	-	17.8	9.8	5.3	2.0	-	17.1	6.0	19.4	8.9	-	34.3	2.2	22.3	6.3	-	30.8	-
Motorcycles	3	9	11	-	23	8	6	2	-	16	10	30	12	-	52	3	41	7	-	51	142
% Motorcycles	0.3	1.3	1.8	-	1.1	0.7	0.9	0.8	-	0.8	1.4	1.3	1.1	-	1.2	1.1	1.5	0.9	-	1.4	1.2
Cars	694	471	399	-	1564	1068	490	165	-	1723	461	1681	791	-	2933	177	1877	533	-	2587	8807
% Cars	80.2	67.7	64.9	-	71.9	88.9	75.9	68.8	-	82.6	62.9	70.7	72.5	-	69.8	65.6	68.7	69.6	-	68.6	72.0
Light Goods Vehicles	147	200	195	-	542	116	135	64	-	315	240	550	276	-	1066	81	680	196	-	957	2880
% Light Goods Vehicles	17.0	28.7	31.7	-	24.9	9.7	20.9	26.7	-	15.1	32.7	23.1	25.3	-	25.4	30.0	24.9	25.6	-	25.4	23.5
Buses	1	5	1	-	7	1	5	2	-	8	1	4	1	-	6	0	4	0	-	4	25
% Buses	0.1	0.7	0.2	-	0.3	0.1	0.8	0.8	-	0.4	0.1	0.2	0.1	-	0.1	0.0	0.1	0.0	-	0.1	0.2
Single-Unit Trucks	16	10	5	-	31	8	9	6	-	23	17	59	11	-	87	8	65	19	-	92	233
% Single-Unit Trucks	1.8	1.4	0.8	-	1.4	0.7	1.4	2.5	-	1.1	2.3	2.5	1.0	-	2.1	3.0	2.4	2.5	-	2.4	1.9
Articulated Trucks	4	1	4	-	9	0	0	1	-	1	4	53	0	-	57	0	67	11	-	78	145
% Articulated Trucks	0.5	0.1	0.7	-	0.4	0.0	0.0	0.4	-	0.0	0.5	2.2	0.0	-	1.4	0.0	2.5	1.4	-	2.1	1.2
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1	0	0	-	1	2

% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.4	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	2	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



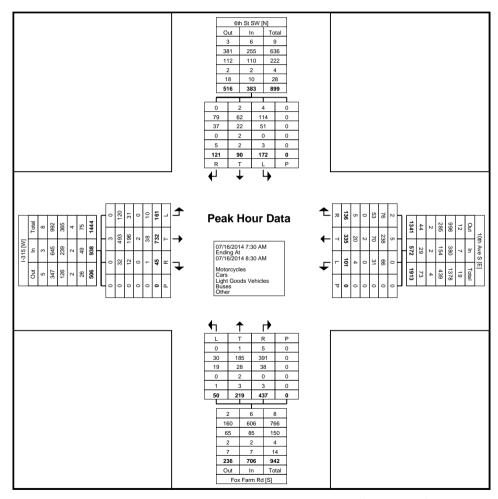
Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 4

## Turning Movement Peak Hour Data (7:30 AM)

	i				i	•	٠	,				αια (	00 /	'/	i						i
			6th St SW					Fox Farm Ro	I				10th Ave S					I-315			
Start Time			Southbound					Northbound					Westbound					Eastbound			
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:30 AM	22	15	36	0	73	103	58	16	0	177	28	99	21	0	148	15	211	45	0	271	669
7:45 AM	32	19	63	0	114	145	81	16	0	242	49	81	24	0	154	10	244	50	0	304	814
8:00 AM	26	33	37	0	96	93	38	5	0	136	26	70	24	0	120	9	128	43	0	180	532
8:15 AM	41	23	36	0	100	96	42	13	0	151	33	85	32	0	150	11	149	23	0	183	584
Total	121	90	172	0	383	437	219	50	0	706	136	335	101	0	572	45	732	161	0	938	2599
Approach %	31.6	23.5	44.9	-	-	61.9	31.0	7.1	-	-	23.8	58.6	17.7	-	-	4.8	78.0	17.2	-	-	-
Total %	4.7	3.5	6.6	-	14.7	16.8	8.4	1.9	-	27.2	5.2	12.9	3.9	-	22.0	1.7	28.2	6.2	-	36.1	-
PHF	0.738	0.682	0.683	-	0.840	0.753	0.676	0.781	-	0.729	0.694	0.846	0.789	-	0.929	0.750	0.750	0.805	-	0.771	0.798
Motorcycles	0	2	4	-	6	5	1	0	-	6	2	5	0	-	7	0	3	0	-	3	22
% Motorcycles	0.0	2.2	2.3	-	1.6	1.1	0.5	0.0	-	8.0	1.5	1.5	0.0	-	1.2	0.0	0.4	0.0	-	0.3	0.8
Cars	79	62	114	-	255	391	185	30	-	606	76	238	66	-	380	32	493	120	-	645	1886
% Cars	65.3	68.9	66.3	-	66.6	89.5	84.5	60.0	-	85.8	55.9	71.0	65.3	-	66.4	71.1	67.3	74.5	-	68.8	72.6
Light Goods Vehicles	37	22	51	-	110	38	28	19	-	85	53	70	31	-	154	12	196	31	-	239	588
% Light Goods Vehicles	30.6	24.4	29.7	-	28.7	8.7	12.8	38.0	-	12.0	39.0	20.9	30.7	-	26.9	26.7	26.8	19.3	-	25.5	22.6
Buses	0	2	0	-	2	0	2	0	-	2	0	2	0	-	2	0	2	0	-	2	8
% Buses	0.0	2.2	0.0	-	0.5	0.0	0.9	0.0	-	0.3	0.0	0.6	0.0	-	0.3	0.0	0.3	0.0	-	0.2	0.3
Single-Unit Trucks	5	1	2	-	8	3	2	0	-	5	5	12	4	-	21	1	24	8	-	33	67
% Single-Unit Trucks	4.1	1.1	1.2	-	2.1	0.7	0.9	0.0	-	0.7	3.7	3.6	4.0	-	3.7	2.2	3.3	5.0	-	3.5	2.6
Articulated Trucks	0	1	1	-	2	0	0	1	-	1	0	8	0	-	8	0	14	2	-	16	27
% Articulated Trucks	0.0	1.1	0.6	-	0.5	0.0	0.0	2.0	-	0.1	0.0	2.4	0.0	-	1.4	0.0	1.9	1.2	-	1.7	1.0
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.5	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	_	-
	•		•														•				



Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



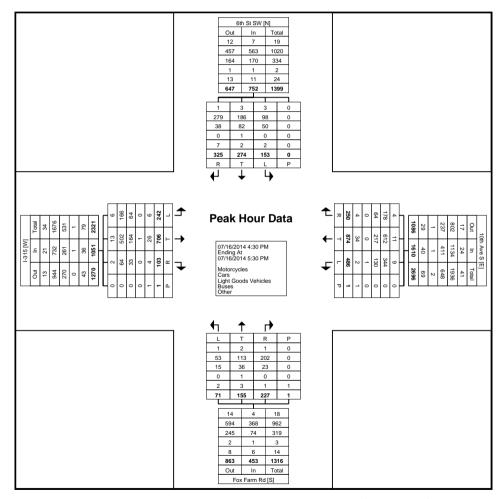
Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 6

## Turning Movement Peak Hour Data (4:30 PM)

			6th St SW					Fox Farm Ro	i			`	10th Ave S	,	I			I-315			ĺ
			Southbound					Northbound					Westbound					Eastbound			İ
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
4:30 PM	79	46	33	0	158	50	37	18	0	105	52	244	121	0	417	34	216	61	1	311	991
4:45 PM	101	64	38	0	203	49	36	15	1	100	55	166	95	0	316	23	163	69	0	255	874
5:00 PM	69	79	44	0	192	54	43	18	0	115	63	217	105	1	385	22	184	53	0	259	951
5:15 PM	76	85	38	0	199	74	39	20	0	133	80	247	165	0	492	24	143	59	0	226	1050
Total	325	274	153	0	752	227	155	71	1	453	250	874	486	1	1610	103	706	242	1	1051	3866
Approach %	43.2	36.4	20.3	-	-	50.1	34.2	15.7	-	-	15.5	54.3	30.2	-	-	9.8	67.2	23.0	-	-	-
Total %	8.4	7.1	4.0	-	19.5	5.9	4.0	1.8	-	11.7	6.5	22.6	12.6	-	41.6	2.7	18.3	6.3	-	27.2	-
PHF	0.804	0.806	0.869	-	0.926	0.767	0.901	0.888	-	0.852	0.781	0.885	0.736	-	0.818	0.757	0.817	0.877	-	0.845	0.920
Motorcycles	1	3	3	-	7	1	2	1	-	4	4	11	9	-	24	2	13	6	-	21	56
% Motorcycles	0.3	1.1	2.0	-	0.9	0.4	1.3	1.4	-	0.9	1.6	1.3	1.9	-	1.5	1.9	1.8	2.5	-	2.0	1.4
Cars	279	186	98	-	563	202	113	53	-	368	178	612	344	-	1134	64	502	166	-	732	2797
% Cars	85.8	67.9	64.1	-	74.9	89.0	72.9	74.6	-	81.2	71.2	70.0	70.8	-	70.4	62.1	71.1	68.6	-	69.6	72.3
Light Goods Vehicles	38	82	50	-	170	23	36	15	-	74	64	217	130	-	411	33	164	64	-	261	916
% Light Goods Vehicles	11.7	29.9	32.7	-	22.6	10.1	23.2	21.1	-	16.3	25.6	24.8	26.7	-	25.5	32.0	23.2	26.4	-	24.8	23.7
Buses	0	1	0	-	1	0	1	0	-	1	0	0	1	-	1	0	1	0	-	1	4
% Buses	0.0	0.4	0.0	-	0.1	0.0	0.6	0.0	-	0.2	0.0	0.0	0.2	-	0.1	0.0	0.1	0.0	-	0.1	0.1
Single-Unit Trucks	4	2	0	-	6	1	3	2	-	6	3	19	2	-	24	3	13	4	-	20	56
% Single-Unit Trucks	1.2	0.7	0.0	-	0.8	0.4	1.9	2.8	-	1.3	1.2	2.2	0.4	-	1.5	2.9	1.8	1.7	-	1.9	1.4
Articulated Trucks	3	0	2	-	5	0	0	0	-	0	1	15	0	-	16	0	13	2	-	15	36
% Articulated Trucks	0.9	0.0	1.3	-	0.7	0.0	0.0	0.0	-	0.0	0.4	1.7	0.0	-	1.0	0.0	1.8	0.8	-	1.4	0.9
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	1.0	0.0	0.0	-	0.1	0.0
Pedestrians	-	-	-	0	-	-	_		1	-	-	-	-	1	-	-	-		1	-	-
% Pedestrians	-	-	-	-	_	-			100.0	-	-	-		100.0	-	-			100.0	-	-



Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 7



Turning Movement Peak Hour Data Plot (4:30 PM)



Count Name: 07-FoxFarm\_I315 TMC Site Code: TMC-07 Start Date: 07/16/2014 Page No: 8



Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 1

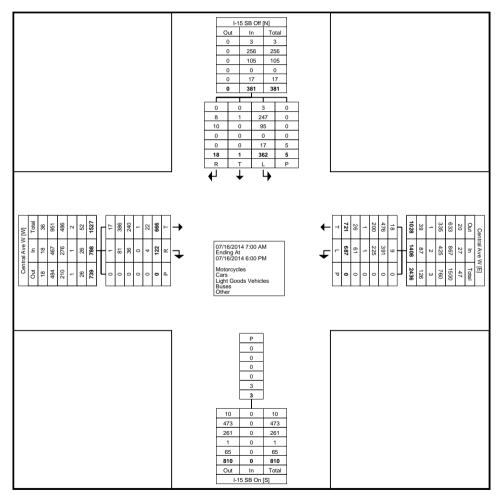
#### **Turning Movement Data**

			I-15 SB Off Southbound				SB On			Ave W				Ave W		
Start Time	Right	Thru	Left	Peds	App. Total	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
7:00 AM	3	0	31	0	34	0	0	9	30	0	39	9	35	0	44	117
7:15 AM	1	0	37	0	38	0	0	19	28	0	47	13	33	0	46	131
7:30 AM	2	0	38	0	40	0	0	27	24	0	51	8	69	0	77	168
7:45 AM	1	0	35	0	36	0	0	22	40	0	62	12	47	0	59	157
Hourly Total	7	0	141	0	148	0	0	77	122	0	199	42	184	0	226	573
8:00 AM	2	0	20	0	22	0	0	20	31	0	51	6	42	0	48	121
8:15 AM	0	0	19	0	19	0	0	20	33	0	53	7	42	0	49	121
8:30 AM	0	0	20	0	20	0	0	23	28	0	51	6	29	0	35	106
8:45 AM	0	0	20	0	20	2	0	21	35	0	56	7	33	0	40	116
Hourly Total	2	0	79	0	81	2	0	84	127	0	211	26	146	0	172	464
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	1	1	26	0	28	0	0	59	46	0	105	10	44	0	54	187
4:15 PM	2	0	13	0	15	0	0	73	44	0	117	5	37	0	42	174
4:30 PM	0	0	23	0	23	0	0	68	53	0	121	7	49	0	56	200
4:45 PM	0	0	14	3	14	0	0	61	65	0	126	2	40	0	42	182
Hourly Total	3	1	76	3	80	0	0	261	208	0	469	24	170	0	194	743
5:00 PM	2	0	16	0	18	0	0	75	52	0	127	7	40	0	47	192
5:15 PM	1	0	17	1	18	1	0	86	64	0	150	5	49	0	54	222
5:30 PM	1	0	15	0	16	0	0	66	64	0	130	9	43	0	52	198
5:45 PM	2	0	18	1	20	0	0	72	50	0	122	9	34	0	43	185
Hourly Total	6	0	66	2	72	1	0	299	230	0	529	30	166	0	196	797
Grand Total	18	1	362	5	381	3	0	721	687	0	1408	122	666	0	788	2577
Approach %	4.7	0.3	95.0	-	-	-	-	51.2	48.8	-	-	15.5	84.5	-	-	-
Total %	0.7	0.0	14.0	-	14.8	-	0.0	28.0	26.7	-	54.6	4.7	25.8	-	30.6	-
Motorcycles	0	0	3	-	3	-	0	18	9	-	27	1	17	-	18	48
% Motorcycles	0.0	0.0	0.8	-	0.8	-	_	2.5	1.3	-	1.9	0.8	2.6	-	2.3	1.9
Cars	8	1	247	-	256	-	0	476	391	-	867	81	386	-	467	1590
% Cars	44.4	100.0	68.2	-	67.2	-	_	66.0	56.9	-	61.6	66.4	58.0	-	59.3	61.7
Light Goods Vehicles	10	0	95	-	105	-	0	200	225	-	425	36	240	_	276	806
% Light Goods Vehicles	55.6	0.0	26.2	-	27.6	-	-	27.7	32.8	-	30.2	29.5	36.0	-	35.0	31.3
Buses	0	0	0	-	0	-	0	1	1	-	2	0	1	-	. 1	3
% Buses	0.0	0.0	0.0	-	0.0	-	_	0.1	0.1	-	0.1	0.0	0.2	_	0.1	0.1
Single-Unit Trucks	0	0	7	-	7	-	0	13	28	-	41	4	10	-	14	62
% Single-Unit Trucks	0.0	0.0	1.9	-	1.8	-	_	1.8	4.1	-	2.9	3.3	1.5	-	1.8	2.4
Articulated Trucks	0	0	10	-	10	-	0	13	33	-	46	0	12	-	12	68
% Articulated Trucks	0.0	0.0	2.8	-	2.6	-	-	1.8	4.8	-	3.3	0.0	1.8	-	1.5	2.6
Bicycles on Road	0	0	0	-	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	-	-	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0

Pedestrians	-	-	-	5	-	3	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	100.0	-	-	-	-	-	-	-	-	-	-



Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



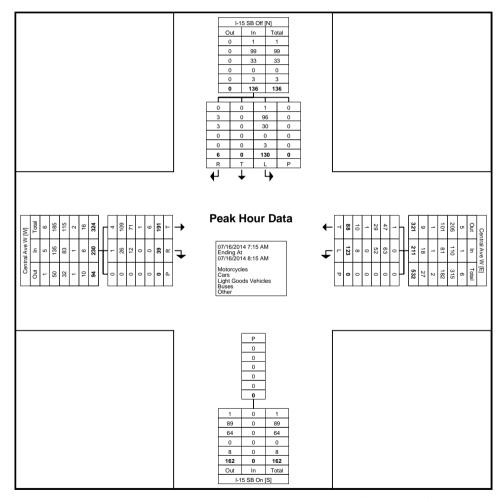
Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 4

Turning Movement Peak Hour Data (7:15 AM)

ı	ı				ı arrınış	,	IIIGIILI GO	ik i lodi	`	,						ı
			I-15 SB Off			I-15	SB On		Centra	l Ave W			Centra	I Ave W		
Start Time			Southbound			Nort	thbound		West	bound			Eastl	oound		
Start Time	Right	Thru	Left	Peds	App. Total	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
7:15 AM	1	0	37	0	38	0	0	19	28	0	47	13	33	0	46	131
7:30 AM	2	0	38	0	40	0	0	27	24	0	51	8	69	0	77	168
7:45 AM	1	0	35	0	36	0	0	22	40	0	62	12	47	0	59	157
8:00 AM	2	0	20	0	22	0	0	20	31	0	51	6	42	0	48	121
Total	6	0	130	0	136	0	0	88	123	0	211	39	191	0	230	577
Approach %	4.4	0.0	95.6	-	-	-	-	41.7	58.3	-	-	17.0	83.0	-	-	-
Total %	1.0	0.0	22.5	-	23.6	-	0.0	15.3	21.3	-	36.6	6.8	33.1	-	39.9	-
PHF	0.750	0.000	0.855	-	0.850	-	0.000	0.815	0.769	-	0.851	0.750	0.692	-	0.747	0.859
Motorcycles	0	0	1	-	1	-	0	1	0	-	1	1	4	-	5	7
% Motorcycles	0.0	_	0.8	-	0.7	-	-	1.1	0.0	-	0.5	2.6	2.1	-	2.2	1.2
Cars	3	0	96	-	99	-	0	47	63	-	110	26	109	-	135	344
% Cars	50.0	-	73.8	-	72.8	-	-	53.4	51.2	-	52.1	66.7	57.1	-	58.7	59.6
Light Goods Vehicles	3	0	30	-	33	-	0	29	52	-	81	12	71	-	83	197
% Light Goods Vehicles	50.0	-	23.1	-	24.3	-	-	33.0	42.3	-	38.4	30.8	37.2	-	36.1	34.1
Buses	0	0	0	-	0	-	0	1	0	-	1	0	1	-	1	2
% Buses	0.0	_	0.0	-	0.0	-	-	1.1	0.0	-	0.5	0.0	0.5	-	0.4	0.3
Single-Unit Trucks	0	0	1	-	1	-	0	1	5	-	6	0	2	-	2	9
% Single-Unit Trucks	0.0	-	0.8	-	0.7	-	-	1.1	4.1	-	2.8	0.0	1.0	-	0.9	1.6
Articulated Trucks	0	0	2	-	2	-	0	9	3	-	12	0	4	-	4	18
% Articulated Trucks	0.0	-	1.5	-	1.5	-	-	10.2	2.4	-	5.7	0.0	2.1	-	1.7	3.1
Bicycles on Road	0	0	0	-	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	<u>-</u>	0.0	-	0.0	-	-	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 5



Turning Movement Peak Hour Data Plot (7:15 AM)



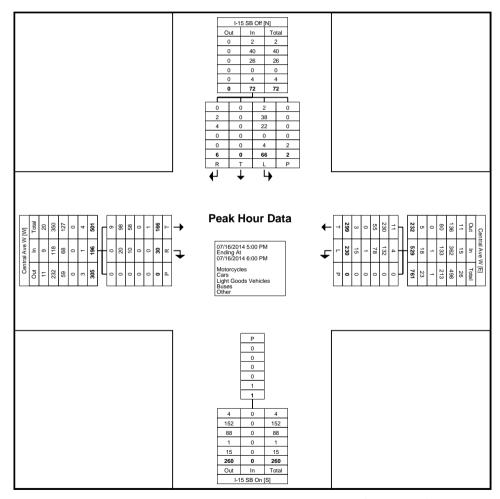
Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 6

Turning Movement Peak Hour Data (5:00 PM)

					ı anınış	<i>j</i> 1410401	HEHL E	in i ioui i	Duta (0.	00 1 111)						
			I-15 SB Off			I-15	SB On		Central	I Ave W			Centra	I Ave W		1
Start Time			Southbound			Nort	hbound		West	bound			East	bound		1
Start Time	Right	Thru	Left	Peds	App. Total	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
5:00 PM	2	0	16	0	18	0	0	75	52	0	127	7	40	0	47	192
5:15 PM	1	0	17	1	18	1	0	86	64	0	150	5	49	0	54	222
5:30 PM	1	0	15	0	16	0	0	66	64	0	130	9	43	0	52	198
5:45 PM	2	0	18	1	20	0	0	72	50	0	122	9	34	0	43	185
Total	6	0	66	2	72	1	0	299	230	0	529	30	166	0	196	797
Approach %	8.3	0.0	91.7	-	-	-	-	56.5	43.5	-	-	15.3	84.7	-	-	-
Total %	0.8	0.0	8.3	-	9.0	-	0.0	37.5	28.9	-	66.4	3.8	20.8	_	24.6	-
PHF	0.750	0.000	0.917	-	0.900	-	0.000	0.869	0.898	-	0.882	0.833	0.847	-	0.907	0.898
Motorcycles	0	0	2	-	2	-	0	11	4	-	15	0	9	-	9	26
% Motorcycles	0.0	_	3.0	-	2.8	-	-	3.7	1.7	_	2.8	0.0	5.4	-	4.6	3.3
Cars	2	0	38	-	40	-	0	230	132	-	362	20	98	-	118	520
% Cars	33.3	-	57.6	-	55.6	-	-	76.9	57.4	-	68.4	66.7	59.0	-	60.2	65.2
Light Goods Vehicles	4	0	22	-	26	-	0	55	78	_	133	10	58	-	68	227
% Light Goods Vehicles	66.7	-	33.3	-	36.1	-	-	18.4	33.9	-	25.1	33.3	34.9	-	34.7	28.5
Buses	0	0	0	-	0	-	0	0	1	-	1	0	0	-	0	1
% Buses	0.0	_	0.0	-	0.0	-	-	0.0	0.4	_	0.2	0.0	0.0	-	0.0	0.1
Single-Unit Trucks	0	0	1	-	1	-	0	3	9	-	12	0	1	-	1	14
% Single-Unit Trucks	0.0	-	1.5	-	1.4	-	-	1.0	3.9	-	2.3	0.0	0.6	-	0.5	1.8
Articulated Trucks	0	0	3	-	3	-	0	0	6	-	6	0	0	-	0	9
% Articulated Trucks	0.0	-	4.5	-	4.2	-	-	0.0	2.6	-	1.1	0.0	0.0	-	0.0	1.1
Bicycles on Road	0	0	0	-	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	_	0.0	-	0.0	-	-	0.0	0.0	_	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	2	-	1	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	100.0	-	-	-		-	-	_		_	-



Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 7



Turning Movement Peak Hour Data Plot (5:00 PM)



Count Name: 08-CentralAve\_I15SB TMC Site Code: TMC-08 Start Date: 07/16/2014 Page No: 8



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014

Page No: 1

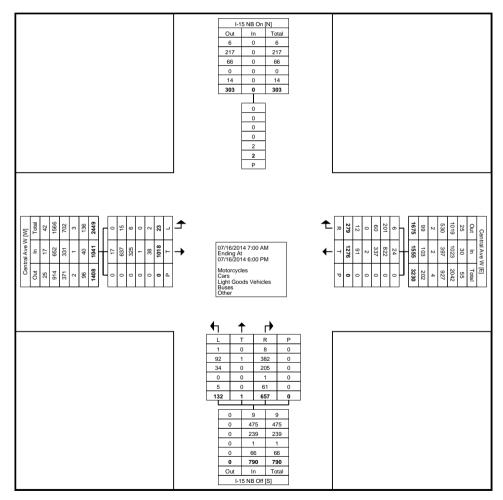
### **Turning Movement Data**

						iai	Tilling Wick	V OILIOITE E	Julu		-					
	I-15	NB On			I-15 NB Off		_		Central	Ave W			Centra	I Ave W		
	Sou	thbound			Northbound				West	bound			Eastl	bound		
Start Time	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	0	0	31	1	0	0	32	8	39	0	47	64	3	0	67	146
7:15 AM	0	0	27	0	7	0	34	6	41	0	47	70	0	0	70	151
7:30 AM	0	0	52	0	7	0	59	7	42	0	49	106	2	0	108	216
7:45 AM	0	0	42	0	1	0	43	11	60	0	71	79	1	0	80	194
Hourly Total	0	0	152	1	15	0	168	32	182	0	214	319	6	0	325	707
8:00 AM	0	0	39	0	3	0	42	11	52	0	63	61	1	0	62	167
8:15 AM	0	0	44	0	4	0	48	15	48	0	63	59	2	0	61	172
8:30 AM	0	0	32	0	3	0	35	11	45	0	56	54	0	0	54	145
8:45 AM	0	0	34	0	9	0	43	4	49	0	53	50	0	0	50	146
Hourly Total	0	0	149	0	19	0	168	41	194	0	235	224	3	0	227	630
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	61	0	7	0	68	19	96	0	115	70	1	0	71	254
4:15 PM	0	0	44	0	16	0	60	18	99	0	117	48	1	0	49	226
4:30 PM	0	0	56	0	12	0	68	20	117	0	137	72	1	0	73	278
4:45 PM	0	0	36	0	10	0	46	28	110	0	138	55	0	0	55	239
Hourly Total	0	0	197	0	45	0	242	85	422	0	507	245	3	0	248	997
5:00 PM	0	0	35	0	15	0	50	34	118	0	152	58	1	0	59	261
5:15 PM	1	0	43	0	20	0	63	31	126	0	157	64	3	0	67	287
5:30 PM	0	0	47	0	8	0	55	30	124	0	154	60	1	0	61	270
5:45 PM	1	0	34	0	10	0	44	26	110	0	136	48	6	0	54	234
Hourly Total	2	0	159	0	53	0	212	121	478	0	599	230	11	0	241	1052
Grand Total	2	0	657	1	132	0	790	279	1276	0	1555	1018	23	0	1041	3386
Approach %	-	-	83.2	0.1	16.7	-	-	17.9	82.1	-	-	97.8	2.2	-	-	-
Total %	-	0.0	19.4	0.0	3.9	-	23.3	8.2	37.7	-	45.9	30.1	0.7	-	30.7	-
Motorcycles	-	0	8	0	1	-	9	6	24	-	30	17	0	-	17	56
% Motorcycles	-	-	1.2	0.0	0.8	-	1.1	2.2	1.9	-	1.9	1.7	0.0	-	1.6	1.7
Cars	-	0	382	1	92	-	475	201	822	-	1023	637	15	-	652	2150
% Cars	-	-	58.1	100.0	69.7	-	60.1	72.0	64.4	-	65.8	62.6	65.2	-	62.6	63.5
Light Goods Vehicles	-	0	205	0	34	-	239	60	337	-	397	325	6	-	331	967
% Light Goods Vehicles	-	-	31.2	0.0	25.8	-	30.3	21.5	26.4	-	25.5	31.9	26.1	-	31.8	28.6
Buses	-	0	1	0	0	-	1	0	2	-	2	1	0	-	1	4
% Buses	-	-	0.2	0.0	0.0	-	0.1	0.0	0.2	-	0.1	0.1	0.0	-	0.1	0.1
Single-Unit Trucks	-	0	25	0	5	-	30	8	43	-	51	16	2	-	18	99
% Single-Unit Trucks	-	-	3.8	0.0	3.8	-	3.8	2.9	3.4	-	3.3	1.6	8.7	-	1.7	2.9
Articulated Trucks	-	0	36	0	0	-	36	4	47	-	51	19	0	-	19	106
% Articulated Trucks	-	-	5.5	0.0	0.0	-	4.6	1.4	3.7	-	3.3	1.9	0.0	-	1.8	3.1
Bicycles on Road	-	0	0	0	0	-	0	0	1	-	1	3	0	-	3	4
% Bicycles on Road	-	-	0.0	0.0	0.0	-	0.0	0.0	0.1	-	0.1	0.3	0.0	-	0.3	0.1

Pedestrians	2	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	100.0	-	_	-	-	-	-	_	-	-	-	-	-	-	-	-



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014 Page No: 4

#### Turning Movement Peak Hour Data (7:30 AM)

					9			<b>-</b> 4	00 /,						1
I-15	NB On			I-15 NB Off				Central	l Ave W			Central	Ave W		
Sout	hbound			Northbound				West	bound			Easth	ound		
Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
0	0	52	0	7	0	59	7	42	0	49	106	2	0	108	216
0	0	42	0	1	0	43	11	60	0	71	79	1	0	80	194
0	0	39	0	3	0	42	11	52	0	63	61	1	0	62	167
0	0	44	0	4	0	48	15	48	0	63	59	2	0	61	172
0	0	177	0	15	0	192	44	202	0	246	305	6	0	311	749
-	-	92.2	0.0	7.8	-	-	17.9	82.1	-	-	98.1	1.9	-	-	-
-	0.0	23.6	0.0	2.0	-	25.6	5.9	27.0	-	32.8	40.7	0.8	-	41.5	-
-	0.000	0.851	0.000	0.536	-	0.814	0.733	0.842	-	0.866	0.719	0.750	-	0.720	0.867
-	0	0	0	0	-	0	1	0	-	1	2	0	-	2	3
-	-	0.0	_	0.0	-	0.0	2.3	0.0	_	0.4	0.7	0.0	-	0.6	0.4
-	0	89	0	11	-	100	23	120	-	143	185	3	-	188	431
-	-	50.3	-	73.3	-	52.1	52.3	59.4	-	58.1	60.7	50.0	-	60.5	57.5
-	0	69	0	4	-	73	14	57	-	71	108	2	-	110	254
-	-	39.0	-	26.7	-	38.0	31.8	28.2	-	28.9	35.4	33.3	-	35.4	33.9
-	0	0	0	0	-	0	0	1	-	1	1	0	-	1	2
-	_	0.0		0.0	-	0.0	0.0	0.5	-	0.4	0.3	0.0	-	0.3	0.3
-	0	7	0	0	-	7	3	10	-	13	2	1	-	3	23
-	-	4.0	-	0.0	-	3.6	6.8	5.0	-	5.3	0.7	16.7	-	1.0	3.1
-	0	12	0	0	-	12	3	13	-	16	4	0	-	4	32
-	-	6.8	-	0.0	-	6.3	6.8	6.4	_	6.5	1.3	0.0	-	1.3	4.3
-	0	0	0	0	-	0	0	1	-	1	3	0	-	3	4
-	-	0.0	_	0.0	-	0.0	0.0	0.5	_	0.4	1.0	0.0	-	1.0	0.5
0	-	-	<u>-</u>	<u>-</u>	0	-	-	-	0	-	-	_	0	-	-
-	-	-	-	_	-	-	-	-		-	-		-	-	-
	Sout Peds 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Southbound           Peds         App. Total         Right           0         0         52           0         0         42           0         0         39           0         0         44           0         0         177           -         -         92.2           -         0.0         23.6           -         0.00         0.851           -         0         0           -         0.0         0           -         0.0         69           -         -         39.0           -         0         0           -         0.0         7           -         0.0         7           -         4.0         12           -         -         6.8           -         0         0           -         -         0.0	Southbound           Peds         App. Total         Right         Thru           0         0         52         0           0         0         42         0           0         0         39         0           0         0         44         0           0         0         177         0           -         -         92.2         0.0           -         0.00         23.6         0.0           -         0.00         0.851         0.000           -         0         0         0           -         0.0         0         -           -         0         89         0           -         0         69         0           -         0         69         0           -         0         0         0           -         0         0         0           -         0         0         0           -         0         0         -           -         0         0         -           -         0         7         0           -	I-15 NB On   Southbound   Peds   App. Total   Right   Thru   Left	I-15 NB On   Southbound   Peds   App. Total   Right   Thru   Left   Peds	I-15 NB On   Southbound   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right	I-15 NB On   Southbound   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   Left   Peds   App. Total   Right   Right   Thru   T	Centra   C	Southbound Peds         App. Total         Right Right         Thru         Left Peds         App. Total App. Total Right         Right Thru         Peds           0         0         52         0         7         0         59         7         42         0           0         0         42         0         1         0         43         11         60         0           0         0         42         0         4         0         42         11         52         0           0         0         44         0         4         0         48         15         48         0           0         0         177         0         15         0         192         44         202         0           -         -         92.2         0.0         7.8         -         -         17.9         82.1         -           -         0.0         23.6         0.0         2.0         -         25.6         5.9         27.0         -           -         0.00         0.851         0.00         0.0         -         0.814         0.733         0.842         -           -         0	Northbound   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Right   Thru   Peds   App. Total   Thru	L15 NB On   Southbound   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Left   Peds   App. Total   Right   Thru   Peds   App. Total   Thru   Teds   Total   Thru   Teds   Total   Thru   Teds   Total   Tot	Fight   Fig	North-bound   North-bound	H-15 NB On



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014 Page No: 5

	1-15 NB On [N]	
Contral Ave W [W]  Out in Total  0 2 2 2  131 188 319  61 110 171  1 1 2  24 10 34  277 311 528  0 185 3  0 0 185 3  0 0 198 2  0 0 9 1  P P P P P P P	Peak Hour Data  O7/16/2014 7:30 AM Ending At O7/16/2014 8:30 AM Motorcycles Care Care Light Goods Vehicles Buses Other	Central Ave W [E]  Out In Total  2 1 3  274 143 447  177 71 248  1 1 1 2  28 30 58  482 246 728  1 0 0  14 57 0  0 1 0  0 1 0  14 57 0  0 1 0  0 0  14 57 0  0 0  15 0  16 57 0  17 0  18 0  1
	L T R P 0 0 0 0 0 11 0 89 0 4 0 69 0 0 0 0 0 0 0 19 0 15 0 177 0 15 0 177 0 0 0 0 0 0 100 100 0 73 73 0 0 0 0 0 19 19 0 192 192 Out In Total I-15 NB Off [S]	

Turning Movement Peak Hour Data Plot (7:30 AM)



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014 Page No: 6

Turning Movement Peak Hour Data (4:30 PM)

i .			i			9 1410401	IIIGIILI G	in i ioai i	Julia ( I	00 1 111)						
	I-15	NB On			I-15 NB Off				Central	Ave W			Centra	l Ave W		
Start Time	Sout	hbound			Northbound				West	oound			Eastl	oound		
Start Time	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
4:30 PM	0	0	56	0	12	0	68	20	117	0	137	72	1	0	73	278
4:45 PM	0	0	36	0	10	0	46	28	110	0	138	55	0	0	55	239
5:00 PM	0	0	35	0	15	0	50	34	118	0	152	58	1	0	59	261
5:15 PM	1	0	43	0	20	0	63	31	126	0	157	64	3	0	67	287
Total	1	0	170	0	57	0	227	113	471	0	584	249	5	0	254	1065
Approach %	-	-	74.9	0.0	25.1	-	-	19.3	80.7	-	-	98.0	2.0	-	-	-
Total %	-	0.0	16.0	0.0	5.4	-	21.3	10.6	44.2	-	54.8	23.4	0.5	-	23.8	-
PHF	-	0.000	0.759	0.000	0.713	-	0.835	0.831	0.935	-	0.930	0.865	0.417	-	0.870	0.928
Motorcycles	-	0	3	0	0	-	3	3	15	-	18	6	0	-	6	27
% Motorcycles	-	-	1.8	-	0.0	-	1.3	2.7	3.2	-	3.1	2.4	0.0	_	2.4	2.5
Cars	-	0	106	0	43	-	149	92	315	-	407	156	4	-	160	716
% Cars	-	-	62.4	-	75.4	-	65.6	81.4	66.9	-	69.7	62.7	80.0	-	63.0	67.2
Light Goods Vehicles	-	0	49	0	13	-	62	17	119	-	136	82	1	_	83	281
% Light Goods Vehicles	-	-	28.8	_	22.8	-	27.3	15.0	25.3	-	23.3	32.9	20.0	-	32.7	26.4
Buses	-	0	0	0	0	-	0	0	0	-	0	0	0	-	0	0
% Buses	-	-	0.0	_	0.0	-	0.0	0.0	0.0	_	0.0	0.0	0.0	_	0.0	0.0
Single-Unit Trucks	-	0	6	0	1	-	7	1	12	-	13	3	0	-	3	23
% Single-Unit Trucks	-	-	3.5	-	1.8	-	3.1	0.9	2.5	-	2.2	1.2	0.0	-	1.2	2.2
Articulated Trucks	-	0	6	0	0	-	6	0	10	-	10	2	0	_	2	18
% Articulated Trucks	-	-	3.5	_	0.0	-	2.6	0.0	2.1	-	1.7	0.8	0.0	-	0.8	1.7
Bicycles on Road	-	0	0	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	_	0.0	-	0.0	0.0	0.0	_	0.0	0.0	0.0	_	0.0	0.0
Pedestrians	1	-	-	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	100.0	_	-	<u>-</u>		-	_	-	-	-	-	-	-			-



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014 Page No: 7

	I-15 NB On [N]	
Control Ave W [M]           Out         In         Total           15         6         21           388         160         518           132         215         0           0         0         0         0           523         215         28           223         5         28           529         284         1           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         249         5           P         T         L	Peak Hour Data  O7/16/2014 4:30 PM Ending At O7/16/2014 5:30 PM Motocycles Cars Cars Cars Cars Cars Cotto Check Ch	Cantral Ave WE  Out In Total 9 118 27 282 407 669 131 136 287 0 0 0 20 17 23 40 419 584 1003 419 59 1000  7 119 0 0 0 17 119 0 1 0 0 17 119 0 1 0 0 1
	L T R P 0 0 0 3 0 43 0 106 0 13 0 49 0 0 0 0 0 1 0 12 0 57 0 170 0  0 3 3 3 0 149 149 0 62 62 0 0 0 0 0 13 13 0 127 Out In Total I-15 NB Off [S]	

Turning Movement Peak Hour Data Plot (4:30 PM)



Count Name: 09-CentralAve\_I15NB TMC Site Code: TMC-09 Start Date: 07/16/2014 Page No: 8



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 1

# **Turning Movement Data**

		Vaugl Southl					I Ave W				l Ave W bound		
Start Time	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	10	17	0	27	9	39	0	48	73	13	0	86	161
7:15 AM	13	13	0	26	10	33	0	43	95	12	0	107	176
7:30 AM	14	19	0	33	17	35	0	52	128	20	0	148	233
7:45 AM	16	25	0	41	21	54	0	75	110	21	0	131	247
Hourly Total	53	74	0	127	57	161	0	218	406	66	0	472	817
8:00 AM	19	21	0	40	14	44	0	58	85	12	0	97	195
8:15 AM	11	12	0	23	13	51	0	64	87	18	0	105	192
8:30 AM	15	8	0	23	16	43	0	59	71	12	0	83	165
8:45 AM	10	13	0	23	18	41	0	59	70	15	0	85	167
Hourly Total	55	54	0	109	61	179	0	240	313	57	0	370	719
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	27	19	0	46	19	90	0	109	99	30	0	129	284
4:15 PM	24	18	0	42	25	96	0	121	77	15	0	92	255
4:30 PM	32	26	0	58	12	104	0	116	111	17	0	128	302
4:45 PM	30	13	1	43	17	106	0	123	74	22	0	96	262
Hourly Total	113	76	1	189	73	396	0	469	361	84	0	445	1103
5:00 PM	31	18	0	49	26	119	0	145	71	16	0	87	281
5:15 PM	28	11	0	39	21	133	0	154	95	11	0	106	299
5:30 PM	34	20	1	54	18	116	0	134	87	19	0	106	294
5:45 PM	33	11	0	44	15	101	0	116	62	14	0	76	236
Hourly Total	126	60	1	186	80	469	0	549	315	60	0	375	1110
Grand Total	347	264	2	611	271	1205	0	1476	1395	267	0	1662	3749
Approach %	56.8	43.2	-	-	18.4	81.6	-	-	83.9	16.1	-	-	•
Total %	9.3	7.0	-	16.3	7.2	32.1	-	39.4	37.2	7.1	-	44.3	ı
Motorcycles	2	2	-	4	2	24	-	26	22	2	-	24	54
% Motorcycles	0.6	0.8	-	0.7	0.7	2.0	-	1.8	1.6	0.7	-	1.4	1.4
Cars	190	179	-	369	169	765	-	934	890	146	-	1036	2339
% Cars	54.8	67.8	-	60.4	62.4	63.5	-	63.3	63.8	54.7	-	62.3	62.4
Light Goods Vehicles	139	70	-	209	82	338	-	420	402	99	-	501	1130
% Light Goods Vehicles	40.1	26.5	-	34.2	30.3	28.0	-	28.5	28.8	37.1	-	30.1	30.1
Buses	0	1	-	1	2	3	-	5	2	0	-	2	8
% Buses	0.0	0.4	-	0.2	0.7	0.2	-	0.3	0.1	0.0	-	0.1	0.2
Single-Unit Trucks	10	11	-	21	10	26	-	36	40	10	-	50	107
% Single-Unit Trucks	2.9	4.2	-	3.4	3.7	2.2	-	2.4	2.9	3.7	-	3.0	2.9
Articulated Trucks	6	1	-	7	6	48		54	37	10		47	108
% Articulated Trucks	1.7	0.4	-	1.1	2.2	4.0	-	3.7	2.7	3.7	-	2.8	2.9
Bicycles on Road	0	0	-	0	0	1	-	1	2	0	-	2	3
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.1	-	0.1	0.1	0.0	-	0.1	0.1

Pedestrians	-	-	2	-	-	-	0	-	-	-	0	-	-
% Pedestrians	_	-	100.0	-	-	-	-	-	-	-	-	-	-



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 3

																			Out 4 315 181 2 36 538 2 190 139 0 16 347 R		9th Re In 4 369 209 1 28 611 1 179 70 1 12 264 L	1	Section   Sect																		
M	Total	20	1991	978	2	190	3214		۲,	7	146	66	0	%	267		4								t	70	271	16	2	82	169	2	ן [	16.50	2 0	٥	472	1069	24	Out.	Ce Ce
Central Ave W [W]	Ē	54	1036	501	2	66	1662	-	Ļ	77	830	402	2	07	1305	2 -	→	•	07/16/2 Ending 07/16/2	2014 At 2014	7:00	AM PM			+		1205	75	3	338	765	24		1476	9 0	n ;	420	934	26	5	Central Ave W [E]
Centr	Ont	56	922	477	9	91	1552		Ļ	0	0	0	0	c	-	۵.			Motorcy Cars Light G Buses Other	ycles	3					ס	•	0	0	0	0	0		21 25	180	0	892	2003	50	Total	<u>√</u> [E]
																			0 0 0 0 0 0		0 0 0 0 0 0		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																		

Turning Movement Data Plot



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

				i airiii ig i	VIOVCITICI	it i can i ic	on Data (	1.00 / ((1))	-				_
		Vaugl	hn Rd	_		Centra	l Ave W			Centra	I Ave W		
Start Time		South	bound			West	bound			Easth	bound		
Start Time	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:30 AM	14	19	0	33	17	35	0	52	128	20	0	148	233
7:45 AM	16	25	0	41	21	54	0	75	110	21	0	131	247
8:00 AM	19	21	0	40	14	44	0	58	85	12	0	97	195
8:15 AM	11	12	0	23	13	51	0	64	87	18	0	105	192
Total	60	77	0	137	65	184	0	249	410	71	0	481	867
Approach %	43.8	56.2	-	-	26.1	73.9	-	-	85.2	14.8	-	-	-
Total %	6.9	8.9	-	15.8	7.5	21.2	-	28.7	47.3	8.2	_	55.5	-
PHF	0.789	0.770	-	0.835	0.774	0.852	-	0.830	0.801	0.845	-	0.813	0.878
Motorcycles	0	0	-	0	1	1	-	2	3	0	-	3	5
% Motorcycles	0.0	0.0	-	0.0	1.5	0.5	-	0.8	0.7	0.0	_	0.6	0.6
Cars	29	49	-	78	36	92	-	128	255	35	_	290	496
% Cars	48.3	63.6	-	56.9	55.4	50.0	-	51.4	62.2	49.3	-	60.3	57.2
Light Goods Vehicles	27	21	-	48	23	67	-	90	129	31	_	160	298
% Light Goods Vehicles	45.0	27.3	-	35.0	35.4	36.4	_	36.1	31.5	43.7		33.3	34.4
Buses	0	0	-	0	1	2	-	3	1	0	-	1	4
% Buses	0.0	0.0	-	0.0	1.5	1.1	-	1.2	0.2	0.0	_	0.2	0.5
Single-Unit Trucks	3	6	-	9	2	3	-	5	10	2	-	12	26
% Single-Unit Trucks	5.0	7.8	-	6.6	3.1	1.6	-	2.0	2.4	2.8	-	2.5	3.0
Articulated Trucks	1	1	-	2	2	18	-	20	11	3	_	14	36
% Articulated Trucks	1.7	1.3	-	1.5	3.1	9.8	-	8.0	2.7	4.2	_	2.9	4.2
Bicycles on Road	0	0	-	0	0	1	-	1	1	0	-	1	2
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.5	-	0.4	0.2	0.0	-	0.2	0.2
Pedestrians	-	_	0	-	-	-	0	-	-	_	0	-	-
% Pedestrians	-	-	-	-	-	_	-	-	-	-	-	_	-



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 5

																			Out 1 71 54 1 9 136 0 0 29 27 0 4 60 R		0 11 137 0 49 21 0 7 7 L	I (N) Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3																	
W	Total	4	411	524	ກ	23	725		[	,	8	31	0	2	7		<u></u>	F	Peak	Н	oui	r Da	ıta	1	<u> </u>	. S	4	_	23	36		٦[	487	29	_	150	304	ω	2 6	
Central Ave W [W]	u	е	290	99 +	-	27	481	$\parallel$	е.	, ,	507	129	1	22	410	-	<b>→</b>		07/16/2 Ending 07/16/2	2014 7 At	7:30 A	AM		•	_ -	184	22	2	67	92		∦	249	26	ω	90	128	2	ut   h   Tc	entral Ave
Centra	Ont	-	121	\$ 0	7	56	244		c		0	0	0	0	0	۵			Motorc Cars Light G Buses Other	ycles						0 0	0	0	0	0	0	]	736	55	4	240	432	on !	Total	W
																			0 0 0 0 0 0	ake Aj	0 0 0 0 0	0 0 0 0 0 Tota																		

Turning Movement Peak Hour Data Plot (7:30 AM)



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 6

Turning Movement Peak Hour Data (4:30 PM)

				running	innovenner	ii r can i ii	Jui Dala (	(4.30 FIVI)					
		Vaug	jhn Rd			Centra	l Ave W			Centra	I Ave W		
Start Time		South	nbound			West	tbound			East	bound		
Start Time	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
4:30 PM	32	26	0	58	12	104	0	116	111	17	0	128	302
4:45 PM	30	13	1	43	17	106	0	123	74	22	0	96	262
5:00 PM	31	18	0	49	26	119	0	145	71	16	0	87	281
5:15 PM	28	11	0	39	21	133	0	154	95	11	0	106	299
Total	121	68	1	189	76	462	0	538	351	66	0	417	1144
Approach %	64.0	36.0	-	-	14.1	85.9	-	-	84.2	15.8	-	-	-
Total %	10.6	5.9	-	16.5	6.6	40.4	-	47.0	30.7	5.8	-	36.5	-
PHF	0.945	0.654	-	0.815	0.731	0.868	-	0.873	0.791	0.750	-	0.814	0.947
Motorcycles	1	1	-	2	1	13	-	14	11	2	-	13	29
% Motorcycles	0.8	1.5	-	1.1	1.3	2.8	-	2.6	3.1	3.0	-	3.1	2.5
Cars	68	50	-	118	54	319	-	373	239	40	-	279	770
% Cars	56.2	73.5	-	62.4	71.1	69.0	-	69.3	68.1	60.6	-	66.9	67.3
Light Goods Vehicles	50	15	-	65	19	114	-	133	86	23	-	109	307
% Light Goods Vehicles	41.3	22.1	-	34.4	25.0	24.7	-	24.7	24.5	34.8	-	26.1	26.8
Buses	0	0	-	0	0	0	-	0	1	0	-	1	1
% Buses	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.3	0.0	-	0.2	0.1
Single-Unit Trucks	1	2	-	3	1	7	-	8	7	1	-	8	19
% Single-Unit Trucks	0.8	2.9	-	1.6	1.3	1.5	-	1.5	2.0	1.5	-	1.9	1.7
Articulated Trucks	1	0	-	1	1	9	-	10	7	0	-	7	18
% Articulated Trucks	0.8	0.0	-	0.5	1.3	1.9	-	1.9	2.0	0.0	-	1.7	1.6
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	1	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 7

																		Out 3 3 94 42 0 0 0 3 3 1422 1 1 688 50 0 2 2 121 R	2	ghn R In 2 118 65 0 4 189 1 50 15 0 2 68 L	Total 5 212 1107 0 7 7 3331 0 0 0 1 1 1 P																
w [w]	otal 27	Н	273	+	33	┥		2	40	Ł	+	+	_	99	_	<u>_</u>	F	Peak			Data	a	t	R	F		H	Н	7	419	16	_	101	┝		Out	Centra
ntral,	14 In In In	Н	164 109	+	#	200 411	H	0 11	0 239	H	+	+	-	0 351	-	<b>→</b>		07/16/2 Ending 07/16/2 Motoro Cars Light G Buses Other	cycle	s			+		~	H		Н		538 957	18 34	0 1	133 234	373 662	14 26	In Total	é∀
																		0 0 0 0		0 0 0 0	0 0 0 0																

Turning Movement Peak Hour Data Plot (4:30 PM)



Count Name: 10-CentralAve\_VaughnRd TMC Site Code: TMC-10 Start Date: 07/16/2014 Page No: 8



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014

Page No: 1

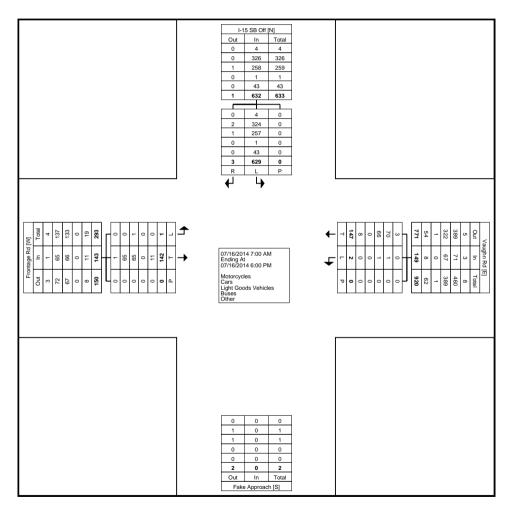
#### **Turning Movement Data**

	i			i	, rumių	j moveme	iii Dala						ı
		I-15 S	SB Off			Vaug	jhn Rd			Fronta	ge Rd		l
Ote at Time a		South	bound			West	bound			Eastb	ound		l
Start Time	Right	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	0	50	0	50	1	0	0	1	8	0	0	8	59
7:15 AM	0	50	0	50	4	0	0	4	6	0	0	6	60
7:30 AM	0	62	0	62	3	1	0	4	5	0	0	5	71
7:45 AM	1	57	0	58	4	0	0	4	8	0	0	8	70
Hourly Total	1	219	0	220	12	1	0	13	27	0	0	27	260
8:00 AM	0	37	0	37	7	0	0	7	7	0	0	7	51
8:15 AM	0	38	0	38	8	0	0	8	6	0	0	6	52
8:30 AM	0	37	0	37	13	0	0	13	7	0	0	7	57
8:45 AM	1	35	0	36	4	0	0	4	9	0	0	9	49
Hourly Total	1	147	0	148	32	0	0	32	29	0	0	29	209
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	32	0	32	9	1	0	10	12	0	0	12	54
4:15 PM	0	38	0	38	14	0	0	14	12	0	0	12	64
4:30 PM	0	35	0	35	13	0	0	13	12	0	0	12	60
4:45 PM	1	38	0	39	14	0	0	14	17	0	0	17	70
Hourly Total	1	143	0	144	50	1	0	51	53	0	0	53	248
5:00 PM	0	23	0	23	14	0	0	14	8	1	0	9	46
5:15 PM	0	29	0	29	16	0	0	16	7	0	0	7	52
5:30 PM	0	35	0	35	11	0	0	11	6	0	0	6	52
5:45 PM	0	33	0	33	12	0	0	12	12	0	0	12	57
Hourly Total	0	120	0	120	53	0	0	53	33	1	0	34	207
Grand Total	3	629	0	632	147	2	0	149	142	1	0	143	924
Approach %	0.5	99.5	-	-	98.7	1.3	-	-	99.3	0.7	-	-	-
Total %	0.3	68.1	-	68.4	15.9	0.2	-	16.1	15.4	0.1	-	15.5	-
Motorcycles	0	4	-	4	3	0	-	3	1	0	-	1	8
% Motorcycles	0.0	0.6	-	0.6	2.0	0.0	-	2.0	0.7	0.0	-	0.7	0.9
Cars	2	324	-	326	70	1	-	71	65	0	-	65	462
% Cars	66.7	51.5	-	51.6	47.6	50.0	-	47.7	45.8	0.0	-	45.5	50.0
Light Goods Vehicles	1	257	-	258	66	1	-	67	65	1	-	66	391
% Light Goods Vehicles	33.3	40.9	-	40.8	44.9	50.0	-	45.0	45.8	100.0	-	46.2	42.3
Buses	0	1	-	1	0	0	-	0	0	0	-	0	1
% Buses	0.0	0.2	-	0.2	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.1
Single-Unit Trucks	0	27	-	27	6	0	-	6	7	0	-	7	40
% Single-Unit Trucks	0.0	4.3	-	4.3	4.1	0.0	-	4.0	4.9	0.0	-	4.9	4.3
Articulated Trucks	0	16	-	16	2	0	-	2	4	0	-	4	22
% Articulated Trucks	0.0	2.5	-	2.5	1.4	0.0	-	1.3	2.8	0.0	-	2.8	2.4
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0

Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	_	-	-	-	-	_	-	-	-	-	-	-	-



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014 Page No: 3



Turning Movement Data Plot



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014 Page No: 4

Turning Movement Peak Hour Data (7:00 AM)

		I-15 S	SB Off			Vauq				Fronta	age Rd		
		South	bound			West	bound				oound		
Start Time	Right	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	0	50	0	50	1	0	0	1	8	0	0	8	59
7:15 AM	0	50	0	50	4	0	0	4	6	0	0	6	60
7:30 AM	0	62	0	62	3	1	0	4	5	0	0	5	71
7:45 AM	1	57	0	58	4	0	0	4	8	0	0	. 8	70
Total	1	219	0	220	12	1	0	13	27	0	0	27	260
Approach %	0.5	99.5	-	-	92.3	7.7	-	-	100.0	0.0	-	-	-
Total %	0.4	84.2	_	84.6	4.6	0.4	-	5.0	10.4	0.0	-	10.4	-
PHF	0.250	0.883	-	0.887	0.750	0.250	-	0.813	0.844	0.000	-	0.844	0.915
Motorcycles	0	1	-	1	0	0	-	0	0	0	-	0	1
% Motorcycles	0.0	0.5	-	0.5	0.0	0.0	-	0.0	0.0	-	-	0.0	0.4
Cars	1	128	-	129	6	0	-	6	14	0	-	14	149
% Cars	100.0	58.4	-	58.6	50.0	0.0	-	46.2	51.9	-	-	51.9	57.3
Light Goods Vehicles	0	79	-	79	5	1	-	6	10	0	-	10	95
% Light Goods Vehicles	0.0	36.1	-	35.9	41.7	100.0	-	46.2	37.0	-	-	37.0	36.5
Buses	0	1	-	1	0	0	-	0	0	0	-	0	1
% Buses	0.0	0.5	-	0.5	0.0	0.0	-	0.0	0.0	-	-	0.0	0.4
Single-Unit Trucks	0	5	-	5	1	0	-	1	2	0	-	2	8
% Single-Unit Trucks	0.0	2.3	-	2.3	8.3	0.0	-	7.7	7.4	-	-	7.4	3.1
Articulated Trucks	0	5	-	5	0	0	-	0	1	0	-	1	6
% Articulated Trucks	0.0	2.3	-	2.3	0.0	0.0	-	0.0	3.7	-	-	3.7	2.3
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014 Page No: 5

	1-15 SB Off [N]	
Prontage Rd IVI  Out 1 Total  0 0 0 0  1 3 27 40  13 27 40  0 0 0 0  0 10 0  0 0 10 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0 0 0 0  0 0 0 0 0	Peak Hour Data  07/16/2014 7:00 AM Ending At 07/16/2014 8:00 AM Motorcycles Cars Light Goods Vehicles Buses Other	Vaughn Rd [5]  Out in Total 1 0 1 142 6 95 1 0 1 14 246 13 259  0 0 0 0 5 1 0 0 0 0 0 1 0
	0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 1 0	

Turning Movement Peak Hour Data Plot (7:00 AM)



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014 Page No: 6

Turning Movement Peak Hour Data (4:00 PM)

		I-15 S	SB Off	۱		Vaug	hn Rd	,		Fronta	age Rd		I
Start Time		South	bound			Westl	oound			Easth	oound		l
Start Time	Right	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
4:00 PM	0	32	0	32	9	1	0	10	12	0	0	12	54
4:15 PM	0	38	0	38	14	0	0	14	12	0	0	12	64
4:30 PM	0	35	0	35	13	0	0	13	12	0	0	12	60
4:45 PM	1	38	0	39	14	. 0	0	14	17	0	0	17	70
Total	1	143	0	144	50	1	0	51	53	0	0	53	248
Approach %	0.7	99.3	-	-	98.0	2.0	-	-	100.0	0.0	-	-	-
Total %	0.4	57.7	-	58.1	20.2	0.4	-	20.6	21.4	0.0		21.4	-
PHF	0.250	0.941	-	0.923	0.893	0.250	-	0.911	0.779	0.000	-	0.779	0.886
Motorcycles	0	1	-	1	1	0	-	1	1	0	-	1	3
% Motorcycles	0.0	0.7	-	0.7	2.0	0.0	-	2.0	1.9	-		1.9	1.2
Cars	1	68	-	69	27	1	-	28	23	0		23	120
% Cars	100.0	47.6	-	47.9	54.0	100.0	-	54.9	43.4	-	-	43.4	48.4
Light Goods Vehicles	0	64	-	64	20	0	-	20	25	0		25	109
% Light Goods Vehicles	0.0	44.8	-	44.4	40.0	0.0	-	39.2	47.2	-		47.2	44.0
Buses	0	0	-	0	0	0	-	0	0	0	-	0	0
% Buses	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	7	-	7	2	0	-	2	3	0	-	3	12
% Single-Unit Trucks	0.0	4.9	-	4.9	4.0	0.0	-	3.9	5.7	-	-	5.7	4.8
Articulated Trucks	0	3	_	3	0	0	_	0	1	0	_	1	4
% Articulated Trucks	0.0	2.1	-	2.1	0.0	0.0	-	0.0	1.9	-	-	1.9	1.6
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	<u>-</u>	0	-	-	<u>-</u>	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014 Page No: 7

	L+15 SB Off  N   Out   In   Total   O	
10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Peak Hour Data  O7716/2014 4:00 PM Ending At 07716/2014 5:00 PM Motorcycles Cars Light Goods Vehicles Buses Other	- Vaugh
	0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

Turning Movement Peak Hour Data Plot (4:00 PM)



Count Name: 11-VaughnRd\_I15SB TMC Site Code: TMC-11 Start Date: 07/16/2014 Page No: 8



Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 1

## **Turning Movement Data**

		NB On hbound		-	jhn Rd bound			-	hn Rd bound		
Start Time	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:00 AM	1	0	16	1	0	17	53	0	0	53	70
7:15 AM	0	0	23	4	0	27	58	0	0	58	85
7:30 AM	0	0	14	4	0	18	67	0	0	67	85
7:45 AM	0	0	18	3	0	21	69	0	0	69	90
Hourly Total	1	0	71	12	0	83	247	0	0	247	330
8:00 AM	0	0	21	8	0	29	43	0	0	43	72
8:15 AM	0	0	19	8	0	27	43	0	0	43	70
8:30 AM	0	0	23	12	0	35	40	1	0	41	76
8:45 AM	0	0	31	5	0	36	47	0	0	47	83
Hourly Total	0	0	94	33	0	127	173	1	0	174	301
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	61	10	0	71	47	0	0	47	118
4:15 PM	0	0	51	14	0	65	47	0	0	47	112
4:30 PM	0	0	72	14	0	86	48	0	0	48	134
4:45 PM	0	0	73	14	0	87	55	0	0	55	142
Hourly Total	0	0	257	52	0	309	197	0	0	197	506
5:00 PM	0	0	84	13	0	97	35	0	0	35	132
5:15 PM	0	0	91	17	0	108	34	0	0	34	142
5:30 PM	0	0	86	11	0	97	41	0	0	41	138
5:45 PM	0	0	81	11	0	92	41	0	0	41	133
Hourly Total	0	0	342	52	0	394	151	0	0	151	545
Grand Total	1	0	764	149	0	913	768	1	0	769	1682
Approach %	-	-	83.7	16.3	-	<u>-</u>	99.9	0.1	-	-	-
Total %	-	0.0	45.4	8.9	-	54.3	45.7	0.1	-	45.7	-
Motorcycles	-	0	5	2	_	7	4	0	_	4	11
% Motorcycles	-		0.7	1.3	-	0.8	0.5	0.0	-	0.5	0.7
Cars	-	0	473	72	-	545	428	0	-	428	973
% Cars	-		61.9	48.3	_	59.7	55.7	0.0		55.7	57.8
Light Goods Vehicles	-	0	237	68	-	305	282	0	_	282	587
% Light Goods Vehicles	-	-	31.0	45.6	-	33.4	36.7	0.0	-	36.7	34.9
Buses	-	0	2	0	_	2	3	0		3	5
% Buses	-	<u>-</u>	0.3	0.0	-	0.2	0.4	0.0	-	0.4	0.3
Single-Unit Trucks	-	0	17	5	-	22	31	1	-	32	54
% Single-Unit Trucks	-	<u>-</u>	2.2	3.4	-	2.4	4.0	100.0	_	4.2	3.2
Articulated Trucks	-	0	30	2	-	32	20	0	-	20	52
% Articulated Trucks	-		3.9	1.3		3.5	2.6	0.0		2.6	3.1
Bicycles on Road	-	0	0	0	-	0	0	0	_	0	0
% Bicycles on Road	-	<u>-</u>	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0

Pedestrians	1	-	-	-	0	-	-	-	0	-	-
% Pedestrians	100.0		-		-	-	-	-	-	-	-



Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 3

																		J. Out 5 473 237 2 48 765		B On In 0 0 0 0 0 0 0 0 0 1 1 P	4 2	otal 5 73 37 2 88 65 5																	
Vaughn Rd [W]	ln Total	-	+	+	+	52 59	$\dashv$	[	0 4	<u> </u>	+	0	+	+	+	┨.	O E	7/16/20 nding 2 7/16/20	014 7 At	::00 A	AM DAM			<b>←</b>	H	764 149	+	2 0	+	+	$\ $	700	+	+	+	428 545		Out In	Vaughn Rd [E]
Vau	Ont	2	72	88 0	1	· ;	149	L	0	0		0		• •	۵		M	lotorcy ars ight Go uses ther	cles						ס	0	0	0		0	֧֧֖֭֭֭֭֭֭֭֭֓֞֡֟֝֟֝֓֓֓֟֟֟֟ ֓	100	1681	o o	587	973	11	Total	1[E]
																		0 0 0 0 0 0 0		0 0 0 0 0 0	To	0 0 0 0 0 0 0 0																	

Turning Movement Data Plot



Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 4

## Turning Movement Peak Hour Data (7:15 AM)

	1.45	NB On	1	_	hn Rd	ai Data (1.1	J,	1/2	hn Rd		I
		nbound		•	nn Ka bound			-	inn Ka bound		
Start Time	Peds	App. Total	Right	vvest Thru	pouna Peds	App. Total	Thru	Left	pouna Peds	App. Total	Int. Total
7:15 AM	0	0	23	4	0	27	58	0	0	58	85
7:30 AM	0	0	14	4	. 0	18	67	0	. 0	67	85
7:45 AM	0	0	18	3	0	21	69	0	0	69	90
8:00 AM	0	0	21	8	0	29	43	0	0	43	72
Total	0	0	76	19	. 0	95	237	0	. 0	237	332
Approach %	-	-	80.0	20.0	-	-	100.0	0.0	-	-	-
Total %	-	0.0	22.9	5.7	-	28.6	71.4	0.0	-	71.4	-
PHF	-	0.000	0.826	0.594	-	0.819	0.859	0.000	-	0.859	0.922
Motorcycles	-	0	0	0	-	0	0	0	-	0	0
% Motorcycles	-	-	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Cars	-	0	40	7	-	47	139	0	-	139	186
% Cars	-	-	52.6	36.8	-	49.5	58.6	-	-	58.6	56.0
Light Goods Vehicles	-	0	25	11	-	36	85	0	-	85	121
% Light Goods Vehicles	-	-	32.9	57.9	-	37.9	35.9	-	-	35.9	36.4
Buses	-	0	0	0	-	0	1	0	-	1	1
% Buses	-	-	0.0	0.0	-	0.0	0.4	-	-	0.4	0.3
Single-Unit Trucks	-	0	5	1	-	6	6	0	-	6	12
% Single-Unit Trucks	-	-	6.6	5.3	-	6.3	2.5	-	-	2.5	3.6
Articulated Trucks	-	0	6	0	-	6	6	0	-	6	12
% Articulated Trucks	-	-	7.9	0.0	-	6.3	2.5	-	-	2.5	3.6
Bicycles on Road	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	0.0	_	0.0	0.0	-	_	0.0	0.0
Pedestrians	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-



Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 5

																	0 t 0 40 25 0 11 76	15 NB 0 0	No   No   No   No   No   No   No   No	5															
	Total	0	146	- 8	13	526	]	0	0	0	0	0	٥.	<b>-</b>	<u> </u>	ı	Peak	Ηοι	ır Da	ata	t	70	76	1 0	25	40	0	٦[	237	12	<b>-</b> 8	85	0	Out	
Vaughn Rd [W]	n.	0	139	£ -	12	237	$\parallel$	0	139	82	-	12	237	- -	<b>→</b>		07/16/20 Ending 07/16/20	014 7:15 At 014 8:15	AM AM		+		19	_ <	0 1	7	0	∦	95	12	0 8	36	0	Б	Vaughn Rd [E]
Vau	Ont	0	۲ ;	- 0	,	19		0	0	0	0	0	0	1			Motorcy Cars Light Go Buses Other	cles				υ	0	0	0	0	0	][	332	24	→ <u>i</u>	121	0	Total	
																	0 0 0 0 0	0 0 0 0 0 0 0 1 In see Approx	0 0 0 0 0 0 0																

Turning Movement Peak Hour Data Plot (7:15 AM)



Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 6

## Turning Movement Peak Hour Data (4:45 PM)

	I-15	NB On		•	hn Rd	ai Bata (4.4		Vaug	hn Rd		
		hbound		-	bound			-	oound		
Start Time	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
4:45 PM	0	0	73	14	0	87	55	0	0	55	142
5:00 PM	0	0	84	13	0	97	35	0	0	35	132
5:15 PM	0	0	91	17	0	108	34	0	0	34	142
5:30 PM	0	0	86	11	0	97	41	0	0	41	138
Total	0	0	334	55	0	389	165	0	0	165	554
Approach %	-	-	85.9	14.1	-	-	100.0	0.0	-	-	-
Total %	-	0.0	60.3	9.9	-	70.2	29.8	0.0	_	29.8	-
PHF	-	0.000	0.918	0.809	-	0.900	0.750	0.000	-	0.750	0.975
Motorcycles	-	0	1	1	-	2	2	0	-	2	4
% Motorcycles	-	-	0.3	1.8	-	0.5	1.2	-	-	1.2	0.7
Cars	-	0	219	31	-	250	90	0	-	90	340
% Cars	-	-	65.6	56.4	-	64.3	54.5	-	-	54.5	61.4
Light Goods Vehicles	-	0	96	22	-	118	62	0	_	62	180
% Light Goods Vehicles	-	-	28.7	40.0	-	30.3	37.6	-	-	37.6	32.5
Buses	-	0	2	0	-	2	1	0	-	1	3
% Buses	-	-	0.6	0.0	-	0.5	0.6	-	-	0.6	0.5
Single-Unit Trucks	-	0	5	1	-	6	9	0	-	9	15
% Single-Unit Trucks	-	-	1.5	1.8	-	1.5	5.5	-	-	5.5	2.7
Articulated Trucks	-	0	11	0	-	11	1	0	-	1	12
% Articulated Trucks	-	-	3.3	0.0	-	2.8	0.6	-	-	0.6	2.2
Bicycles on Road	-	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	0.0	-	0.0	0.0	-	-	0.0	0.0
Pedestrians	0	<u>-</u>	-	<u>-</u>	0	-	-	-	0	<u>-</u>	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-



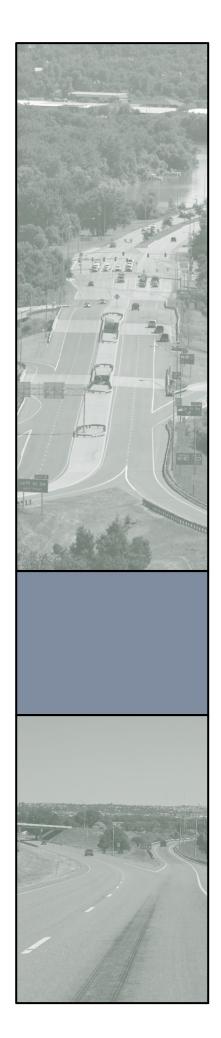
Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 7

																		Out 1 219 96 2 2 16 334	3 On [	N] Total 1 219 96 2 16 334																		
[w]	Total	e 5	2 8	-	7	220	$\parallel$	,	0	0	0	0			$\vdash$	<u></u>		Peak			ta	t	R	334	16	2	96	219		H	165	10	4	62	_	2	Out	Vaug
Vaughn Rd [W]	$\dashv$	2 8	62 8		9	Ť	$\parallel$	۰	7	6	62	-	10	165	F	<b>→</b>		07/16/2 Ending 07/16/2	45 PN 45 PN	И		+		55	1	0	22	31		H	-	4	$\dashv$	_	Ĭ	4	<u> </u>	Vaughn Rd [E]
	Ont	- 2	22 2	0	-	22	]	4		0	0	0	0	0	۵	]		Motorc Cars Light G Buses Other	'ehicle	es			٦	0	0	0	0	0	0		554	27	ω	180	340	4	Total	
																		0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0																		

Turning Movement Peak Hour Data Plot (4:45 PM)



Count Name: 12-VaughnRd\_I15NB TMC Site Code: TMC-12 Start Date: 07/16/2014 Page No: 8





## **APPENDIX C**

**Existing Conditions Traffic Data Analysis** 

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ΕT	
General Information			Site Information		
Analyst Agency or Company Date Performed	Shane Forsy 9/15/2014	the	Highway/Direction of Trave From/To Jurisdiction	I-15 to	astbound 14th Ave
Analysis Time Period  Project Description I-15 (	AM Peak		Analysis Year	2014	
✓ Oper.(LOS)	Joinaol Glady	Пг	Des.(N)	□Pla	nning Data
Flow Inputs			)C3.(I <b>4</b> )		Timing Data
Volume, V	530	veh/h	Peak-Hour Factor, PHF	0.87	
AADT Peak-Hr Prop. of AADT, K		veh/day	%Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	6 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments		·		
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.971</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	55.0	mph	FFS	55.0	mph
Base free-flow Speed, BFFS		mph		00.0	Шрп
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> )		pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S D = v / S	55.0 5.7	mph	S		mph
D = v <sub>p</sub> / S	5.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	Α		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
Copyright © 2010 University of Florid		un/od	HCS 2010 <sup>TM</sup> Version 6.2	Cono	rated: 9/15/2014 7:46

HCS 2010<sup>TM</sup> Version 6.2

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		/estbound 14th Ave
	Corridor Study				
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	454	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.76 6 0 Level mi	
Calculate Flow Adjus	tmonte		Up/Down %		
				1.0	
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.971	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	55.0	mph	FFS	55.0	mph
Base free-flow Speed, BFFS		mph		00.0	трп
LOS and Performanc	e Measures	;	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S	55.0	pc/h/ln mph	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$ S	N x f <sub>HV</sub>	pc/h/ln mph
$D = v_p / S$	5.6	pc/mi/ln	D = v <sub>p</sub> / S		pc/mi/ln
LOS	Α		Required Number of Lane	s, N	po//////
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design			HCS 2010 <sup>TM</sup> Version 6.2		rated: 9/15/2014 7:47

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Shane Forsyt 9/15/2014 PM Peak corridor Study	he	Site Information Highway/Direction of Trave	1 / 215 Fo	
9/15/2014 PM Peak	he		1 1 215 Ea	
		From/To Jurisdiction Analysis Year	I-15 to 1- 2014	
		7 that yello 1 car	20	
•		Des.(N)	Plan	ning Data
		. ,		
675	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.83 4 0	
	veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
tments				
1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 )] 0.980	
		Calc Speed Adj and I	FFS	
	ft ft			mph
2		$f_{LC}$		mph
	ramps/mi	TRD Adjustment		mph
55.0	mph mph	FFS	55.0	mph
e Measures		Design (N)		
N x f <sub>HV</sub> 415	pc/h/ln	I F	N x f <sub>HV</sub>	pc/h/ln
55.0 7.5 A	mph pc/mi/ln	S D = v <sub>p</sub> / S	s, N	mph pc/mi/ln
		Factor Location		
S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		f <sub>p</sub> - Page 11-18		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	tments  1.00  1.5  2  55.0  Measures  N x f <sub>HV</sub> 415  55.0  7.5  A  S - Speed D - Densi FFS - Free BFFS - Base nour volume	of 5 veh/h veh/day  veh/h  tments  1.00  1.5  ft ft ft 2 ramps/mi mph mph  Measures  I x f <sub>HV</sub> 415 pc/h/ln 55.0 mph 7.5 pc/mi/ln A  S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow	$ \begin{array}{c} \text{veh/day} \\ \text{veh/day} \\ \text{Wel/day}	veh/day $\frac{1}{\sqrt{2}}$ $\frac{1}{2$

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		LLWAI OL	GMENTS WORKSHEE	. I	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		estbound 14th Ave
Project Description <i>I-15</i> C			7 maryolo 1 car		
✓ Oper.(LOS)	•		Des.(N)	Plar	nning Data
Flow Inputs			. ,		
Volume, V AADT Peak-Hr Prop. of AADT, K	646	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.93 5 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	55.0	mph mph	FFS	55.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )		pc/h/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S D = v <sub>p</sub> / S LOS	55.0 6.5 A	mph pc/mi/ln	S $D = v_p / S$ Required Number of Lanes	s, N	mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	:T	
General Information			Site Information		
Analyst Agency or Company Date Performed	Shane Forsyt	the	Highway/Direction of Trave From/To Jurisdiction	14th Av	astbound re to Fox Farm
Analysis Time Period Project Description <i>I-15</i> C	AM Peak		Analysis Year	2014	
✓ Oper.(LOS)	onnaer Grady		Des.(N)	□Pla	nning Data
Flow Inputs					<b>3</b>
Volume, V AADT	979	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.83 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and		
Lane Width Rt-Side Lat. Clearance	0	ft ft	$f_{LW}$		mph
Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed,	55.0	ramps/mi mph	f <sub>LC</sub> TRD Adjustment FFS	55.0	mph mph mph
BFFS	- M	mph	Decima (N)		
LOS and Performanc	e weasures	1	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 602 55.0 10.9 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		/estbound re to Fox Farm
,	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐ Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	528	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.82 5 0 Level	
DDHV - AADIXKXD		ven/n	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments		<u> </u>		
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.976	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	55.0	mph	FFS	55.0	mph
Base free-flow Speed, BFFS		mph		00.0	
LOS and Performanc	e Measures	)	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l	N x f <sub>HV</sub>		Design (N) Design LOS		
x f <sub>p</sub> ) S	55.0	pc/h/ln mph	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x t <sub>HV</sub>	pc/h/ln
D = v <sub>p</sub> / S	6.0	pc/mi/ln	S		mph
LOS	0.0 A	ροπιπι	$D = v_p / S$		pc/mi/ln
200	7		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design			HCS 2010 <sup>TM</sup> Version 6.2		rated: 9/15/2014 7:58

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	BASIC FRI	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsythe 9/15/2014 PM Peak		Highway/Direction of Trave From/To Jurisdiction Analysis Year		astbound re to Fox Farm
,	Corridor Study				
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	1044	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.90 3 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft	, <b>,</b>		
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	2		f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		mph
FFS (measured)	55.0	mph	FFS	<i>EE</i> 0	·
Base free-flow Speed, BFFS		mph	FFS	55.0	mph
LOS and Performanc	e Measures	•	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times V)$ $x f_p)$ $S$ $D = v_p / S$ LOS	N x f <sub>HV</sub> 589 55.0 10.7 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \times x f_p)$ $S$ $D = v_p / S$		pc/h/ln mph pc/mi/ln
01			Required Number of Lane	S, IN	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		/estbound re to Fox Farm
Project Description <i>I-15</i> C			7 manyolo 1 oan		
✓ Oper.(LOS)	•		Des.(N)	Pla	nning Data
Flow Inputs			. ,		
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	1279	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
DDHV - AADTX K X D		venin	Grade % Length Up/Down %	1111	
Calculate Flow Adjus	tments		<u> </u>		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] <b>0</b> .985	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	2	.,	f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	55.0	mph mph	FFS	55.0	mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l	N x f <sub>HV</sub> 683	pc/h/ln	Design (N) Design LOS  v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	
x f <sub>p</sub> ) S	55.0	mph	x f <sub>p</sub> )	IIV	pc/h/ln
D = v <sub>p</sub> / S LOS	12.4 B	pc/mi/ln	S $D = v_p / S$ Required Number of Lane	s, N	mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central
Project Description I-15 C	Corridor Study		•		
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	334	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.83 7 0 Level	
DDHV = AADTX K X D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments		<u> </u>		
fp	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.966	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p$ $S$ $D = v_p / S$ LOS	N x f <sub>HV</sub> 209 65.0 3.2 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$		pc/h/ln mph pc/mi/ln
Classem			Required Number of Lane	5, IN	
Glossary	<u> </u>		Factor Location		
<ul> <li>N - Number of lanes</li> <li>V - Hourly volume</li> <li>v<sub>p</sub> - Flow rate</li> <li>LOS - Level of service</li> <li>speed</li> <li>DDHV - Directional design</li> </ul>	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central
•	Corridor Study				
✓ Oper.(LOS)			Des.(N)	☐ Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	200	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.83 21 0 Level mi	
			Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.905	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	}	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p)$ $S$ $D = v_p / S$ $LOS$	N x f <sub>HV</sub> 133 65.0 2.0 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location	5, IV	
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	DAGIC I IX	EEWAT SE	GMENTS WORKSHEE	. I	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central Ave
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	359	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.97 8 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.962	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	;	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 193 65.0 3.0 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central Ave
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			es.(N)	□Plaı	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	309	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.79 14 0 Level mi	
Calculate Flow Adjus	tmonts		Up/Down %		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.935	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed,	2 65.0	ft ft ramps/mi mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	65.0	mph mph mph mph
BFFS	. 14	mph	Decima (NI)		
LOS and Performanc	e Measures		Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x   x f_p)$ S $D = v_p / S$ LOS	N x f <sub>HV</sub> 210 65.0 3.2 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Emerson Junction
•	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐ Plaı	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	288	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.89 21 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.905	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft	,		
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	2		f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		•
FFS (measured)	65.0	mph	-	05.0	mph
Base free-flow Speed, BFFS	00.0	mph	FFS	65.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 179 65.0 2.8 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$		pc/h/ln mph pc/mi/ln
Glossami			Required Number of Lane Factor Location	5, IN	
Glossary			racioi Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsythe 8/7/2014 AM Peak		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-15 SB North of Emerson Junctio 2014	
	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	548	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.87 6 0 Level mi	
	4		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub> E <sub>⊤</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 1)] 0.971	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	2		f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	f <sub>LC</sub> TRD Adjustment		•
FFS (measured)	65.0	mph	-	05.0	mph
Base free-flow Speed, BFFS	33.0	mph	FFS	65.0	mph
LOS and Performanc	e Measures	<del></del>	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p)$ $S$ $D = v_p / S$ LOS	N x f <sub>HV</sub> 323 65.0 5.0 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsythe 8/7/2014 PM Peak		Highway/Direction of Trave From/To Jurisdiction Analysis Year	el I-15 NB North of Emerson Junctic 2014	
	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	696	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.94 6 0 Level mi	
Coloulata Flow Adius	tmonto		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] 0.971	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	65.0	mph	FFS	65.0	•
Base free-flow Speed, BFFS		mph		03.0	mph
LOS and Performanc	e Measures	;	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p)$ S $D = v_p / S$ LOS	N x f <sub>HV</sub> 383 65.0 5.9 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Emerson Junction
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			es.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	456	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.88 13 0 Level mi	
DDIIV /VIDI XIXXD		VOIIIII	Up/Down %	1111	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.939	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S	N x f <sub>HV</sub> 277 65.0 4.3	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ S	N x f <sub>HV</sub>	pc/h/ln mph
LOS	A	po	D = v <sub>p</sub> / S Required Number of Lane:	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FRI	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed	Shane Forsy	the	Highway/Direction of Trave From/To Jurisdiction	North of	Gore Hill
Analysis Time Period  Project Description I-15 C	AM Peak		Analysis Year	2014	
✓ Oper.(LOS)	Joinadi Glady		Pes.(N)	□Plan	ning Data
Flow Inputs					9 = 0.10
Volume, V AADT	517	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.90 16	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade -5.00% Length Up/Down %	0 Grade 0.69mi -5.00	
Calculate Flow Adjus	tments		ор/Во <b>и</b> н 70	0.00	
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = \frac{1}{[1+P_T(E_T - 1) + P_R(E_R - 1)]}$	1.2	
Speed Inputs	1.0		Calc Speed Adj and		
Lane Width		ft	Outo Opeca Auj ana i		
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed,	65.0	ramps/mi mph mph	TRD Adjustment	65.0	mph mph
BFFS LOS and Performanc	o Moasuros	•	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )  S D = v <sub>p</sub> / S		pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S	N x f <sub>HV</sub>	pc/h/ln mph
LOS	Α		D = v <sub>p</sub> / S Required Number of Lanes	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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			GMENTS WORKSHEE		
General Information			Site Information		
Analyst Agency or Company Date Performed	Shane Forsy 8/7/2014	the	Highway/Direction of Trave From/To Jurisdiction		f Gore Hill
Analysis Time Period	AM Peak		Analysis Year	2014	
·	Corridor Study				-
✓ Oper.(LOS)			Des.(N)	∐ Plar	nning Data
Flow Inputs	450	la /la	Deals Have Faster DUE	0.05	
Volume, V AADT	458	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.85 7	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade 5.00% Lengt	0 <i>Grade</i> th 0.69mi	
			Up/Down %	5.00	
Calculate Flow Adjus	tments				
$f_p$	1.00		$E_R$	4.5	
E <sub>T</sub>	2.8		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R -$	1)] <i>0.891</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	65.0	mph	FFS	65.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	<b>S</b>	Design (N)		
			Design (N)		
Operational (LOS)	NI £		Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$ x $f_p$ )	N X <sup>1</sup> HV 303	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x$	N x f <sub>HV</sub>	pc/h/ln
S	65.0	mph	x f <sub>p</sub> ) S		mph
$D = v_p / S$	4.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	Α		Required Number of Lane	s, N	рсліплі
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	D/ (OIO I IX	LLWAI OL	GMENTS WORKSHEE		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Gore Hill
Project Description I-15 C	Corridor Study		·		
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	722	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.80 10 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade -5.00% Length Up/Down %	Grade 0.69mi -5.00	
Calculate Flow Adjus	tments			0.00	
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.952	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft	<u> </u>		
Rt-Side Lat. Clearance Number of Lanes, N	2	ft	f <sub>LW</sub>		mph
Total Ramp Density, TRD	-	ramps/mi	f <sub>LC</sub> TRD Adjustment		mph mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV 4</sub> 73	pc/h/ln	Design (N) Design LOS v <sub>n</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	
x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	65.0 7.3 A	mph pc/mi/ln	$x f_p$ )  S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Gore Hill
Project Description <i>I-15</i> (					
✓ Oper.(LOS)	-		Des.(N)	☐ Plar	nning Data
Flow Inputs			. ,		
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	630	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.93 10 0 Grade	
DDHV = AADT x K x D		veh/h		h 0.69mi 5.00	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 2.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	4.5 )] 0.870	
Speed Inputs			Calc Speed Adj and I	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	2	ft ft	f <sub>LW</sub>		mph mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	65.0	ramps/mi mph mph	TRD Adjustment FFS	65.0	mph mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> )  S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 391 65.0 6.0 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	hour volume		F	11-2,	rated: 9/7/2014

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			GMENTS WORKSHEE		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	f Central	
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	□Plar	ning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	321	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.89 14 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 )] 0.935	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	}	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 193 65.0 3.0 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	f Central	
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	□Plaı	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	352	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.94 8 0 Level mi	
DDITV /VIDIATE		VCIIIII	Up/Down %	,,,,	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.962	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width  Rt-Side Lat. Clearance		ft ft			
Number of Lanes, N	2	10	f <sub>LW</sub>		mph
Total Ramp Density, TRD	_	ramps/mi	f <sub>LC</sub>		mph
FFS (measured) Base free-flow Speed,	65.0	mph mph	TRD Adjustment FFS	65.0	mph mph
BFFS					
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )		pc/h/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S D = v <sub>p</sub> / S LOS	65.0 3.0 A	mph pc/mi/ln	S $D = v_p / S$ Required Number of Lane:	s, N	mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	of Central Ave	
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			es.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	490	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.87 11 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.948	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft ft			
Rt-Side Lat. Clearance	2	11	f <sub>LW</sub>		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD	05.0	ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 298 65.0 4.6 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$	N x f <sub>HV</sub>	pc/h/ln mph pc/mi/ln
			Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed	S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design	da All Dights Doso		, 100 0040TM . V 0.0		ratod: 9/7/2014 11:26

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	ΪT			
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Travel <i>I-15 SB</i> From/To South of Central And Jurisdiction Analysis Year 2014				
Project Description I-15 C	Corridor Study						
✓ Oper.(LOS)			es.(N)	Plar	nning Data		
Flow Inputs							
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	491	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.90 14 0 Level mi	14 0 Level		
			Up/Down %				
Calculate Flow Adjus	tments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.935			
Speed Inputs			Calc Speed Adj and	FFS			
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	2	ft ft	f <sub>LW</sub>		mph mph		
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	65.0	ramps/mi mph mph	TRD Adjustment	65.0	mph mph		
LOS and Performanc	e Measures	}	Design (N)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 293 65.0 4.5 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	f Gore Hill	
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			es.(N)	□Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	244	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.92 10 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.952	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	2	ft ft ramps/mi	f <sub>LW</sub>		mph mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	TRD Adjustment	65.0	mph mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 139 65.0 2.1 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т					
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 AM Peak	the	Highway/Direction of Travel <i>I-15 SB</i> From/To South of Gore Hill Jurisdiction Analysis Year 2014						
Project Description I-15 C	Corridor Study								
✓ Oper.(LOS)			Des.(N)	Pla	nning Data				
Flow Inputs									
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	235	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.79 20 0 Level mi					
Calculate Flow Adjus	tments		Up/Down %						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.909					
Speed Inputs			Calc Speed Adj and	FFS					
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	2 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph				
LOS and Performanc	e Measures	3	Design (N)						
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 163 70.0 2.3 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1				
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т					
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	f Gore Hill					
Project Description I-15 C	Corridor Study								
✓ Oper.(LOS)			Des.(N)	∐ Plar	nning Data				
Flow Inputs Volume, V AADT	249	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.96 12					
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi					
Calculate Flow Adjus	tments								
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.943					
Speed Inputs			Calc Speed Adj and						
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	2	ft ft ramps/mi	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment		mph mph mph				
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph				
LOS and Performanc	e Measures	3	Design (N)						
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 138 65.0 2.1 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11				

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T					
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 8/7/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	f Gore Hill					
Project Description <i>I-15</i> C	Corridor Study		,						
✓ Oper.(LOS)	-		es.(N)	Plai	nning Data				
Flow Inputs			. ,						
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	365	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.89 6 0 Level mi					
DDHV - AADTX K X D		venin	Grade % Length Up/Down %	1111					
Calculate Flow Adjus	tments		·						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.971					
Speed Inputs			Calc Speed Adj and						
Lane Width		ft	, <b>,</b>						
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph				
Number of Lanes, N	2		$f_{LC}$		mph				
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph				
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph				
LOS and Performanc	e Measures	3	Design (N)						
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV 040</sub>		Design (N) Design LOS	NI £					
x f <sub>p</sub> ) S	65.0	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N X T <sub>HV</sub>	pc/h/ln				
S D = v <sub>p</sub> / S	3.3	mph pc/mi/ln	S		mph				
LOS	3.3 A	рс/пплп	$D = v_p / S$		pc/mi/ln				
LO3	A		Required Number of Lane	s, N					
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1				
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		RAMP	S AND RAN	//P JUNCTI	ONS WO	RKS	HEET				
General Infor	mation		<u> </u>	Site Infor							
Analyst Agency or Company		ne Forsythe		reeway/Dir of Tr	avel	10th Av	re NB Off-r	amp			
Date Performed	9/15/	2014		urisdiction		i- io ali	u 1-515				
Analysis Time Period				nalysis Year		2014					
Project Description											
Inputs											
Upstream Adj R	amp	· ·	ber of Lanes, N	2					Downstrea	ım Adj	
□Yes □	On	Ramp Numbe Acceleration L	ane Length, L <sub>A</sub>	1					Ramp Yes	□On	
✓ No	Off	Deceleration I Freeway Volu	ane Length L <sub>D</sub>	740 517					<b>☑</b> No	Off	
L <sub>up</sub> = fi	t	Ramp Volume	e, V <sub>R</sub>	192					L <sub>down</sub> =	ft	
V <sub>u</sub> = ve	eh/h	1	-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	65.0 55.0					V <sub>D</sub> =	veh/h	
Conversion to	pc/h Uni	der Base	Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	517	0.90	Level	16	0	0.	926	1.00	62	22	
Ramp	192	0.83	Level	3	0	0.	985	1.00	23	36	
UpStream											
DownStream											
	Merge Areas							iverge Areas			
Estimation of	v <sub>12</sub>				Estimat	ion o	f 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>F</sub>	P <sub>FD</sub>		
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		)	
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =			000 using Equ			
V <sub>12</sub> =	pc/h	Equation (	-Americ 10 0)		V <sub>12</sub> =			2 pc/h	iation (Exim	oit 10 1)	
	•	Equation 12	14 or 12 17)					•	n 10 11 on	10 17)	
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	. 0.7		pc/h (Equatio	11 13-14 01	13-17)	
Is $V_3$ or $V_{av34} > 2,70$								Yes ☑ No			
Is $V_3$ or $V_{av34} > 1.5$ *					Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5		☐Yes ☑ No			
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equation	13-16, 13-	18, or 13-	
Capacity Che		)			Capacity Checks						
Capacity Cite	Actual		apacity	LOS F?	Actual Capacity LOS F						
	Actual	1 1	apacity	LUSF!	V <sub>F</sub>		622	Exhibit 13-8	1		
.,										No	
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	386	Exhibit 13-8		No	
					$V_R$		236	Exhibit 13-10	2200	No	
Flow Entering	g Merge In	fluence A	rea		Flow Er	terin	g Dive	rge Influen			
	Actual		Desirable	Violation?		/	\ctual	Max Desirab	le	Violation?	
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		622	Exhibit 13-8	4400:All	No	
Level of Serv	-	Level of Service Determination (if not F)									
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	· 0.00627 L <sub>Δ</sub>			D <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>		
D <sub>R</sub> = (pc/mi/ln	• •	12	^		L	.9 (pc/r		12	D		
LOS = (Exhibit	,				I ***		oit 13-2)				
						-		<u> </u>			
Speed Detern					Speed L						
M <sub>S</sub> = (Exibit 13	3-11)				ľ		xhibit 13-	-			
S <sub>R</sub> = mph (Exh	ibit 13-11)					-	(Exhibit				
$S_0 = mph (Exh$	ibit 13-11)				$S_0 = N$	/A mph	(Exhibit	13-12)			
	ibit 13-13)				S = 60	0.6 mph	(Exhibit	13-13)			
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		RAI	MPS AND	RAMP JUN	CTIONS W	ORKSH	EET				
General I	nform				Site Infor						
Analyst		Shan	e Forsythe	Fr	reeway/Dir of Tr	avel	10th Av	e NB On-ra	ımp		
gency or Co				Jι	unction		I-15 and	d I-315			
ate Performe		9/15/2			urisdiction						
nalysis Time		AM P	'eak	Aı	nalysis Year		2014				
roject Descri	ption										
nputs			L							r	
Jpstream Adj	Ramp			ber of Lanes, N	2					Downstre	am Adj
			Ramp Numbe	r of Lanes, N	1					Ramp	
Yes	☐ On		Acceleration L	ane Length, L <sub>A</sub>	590					□Yes	On
✓ No	Off		Deceleration L	ane Length L <sub>D</sub>						   No	□ O#
	0		Freeway Volu	me, V <sub>F</sub>	321					☑ No	Off
up =	ft		Ramp Volume		167					L <sub>down</sub> =	ft
- F				-Flow Speed, S <sub>FF</sub>	65.0					L.	
' <sub>u</sub> =	veh/h			ow Speed, S <sub>FR</sub>	35.0					$V_D =$	veh/h
	: 4-	//-		* 110	33.0						
onversi	UN TO	<u>ρς/π υπα</u> ''		Conditions			_	Г		ı	
(pc/h)		v (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	$f_p$	v = V/PHI	$= x f_{HV} x f_{p}$
reeway	-+	321	0.89	Level	14	0	0.9	935	1.00		385
Ramp	$\neg +$	167	0.75	Level	7	0	_	966	1.00		232
JpStream					· ·	<u> </u>	<del>  "</del>				
DownStream											
		ı	Merge Areas					D	verge Areas		
stimatio	on of v	12				Estimat	ion o	f v <sub>12</sub>			
		V <sub>12</sub> = V <sub>F</sub>	(P.,,)					V <sub>40</sub> = V	<sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	.)P <sub>E</sub> D	
=			ation 13-6 or	13-7)		=			Equation 13-		(3)
EQ =						L <sub>EQ</sub> = D -			-		
= = -				ion (Exhibit 13-6)	)	P <sub>FD</sub> =			sing Equatio	וו (באווטונו	J-1)
12 =		385 p				V <sub>12</sub> =		•	c/h	10.1110	
or V <sub>av34</sub>		-		13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		-	c/h (Equation 1	13-14 or 13-1	17)
		pc/h? 🗌 Yes							]Yes ☐ No		
s V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V	<sub>12</sub> /2 □ Yes				Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5		Yes 🗌 No		
Yes,V <sub>12a</sub> =		pc/h ( 13-19)		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equatio -19)	n 13-16, 1	3-18, or
Capacity	Chac					Capacit			-19)		
upacity	Once	Actual		apacity	LOS F?	Joupain	J	Actual	Car	pacity	LOS F?
		7101001	<del>l i</del>	араону	2001.	V <sub>F</sub>		7101441	Exhibit 13-		10011
							\/		_		+
$V_{FO}$		617	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>		Exhibit 13-		
						$V_R$			Exhibit 13 10	-	
low Ent	erina	Merae In	fluence A	rea	<u> </u>	Flow Fr	terin	a Diver	ge Influen	ce Area	<b></b>
	<u> </u>	Actual		Desirable	Violation?	5	_	Actual	Max Desi		Violation?
V <sub>R12</sub>	-	617	Exhibit 13-8	4600:All	No	V <sub>12</sub>	1		Exhibit 13-8		
	Sorvic		nination (i		110		f Son	vico Dot	erminatio	n (if not	<u> </u>
			).0078 V <sub>12</sub> - 0.0			+					1)
		.,	7.0070 V <sub>12</sub> - 0.0	0021 L <sub>A</sub>					0086 V <sub>12</sub> - 0	.ooa L <sub>D</sub>	
.,	(pc/mi/ln)					1 ., ,,	oc/mi/lr	•			
R = 6.5		-2)					Exhibit				
OS = 6.5	Exhibit 13					Speed I	Deteri	minatio	n		
<sub>R</sub> = 6.5		nation				Opoou -					
OS = 6.5 OS = A (E	etermi					<del>  '</del>	Exhibit 1	3-12)			
$R_{R} = 6.5$ $R_{R} = 6.5$ $R_{R} = 6.5$ $R_{R} = 6.5$ $R_{R} = 6.5$	e <b>termi</b> 87 (Exibit	13-11)				$D_s = (E_s)$	Exhibit 1	3-12) ibit 13-12)			
$R_{R} = 6.5$ $R_{R} = 6.5$ $R_{R} = 6.5$ $R_{R} = 6.5$ $R_{R} = 6.5$	e <b>termi</b> 87 (Exibit 4 mph (Ex	13-11) khibit 13-11)				D <sub>s</sub> = (E S <sub>R</sub> = m	Exhibit 13 ph (Exh	ibit 13-12)			
O <sub>R</sub> = 6.5 OS = A (E Opeed De O <sub>R</sub> = 0.28 O <sub>R</sub> = 58.4 O <sub>R</sub> = N/A	e <b>termi</b> 87 (Exibit 4 mph (Ex 4 mph (Ex	13-11)				$D_s = (E_s)$ $S_R = m$ $S_0 = m$	Exhibit 13 nph (Exh nph (Exh				

		RAMP	S AND RAI	MP JUNCTION	ONS WO	RKS	HEET			
General Infor	mation		- /	Site Infori			· · · · · ·			
Analyst Agency or Company Date Performed	Shan	e Forsythe		Freeway/Dir of Tra Junction Jurisdiction		10th Av I-15 an	ve SB Off-ra d I-315	amp		
Analysis Time Period				Analysis Year		2014				
Project Description			<u> </u>							
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2 1					Downstre: Ramp	am Adj
□Yes	On	Acceleration L	ane Length, L <sub>A</sub>	·					□Yes	On
✓ No	Off	Deceleration I Freeway Volu	_ane Length L <sub>D</sub>	463 352					✓ No	Off
L <sub>up</sub> = f	t	Ramp Volume		192					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	= 65.0 55.0					V <sub>D</sub> =	veh/h
Conversion t	o nc/h Und		111	00.0						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	352	0.94	Level	8	0	0.	962	1.00	3	91
Ramp	192	0.83	Level	3	0	0.	985	1.00	2	36
UpStream				<u> </u>						
DownStream	<u> </u>	l l Merge Areas						iverge Areas		
Estimation of		vierge Areas			Estimat	tion o	f V	iverge Areas		
		<u> </u>			Lotimat				/ \D	
	$V_{12} = V_F$		40 =>		l.			V <sub>R</sub> + (V <sub>F</sub> - V	–	
- <sub>EQ</sub> =		tion 13-6 or			L <sub>EQ</sub> =			Equation 13-		
P <sub>FM</sub> =	_	Equation (	=xhibit 13-6)		P <sub>FD</sub> =			000 using Ed	quation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			1 pc/h		
$V_3$ or $V_{av34}$		-	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equat		r 13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5		☐Yes ☑ No		
If Yes,V <sub>12a</sub> =	pc/h (l 13-19)	•	-16, 13-18, or		If Yes,V <sub>12a</sub> :	=	p 19	c/h (Equatio	n 13-16, 13	-18, or 13-
Capacity Che		'			Capacit	ty Ch		<i>)</i>		
Capacity Circ	Actual		apacity	LOS F?		. <del>,                                    </del>	Actual		apacity	LOS F?
			-		V <sub>F</sub>		391	Exhibit 13	<del>- 1</del>	No
V <sub>FO</sub>		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	_	155	Exhibit 13		No
PO					V <sub>R</sub>		236	Exhibit 13-		No
Flow Entering	Morgo In	fluonco A	roa		<u> </u>			rge Influei		110
Flow Entering	Actual	v	Desirable	Violation?	FIOW EI	- 1	Actual	Max Desira		Violation?
V <sub>R12</sub>	Notual	Exhibit 13-8	Dodinablo	Violation:	V <sub>12</sub>		391	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern		if not F)		<del></del>			terminatio		
$D_R = 5.475 + 0.$								.0086 V <sub>12</sub> - 0	•	,
D <sub>R</sub> = (pc/mi/ln		0.0070 112	0.000 <b>2</b> 7			.4 (pc/r		.0000 112	ооо <u>-</u> Б	
LOS = (Exhibit							,			
							oit 13-2)			
Speed Deterr					Speed I					
$M_S = (Exibit 1)$					ľ	-	xhibit 13-	-		
	nibit 13-11)				1	-	(Exhibit	-		
	nibit 13-11)				1	-	(Exhibit '	*		
· ` `	nibit 13-13)						(Exhibit	13-13)		
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	MPS AND	RAMP JUN	CTIONS W		EET				
mation			Site Infor	mation					
Shan	ne Forsythe	Fr	eeway/Dir of Tr				mp		
					I-15 and	I-315			
	2014	Ju	ırisdiction						
l AM F	Peak	Ar	nalysis Year		2014				
	1							Y	
	Freeway Num	ber of Lanes, N	2					Downstre	am Adi
	Ramp Number	r of Lanes, N	1					Ramp	,
1	Acceleration L	ane Length, L	1500					□Voo	On
_	1	**							
İ	1		450					✓ No	
		•						   . =	ft
		1.	287					-down	
	Freeway Free	-Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
	Ramp Free-Flo	ow Speed, S <sub>FR</sub>	35.0					"	
pc/h Und	der Base (	Conditions							
V			%Truck	% Pv	f		f	v = V/PHI	F x f x f
							· '		<u>.</u>
458	0.85	Level	7	0			1.00		559
287	0.77	Level	5	0	0.9	76	1.00		382
	<u> </u>								
	Merge Areas		Fatimest	ion of	Di	verge Areas			
V <sub>12</sub>				Estimat	ion oi	V <sub>12</sub>			
$V_{12} = V_{F}$	(P <sub>FM</sub> )					$V_{12} = V$	R + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
(Equ	ation 13-6 or	13-7)		L <sub>EO</sub> =		(E	Equation 13-	12 or 13-1	13)
1.000	using Fauat	ion (Exhibit 13-6)				U	sing Equatio	n (Exhibit 1	3-7)
		(=::::::::::::::::::::::::;		1					,
		12 14 or 12 1 <del>7</del> )				•		2 14 or 12 f	17\
-		13-14 01 13-17)			> 0.70	-		3-14 01 13-	17)
				is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5 ^				
		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=			n 13-16, 1	3-18, or
	)			Canacit	v Cho		13)		
	I c	anacity	LOS F2	Capacit	J		Car	nacity	LOS F
7101441	<del>†                                     </del>	араону		V	<del>-  </del>	7 totaai			1 2001
1									+
941	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>				
				V <sub>R</sub>				-	
Morae Ir	fluonoo A	<u> </u>			otorine	Divor		00 Aros	
			\/iolation2	FIOW EI	_				Violation
	<del>1</del>		f	\/	A	Juai		lable	Violatioi
			INO						<u> </u>
				+					: F)
0.00734 v <sub>R</sub> + (	0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			$D_R = 4.$	252 + 0.0	0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
				$D_R = (p$	oc/mi/ln	)			
ln)				L	=vhihit /	13-2)			
				LOS = (E	ZXIIIDIL				
ln) 13-2)							n		
ln) 13-2) <b>nination</b>				Speed L	Detern	ninatio	า		
In) 13-2) nination bit 13-11)				<b>Speed L</b> D <sub>s</sub> = (E	<b>Detern</b> Exhibit 13	nination -12)	n		
In) 13-2)  mination bit 13-11) (Exhibit 13-11)				Speed L D <sub>s</sub> = (E $S_R$ = m	<b>Detern</b> Exhibit 13 oph (Exhil	nination -12) bit 13-12)	n		
In) 13-2) nination bit 13-11)				$\begin{array}{ccc} \textbf{Speed L} \\ \textbf{D}_{s} = & \textbf{(E} \\ \textbf{S}_{R} = & \textbf{m} \end{array}$	<b>Detern</b> Exhibit 13	nination -12) bit 13-12)	n		
	Shar  9/15/ AM F  P  P  P  P  P  P  P  P  P  P  P  P  P	Shane Forsythe  9/15/2014 AM Peak  Freeway Num Ramp Number Acceleration L Freeway Volun Ramp Volume Freeway Free- Ramp Free-Floope/h Under Base (V (Veh/hr) PHF  458 0.85 287 0.77  Merge Areas  FV12  V12 = VF (PFM) (Equation 13-6 or 1.000 using Equation 13-6 or 1.000 using Equation 13-19)  Cks  Actual C  941 Exhibit 13-8	Shane Forsythe  9/15/2014  AM Peak  Freeway Number of Lanes, N  Ramp Number of Lanes, N  Acceleration Lane Length, L <sub>A</sub> Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> Ramp Volume, V <sub>R</sub> Freeway Free-Flow Speed, S <sub>FF</sub> Ramp Free-Flow Speed, S <sub>FR</sub> O pc/h Under Base Conditions  V (Veh/hr)  PHF  Terrain  458  0.85  Level  287  0.77  Level  Merge Areas  FV12  V <sub>12</sub> = V <sub>F</sub> (P <sub>FM</sub> )  (Equation 13-6 or 13-7)  1.000 using Equation (Exhibit 13-6)  559 pc/h  0 pc/h (Equation 13-14 or 13-17)  0 pc/h? Yes No  FV <sub>12</sub> /2 Yes No  pc/h (Equation 13-16, 13-18, or 13-19)  cks  Actual  Capacity  G Merge Influence Area  Actual  Max Desirable	Shane Forsythe    Shane Forsythe	Shane Forsythe   Freeway/Dir of Travel   Junction   9/15/2014   Junisdiction   AM Peak   Analysis Year	Shane Forsythe	Shane Forsythe	Shane Forsythe	Shane Forsythe

		RAMP	S AND RAM	/IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst	Shar	ne Forsythe		reeway/Dir of Tr	avel		re NB Off-r	amp		
Agency or Company Date Performed		/2014		unction urisdiction		I-15 an	d I-315			
Date Performed Analysis Time Period		/2014		unsdiction Inalysis Year		2014				
Project Description	ı FIVI F	ean		Mialysis Teal		2014				
Inputs										
•		Freeway Num	ber of Lanes, N	2						
Upstream Adj R	amp	Ramp Numbe		1					Downstrea Ramp	m Adj
□Yes □	On	l '	ane Length, L <sub>A</sub>	ı					Yes	On
✓ No	Off	Deceleration I	ane Length L <sub>D</sub>	740					✓ No	Off
		Freeway Volu	me, V <sub>F</sub>	722					<b>™</b> INO	
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	436					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>FF</sub>	65.0					· -	ln /ln
V <sub>u</sub> = ve	eh/h	1	ow Speed, S <sub>FR</sub>	55.0					V <sub>D</sub> =	veh/h
Conversion to	o nc/h llni	1	111							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>
Freeway	722	0.80	Level	10	0		952	1.00	94	
Ramp	436	0.83	Level	3	0	_	985	1.00	53	
UpStream	400	0.00	LCVCI			<del>- 0.</del>	300	1.00		
DownStream										
		Merge Areas		•				iverge Areas		
stimation of v <sub>12</sub>					Estimat	ion o	f v <sub>12</sub>			
	$V_{12} = V_F (P_{FM})$							V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	.)P-5	
l =	12 1	ation 13-6 or	13-7)		l =			Equation 13-1		١
L <sub>EQ</sub> = P =		Equation (			L <sub>EQ</sub> = P =			000 using Equ		
P <sub>FM</sub> =	_	Equation (t	_X11101( 13-0)		P <sub>FD</sub> =				iauon (Exili	JIL 13-7)
V <sub>12</sub> =	pc/h	/F 1' 10	44 - 40 47)		V <sub>12</sub> =			8 pc/h	40.44	10 17)
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	. 0.7		pc/h (Equatio	n 13-14 or	13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *			10 10 10		Is V <sub>3</sub> or V <sub>av</sub>	, <sub>34</sub> > 1.5		☐Yes ☑ No	10 10 10	10 10
If Yes,V <sub>12a</sub> =	pc/n ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	p 19	c/h (Equation	13-16, 13-	18, or 13-
Capacity Che		/			Capacit	v Ch		<i>-</i>		
	Actual		apacity	LOS F?	Jupasie	<del>,                                    </del>	Actual	Car	pacity	LOS F?
	7 101001	†	apacity .		V <sub>F</sub>		948	Exhibit 13-8	1	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V	415	Exhibit 13-8		No
▼FO		LAHIDIC 13-0			-			_		
					V <sub>R</sub>		533	Exhibit 13-10		No
Flow Entering		1			Flow Er	-		rge Influen		T
	Actual	1	Desirable	Violation?			Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		948	Exhibit 13-8	4400:All	No
Level of Serv					Level or	f Serv	<u>rice De</u>	terminatio	n (if not l	<u>5)                                    </u>
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 5$	.7 (pc/r	ni/ln)			
LOS = (Exhibit	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Detern					Speed L			on .		
					<del>                                     </del>		xhibit 13-			
M <sub>S</sub> = (Exibit 1:	•					-	(Exhibit	*		
	ibit 13-11)					-	•	· ·		
	ibit 13-11)				1	-	(Exhibit	-		
	ibit 13-13)						(Exhibit	-		
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			MPS AND	RAMP JUNG			<u>EEI</u>				
General	Inforn				Site Infor						
Analyst		Shan	e Forsythe	Fr	eeway/Dir of Tr	avel	10th Ave	NB On-rar	np		
gency or C					nction		I-15 and	I-315			
Oate Perform		9/15/			risdiction						
nalysis Tim		PM P	eak	Ar	nalysis Year		2014				
roject Desc	cription										
nputs			1								
Jpstream Ad	dj Ramp		Freeway Numb	er of Lanes, N	2					Downstre	am Adj
			Ramp Number	of Lanes, N	1					Ramp	•
Yes	☐ On		Acceleration La	ane Length, L <sub>∆</sub>	590					□Yes	☐ On
A N I a			Deceleration La	ane Length L							
✓ No	Off		Freeway Volun		490					✓ No	Off
=	ft									L <sub>down</sub> =	ft
up =	10		Ramp Volume,	1.	262					_aown	
/ <sub>u</sub> =	veh/h		Freeway Free-	Flow Speed, $S_{FF}$	65.0					V <sub>D</sub> =	veh/h
u	VC11/11		Ramp Free-Flo	w Speed, S <sub>FR</sub>	35.0						
onvers	sion to	pc/h Und	der Base C	Conditions							
(pc/h	n)	V	PHF	Terrain	%Truck	%Rv	f	HV	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
	'/	(Veh/hr)									
reeway	$\longrightarrow$	490	0.87	Level	11	0	0.9		1.00		596
Ramp		262	0.92	Level	4	0	0.9	80	1.00		290
JpStream			<del></del>				+				
DownStrear	m _		Morgo Aroso					Dis	erge Areas		
stimat	ion of		Merge Areas			Estimati	ion of		erge Areas		
.Sumat	1011 01					LSuman	1011 01				
		$V_{12} = V_{F}$	(P <sub>FM</sub> )					$V_{12} = V_{F}$	R + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
EQ =		(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(E	quation 13-	12 or 13-1	3)
) <sub>FM</sub> =		1.000	using Equati	on (Exhibit 13-6)		P <sub>FD</sub> =		us	ing Equatio	n (Exhibit 1	3-7)
12 =		596 p		,		V <sub>12</sub> =		рс		`	,
or V <sub>av34</sub>		-		3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		•	/h (Equation 1	3_14 or 13_1	17)
	> 2 700	pc/h? Yes		3-1 <del>-1</del> 01 13-17)			> 2.70	-		0 14 01 10	''')
									Yes No		
s v <sub>3</sub> or v <sub>av3</sub>	<sub>34</sub> > 1.5 " \	V <sub>12</sub> /2 □ Ye:		10 10 10					Yes No	. 10 10 1	0.40
Yes,V <sub>12a</sub> =	=	pc/n 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	•	рс 13-	/h (Equation	1 13-16, 1	3-18, or
Capacit	v Chec					Capacit	v Che		10)		
	<del>,                                    </del>	Actual	Ca	apacity	LOS F?		<u> </u>	Actual	Car	acity	LOS F?
			† Ť		1	V <sub>F</sub>			Exhibit 13-8	_	
			1 1			<u> </u>	\/		+		_
$V_{FC}$	о	886	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>		Exhibit 13-8	_	
						$V_R$			Exhibit 13-	·	
low En	nterina	Merge In	fluence A	roa	<u> </u>	Flow En	toring	Diver	e Influen	co Area	<del>_</del>
.OW LII	itering	Actual		esirable	Violation?	, IOW EII		ctual	Max Desi		Violation
V <sub>R12</sub>	_	886	Exhibit 13-8	4600:All	No	V <sub>12</sub>	<del>  ^</del>		Exhibit 13-8	14010	VIOIGIOII
					INU		[ Co::::			n /if ===4	L
			nination (i						erminatio		<u>r)</u>
1)_ =			0.0078 V <sub>12</sub> - 0.0	0021 L <sub>A</sub>					086 V <sub>12</sub> - 0.	υυ9 L <sub>D</sub>	
	.6 (pc/mi/ln	1)				$D_R = (p$	c/mi/ln	)			
R = 8.		3-2)				LOS = (E	Exhibit '	13-2)			
<sub>R</sub> = 8.	(Exhibit 13					Speed D	Detern	nination	)		
R = 8.0 OS = A		ination				<del>  '                                   </del>					
os = 8.0 <b>Speed D</b>	Determ					$D_s = (E$	:xhibit 13	-12)			
$O_R = 8.0$ $OS = A$	<b>Determ</b> 289 (Exibi	t 13-11)					xhibit 13 nh (Exhil	•			
$O_{R} = 8.0$ $OS = A$ $OS = $	<b>Determ</b> 289 (Exibi 8.3 mph (E	t 13-11) Exhibit 13-11)				S <sub>R</sub> = m <sub>l</sub>	ph (Exhil	oit 13-12)			
$O_{R} = 8.0$ $OS = A$ $OS = $	Determ 289 (Exibi 8.3 mph (Exibi 8.4 mph (Exibi	t 13-11)				$S_R = m_1$ $S_0 = m_1$	ph (Exhil ph (Exhil	•			

		RAMP	S AND RAI	//P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company		ne Forsythe		reeway/Dir of Tr	avel	10th Av I-15 an	re SB Off-r	amp		
Date Performed	9/15/	2014	J	urisdiction						
Analysis Time Period	PM F	Peak	<u> </u>	nalysis Year		2014				
Project Description										
Inputs		1								
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	2 1					Downstrea Ramp	ım Adj
□Yes	On		ane Length, L <sub>A</sub>						□Yes	□On
✓ No	Off	Freeway Volu	_ane Length L <sub>D</sub> me, V <sub>F</sub>	463 491					<b>☑</b> No	Off
L <sub>up</sub> = f	t	Ramp Volume		239					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h	1	-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	65.0 55.0					V <sub>D</sub> =	veh/h
Conversion to	pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	491	0.90	Level	14	0	0.	935	1.00	58	36
Ramp	239	0.83	Level	7	0	0.	966	1.00	29	9
UpStream						_				
DownStream		<u> </u>						\.\.\.\		
Estimation of		Merge Areas			Ectimat	iono		iverge Areas		
stimation of v <sub>12</sub>					Estimat	1011 0				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	$V_R + (V_F - V_F)$	P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Equ	ıation (Exhil	bit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		58	6 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		0	pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h?	s 🗌 No				34 > 2,7	00 pc/h?	Yes <b>☑</b> No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *								Yes ☑ No		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equation	13-16, 13-	18, or 13-
Capacity Che	cks				Capacit	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F?
					V <sub>F</sub>		586	Exhibit 13-8	4700	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	287	Exhibit 13-8	4700	No
					V <sub>R</sub>		299	Exhibit 13-10	2200	No
Flow Entering								rge Influenc		<u> </u>
TOW ZINGINI	Actual	1	Desirable	Violation?	7.01.27	-	Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		586	Exhibit 13-8	4400:All	No
Level of Serv	ice Deterr		if not F)					termination		
$D_R = 5.475 + 0.$								.0086 V <sub>12</sub> - 0.0	_	)
* *		0.0070 112	0.00027 L <sub>A</sub>		1			12 0.0	200 ED	
	,				l ''	.1 (pc/r	,			
LOS = (Exhibit							oit 13-2)			
Speed Detern	nination				Speed L					
M <sub>S</sub> = (Exibit 13	3-11)				ľ	-	xhibit 13-	*		
S <sub>R</sub> = mph (Exh	ibit 13-11)				1	-	(Exhibit	· ·		
$S_0 = mph (Exh$	ibit 13-11)				$S_0 = N$	/A mph	(Exhibit	13-12)		
S = mph (Exh	ibit 13-13)				S = 60	0.5 mph	(Exhibit	13-13)		
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			MPS AND	RAINIP JUNG							
General	Inforn				Site Infor						
nalyst		Shan	e Forsythe	Fr	eeway/Dir of Tr			/e SB On-ra	mp		
gency or Co					inction		I-15 an	d I-315			
ate Perform			2014		risdiction						
Analysis Tim		PM F	Peak	Ar	nalysis Year		2014				
roject Desc	ription										
nputs			ı							1	
Ipstream Ac	lj Ramp		Freeway Numb	er of Lanes, N	2					Downstre	am Adj
	_		Ramp Number	of Lanes, N	1					Ramp	,
Yes	☐ On		Acceleration La	ne Length, L₄	1500					□Yes	On
- L	o"		Deceleration La	,,							
✓ No	Off		Freeway Volun		630					✓ No	
_	ft		1	•						L <sub>down</sub> =	ft
up =	10		Ramp Volume,	11	384					_aown	
′ <sub>u</sub> =	veh/h		Freeway Free-	Flow Speed, $S_{FF}$	65.0					V <sub>D</sub> =	veh/h
u	VC11/11		Ramp Free-Flo	w Speed, S <sub>FR</sub>	35.0						
Convers	ion to	pc/h Und	der Base C	Conditions							
(pc/h	)	V	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
	′	(Veh/hr)									
reeway		630	0.93	Level	10	0	_	952	1.00		711
Ramp	$\longrightarrow$	384	0.94	Level	5	0	0.	976	1.00		419
JpStream			-				_				
DownStream	n		Marria Araaa					<u> </u>			
ctimati	ion of		Merge Areas			Ectimot	iono		verge Areas		
stimati		12				Estimat	ion o	1 V <sub>12</sub>			
		$V_{12} = V_{F}$	(P <sub>FM</sub> )					$V_{12} = V_{12}$	' <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
EQ =		(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(F	Equation 13-	12 or 13-1	13)
) <sub>FM</sub> =		1.000	using Equation	on (Exhibit 13-6)		P <sub>FD</sub> =		u	sing Equatio	n (Exhibit 1	3-7)
'12 =		711 p		(=:::::::::::::::::::::::;		V <sub>12</sub> =			c/h	(=	- ' /
		•		0 44 40 47)				•		2 11 12 /	17\
or V <sub>av34</sub>	. 0.700	-		3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	. 0.7	-	c/h (Equation 1	3-14 01 13-	17)
		pc/h? Ye				0 4	• •		Yes No		
s V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5 * \	/ <sub>12</sub> /2 □ Ye				Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		Yes 🗌 No		
Yes,V <sub>12a</sub> =		•		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equation	n 13-16, 1	3-18, or
Capacity		13-19)							-19)		
apacity	Criec		1 0.		1 100 50	Capacit	y Cili		1 0		1 100 50
		Actual		pacity	LOS F?	· .,	-	Actual	_	oacity	LOS F
			1 1			V <sub>F</sub>			Exhibit 13-8	5	
$V_{FC}$	,	1130	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-8	3	
			1 1			V <sub>R</sub>			Exhibit 13	-	
									10		
low En	tering		fluence A		I .a	Flow En	_		ge Influen		
		Actual		esirable	Violation?		- /	Actual	Max Desi	rable	Violation
$V_{R12}$	2	1130	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
evel of	Service	e Detern	nination (i	f not F)		Level of	Serv	ice Det	erminatio	n (if not	: <b>F</b> )
			0.0078 V <sub>12</sub> - 0.0						0086 V <sub>12</sub> - 0.		
	7 (pc/mi/ln		12	,,			oc/mi/lı		14	D	
	(Exhibit 13	-					Exhibit				
						<u> </u>			-		
peed D	eterm	ination				Speed L			TI		
	228 (Exibi	13-11)					xhibit 1	•			
1 <sub>S</sub> = 0.2		vhihit 13 11\				S <sub>R</sub> = m	ph (Exh	ibit 13-12)			
	.8 mph (E	ATTIDIT 13-11)									
S <sub>R</sub> = 59		· ·				$S_0 = m$	ph (Exh	ibit 13-12)			
R= 59 0= N/.	A mph (Ex	whibit 13-11) whibit 13-13)				ľ		ibit 13-12) ibit 13-13)			

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor		11.10				
Analyst		ne Forsythe	F	reeway/Dir of Tr		14th FF	3 Off-ramp			
Agency or Company	Onai	10 1 010/1110		unction		I-315	on ramp			
Date Performed	9/15/	2014		urisdiction		1010				
Analysis Time Period				nalysis Year		2014				
Project Description										
Inputs										
•		Freeway Num	ber of Lanes, N	2						
Upstream Adj R	amp	•							Downstrea	m Adj
□Yes □	On	Ramp Numbe		1					Ramp	
	1011	Acceleration L	ane Length, L <sub>A</sub>						Yes	On
✓ No	Off	Deceleration I	ane Length L <sub>D</sub>	503					✓ No	Off
		Freeway Volu	me, V₅	530					<b>™</b> INO	⊔Оπ
L <sub>up</sub> = fi	t	Ramp Volume		55					L <sub>down</sub> =	ft
ир		1	-Flow Speed, S <sub>FF</sub>							
V,, = V6	eh/h	1							$V_D =$	veh/h
<u> </u>			ow Speed, S <sub>FR</sub>	35.0						
Conversion to	pc/h Un	der Base	Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		$f_HV$	f <sub>p</sub>	v = V/PHF	x f <sub>uv</sub> x f <sub>n</sub>
, ,	(Veh/hr)					_		-		г
Freeway	530	0.87	Level	6	0	_	971	1.00	62	.7
Ramp	55	0.83	Level	5	0	0.	976	1.00	68	3
UpStream				<u> </u>	ļ					
DownStream		<u>.                                    </u>			<u> </u>					
<b>-</b>		Merge Areas			<b>-</b>			iverge Areas		
Estimation of	'V <sub>12</sub>				Estimat	ion o	t V <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
l = 0 =	12 1	ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		1
L <sub>EQ</sub> =							-	-		
P <sub>FM</sub> =	_	Equation (	EXHIBIT 13-0)		P <sub>FD</sub> =			000 using Equ	iation (Exnit	olt 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			27 pc/h		
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		$V_3$ or $V_{av34}$		0	pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 2,7	00 pc/h? [	☐Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5	* V <sub>12</sub> /2	Yes <b>☑</b> No		
			-16, 13-18, or		1			c/h (Equation	13-16, 13-	18, or 13-
If Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub> =	_	19		•	·
Capacity Che	cks				Capacit	y Ch	ecks			
S.	Actual	C	apacity	LOS F?	1		Actual	Cap	pacity	LOS F?
					V <sub>F</sub>		627	Exhibit 13-8	4500	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- \/	559	Exhibit 13-8	4500	No
▼FO		LAHIDIL 13-0				· VR				
					$V_R$		68	Exhibit 13-10	2000	No
Flow Entering	g Merge In	fluence A	rea		Flow Er	terin	g Dive	rge Influend	ce Area	
	Actual	Max	Desirable	Violation?		I	Actual	Max Desirab	le	Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		627	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)	<u> </u>		f Sen	rice De	termination	ı (if not l	-)
$D_R = 5.475 + 0.1$					i e			.0086 V <sub>12</sub> - 0.0	-	/
	• •	0.0070 V <sub>12</sub>	0.00027 LA					.0000 v <sub>12</sub> 0.0	503 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	,				I ''	.1 (pc/r	,			
LOS = (Exhibit '	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Detern	nination				Speed L	Deter	minatic	n		
M <sub>S</sub> = (Exibit 13					$D_s = 0$	434 (E	xhibit 13-	-12)		
-	•						(Exhibit	*		
	ibit 13-11)						-			
	ibit 13-11)				1	-	(Exhibit	-		
S = mph (Exh	ibit 13-13)				S = 49	9.4 mph	(Exhibit	13-13)		
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	R/	MPS AND	<b>RAMP JUN</b>	CTIONS W	ORKSH	EET				
General In				Site Infor						
Analyst	Sha	ane Forsythe	Fr	eeway/Dir of Tra	avel	14th St	EB On-ram	p		
gency or Comp	any		Ju	inction		I-315				
ate Performed		5/2014		risdiction						
nalysis Time Po		Peak	Ar	nalysis Year		2014				
	on I-15 Corridor	Study								
nputs		le N								
Jpstream Adj Ra	amp	•	ber of Lanes, N	2					Downstre	am Adj
Yes	10-	Ramp Numbe		1					Ramp	
_ Yes ∟	On	Acceleration L	ane Length, L <sub>A</sub>	930					□Yes	On
✓ No	Off	Deceleration L	ane Length L <sub>D</sub>							□ <b>○</b> "
		Freeway Volui	me, V <sub>F</sub>	979					✓ No	Off
<sub>up</sub> = ft		Ramp Volume		497					L <sub>down</sub> =	ft
		1	-Flow Speed, S <sub>FF</sub>	55.0						
' <sub>u</sub> = ve	eh/h	1	ow Speed, S <sub>FR</sub>	35.0					V <sub>D</sub> =	veh/h
`a mi ra ra la	40 0/b	1	. 117	35.0						
onversio	n to pc/h Ur		Conditions	1	I	1				
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f	HV	$f_p$	v = V/PHI	$= x f_{HV} x f_{p}$
reeway	979	0.83	Level	4	0	0.9	80	1.00		1205
Ramp	497	0.83	Level	3	0	0.9		1.00		608
JpStream										
DownStream										
		Merge Areas					Di	verge Areas		
stimation	of v <sub>12</sub>				Estimat	ion of	<sup>F</sup> V <sub>12</sub>			
	V <sub>12</sub> = V	(P <sub>EM</sub> )					V <sub>12</sub> = V	<sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
<sub>EQ</sub> =		uation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-		3)
FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =			sing Equatio		
' = 12		pc/h	ion (Eximple 10 0)		V <sub>12</sub> =			c/h	rr (Extinoit i	0 1 /
<sup>12</sup> ′ <sub>3</sub> or V <sub>av34</sub>		•	12 14 or 12 1 <del>7</del> \				•	c/h (Equation 1	2 14 or 12 f	17\
			13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	> 0.70	-		J-14 01 1J-	17)
	2,700 pc/h? ☐ Y							Yes No		
	1.5 * V <sub>12</sub> /2 □ Y		) 16 12 19 or		is v <sub>3</sub> or v <sub>av</sub>	34 > 1.5		Yes No	- 10 16 1	2 10 00
Yes,V <sub>12a</sub> =	pc/r 13-19		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equatio -19)	n 13-16, 1	3-18, or
Capacity C		-,			Capacit	v Che		,		
<u>, , , , , , , , , , , , , , , , , , , </u>	Actual	C	apacity	LOS F?			Actual	Car	acity	LOS F?
					V <sub>F</sub>			Exhibit 13-8	3	
W	1012	Fyb;b;t 12.0		No.	$V_{FO} = V_{F}$	- V <sub>D</sub>		Exhibit 13-8	3	
$V_{FO}$	1813	Exhibit 13-8		No		·R		Exhibit 13-		
					V <sub>R</sub>			10		
low Enter	ring Merge I	nfluence A	rea		Flow En	tering	Diver	ge Influen	ce Area	
	Actual	Max	Desirable	Violation?		A	ctual	Max Desi	rable	Violation?
$V_{R12}$	1813	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
evel of Se	ervice Deter	mination (i	if not F)		Level of	f Serv	ice Det	erminatio	n (if not	F)
	75 + 0.00734 v <sub>R</sub> +					D <sub>P</sub> = 4.	252 + 0.0	0086 V <sub>12</sub> - 0.	.009 L <sub>D</sub>	•
**	oc/mi/ln)	12	^			oc/mi/ln		12	Б	
	nibit 13-2)				1 ., "	Exhibit	•			
	· · · · · · · · · · · · · · · · · · ·									
	ermination				Speed L			71		
1 <sub>S</sub> = 0.280	(Exibit 13-11)				* ·	Exhibit 13	•			
0		١			$S_R = m$	ph (Exhi	bit 13-12)			
	nph (Exhibit 13-11	)			κ		,			
<sub>R</sub> = 51.4 n	ıph (Exhibit 13-11 ph (Exhibit 13-11)	•					bit 13-12)			
<sub>R</sub> = 51.4 n <sub>0</sub> = N/A m					$S_0 = m$	ph (Exhi	•			

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst		ne Forsythe	F	reeway/Dir of Ti		14th W	B Off-ramp	<u> </u>		
Agency or Company	Onai	io i oloyulo		unction	4701	I-315	D On rump			
Date Performed	9/15/	/2014		urisdiction						
Analysis Time Period	I AM F	Peak	А	nalysis Year		2014				
Project Description		Study								
Inputs		·								
Upstream Adj R	amp	1	ber of Lanes, N	2					Downstrea	m Adj
□Yes □	70-	Ramp Numbe	r of Lanes, N	1					Ramp	
⊔ Yes ∟	On		ane Length, L <sub>A</sub>						□Yes	On
✓ No	Off		Lane Length L <sub>D</sub>	713					✓ No	Off
ء - ا		Freeway Volu		528						ft
L <sub>up</sub> = fi	L	Ramp Volume		216					L <sub>down</sub> =	10
V,, = V6	eh/h		-Flow Speed, S <sub>FF</sub>	55.0					V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	35.0						
Conversion to	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	528	0.82	Level	1	0	0.	995	1.00	64	5
Ramp	216	0.80	Level	0	0	1.	000	1.00	26	9
UpStream										
DownStream										
<b>-</b>		Merge Areas						iverge Areas		
Estimation of	' V <sub>12</sub>				Estimat	ion o	t 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>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =		Equation (E			P <sub>FD</sub> =			000 using Equ		
V <sub>12</sub> =	pc/h	1 (	,		V <sub>12</sub> =			5 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	•	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equatio	n 12 14 or	12 17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-14 01 13-17)			<b>&gt; 2 7</b>			11 13-14 01	13-17)
								Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$ *			10 10 10		1	-		Yes ✓ No	10 10 10	10 10
If Yes,V <sub>12a</sub> =	pc/n ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	p 19	c/h (Equation	13-16, 13-	18, 01 13-
Capacity Che		/			Capacit	v Ch		,		
	Actual		apacity	LOS F?		<u>,                                    </u>	Actual	Car	pacity	LOS F?
	7.0000	İ	- aparony		V <sub>F</sub>		645	Exhibit 13-8	1	No
V		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- \/	376	Exhibit 13-8	+	_
$V_{FO}$		LAHIDIC 13-0							+	No
					V <sub>R</sub>		269	Exhibit 13-10		No
Flow Entering		1			Flow Er	-		ge Influenc		r
	Actual		Desirable	Violation?			Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		645	Exhibit 13-8	4400:All	No
Level of Serv								terminatior	•	<del>-</del> )
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 3$	.4 (pc/r	ni/ln)			
LOS = (Exhibit '	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Detern					Speed L	-		n		
					1 -		xhibit 13-			
M <sub>S</sub> = (Exibit 13	•						(Exhibit	-		
	ibit 13-11)					-	-			
• • •	ibit 13-11)				1 *	-	(Exhibit	-		
S = mph (Exh	ibit 13-13)				S = 49	9.1 mph	(Exhibit	13-13)		
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¬		MIPS AND	IVAIIII JUIN		ORKSHI	<u> </u>			
General Inform				Site Infor					
nalyst	Shan	ne Forsythe	Fr	eeway/Dir of Tr	ravel	14th St WB On	-ramp		
gency or Company				ınction		I-315			
ate Performed	9/15/			ırisdiction					
nalysis Time Period	AM P		Ar	nalysis Year		2014			
roject Description I	-15 Corridor S	tudy							
nputs									
pstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adj
		Ramp Numbe	r of Lanes, N	1				Ramp	•
☐ Yes ☐ On		Acceleration L	ane Length, L₄	505				□Yes	☐ On
- No		Deceleration I	Lane Length L						
☑ No ☐ Off		Freeway Volu		454				✓ No	Off
n = ft								L <sub>down</sub> =	ft
<sub>up</sub> = ft		Ramp Volume	11	123				-down	
u = veh/h		Freeway Free	-Flow Speed, S <sub>FF</sub>	55.0				V <sub>D</sub> =	veh/h
u VCII/II		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	35.0				١٠	
onversion to	pc/h Uno	der Base	Conditions						
Î	V	PHF		%Truck	%Rv	T f	f	v = V/PH	F x f <sub>HV</sub> x f <sub>r</sub>
(pc/h)	(Veh/hr)	<u> </u>	Terrain			f <sub>HV</sub>	f <sub>p</sub>		
reeway	454	0.76	Level	6	0	0.971	1.00		614
Ramp	123	0.80	Level	5	0	0.976	1.00		157
JpStream									
ownStream									
		Merge Areas			<b>-</b>		Diverge Areas	3	
stimation of	V <sub>12</sub>				Estimati	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> - \	/ <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Equ	ation 13-6 or	r 13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-	13)
EQ FM =			tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equat		
	614 p		HOTT (EXTIIDIT 10-0)					tion (Exhibit i	51)
12 =	•				V <sub>12</sub> =		pc/h	10.1110	4=\
<sub>3</sub> or V <sub>av34</sub>	-		13-14 or 13-17)		$V_3$ or $V_{av34}$		pc/h (Equation		17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,700							? ☐ Yes ☐ N		
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2 □ Ye	s 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>	$_{34} > 1.5 * V_{12}/2$	☐Yes ☐N	0	
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =	:	pc/h (Equat	ion 13-16, 1	3-18, or
	13-19)	)					13-19)		
Capacity Chec						v i bocke			
		т .		1	Capacity		. 1		1
apacity circ	Actual	C	Capacity	LOS F?		Actu		Capacity	LOS F
		C	Capacity	LOS F?	V <sub>F</sub>		al C		LOS F
	Actual		Capacity		V <sub>F</sub>	Actu		3-8	LOS F
V <sub>FO</sub>		Exhibit 13-8	Capacity	LOS F?	$V_F$ $V_{FO} = V_F$	Actu	Exhibit 1	3-8	LOS F
V <sub>FO</sub>	Actual 771	Exhibit 13-8			$\frac{V_F}{V_{FO} = V_F}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10	3-8 3-8 3-	
V <sub>FO</sub>	Actual 771	Exhibit 13-8			$\frac{V_F}{V_{FO} = V_F}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1	3-8 3-8 3-	LOS F
V <sub>FO</sub>	Actual 771	Exhibit 13-8			$V_{FO} = V_{FO}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{FO}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 rerge Influe	3-8 3-8 3-	
V <sub>FO</sub>	Actual 771  Merge In	Exhibit 13-8	lrea .	No	$\frac{V_F}{V_{FO} = V_F}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 rerge Influe	3-8 3-8 3- ence Area esirable	
V <sub>FO</sub>	Actual 771  Merge In Actual 771	Exhibit 13-8  offluence A  Max Exhibit 13-8	Area Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow En	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3-8 3- ance Area esirable	Violation
V <sub>FO</sub> low Entering  V <sub>R12</sub> evel of Servi	Actual 771  Merge In Actual 771  ce Determ	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow En $V_{12}$ Level of	- V <sub>R</sub> tering Div Actual  Service D	Exhibit 1 Exhibit 1 Exhibit 1 10 Ererge Influe Max De Exhibit 13-8	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> evel of Servi	771  Merge In Actual 771  Ce Detern 0.00734 v R + 0	Exhibit 13-8  offluence A  Max Exhibit 13-8	Area Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{RO} = V_{RO}$ Flow En	Actual  Tering Div  Actual  Service D  DR = 4.252 +	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub> V <sub>R12</sub> evel of Servi  D <sub>R</sub> = 5.475 + 0  R = 8.3 (pc/mi/lr	771  Merge In Actual 771  Actual 771  Ce Detern 0.00734 v R + (	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$	Actual  Tering Div  Actual  Actual  F Service D  Company Actual	Exhibit 1 Exhibit 1 Exhibit 1 10 Ererge Influe Max De Exhibit 13-8	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> evel of Servi  D <sub>R</sub> = 5.475 + 0  R <sub>R</sub> = 8.3 (pc/mi/lr  DS = A (Exhibit 1	771  Merge In Actual 771  Actual 771  Ce Detern 0.00734 v R + (	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p$ $LOS = (E$	Actual  Tering Div Actual  F Service D D R = 4.252 + D D C/mi/ln) Exhibit 13-2)	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8 Determination	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub> V <sub>R12</sub> evel of Servi  D <sub>R</sub> = 5.475 + 0  R = 8.3 (pc/mi/lr	771  Merge In Actual 771  Actual 771  Ce Detern 0.00734 v R + (	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p$ $LOS = (E$	Actual  Tering Div  Actual  Actual  F Service D  Company Actual	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8 Determination	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> evel of Servi  D <sub>R</sub> = 5.475 + 0  R <sub>R</sub> = 8.3 (pc/mi/li  DS = A (Exhibit 1)  Epeed Determ	Actual 771  Merge In Actual 771  Ce Detern 0.00734 v R + (0n) 3-2)  nination	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p + 1)$ $D_R = (E + 1)$ $D_R = (E + 1)$	Actual  Tering Div Actual  F Service D D R = 4.252 + D D C/mi/ln) Exhibit 13-2)	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8 Determination	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
$V_{FO}$ Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 0$ $C_R = 8.3 \text{ (pc/mi/lit})$ $C_S = A \text{ (Exhibit 1}$ Epeed Determination of the service of the ser	Actual 771  Merge In Actual 771  Ce Detern 0.00734 v R + (cn) 3-2)  innation  it 13-11)	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	V <sub>F</sub>   V <sub>FO</sub> = V <sub>F</sub>   V <sub>R</sub>   Flow En   V <sub>12</sub>   Level of   D <sub>R</sub> = (p   LOS = (E   Speed E   D <sub>S</sub> = (E   E   C   C   C   C   C   C   C   C	Actual  Tering Div  Actual  Actual  F Service D  D  R = 4.252 +   C/mi/ln)  Exhibit 13-2)  Determinate  xhibit 13-12)	Exhibit 1 Exhibit 1 Exhibit 1 10 Exerge Influe Max De Exhibit 13-8 Determination  tion	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> evel of Servi  D <sub>R</sub> = 5.475 + 0  R = 8.3 (pc/mi/lr  DS = A (Exhibit 1)  Flowed Determing  S = 0.294 (Exibuse  R = 51.2 mph (Exibuse)	771  Merge In Actual 771  Ce Detern 0.00734 v R + 0 n) 3-2)  Innation it 13-11)  Exhibit 13-11)	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ $D_S = (E)$ $D_S = (E)$ $D_S = (E)$ $D_S = (E)$ $D_S = (E)$	Actual  - V <sub>R</sub> Actual  F Service D  C (mi/ln)  Exhibit 13-2)  Determinate  xhibit 13-12)  ph (Exhibit 13-1	Exhibit 1 Exhibit 1 Exhibit 1 10 Exhibit 1 10 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 1	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation
V <sub>FO</sub>   V <sub>FO</sub>   V <sub>R12</sub>     V <sub>R12</sub>     V <sub>R12</sub>     V <sub>R12</sub>     V <sub>R12</sub>     V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R12</sub>   V <sub>R</sub>	Actual 771  Merge In Actual 771  Ce Detern 0.00734 v R + (cn) 3-2)  innation  it 13-11)	Exhibit 13-8  offluence A  Max Exhibit 13-8  mination (	Area Desirable 4600:All	No Violation?	$\begin{array}{c} V_F \\ V_{FO} = V_F \\ V_R \end{array}$ $\begin{array}{c} Flow \ En \\ V_{12} \\ Level \ of \\ I \\ D_R = (p \\ LOS = (E \\ Speed \ E \\ S_R = m \\ S_0 = m \end{array}$	Actual  Tering Div  Actual  Actual  F Service D  D  R = 4.252 +   C/mi/ln)  Exhibit 13-2)  Determinate  xhibit 13-12)	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max Do Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- 2nce Area esirable ion (if not	Violation

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst		ne Forsythe	F	reeway/Dir of Tr		14th FF	3 Off-ramp			
Agency or Company	Onai	10 1 010/1110		unction		I-315	on ramp			
Date Performed	9/15/	2014		urisdiction						
Analysis Time Period	PM F	Peak	Α	nalysis Year		2014				
Project Description	I-15 Corridor S	Study								
Inputs										
Upstream Adj R	amp	-	ber of Lanes, N	2					Downstrea	m Adj
□Yes □	On	Ramp Numbe		1					Ramp	
	1011	Acceleration L	ane Length, L <sub>A</sub>						☐Yes	On
✓ No	Off	Deceleration I	ane Length L <sub>D</sub>	503					✓ No	Off
		Freeway Volu	me, V <sub>F</sub>	675						
L <sub>up</sub> = fi		Ramp Volume	e, V <sub>R</sub>	183					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>FF</sub>	55.0						1.0
$V_u = V_0$	eh/h	1	ow Speed, S <sub>FR</sub>	35.0					V <sub>D</sub> =	veh/h
Conversion to	no/h Hn		111	00.0						
Conversion to	y <b>pc/ii on</b> t	der base	Conditions	Т	ī		<u> </u>			
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	$x f_{HV} x f_{p}$
Freeway	675	0.83	Level	4	0	0.	980	1.00	83	0
Ramp	183	0.94	Level	3	0	_	985	1.00	19	
UpStream		100		<del>                                     </del>	<u> </u>	+ *				
DownStream				1						
		Merge Areas						iverge Areas		
Estimation of	V <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P )			<del> </del>			V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	\P	
		1 141	12 7)		-					
L <sub>EQ</sub> =		ation 13-6 or			L <sub>EQ</sub> =			Equation 13-1		
P <sub>FM</sub> =	_	Equation (	=XNIDIT 13-6)		P <sub>FD</sub> =			000 using Equ	ation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		83	0 pc/h		
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		$V_3$ or $V_{av34}$		0	pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 2,7	00 pc/h? [	☐Yes 🗹 No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	, <sub>34</sub> > 1.5	* V <sub>12</sub> /2	]Yes ☑ No		
If Yes,V <sub>12a</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>	=	р	c/h (Equation	13-16, 13-	18, or 13-
1	13-19)						19	9)		
Capacity Che	cks				Capacit	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Car	pacity	LOS F?
					V <sub>F</sub>		830	Exhibit 13-8	4500	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	632	Exhibit 13-8	4500	No
10					V <sub>R</sub>		198	Exhibit 13-10	+	No
Class Cotorins	. Maraa Ir	fluoroo 1								110
Flow Entering		1		Violetian	FIOW ET	-	<del>-</del>	rge Influenc		Violetiano
\ <u>'</u>	Actual		Desirable	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		830	Exhibit 13-8	4400:All	No
Level of Serv								terminatior	•	-)
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0.	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 6$	.9 (pc/r	ni/ln)			
LOS = (Exhibit '	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Detern					Speed L			n		
					<del>  '                                   </del>		xhibit 13-			
M <sub>S</sub> = (Exibit 13	•				ľ	-		-		
$S_R^=$ mph (Exh	ibit 13-11)					-	(Exhibit	*		
$S_0 = mph (Exh$	ibit 13-11)				$S_0 = N$	/A mph	(Exhibit 1	13-12)		
	ibit 13-13)				S = 49	9.2 mph	(Exhibit	13-13)		
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	KAI	MPS AND	RAMP JUN	CTIONS W	ORKSH	EET				
General Infort				Site Infor						
Analyst	Shan	ne Forsythe	Fr	eeway/Dir of Tr		14th St E	B On-ramp	)		
Agency or Company			Ju	ınction		I-315				
ate Performed	9/15/			ırisdiction						
nalysis Time Period			Ar	nalysis Year		2014				
roject Description	I-15 Corridor S	tudy								
nputs		<del>L</del>								
Jpstream Adj Ramp		1	ber of Lanes, N	2					Downstre	am Adj
		Ramp Numbe	r of Lanes, N	1					Ramp	
☐ Yes ☐ On		Acceleration L	ane Length, L <sub>A</sub>	930					Yes	On
☑ No ☐ Off	;	Deceleration L	ane Length L <sub>D</sub>							_
		Freeway Volu	me, V <sub>F</sub>	1044					✓ No	Off
<sub>up</sub> = ft		Ramp Volume		523					L <sub>down</sub> =	ft
-r			-Flow Speed, S <sub>FF</sub>	55.0						
$v_{\rm u} = {\rm veh/h}$			ow Speed, S <sub>FR</sub>	35.0					$V_D =$	veh/h
2	//-		* 110	33.0						
Conversion to	T -	ger Base (	Conditions	<u> </u>	ı	1				
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f⊦	IV	$f_p$	v = V/PHI	$x f_{HV} x f_{p}$
reeway	1044	0.90	Level	3	0	0.98	5	1.00		177
Ramp	523	0.94	Level	1	0	0.99		1.00		559
JpStream		1		· ·	<u> </u>	1 0.00	<del>*  </del>			
DownStream										
		Merge Areas					Div	erge Areas		
stimation of	V <sub>12</sub>				Estimat	ion of	v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>40</sub> = V <sub>5</sub>	+ (V <sub>F</sub> - V <sub>R</sub> )	P <sub>ED</sub>	
=		ation 13-6 or	13-7)		l =			quation 13-		3)
EQ =					L <sub>EQ</sub> = D -			-		
) <sub>FM</sub> =			ion (Exhibit 13-6)		P <sub>FD</sub> =			ing Equation	II (EXIIIDIL I	5-7)
12 =	1177	•			V <sub>12</sub> =		рс			_,
or V <sub>av34</sub>	-		13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	0 =00	-	/h (Equation 1	3-14 or 13-1	7)
s $V_3$ or $V_{av34} > 2,70$								Yes 🗌 No		
ls V <sub>3</sub> or V <sub>av34</sub> > 1.5 *					Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5 *		Yes 🗌 No		
Yes,V <sub>12a</sub> =	pc/h ( 13-19)		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	рс 13-	/h (Equatior	า 13-16, 1	3-18, or
Capacity Che		)			Capacit	v Che		19)		
capacity cire	Actual		apacity	LOS F?	Capacit	y Cried	Actual	Can	acity	LOS F?
	Actual	<del>t ĭ</del>	apacity	L001:	V <sub>F</sub>		Actual	Exhibit 13-8		LOGIE
						.,		+	+	+
	1736	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>		Exhibit 13-8		
$V_{FO}$	1							Exhibit 13-	•	
$V_{FO}$					$V_R$			I 10		1
	Morgo In	fluonco	roa			toring	Divoro	10	co Aros	
				Violation?		_		e Influen		
Flow Entering	Actual	Max	Desirable	Violation?	Flow En	_	tual	e Influen Max Desi		Violation?
Flow Entering V <sub>R12</sub>	Actual 1736	Max Exhibit 13-8	Desirable 4600:All	Violation?	Flow En	Ac	tual	Max Desir Exhibit 13-8	rable	Violation'
Flow Entering  V <sub>R12</sub> .evel of Servi	Actual 1736 ice <b>Detern</b>	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow En	f Servi	tual   ce Dete	Max Desi Exhibit 13-8	rable n (if not	Violation?
V <sub>R12</sub> .evel of Servi	Actual 1736 ice Detern 0.00734 v <sub>R</sub> + (	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow En	Acordinate Acordinate	tual	Max Desir Exhibit 13-8	rable n (if not	Violation'
Flow Entering $V_{R12}$ Evel of Serving $D_{R} = 5.475 + 12.9 \text{ (pc/m)}$	Actual 1736 <b>ice Detern</b> 0.00734 v <sub>R</sub> + 0 i/ln)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow En	F Servi D <sub>R</sub> = 4.2 pc/mi/ln)	ce Dete	Max Desi Exhibit 13-8	rable n (if not	Violation'
Flow Entering $V_{R12}$ Evel of Serving $D_{R} = 5.475 + 12.9 \text{ (pc/m)}$	Actual 1736 <b>ice Detern</b> 0.00734 v <sub>R</sub> + 0 i/ln)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow En	Acordinate Acordinate	ce <b>Dete</b>	Max Desi Exhibit 13-8	rable n (if not	Violation'
Flow Entering $V_{R12}$ Level of Serving $D_R = 5.475 + 12.9 \text{ (pc/m)}$ $OS = B \text{ (Exhibit)}$	Actual 1736 ice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow En	Acordan Acorda	tual	Max Desi Exhibit 13-8 ermination 086 V <sub>12</sub> - 0.	rable n (if not	Violation'
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0.0$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$ $D_R = 12.9 \text{ (pc/m)}$	Actual 1736 ice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow En	Acordan Acorda	tual	Max Desi Exhibit 13-8 ermination 086 V <sub>12</sub> - 0.	rable n (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 12.9 \text{ (pc/m}$ $OS = B \text{ (Exhibit } C)$ Speed Determ $S_1 = 0.278 \text{ (Exit)}$	Actual 1736  ice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2) inination bit 13-11)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		V <sub>12</sub>   Level of     D <sub>R</sub> = (p   LOS = (E   Speed L   D <sub>S</sub> = (E   C   C   C   C   C   C   C   C   C	F Servi  D <sub>R</sub> = 4.2  oc/mi/ln)  Exhibit 1  Determ  Exhibit 13-	tual	Max Desi Exhibit 13-8 ermination 086 V <sub>12</sub> - 0.	rable n (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 12.9 \text{ (pc/m}$ $OS = B \text{ (Exhibit } 3.5 $	Actual 1736  ice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2) nination  bit 13-11) Exhibit 13-11)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		Flow End of $V_{12}$ Level of $D_R = (p_1)^2$ LOS = $(E_1)^2$ Speed L $D_S = (E_2)^2$ S <sub>R</sub> = $(E_1)^2$ m	Accommodition Ac	tual	Max Desi Exhibit 13-8 ermination 086 V <sub>12</sub> - 0.	rable n (if not	Violation?
V <sub>R12</sub> <b>evel of Serv</b> D <sub>R</sub> = 5.475 +  R = 12.9 (pc/m  OS = B (Exhibit of Speed Detern  Speed Detern  R = 0.278 (Exit of Serve)  R = 51.4 mph (Exit of Serve)  OF = N/A mph (Exit of Serve)	Actual 1736  ice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2) inination bit 13-11)	Max Exhibit 13-8	Desirable 4600:All <b>if not F</b> )		V <sub>12</sub>   Level of     V <sub>12</sub>   Level of     V <sub>13</sub>       LOS = (E   Speed L   S <sub>R</sub> = m   S <sub>0</sub> = m   S <sub>0</sub> = m	F Servi  D <sub>R</sub> = 4.2  oc/mi/ln)  Exhibit 1  Determ  Exhibit 13-	tual	Max Desi Exhibit 13-8 ermination 086 V <sub>12</sub> - 0.	rable n (if not	Violation'

		RAMP	S AND RAI	MP JUNCTI	ONS WO	ORKS	HEET			
General Infor	mation		- / IVAI	Site Infori						
Analyst Agency or Company Date Performed		e Forsythe	•	Freeway/Dir of Tra Junction Jurisdiction		14th W I-315	B Off-ramp	)		
Analysis Time Period				Analysis Year		2014				
Project Description		tudy		•						
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2 1					Downstrea Ramp	am Adj
□Yes □	On	Acceleration L	ane Length, L <sub>A</sub>	·					□Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	713 1279					☑No	Off
L <sub>up</sub> = fi	t	Ramp Volume	e, V <sub>R</sub>	792					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h		-Flow Speed, S <sub>FI</sub> low Speed, S <sub>FR</sub>	<sub>F</sub> 55.0 35.0					V <sub>D</sub> =	veh/h
Conversion to	pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	1279	0.91	Level	3	0	0.	985	1.00	14	27
Ramp	792	0.99	Level	2	0	0.	990	1.00	8	10
UpStream										
DownStream		l l Verge Areas			-			iverge Areas	<u> </u>	
Estimation of		vicige Alcas			Estima	tion o	f v	iverge Areas		
		/ D \							\D	
	$V_{12} = V_F$		40.7)		_			V <sub>R</sub> + (V <sub>F</sub> - V	–	,
L <sub>EQ</sub> =		tion 13-6 or			L <sub>EQ</sub> =		-	Equation 13-1		-
P <sub>FM</sub> =	_	Equation (	Exhibit 13-6)		P <sub>FD</sub> =			000 using Eq	uation (Exhi	bit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			27 pc/h		
$V_3^{}$ or $V_{av34}^{}$		-	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equation	on 13-14 o	13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$ *					Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 1.5		☐Yes ☑ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub>	=		c/h (Equation	13-16, 13	-18, or 13-
Capacity Che	13-19)				Capacit		ocks	9)		
Capacity Cite	Actual		apacity	LOS F?	Capacit	ly CII	Actual	Ca	pacity	LOS F?
	7 totaar	Ì	rapaoity	2001:	V <sub>F</sub>		1427	Exhibit 13-		No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{I}$		617	Exhibit 13-	_	No
*FO		LXIIIDIL 13-0			-			Exhibit 13-1		
	<u> </u>	<u> </u>	i		V <sub>R</sub>		810			No
Flow Entering		ir .		Violetian	Flow El			rge Influen		Violeties
V	Actual		Desirable	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Actual	Max Desiral	1	Violation?
V <sub>R12</sub>	. 5 .	Exhibit 13-8	· · · · · · · ·		V <sub>12</sub>		1427	Exhibit 13-8	4400:All	No No
Level of Serv								terminatio	•	F)
D <sub>R</sub> = 5.475 + 0.		0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>					.0086 V <sub>12</sub> - 0.	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln					I ''	0.1 (pc	•			
LOS = (Exhibit '	13-2)				LOS = B	(Exhil	oit 13-2)			
Speed Detern	nination				Speed I	Deter	minatio	n		
M <sub>S</sub> = (Exibit 13	3-11)				$D_s = 0$	.501 (E	xhibit 13-	-12)		
-	ibit 13-11)				S <sub>R</sub> = 4	8.5 mph	(Exhibit	13-12)		
	ibit 13-11)				$S_0 = N$	I/A mph	(Exhibit	13-12)		
	ibit 13-13)				1	8.5 mph	(Exhibit	13-13)		
Copyright © 2012 Unive	ersity of Florida, A	All Rights Reser	ved		HCS2010 <sup>TN</sup>			· · · · · · · · · · · · · · · · · · ·	enerated: 9/15	5/2014 9:48 A

		MPS AND	RAMP JUN			EET				
General Info				Site Infor						
Analyst		ne Forsythe		eeway/Dir of Tr	avel	14th St W	/B On-ran	пр		
gency or Company				ınction		I-315				
ate Performed		/2014		ırisdiction						
nalysis Time Perio			Ar	nalysis Year		2014				
roject Description	I-15 Corridor S	Study								
nputs									í	
pstream Adj Ramp	)	Freeway Num	ber of Lanes, N	2					Downstre	am Adj
		Ramp Number	r of Lanes, N	1					Ramp	-
☐ Yes ☐ O	n	Acceleration L	ane Length, L₄	505					□Yes	On
ZN- DO	££	Deceleration L	ane Length L							
✓ No □ O	П	Freeway Volui		646					✓ No	Off
= ft									L <sub>down</sub> =	ft
<sub>up</sub> = ft		Ramp Volume	11	173					down	.,
'u = veh/l	h	Freeway Free	-Flow Speed, S <sub>FF</sub>	55.0					V <sub>D</sub> =	veh/h
u VOIII	•	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	35.0						
conversion	to pc/h Un	der Base (	Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f <sub>H</sub>	,	fp	v = V/PHI	
	(Veh/hr)							г		
reeway	646	0.93	Level	5	0	0.97		1.00		712
Ramp	173	0.99	Level	1	0	0.99	5	1.00		176
JpStream		$\longrightarrow$								
)ownStream										
- 41 41		Merge Areas			F - 4' 4	·	Di	verge Areas		
stimation o	τν <sub>12</sub>				Estimat	ion of	v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> = V	' <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
EQ =	(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		 (E	Equation 13-	12 or 13-1	3)
FM =			ion (Exhibit 13-6)	1	P <sub>FD</sub> =			· sing Equatio		
-M - 12 =	712 p		ion (Exhibit 10 0)		V <sub>12</sub> =			c/h	TT (EXITIDIT T	0 1 )
	•		40.44 40.47						0.44 40.4	. <del></del>
<sub>3</sub> or V <sub>av34</sub>	-		13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>			c/h (Equation 1	3-14 or 13-1	17)
s $V_3$ or $V_{av34} > 2.7$								Yes 🗌 No		
s $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av</sub>	, <sub>34</sub> > 1.5 * '		Yes □ No		
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equatio	n 13-16, 1	3-18, or
	13-19)	)						-19)		
Capacity Ch		<del></del>		1	Capacit	y Chec		1 ^		1
	Actual		apacity	LOS F?	<del>  ,</del>		Actual		oacity	LOS F
					$V_{F}$			Exhibit 13-8	3	
$V_{FO}$	888	Exhibit 13-8		No	$V_{FO} = V_{F}$	-V <sub>R</sub>		Exhibit 13-8	3	
FO					V <sub>R</sub>			Exhibit 13-	- [	
	<u> </u>							10		
low Enterin	g Merge In	<u>ifluence A</u>	rea		Flow Er	ntering	Diver	ge Influen		
	Actual	<del> </del>	Desirable	Violation?		Ac	tual	Max Desi	rable	Violation
V <sub>R12</sub>	888	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
	vice Detern	nination (i	if not F)		Level of	f Servi	ce Det	erminatio	n (if not	<i>F</i> )
	+ 0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			$D_{D} = 4.2$	252 + 0.0	0086 V <sub>12</sub> - 0.	.009 L <sub>D</sub>	
		12	Α			oc/mi/ln)		12	U	
D <sub>R</sub> = 5.475 -	ı/ln)					,	2 2)			
$D_{R} = 5.475 - 6.475 - 6.475 = 0.2 \text{ (pc/m}$	=				LOS = (E	Exhibit 1	o-∠)			
$D_R = 5.475 - 6$ $D_R = 9.2 \text{ (pc/m)}$ DS = A  (Exhibit)	t 13-2)									
$D_R = 5.475 - 6.475 - 6.475 = 9.2 \text{ (pc/m}$	t 13-2)				Speed L	Determ	inatio	n		
$D_R = 5.475 - 6$ $D_R = 9.2 \text{ (pc/m}$ $D_R = 0.2 \text{ (pc/m}$ $D_R = 0.4 \text{ (Exhibit)}$	t 13-2) <b>mination</b>				Speed L	<b>Determ</b> Exhibit 13-		n		
$D_R = 5.475 - 6$ $D_R = 9.2 \text{ (pc/m}$ $DS = A \text{ (Exhibit)}$ $DS = A \text{ (Exhibit)}$ $DS = A \text{ (Exhibit)}$ $DS = A \text{ (Exhibit)}$ $DS = A \text{ (Exhibit)}$ $DS = A \text{ (Exhibit)}$	t 13-2) <b>mination</b> tibit 13-11)				<b>Speed L</b> D <sub>s</sub> = (E		12)	n		
$D_{R} = 5.475 - 6$ $D_{R} = 9.2 \text{ (pc/m}$ $D_{S} = A \text{ (Exhibit)}$ $D_{S} = A \text{ (Exhibit)}$ $D_{S} = 0.295 \text{ (Exhibit)}$ $D_{R} = 0.295 \text{ (Exhibit)}$	t 13-2)  mination  tibit 13-11)  (Exhibit 13-11)				$\begin{array}{ccc} \textbf{Speed L} \\ \textbf{D}_{s} = & \textbf{(E} \\ \textbf{S}_{R} = & \textbf{m} \end{array}$	Exhibit 13- nph (Exhib	12) t 13-12)	n		
$D_R = 5.475$ $R_R = 9.2 \text{ (pc/m}$ $DS = A \text{ (Exhibit)}$ $CS = Deter$ $DS = 0.295 \text{ (Exhibit)}$	t 13-2) <b>mination</b> tibit 13-11)				$\begin{array}{ccc} \textbf{Speed L} \\ \textbf{D}_{\text{S}} = & (\textbf{E} \\ \textbf{S}_{\text{R}} = & \textbf{m} \\ \textbf{S}_{\text{0}} = & \textbf{m} \end{array}$	Exhibit 13-	12) t 13-12) t 13-12)	n		

		RAMP	S AND RAN	/IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation	2 w 11911		Site Infor			<b>-</b> •			
Analyst Agency or Company	Shan	e Forsythe	J	reeway/Dir of Tra		Central	Ave NB O	ff		
Date Performed	9/9/2			lurisdiction		2014				
Analysis Time Period Project Description				Analysis Year		2014				
Inputs	1-13 Corridor 3	luuy								
-		Freeway Num	ber of Lanes, N	2					T	
Upstream Adj R	_	Ramp Numbe		1					Downstrea Ramp	am Adj
∐Yes L	J On		ane Length, L <sub>A</sub>	4000					□Yes	On
✓ No	Off	Freeway Volu	Lane Length L <sub>D</sub> me, V <sub>E</sub>	1388 321					<b>☑</b> No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	192					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 45.0					V <sub>D</sub> =	veh/h
Conversion to	o nc/h Una		111	10.0						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	T	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	321	0.89	Level	14	0	0	935	1.00		86
Ramp	192	0.83	Level	10	0		952	1.00		44
UpStream	102	0.00	20701	.,	Ť	<del>  "</del>	002	1.00	<u> </u>	
DownStream										
		Merge Areas						iverge Areas		
Estimation of	<sup>f</sup> v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )					V <sub>12</sub> =	· V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>D</sub> )P <sub>CD</sub>	
L <sub>EQ</sub> =		tion 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-		3)
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =			000 using Ed		-
V <sub>12</sub> =	pc/h	Equation (	EXHIBIT 10 0)		V <sub>12</sub> =			86 pc/h	luation (Exi	ibit 10 1)
v <sub>12</sub> V <sub>3</sub> or V <sub>av34</sub>	•	Equation 12	-14 or 13-17)		I '-			•	an 12 11 a	~ 10 17)
v <sub>3</sub> or v <sub>av34</sub> Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-14 01 13-17)		V <sub>3</sub> or V <sub>av34</sub>	× 2 7		pc/h (Equati		1 13-17)
								Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$			16 12 19 or					Yes ☑ No		10 or 12
If Yes,V <sub>12a</sub> =	13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	:	р 19	c/h (Equation 9)	1 13-10, 13	- 10, 01 13-
Capacity Che					Capacity	v Ch		- /		
, ,	Actual		Capacity	LOS F?	1		Actual	С	apacity	LOS F?
					V <sub>F</sub>		386	Exhibit 13-	<del></del>	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	142	Exhibit 13-	8 4700	No
					$V_R$		244	Exhibit 13-	10 2100	No
Flow Entering	a Merae In	fluence A	\rea	-	Flow En	terin	a Dive	rge Influer	ce Area	<del>-</del>
	Actual		Desirable	Violation?	<u> </u>	_	Actual	Max Desira		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		386	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)	•	Level of	Ser	/ice De	terminatio	n (if not	<del>.</del> F)
D <sub>R</sub> = 5.475 + 0.								.0086 V <sub>12</sub> - 0		,
D <sub>R</sub> = (pc/mi/ln		12	A			.9 (pc/		12	D	
LOS = (Exhibit					l ''		oit 13-2)			
•						•	•	<u> </u>		
Speed Detern					Speed D					
M <sub>S</sub> = (Exibit 1:					1 -		xhibit 13-	-		
	nibit 13-11)					-	(Exhibit	-		
	nibit 13-11)				l *	-	(Exhibit	•		
S = mph (Exh	nibit 13-13)				L		(Exhibit	13-13)		
Copyright © 2012 Unive	ersity of Florida, A	All Rights Reser	ved		HCS2010 <sup>™</sup>	<sup>1</sup> Versi	on 6.41	(	Generated: 9/9	9/2014 8:21 AI

0		WPS AND	KAMP JUN	CTIONS W		<u> </u>			
General Infor				Site Infor			_		
Analyst	Shan	e Forsythe		reeway/Dir of Tra	avel	Central Ave NB	On		
Agency or Company Date Performed	9/9/2	014		ınction ırisdiction					
nalysis Time Period				nalysis Year					
Project Description				,					
nputs		•							
Jpstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adi
potroum ray ramp		Ramp Numbe	r of Lanes, N	1				Ramp	anninaj
☐ Yes ☐ On		Acceleration L	ane Length, L	1491				□Yes	On
✓ No 🔲 Off			ane Length L						_
✓ No ☐ Off		Freeway Volu		200				✓ No	Off
<sub>up</sub> = ft		Ramp Volume	'	50				L <sub>down</sub> =	ft
ир			-Flow Speed, S <sub>FF</sub>	65.0					
$v_{\rm u} = {\rm veh/h}$			• • • • • • • • • • • • • • • • • • • •					$V_D =$	veh/h
)	//-		ow Speed, S <sub>FR</sub>	55.0					
Conversion to	y pc/n Und		Conditions	1	1	1	1		
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHI	$F \times f_{HV} \times f_{p}$
reeway	200	0.83	Level	7	0	0.966	1.00		249
Ramp	50	0.74	Level	40	0	0.833	1.00		82
JpStream									
DownStream									
atimatian af		Merge Areas			Fatimati		Diverge Areas		
stimation of					Esumau	on of v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	· V <sub>R</sub> + (V <sub>F</sub> - V	' <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 13	3-12 or 13-1	13)
<sub>FM</sub> =	1.000	using Equat	ion (Exhibit 13-6)	)	P <sub>FD</sub> =		using Equat	ion (Exhibit 1	3-7)
12 =	249 p	c/h			V <sub>12</sub> =		pc/h		
or V <sub>av34</sub>	0 pc/l	h (Equation	13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	13-14 or 13-	17)
s $V_3$ or $V_{av34} > 2,70$	0 pc/h? Ye	s 🗹 No				<sub>34</sub> > 2,700 pc/h?	☐Yes ☐ No	0	
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						,, <sub>34</sub> > 1.5 * V <sub>12</sub> /2			
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =	·-	pc/h (Equati		3-18, or
	13-19)						13-19)		
Capacity Che		1 -		1	Capacity	/ Checks			1
	Actual		apacity	LOS F?		Actua		apacity	LOS F
					V <sub>F</sub>		Exhibit 13		
$V_{FO}$	331	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13		
					V <sub>R</sub>		Exhibit 1 10	3-	
low Entering	Morgo In	fluence A	roa		Flow En	tering Dive		nce Area	<u> </u>
TOW LINCINIS	Actual	1	Desirable	Violation?	10W EII	Actual	Max De		Violation
V <sub>R12</sub>	331	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
evel of Servi	ice Detern					Service D			· F)
	0.00734 v <sub>R</sub> + 0					$D_R = 4.252 + 0$			- /
<sub>R</sub> = -1.3 (pc/mi		3.3070 V <sub>12</sub> 3.5	20027 L <sub>A</sub>			c/mi/ln)	······································	o.ooo 2 <sub>D</sub>	
	•								
OS = A (Exhibit	<u> </u>				-	xhibit 13-2)	· · · · · · · · · · · · · · · · · · ·		
Speed Detern					<del></del>	eterminati	on		
1 <sub>S</sub> = 0.162 (Exit	•				,	xhibit 13-12)			
<sub>R</sub> = 61.3 mph (	Exhibit 13-11)				1,	oh (Exhibit 13-12	-		
					S <sub>0</sub> = mp	oh (Exhibit 13-12	))		
<sub>0</sub> = N/A mph (E	xhibit 13-11)				<b>r</b> 0 '''	JII (LAIIIDIL 10-12	•)		
	Exhibit 13-11)				1 -	oh (Exhibit 13-13	-		

	RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
mation	2 mmi								
Shan		Jı	reeway/Dir of Tra		Central	Ave SB O	ff		
				,	0044				
		A	naiysis Year		2014				
1-13 COITIGOL S	luuy								
	Freeway Num	her of Lanes N	2					ĺ	
amp			1					Downstre Ramp	am Adj
On		- 1						□Yes	On
Off		5						☑ No	Off
			136					L <sub>down</sub> =	ft
eh/h								V <sub>D</sub> =	veh/h
nc/h l/n/		111	43.0						
V			%Truck	%Rv		funz	f_	v = V/PHF	X funz X f
					_		· ·	<b>-</b>	ну р 45
					_				62
100	0.00	LOVOI		<u> </u>	+	300	1.00	<u>'</u>	<u> </u>
					1				
	Merge Areas						iverge Areas		
v <sub>12</sub>				Estimati	on o	f v <sub>12</sub>			
V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	<sub>R</sub> )P <sub>ED</sub>	
		13-7)		L <sub>EO</sub> =					3)
							-		-
_		,						•	,
•	Equation 13	-14 or 13-17)					•	on 13-14 o	r 13-17)
	-	,			, > 2,70				,
pc/h (	Equation 13	-16, 13-18, or				р	c/h (Equation	า 13-16, 13	-18, or 13-
				Capacity	/ Che		-,		
Actual	C	apacity	LOS F?	<u> </u>		Actual	C	apacity	LOS F?
				V <sub>F</sub>		445	Exhibit 13-	8 4700	No
	Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	283	Exhibit 13-	8 4700	No
				V <sub>R</sub>		162	Exhibit 13-	10 2100	No
Merge In	fluence A	rea		Flow En	terin	g Dive	rge Influer	ce Area	
Actual	Max	Desirable	Violation?		ļ	Actual	Max Desira	ble	Violation?
	Exhibit 13-8			V <sub>12</sub>	4	445	Exhibit 13-8	4400:All	No
ice Detern	nination (	if not F)		Level of	Serv	vice De	terminatio	n (if not	F)
00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			O <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
)				D <sub>R</sub> = -2.5	2 (pc/	mi/ln)			
3-2)				LOS = A	(Exhib	oit 13-2)			
nination				Speed D	eteri	minatio	n		
				<del>                                     </del>		xhibit 13-			
3-11)					,		,		
3-11) ihit 13-11)					.8 mph	(Exhibit	13-12)		
ibit 13-11)				S <sub>R</sub> = 57.	-	(Exhibit	-		
				$S_{R} = 57.$ $S_{0} = N/R$	A mph	(Exhibit (Exhibit (Exhibit	13-12)		
	9/9/2  AM F  I-15 Corridor S  amp  On  Off  t  eh/h  O pc/h Und  V (Veh/hr)  334  136  V12  V12 = VF (Equal using pc/h pc/h (0 pc/h?  Yee pc/h (13-19))  Cks  Actual	Shane Forsythe  9/9/2014 AM Peak  I-15 Corridor Study   amp Freeway Num Ramp Numbe Acceleration L Freeway Volu Ramp Volume Ramp Free-Fl D pc/h Under Base (V) (Veh/hr) PHF 334 0.83 136 0.85  Merge Areas  FV12  V12 = VF (PFM) (Equation 13-6 or using Equation (Epc/h pc/h (Equation 13-6 or using Equation (Epc/h pc/h (Equation 13-13-19)  CKS  Actual CM Actual	Shane Forsythe  Shane Forsythe  9/9/2014  AM Peak  A  I-15 Corridor Study  Shamp  Freeway Number of Lanes, N  Ramp Number of Lanes, N  Acceleration Lane Length, L  Deceleration Lane Length, L  Freeway Volume, V  Ramp Volume, V  Ramp Free-Flow Speed, S  Ramp Free-Flow Speed, S  Ph/h  PHF  Terrain  334  0.83  Level  136  0.85  Level  Merge Areas  FV12  V12 = V  V12 = V  (Equation 13-6 or 13-7)  using Equation (Exhibit 13-6)  pc/h  pc/h (Equation 13-14 or 13-17)  0 pc/h? Yes No  13-19)  Cks  Actual  Capacity  Exhibit 13-8  ice Determination (if not F)  00734 v  R + 0.0078 V12 - 0.00627 L  A)  13-2)	Site Information	Site Information   Shane Forsythe   Freeway/Dir of Travel   Junction   Shane Forsythe   Freeway/Dir of Travel   Junction   Shane Forsythe   Freeway/Dir of Travel   Junction   Shane Forsythe   Junction   Jurisdiction   Am Peak   Analysis Year   Shane Foreway Number of Lanes, N   2   Ramp Number of Lanes, N   1   Acceleration Lane Length, L <sub>A</sub>   Dordon   Deceleration Lane Length L <sub>D</sub>   1144   Freeway Volume, V <sub>F</sub>   334   Ramp Volume, V <sub>F</sub>   334   Ramp Volume, V <sub>F</sub>   136   Freeway Free-Flow Speed, S <sub>FF</sub>   65.0   Ramp Free-Flow Speed, S <sub>FR</sub>   45.0   Dordon   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Free Flow Speed, S <sub>FR</sub>   45.0   Dordon   Shane Fr	Site   Information   Shane Forsythe   Freeway Dir of Travel   Junction   J	Shane Forsythe	Site Information	Stane Forsythe   Freeway/Dir of Travel   Central Ave SB Off   Junction

9/9/2014

0		MPS AND	RAMP JUN			ELI			
General Infor				Site Inform			_		
Analyst	Shan	e Forsythe		eeway/Dir of Tra	avel	Central Ave SB (	On		
gency or Company ate Performed	9/9/2	014		ınction ırisdiction					
nalysis Time Period				nalysis Year					
roject Description				,					
nputs		•							
pstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adi
potream ray ramp		Ramp Numbe	r of Lanes, N	1				Ramp	arri 7 taj
☐ Yes ☐ On		Acceleration L	ane Length, L <sub>Δ</sub>	1379				Yes	
			ane Length L <sub>D</sub>						On
☑ No ☐ Off		Freeway Volu		352				✓ No	Off
<sub>up</sub> = ft		Ramp Volume	•	162				L <sub>down</sub> =	ft
ıp			11					down	
u = veh/h			-Flow Speed, S <sub>FF</sub>	65.0				$V_D =$	veh/h
			ow Speed, S <sub>FR</sub>	45.0					
conversion to		der Base (	Conditions	1	·	1	1		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHI	$= x f_{HV} x f_{p}$
reeway	352	0.94	Level	8	0	0.962	1.00		389
Ramp	162	0.76	Level	5	0	0.976	1.00	+	217
JpStream									
DownStream									
		Merge Areas			F		Diverge Areas		
stimation of	v <sub>12</sub>				Estimati	on of v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	$V_R + (V_F - V_F)$	R)P <sub>FD</sub>	
EQ =	(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 13	3-12 or 13-1	3)
<sub>FM</sub> =	1.000	using Equat	ion (Exhibit 13-6)		P <sub>FD</sub> =		ion (Exhibit 1	3-7)	
<sub>12</sub> =	389 p	c/h			V <sub>12</sub> =		pc/h		
<sub>3</sub> or V <sub>av34</sub>			13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	13-14 or 13-	7)
s V <sub>3</sub> or V <sub>av34</sub> > 2,70	-		,			<sub>34</sub> > 2,700 pc/h?			,
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
			3-16, 13-18, or			·-	pc/h (Equati		3-18, or
Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub> =	1	3-19)	•	•
Capacity Che	r	_			Capacity	/ Checks			
	Actual		apacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Actual		apacity	LOS F
					V <sub>F</sub>		Exhibit 13		
$V_{FO}$	606	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13		
					V <sub>R</sub>		Exhibit 1 10	3-	
low Entering	Merge In	fluence A	roa		Flow En	tering Dive		nco Aros	
TOW Emering	Actual	1	Desirable	Violation?	1000 211	Actual	Max De		Violation
V <sub>R12</sub>	606	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
evel of Serv	ice Detern					Service De			<i>F</i> )
	0.00734 v <sub>R</sub> + (				1	$D_R = 4.252 + 0$			- /
R = 1.5 (pc/mi/		12 0.0	A			c/mi/ln)	12	–	
	•					Exhibit 13-2)			
•	<u> </u>				-		<u> </u>		
peed Detern					<del> </del>	eterminati	on		
$I_{\rm S} = 0.204  (Exit)$	oit 13-11)				,	xhibit 13-12)			
	Exhibit 13-11)				S <sub>R</sub> = mp	oh (Exhibit 13-12	)		
$_{\rm R}$ = 60.3 mph (	,								
	Exhibit 13-11)				S <sub>0</sub> = mp	oh (Exhibit 13-12	)		
= N/A mph (E	•					oh (Exhibit 13-12 oh (Exhibit 13-13	•		

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company	Shan	e Forsythe	J	reeway/Dir of Trunction		Central	Ave NB O	ff		
Date Performed	9/9/2			urisdiction		0044				
Analysis Time Period Project Description			Ρ	nalysis Year		2014				
Inputs	1-13 Collidol S	luuy								
-		Freeway Num	ber of Lanes, N	2					Τ	
Upstream Adj R	amp	Ramp Numbe		1					Downstre Ramp	am Adj
□Yes	On	1	ane Length, L <sub>A</sub>						□Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	1388 490					✓No	Off
L <sub>up</sub> = f	t	Ramp Volume		227					L <sub>down</sub> =	ft
V <sub>11</sub> = v	eh/h	1	-Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	45.0						
Conversion to	o pc/n Und         ∨		conaitions	T	1	<del>-</del>			<u> </u>	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	490	0.87	Level	11	0		948	1.00		94
Ramp	227	0.75	Level	6	0	0.	971	1.00	3	13
UpStream		$\vdash$		-	-	_			-	
DownStream		<u>I                                    </u>			-			Diverge Areas		
Estimation of		merge Areas			Estimati	ion o		Alverge Alcus		
		<u> </u>						\( \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	( ) D	
_	V <sub>12</sub> = V <sub>F</sub>		40.7)		L _			: V <sub>R</sub> + (V <sub>F</sub> - V		
L <sub>EQ</sub> =		ition 13-6 or			L <sub>EQ</sub> =			Equation 13-		-
P <sub>FM</sub> =	_	Equation (	Exhibit 13-6)		P <sub>FD</sub> =			000 using Ed	quation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			94 pc/h		
$V_3$ or $V_{av34}$			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equati		r 13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		☐Yes 🗹 No		
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =		p 19	c/h (Equation	n 13-16, 13	-18, or 13-
Capacity Che		1			Capacity			9)		
Capacity One	Actual		apacity	LOS F?	Capacity	<i>y 011</i>	Actual		apacity	LOS F?
	riotadi		apaoity	20011	V <sub>F</sub>		594	Exhibit 13	<del></del>	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	281	Exhibit 13	<del></del>	No
					V <sub>R</sub>		313	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	rea		Flow En	terin	g Dive	rge Influer	nce Area	
	Actual	Max	Desirable	Violation?		/	Actual	Max Desira	ıble	Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		594	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)	•	Level of	Serv	/ice De	terminatio	n (if not	F)
D <sub>R</sub> = 5.475 + 0.	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>		ı	D <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	-
D <sub>R</sub> = (pc/mi/ln	)				D <sub>R</sub> = -3	.1 (pc/	mi/ln)			
LOS = (Exhibit	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Determ	nination				Speed D	eter	minatio	on .		
$M_S = (Exibit 1)$					<del>                                     </del>		xhibit 13-			
	ibit 13-11)						(Exhibit	-		
	iibit 13-11)					-	(Exhibit	-		
	iibit 13-11)				1	-	(Exhibit	•		
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9/9/2014

		MPS AND	RAMP JUN			<u>=                                    </u>			
General Infori				Site Infor					
Analyst	Shan	ne Forsythe		reeway/Dir of Tra	avel	Centrall NB On			
Igency or Company Oate Performed	9/9/2	014		ınction ırisdiction					
nalysis Time Period				nalysis Year		2014			
roject Description				,					
nputs		,							
Jpstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adi
policalii Auj Italiip		Ramp Numbe	r of Lanes, N	1				Ramp	amiraj
☐ Yes ☐ On			ane Length, L	1491					
			ane Length L <sub>D</sub>					□Yes	On
☑ No ☐ Off		Freeway Volum		359				✓ No	Off
<sub>up</sub> = ft		1	•					L <sub>down</sub> =	ft
ıp ıt		Ramp Volume	11	118				down	
u = veh/h			-Flow Speed, S <sub>FF</sub>	65.0				$V_D =$	veh/h
			ow Speed, S <sub>FR</sub>	55.0					
onversion to		der Base (	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	$F \times f_{HV} \times f_{p}$
reeway	359	0.97	Level	8	0	0.962	1.00	1	385
Ramp	118	0.81	Level	1	0	0.995	1.00		146
JpStream									
ownStream									
		Merge Areas					Diverge Areas		
stimation of	v <sub>12</sub>				Estimati	ion of v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - V	' <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-1	13)
<sub>FM</sub> =	1.000	using Equat	ion (Exhibit 13-6)	)	P <sub>FD</sub> =		using Equat	ion (Exhibit 1	3-7)
12 =	385 p		,		V <sub>12</sub> =		pc/h	,	•
or V <sub>av34</sub>	•		13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	13-14 or 13-	17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,700	-		,			<sub>34</sub> > 2,700 pc/h?			,
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
			3-16, 13-18, or				pc/h (Equati		3-18. or
Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub> =		13-19)		, -
Capacity Che	cks				Capacity	y Checks			
	Actual	C	apacity	LOS F?		Actua		apacity	LOS F
					V <sub>F</sub>		Exhibit 13		
$V_{FO}$	531	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13	3-8	
. 0					V <sub>R</sub>		Exhibit 1	3-	
<b>F</b>	. 1/ /	51					10		
low Entering	Actual	1	<b>Irea</b> Desirable	Violation?	Flow En	tering Div	e <b>rge influe</b> Max De		Violation
V	531	Exhibit 13-8	4600:All	No	V <sub>12</sub>	Actual	Exhibit 13-8		Violation
V <sub>R12</sub>				NO		i Convice D			 
evel of Servi		•	· · · · · · · · · · · · · · · · · · ·		1	Service D			<i>F)</i>
		0.0078 V <sub>12</sub> - 0.0	10021 L <sub>A</sub>			$D_{R} = 4.252 +$	0.0000 V <sub>12</sub> -	0.009 L <sub>D</sub>	
R = 0.2 (pc/mi/l	•					c/mi/ln)			
OS = A (Exhibit 1						exhibit 13-2)			
Speed Detern	nination				<del> </del>	Determinat	ion		
	oit 13-11)				$D_s = (E$	xhibit 13-12)			
$_{S}$ = 0.164 (Exit	•				S <sub>R</sub> = m <sub>l</sub>	ph (Exhibit 13-12	2)		
•	Exhibit 13-11)				PR− '''	pii (=xiiibit 10 11	-,		
e 61.2 mph (	Exhibit 13-11) Exhibit 13-11)					ph (Exhibit 13-12	•		
$_{\rm R}^{=}$ 61.2 mph ( $_{\rm D}^{=}$ N/A mph (E	Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = m <sub>l</sub>	•	2)		

		RAMP	S AND RAI	MP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company	Shan	e Forsythe	J	reeway/Dir of Tr lunction		Centra	Ave SB O	ff		
Date Performed Analysis Time Period	9/9/2 9 PM P			lurisdiction Analysis Year		2014				
Project Description			,	tharysis i car		2014				
Inputs	1 10 00111001 0	luuj								
Upstream Adj R	amp	1	ber of Lanes, N	2					Downstre	am Adj
□Yes □	On	Ramp Numbe Acceleration I	ane Length, L <sub>A</sub>	1					Ramp □Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	1144 309					<b>☑</b> No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	72					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 45.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	309	0.79	Level	14	0	0.	935	1.00	4	19
Ramp	72	0.90	Level	6	0	0.	971	1.00	8	32
UpStream						4				
DownStream		Marga Arasa						Niverse Areas		
Estimation of		Merge Areas			Estimati	ion o		Diverge Areas		
<u> </u>					LStillati	011 0				
_	$V_{12} = V_F$		40.7)		L _			: V <sub>R</sub> + (V <sub>F</sub> - V		
L <sub>EQ</sub> =		ition 13-6 or			L <sub>EQ</sub> =			Equation 13-		-
P <sub>FM</sub> =	_	Equation (I	EXNIBIT 13-6)		P <sub>FD</sub> =			000 using Ed	quation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			19 pc/h		
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equati		r 13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$			10 10 10					☐Yes ☑ No		40 40
If Yes,V <sub>12a</sub> =	pc/n ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =		19	c/h (Equation	n 13-16, 13	-18, Of 13-
Capacity Che		'			Capacity	v Ch		<u> </u>		
	Actual		Capacity	LOS F?	1		Actual	С	apacity	LOS F?
					V <sub>F</sub>		419	Exhibit 13	<del></del>	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	337	Exhibit 13-	-8 4700	No
					V <sub>R</sub>		82	Exhibit 13-	10 2100	No
Flow Entering	a Merae In	fluence A	\rea			terin	a Dive	rge Influer	nce Area	
	Actual		Desirable	Violation?	1011 =11		Actual	Max Desira		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		419	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)	•	Level of	Ser	/ice De	terminatio	n (if not	<del> </del>   F)
D <sub>R</sub> = 5.475 + 0.					+			.0086 V <sub>12</sub> - 0		
D <sub>R</sub> = (pc/mi/ln	• • • • • • • • • • • • • • • • • • • •	12	A				mi/ln)	12	D	
LOS = (Exhibit					1 ''		oit 13-2)			
Speed Determ					Speed D	•		on .		
					<del>                                     </del>		xhibit 13-			
$M_S = (Exibit 1)$							(Exhibit	-		
	nibit 13-11)						(Exhibit	-		
	nibit 13-11) nibit 13-13)				1	-	(Exhibit	•		
		All Dialte D					-	· · · · · · · · · · · · · · · · · · ·	Oanasata I Sii	2/2044 - 2.22 - 1
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		RAI	MPS AND	RAMP JUN	CTIONS W	ORKSH	EET				
General I	nforma				Site Infor		<del>-</del>				
Analyst Agency or Cor	mpany	Shan	e Forsythe	Jι	reeway/Dir of Tra	avel	Centrall SB	On			
Date Performe		9/9/2			urisdiction		2211				
Analysis Time		PM P		Ar	nalysis Year		2014				
Project Descri I <b>nputs</b>	puon 1-15	Corndor S	ludy								
•	_		Freeway Num	per of Lanes, N	2						
Jpstream Adj	Ramp		Ramp Number		1					Downstre Ramp	am Adj
□Yes	On			ane Length, L <sub>A</sub>	1379					'	_
				ane Length L <sub>D</sub>	1319					□Yes	☐ On
✓ No	Off				404					✓ No	Off
=	ft		Freeway Volui		491					L <sub>down</sub> =	ft
_up =			Ramp Volume	1.	260					down	
√ <sub>u</sub> =	veh/h			Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
			Ramp Free-Fl	. 110	45.0						
Sonversi	on to p	<u>c∕n Unc</u> ∨	der Base (	Conditions	1						
(pc/h)		v Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>		f <sub>p</sub>	v = V/PHF	$x f_{HV} x f_{p}$
Freeway		491	0.90	Level	14	0	0.935	1.	00		584
Ramp		260	0.89	Level	6	0	0.971	1.	00		301
UpStream											
DownStream			Marria Araaa					Divorse	A ====		
Estimatio	n of v		Merge Areas			Fetimat	ion of v <sub>1</sub>	Diverge	Areas		
	,,, o, v <sub>1</sub>		<u> </u>			LStillat					
		$V_{12} = V_{F}$				[	V	$_{12} = V_R + ($			
-EQ =			ation 13-6 or			L <sub>EQ</sub> =				12 or 13-1	
P <sub>FM</sub> =				on (Exhibit 13-6)	)	P <sub>FD</sub> =		_	Equatio	n (Exhibit 1	3-7)
/ <sub>12</sub> =		584 p				V <sub>12</sub> =		pc/h			
$V_3$ or $V_{av34}$		-		13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>				3-14 or 13-1	7)
Is V <sub>3</sub> or V <sub>av34</sub>							<sub>34</sub> > 2,700 pc				
Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub>					Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5 * V <sub>12</sub>				
f Yes,V <sub>12a</sub> =		pc/h ( 13-19)	(Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	pc/h (t 13-19)	=quatioi	n 13-16, 1	3-18, or
Capacity	Check					Capacit	y Check				
		Actual	С	apacity	LOS F?	Τ΄		ctual	Cap	acity	LOS F?
						V <sub>F</sub>		E	chibit 13-8	3	
$V_{FO}$		885	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	E	chibit 13-8	3	1
* FO		000	EXHIBIT 10 0		140		- 1	Ex	chibit 13-	-	
						V <sub>R</sub>			10		
Flow Ent	ering M		fluence A		1	Flow En	tering D				
		Actual	1	Desirable 4000 All	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Actua		Max Desi	rable	Violation <sup>4</sup>
V <sub>R12</sub>	<u> </u>	885	Exhibit 13-8	4600:All	No	V <sub>12</sub>	1		oit 13-8	/:5	<u></u>
			nination (i			1	Service				<u>r)</u>
		1134 V <sub>R</sub> + (	0.0078 V <sub>12</sub> - 0.0	10021 L <sub>A</sub>			$D_R = 4.252$	: + 0.0086	v <sub>12</sub> - 0.	ooa r <sup>D</sup>	
	(pc/mi/ln)						oc/mi/ln)				
	xhibit 13-2						Exhibit 13-2				
Speed De	etermin	ation				<del>- '</del>	Determin				
$M_{\rm S} = 0.20$	06 (Exibit 13	3-11)				,	Exhibit 13-12)				
$S_{R} = 60.3$	mph (Exh	ibit 13-11)				l ''	ph (Exhibit 1	•			
	mnh (Evhil	oit 13-11)				$S_0 = m$	ph (Exhibit 1	3-12)			
$S_0 = N/A$	IIIhII (Exilii	JIC 10 11)				U U		,			
	mph (Exh						ph (Exhibit 1	•			

		RAMPS AND	RAMP JUNG	CTIONS W	ORKSHI	EET			
General In				Site Infor					
Analyst Agency or Comp Date Performed	oany	Shane Forsythe 9/9/2014	Ju Ju	eeway/Dir of Tr Inction Irisdiction	avel	Emerson Jun	ction NB On		
Analysis Time P		AM Peak	Ar	nalysis Year					
Project Descripti	ion I-15 Corri	dor Study							
nputs		Erooway Num	ber of Lanes, N					<del></del>	
Jpstream Adj Ra	amp	1		2				Downstre	am Adj
☐ Yes ☐	On	Ramp Numbe		1				Ramp	
	011		ane Length, L <sub>A</sub>	980				□Yes	☐ On
✓ No	Off		ane Length L <sub>D</sub>					✓ No	Off
_ £		Freeway Volu		288				=	ft
<sub>up</sub> = ft		Ramp Volume	13	76				L <sub>down</sub> =	11
/ <sub>u</sub> = ve	eh/h		-Flow Speed, S <sub>FF</sub>	65.0				V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	55.0					
Conversio		Under Base	Conditions	,					
(pc/h)	V (Veh/h	nr) PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	$F x f_{HV} x f_{p}$
Freeway	288	0.89	Level	21	0	0.905	1.00		358
Ramp	76	0.83	Level	15	0	0.930	1.00		99
UpStream									
DownStream									
Ectimation	of v	Merge Areas			Ectimat	ion of v	Diverge Area	IS	
Stimation					ESumat	ion of v <sub>1</sub>			
		$= V_F (P_{FM})$				$V_1$	$_{2} = V_{R} + (V_{F} -$		
·EQ =	(	Equation 13-6 or	r 13-7)		L <sub>EQ</sub> =		(Equation	13-12 or 13-1	13)
P <sub>FM</sub> =	1.0	000 using Equat	ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equa	ation (Exhibit 1	3-7)
′ <sub>12</sub> =	35	8 pc/h			V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$		pc/h (Equation	13-14 or 13-17)		$V_3$ or $V_{av34}$			on 13-14 or 13-	17)
Is $V_3$ or $V_{av34}$ >							h? □Yes □I		
Is $V_3$ or $V_{av34}$ >					Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5 * V <sub>12</sub> /	<sup>2</sup> □Yes □1		
f Yes,V <sub>12a</sub> =		oc/h (Equation 13 3-19)	3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	pc/h (Equa 13-19)	ition 13-16, 1	3-18, or
Capacity C		, 10)			Capacit	y Checks			
, ,	Actu	al C	apacity	LOS F?	1			Capacity	LOS F?
					V <sub>F</sub>		Exhibit	13-8	
$V_{FO}$	457	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit	13-8	
* FO	407	Exhibit 10 0		140			Exhibit	13-	
					V <sub>R</sub>		10		
low Enter		e Influence A		\ \tau \\ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \\ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \ \tau \u \u \u \u \u \u \u \u \u \u \u \u \u	Flow En		iverge Influ		1
\/	Actua	<u> </u>	Desirable 4600.All	Violation?	\/	Actual		Desirable o	Violation
V <sub>R12</sub>	457	Exhibit 13-8	4600:All	No	V <sub>12</sub>	f Camaiaa	Exhibit 13-		<u> </u>
		termination (			1		Determina		( <del>F</del> )
		<sub>R</sub> + 0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>			• •	+ 0.0086 V <sub>12</sub>	- 0.009 L <sub>D</sub>	
	c/mi/ln)					oc/mi/ln)	`		
	hibit 13-2)					Exhibit 13-2	-		
Speed Det	erminatio	n			+	Determina	ation		
M <sub>S</sub> = 0.219	(Exibit 13-11)				,	Exhibit 13-12)			
S <sub>R</sub> = 60.0 n	mph (Exhibit 13	i-11)			1,	ph (Exhibit 13	•		
$S_0 = N/A m$	nph (Exhibit 13-	•			I *	ph (Exhibit 13	•		
S = 60.0 n	nph (Exhibit 13	l-13)			S = m	ph (Exhibit 13	3-13)		

		RAMP	S AND RAM	MP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company Date Performed	Shan	e Forsythe	J	reeway/Dir of Tr unction urisdiction		Emerso	on Junction	SB Off		
Analysis Time Period				nalysis Year	2	2014				
Project Description										
Inputs		-								
Upstream Adj R	amp	Freeway Num Ramp Numbe	nber of Lanes, N	2 1					Downstre Ramp	am Adj
□Yes □	On		ane Length, L <sub>A</sub>	'					Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	340 548					✓ No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	220					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 50.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	548	0.87	Level	6	0	0.	971	1.00	6	49
Ramp	220	0.88	Level	5	0	0.	976	1.00	2	56
UpStream						_				
DownStream		<u> </u>		<u> </u>				\' <b>A</b>		
Estimation of		Merge Areas			Estimati	on o		Diverge Areas		
LStillation of					LSumau	011 0				
L <sub>EQ</sub> =	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> ) ition 13-6 or	13-7)		L <sub>EQ</sub> =			· V <sub>R</sub> + (V <sub>F</sub> - V Equation 13-		8)
P <sub>FM</sub> =		Equation (I			P <sub>FD</sub> =			000 using Ed		-
V <sub>12</sub> =	pc/h	Equation (	EXHIBIT 10 0)		V <sub>12</sub> =			19 pc/h	juation (Exi	ibit 10 1)
* <sub>12</sub> V <sub>3</sub> or V <sub>av34</sub>	•	Equation 12	-14 or 13-17)		V <sub>12</sub> - V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equati	on 12 11 o	~ 10 1 <del>7</del> \
v <sub>3</sub> or v <sub>av34</sub> Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-14 01 13-17)			> 2 7			011 13-14 0	1 13-17)
								Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$ f If Yes, $V_{12a} =$		Equation 13	-16, 13-18, or		If Yes, $V_{12a} =$			☐ Yes ☑ No c/h (Equation	า 13-16, 13	-18, or 13-
Capacity Che					Capacity			9)		
	Actual		Capacity	LOS F?		7 0	Actual	C	apacity	LOS F?
	7.000.		apacity		V <sub>F</sub>		649	Exhibit 13-	<del></del>	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	393	Exhibit 13-	8 4700	No
					$V_R$		256	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	\rea		Flow En	terin	g Dive	rge Influer	ice Area	
	Actual		Desirable	Violation?			Actual	Max Desira		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		649	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level of	Ser	/ice De	terminatio	n (if not	<del>.</del> F)
D <sub>R</sub> = 5.475 + 0.					[	) <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	,
D <sub>R</sub> = (pc/mi/ln		,_	,,			. (pc/r		.2	5	
LOS = (Exhibit	•				***		oit 13-2)			
Speed Determ					Speed D	•		on .		
					<del>                                     </del>		xhibit 13-			
M <sub>S</sub> = (Exibit 1:					1	-	(Exhibit	-		
	ibit 13-11)				1	-	(Exhibit	· ·		
	iibit 13-11) iibit 13-13)					-	(Exhibit	-		
		All Dialte D					-	· · · · · · · · · · · · · · · · · · ·	Damas-1- 1 5"	2/2014 - 2.25
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9/9/2014

	RAI	MPS AND	RAMP JUN	CTIONS W	/ORKSHI	EET			
General Infor				Site Infor					
Analyst Agency or Company Date Performed	Shan	e Forsythe	Jı	reeway/Dir of Tr unction urisdiction		Emerson Junc	ion NB On		
Analysis Time Period				nalysis Year		2014			
Project Description		tudy		,		-			
Inputs									
Upstream Adj Ramp		Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	2 1				Downstre Ramp	am Adj
☐ Yes ☐ Or	1	Acceleration L	ane Length, L <sub>A</sub>	980				□Yes	□On
☑ No ☐ Of	f	Deceleration I Freeway Volu	Lane Length L <sub>D</sub> me, V <sub>E</sub>	696				✓No	Off
- <sub>up</sub> = ft		Ramp Volume	11	334				L <sub>down</sub> =	ft
V <sub>u</sub> = veh/h	l		-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	65.0 55.0				V <sub>D</sub> =	veh/h
Conversion to	o pc/h Und	der Base	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>		F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	696	0.94	Level	6	0	0.971	1.00	_	763
Ramp	334	0.92	Level	5	0	0.976	1.00	+	373
UpStream  DownStream		<del>                                     </del>							
Downoueam		I I Merge Areas		<u> </u>			Diverge Areas	 }	
Estimation of					Estimat	ion of v <sub>12</sub>		-	
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>54</sub> )					= V <sub>R</sub> + (V <sub>F</sub> - \	/ <sub>D</sub> )P <sub>ED</sub>	
-o =		ation 13-6 o	· 13-7)		L <sub>EQ</sub> =	* 12	(Equation 1	–	13)
- <sub>EQ</sub> = P <sub>FM</sub> =			ion (Exhibit 13-6	١	P <sub>FD</sub> =		using Equa		
<sub>12</sub> =	763 p		IOTI (EXIIIDIL 13-0	)	V <sub>12</sub> =		pc/h	tion (Exhibit i	01)
′12 / <sub>3</sub> or V <sub>av34</sub>	•		13-14 or 13-17	١	V <sub>12</sub> V <sub>3</sub> or V <sub>av34</sub>		•	n 13-14 or 13-	17\
v <sub>3</sub> or v <sub>av34</sub> Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	-		13-14-01-13-17	)		> 2 700 pc/b	Pc/II (Equation		17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70 Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						• •	: □ Yes □ N □ Yes □ N		
			3-16, 13-18, or				⊢ Yes		3-18 or
f Yes,V <sub>12a</sub> =	13-19)	(Equation 10	7 10, 10 10, 01		If Yes,V <sub>12a</sub> =		13-19)		0 10, 01
Capacity Che	cks				Capacit	y Checks			
	Actual		apacity	LOS F?		Actu	al (	Capacity	LOS F?
					V <sub>F</sub>		Exhibit 1	3-8	
$V_{FO}$	1136	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 1	3-8	
. 0					$V_R$		Exhibit 1	13-	
Flow Entering	Morgo In	fluonco	roa			toring Div	rerge Influe	nco Aros	
-low Entering	Actual	ı ·	Desirable	Violation?	FIOW EII	Actual		esirable	Violation
V <sub>R12</sub>	1136	Exhibit 13-8	4600:All	No	V <sub>12</sub>	7.00001	Exhibit 13-8		7101011
Level of Serv				<u> </u>		Service I	Determinati		<i>F</i> )
	0.00734 v <sub>R</sub> + 0				1		· 0.0086 V <sub>12</sub> -		- /
O <sub>R</sub> = 8.0 (pc/mi/	• • •	IZ -	A		1	oc/mi/ln)	12		
$_{R}$ 0.0 (pc/mi/ $_{L}$ OS = A (Exhibit	· ·					Exhibit 13-2)			
Speed Detern							tion		
•					+	Determina	uon		
M <sub>S</sub> = 0.225 (Exil	•				,	Exhibit 13-12)	10)		
	(Exhibit 13-11)				1.5	ph (Exhibit 13-	•		
	Exhibit 13-11)				1	ph (Exhibit 13-			
S = 59.8 mph (	(Exhibit 13-13)				l .	ph (Exhibit 13-	-		
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		RAMP	S AND RAI	//P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst Agency or Company Date Performed	Shan	ne Forsythe	J	reeway/Dir of Traduction		Emerso	n Junction	SB Off		
Analysis Time Period			A	Analysis Year	2	2014				
Project Description		Study		•						
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2					Downstre Ramp	am Adj
□Yes □	On	Acceleration L	ane Length, L <sub>A</sub>	•					Yes	On
☑ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	340 456					☑ No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	144					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 50.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Uni	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	456	0.88	Level	13	0	0.	939	1.00	5	52
Ramp	144	0.94	Level	7	0	0.	966	1.00	1	59
UpStream										
DownStream		<u>.                                    </u>								
Estimation of		Merge Areas			Estimati	on o		iverge Areas		
Estimation of	V <sub>12</sub>				Estimati	on o	1 12			
L <sub>EQ</sub> =	V <sub>12</sub> = V <sub>F</sub> (Faus	(P <sub>FM</sub> ) ation 13-6 or	13-7)		L <sub>EQ</sub> =			V <sub>R</sub> + (V <sub>F</sub> - V Equation 13-		8)
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =			000 using Eq		-
V <sub>12</sub> =	pc/h	Equation (	EXHIBIT TO 0)		V <sub>12</sub> =			62 pc/h	uation (Exi	ibit 10 1)
* <sub>12</sub> V <sub>3</sub> or V <sub>av34</sub>	•	Equation 12	-14 or 13-17)					•	on 12 11 o	- 10 1 <del>7</del> \
v <sub>3</sub> or v <sub>av34</sub> Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-14 01 13-17)		V <sub>3</sub> or V <sub>av34</sub>	<b>&gt; 2 7</b>		pc/h (Equati	011 13-14 0	1 13-17)
								Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$ f If Yes, $V_{12a} =$	pc/h (	Equation 13	-16, 13-18, or		If Yes, $V_{12a} =$		р	☐Yes ☑ No c/h (Equatior	า 13-16, 13	-18, or 13-
-	13-19)						19	9)		
Capacity Che		1 .		1	Capacity	Ch		1 0		1
	Actual		Capacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Actual	<del></del>	apacity	LOS F?
V		Exhibit 13-8			V <sub>F</sub>	- V	552 393	Exhibit 13-	<del></del>	No No
V <sub>FO</sub>		LAHIDIL 13-0			$V_{FO} = V_{F}$	*R	159	Exhibit 13-		_
	<u> </u>	<u> </u>			V <sub>R</sub>					No
Flow Entering				1 Vr.1.60	Flow En	_		ge Influer		1 1/2 1 1/2 1 10
V <sub>R12</sub>	Actual	Exhibit 13-8	Desirable	Violation?	V <sub>12</sub>		Actual 552	Max Desira Exhibit 13-8	4400:All	Violation?
Level of Serv	ice Detern	nination (	if not F)		Level of	Serv	vice De	terminatio	n (if not	F)
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>		[	$D_R = 4$	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	-
D <sub>R</sub> = (pc/mi/ln					D <sub>R</sub> = 5.9	) (pc/r	ni/ln)			
LOS = (Exhibit	13-2)				I '''	 (Exhil	oit 13-2)			
Speed Determ					Speed D	•		n		
					<del>                                     </del>		xhibit 13-			
M <sub>S</sub> = (Exibit 1:					1		(Exhibit	•		
	nibit 13-11)					-	(Exhibit	-		
	nibit 13-11) nibit 13-13)				1 -	-	(Exhibit	· ·		
		All Dialete D					-		Damarata 1 5"	2/2014 2 2 2 2 :
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vnstream Adj np  Yes □ On  No □ Off  = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
yes ☐ On  No ☐ Off  = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
yes ☐ On  No ☐ Off  = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
yes ☐ On  No ☐ Off  = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
$\begin{array}{cccc} mp & & & & & \\ Yes & & & & \\ On & & & \\ No & & & & \\ Off & & & \\ n = & ft & & \\ & & & & \\ e & & & & \\ veh/h & & \\ & & & & \\ V/PHF \times f_{HV} \times f_{p} & \\ & & & \\ & & & \\ 27 & & & \\ D & & \\ D & & \\ D & & & \\ D & & \\$
yes ☐ On  No ☐ Off  = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
yes ☐ On  No ☐ Off  = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
No $\square$ Off $_{n}$ = ft  = veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> $_{278}$ $_{27}$
n = ft = veh/h V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278 27
= veh/h  V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
V/PHF x f <sub>HV</sub> x f <sub>p</sub> 278  27
278 27
278 27
27 D
D
_
_
_
_
_
· 13-13)
•
on (Exhibit 13-7)
3-14 or 13-17)
16, 13-18, or 13-
y LOS F?
4700 No
4700 No
2100 No
Area
Violation?
00:All No
f not F)
L <sub>D</sub>
y 2 <b>A</b>

9/9/2014

		RAI	IPS AND	<b>RAMP JUN</b>	CTIONS W	ORKSH	EET			
General	Inform				Site Inform		· · · · · · · · · · · · · · · · · · ·			
Analyst Agency or Co	ompany	Shan	e Forsythe	Ju	reeway/Dir of Tra unction	avel	Gore Hill NB C	)n		
Date Perform		9/9/20			urisdiction					
Analysis Time		AM P	eak	A	nalysis Year					
Project Descr <b>Inputs</b>	ription									
			Freeway Num	ber of Lanes, N	2					
Jpstream Ad	lj Ramp		Ramp Numbe		1				Downstre Ramp	am Adj
□Yes	On				•				'	_
				ane Length, L <sub>A</sub>	1500				□Yes	On
✓ No	Off		l	ane Length L <sub>D</sub>	547				✓ No	Off
=	ft		Freeway Volu		517				L <sub>down</sub> =	ft
_up =	10		Ramp Volume	11	301				down	
√ <sub>u</sub> =	veh/h			-Flow Speed, S <sub>FF</sub>	65.0				$V_D =$	veh/h
			-	ow Speed, S <sub>FR</sub>	50.0					
Convers	ion to	pc/h Und	ler Base (	Conditions	1			_		
(pc/h)	)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	$F \times f_{HV} \times f_{p}$
Freeway		517	0.90	Grade	16	0	0.926	1.00		620
Ramp		301	0.82	Level	23	0	0.897	1.00		407
UpStream										
DownStream	n							Diverse Avec		
Estimati	on of		Merge Areas			Fetimat	ion of v <sub>12</sub>	Diverge Area	S	
LStillati	011 01		(B)			LStillat				
		$V_{12} = V_F$ (					V <sub>12</sub>	$= V_R + (V_F - V_F)$	–	
- <sub>EQ</sub> =			ation 13-6 or			L <sub>EQ</sub> =			13-12 or 13-	
P <sub>FM</sub> =				ion (Exhibit 13-6)		P <sub>FD</sub> =			ition (Exhibit 1	3-7)
V <sub>12</sub> =		620 pc				V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$				13-14 or 13-17	)	V <sub>3</sub> or V <sub>av34</sub>			on 13-14 or 13-	17)
	-	pc/h? Yes						? □Yes □ N		
Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 1.5 *	V <sub>12</sub> /2 □ Yes				Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5 * V <sub>12</sub> /2	Yes I		
f Yes,V <sub>12a</sub> =		pc/h ( 13-19)	Equation 13	3-16, 13-18, or		If Yes,V <sub>12a</sub> :	=	pc/h (Equa 13-19)	tion 13-16, 1	3-18, or
Capacity	/ Ched					Capacit	y Checks	10 10)		
, ,		Actual	C	apacity	LOS F?	,	Actu	ual	Capacity	LOS F?
						$V_{F}$		Exhibit '	13-8	
$V_{FO}$		1027	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub>	V <sub>R</sub>	Exhibit '	13-8	
- FO	' l	1021			""	V <sub>R</sub>		Exhibit	13-	
			<u> </u>					10		
Flow En	tering	Merge In				Flow Er		verge Influ		•
\/	<del>-  </del>	Actual 1027	Exhibit 13-8	Desirable 4600:All	Violation? No	V <sub>12</sub>	Actual		esirable g	Violation <sup>*</sup>
V <sub>R12</sub>		ce Detern			INU		f Consider l	Exhibit 13- Determinat		 
			•							<i>F)</i>
		).00734 v <sub>R</sub> + 0		JUUZI LA			• •	+ 0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
	(pc/mi/li	-					oc/mi/ln)			
	Exhibit 1					-	Exhibit 13-2)	4!		
Speed D						-	Determina	tion		
$M_{S} = 0.1$	182 (Exib	it 13-11)				٠ .	Exhibit 13-12)			
$S_R = 60.$	.8 mph (E	Exhibit 13-11)				1.	nph (Exhibit 13-	•		
	A mph (E	xhibit 13-11)				S <sub>0</sub> = m	nph (Exhibit 13-	12)		
	.8 mph (E	Exhibit 13-13)				S= m	nph (Exhibit 13-	13)		

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company Date Performed	Shan	e Forsythe	J	reeway/Dir of Tr unction urisdiction		Gore H	ill SB Off			
Analysis Time Period				nalysis Year	2	2014				
Project Description				. ,						
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2 1					Downstre Ramp	am Adj
□Yes □	On		ane Length, L <sub>A</sub>	•					Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	358 458					<b>☑</b> No	Off
L <sub>up</sub> = f	t	Ramp Volume		309					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 50.0					V <sub>D</sub> =	veh/h
Conversion to	o nc/h Und		111							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	458	0.85	Grade	7	0	0.	891	1.00	6	05
Ramp	309	0.79	Level	7	0	0.	966	1.00	4	03
UpStream										
DownStream										
<b>-</b>		Merge Areas			<b>-</b>			Diverge Areas		
Estimation of	' V <sub>12</sub>				Estimati	on o	t v <sub>12</sub>			
	$V_{12} = V_{F}$						V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	' <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Ed	juation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		60	)5 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		0	pc/h (Equati	on 13-14 o	r 13-17)
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h?	s $\square$ No				, > 2,7		∐Yes ☑ No		,
Is $V_3$ or $V_{av34} > 1.5$								∃Yes ☑No		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equation		-18, or 13-
Capacity Che	cks				Capacity	/ Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	С	apacity	LOS F?
					V <sub>F</sub>		605	Exhibit 13-		No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	202	Exhibit 13-		No
					$V_R$		403	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	rea		Flow En	terin	g Dive	rge Influer	ice Area	
	Actual	Max	Desirable	Violation?		,	Actual	Max Desira	ble	Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		605	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level of	Ser	vice De	terminatio	n (if not	F)
D <sub>R</sub> = 5.475 + 0.	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>		Г	O <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 6.2$	2 (pc/r	ni/ln)			
LOS = (Exhibit	13-2)				LOS = A	(Exhil	oit 13-2)			
Speed Determ	nination				Speed D	eter	minatio	on .		
					<del>                                     </del>		xhibit 13-			
	ibit 13-11)					-	(Exhibit	-		
	iibit 13-11)					-	(Exhibit	-		
	iibit 13-11)				1 -	-	(Exhibit	•		
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ppyrigrit ⊌ ZU IZ UMIV€	FISILY OF FIORIDA, A	- rignis Reser	veu		HCS2010 <sup>TM</sup>	versi	on 6.41	(	senerated: 9/9	012014 8:19/

9/9/2014

011 5		WIPS AND	RAMP JUN			<u> </u>			
General Infor				Site Inform					
Analyst	Shan	e Forsythe		eeway/Dir of Tra	ivel	Gore Hill NB On			
Agency or Company Date Performed	9/9/2	014		ınction ırisdiction					
nalysis Time Period				nalysis Year					
Project Description			Al	iaiysis reai					
nputs	1-13 Comuci C	ntudy							
•		Freeway Num	ber of Lanes, N	2				Davisation	A al:
Jpstream Adj Ramp		Ramp Numbe		1				Downstre Ramp	am Adj
☐ Yes ☐ On		l '	•	•				1 '	
			ane Length, L <sub>A</sub>	1500				□Yes	☐ On
☑ No ☐ Off		Deceleration L	ane Length L <sub>D</sub>					✓ No	Off
		Freeway Volu	me, V <sub>F</sub>	235					
<sub>up</sub> = ft		Ramp Volume	$, V_R$	38				L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>FF</sub>	65.0					
$v_{\rm u} = {\rm veh/h}$		1	ow Speed, S <sub>FR</sub>	50.0				$V_D =$	veh/h
Conversion to	nc/h l In		111	00.0					
	<i>γ γ γ γ</i>			0/= :	0/5		ı.	\//D!!	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHI	- x t <sub>HV</sub> x t <sub>p</sub>
reeway	235	0.79	Level	20	0	0.909	1.00		327
Ramp	38	0.62	Level	40	0	0.833	1.00		73
JpStream									
DownStream									
		Merge Areas					Diverge Areas		
stimation of	V <sub>12</sub>				Estimat	ion of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )				V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	D)PrD	
=		` 「™ / ation 13-6 or	13_7)		l =	12	(Equation 13		13)
EQ =					L <sub>EQ</sub> =				
) = FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equati	IOII (EXIIIDIL I	3-1)
' <sub>12</sub> =	327 p				V <sub>12</sub> =		pc/h		
′ <sub>3</sub> or V <sub>av34</sub>	-		13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation		17)
s $V_3$ or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗹 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 2,700 pc/h?	☐ Yes ☐ No	)	
ls V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2	s 🗹 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5 * V <sub>12</sub> /2	☐ Yes ☐ No	)	
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =	:	pc/h (Equati	on 13-16, 1	3-18, or
	13-19)				-		13-19)		
Capacity Che		1 ^	11		Capacit	y Checks		9	1 1005
	Actual		apacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Actual		apacity	LOS F
					V <sub>F</sub>		Exhibit 13	_	
$V_{FO}$	400	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13	3-8	
					V <sub>R</sub>		Exhibit 1	3-	
<b></b>		<i>f</i>					10		
low Entering		1			Flow En	tering Dive			•
\/	Actual	†	Desirable 4000-All	Violation?	\/	Actual	Max De	Sirable	Violation
V <sub>R12</sub>	400	Exhibit 13-8	4600:All	No	V <sub>12</sub>	<u> </u>	Exhibit 13-8	//5	
evel of Servi		•				Service De			(F)
**		0.0078 V <sub>12</sub> - 0.0	)0627 L <sub>A</sub>			$D_R = 4.252 + 6$	0.0086 V <sub>12</sub> - (	0.009 L <sub>D</sub>	
<sub>R</sub> = -0.8 (pc/mi	/ln)				D <sub>R</sub> = (p	oc/mi/ln)			
OS = A (Exhibit	13-2)				LOS = (E	Exhibit 13-2)			
Speed Detern	<u> </u>				Speed L	Determinati	on		
•					-	Exhibit 13-12)			
l <sub>S</sub> = 0.177 (Exit	-					ph (Exhibit 13-12	)		
	Exhibit 13-11)						•		
$S_0 = N/A \text{ mph } (E)$	Exhibit 13-11)				· ·	ph (Exhibit 13-12	•		
	Exhibit 13-13)				S= m	ph (Exhibit 13-13	)		

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company	Shan	e Forsythe		reeway/Dir of Tr unction		Gore H	ill NB Off			
Date Performed	9/9/2	014		urisdiction						
Analysis Time Period			A	nalysis Year	-	2014				
Project Description	I-15 Corridor S	tudy								
Inputs		le v							_	
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N or of Lanes, N	2 1					Downstre Ramp	am Adj
□Yes □	On	1	Lane Length, L <sub>A</sub>						□Yes	On
✓ No	Off	Preeway Volu	Lane Length L <sub>D</sub> me, V <sub>⊏</sub>	323 249					<b>☑</b> No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	35					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h	1	Flow Speed, $S_{FF}$ low Speed, $S_{FR}$	65.0 50.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Und		111							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	249	0.96	Level	12	0	0.	943	1.00	2	75
Ramp	35	0.74	Level	42	0	0.	826	1.00		57
UpStream										
DownStream										
Fatimatian at		Merge Areas			Fatima ati			Diverge Areas		
Estimation of	1 <sub>2</sub>				Estimati	on o	τν <sub>12</sub>			
	$V_{12} = V_{F}$	(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>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Ed	uation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		27	75 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		0	pc/h (Equati	on 13-14 o	r 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			,			., > 2,7		Yes ☑ No		- /
Is $V_3$ or $V_{av34} > 1.5$								∃Yes ☑ No		
f Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equation		-18, or 13-
Capacity Che	cks				Capacity	/ Ch		- 1		
	Actual		apacity	LOS F?			Actual	C	apacity	LOS F?
					V <sub>F</sub>		275	Exhibit 13-	8 4700	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V <sub>R</sub>	218	Exhibit 13-	8 4700	No
10					V <sub>R</sub>		57	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	-1			Flow En	terin	g Dive	rge Influer	ice Area	
	Actual		Desirable	Violation?			Actual	Max Desira	ble	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		275	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level of	Serv	∕ice De	terminatio	n (if not	<i>F</i> )
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			O <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_{R} = 3.7$	7 (pc/r	mi/ln)			
OS = (Exhibit	13-2)					 (Exhil	oit 13-2)			
Speed Detern					Speed D	•		n e		
•					<del>                                     </del>		xhibit 13-			
$M_S = (Exibit 1)$					1	-	(Exhibit	-		
	ibit 13-11)					-				
	ibit 13-11)				l *	-	(Exhibit	-		
	ibit 13-13)						(Exhibit	· · · · · · · · · · · · · · · · · · ·		
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	RAI	MPS AND	<b>RAMP JUN</b>	CTIONS W	ORKSHI	EET			
General Info				Site Infor					
Analyst Agency or Company Date Performed	/	e Forsythe	Ju	reeway/Dir of Tra unction urisdiction	avel	Gore Hill NB Or	1		
Date Performed Analysis Time Perio	9/9/2 d PM P			nalysis Year		2014			
Project Description			7.0	naryoro roar		2014			
nputs		,							
Jpstream Adj Ramp	)	l '	ber of Lanes, N	2				Downstre	am Adj
□ Yes □ O	n	Ramp Numbe Acceleration L	r of Lanes, N .ane Length, L <sub>A</sub>	1 1500				Ramp □Yes	On
☑ No □ O	ff		ane Length L <sub>D</sub>	700				☑ No	Off
- <sub>up</sub> = ft		Freeway Volu		722 506				L <sub>down</sub> =	ft
-up 10		Ramp Volume	·, v <sub>R</sub> -Flow Speed, S <sub>FF</sub>	506 65.0					
$V_u = veh/l$	1			50.0				$V_D =$	veh/h
Conversion	to no/h lln		ow Speed, S <sub>FR</sub>	50.0					
Conversion	o pc/n und			1	ı	Т.	Т.	T	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	722	0.80	Grade	10	0	0.952	1.00		948
Ramp	506	0.74	Level	9	0	0.957	1.00		714
UpStream DownStream	<del>                                     </del>	<del>                                     </del>							
Downstream	<u> </u>	I I Merge Areas					Diverge Areas	 }	
Estimation o					Estimat	ion of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P )					= V <sub>R</sub> + (V <sub>F</sub> - \	/_\P	
_ <sub>EQ</sub> =		ation 13-6 or	13-7)		L <sub>EQ</sub> =	* 12	(Equation 1	–	3)
P <sub>FM</sub> =			ion (Exhibit 13-6)	١	P <sub>FD</sub> =		using Equat		
<sub>12</sub> =	948 p		IOTI (EXTIIDIC 10-0)	1	V <sub>12</sub> =		pc/h	tion (Exmitted)	01)
$V_3$ or $V_{av34}$	•		13-14 or 13-17	١	V <sub>3</sub> or V <sub>av34</sub>		•	n 13-14 or 13-1	<b>17</b> )
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7	-		10 14 01 10 17	,		<sub>34</sub> > 2,700 pc/h?			•••
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5						<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
			3-16, 13-18, or		If Yes,V <sub>12a</sub> =		pc/h (Equat		3-18, or
f Yes,V <sub>12a</sub> =	13-19)						13-19)		
Capacity Ch	T-	1 -		1	Capacit	y Checks	. 1		1
	Actual		apacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Actua	T T	Capacity	LOS F?
					V <sub>F</sub>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Exhibit 1		
$V_{FO}$	1662	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 1		_
					V <sub>R</sub>		Exhibit 1	13-	
Flow Enterin	a Merae In	fluence A	rea	<u>'</u>	Flow En	tering Div		ence Area	
	Actual	ı .	Desirable	Violation?		Actual		esirable	Violation <sup>4</sup>
V <sub>R12</sub>	1662	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8	3	
Level of Serv	rice Detern	nination (	if not F)		Level of	f Service D	eterminati	ion (if not	<i>F</i> )
	+ 0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			D <sub>R</sub> = 4.252 +	0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
$D_{R} = 5.475 -$	i/ln\				D <sub>R</sub> = (p	oc/mi/ln)			
	VIII)				l 00 /5	b:b:t 40 0\			
$O_{R} = 8.7  (pc/m)$	· ·				LOS = (E	Exhibit 13-2)			
$D_{R} = 8.7  (pc/m)$	13-2)					Determinat	ion		
O <sub>R</sub> = 8.7 (pc/m LOS = A (Exhibit Speed Determ	: 13-2) mination				Speed L	-	ion		
$O_R$ = 8.7 (pc/m $O_S$ = A (Exhibit <b>Speed Deter</b> $M_S$ = 0.192 (Exhibit)	: 13-2) <b>mination</b> ibit 13-11)				<b>Speed D</b> D <sub>s</sub> = (E	Determinat			
$D_R$ = 8.7 (pc/m $D_R$ = 8.7 (pc/m $D_R$ = 4 (Exhibit) $D_R$ = 0.192 (Exhibit) $D_R$ = 0.192 (Exhibit) $D_R$ = 60.6 mph	i 13-2)  mination  iibit 13-11)  (Exhibit 13-11)				<b>Speed L</b> $D_s = (E_s)^2$ $S_R = m$	Determinat Exhibit 13-12) uph (Exhibit 13-12)	2)		
$O_R$ = 8.7 (pc/m $O_R$ = 8.7 (pc/m $O_R$ = 4 (Exhibit) $O_R$ = 0.192 (Exhibit) $O_R$ = 0.192 (Exhibit) $O_R$ = 60.6 mph $O_R$ = N/A mph	: 13-2) <b>mination</b> ibit 13-11)				$\begin{array}{ccc} \textbf{Speed L} \\ \textbf{D}_{\text{S}} = & (\textbf{E} \\ \textbf{S}_{\text{R}} = & \textbf{m} \\ \textbf{S}_{0} = & \textbf{m} \end{array}$	Determinat Exhibit 13-12)	2) 2)		

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company	Shan	e Forsythe	J	reeway/Dir of Tr unction		Gore H	ill SB Off			
Date Performed	9/9/2			urisdiction	,	2044				
Analysis Time Period			A	nalysis Year	2	2014				
Project Description Inputs	1-15 Corridor S	luay								
ιπραιδ		Erooway Num	ber of Lanes, N						Г	
Upstream Adj R	amp -	Ramp Numbe		2 1					Downstrea Ramp	am Adj
	JOn	1	Lane Length, LA	250					□Yes	On
☑ No □	Off	Freeway Volu	Lane Length L <sub>D</sub> me, V <sub>F</sub>	358 630					✓ No	Off
L <sub>up</sub> = f	t	Ramp Volume		290					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 50.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	630	0.93	Grade	10	0	0.	952	1.00	7	11
Ramp	290	0.80	Level	16	0	0.	926	1.00	3	91
UpStream										
DownStream		<u></u>								
Fatimatian at		Merge Areas			Fadimadi			iverge Areas		
Estimation of	V <sub>12</sub>				Estimati	on o	τν <sub>12</sub>			
	$V_{12} = V_{F}$	( 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>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Ed	uation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		71	1 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		0	pc/h (Equati	on 13-14 o	r 13-17)
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 2,7		]Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$						-		_ □Yes ☑ No		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =	•		c/h (Equation		-18, or 13-
Capacity Che	cks				Capacity	/ Ch	ecks			
	Actual		Capacity	LOS F?			Actual	C	apacity	LOS F?
					V <sub>F</sub>		711	Exhibit 13-		No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	320	Exhibit 13-		No
					$V_R$		391	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	\rea		Flow En	terin	g Dive	rge Influer	ice Area	
	Actual	Max	Desirable	Violation?		/	Actual	Max Desira	ble	Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		711	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level of	Serv	vice De	terminatio	n (if not	<del>F</del> )
D <sub>R</sub> = 5.475 + 0.	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			O <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				D <sub>R</sub> = 7.1	l (pc/r	ni/ln)			
LOS = (Exhibit	13-2)					(Exhib	oit 13-2)			
Speed Detern					Speed D	•		n		
					<del>                                     </del>		xhibit 13-			
M <sub>S</sub> = (Exibit 1:							(Exhibit	-		
	ibit 13-11)					-	(Exhibit	-		
	ibit 13-11)				ľ	-	•	•		
	ibit 13-13)						(Exhibit	·		
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9/9/2014

		MPS AND	RAMP JUNG			:E1			
General Informa				Site Infor					
nalyst	Shan	e Forsythe		eeway/Dir of Tra	avel (	Gore Hill SB On			
Igency or Company	0/0/0	04.4		nction					
ate Performed	9/9/20			risdiction	•	0014			
nalysis Time Period Project Description I-15	PM P		All	alysis Year		2014			
nputs	Corridor S	ludy							
-		Erooway Num	ber of Lanes, N	2				1	
pstream Adj Ramp		1						Downstre	am Adj
☐Yes ☐ On		Ramp Number		1				Ramp	
_ resOn		Acceleration L	ane Length, L <sub>A</sub>	1500				□Yes	On
✓ No ☐ Off		Deceleration L	ane Length L <sub>D</sub>					1	o
		Freeway Volui	me, V <sub>E</sub>	365				☑ No	Off
up = ft		Ramp Volume		39				L <sub>down</sub> =	ft
ıμ			13						
u = veh/h			-Flow Speed, S <sub>FF</sub>	65.0				$V_D =$	veh/h
			ow Speed, S <sub>FR</sub>	50.0					
onversion to p	c/h Unc	<u>der Base (</u>	Conditions						
(pc/h)	\/ob/bs\	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>
	Veh/hr)	0.02							
reeway	365	0.93	Level	6	0	0.971	1.00	_	404
Ramp	39	0.65	Level	41	0	0.830	1.00		72
JpStream DownStream		$\vdash$				<del> </del>			
ownStream		I I Merge Areas			<u> </u>		<u>l</u> Diverge Areas		
stimation of v <sub>1</sub>		vierge Areas			Estimation	on of v	Diverge Areas		
Sumation of v <sub>1</sub>					LStillati				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	$V_R + (V_F - V_R)$	)P <sub>FD</sub>	
EQ =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 13-	12 or 13-1	3)
<sub>FM</sub> =	1.000	using Equat	ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equatio	n (Exhibit 1	3-7)
<sub>12</sub> =	404 pc	c/h			V <sub>12</sub> =		pc/h		
or V <sub>av34</sub>	•		13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation 1	3-14 or 13-1	7)
s V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/	-		10 11 01 10 17)			2,700 pc/h?			• ,
						•			
${\rm s} {\rm V}_{3} {\rm or} {\rm V}_{{\rm av}34} > 1.5 {\rm *} {\rm V}_{12}$			3-16, 13-18, or			<sub>4</sub> > 1.5 * V <sub>12</sub> /2		n 12 16 1	2 10 or
Yes,V <sub>12a</sub> =	13-19)		5-10, 13-10, 01		If Yes,V <sub>12a</sub> =		pc/h (Equation 3-19)	11 13-10, 1	3-10, UI
Capacity Checks					Capacity				
					<del></del>			pacity	LOS F
, ,	Actual	I c	apacity	LOS F?		Actual	I Car		
	Actual		apacity	LOS F?	V-	Actual	<del></del>		1
			apacity		V <sub>F</sub>		Exhibit 13-	8	
V <sub>FO</sub>	Actual 476	Exhibit 13-8	apacity	LOS F?	$V_F$ $V_{FO} = V_F$		Exhibit 13-8	8	
			apacity				Exhibit 13-4 Exhibit 13-4 Exhibit 13-4	8	
V <sub>FO</sub>	476	Exhibit 13-8			$V_{FO} = V_F - V_R$	- V <sub>R</sub>	Exhibit 13-6 Exhibit 13-6 Exhibit 13-10	8 8	
V <sub>FO</sub>	476 <b>lerge In</b>	Exhibit 13-8	rea	No	$V_{FO} = V_F - V_R$	tering Dive	Exhibit 13-6 Exhibit 13-6 Exhibit 13-10 rge Influen	8 8 8 Proce Area	
V <sub>FO</sub>	476 <b>Ierge In</b> Actual	Exhibit 13-8  fluence A  Max	<b>rea</b> Desirable	No Violation?	V <sub>FO</sub> = V <sub>F</sub> - V <sub>R</sub>	- V <sub>R</sub>	Exhibit 13-6 Exhibit 13-6 Exhibit 13-10  rge Influen  Max Desi	8 8 8 Proce Area	Violation
V <sub>FO</sub>	476  lerge In Actual 476	Exhibit 13-8  Fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No	$V_{FO} = V_F - V_R$ Flow Ent	tering Dive	Exhibit 13-6 Exhibit 13-6 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8	8 B B B B B B B B B B B B B B B B B B B	Violation
V <sub>FO</sub> Slow Entering M  V <sub>R12</sub> evel of Service	476  lerge In Actual 476  Determ	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of	tering Dive Actual Service De	Exhibit 13-4 Exhibit 13-4 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8 Eterminatio	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> Flow Entering M  V <sub>R12</sub> evel of Service  D <sub>R</sub> = 5.475 + 0.00	476  lerge In Actual 476  Determ	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of	Actual  Service De De De 20 Res 4.252 + 0	Exhibit 13-6 Exhibit 13-6 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> Flow Entering M  V <sub>R12</sub> evel of Service  D <sub>R</sub> = 5.475 + 0.00	476  lerge In Actual 476  Determ	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (po)$	tering Dive Actual  Service De O <sub>R</sub> = 4.252 + 0 c/mi/ln)	Exhibit 13-4 Exhibit 13-4 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8 Eterminatio	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> V <sub>R12</sub> evel of Service  D <sub>R</sub> = 5.475 + 0.00  R = -0.3 (pc/mi/ln)	476  Actual 476  Determ  734 v <sub>R</sub> + 0	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (po)$	Actual  Service De De De 20 Res 4.252 + 0	Exhibit 13-4 Exhibit 13-4 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8 Eterminatio	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> V <sub>R12</sub> evel of Service  D <sub>R</sub> = 5.475 + 0.00  R <sub>R</sub> = -0.3 (pc/mi/ln)  OS = A (Exhibit 13-2)	476    erge In   Actual   476   Determ   1734 v R + 0	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (pc)$ LOS = (Ex	tering Dive Actual  Service De D <sub>R</sub> = 4.252 + 0 C/mi/ln) xhibit 13-2)	Exhibit 13-4 Exhibit 13-4 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0.0	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
$V_{FO}$ Flow Entering M $V_{R12}$ Level of Service $D_R = 5.475 + 0.00$ $D_R = -0.3 \text{ (pc/mi/ln)}$ $D_R = -0.3 \text{ (pc/mi/ln)}$ $D_R = -0.3 \text{ (pc/mi/ln)}$ $D_R = -0.3 \text{ (pc/mi/ln)}$ $D_R = -0.3 \text{ (pc/mi/ln)}$	476  Lerge In Actual 476  Determ 734 v <sub>R</sub> + 0	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (pc)$ LOS = (Ex	Service De De Maio Maria (1988)  Service De De Maria (1988)  Service De De Maria (1988)  Service De De Maria (1988)  Service De De Maria (1988)  Service De De Maria (1988)  Service De De Maria (1988)  Service De De De Maria (1988)  Service De De De De De De De De De De De De De	Exhibit 13-4 Exhibit 13-4 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0.0	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> Flow Entering M  V <sub>R12</sub> evel of Service  D <sub>R</sub> = 5.475 + 0.00  R <sub>R</sub> = -0.3 (pc/mi/ln)  DS = A (Exhibit 13-2)  Epeed Determination	476    Lerge In   Actual   476   Determ   1734 v R + 0   0   0   0   0   0   0   0   0   0	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (pc)$ $LOS = (Ex)$ $D_S = (Ex)$	tering Diversity Actual  Service Decoration OR = 4.252 + Coc/mi/In) Exhibit 13-2)  Setermination Children 13-12	Exhibit 13-4 Exhibit 13-4 Exhibit 13-1 Exhibit 13-1 In Max Desi Exhibit 13-8 Exhibi	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> Flow Entering M  V <sub>R12</sub> Level of Service  D <sub>R</sub> = 5.475 + 0.00  R = -0.3 (pc/mi/ln)  DS = A (Exhibit 13-2)  Epeed Determination  S = 0.177 (Exibit 13-2)  R = 60.9 mph (Exhibit 13-2)	476    Actual   476   Determ   1734 v R + 0   0   0   0   0   0   0   0   0   0	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (pc)$ $LOS = (Ex)$ Speed Do $D_S = (Ex)$ $S_R = mp$	tering Dive Actual  Service De De 4.252 + Ce/mi/In)  xhibit 13-2)  etermination  chibit 13-12)  h (Exhibit 13-12)	Exhibit 13-4 Exhibit 13-4 Exhibit 13-10  rge Influen Max Desi Exhibit 13-8 Exhibit	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation
V <sub>FO</sub> Flow Entering M  V <sub>R12</sub> evel of Service  D <sub>R</sub> = 5.475 + 0.00  R <sub>R</sub> = -0.3 (pc/mi/ln)  DS = A (Exhibit 13-2)  Epeed Determination	476    Actual   476   Determ   1734 v R + 0   0   0   0   0   0   0   0   0   0	Exhibit 13-8  fluence A  Max I  Exhibit 13-8	rea Desirable 4600:All	No Violation?	$V_{FO} = V_F - V_R$ Flow Ent $V_{12}$ Level of $D_R = (po)$ $LOS = (Ex)$ Speed Do $D_S = (Ex)$ $S_R = mp$ $S_0 = mp$	tering Diversity Actual  Service Decoration OR = 4.252 + Coc/mi/In) Exhibit 13-2)  Setermination Children 13-12	Exhibit 13-4 Exhibit 13-4 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhib	8 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Violation



I-15 Corridor Study

Vistro File: F:\...\I-15 Corridor.vistropdb Report File: F:\...\LOS\_Report\_AM.pdf Scenario 1: AM Scenario

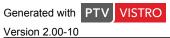
Scenario 1: 1: AM Scenario

9/15/2014

# **Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Tri Hill and Frontage Airport Rd	Two-way stop	HCM2010	NEBL	0.202	13.5	В
2	I-15 NB and Airport Rd	Two-way stop	HCM2010	NEBT	0.000	16.9	С
3	I-15 SB On and Airport RD	Two-way stop	HCM2010	NWBL	0.046	8.6	Α
4	I-15 SB Off and Airport RD Frontage	Two-way stop	HCM2010	SWBL	0.272	12.7	В
5	14th St SW and I-315 EB	Signalized	HCM2010	SBL	0.175	14.4	В
6	14th St SW and I-315 WB	Signalized	HCM2010	EBR	0.254	23.0	С
7	Fox Farm and I-315	Signalized	HCM2010	NEBL	0.687	45.3	D
8	Central Ave and I15 SB	Two-way stop	HCM2010	SBL	0.499	28.0	D
9	Central Ave and I-15 NB	Two-way stop	HCM2010	NBL	0.080	19.9	С
10	Central Ave and Vaughn Rd	Two-way stop	HCM2010	SBL	0.377	27.1	D
11	Vaughn Rd and I-15 SB	Two-way stop	HCM2010	SBL	0.260	10.1	В
12	Vaughn Rd and I-15 NB	Two-way stop	HCM2010	EBL	0.000	7.3	Α

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.



# Intersection Level Of Service Report #1: Tri Hill and Frontage Airport Rd

Control Type: Two-way stop Delay (sec / veh): 13.5 Analysis Method: HCM2010 Level Of Service: В Analysis Period: 15 minutes Volume to Capacity (v/c): 0.202

## Intersection Setup

Name						
Approach	Northea	astbound	Northwe	estbound	Southea	astbound
Lane Configuration	-	r	٦	1	1	•
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30	.00	30	.00	30	0.00
Grade [%]	0.00		0.00		0.00	
Crosswalk	у	es	y	es	yes	

Name						
Base Volume Input [veh/h]	83	19	9	189	97	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	21.70	31.10	22.20	28.60	25.70	5.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	83	19	9	189	97	88
Peak Hour Factor	0.7410	0.4750	0.5630	0.8750	0.9330	0.7590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	10	4	54	26	29
Total Analysis Volume [veh/h]	112	40	16	216	104	116
Pedestrian Volume [ped/h]		0	(	)		0
Bicycle Volume [bicycles/h]		0	(	)		0

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Version 2.00-10

# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.05	0.01	0.00	0.00	0.00				
d_M, Delay for Movement [s/veh]	13.48	13.48 11.42		0.00	0.00	0.00				
Movement LOS	ВВВ		Α	A	A	A				
95th-Percentile Queue Length [veh]	0.99	0.99	0.04	0.00	0.00	0.00				
95th-Percentile Queue Length [ft]	24.73 24.73		0.98	0.00	0.00	0.00				
d_A, Approach Delay [s/veh]	12	93	0.	55	0.	00				
Approach LOS	E	3	,	A	,	4				
d_I, Intersection Delay [s/veh]	3.47									
Intersection LOS	В									

Shane Forsythe 9/15/2014



# Intersection Level Of Service Report #2: I-15 NB and Airport Rd

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 16.9
Level Of Service: C
Volume to Capacity (v/c): 0.000

Scenario 1: 1: AM Scenario

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## Intersection Setup

Name													
Approach	No	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration	+							F			+		
Turning Movement	Left	Left Thru Right			Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00		30.00		30.00			30.00				
Grade [%]	0.00				0.00			0.00		0.00			
Crosswalk		yes			yes			yes		yes			

Name												
Base Volume Input [veh/h]	4	0	13	0	0	0	0	49	222	79	173	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	46.20	2.00	2.00	2.00	2.00	38.80	26.60	12.70	10.90	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	0	13	0	0	0	0	49	222	79	173	0
Peak Hour Factor	0.5000	1.0000	0.8130	1.0000	1.0000	1.0000	1.0000	0.7210	0.8670	0.7050	0.9010	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	4	0	0	0	0	17	64	28	48	0
Total Analysis Volume [veh/h]	8	0	16	0	0	0	0	68	256	112	192	0
Pedestrian Volume [ped/h]	0				0	•	0			0		
Bicycle Volume [bicycles/h]		0			0			0			0	



Version 2.00-10

# Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	
d_M, Delay for Movement [s/veh]	14.89	16.91	10.09	0.00	0.00	0.00	0.00	0.00	0.00	8.38	0.00	0.00	
Movement LOS	В	С	В					Α	Α	Α	Α		
95th-Percentile Queue Length [veh]	0.13	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	1.03	1.03	0.00	
95th-Percentile Queue Length [ft]	3.34	3.34	3.34	0.00	0.00	0.00	0.00	0.00	0.00	25.85	25.85	0.00	
d_A, Approach Delay [s/veh]		11.69			11.69 0.00				0.00			3.09	
Approach LOS		В		A A						A			
d_I, Intersection Delay [s/veh]	1.87												
Intersection LOS	С												



## Intersection Level Of Service Report #3: I-15 SB On and Airport RD

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 8.6
Level Of Service: A
Volume to Capacity (v/c): 0.046

Scenario 1: 1: AM Scenario

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#### Intersection Setup

Name							
Approach	Northea	stbound	Northwe	estbound	Southea	astbound	
Lane Configuration				1	F		
Turning Movement	Left	Left Right		Left Thru		Right	
Lane Width [ft]	12.00	12.00 12.00		12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	30.00		30.00		.00	
Grade [%]	0.	0.00		0.00		00	
Crosswalk	y	es	y	es	yes		

Name							
Base Volume Input [veh/h]	0	0	32	23	251	6	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	43.80	21.70	14.00	16.70	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	0	0	32	23	251	6	
Peak Hour Factor	1.0000	1.0000	0.6670	0.6390	0.8720	0.3750	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	0	0	12	9	72	4	
Total Analysis Volume [veh/h]	0	0	48 36		288	16	
Pedestrian Volume [ped/h]		0		0	0		
Bicycle Volume [bicycles/h]		0		0 0			



Version 2.00-10

# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.05	0.00	0.00	0.00					
d_M, Delay for Movement [s/veh]	0.00	0.00	8.58	8.58 0.00		0.00					
Movement LOS			Α	А	Α	A					
95th-Percentile Queue Length [veh]	0.00	0.00	0.26	0.26	0.00	0.00					
95th-Percentile Queue Length [ft]	0.00	0.00	6.49	6.49	0.00	0.00					
d_A, Approach Delay [s/veh]	0.	00	4	.90	0.	00					
Approach LOS	/	A		A	,	4					
d_I, Intersection Delay [s/veh]	1.06										
Intersection LOS	A										



# Intersection Level Of Service Report #4: I-15 SB Off and Airport RD Frontage

Control Type:Two-way stopDelay (sec / veh):12.7Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.272

## Intersection Setup

Name													
Approach	No	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration	Ŧ				٦r		+			F			
Turning Movement	Left	Left Thru Right			Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00 12.00 12.00		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00		30.00		30.00			30.00				
Grade [%]	0.00				0.00		0.00			0.00			
Crosswalk		yes			yes		yes			yes			

Name												
Base Volume Input [veh/h]	5	0	44	159	54	96	8	12	0	0	40	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.00	11.30	10.10	7.40	3.10	12.50	8.30	2.00	2.00	2.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	0	44	159	54	96	8	12	0	0	40	4
Peak Hour Factor	0.4170	1.0000	0.5240	0.8110	0.9000	0.7060	0.4000	0.7500	1.0000	1.0000	0.7690	0.5000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	21	49	15	34	5	4	0	0	13	2
Total Analysis Volume [veh/h]	12	0	84	196	60	136	20	16	0	0	52	8
Pedestrian Volume [ped/h]	0				0	•		0	•	0		
Bicycle Volume [bicycles/h]		0			0		0 0				0	

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# Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no	no		
Number of Storage Spaces in Median	0	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.09	0.27	0.08	0.13	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.78	0.00	9.10	12.67	12.44	8.90	7.47	0.00	0.00	0.00	0.00	0.00
Movement LOS	В		Α	В	В	Α	Α	Α			Α	Α
95th-Percentile Queue Length [veh]	0.34	0.00	0.34	1.59	1.59	0.44	0.07	0.07	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	8.59	0.00	8.59	39.68	39.68	11.00	1.87	1.87	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		9.31			11.33			4.15			0.00	
Approach LOS		Α	B A A									
d_I, Intersection Delay [s/veh]					9.39							
Intersection LOS				В			В					



#### Intersection Level Of Service Report #5: 14th St SW and I-315 EB

Control Type: Signalized
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 14.4
Level Of Service: B
Volume to Capacity (v/c): 0.175

Scenario 1: 1: AM Scenario

## Intersection Setup

Name													
Approach	١	Northboun	d	S	outhboun	d	I	Eastbound	d	٧	Westbound		
Lane Configuration		Пr			٦١٢			٦١٢			٦١٢		
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	2.00 12.00 12.00 1		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00 100.00 100.00			100.00 100.00 100.00			100.00 100.00 100.0			
Speed [mph]		30.00			30.00			30.00		30.00			
Grade [%]	0.00		0.00			0.00			0.00				
Crosswalk	yes		yes			yes			yes				

Name												
Base Volume Input [veh/h]	7	66	286	142	91	60	44	69	3	20	30	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.30	1.50	1.70	3.50	4.40	5.00	0.00	4.30	0.00	10.00	3.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	66	286	142	91	60	44	69	3	20	30	5
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	20	86	43	27	18	13	21	1	6	9	2
Total Analysis Volume [veh/h]	8	80	345	171	110	72	53	83	4	24	36	6
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0 0 0			0	0	0	0	0	0 0		0
Pedestrian Volume [ped/h]	0			0				0		0		
Bicycle Volume [bicycles/h]		0			0			0		0		

# Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	2	3	0	6	7	7	4	0	3	8	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	15	0	5	15	15	5	0	15	15	0
Maximum Green [s]	0	50	20	0	50	20	20	60	0	20	60	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	22	18	0	22	18	18	20	0	18	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	5	0	5	0	0	5	0	5	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	10	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# **Lane Group Calculations**

Lane Group	L	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	5.00	5.00	5.00	4.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	15	15	34	15	15	33	28	12	12	28	10	10
g / C, Green / Cycle	0.24	0.24	0.57	0.24	0.24	0.54	0.47	0.20	0.20	0.47	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.22	0.13	0.06	0.05	0.03	0.05	0.00	0.02	0.02	0.00
s, saturation flow rate [veh/h]	1140	1872	1588	1294	1820	1538	1631	1822	1615	1432	1839	1615
c, Capacity [veh/h]	299	452	912	342	439	836	920	360	319	797	307	270
d1, Uniform Delay [s]	21.49	18.04	6.95	23.72	18.38	6.55	8.80	20.24	19.36	8.71	21.23	20.89
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	0.19	0.26	1.13	0.30	0.04	0.03	0.32	0.02	0.02	0.17	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.03	0.18	0.38	0.50	0.25	0.09	0.06	0.23	0.01	0.03	0.12	0.02
d, Delay for Lane Group [s/veh]	21.52	18.22	7.21	24.85	18.67	6.60	8.83	20.56	19.38	8.72	21.39	20.92
Lane Group LOS	С	В	Α	С	В	Α	Α	С	В	Α	С	С
Critical Lane Group	no	no	yes	no	no	no	no	no	no	no	yes	no
50th-Percentile Queue Length [veh]	0.09	0.84	1.92	2.26	1.18	0.37	0.33	0.94	0.04	0.15	0.42	0.07
50th-Percentile Queue Length [ft]	2.32	20.94	47.91	56.41	29.43	9.15	8.37	23.62	1.09	3.74	10.46	1.72
95th-Percentile Queue Length [veh]	0.17	1.51	3.45	4.06	2.12	0.66	0.60	1.70	0.08	0.27	0.75	0.12
95th-Percentile Queue Length [ft]	4.18	37.70	86.24	101.54	52.97	16.46	15.06	42.51	1.95	6.74	18.82	3.09

Scenario 1: 1: AM Scenario Version 2.00-10

# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	21.52	18.22	7.21	24.85	18.67	6.60	8.83	20.56	19.38	8.72	21.39	20.92
Movement LOS	С	В	Α	С	В	Α	Α	С	В	Α	С	С
d_A, Approach Delay [s/veh]		9.51			19.20			16.09			16.74	
Approach LOS		Α			В			В			В	
d_I, Intersection Delay [s/veh]	14.37											
Intersection LOS				В								
Intersection V/C						0.1	175					

# Sequence

		_														
Ring 1	2	7	4	ı	-	-	-	-	-	-	-	ı	-	-	-	ı
Ring 2	6	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rina 4	_	_	-	-	_	-	-	-	-	-	-	-	-	-	-	-





#### Intersection Level Of Service Report #6: 14th St SW and I-315 WB

Control Type: Signalized
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 23.0
Level Of Service: C
Volume to Capacity (v/c): 0.254

Scenario 1: 1: AM Scenario

14

## Intersection Setup

Name														
Approach	١	lorthboun	d	S	outhboun	d	ı	Eastbound	d	V	Vestbound	d		
Lane Configuration		٦١٢			٦ŀ			+			46			
Turning Movement	Left	<del>-                                     </del>			Thru	Right	Left	Thru	Right	Left	Thru	Right		
Lane Width [ft]	12.00	2.00 12.00 12.00 1			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00		
No. of Lanes in Pocket	0	0 0 0		0	0	0	0	0	0	0	0	0		
Pocket Length [ft]	100.00	100.00 100.00 100.00 1		100.00 100.00 100.00			100.00	100.00	100.00	100.00 100.00 100.0				
Speed [mph]		30.00			30.00			30.00		30.00				
Grade [%]		0.00			0.00			0.00			0.00			
Crosswalk	yes		yes			yes			yes					

Name													
Base Volume Input [veh/h]	11	17	90	26	136	0	0	7	15	162	16	38	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	9.10	0.00	4.40	7.70	1.50	0.00	0.00	0.00	0.00	2.50	0.00	0.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	11	17	90	26	136	0	0	7	15	162	16	38	
Peak Hour Factor	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	3	5	28	8	42	0	0	2	5	50	5	12	
Total Analysis Volume [veh/h]	14	21	112	32	169	0	0	9	19	201	20	47	
Presence of On-Street Parking	no		no	no		no	no		no	no		no	
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	
Local Bus Stopping Rate [/h]	0	0 0 0			0 0 0			0	0	0	0	0	
Pedestrian Volume [ped/h]	0			0				0		0			
Bicycle Volume [bicycles/h]		0			0			0			0		



Version 2.00-10

# Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	1	2	0	1	0	0	3	0	0	2	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	5	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	35	40	0	35	0	0	25	0	0	40	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	25	19	0	25	0	0	16	0	0	19	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	9	7	0	9	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	11	7	0	11	0	0	0	0	0	7	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		no	no		no			no			no	
Maximum Recall		no	no		no			no			no	
Pedestrian Recall		no	no		no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

I-15 Corridor Study Scenario 1: 1: AM Scenario

# **Lane Group Calculations**

Lane Group	L	С	R	L	С	С	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	11	11	27	11	11	2	11	11
g / C, Green / Cycle	0.19	0.19	0.45	0.19	0.19	0.03	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.08	0.03	0.10	0.02	0.14	0.03
s, saturation flow rate [veh/h]	1019	1710	1392	1181	1685	1527	1636	1454
c, Capacity [veh/h]	178	321	624	283	316	48	290	257
d1, Uniform Delay [s]	27.05	20.04	9.94	22.89	22.00	28.67	23.49	20.99
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	0.08	0.14	0.17	1.40	10.79	4.15	0.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.08	0.07	0.18	0.11	0.53	0.58	0.76	0.18
d, Delay for Lane Group [s/veh]	27.24	20.13	10.07	23.06	23.41	39.47	27.64	21.33
Lane Group LOS	С	С	В	С	С	D	С	С
Critical Lane Group	no	no	no	no	yes	yes	yes	no
50th-Percentile Queue Length [veh]	0.19	0.23	0.79	0.39	2.12	0.52	3.10	0.55
50th-Percentile Queue Length [ft]	4.78	5.84	19.74	9.76	53.01	13.05	77.54	13.75
95th-Percentile Queue Length [veh]	0.34	0.42	1.42	0.70	3.82	0.94	5.58	0.99
95th-Percentile Queue Length [ft]	8.60	10.51	35.54	17.57	95.41	23.49	139.58	24.76

# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.24	20.13	10.07	23.06	23.41	23.41	39.47	39.47	39.47	27.64	27.64	21.33
Movement LOS	С	С	В	С	С	С	D	D	D	С	С	С
d_A, Approach Delay [s/veh]		13.14			23.35			39.47		26.53		
Approach LOS		В			С			D		С		
d_I, Intersection Delay [s/veh]					23.05							
Intersection LOS	С											
Intersection V/C	0.254											

# Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	ı	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





#### Intersection Level Of Service Report #7: Fox Farm and I-315

Control Type: Signalized
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 45.3
Level Of Service: D
Volume to Capacity (v/c): 0.687

Scenario 1: 1: AM Scenario

## Intersection Setup

Name												
Approach	١	Northboun	d	S	outhboun	d	No	rtheastbo	und	Sou	ıthwestbo	und
Lane Configuration		117			۱۱۱۲			Шь		,	ıIIIr	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00 100.00 100.00			100.00 100.00 100.00			100.00 100.00 100.00	
Speed [mph]	30.00				30.00		30.00			30.00		
Grade [%]	0.00			0.00		0.00			0.00			
Crosswalk	yes		yes		yes			yes				

Name												
Base Volume Input [veh/h]	50	219	437	172	90	121	161	732	45	101	335	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.90	0.70	1.80	2.20	4.10	6.20	5.20	2.20	4.00	6.00	3.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	219	437	172	90	121	161	732	45	101	335	136
Peak Hour Factor	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	69	137	54	28	38	50	229	14	32	105	43
Total Analysis Volume [veh/h]	63	274	548	216	113	152	202	917	56	127	420	170
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

# Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	1	8	0	3	6	6	4	0	8	2	5
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	5	0	5	5	5	5	0	5	5	0
Maximum Green [s]	0	60	60	0	60	60	60	60	0	60	60	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	21	47	0	28	76	76	54	0	47	25	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# **Lane Group Calculations**

Lane Group	С	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	3.00	5.00	5.00	3.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	31	31	99	27	27	53	20	44	44	31	54	54
g / C, Green / Cycle	0.21	0.21	0.66	0.18	0.18	0.35	0.14	0.29	0.29	0.20	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.04	0.16	0.34	0.15	0.03	0.10	0.12	0.27	0.04	0.04	0.12	0.11
s, saturation flow rate [veh/h]	1793	1714	1604	1414	3540	1551	1704	3439	1580	3379	3413	1557
c, Capacity [veh/h]	370	353	1058	290	649	547	231	997	458	688	1222	557
d1, Uniform Delay [s]	48.99	56.26	13.19	60.81	51.67	34.87	63.55	51.55	39.19	49.42	35.26	34.71
k, delay calibration	0.11	0.11	0.35	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	3.68	1.29	3.78	0.13	0.27	9.88	4.00	0.12	0.13	0.17	0.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.17	0.78	0.52	0.74	0.17	0.28	0.87	0.92	0.12	0.18	0.34	0.30
d, Delay for Lane Group [s/veh]	49.21	59.94	14.48	64.59	51.80	35.14	73.43	55.55	39.31	49.55	35.42	35.01
Lane Group LOS	D	E	В	E	D	D	E	E	D	D	D	D
Critical Lane Group	no	no	yes	yes	no	no	no	yes	no	no	no	no
50th-Percentile Queue Length [veh]	1.99	10.20	9.77	8.38	1.83	4.11	8.23	17.25	1.56	2.01	5.74	4.60
50th-Percentile Queue Length [ft]	49.82	255.07	244.37	209.46	45.76	102.67	205.68	431.14	39.12	50.27	143.52	114.99
95th-Percentile Queue Length [veh]	3.59	15.44	14.90	13.13	3.29	7.39	12.93	24.06	2.82	3.62	9.67	8.12
95th-Percentile Queue Length [ft]	89.67	386.04	372.56	328.14	82.36	184.80	323.28	601.41	70.42	90.48	241.76	202.92

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Version 2.00-10

# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.21	59.94	14.48	64.59	51.80	35.14	73.43	55.55	39.31	49.55	35.42	35.01
Movement LOS	D	E	В	E	D	D	Е	E	D	D	D	D
d_A, Approach Delay [s/veh]		31.02			52.28			57.85			37.83	
Approach LOS	C D E						D					
d_I, Intersection Delay [s/veh]						45	.33					
Intersection LOS	D											
Intersection V/C	0.687											

# Sequence

Ring 1	1	3	8	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	6	2	-	-	-	-	-	-	-	-	-	-	•	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





#### Intersection Level Of Service Report #8: Central Ave and I15 SB

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 28.0
Level Of Service: D
Volume to Capacity (v/c): 0.499

Scenario 1: 1: AM Scenario

## Intersection Setup

Name													
Approach	S	Southboun	d	-	Eastbound			Westbound			Northwestbound		
Lane Configuration		ጎተ			lr		1						
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]		0.00		0.00		0.00			0.00				
Crosswalk	yes		yes		yes			yes					

Name												
Base Volume Input [veh/h]	130	0	6	0	191	39	123	88	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	0.00	0.00	2.00	3.10	0.00	6.50	11.30	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	0	6	0	191	39	123	88	0	0	0	0
Peak Hour Factor	0.8550	1.0000	0.7500	1.0000	0.6920	0.7500	0.7690	0.8150	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	0	2	0	69	13	40	27	0	0	0	0
Total Analysis Volume [veh/h]	152	0	8	0	276	52	160	108	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0			0				
Bicycle Volume [bicycles/h]	0		0			0			0			

# Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.00	0.01	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	28.03	27.54	8.82	0.00	0.00	0.00	8.27	0.00	0.00	0.00	0.00	0.00
Movement LOS	D	D	Α		Α	Α	Α	Α				
95th-Percentile Queue Length [veh]	2.63	2.63	0.03	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	65.65	65.65	0.64	0.00	0.00	0.00	10.86	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		27.07		0.00				4.94				
Approach LOS		D		A A							А	
d_I, Intersection Delay [s/veh]						7.	48					
Intersection LOS	D											



#### Intersection Level Of Service Report #9: Central Ave and I-15 NB

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 19.9
Level Of Service: C
Volume to Capacity (v/c): 0.080

Scenario 1: 1: AM Scenario

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## Intersection Setup

Name													
Approach	١	Northboun	d	-	Eastbound			Westbound			Southeastbound		
Lane Configuration		ት		1		IIr							
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]	0.00		0.00		0.00			0.00					
Crosswalk	yes		yes		yes			yes					

Name												
Base Volume Input [veh/h]	15	0	177	6	305	0	0	202	44	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	10.80	16.70	2.00	2.00	2.00	11.40	13.60	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	0	177	6	305	0	0	202	44	0	0	0
Peak Hour Factor	0.5360	1.0000	0.8510	0.7500	0.7190	1.0000	1.0000	0.8420	0.7330	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	52	2	106	0	0	60	15	0	0	0
Total Analysis Volume [veh/h]	28	0	208	8	424	0	0	240	60	0	0	0
Pedestrian Volume [ped/h]	0		0		0			0				
Bicycle Volume [bicycles/h]		0			0 0			0				

# Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.34	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	19.87	19.21	15.45	7.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Movement LOS	С	С	С	Α	Α			Α	Α			
95th-Percentile Queue Length [veh]	2.07	2.07	2.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	51.73	51.73	51.73	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		15.98		0.15		0.00						
Approach LOS		C A A								А		
d_I, Intersection Delay [s/veh]	3.96											
Intersection LOS	С											



# Intersection Level Of Service Report #10: Central Ave and Vaughn Rd

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 27.1
Level Of Service: D
Volume to Capacity (v/c): 0.377

Scenario 1: 1: AM Scenario

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## Intersection Setup

Name							
Approach	Southbound		Eastt	oound	West	bound	
Lane Configuration	₩.		٦	1	IF		
Turning Movement	Left Right		Left	Thru	Thru	Right	
Lane Width [ft]	12.00 12.00		12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30.00		30	.00	30.00		
Grade [%]	0.00		0.	00	0.00		
Crosswalk	yes		y	es	yes		

Name						
Base Volume Input [veh/h]	77	60	71	410	184	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	6.70	7.00	5.10	11.40	6.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	77	60	71	410	184	65
Peak Hour Factor	0.7700	0.7890	0.8450	0.8010	0.8520	0.7740
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	19	21	128	54	21
Total Analysis Volume [veh/h]	100 76 84 512		512	216	84	
Pedestrian Volume [ped/h]	] 0		(	)		0
Bicycle Volume [bicycles/h]		0	(	)		0

# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.38	0.10	0.07	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	27.07	18.19	8.13	0.00	0.00	0.00
Movement LOS	D	С	Α	A	Α	A
95th-Percentile Queue Length [veh]	2.47	2.47	0.22	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	61.70	61.70	5.47	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	23.23		1.15		0.00	
Approach LOS	С		Α		A	
d_I, Intersection Delay [s/veh]	4.45					
Intersection LOS	D					



# Intersection Level Of Service Report #11: Vaughn Rd and I-15 SB

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 10.1
Level Of Service: B
Volume to Capacity (v/c): 0.260

Scenario 1: 1: AM Scenario

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## Intersection Setup

Crosswalk	yes		yes		yes	
Grade [%]	0.00		0.00		0.00	
Speed [mph]	30.00		30.00		30.00	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Pocket	0	0	0	0	0	0
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Configuration	₩.		1			
Approach	Southbound		Eastbound		Westbound	
Name						

Name						
Base Volume Input [veh/h]	219	1	0	27	12	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.60	0.00	2.00	11.10	8.30	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	219	1	0	27	12	0
Peak Hour Factor	0.8830	0.2500	1.0000	0.8440	0.7500	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	62	1	0	8	4	0
Total Analysis Volume [veh/h]	248	4	0	32	16	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Scenario 1: 1: AM Scenario

# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

## Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.26 0.00		0.00		0.00	0.00		
d_M, Delay for Movement [s/veh]	10.11 9.71		0.00	0.00	0.00	0.00		
Movement LOS	В А			A	A			
95th-Percentile Queue Length [veh]	1.06	1.06	0.00	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	26.50	26.50	0.00	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]	10	.10	0.00		0.00			
Approach LOS	E	3		A	A			
d_I, Intersection Delay [s/veh]			8.	.49				
Intersection LOS		В						



Intersection Level Of Service Report #12: Vaughn Rd and I-15 NB

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 7.3
Level Of Service: A
Volume to Capacity (v/c): 0.000

Scenario 1: 1: AM Scenario

## Intersection Setup

Name							
Approach	Eastbound		West	bound	Southeastbound		
Lane Configuration	4		1	ſ			
Turning Movement	Left	Thru	Thru	Right	Left	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0 0		0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	.00	30	.00	30.00		
Grade [%]	0.00		0.00		0.00		
Crosswalk	y	es	у	es	yes		

Name						
Base Volume Input [veh/h]	0	237	19	76	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	5.30	14.50	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	237	19	76	0	0
Peak Hour Factor	1.0000	0.8590	0.5940	0.8260	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	69	8	23	0	0
Total Analysis Volume [veh/h]	0	276	32	92	0	0
Pedestrian Volume [ped/h]		0		0		0
Bicycle Volume [bicycles/h]		0		0		0

Scenario 1: 1: AM Scenario

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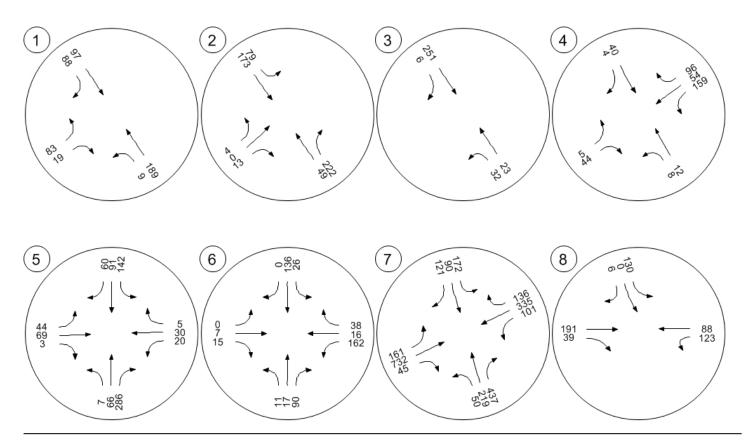
# Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00 0.00		0.00	0.00	
Movement LOS	Α	А	A A				
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	0.	00	0	.00	0.00		
Approach LOS	,	4		A	F	4	
d_I, Intersection Delay [s/veh]			0	.00			
Intersection LOS	A						

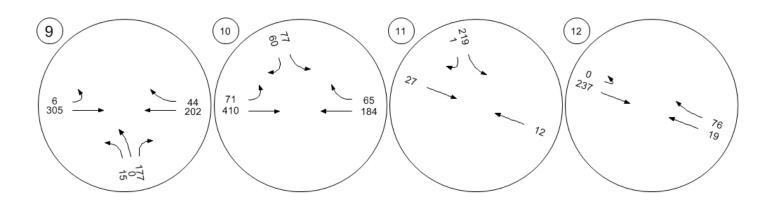
# Traffic Volume - Base Volume





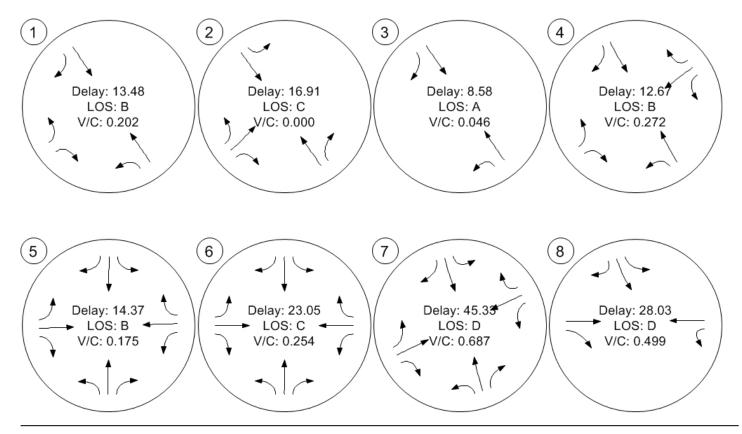
# Traffic Volume - Base Volume





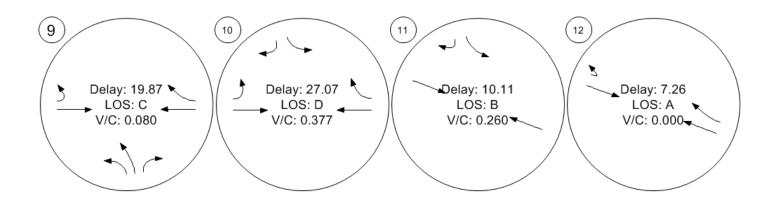
# **Traffic Conditions**





# Traffic Conditions





# I-15 Corridor Study

Vistro File: F:\...\I-15 Corridor.vistropdb Report File: F:\...\LOS\_Report\_PM.pdf Scenario 2: PM Scenario

9/15/2014

# **Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Tri Hill and Frontage Airport Rd	Two-way stop	HCM2010	NEBL	0.256	14.5	В
2	I-15 NB and Airport Rd	Two-way stop	HCM2010	NEBT	0.053	55.4	F
3	I-15 SB On and Airport RD	Two-way stop	HCM2010	NWBL	0.063	11.0	В
4	I-15 SB Off and Airport RD Frontage	Two-way stop	HCM2010	SWBL	0.660	35.3	Е
5	14th St SW and I-315 EB	Signalized	HCM2010	NBL	0.368	13.0	В
6	14th St SW and I-315 WB	Signalized	HCM2010	EBR	0.536	19.4	В
7	Fox Farm and I-315	Signalized	HCM2010	NBT	0.795	38.5	D
8	Central Ave and I15 SB	Two-way stop	HCM2010	SBL	0.432	42.0	Е
9	Central Ave and I-15 NB	Two-way stop	HCM2010	NBL	0.303	29.1	D
10	Central Ave and Vaughn Rd	Two-way stop	HCM2010	SBL	0.576	65.0	F
11	Vaughn Rd and I-15 SB	Two-way stop	HCM2010	SBL	0.177	10.1	В
12	Vaughn Rd and I-15 NB	Two-way stop	HCM2010	EBL	0.000	7.3	Α

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

# Intersection Level Of Service Report #1: Tri Hill and Frontage Airport Rd

Control Type:Two-way stopDelay (sec / veh):14.5Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.256

## Intersection Setup

Name							
Approach	Northeastbound		Northwe	estbound	Southeastbound		
Lane Configuration	т		٦	1	<b>+</b>		
Turning Movement	Left	Right	Left Thru		Thru	Right	
Lane Width [ft]	12.00 12.00		12.00 12.00		12.00	12.00	
No. of Lanes in Pocket	0	0	0 0		0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	.00	30.00		30.00		
Grade [%]	0.00		0.00		0.00		
Crosswalk	yes		yes		yes		

Name								
Base Volume Input [veh/h]	75	7	9	160	207	70		
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Heavy Vehicles Percentage [%]	2.70	0.00	22.20	33.80	18.90	15.80		
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00		
In-Process Volume [veh/h]	0	0	0	0	0	0		
Site-Generated Trips [veh/h]	0	0	0	0	0	0		
Diverted Trips [veh/h]	0	0	0	0	0	0		
Pass-by Trips [veh/h]	0	0	0	0	0	0		
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0		
Other Volume [veh/h]	0	0	0	0	0	0		
Total Hourly Volume [veh/h]	75	7	9	160	207	70		
Peak Hour Factor	0.5680	0.4380	0.7500	0.8000	0.8480	0.8330		
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Total 15-Minute Volume [veh/h]	33	4	3	50	61	21		
Total Analysis Volume [veh/h]	132	16	12	200	244	84		
Pedestrian Volume [ped/h]		0		0	0			
Bicycle Volume [bicycles/h]		0		0		0		



# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.26	0.02	0.01	0.00	0.00	0.00		
d_M, Delay for Movement [s/veh]	14.52	12.30	8.23 0.00		0.00	0.00		
Movement LOS	В	В	A A		Α	A		
95th-Percentile Queue Length [veh]	1.12	1.12	0.03 0.00		0.00	0.00		
95th-Percentile Queue Length [ft]	28.04	28.04	0.81	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]	14	.28	0.	47	0.00			
Approach LOS	E	3		A	A			
d_I, Intersection Delay [s/veh]	3.22							
Intersection LOS		В						

# Intersection Level Of Service Report #2: I-15 NB and Airport Rd

Control Type:Two-way stopDelay (sec / veh):55.4Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):0.053

## Intersection Setup

Name												
Approach	Northeastbound		Sou	Southwestbound		Northwestbound			Southeastbound			
Lane Configuration	+					4		+				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			30.00		30.00		30.00			
Grade [%]	0.00			0.00		0.00		0.00				
Crosswalk		yes			yes		yes			yes		

Name												
Base Volume Input [veh/h]	2	2	31	0	0	0	0	47	197	307	236	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	47.40	2.00	2.00	2.00	2.00	40.40	20.80	0.70	17.40	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	2	31	0	0	0	0	47	197	307	236	0
Peak Hour Factor	0.5000	0.5000	0.7750	1.0000	1.0000	1.0000	1.0000	0.6910	0.8210	0.6910	0.8680	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	10	0	0	0	0	17	60	111	68	0
Total Analysis Volume [veh/h]	4	4	40	0	0	0	0	68	240	444	272	0
Pedestrian Volume [ped/h]	0			0				0		0		
Bicycle Volume [bicycles/h]	0			0				0	•	0		

# Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.05	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00
d_M, Delay for Movement [s/veh]	48.66	55.37	12.63	0.00	0.00	0.00	0.00	0.00	0.00	9.40	0.00	0.00
Movement LOS	E	F	В					Α	А	Α	Α	
95th-Percentile Queue Length [veh]	0.56	0.56	0.56	0.00	0.00	0.00	0.00	0.00	0.00	3.74	3.74	0.00
95th-Percentile Queue Length [ft]	13.96	13.96	13.96	0.00	0.00	0.00	0.00	0.00	0.00	93.56	93.56	0.00
d_A, Approach Delay [s/veh]		19.19		0.00				0.00		5.83		
Approach LOS		С			А			Α		А		
d_I, Intersection Delay [s/veh]	4.75											
Intersection LOS	F											

I-15 Corridor Study Scenario 2: 2: PM Scenario

## Intersection Level Of Service Report #3: I-15 SB On and Airport RD

Control Type:Two-way stopDelay (sec / veh):11.0Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.063

## Intersection Setup

Name							
Approach	Northea	astbound	Northwe	estbound	Southea	astbound	
Lane Configuration			•	1	F		
Turning Movement	Left	Right	Left	Thru	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0 0		0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	30.00		0.00	30.00		
Grade [%]	0.	.00	0.	.00	0.00		
Crosswalk	у	es	у	es	yes		

Name							
Base Volume Input [veh/h]	0	0	25	21	542	14	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	64.00	19.10	7.30	0.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [ve	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	0	0	25	21	542	14	
Peak Hour Factor	1.0000	1.0000	0.6250	0.7500	0.7450	0.7000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	0	0	10	7	182	5	
Total Analysis Volume [veh/h]	0	0	40	28	728	20	
Pedestrian Volume [ped/h]	0			0	0		
Bicycle Volume [bicycles/h]	(	)		0		0	



# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.00	0.00	0.06 0.00		0.01	0.00					
d_M, Delay for Movement [s/veh]	0.00	0.00	11.03 0.00		0.00	0.00					
Movement LOS			В А		A	A					
95th-Percentile Queue Length [veh]	0.00	0.00	0.36 0.36		0.00	0.00					
95th-Percentile Queue Length [ft]	0.00	0.00	8.91	8.91	0.00	0.00					
d_A, Approach Delay [s/veh]	0.	00	6.	49	0.	00					
Approach LOS	/	A	,	4	A						
d_I, Intersection Delay [s/veh]	0.54										
Intersection LOS	В										

ith PTV VISTRO I-15 Corridor Study

# Intersection Level Of Service Report #4: I-15 SB Off and Airport RD Frontage

Scenario 2: 2: PM Scenario

Control Type:Two-way stopDelay (sec / veh):35.3Analysis Method:HCM2010Level Of Service:EAnalysis Period:15 minutesVolume to Capacity (v/c):0.660

## Intersection Setup

Name													
Approach	No	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration	₩.			46				4		F			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]	0.00			0.00			0.00			0.00			
Crosswalk		yes			yes			yes			yes		

Name												
Base Volume Input [veh/h]	0	0	55	217	26	47	8	15	0	0	286	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.00	1.80	18.90	11.50	2.10	37.50	6.70	2.00	2.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	55	217	26	47	8	15	0	0	286	1
Peak Hour Factor	1.0000	1.0000	0.7240	0.8350	0.7220	0.6910	0.6670	0.7500	1.0000	1.0000	0.6810	0.2500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	19	65	9	17	3	5	0	0	105	1
Total Analysis Volume [veh/h]	0	0	76	260	36	68	12	20	0	0	420	4
Pedestrian Volume [ped/h]	0			0				0		0		
Bicycle Volume [bicycles/h]	0			0				0		0		

# Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no	no		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.00	0.00	0.12	0.66	0.08	0.06	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	14.08	0.00	11.47	35.33	33.80	8.64	8.76	0.00	0.00	0.00	0.00	0.00
Movement LOS	В		В	E	D	Α	Α	Α			Α	Α
95th-Percentile Queue Length [veh]	0.41	0.00	0.41	5.82	5.82	0.21	0.10	0.10	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	10.19	0.00	10.19	145.42	145.42	5.15	2.56	2.56	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		11.47		30.19				3.29		0.00		
Approach LOS		В		D				Α		А		
d_I, Intersection Delay [s/veh]	13.35											
Intersection LOS	E											

### Intersection Level Of Service Report #5: 14th St SW and I-315 EB

Control Type: Signalized Delay (sec / veh): 13.0
Analysis Method: HCM2010 Level Of Service: B
Analysis Period: 15 minutes Volume to Capacity (v/c): 0.368

## Intersection Setup

Name													
Approach	١	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration		٦١٢		пiг				٦١٢		пiг			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]	0.00			0.00			0.00			0.00			
Crosswalk	yes			yes			yes			yes			

Name												
Base Volume Input [veh/h]	13	82	260	95	396	262	107	168	10	102	50	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.40	1.20	4.30	1.30	0.40	0.90	0.00	0.00	1.00	0.00	12.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	82	260	95	396	262	107	168	10	102	50	31
Peak Hour Factor	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	22	69	25	106	70	29	45	3	27	13	8
Total Analysis Volume [veh/h]	14	87	277	101	422	279	114	179	11	109	53	33
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate	/ 0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	



# Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	2	3	0	6	7	7	4	0	3	8	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	15	0	5	15	15	5	0	15	15	0
Maximum Green [s]	0	50	20	0	50	20	20	45	0	20	45	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	22	18	0	22	18	18	20	0	18	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	5	0	5	0	0	5	0	5	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	10	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Scenario 2: 2: PM Scenario

# **Lane Group Calculations**

Lane Group	L	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	3.00	5.00	5.00	4.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	18	18	38	18	18	38	32	14	14	32	14	14
g / C, Green / Cycle	0.31	0.31	0.64	0.31	0.31	0.64	0.54	0.24	0.24	0.54	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.01	0.05	0.17	0.08	0.22	0.17	0.07	0.09	0.01	0.07	0.03	0.02
s, saturation flow rate [veh/h]	980	1855	1596	1276	1876	1609	1573	1900	1615	1497	1900	1430
c, Capacity [veh/h]	181	566	1018	416	572	1027	1004	459	390	897	459	345
d1, Uniform Delay [s]	26.77	15.19	4.75	19.22	18.69	4.75	6.76	19.06	17.38	6.92	17.75	17.67
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.18	0.12	0.14	0.30	1.88	0.14	0.05	0.54	0.03	0.06	0.11	0.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.08	0.15	0.27	0.24	0.74	0.27	0.11	0.39	0.03	0.12	0.12	0.10
d, Delay for Lane Group [s/veh]	26.95	15.32	4.89	19.52	20.56	4.89	6.81	19.60	17.41	6.98	17.86	17.79
Lane Group LOS	С	В	Α	В	С	Α	Α	В	В	Α	В	В
Critical Lane Group	no	no	no	no	yes	yes	no	yes	no	no	no	no
50th-Percentile Queue Length [veh]	0.19	0.81	1.09	1.12	5.03	1.10	0.59	2.00	0.11	0.57	0.55	0.34
50th-Percentile Queue Length [ft]	4.75	20.31	27.29	28.03	125.69	27.47	14.87	49.98	2.78	14.22	13.67	8.53
95th-Percentile Queue Length [veh]	0.34	1.46	1.96	2.02	8.70	1.98	1.07	3.60	0.20	1.02	0.98	0.61
95th-Percentile Queue Length [ft]	8.55	36.56	49.12	50.46	217.62	49.44	26.77	89.97	5.01	25.60	24.60	15.36



# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.95	15.32	4.89	19.52	20.56	4.89	6.81	19.60	17.41	6.98	17.86	17.79	
Movement LOS	С	В	Α	В	С	Α	Α	В	В	Α	В	В	
d_A, Approach Delay [s/veh]		8.11			14.98			14.72			11.77		
Approach LOS		Α			В			В			В		
d_I, Intersection Delay [s/veh]						13	.01						
Intersection LOS						I	3						
Intersection V/C						0.3	368						

# Sequence

Ring 1	2	7	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### Intersection Level Of Service Report #6: 14th St SW and I-315 WB

Control Type: Signalized Delay (sec / veh): 19.4
Analysis Method: HCM2010 Level Of Service: B
Analysis Period: 15 minutes Volume to Capacity (v/c): 0.536

## Intersection Setup

Name												
Approach	١	lorthboun	d	S	Southboun	d	ı	Eastbound	d	٧	Vestbound	d
Lane Configuration		٦١٢			٦F			+			<b>4</b> r	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			30.00			30.00			30.00	
Grade [%]		0.00			0.00			0.00			0.00	
Crosswalk		yes			yes			yes			yes	

Name												
Base Volume Input [veh/h]	5	76	146	22	131	2	3	5	19	638	12	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	40.00	6.60	0.70	0.00	2.30	0.00	0.00	0.00	15.80	1.80	8.30	4.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	76	146	22	131	2	3	5	19	638	12	142
Peak Hour Factor	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	19	37	6	33	1	1	1	5	161	3	36
Total Analysis Volume [veh/h]	5	77	148	22	133	2	3	5	19	646	12	144
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate	/ 0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	



# Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	1	2	0	1	0	0	3	0	0	2	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	5	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	35	40	0	35	0	0	25	0	0	40	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	25	19	0	25	0	0	16	0	0	19	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	9	7	0	9	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	11	7	0	11	0	0	0	0	0	7	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		no	no		no			no			no	
Maximum Recall		no	no		no			no			no	
Pedestrian Recall		no	no		no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Scenario 2: 2: PM Scenario

# Lane Group Calculations

Lane Group	L	С	R	L	С	С	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	10	10	44	10	10	2	29	29
g / C, Green / Cycle	0.17	0.17	0.73	0.17	0.17	0.03	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.01	0.05	0.10	0.02	0.08	0.02	0.44	0.10
s, saturation flow rate [veh/h]	819	1604	1443	1209	1667	1514	1505	1395
c, Capacity [veh/h]	164	265	1050	223	275	46	721	668
d1, Uniform Delay [s]	27.03	21.97	2.49	25.56	22.75	28.72	14.48	9.09
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.19	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.07	0.60	0.06	0.19	1.35	11.38	8.39	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.03	0.29	0.14	0.10	0.49	0.59	0.91	0.22
d, Delay for Lane Group [s/veh]	27.10	22.57	2.55	25.75	24.11	40.09	22.87	9.25
Lane Group LOS	С	С	А	С	С	D	С	Α
Critical Lane Group	no	no	no	no	yes	yes	yes	no
50th-Percentile Queue Length [veh]	0.07	0.94	0.29	0.29	1.72	0.51	8.46	0.96
50th-Percentile Queue Length [ft]	1.71	23.40	7.27	7.21	43.07	12.75	211.56	24.03
95th-Percentile Queue Length [veh]	0.12	1.68	0.52	0.52	3.10	0.92	13.23	1.73
95th-Percentile Queue Length [ft]	3.07	42.12	13.09	12.99	77.53	22.96	330.84	43.26



# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.10	22.57	2.55	25.75	24.11	24.11	40.09	40.09	40.09	22.87	22.87	9.25		
Movement LOS	С	С	Α	С	С	С	D	D	D	С	С	Α		
d_A, Approach Delay [s/veh]		9.78			24.34			40.09			20.42			
Approach LOS		Α			С			D						
d_I, Intersection Delay [s/veh]						19	.35							
Intersection LOS						I	3							
Intersection V/C						0.5	536							

# Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	_	-	-	-	-	-	-	-	1	-
Ring 3	-	-	-	-	-	-	_	-	-	-	-	-	-	-	1	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### Intersection Level Of Service Report #7: Fox Farm and I-315

Control Type:SignalizedDelay (sec / veh):38.5Analysis Method:HCM2010Level Of Service:DAnalysis Period:15 minutesVolume to Capacity (v/c):0.795

## Intersection Setup

Name												
Approach	١	orthboun	d	S	Southboun	d	No	rtheastbo	und	Sou	uthwestbo	und
Lane Configuration		<u> 117</u>			<u>1  (</u>			Ш		•	ıIIIr	
Turning Movement	Left Thru Right			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0 0 0			0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00				30.00			30.00			30.00	
Grade [%]	0.00				0.00			0.00			0.00	
Crosswalk	yes				yes			yes			yes	

Name												
Base Volume Input [veh/h]	71	155	227	153	274	325	242	706	103	486	874	250
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.80	1.90	0.40	1.30	0.70	2.10	2.50	3.60	2.90	0.40	3.90	1.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	71	155	227	153	274	325	242	706	103	486	874	250
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	42	62	42	74	88	66	192	28	132	238	68
Total Analysis Volume [veh/h]	77	168	247	166	298	353	263	767	112	528	950	272
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate	/ 0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	



# Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	1	8	0	3	6	6	4	0	8	2	5
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	5	0	5	5	5	5	0	5	5	0
Maximum Green [s]	0	60	60	0	60	60	60	60	0	60	60	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	31	28	0	20	25	25	41	0	28	44	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

I-15 Corridor Study Scenario 2: 2: PM Scenario

# **Lane Group Calculations**

Lane Group	С	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	3.00	5.00	5.00	3.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	16	16	75	25	25	55	25	42	42	24	40	40
g / C, Green / Cycle	0.13	0.13	0.62	0.21	0.21	0.46	0.21	0.35	0.35	0.20	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.05	0.11	0.17	0.13	0.09	0.25	0.17	0.24	0.08	0.17	0.30	0.19
s, saturation flow rate [veh/h]	1604	1527	1448	1279	3233	1424	1589	3143	1413	3150	3134	1431
c, Capacity [veh/h]	211	201	903	303	682	657	332	1093	491	624	1055	482
d1, Uniform Delay [s]	47.76	50.63	10.25	45.27	41.14	23.11	44.98	33.77	27.73	46.37	37.89	32.60
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.21	7.40	0.16	1.55	0.44	0.68	4.26	0.83	0.23	3.29	3.12	1.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.40	0.81	0.27	0.55	0.44	0.54	0.79	0.70	0.23	0.85	0.90	0.56
d, Delay for Lane Group [s/veh]	48.97	58.03	10.41	46.82	41.59	23.80	49.23	34.60	27.96	49.65	41.02	33.65
Lane Group LOS	D	E	В	D	D	С	D	С	С	D	D	С
Critical Lane Group	no	no	yes	no	no	yes	yes	no	no	no	yes	no
50th-Percentile Queue Length [veh]	2.37	5.13	2.92	4.73	3.88	7.19	7.80	9.70	2.33	7.85	13.56	6.60
50th-Percentile Queue Length [ft]	59.22	128.16	73.04	118.23	97.06	179.81	194.94	242.50	58.19	196.24	339.12	164.94
95th-Percentile Queue Length [veh]	4.26	8.84	5.26	8.30	6.99	11.59	12.38	14.81	4.19	12.44	19.60	10.81
95th-Percentile Queue Length [ft]	106.59	220.99	131.48	207.39	174.71	289.77	309.43	370.20	104.74	311.11	490.12	270.25

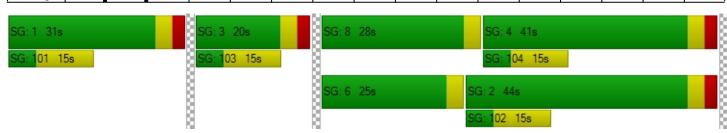


# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.97	57.68	10.41	46.82	41.59	23.80	49.23	34.60	27.96	49.65	41.02	33.65		
Movement LOS	D	E	В	D	D	С	D	С	С	D	D	С		
d_A, Approach Delay [s/veh]		32.58			34.96			37.32						
Approach LOS		С			С			D						
d_I, Intersection Delay [s/veh]						38	.46							
Intersection LOS						Γ	)							
Intersection V/C	0.795													

# Sequence

F	Ring 1	1	3	8	4	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 2		-	6	2	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### Intersection Level Of Service Report #8: Central Ave and I15 SB

Control Type:Two-way stopDelay (sec / veh):42.0Analysis Method:HCM2010Level Of Service:EAnalysis Period:15 minutesVolume to Capacity (v/c):0.432

## Intersection Setup

Name		0 "1 1										
Approach	S	outhboun	d		Eastbound	d	\	Vestboun	d	Nor	rthwestboo	und
Lane Configuration		ጎፐ			٦٢			1				
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0 0 0			0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00				30.00			30.00			30.00	
Grade [%]	0.00				0.00			0.00			0.00	
Crosswalk	yes				yes			yes			yes	

Name												
Base Volume Input [veh/h]	66	0	6	0	166	30	230	299	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	6.00	0.00	0.00	2.00	0.60	0.00	6.50	1.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	0	6	0	166	30	230	299	0	0	0	0
Peak Hour Factor	0.9170	1.0000	0.7500	1.0000	0.8470	0.8330	0.8980	0.8690	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	0	2	0	49	9	64	86	0	0	0	0
Total Analysis Volume [veh/h]	72	0	8	0	196	36	256	344	0	0	0	0
Pedestrian Volume [ped/h]		0			0		0			0		
Bicycle Volume [bicycles/h]		0			0			0		0		

# Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.43	0.00	0.01	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	42.03	39.90	10.18	0.00	0.00	0.00	8.29	0.00	0.00	0.00	0.00	0.00
Movement LOS	E	E	В		А	Α	Α	Α				
95th-Percentile Queue Length [veh]	1.96	1.96	0.03	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	48.88	48.88	0.86	0.00	0.00	0.00	17.46	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		38.84	38.84 0.00				3.54		0.00			
Approach LOS		E	A A						А			
d_I, Intersection Delay [s/veh]	5.73											
Intersection LOS	E											

### Intersection Level Of Service Report #9: Central Ave and I-15 NB

Control Type:Two-way stopDelay (sec / veh):29.1Analysis Method:HCM2010Level Of Service:DAnalysis Period:15 minutesVolume to Capacity (v/c):0.303

## Intersection Setup

Name												
Approach	١	Northbound			Eastbound		Westbound			Southeastbound		und
Lane Configuration		ት			1		IIr					
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00 1		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00		30.00		30.00			30.00			
Grade [%]		0.00		0.00		0.00		0.00				
Crosswalk		yes			yes		yes			yes		

Name												
Base Volume Input [veh/h]	57	0	170	5	249	0	0	471	113	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.80	0.00	7.00	0.00	2.00	2.00	2.00	4.60	0.90	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	0	170	5	249	0	0	471	113	0	0	0
Peak Hour Factor	0.7130	1.0000	0.7590	0.4170	0.8650	1.0000	1.0000	0.9350	0.8310	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	0	56	3	72	0	0	126	34	0	0	0
Total Analysis Volume [veh/h]	80	0	224	12	288	0	0	504	136	0	0	0
Pedestrian Volume [ped/h]		0		0		0			0			
Bicycle Volume [bicycles/h]		0			0		0			0		

# Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.30	0.00	0.30	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	29.07	27.04	20.30	8.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Movement LOS	D	D	С	Α	Α			Α	Α			
95th-Percentile Queue Length [veh]	3.98	3.98	3.98	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	99.39	99.39	99.39	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		22.61 0.34			0.00			0.00				
Approach LOS	С			C A A					А			
d_I, Intersection Delay [s/veh]	5.61											
Intersection LOS	D											

# Intersection Level Of Service Report #10: Central Ave and Vaughn Rd

Control Type:Two-way stopDelay (sec / veh):65.0Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):0.576

## Intersection Setup

Name							
Approach	Southbound		East	oound	Westbound		
Lane Configuration	т		٦	1	l l l		
Turning Movement	Left	Right	Left	Thru	Thru	Right	
Lane Width [ft]	12.00	12.00 12.00		12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	30.00		30.00		0.00	
Grade [%]	0.00		0.00		0.00		
Crosswalk	y	yes		yes		res	

Name							
Base Volume Input [veh/h]	68	121	66	361	462	76	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.90	1.60	1.50	4.00	3.40	2.60	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	68	121	66	361	462	76	
Peak Hour Factor	0.6540	0.9450	0.7500	0.7910	0.8680	0.7310	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	26	32	22	114	133	26	
Total Analysis Volume [veh/h]	104	128	88	456	532	104	
Pedestrian Volume [ped/h]	0			0	0		
Bicycle Volume [bicycles/h]	0			0	0		



# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.58	0.25	0.09	0.00	0.01	0.00	
d_M, Delay for Movement [s/veh]	65.02	52.12	9.18	0.00	0.00	0.00	
Movement LOS	F	F	A	A	А	Α	
95th-Percentile Queue Length [veh]	6.75	6.75	0.31	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	168.80	168.80	7.64	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	57.	.91	1.	48	0.0	00	
Approach LOS	F	=	,	4	A	4	
d_I, Intersection Delay [s/veh]	10.09						
Intersection LOS	F						

# Intersection Level Of Service Report #11: Vaughn Rd and I-15 SB

Control Type:Two-way stopDelay (sec / veh):10.1Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.177

## Intersection Setup

Name							
Approach	Southbound		Eastl	bound	Westbound		
Lane Configuration	1	т				1	
Turning Movement	Left	Right	Left	Thru	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	30.00		30.00		0.00	
Grade [%]	0.00		0.00		0.00		
Crosswalk	yes		yes		yes		

Name						
Base Volume Input [veh/h]	143	1	0	53	50	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	2.00	7.60	4.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	143	1	0	53	50	0
Peak Hour Factor	0.9410	0.2500	1.0000	0.7790	0.8930	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	1	0	17	14	0
Total Analysis Volume [veh/h]	152	4	0	68	56	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

# Intersection Settings

Priority Scheme	Stop	Free	Free	
Flared Lane	no			
Storage Area [veh]	0	0	0	
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	

V/C, Movement V/C Ratio	0.18	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	10.11	9.46	0.00	0.00	0.00	0.00	
Movement LOS	В	А		A	Α		
95th-Percentile Queue Length [veh]	0.66	0.66	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	16.44	16.44	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	10.09		0.00		0.00		
Approach LOS	В		A		A		
d_I, Intersection Delay [s/veh]	5.62						
Intersection LOS	В						

Generated with PTV VISTRO I-15 Corridor Study Scenario 2: 2: PM Scenario

# Intersection Level Of Service Report #12: Vaughn Rd and I-15 NB

Control Type:Two-way stopDelay (sec / veh):7.3Analysis Method:HCM2010Level Of Service:AAnalysis Period:15 minutesVolume to Capacity (v/c):0.000

#### Intersection Setup

Name						
Approach	Eastbound		Westbound		Southeastbound	
Lane Configuration	,	1 Ir				
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	у	es	у	es	yes	

#### Volumes

Name							
Base Volume Input [veh/h]	0	165	55	334	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	0.00	6.10	1.80	4.80	2.00	2.00	
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [ve	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	0	165	55	334	0	0	
Peak Hour Factor	1.0000	0.7500	0.8090	0.9180	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	0	55	17	91	0	0	
Total Analysis Volume [veh/h]	0	220	68	364	0	0	
Pedestrian Volume [ped/h]		0		0		Ö	
Bicycle Volume [bicycles/h]		0	0		0		

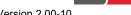


### Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

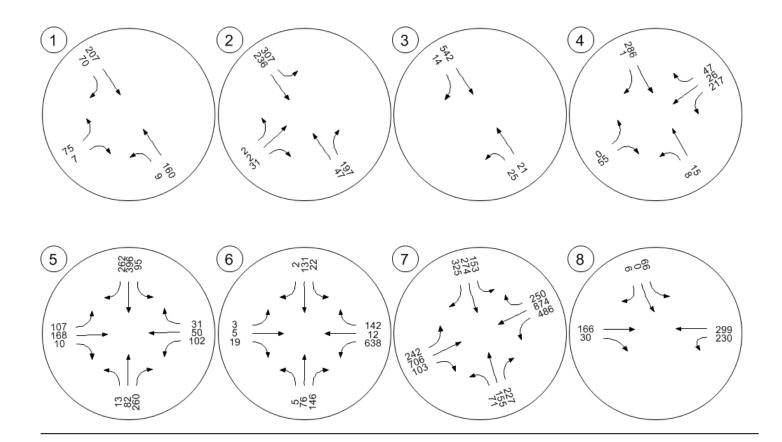
#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	0.00	0.00	0.00	
Movement LOS	Α	A	Α	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	0.0	00	0.00		0.00		
Approach LOS	A	4		A		A	
d_I, Intersection Delay [s/veh]	0.00						
Intersection LOS				A			



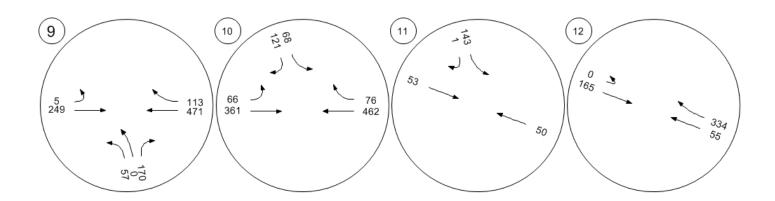
# Traffic Volume - Base Volume





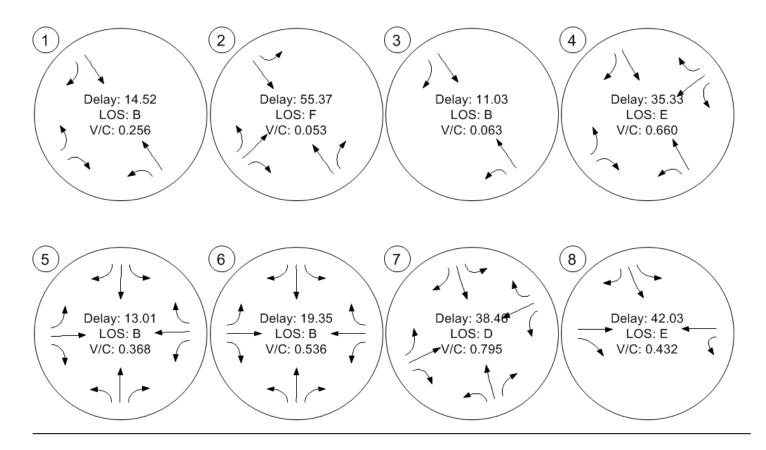
# Traffic Volume - Base Volume





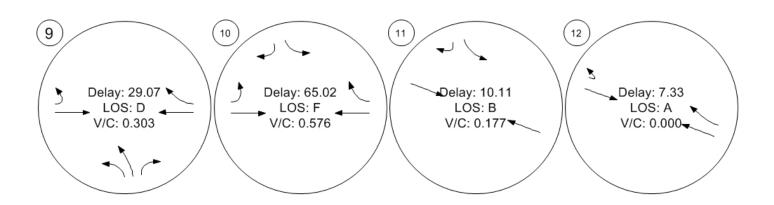
#### **Traffic Conditions**

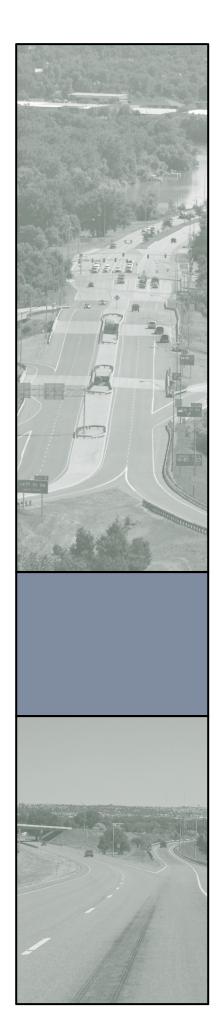




# **Traffic Conditions**









# **APPENDIX D**

**Projected Conditions Traffic Data Analysis** 

	BASIC FRI	EWAY SE	GMENTS WORKSHEE	ΕT	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsyl 9/15/2014 AM Peak	the	Highway/Direction of Trav From/To Jurisdiction Analysis Year	el <i>I-315 E</i>	astbound
•	Corridor Study		,		
✓ Oper.(LOS)	-		Des.(N)	☐ Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	627	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.87 6 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] <b>0</b> .971	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured)	2 55.0	ft ft ramps/mi mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment		mph mph mph
Base free-flow Speed, BFFS		mph	FFS	55.0	mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times V)$ $x f_p)$ $S$ $D = v_p / S$ $LOS$	N x f <sub>HV</sub> 371 55.0 6.7 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times x f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		/estbound 14th Ave
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			es.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	514	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.76 6 0 Level mi	
Calculate Flow Adjus	tments		Up/Down %		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.971	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	2 55.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	55.0	mph mph mph mph
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p)$ $S$ $D = v_p / S$ LOS	N x f <sub>HV</sub> 348 55.0 6.3 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FRI	EWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		astbound 14th Ave
Project Description I-15 C	Corridor Study		. ,		
✓ Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	799	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.83 4 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	55.0	mph mph	FFS	55.0	mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> )	-	pc/h/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
S D = v <sub>p</sub> / S LOS	55.0 8.9 A	mph pc/mi/ln	S $D = v_p / S$ Required Number of Lanes	s, N	mph pc/mi/ln
Glossary	-	-	Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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Information  ray/Direction of Travel <i>I-315 Westbound</i> To
To
Planning Data  Hour Factor, PHF 0.93 cks and Buses, P <sub>T</sub> 5 c, P <sub>R</sub> 0 ral Terrain: Level e % Length mi Up/Down %  1.2  1/[1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1)] 0.976
Hour Factor, PHF 0.93 cks and Buses, P <sub>T</sub> 5 s, P <sub>R</sub> 0 ral Terrain: Level e % Length mi Up/Down %  1.2 1/[1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1)] 0.976
Hour Factor, PHF 0.93 cks and Buses, P <sub>T</sub> 5 s, P <sub>R</sub> 0 ral Terrain: Level e % Length mi Up/Down %  1.2 1/[1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1)] 0.976
cks and Buses, P <sub>T</sub> 5 s, P <sub>R</sub> 0 ral Terrain: Level e % Length mi Up/Down %  1.2 1/[1+P <sub>T</sub> (E <sub>T</sub> -1) + P <sub>R</sub> (E <sub>R</sub> -1)] 0.976
2 % Length <i>mi</i> Up/Down %  1.2  1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)] 0.976
1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)] <i>0.976</i>
1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)] <i>0.976</i>
Speed Adj and FFS
mph
mph
Adjustment mph
55.0 mph
gn (N)
n (N) n LOS / or DDHV) / (PHF x N x f <sub>HV</sub> pc/h/ln
mph pc/mi/ln red Number of Lanes, N
or Location
i

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		astbound re to Fox Farm
	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	979	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.83 4 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>⊤</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.980	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	2	-	f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	55.0	mph	FFS	55 O	·
Base free-flow Speed, BFFS		mph	irro	55.0	mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x)$ $x f_p)$ $S$ $D = v_p / S$ LOS	N x f <sub>HV</sub> 602 55.0 10.9 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
	e enco		i actor Eccation		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		estbound to Fox Farm
	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐ Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	585	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.82 5 0 Level mi	
DDIIV - MADI XIX D		VCIIIII	Up/Down %	1111	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.976	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mnh
Number of Lanes, N	2		f <sub>LW</sub>		mph
Total Ramp Density, TRD	_	ramps/mi	f <sub>LC</sub>		mph
FFS (measured)	55.0	mph	TRD Adjustment	55.0	mph
Base free-flow Speed, BFFS	00.0	mph	FFS	55.0	mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S	N x f <sub>HV</sub> 366 55.0 6.7	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$	N x f <sub>HV</sub>	pc/h/ln mph pc/mi/ln
LOS	Α		Required Number of Lane	s, N	pomimi
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design			HCS 2010 <sup>TM</sup> Version 6.2		rated: 9/15/2014 8:07

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		astbound e to Fox Farm
Project Description I-15 C	Corridor Study				
☑ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	1216	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.90 3 0 Level mi	
			Up/Down %		_
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft ft			
Rt-Side Lat. Clearance	2	11	f <sub>LW</sub>		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD	55.0	ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	55.0	mph mph	FFS	55.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 686 55.0 12.5 B	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$	N x f <sub>HV</sub>	pc/h/ln mph pc/mi/ln
-			Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	Na. All Dights Doso		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		rated: 0/15/2014 9:11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/15/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		/estbound re to Fox Farm
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)	·		Des.(N)	□Pla	nning Data
Flow Inputs			. ,		
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	1418	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.985	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft	<u> </u>		
Rt-Side Lat. Clearance Number of Lanes, N	2	ft	f <sub>LW</sub>		mph
·	2	romno/mi	f <sub>LC</sub>		mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	55.0	ramps/mi mph mph	TRD Adjustment FFS	55.0	mph mph
LOS and Performanc	e Measures	<b>3</b>	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> )	N x f <sub>HV</sub> 758	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>	pc/h/ln
S D = v <sub>p</sub> / S LOS	55.0 13.8 B	mph pc/mi/ln	$x f_p$ ) $S$ $D = v_p / S$ Required Number of Lane	s, N	mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design  Copyright © 2010 University of Floric		nud	HCS 2010 <sup>TM</sup> Version 6.2	Cono	rated: 9/15/2014 8:1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	☐ Plaı	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	384	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.83 7 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments		· · · · · · · · · · · · · · · · · · ·		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)1 <i>0</i> .966	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft	<u> </u>		
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	2		f <sub>LW</sub>		•
Total Ramp Density, TRD	_	ramps/mi	f <sub>LC</sub>		mph
FFS (measured)	65.0	mph	TRD Adjustment		mph
Base free-flow Speed, BFFS	00.0	mph	FFS	65.0	mph
LOS and Performanc	e Measures	6	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>		Design (N) Design LOS		
x f <sub>p</sub> ) S	65.0	pc/h/ln mph	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N X † <sub>HV</sub>	pc/h/ln
D = v <sub>p</sub> / S	3.7	pc/mi/ln	S		mph
•		рс/пп/п	$D = v_p / S$		pc/mi/ln
LOS	Α		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	230	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.83 21 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.905	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	2	ft ft	f <sub>LW</sub> f <sub>LC</sub>		mph mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	65.0	ramps/mi mph mph	TRD Adjustment FFS	65.0	mph mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 153 65.0 2.4 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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Shane Forsy		Site Information		
Shane Forsy				
9/8/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year	North of	Central
orridor Study				
		Des.(N)	□Plan	ning Data
413	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.97 8 0 Level mi	
		Up/Down %		
tments				
1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 )] 0.962	
		Calc Speed Adj and	FFS	
2	ft ft	f <sub>LW</sub>		mph mph
65.0	ramps/mi mph mph	TRD Adjustment FFS	65.0	mph mph
e Measures		Design (N)		
N x f <sub>HV</sub> 221 65.0 3.4 A	pc/h/ln mph pc/mi/ln	$x f_p$ ) S $D = v_p / S$		pc/h/ln mph pc/mi/ln
		Factor Location		
D - Dens FFS - Free BFFS - Ba	ty -flow speed	f <sub>p</sub> - Page 11-18		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	### ### ### ### ### ### ### ### ### ##	### Additional Study  ### Additional Study  ### Additional Study  ### Additional Study  ### Veh/h  ### Veh/h  ### Additional Study  ### Veh/h  ### Additional Study  ### Veh/h  ### Veh/h  ### Additional Study  ### Veh/h  ### Additional Study  ### Veh/h  ### Additional Study  ### Veh/h  ### Additional Study  ### Veh/h  ### Additional Study  ### Additio	Des.(N)   Des.(N)   Des.(N)	orridor Study  Des.(N)  Plan  A13 veh/h veh/day %Trucks and Buses, $P_T$ 8 %RVs, $P_R$ 0 General Terrain: Level veh/h Grade % Length mi Up/Down %  Tments  1.00  E <sub>R</sub> 1.2  f <sub>HV</sub> = 1/[1+ $P_T$ (E <sub>T</sub> - 1) + $P_R$ (E <sub>R</sub> - 1)] 0.962  Calc Speed Adj and FFS  ft  ft  ft  ft  ft  pesign (N)  Design (N)  Design LOS $V_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p)$ S Required Number of Lanes, N  Factor Location  E <sub>R</sub> - Exhibits 11-10, 11-12  E <sub>T</sub> - Exhibits 11-10, 11-11, 11-13  f <sub>p</sub> - Page 11-18  LOS, S, FFS, $V_p$ - Exhibits 11-2, 11-3  nour volume

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	BASIC FRI	EWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed	Shane Forsyt	the	Highway/Direction of Trave From/To Jurisdiction	North o	f Central
Analysis Time Period  Project Description I-15 C	PM Peak Corridor Study		Analysis Year	2035	
✓ Oper.(LOS)	Joinage Glady		Pes.(N)	□Plai	nning Data
Flow Inputs					<b>3</b>
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	356	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.79 14 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.935	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	2 65.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	65.0	mph mph mph mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 241 65.0 3.7 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Emerson Junction
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	351	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.89 21 0 Level mi	
70.51 X 10 X		VOII/II	Up/Down %	****	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.905	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance		ft ft			mph
Number of Lanes, N	2		f <sub>LW</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	<b>3</b>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 218 65.0 3.4 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Classon				5, IN	
Glossary	0 0-	ــا	Factor Location		
N - Number of lanes  V - Hourly volume  v <sub>p</sub> - Flow rate  LOS - Level of service  speed	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design			, , , , , , , , , , , , , , , , , , ,		orated: 0/9/2014 2:10 E

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Emerson Junction
	Corridor Study				
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	669	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.87 6 0 Level mi	
Calculate Flow Adjus	tments		Up/Down %		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.971	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	2 65.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	65.0	mph mph mph mph
LOS and Performanc	e Measures	3	Design (N)		_
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> )  S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 396 65.0 6.1 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x} f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design		nuad	11-3	Con	erated: 9/8/2014 2:

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2035	f Emerson Junction
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0.94 6 0 Level mi	
1111	
1.2 1)] 0.971	
FFS	
ггэ	
	b
	mph
	mph
	mph
65.0	mph
⟨N x f <sub>ы\/</sub>	
TTV	pc/h/ln mph
	pc/mi/ln
s, N	ролнин
	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
2	65.0 x N x f <sub>HV</sub> es, N

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Emerson Junction
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	557	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.88 13 0 Level mi	
DDIIV = AADI X K X D		VCII/II	Up/Down %	1111	
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00 1.5		E <sub>R</sub>	1.2	
Enand Innuts	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	ггэ	
Lane Width Rt-Side Lat. Clearance		ft ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S	65.0	pc/h/ln mph	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$	N x f <sub>HV</sub>	pc/h/ln mph
D = v <sub>p</sub> / S LOS	5.2 A	pc/mi/ln	$D = v_p / S$ Required Number of Lane:	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	No. All Dights Dose		, , , , , , , , , , , , , , , , , , ,		orated: 0/9/2014 2:12

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BAS	IC FREEWAY SE	GMENTS WORKSHEE	Т	
eral Information		Site Information		
	ne Forsythe	Highway/Direction of Trave From/To Jurisdiction		Gore Hill
	Peak	Analysis Year	2035	
ct Description I-15 Corrido  ✓ Oper.(LOS)		Des.(N)	□Plan	ning Data
/ Inputs		500.(14)		ming Bata
ne, V 803 T	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.90 16	
Hr Prop. of AADT, K Hr Direction Prop, D / = AADT x K x D	veh/h	%RVs, P <sub>R</sub> General Terrain: Grade -5.00% Length Up/Down %	0 Grade 0.69mi -5.00	
ulate Flow Adjustme	its		0.00	
1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 10.926	
ed Inputs		Calc Speed Adj and I		
Width	ft	- Caro opoda 7 kaj arra 1		
de Lat. Clearance	ft	f <sub>LW</sub>		mph
per of Lanes, N 2		f <sub>LC</sub>		mph
Ramp Density, TRD	ramps/mi	TRD Adjustment		mph
measured) 65.0 free-flow Speed,	mph mph	FFS	65.0	mph
and Performance Me	asures	Design (N)		
ational (LOS) V or DDHV) / (PHF x N x f <sub>H</sub>	,	Design (N) Design LOS		
, , ,		$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
, / S	65.0 mph 7.4 pc/mi/ln	s		mph
,,,	A po////////	$D = v_p / S$ Required Number of Lanes	s, N	pc/mi/ln
sary		Factor Location		
Hourly volume D Flow rate F - Level of service B	- Speed - Density -S - Free-flow speed -FS - Base free-flow	$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	olume	LOS, S, FFS, v <sub>p</sub> - Exhibits	11-2,	

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		Gore Hill
Project Description I-15 C	Corridor Study				
✓ Oper.(LOS)			Des.(N)	☐ Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	712	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade 5.00% Lengt	0.85 7 0 Grade h 0.69mi	
			Up/Down %	5.00	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>T</sub>	1.00 2.8		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	4.5 1)] 0.891	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed,	2 65.0	ft ft ramps/mi mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	65.0	mph mph mph mph
BFFS		mph			
LOS and Performanc	e Measures	•	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x l x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 470 65.0 7.2 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FRI	EEWAT SE	GMENTS WORKSHEE	<u> </u>	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Gore Hill
	Corridor Study		Alialysis Teal	2033	
✓ Oper.(LOS)			Des.(N)	☐ Plar	nning Data
Flow Inputs					_
Volume, V AADT	1122	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.80 10	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade -5.00% Length	0 Grade 0.69mi	
			Up/Down %	-5.00	
Calculate Flow Adjus	tments				
$f_p$	1.00		$E_R$	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	)] <b>0</b> .952	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_LW$		mph
Number of Lanes, N	2		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)	N v f		Design (N) Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S	65.0	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln
D = v <sub>p</sub> / S	11.3	mph pc/mi/ln	S		mph
LOS	В	ролтип	D = v <sub>p</sub> / S Required Number of Lanes	s, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		Gore Hill
,	Corridor Study				
✓ Oper.(LOS)			Des.(N)	∐ Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	979	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.93 10 0 Grade	
DDHV - AADIXKXD		veh/h	Grade 5.00% Lengt Up/Down %	h <i>0.69mi</i> 5.00	
Calculate Flow Adjus	tments				
f <sub>p</sub> E <sub>⊤</sub>	1.00 2.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	4.5	
Speed Inputs			Calc Speed Adj and		
Lane Width		ft	Guio Opoca / (a) ana		
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	2		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph
LOS and Performanc	e Measures	;	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x   x   f_p)$ S $D = v_p / S$	65.0 9.3	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF x x f_p)$ S $D = v_p / S$	N x f <sub>HV</sub>	pc/h/ln mph pc/mi/ln
LOS	A		Required Number of Lanes	s, N	·
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design			HCS 2010 <sup>TM</sup> Version 6.2		erated: 9/8/2014 2:17 l

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	BASIC FRI	EEWAY SE	GMENTS WORKSHEE	Т			
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		f Central		
Project Description I-15 C	Corridor Study		•				
✓ Oper.(LOS)			Pes.(N)	Plar	nning Data		
Flow Inputs							
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	519	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.89 14 0 Level			
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi			
Calculate Flow Adjus	tments		·				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.935			
Speed Inputs			Calc Speed Adj and FFS				
Lane Width		ft					
Rt-Side Lat. Clearance		ft	f		mph		
Number of Lanes, N	2		f <sub>LW</sub>		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph		
LOS and Performanc	e Measures		Design (N)				
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x i	N x f <sub>HV</sub> 312	pc/h/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x	N x f <sub>HV</sub>			
x f <sub>p</sub> ) S	65.0	mph	x f <sub>p</sub> )	Пν	pc/h/ln		
D = v <sub>p</sub> / S	4.8	pc/mi/ln	S		mph		
LOS	Α		$D = v_p / S$ Required Number of Lane.	s, N	pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		of Central
Project Description I-15 (	Corridor Study				
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	569	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.94 8 0 Level mi	
Calculate Flow Adjus	tments		Up/Down %		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.962	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	2 65.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	65.0	mph mph mph mph
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 315 65.0 4.8 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
DDHV - Directional design		nyed			erated: 9/8/2014 2

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Shane Forsyt 9/8/2014 PM Peak Corridor Study	ihe	Site Information  Highway/Direction of Trave From/To Jurisdiction		
9/8/2014 PM Peak	the	From/To Jurisdiction		
Corridor Study		Analysis Year	2035	f Central
		Des.(N)	☐ Plar	nning Data
792	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.87 11 0 Level mi	
		Up/Down %		
tments				
1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 )] 0.948	
		Calc Speed Adj and	FFS	
	ft			
2	11			mph
_	ramne/mi			mph
65.0	·	_		mph
00.0	mph	FFS	65.0	mph
e Measures		Design (N)		
N x f <sub>HV</sub> 480	pc/h/ln	P	N x f <sub>HV</sub>	pc/h/ln
	-			mph
	pc/mi/ln			pc/mi/ln
Α		۲	s, N	•
		Factor Location		
D - Densi FFS - Free BFFS - Ba	ty -flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, f <sub>p</sub> - Page 11-18		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
	tments  1.00  1.5  2  65.0  E Measures  N x f <sub>HV</sub> 480  65.0  7.4  A  S - Spee D - Densi FFS - Free BFFS - Ba  nour volume	veh/day  veh/h  tments  1.00 1.5  ft ft 2 ramps/mi mph mph  e Measures  N x f <sub>HV</sub> 480 pc/h/ln 65.0 mph 7.4 pc/mi/ln A  S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow	$ \begin{array}{c} \text{veh/day} \\ \text{veh/h} \end{array} \begin{array}{c} \text{%Trucks and Buses, $P_T$} \\ \text{%RVs, $P_R$} \\ \text{General Terrain:} \\ \text{Grade} \end{array} \begin{array}{c} \text{% Length} \\ \text{Up/Down \%} \end{array} \\ \\ \textbf{tments} \\ \hline 1.00 \\ 1.5 \end{array} \begin{array}{c} E_R \\ f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)] \\ \textbf{Calc Speed Adj and I} \end{array} \\ \hline \\ \textbf{ft} \\ \textbf{TRD Adjustment} \\ \textbf{FFS} \\ \textbf{PFS} \\ \textbf{PFS} \\ \textbf{period of N} \\ \textbf{Design (N)} \\ \textbf{Design (N)} \\ \textbf{Design LOS} \\ \textbf{V}_p = (V \text{ or DDHV}) / (PHF \text{ x} \\ \textbf{x} \text{ f}_p) \\ \textbf{S} \\ \textbf{Design (N)} \\ \textbf{Design LOS} \\ \textbf{N} \\ \textbf{N} \\ \textbf{S} \\ \textbf{Pequired Number of Lanes} \\ \textbf{Factor Location} \\ \textbf{E}_R - \text{Exhibits 11-10, 11-12} \\ \textbf{E}_T - \text{Exhibits 11-10, 11-11}, \\ \textbf{f}_p - \text{Page 11-18} \\ \textbf{LOS, S, FFS, V}_p - \text{Exhibits} \\ \textbf{11-3} \\ \textbf{nour volume} \\ \textbf{nour volume} \\ \\ True of the properties of$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

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ORKSHEET				
mation				
ection of Travel <i>I-15 SB</i> South of Cent r 2035	ral			
☐ Planning	Data			
actor, PHF 0.90  Buses, P <sub>T</sub> 14  0  ain: Level  Length mi				
Up/Down %				
1.2 E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)] 0.935				
Calc Speed Adj and FFS				
	mph mph			
ment 65.0	mph mph			
)				
OHV) / (PHF x N x f <sub>HV</sub> mber of Lanes, N	pc/h/ln mph pc/mi/ln			
cation				
11-10, 11-11, 11-13 f <sub>LC</sub> -	- Exhibit 11-8 Exhibit 11-9 ) - Page 11-1			
11-10, 11-11, 11- <sup>-</sup> 18	13 f <sub>LC</sub> - TRD			

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T		
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsythe  9/8/2014  AM Peak		Highway/Direction of Trave From/To Jurisdiction Analysis Year		South of Gore Hill	
Project Description I-15 (	Corridor Study		•			
✓ Oper.(LOS)			Des.(N)	Pla	nning Data	
Flow Inputs						
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	297	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.92 10 0 Level		
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi		
Calculate Flow Adjus	tments		·			
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] <b>0</b> .952		
Speed Inputs			Calc Speed Adj and FFS			
Lane Width		ft	<u> </u>			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph	
Number of Lanes, N	2		f <sub>LC</sub>		mph	
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph	
FFS (measured)	65.0	mph	FFS	65.0	mph	
Base free-flow Speed, BFFS		mph				
LOS and Performanc	e Measures	<del></del>	Design (N)			
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x	N x f		Design (N) Design LOS			
x f <sub>p</sub> )		pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f <sub>HV</sub>	pc/h/ln	
S D = v / S	65.0	mph	s		mph	
D = v <sub>p</sub> / S	2.6	pc/mi/ln	$D = v_p / S$		pc/mi/ln	
LOS	Α		Required Number of Lane	s, N		
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11 f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1	
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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 AM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		s of Gore Hill
	Corridor Study				. 5.
✓ Oper.(LOS)		L	Des.(N)	Pla	nning Data
Flow Inputs  Volume, V  AADT  Peak-Hr Prop. of AADT, K  Peak-Hr Direction Prop, D  DDHV = AADT x K x D	286	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.79 20 0 Level mi	
Only late Flor Addition	11-		Up/Down %		
Calculate Flow Adjus					
f <sub>p</sub> E <sub>⊤</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.909	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	2 65.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	65.0	mph mph mph mph
LOS and Performanc	e Measures	<u> </u>	Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x   x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 199 65.0 3.1 A	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \text{ x})$ $x f_p)$ $S$ $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1
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	BASIC FRI	EEWAY SE	GMENTS WORKSHEE	Τ			
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsythe 9/8/2014 PM Peak		Highway/Direction of Trave From/To Jurisdiction Analysis Year		South of Gore Hill		
Project Description I-15 C	Corridor Study						
☑ Oper.(LOS)			es.(N)	□Pla	nning Data		
Flow Inputs							
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	303	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.96 12 0 Level mi			
			Up/Down %				
Calculate Flow Adjus	tments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.943			
Speed Inputs			Calc Speed Adj and FFS				
Lane Width Rt-Side Lat. Clearance		ft ft					
Number of Lanes, N	2	10	f <sub>LW</sub>		mph		
Total Ramp Density, TRD	_	ramps/mi	f <sub>LC</sub>		mph		
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	TRD Adjustment	65.0	mph mph		
LOS and Performanc	e Measures	}	Design (N)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x I x f <sub>p</sub> ) S D = v <sub>p</sub> / S LOS	N x f <sub>HV</sub> 167 65.0 2.6 A	pc/h/ln mph pc/mi/ln	Design (N)  Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lanes		pc/h/ln mph pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т			
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	Shane Forsy 9/8/2014 PM Peak	the	Highway/Direction of Trave From/To Jurisdiction Analysis Year		of Gore Hill		
Project Description I-15 C	Corridor Study						
✓ Oper.(LOS)			Des.(N)	Pla	nning Data		
Flow Inputs							
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	444	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.89 6 0 Level mi			
			Up/Down %				
Calculate Flow Adjus	tments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 1)] 0.971			
Speed Inputs			Calc Speed Adj and FFS				
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	2	ft ft ramps/mi	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment		mph mph mph		
FFS (measured) Base free-flow Speed, BFFS	65.0	mph mph	FFS	65.0	mph		
LOS and Performanc	e Measures	5	Design (N)				
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times I)$ $x f_p)$ $S$ $D = v_p / S$ $LOS$	N x f <sub>HV</sub> 257 65.0 4.0 A	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \text{ x} \text{ x } f_p)$ S $D = v_p / S$ Required Number of Lane		pc/h/ln mph pc/mi/ln		
Glossary			Factor Location				
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11 $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-3	, 11-13	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1		

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		RAMP	S AND RAN	MP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst Agency or Company		ne Forsythe		reeway/Dir of Trunction	avel	10th Av	re NB Off-r	amp		
Date Performed	9/15/	2014		urisdiction		1 10 011	41010			
Analysis Time Period	AM F	Peak	Α	nalysis Year		2035				
Project Description										
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2					Downstrea Ramp	ım Adj
□Yes □	On	Acceleration L	ane Length, L <sub>A</sub>	'					Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub> me, V <sub>⊏</sub>	740 803					<b>✓</b> No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	206					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h	1	-Flow Speed, $S_{FF}$ ow Speed, $S_{FR}$	65.0 55.0					V <sub>D</sub> =	veh/h
Conversion to	pc/h Un	der Base	Conditions					•		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	803	0.90	Level	16	0	0.	926	1.00	96	67
Ramp	206	0.83	Level	3	0	0.	985	1.00	25	53
UpStream										
DownStream										
<b>-</b>		Merge Areas			Diverge Areas					
Estimation of	V <sub>12</sub>				Estimation of v <sub>12</sub>					
	$V_{12} = V_{F}$	(P <sub>FM</sub> )			$V_{12} = V_R + (V_F - V_R)P_{FD}$					
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (E	Exhibit 13-6)		P <sub>FD</sub> = 1.000 using Equation (Exhibit 13-7)					
V <sub>12</sub> =	pc/h	. ,	•		$V_{12} = 967 \text{ pc/h}$					
$V_3$ or $V_{av34}$	•	Fouation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 0 pc/h (Equation 13-14 or 13-17)					
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			110.1017		Is V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/h? ☐ Yes ☑ No					
Is $V_3$ or $V_{av34} > 2,70$										
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No pc/h (Equation 13-16, 13-18, or 13-19)					
Capacity Che		,			Capacit	v Ch		,		
	Actual		apacity	LOS F?		1	Actual	Car	pacity	LOS F?
					V <sub>F</sub>		967	Exhibit 13-8	1	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V-	714	Exhibit 13-8		No
*FO		EXHIBIT 10 0			V <sub>R</sub>	· *R	253	Exhibit 13-10		No
Elow Entoring	Morgo Ir	fluonoo 1	roo			torin		ge Influenc		1110
Flow Entering	Actual	1	Desirable	Violation?	FIOW EI	-	Actual	Max Desirab		Violation?
V <sub>R12</sub>	Actual	Exhibit 13-8	Desirable	Violations	V <sub>12</sub>		967	Exhibit 13-8	4400:All	No
	ica Datarr		if not E)		<del> </del>					
Level of Serv								termination		<u>-)                                    </u>
$D_R = 5.475 + 0.$		0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>					.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	,				_ ··	.9 (pc/r	,			
LOS = (Exhibit					LOS = A	(Exhib	oit 13-2)			
Speed Detern	nination				Speed L	Deter	minatic	n		
M <sub>S</sub> = (Exibit 13-11)					D <sub>s</sub> = 0.191 (Exhibit 13-12)					
10	ibit 13-11)				S <sub>R</sub> = 60.6 mph (Exhibit 13-12)					
	ibit 13-11)				$S_0$ = N/A mph (Exhibit 13-12)					
S = mph (Exh	ibit 13-13)				S = 60	0.6 mph	(Exhibit	13-13)		
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		RAI	MPS AND	<b>RAMP JUN</b>	<b>CTIONS W</b>	ORKSH	EET				
General In	nformat				Site Infor						
Analyst			e Forsythe	F	reeway/Dir of Tra		10th A	ve NB On-ra	amp		
Agency or Com				Jı	unction		I-15 ar	nd I-315			
ate Performed		9/15/2			urisdiction						
nalysis Time F		AM P	'eak	A	nalysis Year		2035				
roject Descrip	otion										
nputs			L							T	
Jpstream Adj F	Ramp		•	ber of Lanes, N	2					Downstre	am Adj
			Ramp Number	r of Lanes, N	1					Ramp	
Yes	On		Acceleration L	ane Length, L <sub>A</sub>	590					□Yes	On
✓ No	Off		Deceleration L	ane Length L <sub>D</sub>						Z Na	□ <b>0</b> #
	_ 0		Freeway Volui	me, V <sub>F</sub>	519					✓ No	Off
. <sub>up</sub> = 1	ft		Ramp Volume	•	175					L <sub>down</sub> =	ft
				Flow Speed, S <sub>FF</sub>						l.	
' <sub>u</sub> = v	/eh/h			ow Speed, S <sub>FR</sub>	35.0					$V_D =$	veh/h
) <i>!</i> -	4	//2		* 111	33.0						
onversio	on to pc	<u>'n Unc</u>	der Base (	Conditions	1	1		1		1	
(pc/h)	ſ٧	v eh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	$f_p$	v = V/PHI	$F x f_{HV} x f_{p}$
Freeway		519	0.89	Level	14	0	n	.935	1.00		623
Ramp		75	0.75	Level	7	0	_	.966	1.00	_	243
JpStream			"	2010.		Ť	╅				
DownStream								Ì			
		ı	Merge Areas					D	iverge Areas		
stimatio	n of v <sub>12</sub>					Estimat	tion c	of v <sub>12</sub>			
		V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>40</sub> = \	/ <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	)P <sub>E</sub> D	
=			ation 13-6 or	13-7)		  =			Equation 13		13)
EQ =				ion (Exhibit 13-6	١	L <sub>EQ</sub> = P =			ising Equation		
) <sub>FM</sub> = ' –				IOIT (EXTIIDIT 13-0	)	P <sub>FD</sub> =				DII (EXIIIDIL I	J-1)
' <sub>12</sub> =		623 p		<del></del>		V <sub>12</sub> =		•	oc/h	40.44 . 40.4	17\
or V <sub>av34</sub>	0.700 #	-		13-14 or 13-17	)	V <sub>3</sub> or V <sub>av34</sub>		-	oc/h (Equation		17)
s V <sub>3</sub> or V <sub>av34</sub> >									]Yes ☐ No		
ls V <sub>3</sub> or V <sub>av34</sub> >	> 1.5 * V <sub>12</sub> /2					Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5		]Yes ☐ No		
Yes,V <sub>12a</sub> =		pc/h ( 13-19)		3-16, 13-18, or		If Yes,V <sub>12a</sub> :	=		oc/h (Equatio 3-19)	n 13-16, 1	3-18, or
Capacity (	Checks	13-13)				Capacit	ty Ch		5-19)		
upacity		Actual	I c	apacity	LOS F?	Capacit	. <del>y                                    </del>	Actual	Ca	pacity	LOS F?
		totaai	<del>l i</del>	араону	20011	V <sub>F</sub>	$\neg$	7101441	Exhibit 13-		2001.
							1/		_		
$V_{FO}$		866	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>		Exhibit 13-		
						$V_R$			Exhibit 13 10	i-	
low Ente	ring Me	rae In	fluence A	rea		Flow Fr	nterir	na Diver	ge Influer	nce Area	<b></b>
TOW LINE		ctual		Desirable	Violation?	1 10W L1	_	Actual	Max Des		Violation?
V <sub>R12</sub>		366	Exhibit 13-8	4600:All	No	V <sub>12</sub>	$\top$	/ totadi	Exhibit 13-8		Violation
*R12					140	1	f Cor	vice De	terminatio	n /if not	<u> </u>
aval of S						1					<i>F)</i>
		34 V <sub>R</sub> + C	).0076 v <sub>12</sub> - 0.0	10021 L <sub>A</sub>					0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = 5.4							pc/mi/l	•			
$D_{R} = 5.4$	pc/mi/ln)						Evhibi	t 13-2)			
$D_{R} = 5.4$ $O_{R} = 8.4  (\mu$						LOS = (I	-XIIIDI	10 2)			
D <sub>R</sub> = 5.4 Θ <sub>R</sub> = 8.4 (β OS = A (Ε)	pc/mi/ln) xhibit 13-2)	tion				Speed I			n		
0 <sub>R</sub> = 8.4 (p 0S = A (Ex <b>Speed De</b>	pc/mi/ln) xhibit 13-2) atermina					Speed I		minatio	n		
$D_{R} = 5.4$ $D_{R} = 8.4$ (FOS = A (EXID) <b>Speed De</b> $D_{S} = 0.289$	pc/mi/ln) xhibit 13-2) termina 9 (Exibit 13-	11)				<b>Speed I</b> D <sub>s</sub> = (E	<b>Deter</b> Exhibit	<b>minatio</b> 13-12)	n		
$D_{R} = 5.4$ $D_{R} = 8.4$ (FOS = A (EXIDER) A (EXID	pc/mi/ln) xhibit 13-2) termina 9 (Exibit 13- mph (Exhib	11) it 13-11)				<b>Speed L</b> $D_s = (E_s)^T$ $S_R = m$	<b>Deter</b> Exhibit f nph (Exl	rminatio 13-12) hibit 13-12)	n		
$D_{R} = 5.4$ $D_{R} = 8.4$ (FOS = A (EXIDER) $D_{R} = 0.289$ $D_{R} = 0.289$ $D_{R} = 0.289$ $D_{R} = 0.4$ $D_{R} = 0.4$	pc/mi/ln) xhibit 13-2) termina 9 (Exibit 13-	11) it 13-11) i 13-11)				$\begin{array}{ccc} \textbf{Speed I} \\ \textbf{D}_{\text{S}} = & \text{(E} \\ \textbf{S}_{\text{R}} = & \text{m} \\ \textbf{S}_{\text{0}} = & \text{n} \end{array}$	Deter Exhibit on the ph (Exhipping)	<b>minatio</b> 13-12)	n		

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst Agency or Company	Shar	ne Forsythe		reeway/Dir of Trunction		10th Av I-15 an	ve SB Off-r d I-315	amp		
Date Performed	9/15/	/2014	J	urisdiction						
Analysis Time Period	d AM F	Peak	A	nalysis Year		2035				
Project Description										
Inputs		1								
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N or of Lanes, N	2 1					Downstrea Ramp	ım Adj
□Yes	On		ane Length, L <sub>A</sub>						□Yes	□On
✓ No	Off	Preeway Volu	Lane Length L <sub>D</sub> me, V <sub>F</sub>	463 671					✓No	Off
L <sub>up</sub> = f	t	Ramp Volume		206					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h		-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 55.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	671	0.94	Level	8	0	0.	962	1.00	74	16
Ramp	206	0.83	Level	3	0	0.	985	1.00	25	53
UpStream										
DownStream										
<b>-</b>		Merge Areas			F-4i	·•		Diverge Areas		
Estimation of	1 <sub>2</sub>				Estimat	ion o	τν <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	R)P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Equ	uation (Exhil	bit 13-7)
V <sub>12</sub> =	pc/h		,		V <sub>12</sub> =			l6 pc/h	(	,
V <sub>3</sub> or V <sub>av34</sub>	•	Fauation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equatio	n 13-14 or	13_17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			14 01 10 17)			> 2 7		Yes ☑ No	11 13-14 01	10-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 * If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> :	-		Yes VNo c/h (Equation	13-16, 13-	18, or 13-
Capacity Che		/			Capacit	v Ch		<i>-</i>		
	Actual		apacity	LOS F?		<u>,                                    </u>	Actual	Ca	pacity	LOS F?
	7101001	İ	- aparony		V <sub>F</sub>		746	Exhibit 13-8	1	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V	493	Exhibit 13-8		No
▼FO		LAHIDIC 13-0						Exhibit 13-10		
	<u> </u>				V <sub>R</sub>		253			No
Flow Entering		1		1 1/2-1-60	Flow Er	-		rge Influen		1.75.1.60
	Actual		Desirable	Violation?	.,		Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		746	Exhibit 13-8	4400:All	No
Level of Serv								terminatio		F)
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 6$	.5 (pc/r	mi/ln)			
LOS = (Exhibit	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Detern	nination				Speed L	-		on .		
$M_S = (Exibit 1)$					<del></del>		xhibit 13-			
-	ibit 13-11)						(Exhibit	· ·		
	•					-	(Exhibit	•		
	iibit 13-11) iibit 13-13)				1 -	-	•	•		
	•	A II D =			1		(Exhibit	-		10011
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	RA	MPS AND	RAMP JUN			EET				
General Info	rmation			Site Infor	mation					
Analyst		ne Forsythe	Fr	eeway/Dir of Tr	avel	10th Av	sB On-ra	mp		
gency or Company	/		Ju	inction		I-15 and	I-315			
ate Performed	9/15/	/2014	Ju	risdiction						
nalysis Time Perio	d AM F	Peak	Ar	nalysis Year		2035				
roject Description										
nputs										
lpstream Adj Ramp	)	Freeway Num	ber of Lanes, N	2					Downstre	am Adi
,		Ramp Number	of Lanes, N	1					Ramp	,
Yes O	n	Acceleration L	ane Length, L₄	1500					□Vaa	
			ane Length L <sub>D</sub>						Yes	☐ On
✓ No □ Of	ff			740					✓ No	Off
- ft		Freeway Volui	•	713					=	ft
<sub>up</sub> = ft		Ramp Volume	13	339					L <sub>down</sub> =	11
' = veh/l	2	Freeway Free	Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
u = veh/h	1	Ramp Free-Flo	ow Speed, S <sub>FR</sub>	35.0					I, D	1011111
onversion t	to pc/h Uni	der Base (	Conditions							
	V			0/ Taylold	0/ Dv	1 4		f	v = V/DU	Evf vf
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		HV	f <sub>p</sub>	v <b>–</b> v/Fni	F x f <sub>HV</sub> x f <sub>p</sub>
reeway	713	0.85	Level	7	0	0.9	66	1.00		870
Ramp	339	0.77	Level	5	0	0.9	76	1.00		451
JpStream										
DownStream										
		Merge Areas				_	Di	verge Areas		
stimation o	f v <sub>12</sub>				Estimat	ion of	V <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>12</sub> = V	' <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	)P <sub>ED</sub>	
EQ =		ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13		13)
			ion (Exhibit 13-6)					sing Equatio		
FM =			IOIT (EXIIIDIL 10-0)		P <sub>FD</sub> =				ו ווטונ ו	J-1)
12 =	870 p				V <sub>12</sub> =			c/h		
or V <sub>av34</sub>	-		13-14 or 13-17)	1	V <sub>3</sub> or V <sub>av34</sub>		-	c/h (Equation		17)
$V_3 \text{ or } V_{av34} > 2,70$					Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 2,70	0 pc/h?	Yes □ No		
s $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5 <sup>3</sup>	V <sub>12</sub> /2	Yes 🗌 No		
Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equatio	n 13-16, 1	3-18, or
.20	13-19)	)						-19)		
Capacity Che		1 .		T	Capacit	y Che				1
	Actual	C	apacity	LOS F?	<b>.</b>	_	Actual	_	pacity	LOS F?
					V <sub>F</sub>			Exhibit 13-	8	
$V_{FO}$	1321	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-	8	
FO					\ <u>/</u>			Exhibit 13	i-	
					V <sub>R</sub>			10		
	a Merae In	ifluence A	rea		Flow En	tering	g Diver	ge Influer	nce Area	1
low Enterin	<del>y o. y o</del>	Movi	Desirable	Violation?	1	A	ctual	Max Des	irable	Violation
	Actual	IVIAX		i			Г	Exhibit 13-8	I	I
V <sub>R12</sub>	<del></del>	Exhibit 13-8	4600:All	No	V <sub>12</sub>		ı	EXHIDIT 19-0	l .	
V <sub>R12</sub>	Actual 1321	Exhibit 13-8	4600:All	No		 F Serv	ice Det		n (if not	! <b>F</b> )
V <sub>R12</sub> evel of Serv	Actual 1321 vice Determ	Exhibit 13-8	4600:All <b>f not F)</b>	No	Level of			erminatio		: <b>F</b> )
V <sub>R12</sub> .evel of Serv D <sub>R</sub> = 5.475 +	Actual 1321 vice Determ + 0.00734 v <sub>R</sub> + (	Exhibit 13-8	4600:All <b>f not F)</b>	No	Level of	D <sub>R</sub> = 4.	252 + 0.0			: F)
$V_{R12}$ Level of Serv $D_R = 5.475 + 6.2 \text{ (pc/miss}$	Actual 1321 Vice Determ + 0.00734 v <sub>R</sub> + 0	Exhibit 13-8	4600:All <b>f not F)</b>	No	Level of	D <sub>R</sub> = 4. oc/mi/ln	252 + 0.( )	erminatio		: F)
D <sub>R</sub> = $5.475 + 6.2$ (pc/mi) OS = A (Exhibit	Actual 1321 Vice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2)	Exhibit 13-8	4600:All <b>f not F)</b>	No	D <sub>R</sub> = (p	D <sub>R</sub> = 4. oc/mi/In Exhibit	252 + 0.( ) 13-2)	<b>erminatio</b> 0086 V <sub>12</sub> - 0		(:F)
$V_{R12}$ Level of Serv $D_R = 5.475 + 6.2 \text{ (pc/mi)}$ $D_R = 6.2 \text{ (pc/mi)}$ $D_R = 6.2 \text{ (pc/mi)}$	Actual 1321 Vice Detern 0.00734 v <sub>R</sub> + 0 i/ln) 13-2)	Exhibit 13-8	4600:All <b>f not F)</b>	No	Level of	D <sub>R</sub> = 4. oc/mi/In Exhibit	252 + 0.( ) 13-2)	<b>erminatio</b> 0086 V <sub>12</sub> - 0		: F)
$V_{R12}$ Level of Serv $D_R = 5.475 + 6.2 \text{ (pc/mi)}$ $D_R = 6.2 \text{ (pc/mi)}$ $D_R = 6.2 \text{ (pc/mi)}$ $D_R = 6.2 \text{ (pc/mi)}$	Actual 1321  rice Determ 0.00734 v R + ( i/ln) 13-2)  mination	Exhibit 13-8	4600:All <b>f not F)</b>	No	D <sub>R</sub> = (p LOS = (E	D <sub>R</sub> = 4. oc/mi/In Exhibit	252 + 0.0 ) 13-2) ninatio	<b>erminatio</b> 0086 V <sub>12</sub> - 0		(F)
$V_{R12}$ Level of Serv $D_R = 5.475 + 6.2 \text{ (pc/mi)}$ $OS = A \text{ (Exhibit)}$ Speed Determines $S_{S} = 0.231 \text{ (Exhibit)}$	Actual 1321  Vice Detern 0.00734 v R + 0 13-2)  mination  ibit 13-11)	Exhibit 13-8	4600:All <b>f not F)</b>	No	D <sub>R</sub> = (p LOS = (E <b>Speed L</b> D <sub>s</sub> = (E	D <sub>R</sub> = 4. oc/mi/ln Exhibit <b>Detern</b> Exhibit 13	252 + 0.0 ) 13-2) <b>ninatio</b> i-12)	<b>erminatio</b> 0086 V <sub>12</sub> - 0		F)
V <sub>R12</sub> .evel of Serv  D <sub>R</sub> = 5.475 +  R = 6.2 (pc/mi  OS = A (Exhibit  Speed Deteri  S <sub>S</sub> = 0.231 (Ex	Actual 1321  Fice Determ 0.00734 v R + 0 13-2)  mination ibit 13-11) (Exhibit 13-11)	Exhibit 13-8	4600:All <b>f not F)</b>	No	$\begin{array}{c} \textbf{Level of} \\ \textbf{D}_{\textbf{R}} = & (\textbf{p} \\ \textbf{LOS} = & (\textbf{E} \\ \textbf{Speed L} \\ \textbf{D}_{\textbf{S}} = & (\textbf{E} \\ \textbf{S}_{\textbf{R}} = & \textbf{m} \\ \end{array}$	D <sub>R</sub> = 4. Dc/mi/ln Exhibit <b>Detern</b> Exhibit 13 ph (Exhi	252 + 0.0 ) 13-2) nination -12) bit 13-12)	<b>erminatio</b> 0086 V <sub>12</sub> - 0		F)
$V_{R12}$ Level of Serv $D_R = 5.475 + 6.2 \text{ (pc/mi)}$ $D_R = 6.2 $	Actual 1321  Vice Detern 0.00734 v R + 0 13-2)  mination  ibit 13-11)	Exhibit 13-8	4600:All <b>f not F)</b>	No	$\begin{array}{cccc} \textbf{Level of} \\ \textbf{D}_{R} = & (\textbf{p} \\ \textbf{LOS} = & (\textbf{E} \\ \textbf{Speed L} \\ \textbf{D}_{s} = & (\textbf{E} \\ \textbf{S}_{R} = & \textbf{m} \\ \textbf{S}_{0} = & \textbf{m} \end{array}$	D <sub>R</sub> = 4. Dc/mi/ln Exhibit Detern Exhibit 13 ph (Exhi ph (Exhi	252 + 0.0 ) 13-2) <b>ninatio</b> i-12)	<b>erminatio</b> 0086 V <sub>12</sub> - 0		F)

		RAMP	S AND RAI	/P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company		ne Forsythe		reeway/Dir of Tr		10th Av	re NB Off-r	amp		
Date Performed	9/15/	/2014		urisdiction		1 10 011	41010			
Analysis Time Period	l PM F	Peak	A	Analysis Year		2035				
Project Description										
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2					Downstrea Ramp	ım Adj
□Yes	On	1 '	ane Length, L <sub>A</sub>	'					Yes	□On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub> me, V₌	740 1122					✓No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	543					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h		-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 55.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	1122	0.80	Level	10	0	0.	952	1.00	14	73
Ramp	543	0.83	Level	3	0	0.	985	1.00	66	64
UpStream										
DownStream					ļ					
<b>-</b>		Merge Areas			<b>F</b> - 4: 4	· · · · ·		iverge Areas		
Estimation of	· V <sub>12</sub>				Estimat	ion o	t v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	$V_R + (V_F - V_F)$	R)P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =			000 using Equ		
V <sub>12</sub> =	pc/h	, ,	,		V <sub>12</sub> =			73 pc/h		,
V <sub>3</sub> or V <sub>av34</sub>	•	Fauation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equatio	n 13-14 or	13_17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-14-01-10-17)			> 2 7		Yes ☑ No	11 13-1 <del>4</del> 01	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 * If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> :			Yes Mo c/h (Equation	13-16, 13-	18, or 13-
Capacity Che		/			Capacit	tv Ch		,		
	Actual		apacity	LOS F?	Joupaon	. <del>)</del>	Actual	Car	pacity	LOS F?
	7101001	İ	- aparony		V <sub>F</sub>		1473	Exhibit 13-8		No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$		809	Exhibit 13-8		No
▼FO		LAHIDIL 13-0								
					V <sub>R</sub>		664	Exhibit 13-10		No
Flow Entering		1			Flow Er			rge Influen		
	Actual		Desirable	Violation?			Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	1	473	Exhibit 13-8	4400:All	No
Level of Serv	ice Deterr	nination (	if not F)		Level of	f Serv	<u>rice De</u>	terminatior	n (if not l	F)
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				D <sub>R</sub> = 1	0.3 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = B	(Exhib	oit 13-2)			
Speed Detern					Speed L			n		
					<del></del>		xhibit 13-			
$M_S = (Exibit 1)$	•				ľ			-		
	ibit 13-11)					-	(Exhibit			
	ibit 13-11)				1	-	(Exhibit	•		
S = mph (Exh	ibit 13-13)				S = 59	9.8 mph	(Exhibit	13-13)		
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	RA	MPS AND	RAMP JUNG	CTIONS W	ORKSH	EET				
General Inf				Site Infor						
Analyst		ne Forsythe	Fr	eeway/Dir of Tr		10th A	ve NB On-ra	ımp		
gency or Compa	any		Ju	inction		I-15 ar	nd I-315			
ate Performed		5/2014		risdiction						
nalysis Time Pe		Peak	Ar	nalysis Year		20				
roject Descriptio	n									
nputs		1								
Jpstream Adj Ra	mp	1	ber of Lanes, N	2					Downstre	am Adj
	_	Ramp Numbe	r of Lanes, N	1					Ramp	
Yes	On	Acceleration L	ane Length, L <sub>A</sub>	590					□Yes	On
✓ No	Off	Deceleration L	ane Length L <sub>D</sub>							
<u> </u>	Oli	Freeway Volui	me, V <sub>E</sub>	792					✓ No	Off
<sub>up</sub> = ft		Ramp Volume		274					L <sub>down</sub> =	ft
ap			-Flow Speed, S <sub>FF</sub>	65.0						
$v_{\rm u}$ = vel	h/h		ow Speed, S <sub>ER</sub>						V <sub>D</sub> =	veh/h
			- 111	35.0						
onversion	to pc/h Un	der Base (	Conditions	1	1					
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	$f_p$	v = V/PHF	$= x f_{HV} x f_{p}$
reeway	792	0.87	Level	11	0	0	.948	1.00		963
Ramp	274	0.92	Level	4	0		.980	1.00		304
JpStream		0.02	20101	<u> </u>	Ť	Ť	.000	1.00		001
DownStream										
	-	Merge Areas					D	verge Areas	•	
stimation	of v <sub>12</sub>				Estimat	ion c	of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P)						<sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	.)P	
=		. ៶ · ⊦м / ıation 13-6 or	· 13_7)		l <u>-</u>			Equation 13		3)
EQ =					L <sub>EQ</sub> =			-		
) <sub>FM</sub> = ' –			ion (Exhibit 13-6)		P <sub>FD</sub> =			sing Equatio	וו (באוווטונו	5-1)
' <sub>12</sub> =	963 p				V <sub>12</sub> =		•	c/h		_,
or V <sub>av34</sub>	-		13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		-	c/h (Equation	13-14 or 13-1	7)
	2,700 pc/h? ☐ Ye							Yes 🗌 No		
s V <sub>3</sub> or V <sub>av34</sub> > 1	.5 * V <sub>12</sub> /2 \(\sum \) Ye				Is V <sub>3</sub> or V <sub>av</sub>	, <sub>34</sub> > 1.5		]Yes 🗌 No		
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equatio	n 13-16, 1	3-18, or
Capacity C	13-19	<u>)                                    </u>			Capacit			-19)		
араспу С	Actual	T c	apacity	LOS F?	Capacit	y Cii	Actual		pacity	LOS F?
	Actual	<del>                                     </del>	ναρασιιγ	LUGF!	V <sub>F</sub>	-	nulual	Exhibit 13-		LUSP
						.,		_	_	+
$V_{FO}$	1267	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-		
					$V_R$			Exhibit 13 10	-	
	ina Morao Ir	nfluonco A	roa		Flow Fr	torir	na Divor	ge Influer	on Arna	
Jow Entor	ng weige n		Desirable	Violation?	I IOW LI	-	Actual	Max Des		Violation
low Enteri	Actual				V <sub>12</sub>	+	, totalii	Exhibit 13-8		violation
Flow Enteri	Actual	<del> </del>	4600·AII					∟VIIINIſ 19-0		
V <sub>R12</sub>	1267	Exhibit 13-8	4600:All	No		£ Ca.	viaa Dad		/:E4	<i>(</i> -)
V <sub>R12</sub> .evel of Se	1267 <b>rvice Deteri</b>	Exhibit 13-8	if not F)	NO	Level or			erminatio		<i>F</i> )
V <sub>R12</sub> Level of Se D <sub>R</sub> = 5.47	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> +	Exhibit 13-8	if not F)	NO NO	Level or	D <sub>R</sub> = 4	1.252 + 0.	<b>erminatio</b> 0086 V <sub>12</sub> - 0		<i>F</i> )
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> + c/mi/ln)	Exhibit 13-8	if not F)	NO	D <sub>R</sub> = (p	D <sub>R</sub> = 4 oc/mi/l	4.252 + 0.0 n)			<i>F</i> )
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> +	Exhibit 13-8	if not F)	NO NO	D <sub>R</sub> = (p	D <sub>R</sub> = 4 oc/mi/l	1.252 + 0.			<i>F</i> )
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47  d <sub>R</sub> = 11.5 (p  OS = B (Exhi	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> + c/mi/ln) bit 13-2)	Exhibit 13-8	if not F)	No	D <sub>R</sub> = (p	D <sub>R</sub> = 4 oc/mi/l Exhibit	4.252 + 0.0 n) : 13-2)	0086 V <sub>12</sub> - 0		<u>F)</u>
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47: D <sub>R</sub> = 11.5 (p  OS = B (Exhi	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> + c/mi/ln) bit 13-2) <b>ermination</b>	Exhibit 13-8	if not F)	No	D <sub>R</sub> = (F LOS = (F Speed L	D <sub>R</sub> = 4 oc/mi/l Exhibit	4.252 + 0.4 n) : 13-2) <b>:minatio</b>	0086 V <sub>12</sub> - 0		<i>F</i> )
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47  D <sub>R</sub> = 11.5 (p  OS = B (Exhi  Speed Dete	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> + c/mi/ln) bit 13-2) <b>ermination</b> Exibit 13-11)	Exhibit 13-8 <b>mination (</b> 10.0078 V <sub>12</sub> - 0.0	if not F)	No	D <sub>R</sub> = (p LOS = (E <b>Speed L</b> D <sub>s</sub> = (E	D <sub>R</sub> = 4 oc/mi/l Exhibit <b>Deter</b> Exhibit	4.252 + 0.0 n) : 13-2) <b>: minatio</b> (3-12)	0086 V <sub>12</sub> - 0		<u>F)</u>
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47  D <sub>R</sub> = 11.5 (p  OS = B (Exhi  Speed Dete	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> + c/mi/ln) bit 13-2) <b>ermination</b> Exibit 13-11) ph (Exhibit 13-11)	Exhibit 13-8 <b>mination (</b> 10.0078 V <sub>12</sub> - 0.0	if not F)	No	$\begin{array}{c} \textbf{Level of} \\ \textbf{D}_{\textbf{R}} = & (\textbf{p} \\ \textbf{LOS} = & (\textbf{E} \\ \textbf{Speed L} \\ \textbf{D}_{\textbf{S}} = & (\textbf{E} \\ \textbf{S}_{\textbf{R}} = & \textbf{m} \\ \end{array}$	D <sub>R</sub> = 4 Dc/mi/l Exhibit <b>Deter</b> Exhibit 1	4.252 + 0.4 n) : 13-2) <b>minatio</b> (3-12) nibit 13-12)	0086 V <sub>12</sub> - 0		<i>F</i> )
V <sub>R12</sub> Level of Se  D <sub>R</sub> = 5.47  D <sub>R</sub> = 11.5 (p  OS = B (Exhi  Speed Dete  1 <sub>S</sub> = 0.294 (  R = 58.2 m  0 = N/A mp	1267 <b>rvice Deteri</b> 5 + 0.00734 v <sub>R</sub> + c/mi/ln) bit 13-2) <b>ermination</b> Exibit 13-11)	Exhibit 13-8 <b>mination (</b> 1 0.0078 V <sub>12</sub> - 0.0	if not F)	No	$\begin{array}{cccc} \textbf{Level of} \\ \textbf{D}_{\textbf{R}} = & (\textbf{I} \\ \textbf{LOS} = & (\textbf{I} \\ \textbf{Speed L} \\ \textbf{D}_{\textbf{S}} = & (\textbf{E} \\ \textbf{S}_{\textbf{R}} = & \textbf{m} \\ \textbf{S}_{\textbf{0}} = & \textbf{m} \end{array}$	D <sub>R</sub> = 4 pc/mi/l Exhibit <b>Deter</b> Exhibit aph (Exl	4.252 + 0.0 n) : 13-2) <b>: minatio</b> (3-12)	0086 V <sub>12</sub> - 0		<i>F</i> )

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst Agency or Company	Shar	ne Forsythe		reeway/Dir of Trunction	avel	10th Av I-15 an	ve NB Off-r d I-315	amp		
Date Performed	9/15/	/2014		urisdiction						
Analysis Time Period	l PM F	Peak	A	nalysis Year		2035				
Project Description										
Inputs		<u> </u>						ĺ		
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N or of Lanes, N	2 1					Downstrea Ramp	am Adj
□Yes □	On		ane Length, L <sub>A</sub>						□Yes	□On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub> me, V <sub>E</sub>	463 936					✓ No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	256					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h		-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 55.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	936	0.90	Level	14	0	0.	935	1.00	11	18
Ramp	256	0.83	Level	7	0	0.	966	1.00	32	20
UpStream										
DownStream		ــــــــــــــــــــــــــــــــــــــ								
Estimation of		Merge Areas			Ectimot	ion o		iverge Areas		
Estimation of					Estimat	1011 0				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )						$V_R + (V_F - V_F)$		
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13	)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Equ	ıation (Exhi	bit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		11	18 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	(Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		0	pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 2,7	00 pc/h? [	☐Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	'V <sub>12</sub> /2 ∐Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	, <sub>34</sub> > 1.5	* V <sub>12</sub> /2	Yes ☑ No		
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	p 19	c/h (Equation 9)	13-16, 13-	-18, or 13-
Capacity Che	cks				Capacit	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F?
					$V_{F}$		1118	Exhibit 13-8	4700	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	798	Exhibit 13-8	4700	No
					$V_R$		320	Exhibit 13-10	2200	No
Flow Entering	a Merae Ir	fluence A	rea		Flow Er	nterin	a Dive	ge Influen	ce Area	
	Actual	1	Desirable	Violation?		-	Actual	Max Desirab		Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>	1	1118	Exhibit 13-8	4400:All	No
Level of Serv	ice Deterr	nination (	if not F)			f Serv	∕ice De	terminatio	n (if not	<del>.</del> F)
D <sub>R</sub> = 5.475 + 0.								.0086 V <sub>12</sub> - 0.0	•	
D <sub>R</sub> = (pc/mi/ln	7.7	12	^		L	.7 (pc/r		12	D	
LOS = (Exhibit	•				1	**	oit 13-2)			
Speed Detern					Speed L	-		n n		
					1 -		xhibit 13-			
M <sub>S</sub> = (Exibit 13	•							-		
	ibit 13-11)					-	(Exhibit			
	ibit 13-11)				1 *	-	(Exhibit	•		
. `	ibit 13-13)				1		(Exhibit	-		
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0		RAMPS AND	RAMP JUN			== 1			
	nformation			Site Infor					
nalyst		Shane Forsythe		eeway/Dir of Tr		10th Ave SB	•		
igency or Com Date Performed		0/45/0044		ınction ırisdiction		I-15 and I-315	)		
nalysis Time I		9/15/2014 PM Peak		nalysis Year		2035			
Project Descrip		Wil eak	74	idiyələ i cai		2000			
nputs	70011								
•	Domn	Freeway Num	ber of Lanes, N	2				Downet	room Adi
Ipstream Adj F	катр	Ramp Number		1				Ramp	ream Adj
Yes	On	· ·	ane Length, L <sub>Δ</sub>	1500				'	
	_		ane Length L <sub>D</sub>	1300				□Yes	☐ On
✓ No	Off			004				✓ No	Off
	ft	Freeway Volui	•	981				L <sub>down</sub> =	ft
up =	10	Ramp Volume	11	453				-down	
′ <sub>u</sub> =	veh/h		Flow Speed, $S_{FF}$	65.0				V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	35.0					
Conversion		<u>Under Base (</u>	Conditions	1	1				
(pc/h)	V (Veh/h	r) PHF	Terrain	%Truck	%Rv	$f_{HV}$	fp	v = V/PI	HF x f <sub>HV</sub> x f <sub>p</sub>
reeway	981	0.93	Level	10	0	0.952	1.00		1108
Ramp	453	0.94	Level	5	0	0.976	1.00		494
JpStream									
DownStream									
•		Merge Areas					Diverge A	reas	
stimatio	n of v <sub>12</sub>				Estimati	ion of v <sub>12</sub>	?		
	V <sub>12</sub> :	= V <sub>F</sub> ( P <sub>FM</sub> )				V <sub>12</sub>	$_{2} = V_{R} + (V_{F})$	V <sub>R</sub> )P <sub>FD</sub>	
EQ =	(1	Equation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equatio	n 13-12 or 13	-13)
e <sub>FM</sub> =	1.0	00 using Equat	ion (Exhibit 13-6)	1	P <sub>FD</sub> =		using Ed	quation (Exhibit	13-7)
' <sub>12</sub> =	110	08 pc/h			V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	0	pc/h (Equation	13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equ	ation 13-14 or 13	3-17)
	> 2,700 pc/h?		,			<sub>34</sub> > 2,700 pc/l			,
	> 1.5 * V <sub>12</sub> /2					<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
Yes,V <sub>12a</sub> =		c/h (Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =			uation 13-16,	13-18, or
		-19)					13-19)		
Capacity					Capacit	y Checks	Ď.		
	Actua	al C	apacity	LOS F?	ļ ,,	Act		Capacity	LOS F?
					V <sub>F</sub>			bit 13-8	
$V_{FO}$	1602	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		bit 13-8	
					V <sub>R</sub>			bit 13-	
Jow Ente	oring Mora	e Influence A	<u>roa</u>			torina Di		10   Tuence Are	<u> </u>
TOW LITTE	Actua		Desirable	Violation?	I IOW LII	Actual		x Desirable	Violation?
V <sub>R12</sub>	1602	Exhibit 13-8	4600:All	No	V <sub>12</sub>	7101001	Exhibit		violation:
		ermination (i		110		Service		ation (if no	)
		<sub>R</sub> + 0.0078 V <sub>12</sub> - 0.0						<sub>12</sub> - 0.009 L <sub>D</sub>	<i>(</i> )
.,	pc/mi/ln)	R · 0.0070 V <sub>12</sub> 0.0	70027 LA				. 0.0000 1	12 0.000 LD	
	•					c/mi/ln)			
	xhibit 13-2)					xhibit 13-2			
speed De	eterminatio	<u>n</u>			<del>  '                                   </del>	<u>Determina</u>	ition		
	5 (Exibit 13-11)					xhibit 13-12)			
N <sub>S</sub> = 0.23	3 (EXIDIT 13-11)					1 /5 1 11 11 40	40\		
ū	mph (Exhibit 13-	-11)			I	ph (Exhibit 13	•		
S <sub>R</sub> = 59.6		•				ph (Exhibit 13 ph (Exhibit 13	•		

		RAMP	S AND RAI	MP JUNCTI	ONS WO	ORKS	HEET			
General Infor	mation	. W 11111	- / IVA	Site Infori			· · ·			
Analyst Agency or Company Date Performed		e Forsythe		Freeway/Dir of Tra Junction Jurisdiction		14th EI I-315	3 Off-ramp			
Analysis Time Period	I AM P	eak	,	Analysis Year		2035				
Project Description	I-15 Corridor S	tudy								
Inputs										
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes. N	2 1					Downstrea Ramp	am Adj
□Yes □	On	Acceleration L	ane Length, L <sub>A</sub>						□Yes	On
✓ No	Off	Deceleration I Freeway Volu	∟ane Length L <sub>D</sub> me, V <sub>⊏</sub>	503 627					☑No	Off
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	68					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h		-Flow Speed, $S_{Fl}$ ow Speed, $S_{FR}$	<sub>F</sub> 55.0 35.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Und		111						<u>.                                    </u>	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	627	0.87	Level	6	0	0.	971	1.00	7	42
Ramp	68	0.83	Level	5	0	0.	976	1.00	3	34
UpStream						_				
DownStream		l l Merge Areas						iverge Areas		
Estimation of		vierge Areas			Estima	tion o	fv	iverge Areas		
L3timation of					LStilla					
	$V_{12} = V_{F}$							$V_R + (V_F - V_I)$	–	
L <sub>EQ</sub> =		tion 13-6 or			L <sub>EQ</sub> =		-	Equation 13-1		
P <sub>FM</sub> =	_	Equation (	Exhibit 13-6)		P <sub>FD</sub> =			000 using Eq	uation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			2 pc/h		
$V_3^{}$ or $V_{av34}^{}$			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equation	on 13-14 o	r 13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 1.5		☐Yes ☑ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub>	=		c/h (Equation	13-16, 13	-18, or 13-
Capacity Che	13-19)				Capacit		19 ocks	")		
Capacity Cite	Actual		apacity	LOS F?	Capacit	y Cir	Actual	Ca	pacity	LOS F?
	7 totaai	Ì	αρασιτή	20011	V <sub>F</sub>		742	Exhibit 13-8		No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>I</sub>	_	658	Exhibit 13-8	_	No
*FO		EXHIBIT 13-0						Exhibit 13-1		_
	<u> </u>	<u> </u>			V <sub>R</sub>		84			No
Flow Entering		ir .		Violetian	Flow El			ge Influen		Violeties
V	Actual	Exhibit 13-8	Desirable	Violation?	\/		Actual	Max Desiral	1	Violation?
V <sub>R12</sub>	. 5 (		· · · · · · · ·		V <sub>12</sub>		742	Exhibit 13-8	4400:All	No No
Level of Serv								terminatio	•	F)
$D_R = 5.475 + 0.$		0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>					0086 V <sub>12</sub> - 0.	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln					l ''	.1 (pc/r	,			
LOS = (Exhibit							oit 13-2)			
Speed Detern	nination				Speed I	Deter	<u>minatio</u>	n		
M <sub>S</sub> = (Exibit 1:	3-11)				$D_s = 0$	.436 (E	xhibit 13-	12)		
-	ibit 13-11)				S <sub>R</sub> = 4	9.3 mph	(Exhibit	13-12)		
	ibit 13-11)				$S_0 = N$	I/A mph	(Exhibit 1	13-12)		
	ibit 13-13)				S = 4	9.3 mph	(Exhibit	13-13)		
Copyright © 2012 Unive	ersity of Florida, A	All Rights Reser	ved		HCS2010 <sup>TN</sup>			•	enerated: 9/15	5/2014 9:53 A

		MPS AND	RAMP JUN			ET		
General Info	rmation			Site Infor	mation			
Analyst		ne Forsythe	Fr	eeway/Dir of Tr	avel 1	14th St EB On-ra	mp	
gency or Compan	•			inction	ļ	-315		
ate Performed		5/2014		risdiction				
nalysis Time Peri		Peak	Ar	nalysis Year	2	2035		
roject Description	I-15 Corridor S	Study						
nputs								r
Jpstream Adj Ram	р	Freeway Numb	per of Lanes, N	2				Downstream Adj
		Ramp Number	of Lanes, N	1				Ramp
□ Yes □ C	n	Acceleration L	ane Length, L <sub>A</sub>	930				□Yes □On
☑No □C	vee.	Deceleration L	ane Length L					
✓ No □ C	лі -	Freeway Volur	5	1140				✓ No ☐ Off
<sub>-up</sub> = ft		Ramp Volume		617				L <sub>down</sub> = ft
up			11					down
/ <sub>u</sub> = veh/	/h		Flow Speed, S <sub>FF</sub>	55.0				$V_D = veh/h$
u -		Ramp Free-Flo	ow Speed, S <sub>FR</sub>	35.0				
Conversion	to pc/h Un	der Base (	Conditions					-
(pc/h)	V () ( =  - (   )	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF x f <sub>HV</sub> x f <sub>p</sub>
	(Veh/hr)	+				ļ	<u> </u>	<u> </u>
Freeway	1140	0.83	Level	4	0	0.980	1.00	1403
Ramp	617	0.83	Level	3	0	0.985	1.00	755
JpStream	+	++				1		
DownStream		Merge Areas					L Diverge Areas	<u> </u>
stimation o		Weige Aleas			Estimation	on of v <sub>12</sub>	Diverge Areas	
-Sumation C					LStillati			
	$V_{12} = V_{F}$						$V_R + (V_F - V_F)$	· 15
EQ =	(Equ	uation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 13	-12 or 13-13)
P <sub>FM</sub> =	1.000	using Equati	on (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	on (Exhibit 13-7)
′ <sub>12</sub> =	1403	pc/h			V <sub>12</sub> =		pc/h	
′ <sub>3</sub> or V <sub>av34</sub>	0 pc/	h (Equation 1	3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	13-14 or 13-17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,7			,			4 > 2,700 pc/h? [		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5						<sub>4</sub> > 1.5 * V <sub>12</sub> /2 [		
			-16, 13-18, or			· · · · · · · · · · · · · · · · · · ·		on 13-16, 13-18, or
Yes,V <sub>12a</sub> =	13-19		-10, 15-10, 01		If Yes,V <sub>12a</sub> =		3-19)	JII 13-10, 13-10, OI
Capacity Ch	ecks				Capacity	Checks	,	
•	Actual	C	apacity	LOS F?		Actual	Са	pacity LOS F?
					V <sub>F</sub>		Exhibit 13-	.8
				l	$V_{FO} = V_F$	- \/	Exhibit 13-	
$V_{FO}$	2158	Exhibit 13-8		No		*R	Exhibit 13	
					$V_R$		10	)-
low Enterin	na Merae Ir	nfluence A	rea		Flow Ent	tering Dive		nce Area
	Actual		Desirable	Violation?	7.01.	Actual	Max Des	
V <sub>R12</sub>	2158	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8	
				1	1	Service De		on (if not F)
aval of Sar		•				$O_{R} = 4.252 + 0$		
	+ 0.00734 V R +	0.0076 V <sub>12</sub> - 0.0	0027 L <sub>A</sub>				7.0000 V <sub>12</sub> - 0	009 L <sub>D</sub>
D <sub>R</sub> = 5.475						c/mi/ln)		
$D_{R} = 5.475$ $D_{R} = 16.1 \text{ (pc/)}$	•				LOS = (E)	xhibit 13-2)		
$D_{R} = 5.475$ $D_{R} = 16.1 \text{ (pc/)}$	•				LOO - (L.			
O <sub>R</sub> = 16.1 (pc/	it 13-2)				<del> </del>	etermination	on	
$D_R = 5.475$ $D_R = 16.1 \text{ (pc/OS} = B \text{ (Exhib)}$	it 13-2) rmination				Speed D		on	
$D_{R} = 5.475$ $D_{R} = 16.1 \text{ (pc/OS} = B  (Exhibition of the power of the po$	rmination xibit 13-11)				<b>Speed D</b> D <sub>s</sub> = (Ex	etermination		
$D_{R} = 5.475$ $D_{R} = 16.1 \text{ (pc/OS} = B \text{ (Exhib)}$ $D_{S} = 0.290 \text{ (Exhib)}$ $D_{R} = 0.290 \text{ (Exhib)}$ $D_{R} = 0.290 \text{ (Exhib)}$	it 13-2) rmination xibit 13-11) n (Exhibit 13-11)				Speed D $D_s = (Ex \\ S_R = mp$	etermination whibit 13-12) wh (Exhibit 13-12)	)	
$D_{\rm R} = 5.475$ $D_{\rm R} = 16.1  ({\rm pc}/{\rm oS})$ $D_{\rm R} = 16.1  ({\rm pc}/{\rm oS}$	rmination xibit 13-11)				Speed D $D_{s} = (Ex)$ $S_{R} = mp$ $S_{0} = mp$	etermination	)	

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst		ne Forsythe	F	reeway/Dir of Ti		14th W	B Off-ramp	1		
Agency or Company				unction		I-315				
Date Performed		/2014		urisdiction						
Analysis Time Period			A	nalysis Year		2035				
Project Description	I-15 Corridor S	Study								
Inputs		<u> </u>								
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2 1					Downstrea Ramp	m Adj
□Yes □	On	l '	ane Length, L <sub>A</sub>	ı				I	Yes	On
✓ No	Off		Lane Length L <sub>D</sub>	713					<b>☑</b> No	Off
L <sub>up</sub> = f	t	Freeway Volu Ramp Volume		585 251					L <sub>down</sub> =	ft
up.			-Flow Speed, S <sub>FF</sub>							
V <sub>u</sub> = ve	eh/h		low Speed, S <sub>FR</sub>	35.0					V <sub>D</sub> =	veh/h
Conversion to	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	585	0.82	Level	1	0	0.	995	1.00	71	4
Ramp	251	0.80	Level	0	0	1.	000	1.00	31	2
UpStream										
DownStream										
		Merge Areas						iverge Areas		
Estimation of	<sup>f</sup> V <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
L <sub>EQ</sub> =	12 1	ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		
_		Equation (			P <sub>FD</sub> =			000 using Equ		
P <sub>FM</sub> = W -	_	Equation (	_xilibit 10 0)						iation (Exilia	11. 13-1)
V <sub>12</sub> =	pc/h	/F (; 40	44 40 47)		V <sub>12</sub> =			4 pc/h		
V <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equatio	n 13-14 or	13-17)
Is $V_3$ or $V_{av34} > 2,70$								Yes ✓ No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av</sub>	, <sub>34</sub> > 1.5		☐Yes 🗹 No		
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=		c/h (Equation	13-16, 13-	18, or 13-
Capacity Che		)			Capacit		19 ncks	<u>"</u>		
Capacity Cite	Actual		apacity	LOS F?	Capacit	y Circ	Actual	l Cor	pacity	LOS F?
	Actual		apacity	LUSF!	V <sub>F</sub>		714	Exhibit 13-8	1	
.,										No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$		402	Exhibit 13-8	+	No
					$V_R$		312	Exhibit 13-10	2000	No
Flow Entering	g Merge In	ifluence A	rea		Flow Er	iterin	g Dive	rge Influend		
	Actual		Desirable	Violation?		1	\ctual	Max Desirab	le	Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		714	Exhibit 13-8	4400:All	No
Level of Serv	ice Deterr	nination (	if not F)		Level or	f Serv	vice De	termination	if not F	<del>-</del> )
D <sub>R</sub> = 5.475 + 0.	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln					D <sub>R</sub> = 4.	.0 (pc/r	ni/ln)	· <u>-</u>	-	
LOS = (Exhibit	,				1		oit 13-2)			
Speed Detern					Speed L			n .		
					<del>                                     </del>		xhibit 13-			
$M_S = (Exibit 1)$	•				ľ	-		-		
	ibit 13-11)					-	(Exhibit	*		
	ibit 13-11)				1 *	-	(Exhibit '	•		
S = mph (Exh	ibit 13-13)				S = 49	9.1 mph	(Exhibit	13-13)		
Copyright © 2012 Unive	ersity of Florida,	All Rights Reser	ved		HCS2010 <sup>TM</sup>	Versio	n 6.41	Ger	nerated: 9/15/	2014 9:46 Al

		MPS AND	RAMP JUNG			<u>EET</u>				
General Inf				Site Infor						
nalyst		ne Forsythe	Fr	eeway/Dir of Tr	avel	14th St WE	3 On-ramp			
gency or Compa				ınction		I-315				
ate Performed		5/2014		risdiction						
nalysis Time Pe		Peak	Ar	nalysis Year		2014				
	n I-15 Corridor	Study								
nputs		1								
pstream Adj Rai	mp	Freeway Num	ber of Lanes, N	2					Downstre	am Adj
		Ramp Numbe	r of Lanes, N	1					Ramp	,
☐ Yes ☐	On	Acceleration L	ane Length, L₄	505					□Yes	On
ZN. 🗆	0,11	Deceleration L	ane Length L <sub>D</sub>							
✓ No	Off	Freeway Volu	5	514					✓ No	Off
n = ft		1	•						L <sub>down</sub> =	ft
<sub>up</sub> = ft		Ramp Volume	11	142					down	
u = vel	n/h	1	-Flow Speed, S <sub>FF</sub>	55.0					V <sub>D</sub> =	veh/h
u VO	711	Ramp Free-Fl	ow Speed, S <sub>FR</sub>	35.0						
onversion	to pc/h Un	der Base (	Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	,	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>r</sub>
	(Veh/hr)		TCITAIII					г		
reeway	514	0.76	Level	6	0	0.971		1.00		696
Ramp	142	0.80	Level	5	0	0.976		1.00		181
JpStream							_			
ownStream		<u> </u>								
'atimatian	<b>-f</b> . ,	Merge Areas			Catingat	ion of .	DIVE	erge Areas		
stimation	or v <sub>12</sub>				Estimat	ion or v	12			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				,	$V_{12} = V_{R}$	+ (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
<sub>EQ</sub> =	(Equ	uation 13-6 or	13-7)		L <sub>EQ</sub> =		(Ec	uation 13-	12 or 13-1	3)
FM =	1.000	using Equat	ion (Exhibit 13-6)		P <sub>FD</sub> =			ng Equatio		
12 =	696 p		(=:::::::::::::::::::::::;		V <sub>12</sub> =		pc/		(=	/
<sub>3</sub> or V <sub>av34</sub>			12 14 or 12 1 <del>7</del> \					 h (Equation 1	2 11 or 12 1	<b>7</b> \
	-		13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	> 0.700			3-14 01 13-1	11)
	,700 pc/h? ☐ Y€							′es □ No		
s V <sub>3</sub> or V <sub>av34</sub> > 1	.5 * V <sub>12</sub> /2 \(\sum \cdot \cdo				Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 1.5 * V		′es ☐ No		
Yes,V <sub>12a</sub> =	pc/h 13-19		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	pc/ 13-1	h (Equation	า 13-16, 1	3-18, or
Capacity C		')			Capacit			9)		
apacity of	Actual	1 ^	apacity	LOS F?	Jupach		Actual	Car	acity	LOS F
	rioluai	<del>                                       </del>	apaony	2001:	\/		Totalai	Exhibit 13-8		1 2001
					V <sub>F</sub>					+
$V_{FO}$	877	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-8	_	
					V <sub>R</sub>			Exhibit 13-	·	
Tarre Fratari						40 11 10 01	Discourse	10		
iow Enteri	ng Merge II			\/iolotion?	FIOW EN			e Influen		
1/	Actual	<del> </del>	Desirable 4600-All	Violation?	1/	Actu		Max Desi	iavie	Violation
V <sub>R12</sub>	877	Exhibit 13-8	4600:All	No	V <sub>12</sub>			xhibit 13-8		_
	rvice Deteri							rminatio		<i>F</i> )
$D_{R} = 5.47$	5 + 0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			$D_{R} = 4.25$	52 + 0.00	)86 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
<sub>R</sub> = 9.1 (pc/	mi/ln)				$D_R = (p$	oc/mi/ln)				
	bit 13-2)					Exhibit 13	-2)			
peed Dete					Speed D					
Peca Dele					<del>                                     </del>					
_	Exibit 13-11)					xhibit 13-1	•			
					E = 100	ph (Exhibit	13-12)			
•	oh (Exhibit 13-11)						•			
R= 51.2 m <sub>β</sub>	oh (Exhibit 13-11) h (Exhibit 13-11)					ph (Exhibit	•			
= 51.2 mp = N/A mp					$S_0 = m$		13-12)			

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation		<u> </u>	Site Infor						
Analyst		ne Forsythe	F	reeway/Dir of Ti		14th FF	3 Off-ramp			
Agency or Company	Onai	io i orojalo		unction		I-315	on ramp			
Date Performed	9/15/	/2014		urisdiction						
Analysis Time Period	l PM F	Peak	А	nalysis Year		2035				
Project Description	I-15 Corridor S	Study								
Inputs										
Upstream Adj R	amp		ber of Lanes, N	2					Downstrea	m Adj
□Yes □	On	Ramp Numbe	•	1					Ramp	
	1011	1	ane Length, L <sub>A</sub>						☐Yes	On
✓ No	Off	Deceleration I	Lane Length L <sub>D</sub>	503					✓ No	Off
		Freeway Volu	me, V <sub>F</sub>	799						
L <sub>up</sub> = fi	t	Ramp Volume	e, V <sub>R</sub>	226					L <sub>down</sub> =	ft
.,		Freeway Free	-Flow Speed, S <sub>FF</sub>	55.0				Į,	\	vob/b
V <sub>u</sub> = ve	eh/h		low Speed, S <sub>FR</sub>	35.0					V <sub>D</sub> =	veh/h
Conversion to	o nc/h Hn	1	111							
(pc/h)	<i>∨ ∨</i>	PHF	Terrain	%Truck	%Rv		f	f	v = V/PHF	v f v f
. ,	(Veh/hr)	ГПГ	Terrain	/0 ITUCK	/0T\V	_	f <sub>HV</sub>	f <sub>p</sub>	v — v/i i ii	^ 'HV ^ 'p
Freeway	799	0.83	Level	4	0	_	980	1.00	98	2
Ramp	226	0.94	Level	3	0	0.	985	1.00	24	4
UpStream				-	<del>                                     </del>					
DownStream		Merge Areas			<del>                                     </del>			iverge Areas		
Estimation of		Merge Areas			Estimat	ion o		iverge Areas		
LStillation of					LStillat	.1011 0				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	$V_R + (V_F - V_R)$	P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(I	Equation 13-1	2 or 13-13)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		1.0	000 using Equ	ation (Exhib	it 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		98	2 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		0	pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70						.24 > 2,7		Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *								Yes ☑ No		
			-16, 13-18, or			-		c/h (Equation	13-16. 13-	18. or 13-
If Yes,V <sub>12a</sub> =	13-19		,,		If Yes,V <sub>12a</sub> =	=	19		,	,
Capacity Che	cks				Capacit	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Car	pacity	LOS F?
					V <sub>F</sub>		982	Exhibit 13-8	4500	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V <sub>D</sub>	738	Exhibit 13-8	4500	No
10					V <sub>R</sub>		244	Exhibit 13-10	+	No
Class Cotorins		-fl								INO
Flow Entering		1		\/iolotion?	FIOW ET	-		rge Influenc		\/iolotion?
	Actual		Desirable	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		982	Exhibit 13-8	4400:All	No
Level of Serv								terminatior	•	-)
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0.	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 8$	.2 (pc/r	ni/ln)			
LOS = (Exhibit '	13-2)				LOS = A	(Exhib	oit 13-2)			
Speed Detern	nination				Speed L	Deter	minatio	n		
M <sub>S</sub> = (Exibit 13					1 -		xhibit 13-			
-	ibit 13-11)						(Exhibit	•		
	-					-	(Exhibit	•		
• • •	ibit 13-11)				1 *	-	•	•		
. ,	ibit 13-13)				1		(Exhibit			
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	RA	MPS AND	RAMP JUN	CTIONS W	ORKSH	EET				
General Info				Site Infor						
Analyst	Shar	ne Forsythe	Fr	eeway/Dir of Tr		14th S	t EB On-ram	ıp		
gency or Compar	ıy		Jι	ınction		I-315				
ate Performed		/2014		ırisdiction						
nalysis Time Peri			Aı	nalysis Year		2014				
roject Description	I-15 Corridor S	3tudy								
nputs		<u>l</u>							1	
Jpstream Adj Ram	р	1	ber of Lanes, N	2					Downstre	am Adj
		Ramp Number	r of Lanes, N	1					Ramp	
Yes C	n	Acceleration L	ane Length, L <sub>A</sub>	930					□Yes	On
✓ No 🔲 C	)ff	Deceleration L	ane Length L <sub>D</sub>							
	<b>711</b>	Freeway Volui	me, V <sub>F</sub>	1216					✓ No	Off
<sub>up</sub> = ft		Ramp Volume		648					L <sub>down</sub> =	ft
-r			-Flow Speed, S <sub>FF</sub>	55.0						
$v_{\rm u} = {\rm veh}$	⁄h	1	ow Speed, S <sub>FR</sub>	35.0					V <sub>D</sub> =	veh/h
2	40 //- 11		* 110	33.0						
Conversion	to pc/n Und	der Base (	Conditions	1			1		1	
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	$f_p$	v = V/PHF	$= x f_{HV} x f_{p}$
Freeway	1216	0.90	Level	3	0	0	.985	1.00	,	1371
Ramp	648	0.94	Level	1	0		.995	1.00		693
UpStream	+	<del>                                     </del>				Ť	1			
DownStream										
		Merge Areas					D	iverge Areas		
stimation o	of v <sub>12</sub>				Estimat	tion c	of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>40</sub> = \	/ <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>E</sub> D	
. <sub>EQ</sub> =		ation 13-6 or	13-7)		l =		.=	Equation 13-		3)
			ion (Exhibit 13-6)		L <sub>EQ</sub> = P =			sing Equatio		
) <sub>FM</sub> = / _			IOTT (EXTIIDIT 13-0)	1	P <sub>FD</sub> =				MI (EXIIIDIL I	J-1)
' <sub>12</sub> =	1371	•	10 11 10 17		V <sub>12</sub> =		•	c/h	10.44 40.4	. <b>7</b> \
or V <sub>av34</sub>	-		13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		-	c/h (Equation 1	13-14 OF 13-1	17)
$ s V_3  \text{ or } V_{av34} > 2,$								Yes No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av</sub>	<sub>v34</sub> > 1.5		Yes ☐ No		
Yes,V <sub>12a</sub> =	pc/h 13-19)		3-16, 13-18, or		If Yes,V <sub>12a</sub> :	=		c/h (Equatio -19)	n 13-16, 1	3-18, or
Capacity Ch		)			Capacit	ty Ch		-13)		
apaony on	Actual		apacity	LOS F?	Jupaon	. <del>,                                    </del>	Actual	Ca	pacity	LOS F?
	7 totali	<del>†                                     </del>	араону	20011	V <sub>F</sub>	$\neg$	riotaar	Exhibit 13-		1 2001.
						\/		_	_	+
$V_{FO}$	2064	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v <sub>R</sub>		Exhibit 13-		
					$V_R$			Exhibit 13 10	-	
low Enterii	na Merae Ir	fluence A	rea		Flow Fr	nterir	na Diver	ge Influen	ce Area	
	Actual		Desirable	Violation?	5.7 -		Actual	Max Des		Violation
V <sub>R12</sub>	2064	Exhibit 13-8	4600:All	No	V <sub>12</sub>	$\top$		Exhibit 13-8		
				110		f Sor	vice Det	erminatio	n (if not	<u> </u>
								0086 V <sub>12</sub> - 0		1)
evel of Ser	. 0 0072/1	0.0076 V <sub>12</sub> - 0.0	0027 L <sub>A</sub>					0000 v <sub>12</sub> - 0	.009 L <sub>D</sub>	
<b>D</b> <sub>R</sub> = 5.475	+ 0.00734 v <sub>R</sub> + 0				$D_R = ($	pc/mi/l	n)			
D <sub>R</sub> = 5.475 $D_R = 15.4 \text{ (pc.)}$	/mi/ln)				1 ., ,,					
evel of Ser $D_R = 5.475$ $D_R = 15.4 \text{ (pc.)}$ $OS = B \text{ (Exhib)}$	/mi/ln) it 13-2)				1 ., ,,	Exhibi	13-2)			
D <sub>R</sub> = 5.475 $D_R = 15.4 \text{ (pc.)}$	/mi/ln) it 13-2)				LOS = (I		t 13-2) <b>minatio</b>	n		
D <sub>R</sub> = 5.475 D <sub>R</sub> = 15.4 (pc. OS = B (Exhib	/mi/ln) it 13-2) rmination				LOS = (I Speed L		minatio	n		
$D_{R} = 5.475$ $D_{R} = 15.4 \text{ (pc. OS} = B \text{ (Exhib})$ $D_{R} = 0.287 \text{ (Exhib}$	/mi/ln) it 13-2) rmination xibit 13-11)				LOS = (I <b>Speed I</b> D <sub>s</sub> = (E	<b>Deter</b> Exhibit	minatio	n		
$D_{R} = 5.475$ $D_{R} = 15.4 \text{ (pc. OS} = B \text{ (Exhib})$ $D_{R} = 0.287 \text{ (Exhip}$ $D_{R} = 0.287 \text{ (Exhip}$ $D_{R} = 0.287 \text{ (Exhip}$	/mi/ln) it 13-2) rmination xibit 13-11) n (Exhibit 13-11)				$LOS = (I)$ <b>Speed I</b> $D_s = (I)$ $S_R = m$	<b>Deter</b> Exhibit on Sph (Exh	rminatio 13-12) nibit 13-12)	n		
$D_{R} = 5.475$ $D_{R} = 15.4 \text{ (pc. OS} = B \text{ (Exhib})$ $D_{S} = 0.287 \text{ (Exhib})$ $D_{S} = 0.287 \text{ (Exhib})$ $D_{S} = 0.287 \text{ (Exhib})$ $D_{S} = 0.287 \text{ (Exhib})$ $D_{S} = 0.287 \text{ (Exhib})$ $D_{S} = 0.287 \text{ (Exhib})$	/mi/ln) it 13-2) rmination xibit 13-11)				$LOS = (I)$ $Speed LOS = (I)$ $D_S = (I)$ $S_R = m$ $S_0 = m$	Deter Exhibit on the ph (Exhaus)	<b>minatio</b> 13-12)	n		

		RAMP	S AND RAN	IP JUNCTI	ONS WO	RKS	HEET				
General Infor	mation			Site Infor							
Analyst Agency or Company		ne Forsythe		reeway/Dir of Trunction		14th W I-315	B Off-ramp				
Date Performed	9/15/	/2014		urisdiction							
Analysis Time Period	l PM F	Peak	Δ	nalysis Year		2035					
Project Description	I-15 Corridor S	Study									
Inputs											
Upstream Adj R	amp	Freeway Num Ramp Numbe	ber of Lanes, N	2					Downstrea Ramp	m Adj	
□Yes	On	1 '	ane Length, L <sub>A</sub>	'					Yes	□On	
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub> me, V₌	713 1418					<b>☑</b> No	Off	
L <sub>up</sub> = f	t	Ramp Volume	e, V <sub>R</sub>	919					L <sub>down</sub> =	ft	
V <sub>u</sub> = ve	eh/h		-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	55.0 35.0				,	V <sub>D</sub> =	veh/h	
Conversion to	o pc/h Un	der Base	Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	1418	0.91	Level	3	0	0.	985	1.00	158	32	
Ramp	919	0.99	Level	2	0	0.	990	1.00	93	9	
UpStream											
DownStream	nStream Merge Areas										
<b>-</b>				<b>-</b>			iverge Areas				
Estimation of	' 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>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13)		
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =			000 using Equ			
V <sub>12</sub> =	pc/h	1 (	,		V <sub>12</sub> =			82 pc/h		,	
V <sub>3</sub> or V <sub>av34</sub>	•	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equatio	n 12 14 or	12 17)	
Is V <sub>3</sub> or V <sub>av34</sub>			-14 01 13-17)			<b>&gt; 2 7</b>			11 13-14 01	13-17)	
								Yes ☑ No			
Is $V_3$ or $V_{av34} > 1.5$			10 10 10			-		Yes ✓ No	10 10 10	10 10	
If Yes,V <sub>12a</sub> =	pc/n ( 13-19		-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	p 19	c/h (Equation	13-16, 13-	18, OF 13-	
Capacity Che		/			Capacit	v Ch		-,			
	Actual		apacity	LOS F?		<del>,                                    </del>	Actual	Car	pacity	LOS F?	
					V <sub>F</sub>		1582	Exhibit 13-8	1	No	
V		Exhibit 13-8			$V_{FO} = V_{F}$	- \/	643	Exhibit 13-8	+	_	
V <sub>FO</sub>		LAHIDIL 13-0						_	+	No	
					V <sub>R</sub>		939	Exhibit 13-10		No	
Flow Entering		1		_	Flow Er	-		ge Influenc			
	Actual		Desirable	Violation?			Actual	Max Desirab		Violation?	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	1	1582	Exhibit 13-8	4400:All	No	
Level of Serv	ice Deterr	nination (	if not F)		Level of	f Serv	∕ice De	terminatior	n (if not F	-)	
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>		
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 1$	1.4 (pc	/mi/ln)				
LOS = (Exhibit	13-2)				LOS = B	(Exhib	oit 13-2)				
Speed Determination					Speed L	-		n			
					<del></del>		xhibit 13-				
$M_S = (Exibit 1)$	•				ľ			•			
	ibit 13-11)					-	(Exhibit	*			
	ibit 13-11)				1	-	(Exhibit	-			
S = mph (Exh	ibit 13-13)				S = 4	8.3 mph	(Exhibit	13-13)			
copyright © 2012 University of Florida, All Rights Reserved					HCS2010 <sup>TM</sup>	l Versio	n 6.41	Ger	nerated: 9/15/	2014 9:49 Al	

		WII O AIND	INAMI JUN		ORKSHE	<u>= E I                                  </u>			
General Infor				Site Infor					
nalyst	Shan	ne Forsythe	Fr	eeway/Dir of Tr	avel	14th St WB On	-ramp		
gency or Company				ınction		I-315			
ate Performed	9/15/			ırisdiction					
nalysis Time Period			Ar	nalysis Year		2035			
roject Description	I-15 Corridor S	Study							
nputs									
pstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adj
		Ramp Numbe	r of Lanes, N	1				Ramp	•
☐ Yes ☐ On	I	Acceleration L	ane Length, L₄	505				□Yes	On
	_	1	ane Length L					1 163	
✓ No ☐ Off		Freeway Volu		728				✓ No	Off
= ft		1						L <sub>down</sub> =	ft
<sub>ip</sub> = ft		Ramp Volume	13	201				-down	
u = veh/h		Freeway Free	-Flow Speed, S <sub>FF</sub>	55.0				V <sub>D</sub> =	veh/h
u Venin		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	35.0				ا ا	
conversion to	pc/h Und	der Base	Conditions						
	V	PHF	Terrain	%Truck	%Rv	f	f	v = \//PH	F x f <sub>HV</sub> x f <sub>p</sub>
(pc/h)	(Veh/hr)	<u> </u>	ı Ulalı			f <sub>HV</sub>	f <sub>p</sub>		
reeway	728	0.93	Level	5	0	0.976	1.00		802
Ramp	201	0.99	Level	1	0	0.995	1.00		204
JpStream		igsquare							
ownStream		لـــــــــــــــــــــــــــــــــــــ					<u> </u>		
		Merge Areas			<b>-</b>		Diverge Areas	<u> </u>	
stimation of	V <sub>12</sub>				Estimati	ion of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )				V <sub>12</sub>	= V <sub>R</sub> + (V <sub>F</sub> - \	/ <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Eau	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-	13)
FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equat		
	802 p		ion (Exhibit 10-0)					ion (Exhibit i	01)
12 =	•				V <sub>12</sub> =		pc/h		4>
<sub>3</sub> or V <sub>av34</sub>	-		13-14 or 13-17)		$V_3$ or $V_{av34}$		pc/h (Equation		17)
$V_3 \text{ or } V_{av34} > 2,70$							Yes □ N		
s $V_3$ or $V_{av34} > 1.5 *$	V <sub>12</sub> /2	s 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>	$_{34} > 1.5 * V_{12}/2$	☐Yes ☐ N	0	
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =	:	pc/h (Equat	ion 13-16, 1	3-18, or
	13-19)	)					13-19)		
Capacity Che	rke				Capacity	y Checks			
		T -	. ,,	1.00.50	<del>\ ''</del>		. 1		1
	Actual	C	apacity	LOS F?		Actu		Capacity	LOS F
		C	Capacity	LOS F?	V <sub>F</sub>	Actu	Exhibit 1		LOS F
V <sub>FO</sub>	Actual		Capacity		$V_F$ $V_{FO} = V_F$			3-8	LOS F
V <sub>FO</sub>		Exhibit 13-8	Capacity	LOS F?	$V_{FO} = V_{F}$		Exhibit 1	3-8	LOS F?
	Actual 1006	Exhibit 13-8			$V_{FO} = V_{F}$ $V_{R}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10	3-8 3-8 3-	
	Actual 1006	Exhibit 13-8			$V_{FO} = V_{F}$ $V_{R}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe	3-8 3-8 3- 3- ence Area	
low Entering	Actual 1006	Exhibit 13-8			$V_{FO} = V_F$ $V_R$ Flow En	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe	3-8 3-8 3-	
low Entering	Actual 1006  g Merge In	Exhibit 13-8	Irea	No	$V_{FO} = V_{F}$ $V_{R}$	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe	3-8 3-8 3- ence Area esirable	
Flow Entering	Actual  1006  Merge In  Actual  1006	Exhibit 13-8  offluence A  Max Exhibit 13-8	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En	- V <sub>R</sub>	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3-8 3- ance Area esirable	Violation
Flow Entering  V <sub>R12</sub> evel of Servi	Actual  1006  7 Merge In  Actual  1006  ice Determ	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of	- V <sub>R</sub> tering Div  Actual  Service D	Exhibit 1 Exhibit 1 Exhibit 1 10 Eerge Influe Max De Exhibit 13-8	3-8 3-8 3-8 3- 2nce Area esirable ion (if no	Violation
V <sub>R12</sub> evel of Server D <sub>R</sub> = 5.475 +	Actual  1006  Actual  1006  ice Detern  0.00734 v R + C	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> Flow En  V <sub>12</sub> Level of	tering Div Actual  F Service D D R = 4.252 +	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3-8 3-8 3- 2nce Area esirable ion (if no	Violation
Flow Entering $V_{R12}$ evel of Servi $D_{R} = 5.475 + 10.1 \text{ (pc/m)}$	Actual  1006  7 Merge In  Actual  1006  ice Detern  0.00734 v R + 0	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow En $V_{12}$ Level of $D_{R} = (p)$	Actual  F Service D  D  R = 4.252 + oc/mi/ln)	Exhibit 1 Exhibit 1 Exhibit 1 10 Eerge Influe Max De Exhibit 13-8	3-8 3-8 3-8 3- 2nce Area esirable ion (if no	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_{R} = 5.475 + 10.1 \text{ (pc/m)}$ $DS = B \text{ (Exhibit } 10.1 \text{ (pc.)}$	Actual  1006  7 Merge In  Actual  1006  ice Detern  0.00734 v <sub>R</sub> + 0  i/ln)  13-2)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ LOS = (E	tering Div Actual  F Service D D R = 4.252 + ac/mi/ln) Exhibit 13-2)	Exhibit 1 Exhibit 1 Exhibit 1 10  erge Influe Max De Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- 2nce Area esirable ion (if no	Violation
Flow Entering $V_{R12}$ evel of Servi $D_{R} = 5.475 + 10.1 \text{ (pc/m)}$	Actual  1006  7 Merge In  Actual  1006  ice Detern  0.00734 v <sub>R</sub> + 0  i/ln)  13-2)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ LOS = (E	Actual  F Service D  D  R = 4.252 + oc/mi/ln)	Exhibit 1 Exhibit 1 Exhibit 1 10  erge Influe Max De Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- 2nce Area esirable ion (if no	Violation
V <sub>R12</sub> vevel of Servi D <sub>R</sub> = 5.475 + R = 10.1 (pc/m DS = B (Exhibit	Actual  1006  Actual 1006  ice Detern 0.00734 v R + 0 i/ln) 13-2)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ LOS = (E  Speed D	tering Div Actual  F Service D D R = 4.252 + ac/mi/ln) Exhibit 13-2)	Exhibit 1 Exhibit 1 Exhibit 1 10  erge Influe Max De Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- 2nce Area esirable ion (if no	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 10.1 \text{ (pc/m)}$ $DS = B \text{ (Exhibit of Speed Detern)}$ $S = 0.296 \text{ (Exit)}$	Actual  1006  7 Merge In  Actual  1006  ice Detern  0.00734 v <sub>R</sub> + 0  i/ln)  13-2)  nination  pit 13-11)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ $LOS = (E)$ Speed D $D_S = (E)$	Actual  F Service D  Comi/In)  Exhibit 13-2)  Determinate  Exhibit 13-12)	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- ence Area esirable	Violation
Flow Entering $V_{R12}$ Evel of Serving $D_R = 5.475 + 10.1 \text{ (pc/m)}$ $DS = B \text{ (Exhibit of Speed Deternity)}$ $S = 0.296 \text{ (Exitor)}$ $R = 51.1 \text{ mph (properties)}$	Actual  1006  7 Merge In  Actual  1006  ice Detern  0.00734 v R + 0  i/ln)  13-2)  nination  bit 13-11)  Exhibit 13-11)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ $LOS = (E)$ Speed D $D_S = (E)$ $S_R = mp$	Actual  F Service D  R = 4.252 + bc/mi/ln)  Exhibit 13-12)  Peterminat  xhibit 13-12)  ph (Exhibit 13-1	Exhibit 1 Exhibit 1 Exhibit 1 10 Eerge Influe Max De Exhibit 13-8 Determination 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- ence Area esirable	Violation
Flow Entering $V_{R12}$ evel of Servi $D_R = 5.475 + $ $R = 10.1 \text{ (pc/m}$ $R = 10.296 \text{ (Exit)}$	Actual  1006  7 Merge In  Actual  1006  ice Detern  0.00734 v <sub>R</sub> + 0  i/ln)  13-2)  nination  pit 13-11)	Exhibit 13-8  Influence A  Max Exhibit 13-8  Influence (A)	Area Desirable 4600:All	No Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ $LOS = (E)$ Speed D $D_S = (E)$ $S_R = m_F$ $S_0 = m_F$	Actual  F Service D  Comi/In)  Exhibit 13-2)  Determinate  Exhibit 13-12)	Exhibit 1 Exhibit 1 Exhibit 1 10 Erge Influe Max Do Exhibit 13-8 Determinati 0.0086 V <sub>12</sub> -	3-8 3-8 3-8 3- ence Area esirable	Violation

		RAMP	S AND RAI	/IP JUNCTI	ONS WO	RKS	HEET			
General Info	rmation			Site Infor						
Analyst Agency or Company Date Performed	Shar	ne Forsythe	J	Freeway/Dir of Tra lunction lurisdiction		Centra	Ave NB O	ff		
Date Performed Analysis Time Perio	9/9/2 d AM F			Analysis Year		2035				
Project Description	u AIVIT	can		anarysis rear		2000				
Inputs										
Upstream Adj F	Ramp	Freeway Num	nber of Lanes, N	2					Downstre	am Adi
	On	Ramp Numbe		1					Ramp	<b>-</b>
			Lane Length, L <sub>A</sub>	4200					□Yes	On
✓ No	Off	Freeway Volu	Lane Length L <sub>D</sub>	1388 519					✓ No	Off
L <sub>up</sub> =	ft	Ramp Volume	•	315					L <sub>down</sub> =	ft
V,, = v	reh/h		e-Flow Speed, S <sub>FF</sub>						V <sub>D</sub> =	veh/h
			low Speed, S <sub>FR</sub>	45.0						
Conversion t	o pc/n Und		conaitions	1	1	_			1	
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	519	0.89	Level	14	0	0.	935	1.00	6	24
Ramp	315	0.83	Level	10	0	0.	952	1.00	4	00
UpStream						_				
DownStream								iverge Areas		
Fstimation o	Merge Areas					ion o		iverge Areas		
					Estimat	1011 0				
	V <sub>12</sub> = V <sub>F</sub>		40.7)		_			V <sub>R</sub> + (V <sub>F</sub> - V		
- <sub>EQ</sub> =		ation 13-6 or			L <sub>EQ</sub> =			Equation 13-		-
P <sub>FM</sub> =	_	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =			000 using Ed	luation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			24 pc/h		
$V_3$ or $V_{av34}$			3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equati	on 13-14 o	r 13-17)
Is $V_3$ or $V_{av34} > 2,70$								☐Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		☐Yes ☑ No		
f Yes,V <sub>12a</sub> =	pc/h ( 13-19)		s-16, 13-18, or		If Yes,V <sub>12a</sub> =	•	p 19	c/h (Equation	า 13-16, 13	-18, or 13-
Capacity Che					Capacit			<i>5)</i>		
capacity circ	Actual		Capacity	LOS F?		,	Actual	C	apacity	LOS F?
					V <sub>F</sub>		624	Exhibit 13-	<del></del>	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	-V <sub>R</sub>	224	Exhibit 13-	8 4700	No
					$V_R$		400	Exhibit 13-	10 2100	No
Flow Enterin	g Merge In	-1			Flow En	_		rge Influer		
	Actual		Desirable	Violation?			Actual	Max Desira		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		624	Exhibit 13-8	4400:All	No
Level of Serv								terminatio		<i>F</i> )
D <sub>R</sub> = 5.475 + 0.00734 v <sub>R</sub> + 0.0078 V <sub>12</sub> - 0.00627 L <sub>A</sub>					'	D <sub>R</sub> = 4	1.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln)					$D_R = -2$	.9 (pc/	mi/ln)			
LOS = (Exhibit 13-2)						•	oit 13-2)			
Speed Determination					Speed D	Deter	minatic	n		
M <sub>S</sub> = (Exibit 1	3-11)				$D_s = 0.5$	334 (E	xhibit 13-	12)		
	nibit 13-11)					-	(Exhibit	-		
S <sub>0</sub> = mph (Ext	nibit 13-11)				$S_0 = N$	/A mph	(Exhibit	13-12)		
S = mph (Ext	nibit 13-13)				S = 57	7.3 mph	(Exhibit	13-13)		
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9/9/2014

0		MPS AND	RAMP JUN			<u> </u>			
General Inform				Site Infor		<u> </u>			
Analyst	Shan	ne Forsythe		eeway/Dir of Tr	avel	Central NB On			
Agency or Company Date Performed	9/9/2	· <b>∩1</b> /		ınction ırisdiction					
Analysis Time Period	AM P			nalysis Year		2035			
Project Description	AIVI F	Can		idiyələ i cai		2000			
nputs									
•		Freeway Num	ber of Lanes, N	2				Downstroom	۸di
Jpstream Adj Ramp		Ramp Numbe	•	1				Downstream Ramp	Adj
Yes On		1 '		•				'	
		1	Lane Length, L <sub>A</sub>	1491				□Yes □	On
✓ No ☐ Off		1	Lane Length L <sub>D</sub>					☑ No □	Off
		Freeway Volu	me, V <sub>F</sub>	230					_
<sub>up</sub> = ft		Ramp Volume	e, V <sub>R</sub>	82				L <sub>down</sub> = f	τ
/ <b>-</b>		Freeway Free	-Flow Speed, S <sub>FF</sub>	65.0				$V_D = V$	eh/h
' <sub>u</sub> = veh/h		Ramp Free-F	low Speed, S <sub>FR</sub>	55.0				V <sub>D</sub> – v	CII/II
Conversion to	pc/h Und		111						
(pc/h)	V	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF x	f <sub>LN</sub> , x f <sub>r</sub>
" ,	(Veh/hr)	1000					<u> </u>		- '
reeway	230	0.83	Level	7	0	0.966	1.00	287	
Ramp	82	0.74	Level	14	0	0.935	1.00	119	
JpStream DownStream		<del>                                     </del>				+		+	
JownStream		Merge Areas		<u> </u>	<u> </u>		Diverge Areas		
stimation of		gu :u			Estimati	ion of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	/ D \					= V <sub>R</sub> + (V <sub>F</sub> - V	' \D	
_			. 40. 7)			<b>v</b> 12 –			
EQ =		ation 13-6 or			L <sub>EQ</sub> =			3-12 or 13-13)	
P <sub>FM</sub> =			tion (Exhibit 13-6)		P <sub>FD</sub> =			ion (Exhibit 13-7)	
12 =	287 p	c/h			V <sub>12</sub> =		pc/h		
′ <sub>3</sub> or V <sub>av34</sub>	0 pc/h	h (Equation	13-14 or 13-17)	)	$\mathrm{V_3}$ or $\mathrm{V_{av34}}$			13-14 or 13-17)	
s $V_3$ or $V_{av34} > 2,700$	pc/h? TYe	s 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 2,700 pc/h?	☐Yes ☐ No	o	
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2 □ Ye	s 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5 * V <sub>12</sub> /2	☐Yes ☐ No	o	
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =			on 13-16, 13-1	8, or
	13-19)	)					13-19)		
Capacity Chec		Т .	No. 10 10	1.00.50	Capacity	y Checks	. 1 ^		100 50
	Actual	1 1	Capacity	LOS F?	\/	Actua		apacity	LOS F
					V <sub>F</sub>		Exhibit 13	<del></del>	
	406	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 13		
$V_{FO}$					$V_R$		Exhibit 1	3-	
v <sub>FO</sub>							10		
	Mareralie	fluores (	\			toring Dive		A	
		1		Violation?		tering Dive	erge Influe		Violation
Flow Entering	Actual	Max	Desirable	Violation?	Flow En	tering Dive	erge Influe Max De	sirable	Violation
Flow Entering V <sub>R12</sub>	Actual 406	Max Exhibit 13-8	Desirable 4600:All	Violation?	Flow En	Actual	erge Influe Max De Exhibit 13-8	esirable	
Flow Entering  V <sub>R12</sub> Level of Servi	Actual 406 <b>ce Detern</b>	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	Flow En  V <sub>12</sub> Level of	Actual Service D	erge Influe Max De Exhibit 13-8 eterminati	on (if not F)	
V <sub>R12</sub> Level of Servi	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	Flow En	Actual  Service D  OR = 4.252 +	erge Influe Max De Exhibit 13-8 eterminati	on (if not F)	Violation
V <sub>R12</sub> Level of Servi  D <sub>R</sub> = 5.475 + 0  R = -0.8 (pc/mi/	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = (p	Actual  Service D  C  C  C  C  C  C  Minute  Actual	erge Influe Max De Exhibit 13-8 eterminati	on (if not F)	
Flow Entering $V_{R12}$ Level of Servi $D_{R} = 5.475 + 0$ $V_{R} = -0.8 \text{ (pc/mi/OS} = A \text{ (Exhibit 1)}$	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 In) 3-2)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = (p LOS = (E	Actual  Service D  C  C  C  C  C  C  C  C  C  C  C  C  C	Max De Exhibit 13-8 etermination 0.0086 V <sub>12</sub> -	on (if not F)	
V <sub>R12</sub> Level of Servi  D <sub>R</sub> = 5.475 + 0  R = -0.8 (pc/mi/	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 In) 3-2)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = (p LOS = (E	Actual  Service D  C  C  C  C  C  C  Minute  Actual	Max De Exhibit 13-8 etermination 0.0086 V <sub>12</sub> -	on (if not F)	
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 0$ $C_R = -0.8 \text{ (pc/mi/OS} = A \text{ (Exhibit 1)}$ Speed Determine	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 In) 3-2) <b>sination</b>	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	V <sub>12</sub>   Level of	Actual  Service D  C  C  C  C  C  C  C  C  C  C  C  C  C	Max De Exhibit 13-8 etermination 0.0086 V <sub>12</sub> -	on (if not F)	
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 0$ $R = -0.8 \text{ (pc/mi/OS} = A \text{ (Exhibit 1)}$ Speed Determing $S_S = 0.163 \text{ (Exib}$	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 In) 3-2) <b>sination</b> it 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	V <sub>12</sub>   Level of	Actual  Service D  C  C  C  C  C  C  C  C  C  C  C  C  C	erge Influe  Max De  Exhibit 13-8  eterminati  0.0086 V <sub>12</sub> -	on (if not F)	
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $R = -0.8 \text{ (pc/mi/}$ $OS = A \text{ (Exhibit 1)}$ $Cos = A  (Exh$	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0  In) 3-2) <b>iination</b> it 13-11)  Exhibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	V <sub>12</sub>   Level of	Actual  Service D  C  C  C  C  C  C  C  C  C  C  C  C  C	Max De Exhibit 13-8 etermination	on (if not F)	
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 0$ $D_R = 0.8 \text{ (pc/mi/OS} = A \text{ (Exhibit 1)}$ Expeed Determing $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$ $D_R = 0.163 \text{ (Exhibit 1)}$	Actual 406 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 In) 3-2) <b>sination</b> it 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	1	Flow En $V_{12}$ Level of $D_R = (p)$ LOS = (E  Speed D $D_S = (E)$ $S_R = mp$ $S_0 = mp$	Actual  Service D  C  C  C/mi/ln)  Exhibit 13-2)  Determination  Actual	Max De Exhibit 13-8  etermination 0.0086 V <sub>12</sub> - 1  fon  2)	on (if not F)	

		RAMP	S AND RAI	/IP JUNCTI	ONS WC	RKS	HEET			
General Info	rmation			Site Infor						
Analyst Agency or Company Date Performed	Shan	e Forsythe	J	reeway/Dir of Tra lunction lurisdiction		Centra	Ave SB Of	f		
Analysis Time Perio			A	Analysis Year		2035				
Project Description										
Inputs		1						- T		
Upstream Adj F	Ramp	Freeway Num Ramp Numbe	nber of Lanes, N er of Lanes, N	2 1					Downstrea Ramp	m Adj
□Yes	On	Acceleration I	ane Length, L <sub>A</sub>						Yes	On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	1144 376					✓ No	Off
L <sub>up</sub> =	ft	Ramp Volume		191					L <sub>down</sub> =	ft
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 45.0					V <sub>D</sub> =	veh/h
Conversion t	to nc/h Hn/		111	TO.0						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	376	0.83	Level	21	0	0.	905	1.00	50	1
Ramp	191	0.85	Level	2	0	0.	990	1.00	22	7
UpStream										
DownStream										
Fatimatian a	Merge Areas				Catimat	·:		iverge Areas		
Estimation o	7 V <sub>12</sub>				Estimat	ion c	7 V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )			$V_{12} = V_R + (V_F - V_R)P_{FD}$					
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(E	Equation 13-1	2 or 13-13)	)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		1.0	000 using Equ	ation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		50	1 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		0	pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Ye:	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 2,7	00 pc/h?	Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2  Yes	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 1.5	* V <sub>12</sub> /2 [	Yes <b>☑</b> No		
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)	Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub>		19	c/h (Equation ))	13-16, 13-	18, or 13-
Capacity Che	ecks				Capacit	ty Ch	ecks			
	Actual		Capacity	LOS F?			Actual	Ca	oacity	LOS F?
					$V_{F}$		501	Exhibit 13-8	4700	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	274	Exhibit 13-8	4700	No
					$V_R$		227	Exhibit 13-10	2100	No
Flow Enterin	a Merae In	fluence A	\rea				a Diver	ge Influen	ce Area	
	Actual	1	Desirable	Violation?	- 1011 =1		Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		501	Exhibit 13-8	4400:All	No
Level of Serv	rice Detern	nination (	if not F)			f Ser	vice De	terminatio	if not F	=)
$D_R = 5.475 + 0$								0086 V <sub>12</sub> - 0.0		,
D <sub>R</sub> = (pc/mi/lr		12	A			к 1.7 (рс/		12	U U	
							oit 13-2)			
LOS = (Exhibit 13-2)  Speed Determination					Speed I	-		n		
					<del> </del>					
M <sub>S</sub> = (Exibit 1					ľ	,	xhibit 13-	*		
	nibit 13-11)						(Exhibit	· ·		
	nibit 13-11)				ľ	-	(Exhibit 1	•		
	nibit 13-13)						(Exhibit	13-13)		
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	RAI	MPS AND	RAMP JUN	CTIONS W	ORKSH	EET				
General Infor		571115	0011	Site Infor						
Analyst Agency or Company		e Forsythe	Ju	reeway/Dir of Tr	avel	Central SI	3 On			
Date Performed Analysis Time Period	9/9/2 AM P			urisdiction nalysis Year		2035				
Project Description	AIVI F	tak	A	ilalysis i cal		2033				
Inputs										
Upstream Adj Ramp		Freeway Num	ber of Lanes, N	2					Downstre	am Adi
		Ramp Numbe	r of Lanes, N	1					Ramp	arii 7 taj
☐ Yes ☐ Or	1	Acceleration I	ane Length, L <sub>A</sub>	1144					□Yes	☐ On
☑ No ☐ Of	f	Deceleration I	Lane Length L <sub>D</sub>						1	
E 140	ı	Freeway Volu	me, V <sub>F</sub>	671					✓ No	Off
<sub>-up</sub> = ft		Ramp Volume	e, V <sub>R</sub>	228					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
$V_{\rm u} = {\rm veh/h}$		Ramp Free-F	ow Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> -	VEII/II
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>H</sub>	v	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	671	0.94	Level	8	0	0.962	2	1.00		742
Ramp	228	0.76	Level	5	0	0.97	ĵ	1.00		306
UpStream										
DownStream		Merge Areas						verge Areas		
Estimation of		werge Areas			Estimat	tion of		verge Areas		
	V <sub>12</sub> = V <sub>F</sub>	( D )						R + (V <sub>F</sub> - V <sub>F</sub>	\D	
=		( ' <sub>FM</sub> / ation 13-6 o	r 13 7)		_			R ' (VF - VF Equation 13		3)
- <sub>EQ</sub> = P <sub>FM</sub> =			tion (Exhibit 13-6)	١	L <sub>EQ</sub> = P <sub>FD</sub> =		-	sing Equation		
У <sub>12</sub> =	742 p		IOTT (EXTIIDIT 13-0)	)	V <sub>12</sub> =			c/h	JII (EXIIIDIC I	01)
V <sub>3</sub> or V <sub>av34</sub>	•		13-14 or 13-17	)	V <sub>3</sub> or V <sub>av34</sub>		•	c/h (Equation	13-14 or 13-1	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	-		10-14-01-10-17	,		· > 2.700	-	Yes □ No		,,
Is $V_3$ or $V_{av34} > 1.5$								Yes □ No		
f Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub>			c/h (Equatio		3-18, or
	13-19)							-19)		
Capacity Che	T .	1 /		1 100 50	Capacit			1 ^	.,	1
	Actual		Capacity	LOS F?	V <sub>F</sub>		Actual	Exhibit 13-	pacity	LOS F?
						\ <u></u>		_		+
$V_{FO}$	1048	Exhibit 13-8		No	$V_{FO} = V_{F}$	· · V <sub>R</sub>		Exhibit 13-		
					V <sub>R</sub>			10	<u>'</u>	
Flow Entering	g Merge In	fluence A	rea	-	Flow Er	ntering	Diver	ge Influer	nce Area	!
	Actual	Max	Desirable	Violation?		Act	1	Max Des		Violation'
V <sub>R12</sub>	1048	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
Level of Serv	ice Detern	nination (	if not F)		1			erminatio		<i>F</i> )
$D_{R} = 5.475 +$	0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>			$D_{R} = 4.2$	52 + 0.0	0086 V <sub>12</sub> - 0	0.009 L <sub>D</sub>	
$D_R = 6.3 \text{ (pc/mi/s)}$	ľn)				$D_R = (I$	pc/mi/ln)				
OS = A (Exhibit						Exhibit 13				
Speed Detern	nination				Speed I	Determ	inatio	n		
M <sub>S</sub> = 0.229 (Exi	bit 13-11)				$D_s = (E_s)^T$	Exhibit 13-1	12)			
	(Exhibit 13-11)				1.5	nph (Exhibit	t 13-12)			
	Exhibit 13-11)				$S_0 = m$	nph (Exhibit	t 13-12)			
	(Exhibit 13-13)				S = m	nph (Exhibit	t 13-13)			
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		RAMP	S AND RAI	MP JUNCTI	ONS WO	RKS	HEET				
General Info	rmation			Site Infor							
Analyst Agency or Company Date Performed	Shar	ne Forsythe	J	Freeway/Dir of Tra lunction lurisdiction		Centra	Ave NB O	ff			
Analysis Time Perio				Analysis Year		2035					
Project Description				,							
Inputs											
Upstream Adj F	Ramp	Freeway Num Ramp Numbe	nber of Lanes, N	2 1					Downstre Ramp	am Adj	
□Yes	On	· '	Lane Length, L <sub>A</sub>	'					Yes	On	
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	1388 792					<b>☑</b> No	Off	
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>R</sub>	372					L <sub>down</sub> =	ft	
V <sub>u</sub> = v	eh/h		e-Flow Speed, S <sub>FF</sub> low Speed, S <sub>FR</sub>	65.0 45.0					V <sub>D</sub> =	veh/h	
Conversion t	to pc/h Uni		111						<u> </u>		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	792	0.87	Level	11	0	0.	948	1.00	9	60	
Ramp	372	0.75	Level	6	0	0.	971	1.00	5	13	
UpStream						_			ļ		
DownStream	nStream Merge Areas							Niverse Areas			
Estimation o			Estimati	ion o		Diverge Areas					
<u> </u>					LStillati						
	$V_{12} = V_{F}$				$V_{12} = V_R + (V_F - V_R)P_{FD}$ $L_{FO} = $ (Equation 13-12 or 13-13)						
L <sub>EQ</sub> =		ation 13-6 or			L <sub>EQ</sub> =			-		-	
P <sub>FM</sub> =	_	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =			000 using Ed	uation (Exh	ibit 13-7)	
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			60 pc/h			
$V_3$ or $V_{av34}$			3-14 or 13-17)		$V_3$ or $V_{av34}$			pc/h (Equati		r 13-17)	
Is $V_3$ or $V_{av34} > 2,70$								☐Yes 🗹 No			
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		☐Yes ☑ No			
If Yes,V <sub>12a</sub> =	pc/h ( 13-19)		3-16, 13-18, or		If Yes,V <sub>12a</sub> =		p 19	c/h (Equation	า 13-16, 13	-18, or 13-	
Capacity Che		)			Capacity			9)			
Capacity One	Actual	Τ	Capacity	LOS F?	Capacity	, 011	Actual		apacity	LOS F?	
	7 totaai	†	Japaony	2001.	V <sub>F</sub>		960	Exhibit 13-	<del></del>	No	
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V_	447	Exhibit 13-		No	
* FO		LAIIIDIC 10 0				*R	513	Exhibit 13-	_	_	
	<u> </u>	<u> </u>	1		V <sub>R</sub>					No	
Flow Enterin		-1		Violetiano	Flow En	-ir		rge Influer		Violetie - O	
V <sub>R12</sub>	Actual	Exhibit 13-8	Desirable	Violation?	V <sub>12</sub>		Actual 960	Max Desira Exhibit 13-8	4400:All	Violation?	
Level of Serv	rice Detern	nination (	if not F)		Level of	Ser	∕ice De	terminatio	n (if not	<i>F</i> )	
D <sub>R</sub> = 5.475 + 0	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>		[	D <sub>R</sub> = 4	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>		
D <sub>R</sub> = (pc/mi/ln)					$D_R = 0.0$	0 (pc/r	mi/ln)				
LOS = (Exhibit 13-2)						(Exhil	oit 13-2)				
Speed Determination					Speed D	•	•	on .			
					<del>                                     </del>		xhibit 13-				
M <sub>S</sub> = (Exibit 1							(Exhibit	-			
	nibit 13-11)						(Exhibit	-			
	nibit 13-11) nibit 13-13)				1	-	•	-			
		All District					(Exhibit	· · · · · · · · · · · · · · · · · · ·		10044 10 55	
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		MIPS AND	RAMP JUNG			:E1			
General Infor	mation			Site Infor	mation				
Analyst	Shan	ne Forsythe	Fre	eeway/Dir of Ti	avel (	Central NB On			
gency or Company	0.10.10			nction					
ate Performed	9/9/2			risdiction	,	2025			
nalysis Time Period	l PM P	<sup>2</sup> eak	An	alysis Year		2035			
roject Description nputs									
		Freeway Num	ber of Lanes, N	2				<u> </u>	
Jpstream Adj Ramp		1						Downstre	am Adj
☐Yes ☐ On	ì	Ramp Number		1				Ramp	
_ 100 _ 011	ı		ane Length, L <sub>A</sub>	1491				□Yes	☐ On
☑ No ☐ Off	F		ane Length L <sub>D</sub>					✓ No	Off
		Freeway Volur	me, V <sub>F</sub>	413					_
<sub>up</sub> = ft		Ramp Volume	, V <sub>R</sub>	193				L <sub>down</sub> =	ft
		Freeway Free	Flow Speed, S <sub>FF</sub>	65.0				V <sub>D</sub> =	vah/h
u = veh/h			ow Speed, S <sub>FR</sub>	55.0				V <sub>D</sub> -	veh/h
onversion to	o pc/h Und		111						
	V			0/ Truck	0/ Dv	l f	f f	V = V/DHI	Evf vf
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v - v/Pni	F x f <sub>HV</sub> x f <sub>p</sub>
reeway	413	0.97	Level	8	0	0.962	1.00		443
Ramp	193	0.81	Level	1	0	0.995	1.00		239
JpStream		$\longmapsto$							
ownStream		M A					<u> </u>		
stimation of		Merge Areas			Ectimati	on of v <sub>12</sub>	Diverge Areas	<u> </u>	
.sumation of					LSuman				
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	$V_R + (V_F - V_F)$	/ <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-1	13)
<sub>FM</sub> =	1.000	using Equat	ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equat	tion (Exhibit 1	3-7)
<sub>12</sub> =	443 p	oc/h			V <sub>12</sub> =		pc/h		
or V <sub>av34</sub>	0 pc/	h (Equation '	13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	n 13-14 or 13-1	17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,70	-		,			4 > 2,700 pc/h?			•
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						4 > 1.5 * V <sub>12</sub> /2			
			3-16, 13-18, or				pc/h (Equat		3-18, or
Yes,V <sub>12a</sub> =	13-19)				If Yes,V <sub>12a</sub> =	1	3-19)		, -
apacity Che					Capacity	/ Checks			
	Actual	C	apacity	LOS F?		Actual		Capacity	LOS F
				1			E 1 1 1 4	3 Q <b>I</b>	
					$V_{F}$		Exhibit 1	3-0	Į
V <sub>EO</sub>	682	Exhibit 13-8		No	<u> </u>	- V <sub>R</sub>	Exhibit 1		
$V_{FO}$	682	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	-	3-8	
				No	$V_{FO} = V_{F}$		Exhibit 1 Exhibit 1 10	3-8	
	g Merge In	nfluence A			$V_{FO} = V_{F}$	tering Dive	Exhibit 1 Exhibit 1 10 Erge Influe	3-8  3-   <b>ence Area</b>	
low Entering	<b>g Merge In</b> Actual	nfluence A	Desirable	Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow En		Exhibit 1 Exhibit 1 10 Erge Influe Max De	3-8 3- ence Area	Violation
Flow Entering	g Merge In Actual 682	Max I Exhibit 13-8	Desirable 4600:All		$V_{FO} = V_F$ $V_R$ Flow Enterty	tering Dive	Exhibit 1  Exhibit 1  10  Erge Influe  Max De  Exhibit 13-8	3-8 3- ence Area esirable	Violation
V <sub>R12</sub> evel of Servi	Merge In Actual 682 ice Determ	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_{FO} = V_F$ $V_R$ Flow Enter $V_{12}$ Level of	tering Dive	Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3- ence Area esirable ion (if not	Violation
low Entering  V <sub>R12</sub> evel of Servi	Merge In Actual 682 ice Determ	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_{FO} = V_F$ $V_R$ Flow Enter $V_{12}$ Level of	tering Dive	Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3- ence Area esirable ion (if not	Violation
V <sub>R12</sub> evel of Servi	Actual 682 ice Determ 0.00734 v R + (	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>FO</sub> = V <sub>F</sub> · V <sub>R</sub> Flow Entire V <sub>12</sub> Level of	tering Dive	Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3- ence Area esirable ion (if not	Violation
V <sub>R12</sub> evel of Servi D <sub>R</sub> = 5.475 + R = 1.3 (pc/mi/l	Actual 682 ice Detern 0.00734 v R + 0	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of $D_{R} = (percentage)$	Actual  Service De	Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8	3-8 3- ence Area esirable ion (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_{R} = 5.475 + 1.3 \text{ (pc/mi/}$ $OS = A \text{ (Exhibit }$	Actual 682 ice Detern 0.00734 v R + 0	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_{FO} = V_F$ $V_R$ Flow Entirely $V_{12}$ Level of $D_R = (percent level of level l$	Actual  Service De  O <sub>R</sub> = 4.252 + 0  c/mi/ln)	Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8 Exermination 2.0086 V <sub>12</sub> -	3-8 3- ence Area esirable ion (if not	Violation
V <sub>R12</sub> vevel of Servi D <sub>R</sub> = 5.475 + R = 1.3 (pc/mi/l OS = A (Exhibit	Actual 682 ice Detern 0.00734 v R + ((in)) 13-2) mination	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_{FO} = V_{F}$ $V_{R}$ Flow End $V_{12}$ Level of $D_{R} = (p_{0}$ LOS = (E  Speed D	Actual  Service De  O <sub>R</sub> = 4.252 + ( c/mi/ln)  xhibit 13-2)	Exhibit 1 Exhibit 1 10 Erge Influe Max De Exhibit 13-8 Exermination	3-8 3- ence Area esirable ion (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 1.3 \text{ (pc/mi//} 20S = A \text{ (Exhibit of Speed Deterning)}$ $C_S = 0.165 \text{ (Exitor)}$	Actual 682 ice Determ 0.00734 v R + ((In)) 13-2) mination bit 13-11)	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>FO</sub> = V <sub>F</sub> · V <sub>R</sub> Flow Ent  V <sub>12</sub> Level of  D <sub>R</sub> = (po LOS = (E Speed D D <sub>S</sub> = (E)	Actual  Service De  O <sub>R</sub> = 4.252 + (c/mi/ln)  xhibit 13-2)  Setermination  xhibit 13-12)	Exhibit 1  Exhibit 1  10  Erge Influe  Max De  Exhibit 13-8  Etermination  0.0086 V <sub>12</sub> -	3-8 3- ence Area esirable ion (if not	Violation
Flow Entering $V_{R12}$ evel of Servi $D_R = 5.475 + $ $R = 1.3 \text{ (pc/mi/l})$ $R = 0.165 \text{ (Exiting Signature)}$ $R = 0.165 \text{ (Exiting Signature)}$ $R = 0.165 \text{ (Exiting Signature)}$	Actual 682 ice Detern 0.00734 v R + ( In) 13-2) inination bit 13-11) (Exhibit 13-11)	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>FO</sub> = V <sub>F</sub> · V <sub>R</sub> V <sub>R</sub> Flow Ent  V <sub>12</sub> Level of  D <sub>R</sub> = (po LOS = (E) Speed D D <sub>S</sub> = (E) S <sub>R</sub> = mp	Actual  Service De  O <sub>R</sub> = 4.252 + (  c/mi/ln)  xhibit 13-2)  etermination  khibit 13-12  ch (Exhibit 13-12)	Exhibit 1  Exhibit 1  10  Exhibit 1  Rege Influe  Max De  Exhibit 13-8  Exermination 10.0086 V <sub>12</sub> -	3-8 3- ence Area esirable ion (if not	Violation
V <sub>R12</sub> vevel of Servi  D <sub>R</sub> = 5.475 +  R = 1.3 (pc/mi/l)  OS = A (Exhibit of Speed Deternorm)  S = 0.165 (Exitory)  R = 61.2 mph (Company)	Actual 682 ice Determ 0.00734 v R + ((In)) 13-2) mination bit 13-11)	Max I Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_{FO} = V_F$ $V_R$ Flow Entirely $V_{12}$ Level of $D_R = (p_1 + p_2)$ $LOS = (E + p_3)$ $D_S = (E + p_4)$ $D_S = (E $	Actual  Service De  O <sub>R</sub> = 4.252 + (c/mi/ln)  xhibit 13-2)  Setermination  xhibit 13-12)	Exhibit 1  Exhibit 1  10  Erge Influe  Max De  Exhibit 13-8  Exermination  0.0086 V <sub>12</sub> -	3-8 3- ence Area esirable ion (if not	Violation

		RAMP	S AND RAI	MP JUNCTI	ONS WOF	RKSI	HEET			
General In	formation			Site Infor						
Analyst		hane Forsythe		Freeway/Dir of Tr	avel C	Central	Ave SB O	ff		
Agency or Comp	-			Junction						
Date Performed		/9/2014		Jurisdiction	•					
Analysis Time Po		M Peak		Analysis Year	2	035				
Project Descripti	on									
Inputs		Francisco Nicor	shar of Lanca N						1	
Upstream A	ıdj Ramp		ber of Lanes, N	2					Downstrea	am Adj
□Vas	On	Ramp Numbe	-	1					Ramp	
□Yes		Acceleration I	ane Length, L <sub>A</sub>						□Yes	On
✓ No	Off	Deceleration I	Lane Length L <sub>D</sub>	1144					✓No	Off
		Freeway Volu	me, V <sub>F</sub>	348					I	
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>R</sub>	101					L <sub>down</sub> =	ft
		Freeway Free	Flow Speed, S <sub>F</sub>	65.0					\	
$V_u =$	veh/h		low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	veh/h
Conversio	n to nc/h l	Inder Base	111							
	11 to peni e				1	Π.	. 1			
(pc/h)	(Veh/hr)	) PHF	Terrain	%Truck	%Rv	1	HV	$f_p$	v = V/PHF	$x t_{HV} x t_{p}$
Freeway	348	0.79	Level	14	0	0.9	935	1.00	4	71
Ramp	101	0.90	Level	6	0	0.9	971	1.00	1	15
UpStream										
DownStream										
<b>-</b> 4: 4:	Merge Areas				F - 4: 4:-			iverge Areas		
Estimation	1 of V <sub>12</sub>				Estimation	on o	r v <sub>12</sub>			
	V <sub>12</sub> =	$V_F(P_{FM})$					V <sub>12</sub> =	$V_R + (V_F - V_F)$	<sub>R</sub> )P <sub>FD</sub>	
- <sub>EQ</sub> =	(Ed	quation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	12 or 13-13	)
P <sub>FM</sub> =	usi	ng Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		1.0	000 using Eq	uation (Exhi	bit 13-7)
V <sub>12</sub> =	pc/		,		V <sub>12</sub> =			'1 pc/h	,	,
√ <sub>3</sub> or V <sub>av34</sub>	•	h (Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equation	on 13 <sub>-</sub> 14 or	· 13_17\
	2,700 pc/h?		14 61 16 17)			> 2.70		Yes ☑ No	)   10-1 <del>4</del> 0	13-17)
	1.5 * V <sub>12</sub> /2									
0 4.0.		Yes  □ No ′h (Equation 13	_16 13_18 or			1.0		☐Yes ☑ No c/h (Equation	13_16 13.	18 or 13.
f Yes,V <sub>12a</sub> =	13-		-10, 13-10, 01		If Yes,V <sub>12a</sub> =		19		1 10-10, 10-	10, 01 13
Capacity C	Checks	•			Capacity	Che	ecks	,		
	Actual	C	Capacity	LOS F?	1		Actual	Ca	pacity	LOS F
					V <sub>F</sub>		471	Exhibit 13-8	3 4700	No
$V_{FO}$		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub> -	- V <sub>D</sub>	356	Exhibit 13-8	3 4700	No
FU					V <sub>R</sub>	R	115	Exhibit 13-1		No
Classe Codes	rina Mara	Influence	\		<del>                                     </del>	<u> </u>				110
Flow Enter		Influence A		\/iolotion?	Flow Ent			rge Influen		Violetion
1/	Actual		Desirable	Violation?	\/		ctual	Max Desirat	1	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		71	Exhibit 13-8	4400:All	No No
		ermination (						terminatio		F)
	•	+ 0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>					.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln)					$D_{R} = -2.0$	) (pc/ı	mi/ln)			
LOS = (Exhibit 13-2)					LOS = A (I	Exhib	it 13-2)			
Speed Det	ermination	)			Speed De	eteri	ninatio	n		
	it 13-11)				<del>  '                                   </del>		chibit 13-			
		`					(Exhibit	•		
	Exhibit 13-11					-	(Exhibit 1	•		
•	Exhibit 13-11					-		•		
• • •	Exhibit 13-13	,					(Exhibit	·		
opyright © 2012 I	right © 2012 University of Florida, All Rights Reserved				HCS2010 <sup>TM</sup>	Version	1 6.41	Ge	enerated: 9/9/2	2014 12:37

O = == :	1 1 F .		III O AIID	RAMP JUN			<u> </u>				
General	Inforn				Site Infor			25.6			
Analyst	`amna=:	Shan	e Forsythe		eeway/Dir of Tranction	avel	Central	SB On			
Agency or C Date Perfori		9/9/2	014		risdiction						
Analysis Tin		PM P			nalysis Year		2035				
Project Des		1 101 1	Cak	711	laryoio i cai		2000				
nputs	оприон										
	I' D		Freeway Num	ber of Lanes, N	2					D	A al:
Jpstream A	aj Ramp		Ramp Number		1					Downstre Ramp	am Adj
Yes	On		· ·		•						
				ane Length, L <sub>A</sub>	1144					☐Yes	On
✓ No				ane Length L <sub>D</sub>						✓ No	Off
			Freeway Volui		936						£.
_up =	ft		Ramp Volume	$, V_R$	366					L <sub>down</sub> =	ft
<i>,</i> –	vah/h		Freeway Free	-Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
/ <sub>u</sub> =	veh/h		Ramp Free-Flo	ow Speed, S <sub>ER</sub>	45.0					<b>v</b> D _	VCII/II
Convers	sion to	pc/h Und	der Base (	Conditions							
		V	PHF	Terrain	%Truck	%Rv	T f	T	f	v – V/DH	F x f <sub>HV</sub> x f <sub>r</sub>
(pc/l	''/	(Veh/hr)		i ci i aii i				HV	F		
Freeway		936	0.90	Level	14	0	0.9		1.00		1113
Ramp		366	0.89	Level	6	0	0.9	71	1.00		423
UpStream			-								
DownStrea	m		Merge Areas						verge Areas		
Estimat	ion of	· · · · · · · · · · · · · · · · · · ·	werge Areas			Estimat	ion of	· <b>V</b>	verge Areas		
_311111111	1011 01					LStillat	1011 01				
		$V_{12} = V_{F}$	(P <sub>FM</sub> )					$V_{12} = V$	R + (V <sub>F</sub> - V <sub>R</sub>	P <sub>FD</sub>	
- <sub>EQ</sub> =		(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(E	Equation 13-	12 or 13-1	13)
P <sub>FM</sub> =		1.000	using Equat	ion (Exhibit 13-6)		P <sub>FD</sub> =		u	sing Equatio	n (Exhibit 1	3-7)
/ <sub>12</sub> =		1113	pc/h			V <sub>12</sub> =		p	c/h		
/ <sub>3</sub> or V <sub>av34</sub>		0 pc/h	n (Equation <sup>•</sup>	13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		p	c/h (Equation 1	3-14 or 13-	17)
	., > 2.700	pc/h? Yes		,			ر مر > 2.70	-	Yes No		,
		V <sub>12</sub> /2 □ Yes							Yes No		
				s-16, 13-18, or					c/h (Equation	13-16. 1	3-18. or
f Yes,V <sub>12a</sub> =	=	13-19)		,,		If Yes,V <sub>12a</sub> =	=		-19)		,
Capacit	y Chec	ks				Capacit	y Che	cks			
		Actual	C	apacity	LOS F?			Actual	Cap	acity	LOS F
						V <sub>F</sub>			Exhibit 13-8	3	
V <sub>F</sub>	_	1536	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-8	3	
*F0	0	1000	EXHIBIT 10 0		110		- ``		Exhibit 13-		
						V <sub>R</sub>			10		
low Er	ntering	Merge In	fluence A	rea		Flow Er	tering	Diver	ge Influen		
		Actual	1	Desirable	Violation?		A	ctual	Max Desi	rable	Violation
$V_{R1}$	2	1536	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
		ce Detern	nination (i	if not F)		Level or	f Serv	ice Det	erminatio	n (if not	: <b>F</b> )
			0.0078 V <sub>12</sub> - 0.0				D <sub>R</sub> = 4.	252 + 0.0	0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
• • • • • • • • • • • • • • • • • • • •	0.1 (pc/mi/	• • •	14				oc/mi/ln		12	5	
••	(Exhibit 1	•					Exhibit ′				
		ination				Speed L			<u> </u>		
•						<del> </del>			1		
•	.236 (Exibi	t 13-11)				,	Exhibit 13	•			
S <sub>R</sub> = 59	9.6 mph (E	Exhibit 13-11)				l ''		oit 13-12)			
	/A mph (E	xhibit 13-11)				$S_0 = m$	ph (Exhil	oit 13-12)			
						h		140 40			
	9.6 mph (E	Exhibit 13-13)				S = m	ıpn (Exnii	oit 13-13)			

0		WIPS AND	RAMP JUN			EEI			
General Inform		F "		Site Infor			ND 0		
Analyst Agency or Company	Shan	e Forsythe		eeway/Dir of Tr inction	avel	Emerson Junction	on NB On		
Date Performed	9/9/2	014		risdiction					
nalysis Time Period	AM F			nalysis Year		2035			
roject Description				,					
nputs									
Jpstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adj
		Ramp Numbe	r of Lanes, N	1				Ramp	,
Yes On		Acceleration L	ane Length, L <sub>A</sub>	980				□Yes	On
✓ No ☐ Off		Deceleration L	ane Length L <sub>D</sub>						
¥ 140 🗀 OII		Freeway Volu	me, V <sub>F</sub>	351				✓No	Off
up = ft		Ramp Volume	, V <sub>D</sub>	104				L <sub>down</sub> =	ft
			Flow Speed, S <sub>FF</sub>	65.0					
u = veh/h		1	ow Speed, S <sub>FR</sub>	55.0				$V_D =$	veh/h
Conversion to	nc/h Hn		111	00.0					
	<del>γρε/π οπο</del> ∀			0/= :	0/5		,	= \//D!!!	Tyf of
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
reeway	351	0.89	Level	21	0	0.905	1.00		436
Ramp	104	0.83	Level	15	0	0.930	1.00		135
JpStream									
OownStream							Diverge Areas	<u> </u>	
stimation of		merge Areas			Estimati	ion of v <sub>12</sub>	Diverge Areas	•	
		/ D \					- \ /	/ \D	
_	$V_{12} = V_F$		40.7)		_	v <sub>12</sub> -	= V <sub>R</sub> + (V <sub>F</sub> - \		10)
EQ =		ation 13-6 or			L <sub>EQ</sub> =		(Equation 1		
<sub>FM</sub> =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equa	tion (Exhibit 1	3-7)
12 =	436 p				V <sub>12</sub> =		pc/h		
<sub>3</sub> or V <sub>av34</sub>	-		13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			n 13-14 or 13-1	17)
$s V_3 \text{ or } V_{av34} > 2,700$						<sub>34</sub> > 2,700 pc/h?			
s $V_3$ or $V_{av34} > 1.5 *$					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
Yes,V <sub>12a</sub> =	pc/h 13-19)		3-16, 13-18, or		If Yes,V <sub>12a</sub> =	:	pc/h (Equat 13-19)	ion 13-16, 1	3-18, or
Capacity Chec		<i></i>			Capacit	y Checks	10 10)		
, ,	Actual	С	apacity	LOS F?		Actua	(	Capacity	LOS F
					V <sub>F</sub>		Exhibit 1		
V	571	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>D</sub>	Exhibit 1	3-8	
$V_{FO}$	3/1	EXHIDIC 13-0		INO		N .	Exhibit 1		
					V <sub>R</sub>		10		
low Entering	Merge In	fluence A	rea		Flow En	tering Dive			1
	Actual	i r	Desirable	Violation?		Actual	1	esirable	Violation
V <sub>R12</sub>	571	Exhibit 13-8	4600:All	No	V <sub>12</sub>	1	Exhibit 13-8		<u> </u>
evel of Servi		•			_	Service D			: <i>F</i> )
* *		0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			$D_R = 4.252 +$	0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
R = 3.7 (pc/mi/li	n)				$D_R = (p$	c/mi/ln)			
	3-2)				LOS = (E	xhibit 13-2)			
OS = A (Exhibit 1	ination				Speed D	Peterminati	ion		
OS = A (Exhibit 1 Speed Determ	<u>a</u> c.o				$D_s = (E$	xhibit 13-12)			
peed Determ					Fs (-				
Speed Determine Speed Determin	it 13-11)					ph (Exhibit 13-12	2)		
<b>Speed Determ</b> S = 0.220 (Exib R = 59.9 mph (I	it 13-11) Exhibit 13-11)				S <sub>R</sub> = m <sub>l</sub>	ph (Exhibit 13-12	-		
<b>Speed Determ</b> S = 0.220 (Exib R = 59.9 mph (I D = N/A mph (E	it 13-11)				S <sub>R</sub> = m <sub>l</sub> S <sub>0</sub> = m <sub>l</sub>	•	2)		

		RAMP	S AND RAI	MP JUNCTI	ONS WOF	RKSI	IEET			
General In:	formation			Site Infor						
Analyst		hane Forsythe		Freeway/Dir of Tr	avel E	merso	n Junction	SB Off		
Agency or Comp	-			Junction						
Date Performed		/9/2014		Jurisdiction						
Analysis Time Po		M Peak		Analysis Year	2	2035				
Project Descripti	on									
Inputs		Francisco Nicia	har of Lanca N						1	
Upstream A	dj Ramp	1	ber of Lanes, N	2					Downstrea	am Adj
□Vaa	On	Ramp Numbe	-	1					Ramp	
□Yes	□ On	Acceleration L	ane Length, L <sub>A</sub>						□Yes	On
✓ No	Off	Deceleration I	Lane Length L <sub>D</sub>	340					✓No	Off
		Freeway Volu	me, V <sub>F</sub>	673					I ™ NO	
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>D</sub>	299					L <sub>down</sub> =	ft
			-Flow Speed, S <sub>F</sub>	65.0					,	
$V_u =$	veh/h		low Speed, S <sub>FR</sub>	50.0					V <sub>D</sub> =	veh/h
Convorcio	n to no/h l		111							
	<i>11 to pc/11 c</i>	Inder Base	Conditions		Ĭ	1			ī	
(pc/h)	(Veh/hr	) PHF	Terrain	%Truck	%Rv	f	HV	$f_p$	v = V/PHF	$x f_{HV} x f_{p}$
Freeway	673	0.87	Level	6	0	0.9	71	1.00	7:	97
Ramp	299	0.88	Level	5	0	0.9	76	1.00	34	48
UpStream										
DownStream										
		Merge Areas						iverge Areas		
Estimation	of v <sub>12</sub>				Estimation	on of	<sup>F</sup> 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>F</sub>	<sub>B</sub> )P <sub>ED</sub>	
- <sub>EQ</sub> =		quation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1	–	3
P <sub>FM</sub> =	· ·	ng Equation (I			P <sub>FD</sub> =			000 using Eq		•
FM / <sub>12</sub> =	pc/		_XIIIDIL 10-0)						uation (Exil	DIL 13-1)
	•		11 10 17)		V <sub>12</sub> =			7 pc/h	40.44	40.47)
V <sub>3</sub> or V <sub>av34</sub>		h (Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	. 0.70		pc/h (Equatio	on 13-14 oi	r 13-17)
Is $V_3$ or $V_{av34} >$						•		Yes ✓ No		
Is $V_3$ or $V_{av34} >$			10 10 10			1.5 <sup>1</sup>		Yes ☑ No	10 10 10	10 10
f Yes,V <sub>12a</sub> =	рс/ 13-	h (Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =		p 19	c/h (Equation	13-16, 13	-18, or 13-
Capacity C		10)			Capacity	Che		<i>)</i>		
oupuony c	Actual		apacity	LOS F?	Gupuony	7	Actual	Ca	pacity	LOS F
	7101001		rapaorty	20011	V <sub>F</sub>		797	Exhibit 13-8		No
V		Exhibit 13-8				1/	449	Exhibit 13-8	+	No
$V_{FO}$		EXHIBIT 13-0			$V_{FO} = V_{F}$	VR .		_		
					V <sub>R</sub>		348	Exhibit 13-1		No
Flow Enter		Influence A			Flow Ent			rge Influen		•
	Actual		Desirable	Violation?			ctual	Max Desiral	1	Violation
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		97	Exhibit 13-8	4400:All	No
		ermination (						terminatio		<i>F</i> )
$D_R = 5.475 -$	+ 0.00734 v <sub>R</sub>	+ 0.0078 V <sub>12</sub> -	- 0.00627 L <sub>A</sub>		D	<sub>R</sub> = 4.	252 + 0.	.0086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
O <sub>R</sub> = (pc/m	ni/ln)				$D_{R} = 8.0$	(pc/m	ıi/ln)			
	bit 13-2)					Exhib	it 13-2)			
	ermination	)			Speed De			n		
-		•			+ '					
•	it 13-11)				1 -		hibit 13-	•		
	Exhibit 13-11					-	(Exhibit	•		
•	Exhibit 13-11				$S_0 = N/A \text{ mph (Exhibit 13-12)}$					
S = mph (	Exhibit 13-13	)			S = 58.9	9 mph	(Exhibit	13-13)		
		da, All Rights Reser			HCS2010 <sup>TM</sup>				enerated: 9/9/	

Canaral lafa		WIF 3 AND	RAMP JUN			<u> </u>			
General Infori		F "		Site Infor		<b>-</b>	ND 0		
Analyst Agency or Company	Shan	e Forsythe		eeway/Dir of Tranction	avel	Emerson Juncti	on NB On		
late Performed	9/9/2	014		ırisdiction					
nalysis Time Period				nalysis Year		2035			
roject Description		-	<u> </u>						
nputs									
pstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adi
potrodiii / taj / tailip		Ramp Numbe	r of Lanes, N	1				Ramp	
☐ Yes ☐ On		Acceleration L	ane Length, L <sub>Δ</sub>	980				□Yes	On
ZNa 🗆 O#		1	ane Length L						_
☑ No ☐ Off		Freeway Volu		849				✓ No	Off
<sub>up</sub> = ft		Ramp Volume	'	458				L <sub>down</sub> =	ft
ıp			Flow Speed, S <sub>FF</sub>					down	
u = veh/h		1		65.0				$V_D =$	veh/h
			ow Speed, S <sub>FR</sub>	55.0					
Conversion to	y pc/n Uno	der Base (	Conditions	<del> </del>	Ι	<del></del>			
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	$F \times f_{HV} \times f_{p}$
reeway	849	0.94	Level	6	0	0.971	1.00		930
Ramp	458	0.92	Level	5	0	0.976	1.00		511
JpStream									
ownStream							<u> </u>		
otimotion of		Merge Areas			Catinasti	ion of w	Diverge Areas	8	
stimation of	V <sub>12</sub>				Estimati	ion of v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )				V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - \	$/_{R})P_{FD}$	
<sub>EQ</sub> =	(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-1	13)
FM =	1.000 using Equation (Exhibit 13-6)						using Equa	tion (Exhibit 1	3-7)
<sub>12</sub> =	930 p	c/h			P <sub>FD</sub> = V <sub>12</sub> =		pc/h		
or V <sub>av34</sub>	0 pc/l	h (Equation	13-14 or 13-17)	)	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	n 13-14 or 13-	17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,700	-		,			<sub>34</sub> > 2,700 pc/h?			•
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
Yes,V <sub>12a</sub> =			3-16, 13-18, or		If Yes,V <sub>12a</sub> =		pc/h (Equat		3-18, or
	13-19)	)					13-19)		
apacity Che		1 0		1 100 50	Capacity	y Checks		,	1
	Actual		apacity	LOS F?	\/	Actua		Capacity	LOS F
					V <sub>F</sub>		Exhibit 1	_	
$V_{FO}$	1441	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 1		
					$V_R$		Exhibit 10	13-	
low Entering	Merge In	fluence 4	rea		Flow En	tering Div		ence Area	)
ion Lincinig	Actual	1	Desirable	Violation?	1011 211	Actual		esirable	Violation
V <sub>R12</sub>	1441	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8	3	
evel of Servi	ce Detern	nination (	if not F)	<u> </u>		Service D			: F)
		0.0078 V <sub>12</sub> - 0.0				$D_R = 4.252 +$			- /
R = 10.3 (pc/mi		12	-д			c/mi/ln)	12	о.ооо -Б	
	•								
OS = B (Exhibit 1						exhibit 13-2)			
peed Determ					<del>+                                    </del>	eterminat	ion		
$I_{S} = 0.230 \text{ (Exit)}$	•				,	xhibit 13-12)	٥,		
R= 59.7 mph (	Exhibit 13-11)				S <sub>R</sub> = m	ph (Exhibit 13-1	-		
R 33.7 mpm (									
	Exhibit 13-11)				$S_0 = m_1$	ph (Exhibit 13-1	2)		
= N/A mph (E	Exhibit 13-11) Exhibit 13-13)				1 -	oh (Exhibit 13-1 oh (Exhibit 13-1	•		

		RAMP	S AND RAI	MP JUNCTI	ONS WO	RKS	HEET			
General Info	ormation			Site Infor						
Analyst Agency or Compa Date Performed	iny 9/9/2			reeway/Dir of Tr Junction Jurisdiction			on Junction	SB Off		
Analysis Time Per Project Description		Peak		Analysis Year		2035				
Inputs	[]									
	: D	Freeway Num	ber of Lanes, N	2				I,	D	A -I'
Upstream Ad	j Ramp	Ramp Numbe		1					Downstrea Ramp	m Adj
□Yes	On	Acceleration L	ane Length, L <sub>A</sub>	·					□Yes	□On
✓ No	Off	Deceleration I Freeway Volu	Lane Length L <sub>D</sub>	340 560					✓No	Off
L <sub>up</sub> =	ft	Ramp Volume	e, V <sub>R</sub>	195				L	-down =	ft
V,, =	veh/h	1	-Flow Speed, S <sub>FF</sub>	65.0				\	√ <sub>D</sub> =	veh/h
			low Speed, S <sub>FR</sub>	50.0						
Conversion	to pc/h Un	der Base	Conditions	_						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	/ = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	560	0.88	Level	13	0	_	939	1.00	67	
Ramp	195	0.94	Level	7	0	0.	966	1.00	21	6
UpStream DownStream	-			+		+				
Downoucum		Merge Areas					D	verge Areas		
Estimation	of v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>rw</sub> )						V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
L <sub>EQ</sub> =		ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-12		
P <sub>FM</sub> =		Equation (			P <sub>FD</sub> =		•	00 using Equ	•	
V <sub>12</sub> =	pc/h	1 (	,		V <sub>12</sub> =			3 pc/h	(	,
V <sub>3</sub> or V <sub>av34</sub>	•	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$			pc/h (Equatio	n 13-14 or	13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2		-	,			, > 2,7		Yes ☑ No		- ,
	.5 * V <sub>12</sub> /2 Ye							Yes ☑ No		
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =			h (Equation	13-16, 13-	18, or 13-
Capacity Cl	hecks				Capacity	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Cap	acity	LOS F?
					$V_{F}$		678	Exhibit 13-8	4700	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	462	Exhibit 13-8	4700	No
					$V_R$		216	Exhibit 13-10	2100	No
Flow Enteri	ng Merge In	fluence A	rea		Flow En	terin	g Diver	ge Influenc	e Area	
	Actual	Max	Desirable	Violation?		,	Actual	Max Desirabl	е	Violation?
$V_{R12}$		Exhibit 13-8			V <sub>12</sub>		678	Exhibit 13-8	4400:All	No
	rvice Detern							ermination	•	-)
	0.00734 v $_{R}$ +	0.0078 V <sub>12</sub> -	0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	1.252 + 0.0	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi	/ln)				$D_R = 7.0$	0 (pc/r	mi/ln)			
LOS = (Exhib	oit 13-2)				LOS = A	(Exhil	oit 13-2)			
Speed Dete	rmination				Speed D	eter	minatio	n		
M <sub>S</sub> = (Exibit	: 13-11)				$D_{s} = 0.2$	252 (E	xhibit 13-	12)		
ŭ	xhibit 13-11)				S <sub>R</sub> = 59	9.2 mph	(Exhibit 1	13-12)		
	xhibit 13-11)				$S_0 = N/$	'A mph	(Exhibit 1	3-12)		
	xhibit 13-13)				S = 59	9.2 mph	(Exhibit 1	13-13)		
Copyright © 2012 Ur	niversity of Florida,	All Rights Reser	ved		HCS2010 <sup>™</sup>	Versio	n 6.41	Gen	nerated: 9/9/2	014 12:39 F

		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General Infor	mation	2 w 11911		Site Infor						
Analyst Agency or Company		e Forsythe	Jı	reeway/Dir of Tr unction		Gore H	ill NB Off			
Date Performed	9/9/2			urisdiction	_					
Analysis Time Period	l AM P	'eak	A	nalysis Year		2035				
Project Description Inputs										
•		Erooway Num	ber of Lanes, N	2						
Upstream Adj R	amp	Ramp Numbe		1					Downstre Ramp	am Adj
□Yes □	On		ane Length, L	ı					Yes	On
✓ No	Off		Lane Length L <sub>D</sub>	323					✓ No	
		Freeway Volu	me, V <sub>F</sub>	442					I NO	Off
L <sub>up</sub> = f	t	Ramp Volume		33					L <sub>down</sub> =	ft
V <sub>u</sub> = ve	eh/h		Flow Speed, $S_{FF}$ low Speed, $S_{FR}$	65.0 50.0					V <sub>D</sub> =	veh/h
Conversion to	n nc/h l ln/		111	50.0						
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	fp	v = V/PHF	x f <sub>inv</sub> x f
Freeway	(Veh/hr) 442	0.92	Level	10	0	-	952	1.00		04
Ramp	33	0.74	Level	35	0	_	851	1.00		52
UpStream		<del>  •    </del>			Ť	†	-			<u> </u>
DownStream										
		Merge Areas						iverge Areas		
Estimation of	<sup>r</sup> v <sub>12</sub>				Estimati	on o	f 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	R)P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		1.0	000 using Eq	uation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =			4 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equation	on 13-14 o	r 13-17)
Is $V_3$ or $V_{av34} > 2,70$			•			<sub>4</sub> > 2,70		Yes ☑ No		,
Is $V_3$ or $V_{av34} > 1.5$					Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes $\checkmark$ No					
If Yes,V <sub>12a</sub> =		Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equatior	n 13-16, 13	-18, or 13-
Capacity Che					Capacity	/ Che		- /		
	Actual	C	apacity	LOS F?			Actual	Ca	apacity	LOS F?
					V <sub>F</sub>		504	Exhibit 13-	8 4700	No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	452	Exhibit 13-	<del>-</del>	No
					V <sub>R</sub>		52	Exhibit 13-1		No
Flow Entering		-1		VE-1-E0	Flow En	_		ge Influen		V. L. C. O
V <sub>R12</sub>	Actual	Exhibit 13-8	Desirable	Violation?	V <sub>12</sub>		Actual 504	Max Desira Exhibit 13-8	4400:All	Violation?
Level of Serv	ico Dotorn		if not E)					terminatio		
D <sub>R</sub> = 5.475 + 0.								.0086 V <sub>12</sub> - 0		<i>r)</i>
D <sub>R</sub> = 0.475 · 0. D <sub>R</sub> = (pc/mi/ln	7.7	0.0070 V <sub>12</sub>	0.00027 L <sub>A</sub>		L	R - ¬ 7 (pc/n		0000 v <sub>12</sub> 0	.000 L <sub>D</sub>	
LOS = (Exhibit	•						oit 13-2)			
Speed Detern					Speed D	•		n		
-					<del>                                     </del>		xhibit 13-			
$M_S = (Exibit 13)$ $S_{-} = mnh (Exh$								-		
S <sub>R</sub> = mph (Exhibit 13-11)					$S_R$ = 59.5 mph (Exhibit 13-12) $S_0$ = N/A mph (Exhibit 13-12)					
S₁= mnh /⊏vh	IDIT 13-111				IOU 14/7					
$S_0$ = mph (Exh S = mph (Exh	ibit 13-11) ibit 13-13)				1 -	-	(Exhibit	-		

O a marral 1 to f		MPS AND	IVAIIII JUIN			<u>-                                    </u>			
General Infori				Site Infor					
Analyst	Shan	e Forsythe		eeway/Dir of Tranction	avel (	Gore Hill NB On	1		
Agency or Company Date Performed	9/9/2	014		risdiction					
analysis Time Period	AM P			nalysis Year	2	2035			
Project Description				,					
nputs									
Jpstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adi
potroum raj ramp		Ramp Numbe	r of Lanes, N	1				Ramp	u, .u.j
☐ Yes ☐ On		Acceleration L	ane Length, L₄	1500				□Yes	On
□Na □o#		1	ane Length L						_
✓ No ☐ Off		Freeway Volu		803				✓ No	Off
<sub>up</sub> = ft		Ramp Volume		572				L <sub>down</sub> =	ft
ир			·, * <sub>R</sub> -Flow Speed, S <sub>FF</sub>	65.0					
$v_u = veh/h$		1						$V_D =$	veh/h
			ow Speed, S <sub>FR</sub>	50.0					
Conversion to	pc/n Und	ger Base (	Conditions	1		1	1		
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHI	$= x f_{HV} x f_{p}$
reeway	803	0.90	Grade	16	0	0.926	1.00	1	964
Ramp	572	0.82	Level	23	0	0.897	1.00		774
JpStream				-					
DownStream									
		Merge Areas					Diverge Areas	5	
stimation of	V <sub>12</sub>				Estimati	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> - \	/ <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Equa	ation 13-6 or	r 13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-1	3)
) = FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equa		
' <sub>12</sub> =	964 p		(=/		V <sub>12</sub> =		pc/h		/
<sup>12</sup> <sup>12</sup> or V <sub>av34</sub>	•		13-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		•	n 13-14 or 13-1	7)
s V <sub>3</sub> or V <sub>av34</sub> > 2,700	-		13-14-01-13-17)	1		<sub>34</sub> > 2,700 pc/h?			11)
s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *			3-16, 13-18, or			<sub>34</sub> > 1.5 * V <sub>12</sub> /2	⊢ Yes		3_18 or
Yes,V <sub>12a</sub> =	13-19)		J-10, 13-10, 01		If Yes,V <sub>12a</sub> =		13-19)	1011 13-10, 1	J- 10, UI
Capacity Che	cks				Capacity	y Checks	,		
	Actual	C	apacity	LOS F?		Actua	ıl (	Capacity	LOS F
							<b>I</b>		
					V <sub>F</sub>		Exhibit 1	3-8	
V=0	1738	Exhibit 13-8		No		- V <sub>R</sub>	Exhibit 1 Exhibit 1		+
$V_{FO}$	1738	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		3-8	
				No	$V_{FO} = V_{F}$ $V_{R}$		Exhibit 1 Exhibit 1	3-8	
	Merge In	fluence A			$V_{FO} = V_{F}$ $V_{R}$	tering Dive	Exhibit 1 Exhibit 1 10 erge Influe	3-8 13- ence Area	
Flow Entering	Merge In	fluence A	Desirable	Violation?	V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub>		Exhibit 1 Exhibit 1 10 erge Influe	3-8 3- ence Area esirable	Violation
Flow Entering V <sub>R12</sub>	Merge In Actual 1738	Max Exhibit 13-8	Desirable 4600:All		$V_{FO} = V_{F}$ $V_{R}$ Flow En	tering Dive	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8	3-8 13- ence Area esirable	Violation
Flow Entering  V <sub>R12</sub> Level of Servi	Merge In Actual 1738 Ce Detern	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of	tering Diversity Actual	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering  V <sub>R12</sub> Level of Servi	Merge In Actual 1738 Ce Detern	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of	tering Dive	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
V <sub>R12</sub> .evel of Servi	Merge In Actual 1738 Ce Detern 0.00734 v R + C	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> Flow En  V <sub>12</sub> Level of	tering Diversity Actual	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_{R} = 5.475 + 0$ $P_{R} = 9.3 \text{ (pc/mi/l}$	Actual 1738 CCE Detern 0.00734 v R + Con)	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$	Actual  Service D  D <sub>R</sub> = 4.252 +	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_{R} = 5.475 + 0$ $P_{R} = 9.3 \text{ (pc/mi/l}$	Merge In Actual 1738 Ce Detern 0.00734 v <sub>R</sub> + 0 n) 3-2)	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> Flow End V <sub>12</sub> Level of D <sub>R</sub> = (pi LOS = (E	Actual  Service D  Red 4.252 + c/mi/ln)  Exhibit 13-2)	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat 0.0086 V <sub>12</sub> -	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + (1.8) = 9.3 \text{ (pc/mi/l}$ $OS = A \text{ (Exhibit 1)}$ Speed Determ	Actual 1738 CCE Detern 0.00734 v R + ( n) 3-2) nination	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = (p)$ $LOS = (E)$ Speed D	Actual  Service D  CR = 4.252 + c/mi/ln)  Exhibit 13-2)  Determinate	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat 0.0086 V <sub>12</sub> -	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering $V_{R12}$ Evel of Servi $D_R = 5.475 + 0$ $R = 9.3 (pc/mil/l)$ $OS = A (Exhibit 1)$ Speed Determing $S = 0.193 (Exib)$	Merge In Actual 1738 Ce Detern 0.00734 v <sub>R</sub> + 0 n) 3-2) nination iit 13-11)	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> Flow End V <sub>12</sub> Level of  D <sub>R</sub> = (p) LOS = (E) Speed D D <sub>S</sub> = (E)	Actual  Service D  Complete A.252 + c/mi/ln)  Exhibit 13-2)  Determination	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat 0.0086 V <sub>12</sub> -	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $R = 9.3 \text{ (pc/mi/l)}$ $OS = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$ $Cos = A \text{ (Exhibit 1}$	Actual 1738 CCE Detern 0.00734 v R + Con) 3-2) Innation it 13-11) Exhibit 13-11)	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = (p)$ $LOS = (E)$ Speed D $D_S = (E)$ $S_R = (E)$	Actual  Service D  Capacita Service Se	Exhibit 1 Exhibit 1 10 erge Influe Max D Exhibit 13-8 eterminat 0.0086 V <sub>12</sub> -	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 9.3 \text{ (pc/mi/l})$ $D_R = 0.3 \text{ (pc/mi/l})$ $D_R = 0.493 \text{ (Exhibit 1)}$	Merge In Actual 1738 Ce Detern 0.00734 v <sub>R</sub> + 0 n) 3-2) nination iit 13-11)	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$\begin{array}{c} V_{FO} = V_F \\ \hline V_R \\ \hline \end{array}$	Actual  Service D  Complete A.252 + c/mi/ln)  Exhibit 13-2)  Determination	Exhibit 1 Exhibit 1 10 Erge Influe Max D Exhibit 13-8 Etermination  2)	3-8 3-1 3- ence Area esirable 3 ion (if not	Violation

		RAMP	S AND RAI	//P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor						
Analyst Agency or Company	Shan	e Forsythe	J	reeway/Dir of Tr lunction		Gore H	ill SB Off			
Date Performed	9/9/2			Jurisdiction						
Analysis Time Period	d AM F	'eak	F	Analysis Year		2035				
Project Description Inputs										
<u>.</u>		Erooway Num	ber of Lanes, N	2						
Upstream Adj R	lamp	1							Downstre	am Adj
□Yes□	On	Ramp Numbe		1					Ramp	
	_ 0		ane Length, L <sub>A</sub>						□Yes	On
✓ No	Off		Lane Length L <sub>D</sub>	358					<b>☑</b> No	Off
1 - 4	1	Freeway Volu		713					=	ft
L <sub>up</sub> = f	τ	Ramp Volume		686					L <sub>down</sub> –	10
V,, = v	eh/h		-Flow Speed, S <sub>FF</sub>	65.0					V <sub>D</sub> =	veh/h
			low Speed, S <sub>FR</sub>	50.0						
Conversion t		der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	713	0.85	Grade	7	0	0.	891	1.00	9	42
Ramp	686	0.79	Level	7	0	0.	966	1.00	8	94
UpStream										
DownStream										
Fatimatian a		Merge Areas			Fatime at			Diverge Areas		
Estimation of	12				Estimati	ion o	7 V <sub>12</sub>			
	$V_{12} = V_{F}$	(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>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		1.	000 using Ed	quation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		94	12 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		${ m V_3}$ or ${ m V_{av34}}$		0	pc/h (Equati	on 13-14 o	r 13-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 2,7	00 pc/h? [	]Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5	* V <sub>12</sub> /2	∃Yes ☑ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub> =	:		c/h (Equation	n 13-16, 13	-18, or 13-
	13-19)						19	9)		
Capacity Che	Actual		apacity	LOS F?	Capacity	y CIII	Actual		apacity	LOS F?
	Actual	† Ť	σαρασιτή	LOGIT	V <sub>F</sub>		942	Exhibit 13-	<del></del>	No No
		Fvb:bit 12 0			-	\/		Exhibit 13		_
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- <b>v</b> <sub>R</sub>	48	_	_	No
	<u> </u>				V <sub>R</sub>		894	Exhibit 13-		No
Flow Entering	T -			1 15 1 5 0	Flow En	_		rge Influer		1 1 1 1 1 0
\/	Actual		Desirable	Violation?	\/	$\neg$	Actual	Max Desira		Violation?
V <sub>R12</sub>	. 5 .	Exhibit 13-8	· · · · · · · · ·		V <sub>12</sub>		942	Exhibit 13-8	4400:All	No No
Level of Serv								terminatio		F)
$D_R = 5.475 + 0.$		0.0078 V <sub>12</sub> -	· 0.00627 L <sub>A</sub>					.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	1)				l ''	1 (pc/r	,			
LOS = (Exhibit						•	oit 13-2)			
Speed Deterr	nination				Speed D	eter	minatio	on		
M <sub>S</sub> = (Exibit 1	3-11)				$D_s = 0.3$	313 (E	xhibit 13-	-12)		
	nibit 13-11)				S <sub>R</sub> = 57	'.8 mph	(Exhibit	13-12)		
	nibit 13-11)				$S_0$ = N/A mph (Exhibit 13-12)					
	nibit 13-13)				S = 57	'.8 mph	(Exhibit	13-13)		
`apyriaht @ 2012 Hniy	ersity of Florida	All Rights Reser	ved		HCS2010 <sup>™</sup>	1 Versi	on 6 41	(	Generated: 9/9	9/2014 9:56 A

0		WIPS AND	RAMP JUN			EEI			
General Inform				Site Infor					
Analyst	Shan	e Forsythe		eeway/Dir of Tra	avel	Gore Hill SB On	l		
Agency or Company Date Performed	9/9/2	014		ınction ırisdiction					
nalysis Time Period	AM P			nalysis Year		2035			
roject Description	7 (1) 1	Car	7.0	iaryolo i cai		2000			
nputs									
Ipstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstre	am Adi
pstream Auj Ramp		Ramp Numbe	r of Lanes. N	1				Ramp	aiii Auj
☐ Yes ☐ On		1 '	ane Length, L <sub>Δ</sub>	1500				1 '	
		1	ane Length L <sub>D</sub>	1300				□Yes	☐ On
✓ No ☐ Off		1		000				✓ No	Off
= ft		Freeway Volui		286				L <sub>down</sub> =	ft
<sub>up</sub> = ft		Ramp Volume	11	81				-down	
veh/h		1	-Flow Speed, S <sub>FF</sub>	65.0				V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	50.0					
conversion to	<u> </u>	der Base (	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
reeway	286	0.79	Level	20	0	0.909	1.00		398
Ramp	81	0.62	Level	40	0	0.833	1.00		157
JpStream	•	****				1.000			
DownStream									
		Merge Areas					Diverge Areas	3	
stimation of	V <sub>12</sub>				Estimati	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> - \	/ <sub>R</sub> )P <sub>FD</sub>	
EQ =	(Equ	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(Equation 1	3-12 or 13-1	3)
) = FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equat		
' <sub>12</sub> =	398 p		, , ,		V <sub>12</sub> =		pc/h	,	,
' <sub>3</sub> or V <sub>av34</sub>	•		13-14 or 13-17)	<b>\</b>	V <sub>3</sub> or V <sub>av34</sub>		pc/h (Equation	n 13-14 or 13-1	<b> 7</b>
s V <sub>3</sub> or V <sub>av34</sub> > 2,700	-		10-14-01-10-17)			<sub>34</sub> > 2,700 pc/h?			11)
ls V <sub>3</sub> or V <sub>av34</sub> > 1.5 *						<sub>34</sub> > 1.5 * V <sub>12</sub> /2			
			3-16, 13-18, or				pc/h (Equat		3-18 or
Yes,V <sub>12a</sub> =	13-19)		7 10, 10 10, 01		If Yes,V <sub>12a</sub> =	•	13-19)	1011 10 10, 1	0 10, 01
Capacity Chec	cks				Capacity	y Checks			
	Actual	C	apacity	LOS F?		Actua		Capacity	LOS F
					$V_{F}$		Exhibit 1	3-8	
$V_{FO}$	555	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 1	3-8	
FO					V <sub>R</sub>		Exhibit 1	3-	
		<u> </u>					10		
low Entering		1		1 15 1 5 0	Flow En	tering Div			
.,	Actual	i r	Desirable 4000 All	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Actual		esirable	Violation
V <sub>R12</sub>	555	Exhibit 13-8	4600:All	No	V <sub>12</sub>	<u> </u>	Exhibit 13-8		L
evel of Servi		•	· ·			Service D		<u> </u>	<i>F)</i>
		0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>			D <sub>R</sub> = 4.252 +	0.0086 V <sub>12</sub> -	0.009 L <sub>D</sub>	
<sub>R</sub> = 0.3 (pc/mi/li	· ·					c/mi/ln)			
Κ	3-2)				LOS = (E	Exhibit 13-2)			
	• •				Speed D	Determinat	ion		
	unation				D - /F	xhibit 13-12)			
OS = A (Exhibit 1						.XIIIDIL 10-12)			
OS = A (Exhibit 1  Speed Determ  S = 0.178 (Exib	it 13-11)				,	ph (Exhibit 13-12)	2)		
SS = A (Exhibit 1)  Speed Determination of the property of	it 13-11) Exhibit 13-11)				S <sub>R</sub> = m <sub>l</sub>	ph (Exhibit 13-1	•		
OS = A (Exhibit 1)  Speed Determination of the property of	it 13-11)				S <sub>R</sub> = m <sub>l</sub> S <sub>0</sub> = m <sub>l</sub>	•	2)		

Gore Hill NI  2035  Rv f <sub>HV</sub> 0.943  0.826	f <sub>p</sub>	Downstre Ramp ☐ Yes ☑ No L <sub>down</sub> = V <sub>D</sub> =	eam Adj On Off ft veh/h
Gore Hill NI 2035  Rv f <sub>HV</sub> 0.943	fp	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
Rv f <sub>HV</sub> 0.943	<del></del>	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
Rv f <sub>HV</sub> 0.943	<del></del>	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
Rv f <sub>HV</sub> 0.943	<del></del>	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
0.943	<del></del>	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
0.943	<del></del>	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
0.943	<del></del>	Ramp  ☐ Yes  ☑ No  L <sub>down</sub> =  V <sub>D</sub> =	□ On □ Off
0.943	<del></del>	Yes  Volume  V <sub>D</sub> =	☐ Off ft
0.943	<del></del>	✓ No L <sub>down</sub> = V <sub>D</sub> =	☐ Off ft
0.943	<del></del>	✓ No L <sub>down</sub> = V <sub>D</sub> =	☐ Off ft
0.943	<del></del>	L <sub>down</sub> = V <sub>D</sub> =	ft
0.943	<del></del>	V <sub>D</sub> =	
0.943	<del>`</del>		veh/h
0.943	<del>`</del>		veh/h
0.943	<del>`</del>	v = V/PHI	
0.943	<del>`</del>	v = V/PHI	
0.943	<del>`</del>	v = V/PHI	· ·
	1.00	I	$F x f_{HV} x f_{p}$
			498
	1.00		109
	Diverge Area	as	
nation of v	12		
	$V_{12} = V_R + (V_F)$	- V <sub>P</sub> )P <sub>ED</sub>	
		13-12 or 13-1	3)
		Equation (Ext	-
	498 pc/h	Equation (Ex	
av34	•	otion 12 14 c	r 10 17\
		iation 13-14 c	113-17)
	c/h? ☐ Yes ☑ I		
	2/2 ☐ Yes ☑ I	No tion 13-16, 13	2 10 or 12
/ <sub>12a</sub> =	19)	11011 13-10, 13	)-10, UI 13-
acity Check			
	Actual	Capacity	LOS F?
		<del></del>	No
			No
			No
			Violation
			No
			<i>F</i> )
$D_{R} = 4.25$	2 + 0.0086 V <sub>12</sub>	- 0.009 L <sub>D</sub>	
5.6 (pc/mi/lr	1)		
A (Exhibit 1	3-2)		
u Determin			
	•		
0.243 (Exhib	•		
0.243 (Exhib 59.4 mph (Ex	nidit 13-12)		
0.243 (Exhib 59.4 mph (Ex N/A mph (Ex			
	V <sub>F</sub> - V <sub>R</sub>   V <sub>R</sub>   V <sub>R</sub>   V <sub>R</sub>   Actual   498   498   4.25   5.6 (pc/mi/ling A (Exhibit 1 of Determination   0.243 (Exhibit 59.4 mph (Exhibit 1 of Determination   0.243 (	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	V <sub>F</sub> - V <sub>R</sub>   389

9/9/2014

<u> </u>		MPS AND	RAMP JUNG			ET			
General Info	ormation			Site Infor	mation				
Analyst Agency or Compai	ny	ne Forsythe	Ju	eeway/Dir of Tranction	avel (	Gore Hill NB On			
Date Performed	9/9/2			risdiction					
Analysis Time Peri		Peak	An	alysis Year	- 2	2035			
Project Description Proputs	1								
•		Erooway Num	nber of Lanes, N	2				1	
Jpstream Adj Ram	np	1						Downstrea	am Adj
☐ Yes ☐ (	On	Ramp Numbe		1				Ramp	
		1	Lane Length, L <sub>A</sub>	1500				□Yes	☐ On
☑ No 🔲 (	Off		Lane Length L <sub>D</sub>					✓No	Off
		Freeway Volu		1122					£L.
<sub>up</sub> = ft		Ramp Volume	11	961				L <sub>down</sub> =	ft
/ <sub>u</sub> = veh	ı/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	65.0				V <sub>D</sub> =	veh/h
u ven	W11	Ramp Free-Fl	low Speed, S <sub>FR</sub>	50.0				"	
Conversion	to pc/h Un	der Base	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	1122	0.80	Grade	10	0	0.952	1.00	1	473
Ramp	961	0.74	Level	9	0	0.957	1.00	1	357
JpStream									
DownStream		Marria Araaa					Diverse Asses		
Stimation	of v	Merge Areas			Estimatio	on of v <sub>12</sub>	Diverge Areas		
.sumation (					LStillati				
	$V_{12} = V_{F}$					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>		
EQ =		ation 13-6 o			L <sub>EQ</sub> =		(Equation 13		
<sub>FM</sub> =			tion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	on (Exhibit 13	3-7)
′ <sub>12</sub> =	1473	pc/h			V <sub>12</sub> =		pc/h		
$V_3$ or $V_{ m av34}$	-		13-14 or 13-17)		$ m V_3$ or $ m V_{av34}$		pc/h (Equation		7)
	,700 pc/h? □Ye					•	☐Yes ☐ No		
Is $V_3$ or $V_{av34} > 1$ .	.5 * V <sub>12</sub> /2				Is V <sub>3</sub> or V <sub>av34</sub>	<sub>4</sub> > 1.5 * V <sub>12</sub> /2	☐Yes ☐ No		
Yes,V <sub>12a</sub> =	pc/h	(Equation 13	3-16, 13-18, or		If Yes,V <sub>12a</sub> =	,	pc/h (Equatio	on 13-16, 1	3-18, or
Capacity Ch	13-19)	)			Capacity		13-19)		
bapacity Of	Actual		Capacity	LOS F?		Actual	l Ca	pacity	LOS F?
	Hotaai		Supudity	20011	V <sub>F</sub>	riotaai	Exhibit 13-		1 2001
					$V_{FO} = V_F$	- \/	Exhibit 13-		
.,		Exhibit 13-8		No		*R	Exhibit 13		
$V_{FO}$	2830			1	$V_R$			) <sup>-</sup>	
$V_{FO}$	2030				*R		10		
	ng Merge In	nfluence A	Area			tering Dive	erge Influer	nce Area	
Flow Enteri			<b>Area</b> Desirable	Violation?	Flow Ent	tering Dive			Violation
	ng Merge In			Violation?			erge Influer		Violation
Flow Enterion	ng Merge In	Max Exhibit 13-8	Desirable 4600:All	î e	Flow Ent	Actual	erge Influer Max Des	sirable	
Flow Enterion  V <sub>R12</sub> Level of Ser	ng Merge In Actual 2830	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	Flow Ent	Actual Service De	Max Des Exhibit 13-8	irable on (if not	
V <sub>R12</sub> Level of Ser	Actual 2830  rvice Deterr 5+0.00734 v R +	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	Flow Ent	Actual Service De	erge Influer Max Des Exhibit 13-8 etermination	irable on (if not	
Flow Entering $V_{R12}$ Level of Serial D <sub>R</sub> = 5.475 $D_{R} = 17.5 \text{ (pc)}$	Actual 2830  rvice Deterr 5 + 0.00734 v R + 10000000000000000000000000000000000	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	Flow Ent	Actual  Service De  O <sub>R</sub> = 4.252 + 6  c/mi/ln)	erge Influer Max Des Exhibit 13-8 etermination	irable on (if not	
Flow Entering $V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 17.5$ (pc $D_R = 17.5$ ) $D_R = 17.5$ (pc $D_R = 17.5$ )	Actual 2830  rvice Determ 5 + 0.00734 v R + 4 c/mi/ln) oit 13-2)	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	V <sub>12</sub> Level of  D <sub>R</sub> = (pc LOS = (E:	Actual  Service Do  R = 4.252 + 6  c/mi/ln)  xhibit 13-2)	Max Des Exhibit 13-8 eterminatio 0.0086 V <sub>12</sub> - 0	irable on (if not	
Flow Entering $V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 17.5 \text{ (pc)}$ $OS = B \text{ (Exhibit)}$ Speed Determine $OS = OS = OS = OS = OS = OS = OS = OS $	Actual 2830  rvice Deterr 5 + 0.00734 v R + 10000000000000000000000000000000000	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	Flow End  V <sub>12</sub> Level of  D <sub>R</sub> = (po  LOS = (E:	Actual  Service Do  OR = 4.252 + (c/mi/ln)  xhibit 13-2)  eterminati	Max Des Exhibit 13-8 eterminatio 0.0086 V <sub>12</sub> - 0	irable on (if not	
Flow Entering $V_{R12}$ Level of Ser $D_R = 5.475$ $O_R = 17.5$ (pc $OS = B$ (Exhibit Speed Determine) $O_R = 0.237$ (E	Actual 2830  rvice Determ 5 + 0.00734 v R + 10 c/mi/ln) pit 13-2) rmination Exibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	V <sub>12</sub>   Level of   D <sub>R</sub> = (pc   LOS = (E: Speed D   D <sub>S</sub> = (Ex	Actual  Service Do  OR = 4.252 + 0  c/mi/In)  xhibit 13-2)  eterminati  khibit 13-12)	erge Influer Max Des Exhibit 13-8 eterminatio 0.0086 V <sub>12</sub> - 0	irable on (if not	
Flow Entering $V_{R12}$ Level of Ser $D_R = 5.475$ $O_R = 17.5$ (pc $O_S = B$ (Exhibitable) (Exhibitable) $O_S = 0.237$ (Exhipitable) $O_S = $	Actual 2830  rvice Deterr 5 + 0.00734 v <sub>R</sub> + 10 c/mi/ln) bit 13-2)  rmination Exibit 13-11) bh (Exhibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	Flow Entire V <sub>12</sub> Level of C D <sub>R</sub> = (pot LOS = (Ex Speed D D <sub>S</sub> = (Ex S <sub>R</sub> = mp	Actual  Service Do  R = 4.252 + 6  c/mi/ln)  xhibit 13-2)  eterminati  khibit 13-12)  th (Exhibit 13-12)	erge Influer  Max Des  Exhibit 13-8  etermination  0.0086 V <sub>12</sub> - 0	irable on (if not	
Flow Entering $V_{R12}$ Level of Ser $D_R = 5.475$ $D_R = 17.5$ (pc $OS = B$ (Exhibit Speed Determine $M_S = 0.237$ (E $S_R = 59.5$ mp $S_D = N/A$ mph	Actual 2830  rvice Determ 5 + 0.00734 v R + 10 c/mi/ln) pit 13-2) rmination Exibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All (if not F)	î e	Flow End $V_{12}$ Level of $D_R = (po$ $LOS = (E:$ Speed D $D_S = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$	Actual  Service Do  OR = 4.252 + 0  c/mi/In)  xhibit 13-2)  eterminati  khibit 13-12)	erge Influer  Max Des  Exhibit 13-8  etermination  0.0086 V <sub>12</sub> - 0	irable on (if not	Violation

		RAMP	S AND RAM	IP JUNCTI	ons wo	RKS	HEET			
General Inf	ormation			Site Infor						
Analyst	Shar	ne Forsythe	Fı	eeway/Dir of Tr	avel	Gore H	ill SB Off			
Agency or Compa	iny	•	Jι	ınction						
ate Performed	9/9/2	2014	Jı	ırisdiction						
analysis Time Per		Peak	Aı	nalysis Year		2035				
Project Descriptio	n									
nputs									TC .	
Upstream Ad	lj Ramp	1	ber of Lanes, N	2					Downstre	am Adj
□Yes	On	Ramp Numbe	•	1					Ramp	
		1	Lane Length, L <sub>A</sub> Lane Length L <sub>D</sub>	358					□Yes	On
✓ No	☐ Off	Freeway Volu		981					☑ No	Off
L <sub>up</sub> =	ft	Ramp Volume	•	644					L <sub>down</sub> =	ft
·		1	-Flow Speed, S <sub>FF</sub>	65.0					,	
$V_u =$	veh/h		low Speed, S <sub>FR</sub>	50.0					V <sub>D</sub> =	veh/h
Conversion	to pc/h Un		111							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
reeway	981	0.93	Grade	10	0	0.	870	1.00	1:	213
Ramp	644	0.80	Level	16	0	0.	926	1.00	8	67
JpStream		1 1								
DownStream										
		Merge Areas						Diverge Areas		
stimation	of v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>E</sub>	(P <sub>FM</sub> )					V <sub>12</sub> =	· V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	P <sub>ED</sub>	
EQ =		ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		3)
EQ FM =		Equation (I			P <sub>FD</sub> =			000 using Eq		•
гм 12 =	pc/h	Lquation (i	Exhibit 10 0)		V <sub>12</sub> =				uation (Ex	iibit 10 1)
	•	(Cauction 12	14 or 12 17)					213 pc/h	40 44 -	- 40 4 <del>7</del> )
<sub>3</sub> or V <sub>av34</sub>	-		-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	. 0.7		pc/h (Equation	on 13-14 o	r 13-17)
	,700 pc/h? Ye							☐Yes ☑ No		
s V <sub>3</sub> or V <sub>av34</sub> > 1	.5 * V <sub>12</sub> /2 Ye				Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		☐Yes ☑ No		
Yes,V <sub>12a</sub> =	pc/h ( 13-19		-16, 13-18, or		If Yes,V <sub>12a</sub> =	:	p 19	c/h (Equation	13-16, 13	3-18, or 13-
Capacity Ci		)			Capacit			9)		
apacity of	Actual		Capacity	LOS F?	Capacity	<i>y 011</i>	Actual	Ca	pacity	LOS F
	Actual		papacity	LOGITE	V <sub>F</sub>		1213	Exhibit 13-8	<del></del>	
.,		E 1 " " 40 0			<u> </u>	.,				No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- <b>v</b> <sub>R</sub>	346	Exhibit 13-8		No
					V <sub>R</sub>		867	Exhibit 13-1		No
	ing Merge Ir	ī		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Flow En			rge Influen		N. 1
low Enteri							Actual	Max Desiral	ole	Violation'
	Actual		Desirable	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				ı	I
V <sub>R12</sub>		Exhibit 13-8		Violation?	V <sub>12</sub>	·	1213	Exhibit 13-8	4400:All	No
V <sub>R12</sub> .evel of Se	rvice Deteri	Exhibit 13-8	if not F)	Violation?	Level of	Ser	213 /ice De	Exhibit 13-8 <b>terminatio</b>	4400:All <b>n (if not</b>	-
V <sub>R12</sub> .evel of Se D <sub>R</sub> = 5.475 +		Exhibit 13-8	if not F)	Violation?	Level of	Serv D <sub>R</sub> = 4	213 /ice De 1.252 + 0	Exhibit 13-8	4400:All <b>n (if not</b>	
V <sub>R12</sub> .evel of Se D <sub>R</sub> = 5.475 +	<i>rvice Deteri</i> 0.00734 v <sub>R</sub> +	Exhibit 13-8	if not F)	Violation?	Level of	Serv D <sub>R</sub> = 4	213 /ice De	Exhibit 13-8 <b>terminatio</b>	4400:All <b>n (if not</b>	
V <sub>R12</sub> .evel of Se D <sub>R</sub> = 5.475 + <sub>R</sub> = (pc/mi	<i>rvice Deteri</i> 0.00734 v <sub>R</sub> +	Exhibit 13-8	if not F)	Violation?	Level of  I D <sub>R</sub> = 11	D <sub>R</sub> = 4	213 /ice De 1.252 + 0	Exhibit 13-8 <b>terminatio</b>	4400:All <b>n (if not</b>	
Level of Se $D_R = 5.475 + 6$ $D_R = 6.475 + 6$	rvice Deteri 0.00734 v <sub>R</sub> + /ln) bit 13-2)	Exhibit 13-8	if not F)	Violation?	Level of  I D <sub>R</sub> = 11	D <sub>R</sub> = 4 .5 (pc. (Exhib	/ice De 1.252 + 0 /mi/ln) bit 13-2)	Exhibit 13-8 <b>terminatio</b> 0086 V <sub>12</sub> - 0.	4400:All <b>n (if not</b>	
$V_{R12}$ Level of Se $D_R = 5.475 + 0$ $D_R =$	rvice Deteri 0.00734 v <sub>R</sub> + /ln) bit 13-2)	Exhibit 13-8	if not F)	Violation?	Level of  D <sub>R</sub> = 11  LOS = B  Speed L	D <sub>R</sub> = 4 .5 (pc. (Exhib	/ice De 1.252 + 0 /mi/ln) bit 13-2)	Exhibit 13-8 <b>terminatio</b> .0086 V <sub>12</sub> - 0.	4400:All <b>n (if not</b>	
$V_{R12}$ Level of Separate $D_R = 5.475 + C_R = C_R $	rvice Deteri 0.00734 v <sub>R</sub> + /ln) bit 13-2) ermination	Exhibit 13-8	if not F)	Violation?	Level of	F Serv D <sub>R</sub> = 4 1.5 (pc (Exhit Deter 311 (E	/ice De 1.252 + 0 /mi/ln) bit 13-2) minatic	Exhibit 13-8 <b>terminatio</b> .0086 V <sub>12</sub> - 0.	4400:All <b>n (if not</b>	
$V_{R12}$ Level of Second Properties of Second Pr	rvice Deteri 0.00734 v <sub>R</sub> + /In) bit 13-2) rmination 13-11) Exhibit 13-11)	Exhibit 13-8	if not F)	Violation?	$\begin{tabular}{cccc} $Level of \\ & & & & & & \\ & & & & & \\ D_R = & & & & \\ LOS = & & & & \\ & & & & \\ Speed & L \\ D_S = & & & & \\ D_S = & & & & \\ S_R = & & & & \\ \hline \end{tabular}$	F Serv D <sub>R</sub> = 4 .5 (pc. (Exhilt Deter 311 (E 7.8 mph	/ice De 1.252 + 0 1.252 +	Exhibit 13-8 <b>terminatio</b> .0086 V <sub>12</sub> - 0. <b>on</b> .12) 13-12)	4400:All <b>n (if not</b>	
$V_{R12}$ Level of Set $D_R = 5.475 + D_R = 0$ OS = (Exhibitation of the context of the conte	rvice Deteri 0.00734 v <sub>R</sub> + /ln) bit 13-2) ermination	Exhibit 13-8	if not F)	Violation?	Level of	Service Servic	/ice De 1.252 + 0 /mi/ln) bit 13-2) mination xhibit 13-	Exhibit 13-8  termination .0086 V <sub>12</sub> - 0.  on -12) 13-12) 13-12)	4400:All <b>n (if not</b>	

0		MPS AND	KAWF JUN					
General Inform				Site Infor		<u> </u>		
Analyst	Shan	ne Forsythe		eeway/Dir of Tr	avel	Gore Hill SB (	On	
Agency or Company Date Performed	9/9/2	·014		ınction ırisdiction				
nalysis Time Period	PM P			nalysis Year		2035		
roject Description	1 1011	Can	74	iaryolo i cai		2000		
nputs								
pstream Adj Ramp		Freeway Num	ber of Lanes, N	2				Downstream Adj
pstream Auj Ramp		Ramp Numbe	r of Lanes. N	1				Ramp
☐ Yes ☐ On		1 '	ane Length, L <sub>Δ</sub>	1500				· '
_		1	Lane Length L <sub>D</sub>	1000				☐Yes ☐On
✓ No ☐ Off		1		444				☑ No ☐ Off
= ft		Freeway Volu		444				L <sub>down</sub> = ft
<sub>up</sub> = ft		Ramp Volume	11	83				-down
veh/h		1	-Flow Speed, S <sub>FF</sub>	65.0				$V_D = veh/h$
			ow Speed, S <sub>FR</sub>	50.0				
conversion to	<u> </u>	der Base	Conditions			_		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	$v = V/PHF \times f_{HV} \times f_{p}$
reeway	444	0.89	Level	6	0	0.971	1.00	514
Ramp	83	0.65	Level	41	0	0.830	1.00	153
JpStream								
DownStream								
		Merge Areas					Diverge Areas	S
stimation of	v <sub>12</sub>				Estimati	ion of v <sub>12</sub>	?	
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V <sub>12</sub>	$_{\rm p} = V_{\rm R} + (V_{\rm F} - V_{\rm F})$	$V_R)P_{FD}$
EQ =	(Equa	ation 13-6 or	r 13-7)		L <sub>EQ</sub> =	-	(Equation 1	3-12 or 13-13)
			tion (Exhibit 13-6)		P <sub>FD</sub> =			tion (Exhibit 13-7)
12 =	514 p		( ,		V <sub>12</sub> =		pc/h	,
or V <sub>av34</sub>	•		13-14 or 13-17)	<b>\</b>	V <sub>3</sub> or V <sub>av34</sub>		•	n 13-14 or 13-17)
s V <sub>3</sub> or V <sub>av34</sub> > 2,700			10-14-01-10-17)			> 2 700 nc/h	n? □Yes □ N	· ·
s V <sub>3</sub> or V <sub>av34</sub> > 2,760 s V <sub>3</sub> or V <sub>av34</sub> > 1.5 *							¹¹ □ res □ N 2 □ Yes □ N	
			3-16, 13-18, or					tion 13-16, 13-18, or
Yes,V <sub>12a</sub> =	13-19)		7 10, 10 10, 01		If Yes,V <sub>12a</sub> =		13-19)	1011 10 10, 10 10, 01
Capacity Chec	cks				Capacity	y Checks		
	Actual		Capacity	LOS F?		Act		Capacity LOS F
					$V_{F}$		Exhibit 1	3-8
$V_{FO}$	667	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>	Exhibit 1	3-8
FO					V <sub>R</sub>		Exhibit 1	13-
					*R		10	
low Entering		1		Lygue	Flow En		verge Influe	
	Actual	Max	Desirable	Violation?		Actual	Max D	esirable Violation
V <sub>R12</sub>	Actual 667	Max Exhibit 13-8	Desirable 4600:All	Violation?	V <sub>12</sub>	Actual	Max Di Exhibit 13-8	esirable Violation
V <sub>R12</sub> evel of Servi	Actual 667 <b>ce Detern</b>	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of	Actual F Service	Max D Exhibit 13-8 <b>Determinat</b>	esirable Violation  ion (if not F)
V <sub>R12</sub> .evel of Servi D <sub>R</sub> = 5.475 + 0	Actual 667 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of	Actual  F Service  D <sub>R</sub> = 4.252	Max Di Exhibit 13-8	esirable Violation  ion (if not F)
V <sub>R12</sub> .evel of Servi D <sub>R</sub> = 5.475 + ( R = 1.2 (pc/mi/li	Actual 667 <b>ce Detern</b> 0.00734 v <sub>R</sub> + (	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of  I D <sub>R</sub> = (p	Actual  F Service A  D <sub>R</sub> = 4.252  DC/mi/ln)	Max Di Exhibit 13-8 <b>Determinat</b> : + 0.0086 V <sub>12</sub> -	esirable Violation  ion (if not F)
<b>D<sub>R</sub> = 5.475 + 0</b>	Actual 667 <b>ce Detern</b> 0.00734 v <sub>R</sub> + (	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of  I D <sub>R</sub> = (p	Actual  F Service  D <sub>R</sub> = 4.252	Max Di Exhibit 13-8 <b>Determinat</b> : + 0.0086 V <sub>12</sub> -	esirable Violation  ion (if not F)
V <sub>R12</sub> .evel of Servi  D <sub>R</sub> = 5.475 + ( B <sub>R</sub> = 1.2 (pc/mi/li	Actual 667 <b>ce Detern</b> 0.00734 v <sub>R</sub> + ( n) 3-2)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of  I D <sub>R</sub> = (p LOS = (E	Actual  F Service A  D <sub>R</sub> = 4.252  DC/mi/ln)	Max Di Exhibit 13-8 Determinat + 0.0086 V <sub>12</sub> -	esirable Violation  ion (if not F)
$V_{R12}$ Level of Servi $D_R = 5.475 + ($ $D_R = 1.2 \text{ (pc/mi/lit})$ $D_R = 1.2 \text{ (pc/mi/lit})$ $D_R = 1.2 \text{ (pc/mi/lit})$ $D_R = 1.2 \text{ (pc/mi/lit})$ $D_R = 1.2 \text{ (pc/mi/lit})$ $D_R = 1.2 \text{ (pc/mi/lit})$	Actual 667 <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 n) 3-2) <b>sination</b>	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of  I  D <sub>R</sub> = (p  LOS = (E  Speed L	Actual  F Service ( D <sub>R</sub> = 4.252 ( Doc/mi/ln)  Exhibit 13-2)	Max Di Exhibit 13-8 Determinat + 0.0086 V <sub>12</sub> -	esirable Violation  ion (if not F)
$V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 1.2 \text{ (pc/mi/lit})$ $D_R = A \text{ (Exhibit 1 } A \text{ (Exhibit 1 } A \text{ (Exhibit 2 } A$	Actual 667 <b>Ce Detern</b> 0.00734 v <sub>R</sub> + 0 n) 3-2) <b>sination</b> it 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	V <sub>12</sub> Level of  I D <sub>R</sub> = (p LOS = (E Speed L D <sub>S</sub> = (E	Actual  F Service of DR = 4.252  Oc/mi/ln)  Exhibit 13-2)  Determina	Max D Exhibit 13-8 Determinat + 0.0086 V <sub>12</sub> -	esirable Violation  ion (if not F)
$V_{R12}$ evel of Servi $D_R = 5.475 + 0$ $D_R = 1.2 \text{ (pc/mi/lit}$ $D_R = 1.2 \text$	Actual 667 <b>ce Detern</b> 0.00734 v <sub>R</sub> + (n) 3-2) <b>sination</b> it 13-11)  Exhibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	$\begin{array}{c} V_{12} \\ \hline Level \ of \\ \\ D_R = & (p\\ LOS = & (E\\ \hline Speed \ D\\ S_R = & (E\\ S_R = & m) \end{array}$	Actual  F Service ( D <sub>R</sub> = 4.252  Dec/mi/ln)  Exhibit 13-2)  Determinal  Exhibit 13-12)  ph (Exhibit 13-12)	Max Di Exhibit 13-8 Determinati + 0.0086 V <sub>12</sub> -	esirable Violation  ion (if not F)
$V_{R12}$ Level of Servi $D_R = 5.475 + 0$ $D_R = 1.2 \text{ (pc/mi/li)}$ $D_R = 1.2 $	Actual 667 <b>Ce Detern</b> 0.00734 v <sub>R</sub> + 0 n) 3-2) <b>sination</b> it 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F)</b>	î e	$\begin{array}{c} V_{12} \\ \hline Level \ of \\ I \\ D_R = (p \\ LOS = (E \\ \hline Speed \ E \\ S_R = m_I \\ S_0 = m_I \end{array}$	Actual  F Service ( D <sub>R</sub> = 4.252 ( D <sub>C</sub> /mi/ln)  Exhibit 13-2)  Determinal  Exhibit 13-12)	Max D Exhibit 13-8  Determination  12)  12)	esirable Violation  ion (if not F)

8/19/2014

Vistro File: F:\...\I-15 Corridor.vistropdb

Report File: F:\...\Future\_LOS\_Report\_AM.pdf

Scenario 3: Future AM Scenario

8/19/2014

## **Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Tri Hill and Frontage Airport Rd	Two-way stop	HCM2010	NEBL	0.514	27.3	D
2	I-15 NB and Airport Rd	Two-way stop	HCM2010	NEBT	0.000	44.2	Е
3	I-15 SB On and Airport RD	Two-way stop	HCM2010	NWBL	0.133	10.4	В
4	I-15 SB Off and Airport RD Frontage	Two-way stop	HCM2010	SWBL	0.947	121.8	F
5	14th St SW and I-315 EB	Signalized	HCM2010	SBL	0.218	13.3	В
6	14th St SW and I-315 WB	Signalized	HCM2010	EBR	0.295	22.2	С
7	Fox Farm and I-315	Signalized	HCM2010	NEBL	0.760	39.0	D
8	Central Ave and I15 SB	Two-way stop	HCM2010	SBL	1.188	178.9	F
9	Central Ave and I-15 NB	Two-way stop	HCM2010	NBL	0.274	113.1	F
10	Central Ave and Vaughn Rd	Two-way stop	HCM2010	SBL	1.518	406.0	F
11	Vaughn Rd and I-15 SB	Two-way stop	HCM2010	SBL	0.361	11.0	В
12	Vaughn Rd and I-15 NB	Two-way stop	HCM2010	EBL	0.000	7.3	Α

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

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# Intersection Level Of Service Report #1: Tri Hill and Frontage Airport Rd

Control Type:Two-way stopDelay (sec / veh):27.3Analysis Method:HCM2010Level Of Service:DAnalysis Period:15 minutesVolume to Capacity (v/c):0.514

#### Intersection Setup

Name							
Approach	Northeastbound		Northwe	estbound	Southeastbound		
Lane Configuration	Ψ		+	ıİ	F		
Turning Movement	Left Right		Left	Thru	Thru	Right	
Lane Width [ft]	12.00 12.00		12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30.00		30	30.00		.00	
Grade [%]	0.00		0.00		0.00		
Crosswalk	ye	es	у	es	yes		

Name							
Base Volume Input [veh/h]	83	19	9	189	97	88	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	21.70	31.10	22.20	28.60	25.70	5.70	
Growth Rate	1.70	1.70	1.70	1.70	1.70	1.70	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	141	32	15	321	165	150	
Peak Hour Factor	0.7410	0.4750	0.5630	0.8750	0.9330	0.7590	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	48	17	7	92	44	49	
Total Analysis Volume [veh/h]	190	67	27	367	177	198	
Pedestrian Volume [ped/h]		0		0	0		
Bicycle Volume [bicycles/h]		0		0	0		

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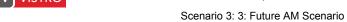


# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.51	0.10	0.02	0.00	0.00	0.00			
d_M, Delay for Movement [s/veh]	27.25 22.66		8.42	0.00	0.00	0.00			
Movement LOS	D C		Α	A	Α	A			
95th-Percentile Queue Length [veh]	3.94 3.94		0.08	0.00	0.00	0.00			
95th-Percentile Queue Length [ft]	98.56	98.56	1.92	0.00	0.00	0.00			
d_A, Approach Delay [s/veh]	26	.06	0.	58	0.0	00			
Approach LOS	[	)	,	4	A				
d_I, Intersection Delay [s/veh]	6.75								
Intersection LOS	D								

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# Intersection Level Of Service Report #2: I-15 NB and Airport Rd

8/19/2014

Control Type:Two-way stopDelay (sec / veh):44.2Analysis Method:HCM2010Level Of Service:EAnalysis Period:15 minutesVolume to Capacity (v/c):0.000

#### Intersection Setup

Name												
Approach	No	Northeastbound		Sou	ıthwestbo	und	Northwestbound			Southeastbound		und
Lane Configuration	+					F		1		4		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			30.00		30.00			30.00		
Grade [%]	0.00		0.00		0.00		0.00					
Crosswalk		yes			yes		yes			yes		

Name												
Base Volume Input [veh/h]	4	0	13	0	0	0	0	49	222	79	173	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	46.20	2.00	2.00	2.00	2.00	38.80	26.60	12.70	10.90	2.00
Growth Rate	1.90	1.90	1.90	1.00	1.00	1.00	1.00	1.90	1.90	1.90	1.90	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	0	25	0	0	0	0	93	422	150	329	0
Peak Hour Factor	0.5000	1.0000	0.8130	1.0000	1.0000	1.0000	1.0000	0.7210	0.8670	0.7050	0.9010	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	0	8	0	0	0	0	32	122	53	91	0
Total Analysis Volume [veh/h]	16	0	31	0	0	0	0	129	487	213	365	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

# Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.12	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00
d_M, Delay for Movement [s/veh]	34.72	44.22	13.81	0.00	0.00	0.00	0.00	0.00	0.00	10.13	0.00	0.00
Movement LOS	D	E	В					Α	Α	В	Α	
95th-Percentile Queue Length [veh]	0.61	0.61	0.61	0.00	0.00	0.00	0.00	0.00	0.00	4.65	4.65	0.00
95th-Percentile Queue Length [ft]	15.29	15.29	15.29	0.00	0.00	0.00	0.00	0.00	0.00	116.18	116.18	0.00
d_A, Approach Delay [s/veh]		20.93		0.00			0.00				3.73	
Approach LOS		С		A A A						Α		
d_I, Intersection Delay [s/veh]	2.53											
Intersection LOS		E										

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8/19/2014 Scenario 3: 3: Future AM Scenario

#### Intersection Level Of Service Report #3: I-15 SB On and Airport RD

Control Type: Two-way stop Delay (sec / veh): 10.4 Analysis Method: HCM2010 Level Of Service: В Analysis Period: 15 minutes Volume to Capacity (v/c): 0.133

#### Intersection Setup

Crosswalk	yes		y	es	yes		
Grade [%]	0	0.00		0.00		.00	
Speed [mph]	30	30.00		.00	30.00		
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	
Turning Movement	Left	Right	Left	Thru	Thru	Right	
Lane Configuration		<b>-</b>		<b> </b>			
Approach	Northeastbound		Northwe	estbound	Southeastbound		
Name							

Name						
Base Volume Input [veh/h]	0	0	32	23	251	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	43.80	21.70	14.00	16.70
Growth Rate	1.00	1.00	2.12	2.12	2.12	2.12
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	68	49	532	13
Peak Hour Factor	1.0000	1.0000	0.6670	0.6390	0.8720	0.3750
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	25	19	153	9
Total Analysis Volume [veh/h]	0	0	102	77	610	35
Pedestrian Volume [ped/h]	0			0	0	
Bicycle Volume [bicycles/h]		0	0			0

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# Scenario 3: 3: Future AM Scenario

# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.00	0.00	0.13	0.00	0.01	0.00			
d_M, Delay for Movement [s/veh]	0.00	0.00	10.39	0.00	0.00	0.00			
Movement LOS			В	A	A	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.90	0.90	0.00	0.00			
95th-Percentile Queue Length [ft]	0.00	0.00	22.46	22.46	0.00	0.00			
d_A, Approach Delay [s/veh]	0.	.00	5	.92	0.00				
Approach LOS		A		A		A			
d_I, Intersection Delay [s/veh]	1.29								
Intersection LOS	В								

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# Scenario 3: 3: Future AM Scenario

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# Intersection Level Of Service Report #4: I-15 SB Off and Airport RD Frontage

Control Type:Two-way stopDelay (sec / veh):121.8Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):0.947

#### Intersection Setup

Name												
Approach	No	rtheastboo	und	Sou	uthwestbo	und	Noi	thwestbo	und	Sou	utheastboo	und
Lane Configuration		eft Thru Right			44			4			H	
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	2.00 12.00 12.00 1			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00 100.00 100.00		100.00 100.00 100.00		0 100.00 100.00 100		100.00	
Speed [mph]		30.00			30.00		30.00			30.00		
Grade [%]	0.00			0.00		0.00				0.00		
Crosswalk		yes			yes		yes			yes		

1												
Name												
Base Volume Input [veh/h]	5	0	44	159	54	96	8	12	0	0	40	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.00	11.30	10.10	7.40	3.10	12.50	8.30	2.00	2.00	2.50	0.00
Growth Rate	2.22	1.00	2.22	2.22	2.22	2.22	2.22	2.22	1.00	1.00	2.22	2.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	98	353	120	213	18	27	0	0	89	9
Peak Hour Factor	0.4170	1.0000	0.5240	0.8110	0.9000	0.7060	0.4000	0.7500	1.0000	1.0000	0.7690	0.5000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	47	109	33	75	11	9	0	0	29	5
Total Analysis Volume [veh/h]	26	0	187	435	133	302	45	36	0	0 116		18
Pedestrian Volume [ped/h]		0			0	-		0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

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9 Scenario 3: 3: Future AM Scenario

# Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no	no		
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.07	0.00	0.21	0.95	0.22	0.29	0.03	0.00	0.00	0.00	0.00	0.00		
d_M, Delay for Movement [s/veh]	16.59	0.00	10.80	121.78	119.80	9.92	7.68	0.00	0.00	0.00	0.00	0.00		
Movement LOS	С		В	F	F	Α	Α	Α			Α	Α		
95th-Percentile Queue Length [veh]	1.14	0.00	1.14	20.41	20.41	1.22	0.19	0.19	0.00	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	28.44	0.00	28.44	510.19	510.19	30.56	4.64	4.64	0.00	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]		11.50			82.65			4.27			0.00			
Approach LOS		В			F			Α			Α			
d_I, Intersection Delay [s/veh]						57	.55							
Intersection LOS						F	=							

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#### Scenario 3: 3: Future AM Scenario

8/19/2014

#### Intersection Level Of Service Report #5: 14th St SW and I-315 EB

Control Type:SignalizedDelay (sec / veh):13.3Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.218

#### Intersection Setup

Name													
Approach	١	Northboun	d	S	outhboun	d	I	Eastbound	d t	V	Westbound		
Lane Configuration		Пr			٦١٢			٦١٢			٦١٢		
Turning Movement	Left	<del>-                                     </del>			Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00 100.00 100.00		100.00 100.00 100.00			100.00 100.00 100.0		100.00		
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]	0.00			0.00			0.00			0.00			
Crosswalk		yes			yes		yes			yes			

Name						•					•	
Base Volume Input [veh/h]	7	66	286	142	91	60	44	69	3	20	30	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.30	1.50	1.70	3.50	4.40	5.00	0.00	4.30	0.00	10.00	3.30	0.00
Growth Rate	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	82	355	176	113	74	55	86	4	25	37	6
Peak Hour Factor	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	25	107	53	34	22	17	26	1	8	11	2
Total Analysis Volume [veh/h]	11	99	428	212	136	89	66	104	5	30	45	7
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

# Intersection Settings

G		
Located in CBD	no	
Signal Coordination Group	-	
Cycle Length [s]	60	
Coordination Type	Time of Day Pattern Coordinated	
Actuation Type	Semi-actuated	
Offset [s]	0.0	
Offset Reference	LeadGreen	
Permissive Mode	SingleBand	
Lost time [s]	0.00	

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# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	2	3	0	6	7	7	4	0	3	8	0
Lead / Lag	-	-	-	-	_	-	Lead	-	-	Lead	-	_
Minimum Green [s]	0	5	15	0	5	15	15	5	0	15	15	0
Maximum Green [s]	0	50	20	0	50	20	20	60	0	20	60	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	22	18	0	22	18	18	20	0	18	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	5	0	5	0	0	5	0	5	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	10	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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# Scenario 3: 3: Future AM Scenario

# **Lane Group Calculations**

Lane Group	L	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	5.00	5.00	5.00	4.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	17	17	37	17	17	36	29	12	12	29	11	11
g / C, Green / Cycle	0.28	0.28	0.62	0.28	0.28	0.60	0.49	0.21	0.21	0.49	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.01	0.05	0.27	0.17	0.07	0.06	0.04	0.06	0.00	0.02	0.02	0.00
s, saturation flow rate [veh/h]	1114	1872	1588	1272	1820	1538	1616	1822	1615	1422	1839	1615
c, Capacity [veh/h]	334	530	979	387	515	920	948	376	333	816	346	304
d1, Uniform Delay [s]	19.78	16.28	6.04	22.47	16.66	5.14	8.16	20.04	18.95	8.07	20.26	19.85
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	0.17	0.31	1.21	0.27	0.05	0.03	0.39	0.02	0.02	0.17	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.03	0.19	0.44	0.55	0.26	0.10	0.07	0.28	0.01	0.04	0.13	0.02
d, Delay for Lane Group [s/veh]	19.82	16.44	6.35	23.68	16.93	5.19	8.20	20.43	18.97	8.08	20.43	19.88
Lane Group LOS	В	В	А	С	В	Α			С	В		
Critical Lane Group	no	no	yes	no	no	no	no	no	no	no	yes	no
50th-Percentile Queue Length [veh]	0.12	0.97	2.14	2.75	1.37	0.37	0.40	1.18	0.05	0.18	0.51	0.08
50th-Percentile Queue Length [ft]	3.03	24.30	53.51	68.66	34.27	9.31	9.90	29.58	1.34	4.43	12.70	1.94
95th-Percentile Queue Length [veh]	ngth [veh] 0.22 1.75 3.85 4.94 2.47 0.67 0.71 2.13		0.10	0.32	0.91	0.14						
95th-Percentile Queue Length [ft]	5.46	43.75	96.31	123.59	61.69	16.75	17.82	53.25	2.41	7.97 22.86		3.49



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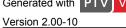
# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.82	16.44	6.35	23.68	16.93	5.19	8.20	20.43	18.97	8.08	20.43	19.88	
Movement LOS	В	В	Α	С	В	Α	Α	С	В	Α	С	В	
d_A, Approach Delay [s/veh]		8.48			17.81			15.78 15.87					
Approach LOS	A B B						В						
d_I, Intersection Delay [s/veh]						13	.32						
Intersection LOS	В												
Intersection V/C						0.2	:18						

# Sequence

Ring 1	2	7	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-





# Scenario 3: 3: Future AM Scenario Intersection Level Of Service Report #6: 14th St SW and I-315 WB

8/19/2014

Control Type:SignalizedDelay (sec / veh):22.2Analysis Method:HCM2010Level Of Service:CAnalysis Period:15 minutesVolume to Capacity (v/c):0.295

#### Intersection Setup

Name													
Approach	١	orthboun	d	S	Southboun	d	E	Eastbound	d t	Westbound			
Lane Configuration		٦١٢			44			+		٩r			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00			30.00		30.00			
Grade [%]	0.00			0.00				0.00		0.00			
Crosswalk		yes			yes			yes		yes			

Name												
Base Volume Input [veh/h]	11	17	90	26	136	0	0	7	15	162	16	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	0.00	4.40	7.70	1.50	0.00	0.00	0.00	0.00	2.50	0.00	0.00
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	20	104	30	158	0	0	8	17	188	19	44
Peak Hour Factor	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040	0.8040
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	6	32	9	49	0	0	2	5	58	6	14
Total Analysis Volume [veh/h]	16	25	129	37	197	0	0	10	21	234	24	55
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0				0		0			
Bicycle Volume [bicycles/h]		0		0				0		0		

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# Scenario 3: 3: Future AM Scenario

# Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	1	2	0	1	0	0	3	0	0	2	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	5	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	35	40	0	35	0	0	25	0	0	40	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	25	19	0	25	0	0	16	0	0	19	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	9	7	0	9	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	11	7	0	11	0	0	0	0	0	7	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		no	no		no			no			no	
Maximum Recall		no	no		no			no			no	
Pedestrian Recall		no	no		no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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Scenario 3: 3: Future AM Scenario

8/19/2014

# **Lane Group Calculations**

Lane Group	L	С	R	L	С	С	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	13	13	30	13	13	2	12	12
g / C, Green / Cycle	0.21	0.21	0.49	0.21	0.21	0.03	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.09	0.03	0.12	0.02	0.16	0.04
s, saturation flow rate [veh/h]	994	1710	1392	1176	1685	1527	1636	1454
c, Capacity [veh/h]	183	356	686	305	350	52	329	292
d1, Uniform Delay [s]	26.76	19.09	8.52	21.98	21.31	28.58	22.73	19.90
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.20	0.08	0.13	0.18	1.41	10.57	4.12	0.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.09	0.07	0.19	0.12	0.56	0.60	0.78	0.19
d, Delay for Lane Group [s/veh]	26.96	19.18	8.65	22.16	22.72	39.15	26.86	20.21
Lane Group LOS	С	В	А	С	С	D	С	С
Critical Lane Group	no	no	no	no	yes	yes	yes	no
50th-Percentile Queue Length [veh]	0.22	0.27	0.82	0.44	2.44	0.57	3.57	0.62
50th-Percentile Queue Length [ft]	5.43	6.74	20.40	11.02	60.90	14.26	89.30	15.53
95th-Percentile Queue Length [veh]	0.39	0.49	1.47	0.79	4.38	1.03	6.43	1.12
95th-Percentile Queue Length [ft]	9.77	12.13	36.71	19.83	109.62	25.67	160.74	27.96



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# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.96	19.18	8.65	22.16	22.72	22.72	39.15	39.15	39.15	26.86	26.86	20.21
Movement LOS	С	В	Α	С				D	D	С	С	С
d_A, Approach Delay [s/veh]		11.92			22.63			39.15				
Approach LOS		В			С			D			С	
d_I, Intersection Delay [s/veh]						22	.16					
Intersection LOS						(	)					
Intersection V/C	0.295											

# Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-



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# Scenario 3: 3: Future AM Scenario Intersection Level Of Service Report #7: Fox Farm and I-315

Control Type:SignalizedDelay (sec / veh):39.0Analysis Method:HCM2010Level Of Service:DAnalysis Period:15 minutesVolume to Capacity (v/c):0.760

#### Intersection Setup

Version 2.00-10

Name													
Approach	١	lorthboun	d	S	outhboun	d	No	rtheastboo	und	Southwestbound			
Lane Configuration		<u> 117</u>			<u>1  (</u>			Шь		71  r			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0 0 0		0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00			30.00		30.00			
Grade [%]	0.00				0.00			0.00		0.00			
Crosswalk		yes			yes			yes		yes			

Name												
Base Volume Input [veh/h]	50	219	437	172	90	121	161	732	45	101	335	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.90	0.70	1.80	2.20	4.10	6.20	5.20	2.20	4.00	6.00	3.70
Growth Rate	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	59	256	511	201	105	142	188	856	53	118	392	159
Peak Hour Factor	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980	0.7980
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	80	160	63	33	44	59	268	17	37	123	50
Total Analysis Volume [veh/h]	74	321	640	252	132	178	236	1073	66	148	491	199
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0				0		0			
Bicycle Volume [bicycles/h]		0			0			0			0	

# Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

# Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	1	8	0	3	6	6	4	0	8	2	5
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	5	0	5	5	5	5	0	5	5	0
Maximum Green [s]	0	60	60	0	60	60	60	60	0	60	60	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	20	41	0	33	67	67	46	0	41	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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Scenario 3: 3: Future AM Scenario

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# **Lane Group Calculations**

Lane Group	С	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	3.00	5.00	5.00	3.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	31	31	97	25	25	52	22	47	47	31	56	56
g / C, Green / Cycle	0.22	0.22	0.69	0.18	0.18	0.37	0.16	0.34	0.34	0.22	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.04	0.19	0.40	0.14	0.04	0.11	0.14	0.31	0.04	0.04	0.14	0.13
s, saturation flow rate [veh/h]	1793	1714	1604	1778	3540	1551	1704	3439	1580	3379	3413	1557
c, Capacity [veh/h]	405	387	1160	365	727	618	268	1167	536	750	1378	629
d1, Uniform Delay [s]	43.76	51.63	8.93	51.50	45.91	28.61	57.70	44.43	31.90	44.32	29.06	28.52
k, delay calibration	0.11	0.11	0.41	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.21	4.62	1.56	2.33	0.12	0.25	9.13	3.49	0.10	0.13	0.16	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

# Lane Group Results

X, volume / capacity	0.18	0.83	0.55	0.69	0.18	0.29	0.88	0.92	0.12	0.20	0.36	0.32
d, Delay for Lane Group [s/veh]	43.98	56.25	10.49	53.83	46.03	28.87	66.82	47.91	32.00	44.45	29.22	28.81
Lane Group LOS	D	E	В	D	D	С	E	D	С	D	С	С
Critical Lane Group	no	no	yes	yes	no	no	no	yes	no	no	no	no
50th-Percentile Queue Length [veh]	2.13	11.29	10.10	9.13	2.00	4.36	8.87	18.35	1.59	2.14	5.88	4.71
50th-Percentile Queue Length [ft]	53.34	282.26	252.44	228.16	49.99	109.09	221.67	458.87	39.66	53.49	147.02	117.63
95th-Percentile Queue Length [veh]	3.84	16.80	15.31	14.08	3.60	7.79	13.75	25.38	2.86	3.85	9.86	8.26
95th-Percentile Queue Length [ft]	96.01	420.02	382.72	352.03	89.98	194.73	343.76	634.52	71.39	96.29	246.44	206.56



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# Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.98	56.25	10.49	53.83	46.03	28.87	66.82	47.91	32.00	44.45	29.22	28.81	
Movement LOS	D	E	В	D	D	С	E	D	С	D	С	С	
d_A, Approach Delay [s/veh]		27.07			44.09			50.39					
Approach LOS		С			D			D		С			
d_I, Intersection Delay [s/veh]						39	.04						
Intersection LOS						[	)						
Intersection V/C						0.7	760						

# Sequence

F	Ring 1	1	3	8	4	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 2		-	6	2	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





8/19/2014 Scenario 3: 3: Future AM Scenario

#### Intersection Level Of Service Report #8: Central Ave and I15 SB

Control Type: Two-way stop Delay (sec / veh): 178.9 Analysis Method: HCM2010 Level Of Service: F Analysis Period: 15 minutes Volume to Capacity (v/c): 1.188

#### Intersection Setup

Name		Couthhound										
Approach	S	outhboun	ıd	1	Eastbound	d	١	Vestboun	d	Nor	rthwestboo	und
Lane Configuration		ጎፐ			٦ſ			111				
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0 0 0			0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			30.00		30.00				30.00	
Grade [%]	0.00			0.00		0.00				0.00		
Crosswalk	yes		yes				yes			yes		

1												
Name												
Base Volume Input [veh/h]	130	0	6	0	191	39	123	88	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	0.00	0.00	2.00	3.10	0.00	6.50	11.30	2.00	2.00	2.00	2.00
Growth Rate	1.41	1.41	1.41	1.00	1.41	1.41	1.41	1.41	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	0	8	0	269	55	173	124	0	0	0	0
Peak Hour Factor	0.8550	1.0000	0.7500	1.0000	0.6920	0.7500	0.7690	0.8150	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	0	3	0	97	18	56	38	0	0	0	0
Total Analysis Volume [veh/h]	214	0	11	0	389	73	225	152	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

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# Intersection Settings

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	1.19	0.00	0.01	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	178.88	176.96	9.05	0.00	0.00	0.00	8.91	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	Α		Α	Α	Α	Α				
95th-Percentile Queue Length [veh]	11.32	11.32	0.04	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	282.97	282.97	0.93	0.00	0.00	0.00	18.22	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		170.57			0.00			5.32			0.00	
Approach LOS		F			Α			Α			А	
d_I, Intersection Delay [s/veh]						37	.95					
Intersection LOS						ı	F					

# Scenario 3: 3: Future AM Scenario

#### Intersection Level Of Service Report #9: Central Ave and I-15 NB

Control Type:Two-way stopDelay (sec / veh):113.1Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):0.274

#### Intersection Setup

Name		Northbound										
Approach	١	lorthboun	d		Eastbound	d	١	Vestboun	d	Sou	utheastbo	und
Lane Configuration		Ť			1			Πr				
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0				0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00		30.00				30.00		
Grade [%]	0.00		0.00		0.00				0.00			
Crosswalk	yes		yes				yes			yes		

Name												
Base Volume Input [veh/h]	15	0	177	6	305	0	0	202	44	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	10.80	16.70	2.00	2.00	2.00	11.40	13.60	2.00	2.00	2.00
Growth Rate	1.64	1.64	1.64	1.64	1.64	1.00	1.00	1.64	1.64	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	0	290	10	500	0	0	331	72	0	0	0
Peak Hour Factor	0.5360	1.0000	0.8510	0.7500	0.7190	1.0000	1.0000	0.8420	0.7330	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	0	85	3	174	0	0	98	25	0	0	0
Total Analysis Volume [veh/h]	47	0	341	13	695	0	0	393	98	0	0	0
Pedestrian Volume [ped/h]	0		0		0				0			
Bicycle Volume [bicycles/h]		0			0			0			0	

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# Scenario 3: 3: Future AM Scenario

# Intersection Settings

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Priority Scheme	Stop	Free	Free	Stop
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

V/C, Movement V/C Ratio	0.27	0.00	0.80	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	113.09	109.47	100.54	8.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Movement LOS	F	F	F	Α	Α			Α	А				
95th-Percentile Queue Length [veh]	13.79	13.79	13.79	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	344.63	344.63	344.63	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]		102.06			0.15			0.00			0.00		
Approach LOS		F			Α			Α		A			
d_I, Intersection Delay [s/veh]						25.	.02			1			
Intersection LOS						F	=						

8/19/2014 Scenario 3: 3: Future AM Scenario

#### Intersection Level Of Service Report #10: Central Ave and Vaughn Rd

Control Type: Two-way stop Delay (sec / veh): 406.0 Analysis Method: HCM2010 Level Of Service: F Analysis Period: 15 minutes Volume to Capacity (v/c): 1.518

#### Intersection Setup

Version 2.00-10

Crosswalk	y	es	у	es	yes	
Grade [%]	0.	0.00		00	0.00	
Speed [mph]	30	30.00		.00	30.00	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Pocket	0	0	0	0	0	0
Lane Width [ft]	12.00	12.00 12.00		12.00	12.00	12.00
Turning Movement	Left	Left Right		Thru	Thru	Right
Lane Configuration	T		ηİ		IF	
Approach	South	bound	Eastl	oound	Westbound	
Name						

Name						
Base Volume Input [veh/h]	77	60	71	410	184	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	6.70	7.00	5.10	11.40	6.20
Growth Rate	1.63	1.63	1.63	1.63	1.63	1.63
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	126	98	116	668	300	106
Peak Hour Factor	0.7700	0.7890	0.8450	0.8010	0.8520	0.7740
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	31	34	208	88	34
Total Analysis Volume [veh/h]	164	124	137	834	352	137
Pedestrian Volume [ped/h]		0	0		0	
Bicycle Volume [bicycles/h]	0		0		0	

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# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	1.52	0.20	0.13	0.01	0.00	0.00	
d_M, Delay for Movement [s/veh]	405.95	378.42	8.95	0.00	0.00	0.00	
Movement LOS	F	F	А	Α	А	А	
95th-Percentile Queue Length [veh]	20.34	20.34	0.45	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	508.50	508.50	11.23	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	394	1.10	1.	26	0.0	00	
Approach LOS	F	=	,	4	A	4	
d_I, Intersection Delay [s/veh]	65.63						
Intersection LOS	F						

Scenario 3: 3: Future AM Scenario

# Intersection Level Of Service Report #11: Vaughn Rd and I-15 SB

Control Type:Two-way stopDelay (sec / veh):11.0Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.361

#### Intersection Setup

Name						
Approach	South	Southbound		Eastbound		bound
Lane Configuration	-	Ŧ				
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00 12.00		12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30	30.00		30.00		0.00
Grade [%]	0	0.00		0.00		.00
Crosswalk	У	yes		yes		es

Name						
Base Volume Input [veh/h]	219	1	0	27	12	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.60	0.00	2.00	11.10	8.30	2.00
Growth Rate	1.36	1.36	1.00	1.36	1.36	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	298	1	0	37	16	0
Peak Hour Factor	0.8830	0.2500	1.0000	0.8440	0.7500	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	84	1	0	11	5	0
Total Analysis Volume [veh/h]	337	4	0	44	21	0
Pedestrian Volume [ped/h]	0			0	0	
Bicycle Volume [bicycles/h]	0		0		0	

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# Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.36	0.00	0.00	0.00	0.00	0.00		
d_M, Delay for Movement [s/veh]	11.04	10.58	0.00	0.00	0.00	0.00		
Movement LOS	В	В		A	A			
95th-Percentile Queue Length [veh]	1.68	1.68	0.00	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	42.07	42.07	0.00	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]	11.	.04	0	.00	0.	00		
Approach LOS	E	3		A	,	Ą		
d_I, Intersection Delay [s/veh]	9.27							
Intersection LOS		В						

Version 2.00-10

8/19/2014 Scenario 3: 3: Future AM Scenario

#### Intersection Level Of Service Report #12: Vaughn Rd and I-15 NB

Control Type: Two-way stop Delay (sec / veh): 7.3 Analysis Method: HCM2010 Level Of Service: Α Analysis Period: 15 minutes Volume to Capacity (v/c): 0.000

#### Intersection Setup

Name							
Approach	East	oound	Wes	tbound	Southeastbound		
Lane Configuration	1		ìr				
Turning Movement	Left	Thru	Thru	Right	Left	Right	
Lane Width [ft]	12.00	12.00 12.00		12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00		
Crosswalk	y	yes		yes		yes	

Name						
Base Volume Input [veh/h]	0	237	19	76	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	5.30	14.50	2.00	2.00
Growth Rate	1.37	1.37	1.37	1.37	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	325	26	104	0	0
Peak Hour Factor	1.0000	0.8590	0.5940	0.8260	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	95	11	31	0	0
Total Analysis Volume [veh/h]	0	378	44	126	0	0
Pedestrian Volume [ped/h]		0		0	0	
Bicycle Volume [bicycles/h]		0		0		



Generated with PTV VISTRO 31 8/19/2014

# Intersection Settings

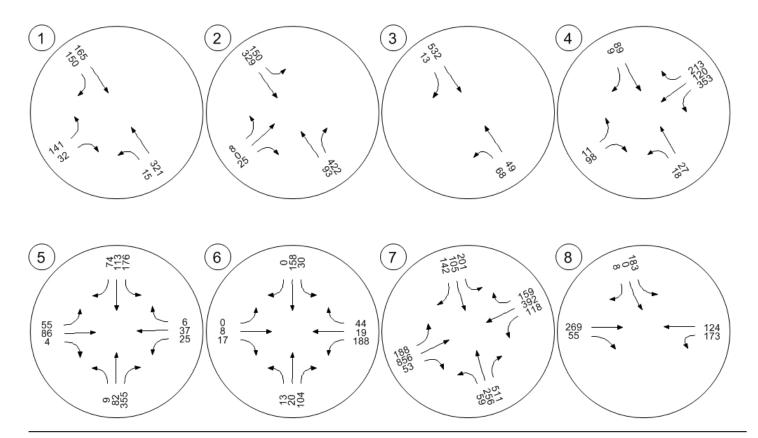
Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00		
d_M, Delay for Movement [s/veh]	7.28	0.00	0.00	0.00	0.00	0.00		
Movement LOS	Α	A	A	A				
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]	0.	00	C	0.00	0.00			
Approach LOS	,	A		A	F	4		
d_I, Intersection Delay [s/veh]	0.00							
Intersection LOS		A						

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# Traffic Volume - Future Total Volume

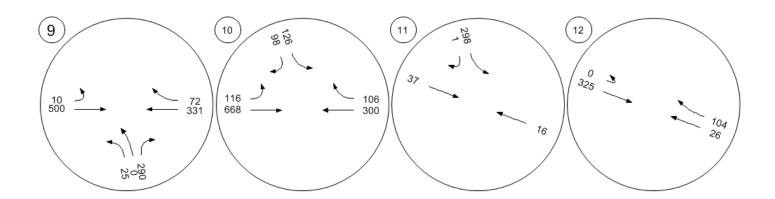




Shane Forsythe
Robert Peccia and Associates

# Traffic Volume - Future Total Volume



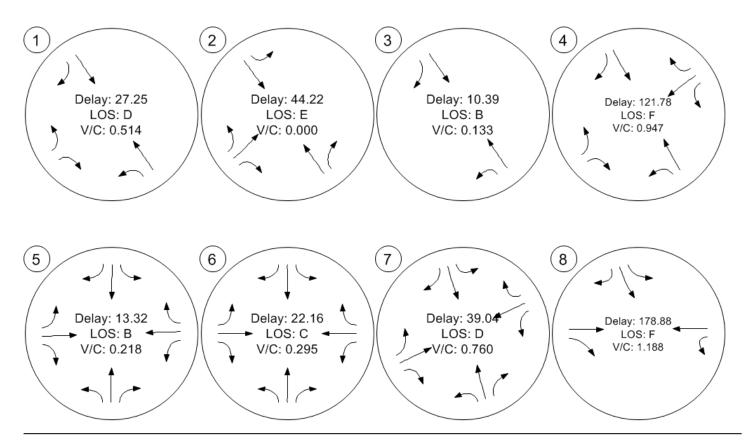


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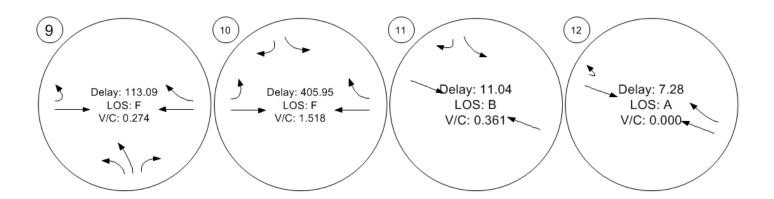
#### **Traffic Conditions**





# Traffic Conditions





I-15 Corridor Study

Vistro File: F:\...\I-15 Corridor.vistropdb

Scenario 4: Future PM Scenario 9/15/2014

Report File: F:\...\Future\_LOS\_Report\_PM.pdf

# **Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Tri Hill and Frontage Airport Rd	Two-way stop	HCM2010	NEBL	0.713	43.7	Е
2	I-15 NB and Airport Rd	Two-way stop	HCM2010	NEBR	0.159	10,000.0	F
3	I-15 SB On and Airport RD	Two-way stop	HCM2010	NWBL	0.305	23.5	С
4	I-15 SB Off and Airport RD Frontage	Two-way stop	HCM2010	SWBL	7.378	3,138.9	F
5	14th St SW and I-315 EB	Signalized	HCM2010	NBL	0.457	12.4	В
6	14th St SW and I-315 WB	Signalized	HCM2010	EBR	0.621	19.6	В
7	Fox Farm and I-315	Signalized	HCM2010	NBT	0.891	35.6	D
8	Central Ave and I15 SB	Two-way stop	HCM2010	SBL	1.339	314.9	F
9	Central Ave and I-15 NB	Two-way stop	HCM2010	NBL	1.211	445.2	F
10	Central Ave and Vaughn Rd	Two-way stop	HCM2010	SBL	3.231	1,422.7	F
11	Vaughn Rd and I-15 SB	Two-way stop	HCM2010	SBL	0.254	11.0	В
12	Vaughn Rd and I-15 NB	Two-way stop	HCM2010	EBL	0.000	7.4	Α

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

9/15/2014

# Intersection Level Of Service Report #1: Tri Hill and Frontage Airport Rd

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 43.7
Level Of Service: E
Volume to Capacity (v/c): 0.713

#### Intersection Setup

Name						
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration	₩.		<u>ا</u>		F	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

#### Volumes

Name						
Base Volume Input [veh/h]	75	7	9	160	207	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	0.00	22.20	33.80	18.90	15.80
Growth Rate	1.70	1.70	1.70	1.70	1.70	1.70
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [ve	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	128	12	15	272	352	119
Peak Hour Factor	0.5680	0.4380	0.7500	0.8000	0.8480	0.8330
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	7	5	85	104	36
Total Analysis Volume [veh/h]	225	27	20	340	415	143
Pedestrian Volume [ped/h]	0		0		Ö	
Bicycle Volume [bicycles/h]	0		0		0	

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## Intersection Settings

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Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.71	0.05	0.02	0.00	0.00	0.00		
d_M, Delay for Movement [s/veh]	43.71	38.46	9.00	0.00	0.00	0.00		
Movement LOS	E	E	Α	A	Α	A		
95th-Percentile Queue Length [veh]	5.93	5.93	0.07	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	148.33	148.33	1.67	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]	43	.15	0.	50	0.0	00		
Approach LOS	E	<b>=</b>	,	4	A	4		
d_I, Intersection Delay [s/veh]	9.45							
Intersection LOS	E							



# Intersection Level Of Service Report #2: I-15 NB and Airport Rd

Control Type:Two-way stopDelay (sec / veh):10,000.0Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):0.159

#### Intersection Setup

Name													
Approach	No	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration		+						F			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]		0.00			0.00		0.00			0.00			
Crosswalk		yes			yes		yes			yes			

#### Volumes

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Name												
Base Volume Input [veh/h]	2	2	31	0	0	0	0	47	197	307	236	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	47.40	2.00	2.00	2.00	2.00	40.40	20.80	0.70	17.40	2.00
Growth Rate	1.90	1.90	1.90	1.00	1.00	1.00	1.00	1.90	1.90	1.90	1.90	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	4	59	0	0	0	0	89	374	583	448	0
Peak Hour Factor	0.5000	0.5000	0.7750	1.0000	1.0000	1.0000	1.0000	0.6910	0.8210	0.6910	0.8680	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	2	19	0	0	0	0	32	114	211	129	0
Total Analysis Volume [veh/h]	8	8	76	0	0	0	0	129	456	844	516	0
Pedestrian Volume [ped/h]	0		0				0		0			
Bicycle Volume [bicycles/h]		0			0			0	•		0	•

## Intersection Settings

Robert Peccia And Associates

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.01	0.00
d_M, Delay for Movement [s/veh]	10000.0	10000.0	10000.0	0.00	0.00	0.00	0.00	0.00	0.00	24.83	0.00	0.00
Movement LOS	F	F	F					Α	Α	С	Α	
95th-Percentile Queue Length [veh]	13.97	13.97	13.97	0.00	0.00	0.00	0.00	0.00	0.00	54.79	54.79	0.00
95th-Percentile Queue Length [ft]	349.24	349.24	349.24	0.00	0.00	0.00	0.00	0.00	0.00	1369.74	1369.74	0.00
d_A, Approach Delay [s/veh]		10000.00		0.00				0.00		15.41		
Approach LOS		F		Α Α						F		
d_I, Intersection Delay [s/veh]	461.93											
Intersection LOS		F						F				

#### Intersection Level Of Service Report #3: I-15 SB On and Airport RD

Control Type:Two-way stopDelay (sec / veh):23.5Analysis Method:HCM2010Level Of Service:CAnalysis Period:15 minutesVolume to Capacity (v/c):0.305

#### Intersection Setup

Name							
Approach	Northeastbound		Northwe	estbound	Southeastbound		
Lane Configuration			-	1	F		
Turning Movement	Left	Right	Left	Thru	Thru	Right	
Lane Width [ft]	12.00 12.00		12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]	30.00		30	.00	30.00		
Grade [%]	0.00		0.	00	0.00		
Crosswalk	yes		y	es	yes		

#### Volumes

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Name							
Base Volume Input [veh/h]	0	0	25	21	542	14	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	2.00	2.00	64.00	19.10	7.30	0.00	
Growth Rate	1.00	1.00	2.12	2.12	2.12	2.12	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [v	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	0	0	53	45	1149	30	
Peak Hour Factor	1.0000	1.0000	0.6250	0.7500	0.7450	0.7000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	0	0	21	15	386	11	
Total Analysis Volume [veh/h]	0	0	85	60	1542	43	
Pedestrian Volume [ped/h]	(	0		0		0	
Bicycle Volume [bicycles/h]	0			0	0		

## Intersection Settings

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Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.30	0.00	0.02	0.00			
d_M, Delay for Movement [s/veh]	0.00	0.00	23.48	0.00	0.00	0.00			
Movement LOS			С	A	A	A			
95th-Percentile Queue Length [veh]	0.00	0.00	2.79	2.79	0.00	0.00			
95th-Percentile Queue Length [ft]	0.00	0.00	69.68	69.68	0.00	0.00			
d_A, Approach Delay [s/veh]	0.	00	10	3.76	0.	00			
Approach LOS	,	A		В	,	4			
d_I, Intersection Delay [s/veh]	1.15								
Intersection LOS	С								



# Intersection Level Of Service Report #4: I-15 SB Off and Airport RD Frontage

Control Type:Two-way stopDelay (sec / veh):3,138.9Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):7.378

#### Intersection Setup

Name													
Approach	No	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration	Ψ.			٦r			4			F			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]	0.00			0.00		0.00			0.00				
Crosswalk		yes			yes			yes			yes		

#### Volumes

Robert Peccia And Associates

Name												
Base Volume Input [veh/h]	0	0	55	217	26	47	8	15	0	0	286	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.00	1.80	18.90	11.50	2.10	37.50	6.70	2.00	2.00	1.00	0.00
Growth Rate	2.22	1.00	2.22	2.22	2.22	2.22	2.22	2.22	1.00	1.00	2.22	2.22
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	122	482	58	104	18	33	0	0	635	2
Peak Hour Factor	1.0000	1.0000	0.7240	0.8350	0.7220	0.6910	0.6670	0.7500	1.0000	1.0000	0.6810	0.2500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	42	144	20	38	7	11	0	0	233	2
Total Analysis Volume [veh/h]	0	0	169	577	80	151	27	44	0	0	932	8
Pedestrian Volume [ped/h]	0		0			0			0			
Bicycle Volume [bicycles/h]		0			0			0			0	

## Intersection Settings

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Priority Scheme	Stop	Stop	Free	Free
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no	no		
Number of Storage Spaces in Median	0	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.53	7.38	0.38	0.15	0.04	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	47.75	0.00	27.94	3138.95	3109.90	9.11	11.25	0.00	0.00	0.00	0.00	0.00
Movement LOS	E		D	F	F	Α	В	Α			Α	Α
95th-Percentile Queue Length [veh]	2.88	0.00	2.88	74.83	74.83	0.52	0.40	0.40	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	72.12	0.00	72.12	1870.70	1870.70	12.88	9.95	9.95	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		27.94			2551.16			4.28			0.00	
Approach LOS	D F A							A				
d_I, Intersection Delay [s/veh]			1039.42									
Intersection LOS						F	F					

#### Intersection Level Of Service Report #5: 14th St SW and I-315 EB

Control Type:SignalizedDelay (sec / veh):12.4Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.457

#### Intersection Setup

Name												
Approach	١	lorthboun	d	S	outhboun	d	ı	Eastbound	d	٧	Vestbound	d
Lane Configuration		٦lr			٦١٢			חור			٦lr	
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00 100.00 100.00		100.00 100.00 100.00		100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00		30.00				30.00		
Grade [%]	0.00			0.00		0.00				0.00		
Crosswalk	yes			yes		yes			yes			

#### Volumes

Robert Peccia And Associates

Name												
Base Volume Input [veh/h]	13	82	260	95	396	262	107	168	10	102	50	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.40	1.20	4.30	1.30	0.40	0.90	0.00	0.00	1.00	0.00	12.90
Growth Rate	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	102	322	118	491	325	133	208	12	126	62	38
Peak Hour Factor	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380	0.9380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	27	86	31	131	87	35	55	3	34	17	10
Total Analysis Volume [veh/h]	17	109	343	126	523	346	142	222	13	134	66	41
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate	/ 0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

## Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

## Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	2	3	0	6	7	7	4	0	3	8	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	15	0	5	15	15	5	0	15	15	0
Maximum Green [s]	0	50	20	0	50	20	20	45	0	20	45	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	22	18	0	22	18	18	20	0	18	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	5	0	5	0	0	5	0	5	5	0
Pedestrian Clearance [s]	0	10	10	0	10	0	0	10	0	10	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## **Lane Group Calculations**

Lane Group	L	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	3.00	5.00	5.00	3.00	3.00	5.00	5.00	4.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	0.00	3.00	3.00	0.00	3.00	3.00
g_i, Effective Green Time [s]	21	21	41	21	21	41	33	15	15	33	15	15
g / C, Green / Cycle	0.35	0.35	0.68	0.35	0.35	0.68	0.55	0.25	0.25	0.55	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.02	0.06	0.21	0.10	0.28	0.22	0.09	0.12	0.01	0.09	0.03	0.03
s, saturation flow rate [veh/h]	893	1855	1596	1251	1876	1609	1564	1900	1615	1472	1900	1430
c, Capacity [veh/h]	183	647	1089	469	654	1097	998	466	396	872	466	351
d1, Uniform Delay [s]	26.40	13.51	3.86	17.33	17.64	3.86	6.75	19.34	17.22	7.01	17.69	17.58
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.20	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	0.12	0.16	0.30	2.31	0.30	0.06	0.75	0.03	0.08	0.14	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## Lane Group Results

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X, volume / capacity	0.09	0.17	0.32	0.27	0.80	0.32	0.14	0.48	0.03	0.15	0.14	0.12
d, Delay for Lane Group [s/veh]	26.62	13.63	4.03	17.63	19.95	4.16	6.82	20.09	17.25	7.09	17.83	17.73
Lane Group LOS	С	В	Α	В	В	Α	Α	С	В	Α	В	В
Critical Lane Group	no	no	no	no	yes	yes	no	yes	no	no	no	no
50th-Percentile Queue Length [veh]	0.23	0.94	1.10	1.32	6.19	1.15	0.74	2.53	0.13	0.70	0.68	0.42
50th-Percentile Queue Length [ft]	5.73	23.57	27.43	32.90	154.65	28.69	18.54	63.35	3.27	17.48	17.01	10.58
95th-Percentile Queue Length [veh]	0.41	1.70	1.97	2.37	10.26	2.07	1.33	4.56	0.24	1.26	1.22	0.76
95th-Percentile Queue Length [ft]	10.31	42.42	49.37	59.22	256.62	51.65	33.37	114.02	5.88	31.46	30.62	19.05

## Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.62	13.63	4.03	17.63	19.95	4.16	6.82	20.09	17.25	7.09	17.83	17.73
Movement LOS	С	В	Α	В	В	Α	Α	С	В	Α	В	В
d_A, Approach Delay [s/veh]		7.08			14.16			15.00			11.84	
Approach LOS	А				В			В				
d_I, Intersection Delay [s/veh]	, ,			12.45								
Intersection LOS				В								
Intersection V/C	0.457											

## Sequence

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Ring 1	2	7	4	1	-	-	-	-	-	-	-	ı	-	-	-	ı
Ring 2	6	3	8	-	_	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	_	-	-	_	-	-	_	-	-	-	-	-	-	-	



#### Intersection Level Of Service Report #6: 14th St SW and I-315 WB

Control Type:SignalizedDelay (sec / veh):19.6Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.621

#### Intersection Setup

Name		Northbound										
Approach	١	Northboun	d	S	outhboun	d	ı	Eastbound	d	V	Vestbound	d
Lane Configuration		٦١٢			٦F			+			4	
Turning Movement	Left				Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0 0 0			0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00 100.00 100.00			100.00 100.00 100.00			100.00	100.00
Speed [mph]	30.00			30.00		30.00			30.00			
Grade [%]	0.00			0.00		0.00			0.00			
Crosswalk	yes			yes			yes			yes		

#### Volumes

Robert Peccia And Associates

Name												
Base Volume Input [veh/h]	5	76	146	22	131	2	3	5	19	638	12	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	40.00	6.60	0.70	0.00	2.30	0.00	0.00	0.00	15.80	1.80	8.30	4.20
Growth Rate	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	88	169	26	152	2	3	6	22	740	14	165
Peak Hour Factor	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	22	43	7	38	1	1	2	6	187	4	42
Total Analysis Volume [veh/h]	6	89	171	26	154	2	3	6	22	749	14	167
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate	/ 0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0	-	0				0	-
Bicycle Volume [bicycles/h]		0			0			0			0	

## Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

## Phasing & Timing

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Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	1	2	0	1	0	0	3	0	0	2	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	5	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	35	40	0	35	0	0	25	0	0	40	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	25	19	0	25	0	0	16	0	0	19	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	9	7	0	9	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	11	7	0	11	0	0	0	0	0	7	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		no	no		no			no			no	
Maximum Recall		no	no		no			no			no	
Pedestrian Recall		no	no		no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## **Lane Group Calculations**

Lane Group	L	С	R	L	С	С	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	3.00	3.00	3.00
g_i, Effective Green Time [s]	11	11	49	11	11	2	33	33
g / C, Green / Cycle	0.18	0.18	0.81	0.18	0.18	0.03	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.01	0.06	0.12	0.02	0.09	0.02	0.51	0.12
s, saturation flow rate [veh/h]	804	1604	1443	1196	1668	1513	1505	1395
c, Capacity [veh/h]	167	290	1168	234	301	51	820	760
d1, Uniform Delay [s]	26.79	21.32	1.24	25.10	22.21	28.59	12.61	7.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.27	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.09	0.59	0.06	0.21	1.37	11.05	11.60	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## Lane Group Results

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X, volume / capacity	0.04	0.31	0.15	0.11	0.52	0.61	0.93	0.22
d, Delay for Lane Group [s/veh]	26.88	21.91	1.30	25.31	23.59	39.64	24.21	7.20
Lane Group LOS	С	С	Α	С	С	D	С	Α
Critical Lane Group	no	no	no	no	yes	yes	yes	no
50th-Percentile Queue Length [veh]	0.08	1.06	0.08	0.34	1.97	0.58	9.92	0.92
50th-Percentile Queue Length [ft]	2.04	26.57	1.93	8.44	49.22	14.38	247.97	23.06
95th-Percentile Queue Length [veh]	0.15	1.91	0.14	0.61	3.54	1.04	15.08	1.66
95th-Percentile Queue Length [ft]	3.67	47.82	3.47	15.19	88.60	25.89	377.09	41.51

## Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.88	21.91	1.30	25.31	23.59	23.59	39.64	39.64	39.64	24.21	24.21	7.20
Movement LOS	С	C C A C C D						D	D	С	С	Α
d_A, Approach Delay [s/veh]		8.77			23.83			39.64			21.15	
Approach LOS		Α			С			D			С	
d_I, Intersection Delay [s/veh]						19	.57					
Intersection LOS		В										
Intersection V/C	0.621											

## Sequence

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	-																
I	Ring 1	1	2	3	ı	ı	-	-	-	-	-	-	ı	ı	-	-	ı
	Ring 2		-	-	-	-	-	_	-	-	-	-	-	-	-	-	-
I	Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ī	Ring 4	-	-	-	-	_	_	_	_	-	_	-	-	-	-	-	_



35.6

D

0.891

#### Intersection Level Of Service Report #7: Fox Farm and I-315

Control Type:SignalizedDelay (sec / veh):Analysis Method:HCM2010Level Of Service:Analysis Period:15 minutesVolume to Capacity (v/c):

#### Intersection Setup

Name													
Approach	١	Northboun	d	S	outhboun	d	No	rtheastbo	und	Sou	Southwestbound		
Lane Configuration		117			۱۱۱۲			Шь		71  r			
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00 12.00 12.00			12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0 0 0		0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00 100.00 100.00			100.00 100.00 100.00			100.00 100.00 100.00		
Speed [mph]		30.00			30.00			30.00		30.00			
Grade [%]	0.00			0.00				0.00		0.00			
Crosswalk		yes			yes			yes		yes			

#### Volumes

Robert Peccia And Associates

Name												
Base Volume Input [veh/h]	71	155	227	153	274	325	242	706	103	486	874	250
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.80	1.90	0.40	1.30	0.70	2.10	2.50	3.60	2.90	0.40	3.90	1.60
Growth Rate	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	83	181	266	179	321	380	283	826	121	569	1023	293
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	49	72	49	87	103	77	224	33	155	278	80
Total Analysis Volume [veh/h]	90	197	289	195	349	413	308	898	132	618	1112	318
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate	/ 0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]		0			0	-		0			0	-
Bicycle Volume [bicycles/h]		0			0			0			0	

## Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

## Phasing & Timing

Robert Peccia And Associates

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	1	8	0	3	6	6	4	0	8	2	5
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	5	0	5	5	5	5	0	5	5	0
Maximum Green [s]	0	60	60	0	60	60	60	60	0	60	60	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	35	26	0	20	23	23	39	0	26	42	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.0	1.0	0.0	3.0	1.0	1.0	3.0	0.0	1.0	3.0	0.0
Minimum Recall		no	no		no	no	no	no		no	no	
Maximum Recall		no	no		no	no	no	no		no	no	
Pedestrian Recall		no	no		no	no	no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## **Lane Group Calculations**

Lane Group	С	С	R	L	С	R	L	С	R	L	С	R
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	3.00	3.00	5.00	5.00	3.00	5.00	5.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	3.00	3.00	0.00	3.00	3.00	0.00	1.00	3.00	3.00	1.00	3.00	3.00
g_i, Effective Green Time [s]	18	18	82	28	28	61	28	47	47	27	47	47
g / C, Green / Cycle	0.15	0.15	0.68	0.24	0.24	0.51	0.23	0.40	0.40	0.23	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.06	0.12	0.20	0.12	0.11	0.29	0.19	0.29	0.09	0.20	0.35	0.22
s, saturation flow rate [veh/h]	1604	1527	1448	1608	3233	1424	1589	3143	1413	3150	3134	1431
c, Capacity [veh/h]	243	231	985	380	764	729	371	1245	559	719	1224	559
d1, Uniform Delay [s]	46.00	49.37	7.66	39.82	39.22	20.15	43.70	30.64	24.14	44.46	34.54	28.65
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.15	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.06	7.18	0.16	1.07	0.43	0.96	4.79	0.80	0.21	3.15	2.94	0.91
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

## Lane Group Results

Robert Peccia And Associates

X, volume / capacity	0.40	0.82	0.29	0.51	0.46	0.57	0.83	0.72	0.24	0.86	0.91	0.57
d, Delay for Lane Group [s/veh]	47.07	56.55	7.83	40.89	39.65	21.11	48.50	31.44	24.35	47.61	37.48	29.57
Lane Group LOS	D	Е	Α	D	D	С	D	С	С	D	D	С
Critical Lane Group	no	yes	no	no	no	yes	yes	no	no	no	yes	no
50th-Percentile Queue Length [veh]	2.70	5.98	2.86	5.12	4.46	7.98	9.16	10.99	2.55	9.09	15.51	7.26
50th-Percentile Queue Length [ft]	67.38	149.57	71.39	127.98	111.45	199.62	228.90	274.66	63.65	227.31	387.83	181.61
95th-Percentile Queue Length [veh]	4.85	9.99	5.14	8.83	7.92	12.62	14.12	16.42	4.58	14.04	21.97	11.68
95th-Percentile Queue Length [ft]	121.29	249.86	128.51	220.75	198.02	315.47	352.97	410.56	114.57	350.95	549.31	292.12

## Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.07	56.22	7.83	40.89	39.65	21.11	48.50	31.44	24.35	47.61	37.48	29.57
Movement LOS	D	E	Α	D	D	С	D	С	С	D	D	С
d_A, Approach Delay [s/veh]		30.51			31.90			34.67			39.31	
Approach LOS		С			С			С			D	
d_I, Intersection Delay [s/veh]						35	.58					
Intersection LOS						[	)					
Intersection V/C	0.891											

## Sequence

Robert Peccia And Associates

F	Ring 1	1	3	8	4	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 2		-	6	2	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



314.9

F

1.339

#### Intersection Level Of Service Report #8: Central Ave and I15 SB

Control Type: Two-way stop Delay (sec / veh):

Analysis Method: HCM2010 Level Of Service:

Analysis Period: 15 minutes Volume to Capacity (v/c):

#### Intersection Setup

Name												
Approach	S	Southbound			Eastbound	d	\	Vestboun	d	Nor	rthwestbo	und
Lane Configuration		ጎፐ			ir			1				
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]		30.00			30.00			30.00			30.00	
Grade [%]		0.00		0.00		0.00			0.00			
Crosswalk		yes		yes		yes			yes			

#### Volumes

Robert Peccia And Associates

Name												
Base Volume Input [veh/h]	66	0	6	0	166	30	230	299	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	6.00	0.00	0.00	2.00	0.60	0.00	6.50	1.00	2.00	2.00	2.00	2.00
Growth Rate	1.41	1.41	1.41	1.00	1.41	1.41	1.41	1.41	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	93	0	8	0	234	42	324	422	0	0	0	0
Peak Hour Factor	0.9170	1.0000	0.7500	1.0000	0.8470	0.8330	0.8980	0.8690	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	0	3	0	69	13	90	121	0	0	0	0
Total Analysis Volume [veh/h]	101	0	11	0	276	50	361	486	0	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

## Intersection Settings

Robert Peccia And Associates

Priority Scheme	Stop	Free	Free	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.34	0.00	0.02	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	314.89	307.18	11.27	0.00	0.00	0.00	8.99	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	В		Α	Α	Α	Α				
95th-Percentile Queue Length [veh]	7.96	7.96	0.06	0.00	0.00	0.00	1.19	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	198.90	198.90	1.44	0.00	0.00	0.00	29.75	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		285.07			0.00			3.83			0.00	
Approach LOS		F			Α			Α			А	
d_I, Intersection Delay [s/veh]						27	.37					
Intersection LOS						·	=					



#### Intersection Level Of Service Report #9: Central Ave and I-15 NB

Control Type:Two-way stopDelay (sec / veh):445.2Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):1.211

#### Intersection Setup

Name													
Approach	١	Northboun	d	1	Eastbound	i	\	Vestboun	d	Sou	utheastbo	und	
Lane Configuration		ት			1			IIr					
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Speed [mph]		30.00			30.00		30.00			30.00			
Grade [%]		0.00		0.00		0.00			0.00				
Crosswalk		yes			yes			yes			yes		

#### Volumes

Robert Peccia And Associates

Name												
Base Volume Input [veh/h]	57	0	170	5	249	0	0	471	113	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.80	0.00	7.00	0.00	2.00	2.00	2.00	4.60	0.90	2.00	2.00	2.00
Growth Rate	1.64	1.64	1.64	1.64	1.64	1.00	1.00	1.64	1.64	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	93	0	279	8	408	0	0	772	185	0	0	0
Peak Hour Factor	0.7130	1.0000	0.7590	0.4170	0.8650	1.0000	1.0000	0.9350	0.8310	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	0	92	5	118	0	0	206	56	0	0	0
Total Analysis Volume [veh/h]	130	0	368	19	472	0	0	826	223	0	0	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

## Intersection Settings

Robert Peccia And Associates

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	no			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			
Number of Storage Spaces in Median	0	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.21	0.00	0.63	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	445.19	435.47	417.85	9.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Movement LOS	F	F	F	Α	Α			Α	Α			
95th-Percentile Queue Length [veh]	33.98	33.98	33.98	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	849.39	849.39	849.39	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		424.99			0.37			0.00			0.00	
Approach LOS		F			Α			Α			А	
d_I, Intersection Delay [s/veh]						103	3.94					
Intersection LOS						ı	F					



# Intersection Level Of Service Report #10: Central Ave and Vaughn Rd

Control Type:Two-way stopDelay (sec / veh):1,422.7Analysis Method:HCM2010Level Of Service:FAnalysis Period:15 minutesVolume to Capacity (v/c):3.231

#### Intersection Setup

Crosswalk	y	es	ye	es	yes		
Grade [%]	0.00		0.	00	0	.00	
Speed [mph]	30	30.00		30.00		0.00	
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	
No. of Lanes in Pocket	0	0	0	0	0	0	
Lane Width [ft]	12.00	12.00 12.00		12.00	12.00	12.00	
Turning Movement	Left	Right	Left	Thru	Thru	Right	
Lane Configuration	η -	r	٦	Ī	1	F	
Approach	South	bound	Eastb	ound	Westbound		
Name							

#### Volumes

Robert Peccia And Associates

Name						
Base Volume Input [veh/h]	68	121	66	361	462	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.90	1.60	1.50	4.00	3.40	2.60
Growth Rate	1.63	1.63	1.63	1.63	1.63	1.63
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [v	e 0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	197	108	588	753	124
Peak Hour Factor	0.6540	0.9450	0.7500	0.7910	0.8680	0.7310
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	52	36	186	217	42
Total Analysis Volume [veh/h]	170	208	144	743	868	170
Pedestrian Volume [ped/h]		0		0		0
Bicycle Volume [bicycles/h]		0		0		0

## Intersection Settings

Robert Peccia And Associates

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	3.23	0.66	0.21	0.01	0.01	0.00		
d_M, Delay for Movement [s/veh]	1422.75	1365.77	11.82	0.00	0.00	0.00		
Movement LOS	F	F	В	A	А	A		
95th-Percentile Queue Length [veh]	38.77	38.77	0.81	0.00	0.00	0.00		
95th-Percentile Queue Length [ft]	969.13	969.13	20.22	0.00	0.00	0.00		
d_A, Approach Delay [s/veh]	139	1.39	1.92		0.00			
Approach LOS	F	F A				A		
d_I, Intersection Delay [s/veh]	229.11							
Intersection LOS	F							

# Intersection Level Of Service Report #11: Vaughn Rd and I-15 SB

Control Type:Two-way stopDelay (sec / veh):11.0Analysis Method:HCM2010Level Of Service:BAnalysis Period:15 minutesVolume to Capacity (v/c):0.254

#### Intersection Setup

Name						
Approach	South	bound	Eastl	Eastbound		bound
Lane Configuration	т		1			1
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	у	es	yes		yes	

#### Volumes

Robert Peccia And Associates

Name							
Base Volume Input [veh/h]	143	1	0	53	50	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	7.00	0.00	2.00	7.60	4.00	2.00	
Growth Rate	1.36	1.36	1.00	1.36	1.36	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [ve	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	194	1	0	72	68	0	
Peak Hour Factor	0.9410	0.2500	1.0000	0.7790	0.8930	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	52	1	0	23	19	0	
Total Analysis Volume [veh/h]	206	4	0	92	76	0	
Pedestrian Volume [ped/h]	Ö		0		0		
Bicycle Volume [bicycles/h]		0	(	0		0	

## Intersection Settings

Robert Peccia And Associates

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.25	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	10.97	10.17	0.00	0.00	0.00	0.00	
Movement LOS	В	В		A	Α		
95th-Percentile Queue Length [veh]	1.03	1.03	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	25.74	25.74	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	10.96		0.00		0.00		
Approach LOS	E	3	A		A		
d_I, Intersection Delay [s/veh]	6.09						
Intersection LOS	В						

# Intersection Level Of Service Report #12: Vaughn Rd and I-15 NB

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 7.4
Level Of Service: A
Volume to Capacity (v/c): 0.000

#### Intersection Setup

Name						
Approach	Eastt	oound	Westbound		Southeastbound	
Lane Configuration	4		Ĭſ			
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	ye	es	yes		yes	

#### Volumes

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Name							
Base Volume Input [veh/h]	0	165	55	334	0	0	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	0.00	6.10	1.80	4.80	2.00	2.00	
Growth Rate	1.37	1.37	1.37	1.37	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	
Existing Site Adjustment Volume [ve	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	0	226	75	458	0	0	
Peak Hour Factor	1.0000	0.7500	0.8090	0.9180	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	0	75	23	125	0	0	
Total Analysis Volume [veh/h]	0	301	93	499	0	0	
Pedestrian Volume [ped/h]	0		0		Ō		
Bicycle Volume [bicycles/h]		0		0		0	

## Intersection Settings

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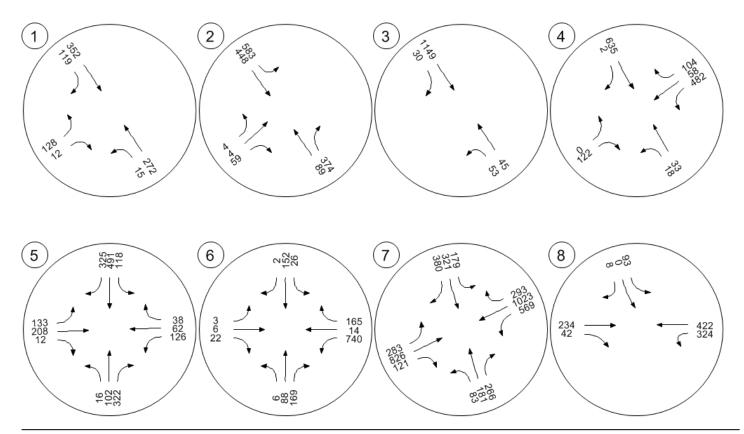
Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			
Number of Storage Spaces in Median	0	0	0

#### Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	7.38	0.00	0.00	0.00	0.00	0.00	
Movement LOS	Α	A	Α	A			
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	0.	00	0.00		0.00		
Approach LOS	,	A A				А	
d_I, Intersection Delay [s/veh]	0.00						
Intersection LOS	A						

## Traffic Volume - Future Total Volume



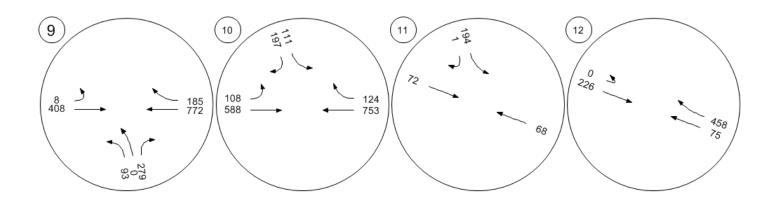


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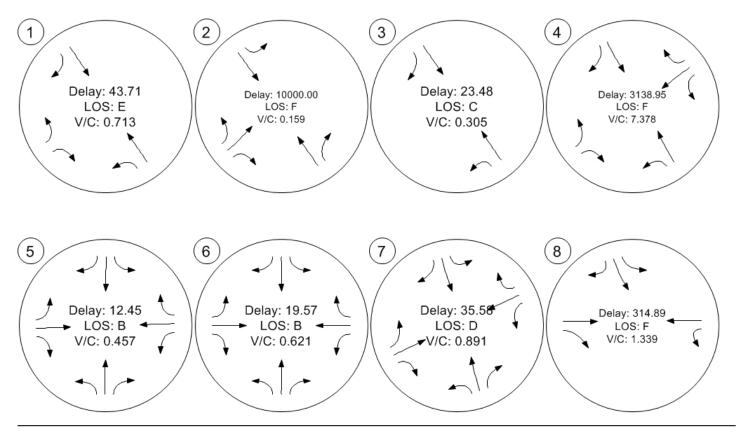
## Traffic Volume - Future Total Volume





#### **Traffic Conditions**





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## Traffic Conditions

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