Traffic Report

I-25/I-80 Interchange

Traffic Report

I-25/I-80 Interchange Project

Wyoming Department of Transportation

Traffic Report

For the

I-25/I-80 Interchange Project
Laramie County

WYDOT Project Number I806212
FHWA—WYDOT—EA-20-01

Prepared for:

Wyoming Department of Transportation
and
U.S. Department of Transportation
Federal Highway Administration

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Jacobs Engineering Group Inc.

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Contents

Exhibits

Tables

Appendixes

Acronyms and Abbreviations

Acronym or Abbreviation	Definition
>	greater than
<	less than
≤	less than or equal to
%	Percent
AADT	annual average daily traffic
a.m.	weekday morning
Cheyenne Model	Cheyenne MPO Travel Demand Forecasting model
EB	Eastbound
HCM	*Highway Capacity Manual*
HCS	Highway Capacity Software
I	Interstate
LOS	level of service
mph	mile(s) per hour
MPO	Metropolitan Planning Organization
NB	Northbound
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
OWSC	one-way stop controlled
pc/mi/ln	passenger car(s) per mile per lane
p.m.	weekday evening
SB	Southbound
Sec/Veh	second(s) per vehicle
Synchro	Synchro Studio [program]
TRB	Transportation Research Board
US	U.S. Highway
v/c	volume/capacity ratio
veh/hr	vehicle(s) per hour
VHT	vehicle hours of travel
VMT	vehicle miles of travel
vph	vehicles per hour
WB	Westbound
WYDOT	Wyoming Department of Transportation

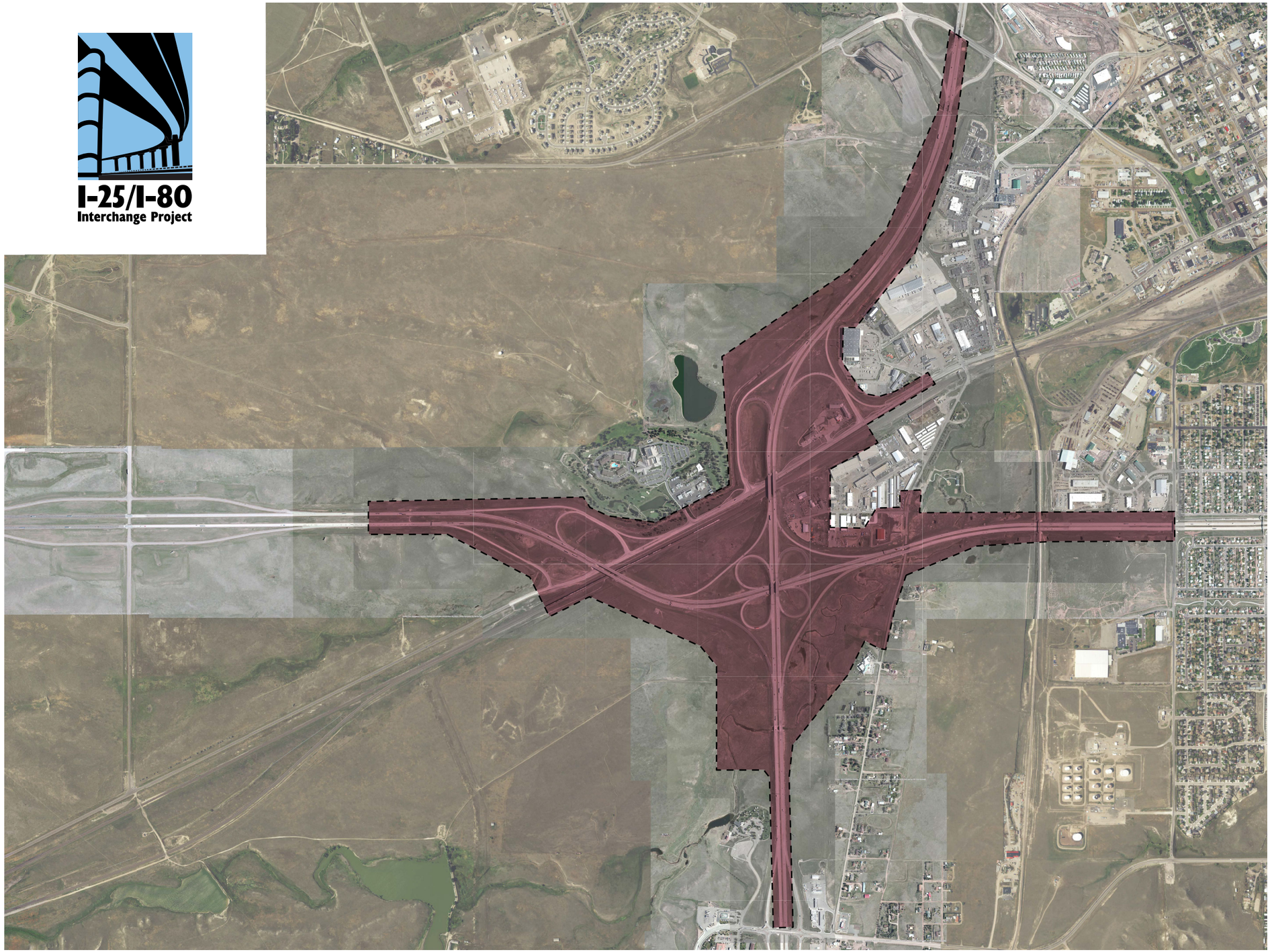
Chapter 1 Introduction

The Wyoming Department of Transportation (WYDOT) previously conducted an interchange study in 2008 for the Interstate 25 (I-25) and Interstate 80 (I-80) system interchange and the adjacent service interchanges (CH2M HILL 2008) of U.S. Highway (US 30) (Lincolnway) with I-25, Missile Drive with I-25, Lincolnway with I-80, and Round Top Road with I-80. The study recommended an alternative that proposed reconfiguring three of the evaluated interchanges in a four-phase construction process. The recommended alternative included elements that addressed the operations, capacity, and safety issues identified at that time. The interchange study recommended a phased approach to implementing the alternative to spread the traffic impacts and funding requirements over several years.

In 2019, WYDOT initiated an Environmental Assessment and design effort for the first two phases of the 2008 recommended alternative, which include the system interchange between I-25 and I-80 and the service interchange between I-25 and Lincolnway. The Roundtop Road and Missile Drive interchanges are not included in these phases. Exhibit 1 shows the study area and encompasses the recommended alternative that is the subject of the Environmental Assessment and design effort. This effort included traffic forecasting for use in assessing the existing and future traffic operations with and without implementation of the recommended alternative, and for use in the air quality and noise modelling conducted as part of the Environmental Assessment.

A traffic operations analysis was conducted to determine the traffic operating conditions of the current facilities with existing and future forecast volumes, and to analyze the operations benefits of the Build Alternative compared to the No Build Alternative with future forecast volumes. The Build Alternative is defined as the recommended alternative with a few modifications, such as two-lane exit ramps and additional auxiliary lanes, that were added in this recent assessment and design effort. The assessment and design effort also included a safety analysis of recent crash data that identified relevant crash trends or patterns based on crash records between the years 2014 and 2018 and assessed the potential for the recommended alternative to address these crash patterns. The analysis also produced recommended additional improvements, such as changeable message signs, to include in the design that will supplement the recommended alternative. This report documents the forecasting process along with the operations and safety analyses.

I-25/I-80
Interchange Project



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Study Area

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Exhibit 1. Study Area
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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Chapter 2 Traffic Forecasting

The traffic forecasting for this project is based on the Cheyenne Metropolitan Planning Organization's (MPO) Travel Demand Forecasting model (Cheyenne Model). The Cheyenne Model is a database of land use characteristics, expected future roadway network improvements, and travel behavior used to forecast future regional traffic volumes. As Exhibit 2 shows, the model area encompasses the City of Cheyenne and neighboring areas that have high levels of interactions with Cheyenne. The Cheyenne Model was last updated in 2014 with model existing year set and calibrated to the 2010 census and employer-level information.

The MPO began the process to update their Cheyenne Model during the latter stages of this traffic analysis and documentation effort. This effort was based on the 2040 horizon planning year to match the approved model at the time the analysis was conducted. The updated horizon planning year will be 2045; therefore, the Environmental Assessment assumed a design year of 2045 to match the updated model. Once the updated model is approved, this traffic forecasting effort will be updated and documented in a separate technical memorandum for the year 2045 No Build and Build alternatives. The same traffic forecasting methodology as discussed in this chapter will be followed to forecast the 2045 No Build and Build volumes for use in updating the operations analysis. Results of this Year 2045 analysis will be summarized in the Decision Document for the Environmental Assessment.

2.1: Data Collection

WYDOT provided existing data for study-area roadway segments, ramps, and intersections. For the interstate and Lincolnway segments, average annual daily traffic (AADT) and bidirectional peak hour volumes were provided for 2018, in addition to peak hour percentages. For the interchange ramps, the most recently available 3- to 5-day short-term counts and vehicle classification percentages were provided.

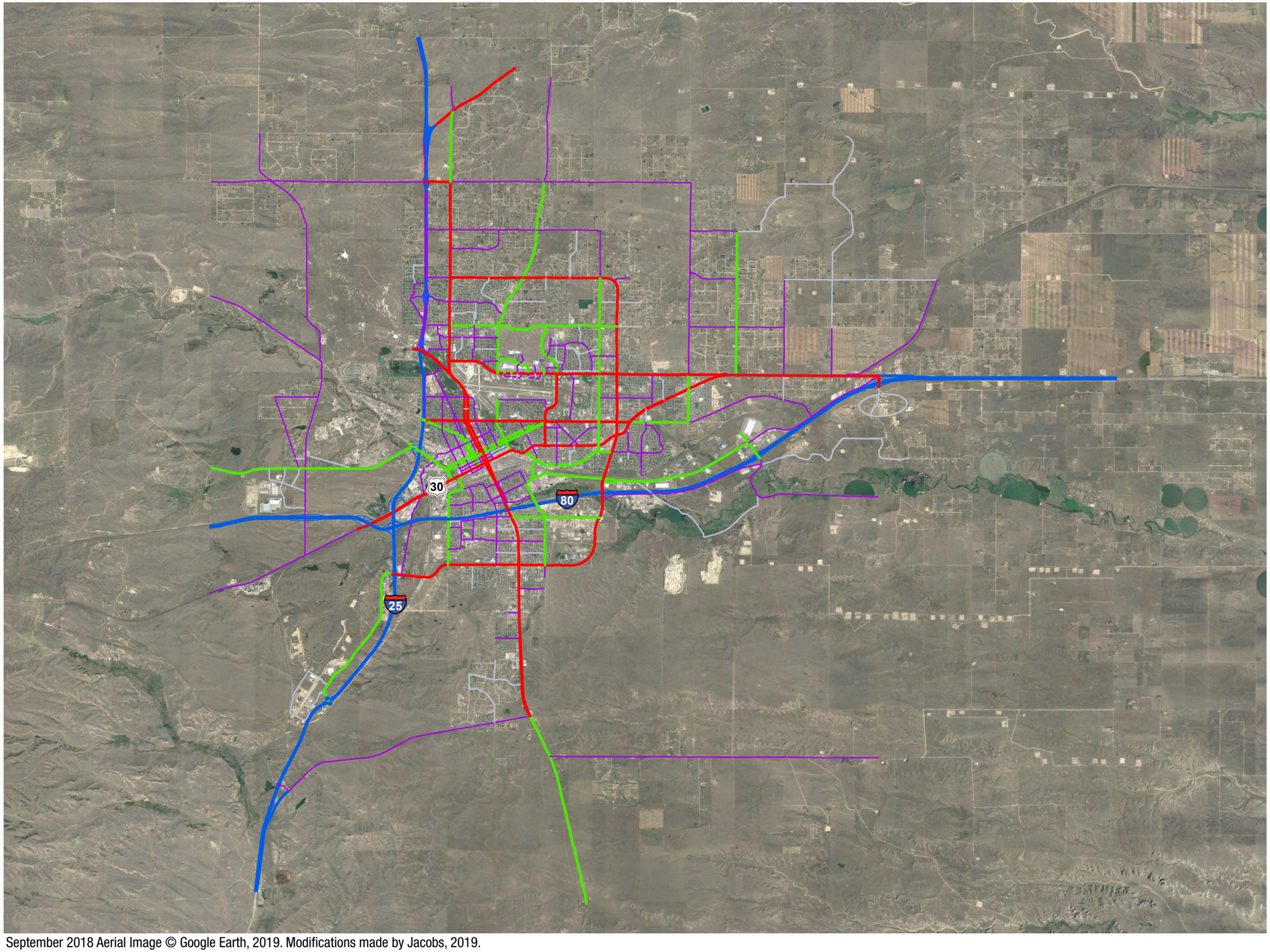
On April 16, 2019, WYDOT collected (and subsequently provided) turning movement count data at the following intersections:

1. Lincolnway and eastbound (EB) I-80 ramps
2. Lincolnway and westbound (WB) I-80 ramps
3. Lincolnway and southbound (SB) I-25 ramps
4. Lincolnway and northbound (NB) I-25 ramps

2.2: Analysis Scenarios

The Environmental Assessment focused on two distinct years: the existing year and future year (2040). The future year is analyzed for both No Build and Build Alternatives that reflect the roadway network with and without the recommended alternative.

In general, the volumes in off-peak periods and on weekends are less than during the typical weekday commuter periods. To more accurately capture traffic patterns, the analysis considered weekday morning (a.m.) and weekday evening (p.m.) peak hours, as well as conditions over an average weekday.



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Roadway Classifications

- Collector
- Interstate
- Local
- Minor Arterial
- Principal Arterial
- Ramp

Note: The Model Network includes only links shown in color on this map.

N

0 1 2 3

Approximate scale in Miles

Exhibit 2. Model Network Area
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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September 2018 Aerial Image © Google Earth, 2019. Modifications made by Jacobs, 2019.

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Existing Year

Segment and Ramp Volumes

Because the interstate traffic data for the study segments were bidirectional totals, the directional traffic volumes for these segments were estimated using the directional splits of these segments as available from the Cheyenne Model. The segment volumes were generally rounded to the nearest hundred.

Exhibit 3 shows the existing a.m. and p.m. peak hour and AADT volumes on the interstate mainline segments and ramps within the study area.

Intersection Turning Movement Volumes

The existing scenario reflects present roadway conditions, traffic volumes, traffic patterns, and traffic operations. For the sections of Lincolnway that do not have driveways between the intersections, the traffic count data for existing conditions were balanced so that all traffic entering and leaving one intersection/junction is accounted for at the next intersection/junction. Volume differences on the links between the WB I-80 ramps and SB I-25 ramps, as well as the links between the SB I-25 ramps and NB I-25 ramps (with sinks and sources such as driveways to Little America and American Inn/La Quinta), were maintained within a range of 10 to 50 trips during the peak hours to represent traffic accessing the facilities there. Exhibit 4 shows the existing a.m. and p.m. peak hour turning movement volumes.

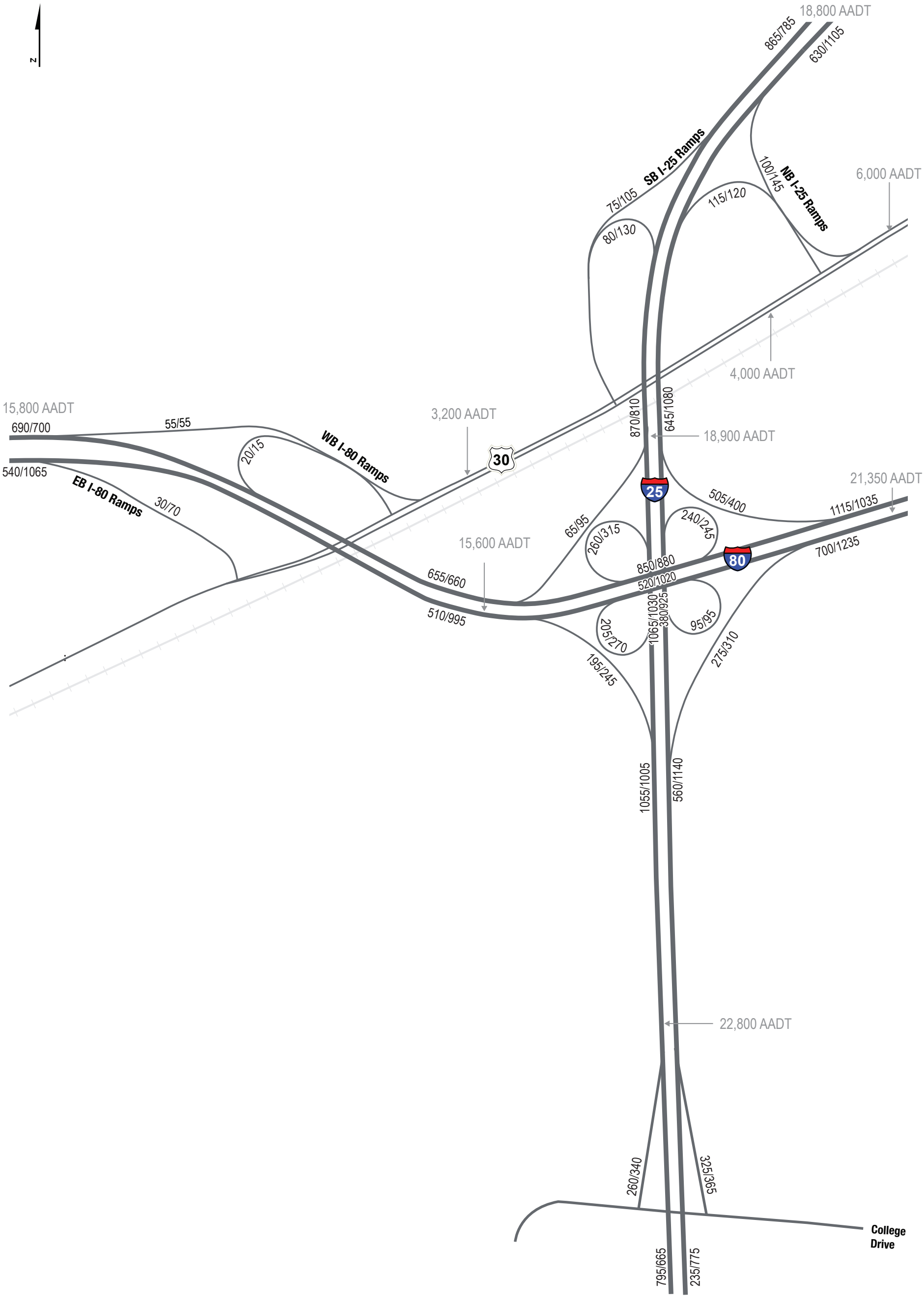
Future Year (2040)

The future transportation network reflects those improvements identified in the Long-Range Transportation Plan as planned or programmed projects in the study area (WYDOT 2010). To develop the traffic forecasts for the future year, the model results from the Cheyenne Model base year (2010) and the Cheyenne Model future year (2040) were used.

The forecasting effort assumes the 2040 Fiscally Constrained Long-Range Plan scenario of the Cheyenne Model represents the 2040 No Build Alternative for the Environmental Assessment. As a result, this forecasting effort did not add any transportation network improvements to those already included in this model scenario or modify any Traffic Analysis Zone data.

The forecasting effort assumes the 2040 Vision Plan scenario of the Cheyenne Model represents the 2040 Build Alternative for the Environmental Assessment. As a result, this forecasting effort did not alter the roadway network or Traffic Analysis Zone data included in this model scenario.

The future No Build intersection turning movements and average annual daily volumes are forecast using the existing traffic count data and the Cheyenne Model results for the base year and 2040 No Build Alternative. The future Build Alternative forecasts are based on the model results for the 2040 No Build and 2040 Build Alternatives.



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XX/XX	AM/PM Peak Hour Turning Movements
AADT	Average Annual Daily Traffic

Exhibit 3. Existing Volumes
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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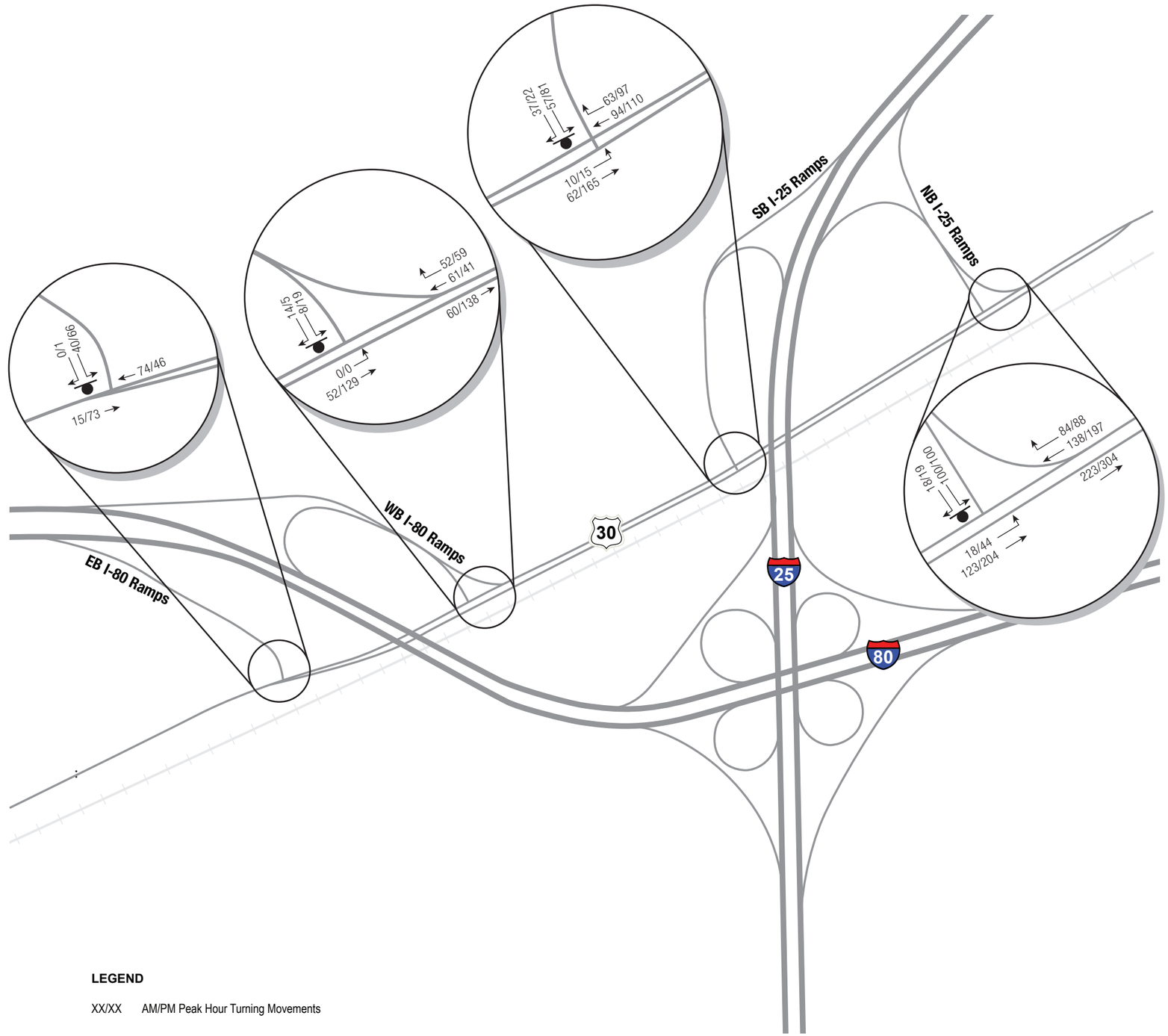

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XX/XX AM/PM Peak Hour Turning Movements

Exhibit 4. Existing Turning Movement Volumes
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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2.3: Forecasting Methodology

The Cheyenne Model was applied to develop the traffic forecasts. Regional travel demand models are widely accepted planning tools that produce system-level traffic forecasts used to identify transportation needs and future travel conditions. Though these models can be a useful tool to develop the traffic projects, the output needs to be properly evaluated for reasonableness. The traffic forecast development process followed the guidelines as provided in the Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) *Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design* (TRB 2014). The forecasts for each mainline segment and ramp were developed individually based on the existing traffic data, model outputs, and expected growth in the area. This section provides a brief description of these guidelines.

The future year No Build Alternative traffic forecasts were developed using the growth trends from the Cheyenne Model results between the base year (2010) and future year (2040), following the NCHRP Report 765 guidelines (TRB 2014). The adjusted growth was applied to the existing traffic volumes to estimate the 2040 No-Build Alternative traffic volumes

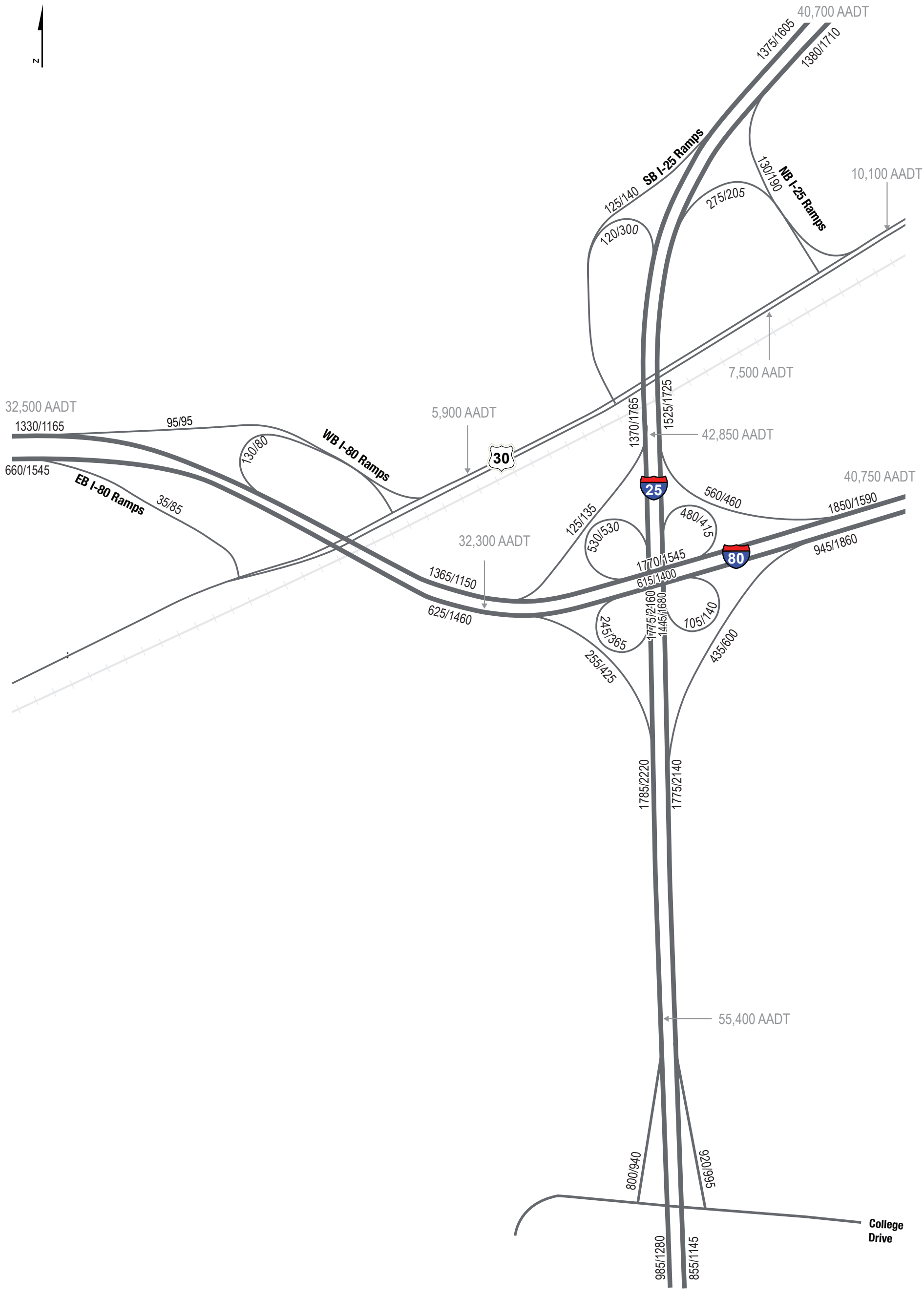
Segment and Ramp Volumes

The 2040 Build Alternative traffic forecasts were developed using the traffic shifts and patterns from the Cheyenne Model results between the 2040 No Build (Fiscally Constrained) and 2040 Build (Vision) Alternatives. The traffic shifts evident in the model results were applied to the 2040 No Build traffic forecasts and post-processed using the NCHRP Report 765 guidelines (TRB 2014).

Exhibits 5 and 6 show the future year (2040) a.m. peak hour, p.m. peak hour, and AADT on the study segments for both No Build and Build Alternatives, respectively.

The traffic volumes on the interstate segments grow at an annual average rate of 2 to 4 percent from existing year to future year (2040), with higher growth rate occurring on the I-25 mainline segments. The interstate ramp segments grow at a lower rate compared to mainline segments.

In the future Build Alternative, the reconfiguration of the system ramps at the I-25 and I-80 interchange causes some change in traffic patterns. The Build Alternative also assumes additional roadway network in the northwest quadrant of the I-25 and I-80 interchange that connects to the crossroad in the Lincolnway diamond interchange. The reconfigured ramps eliminate most of the existing weaving sections, which would reduce congestion on the mainlines predicted for the No Build Alternative. As a result, the interchange can throughput more traffic volumes, particularly to the north and west of the interchange.



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XX/XX	AM/PM Peak Hour Turning Movements
AADT	Average Annual Daily Traffic

Exhibit 5. 2040 No Build Volumes
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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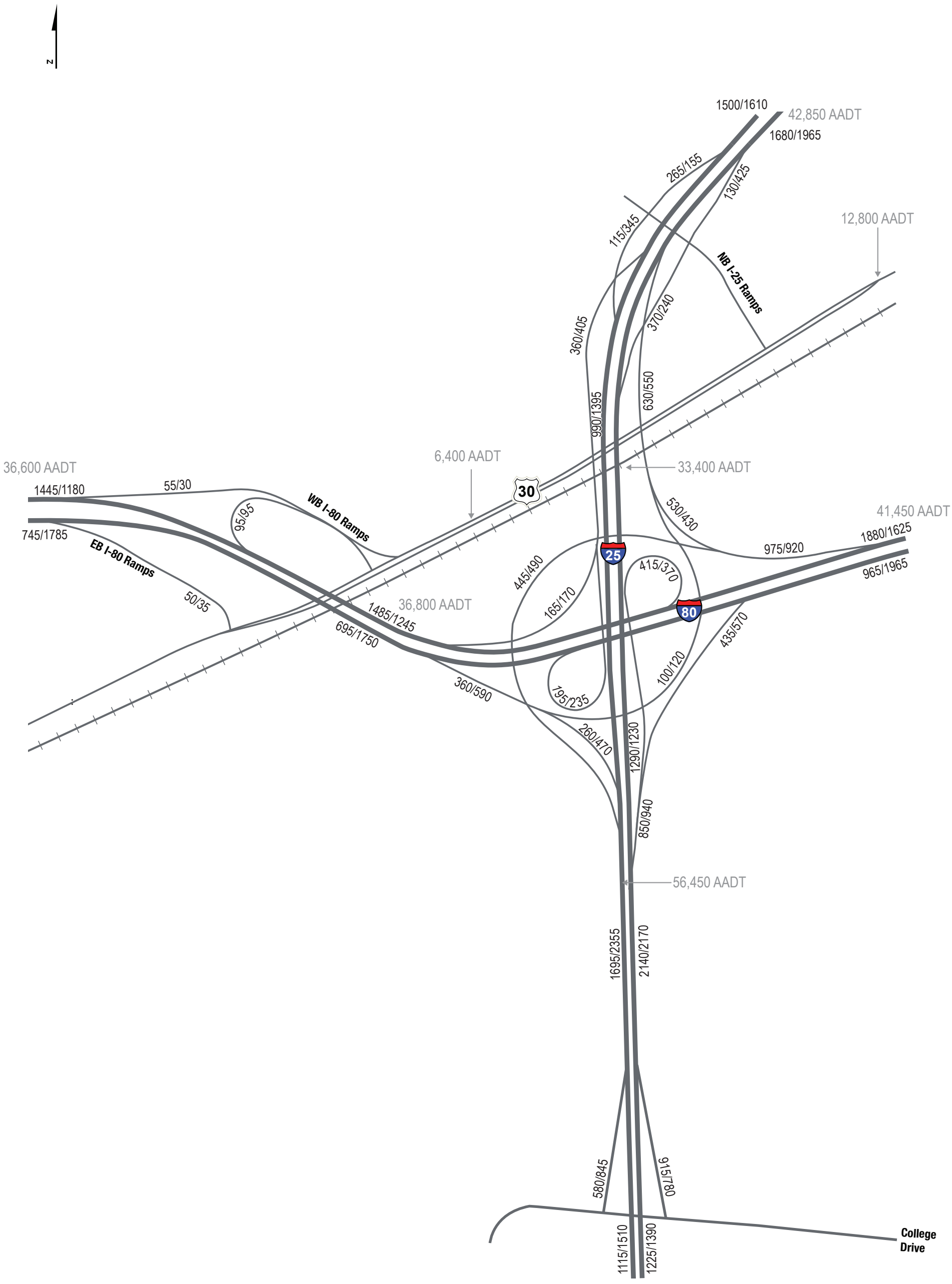

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XX/XX	AM/PM Peak Hour Turning Movements
AADT	Average Annual Daily Traffic

Exhibit 6. 2040 Build Volumes
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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Intersection Turning Movement Volumes

The Iterative Procedure—Directional Method as described in NCHRP Report 765 was used to generate intersection turning movement forecasts for the horizon year (TRB 2014). The directional method uses an iterative approach to alternatively balance entering traffic and departing traffic volumes until an acceptable level of convergence is reached. The method applies existing turning movement volumes and base and future year link volumes. The Iterative Procedure—Directional Method was previously documented in NCHRP Report 255 (TRB 1982). The method has been in use for many years and is widely accepted by transportation practitioners.

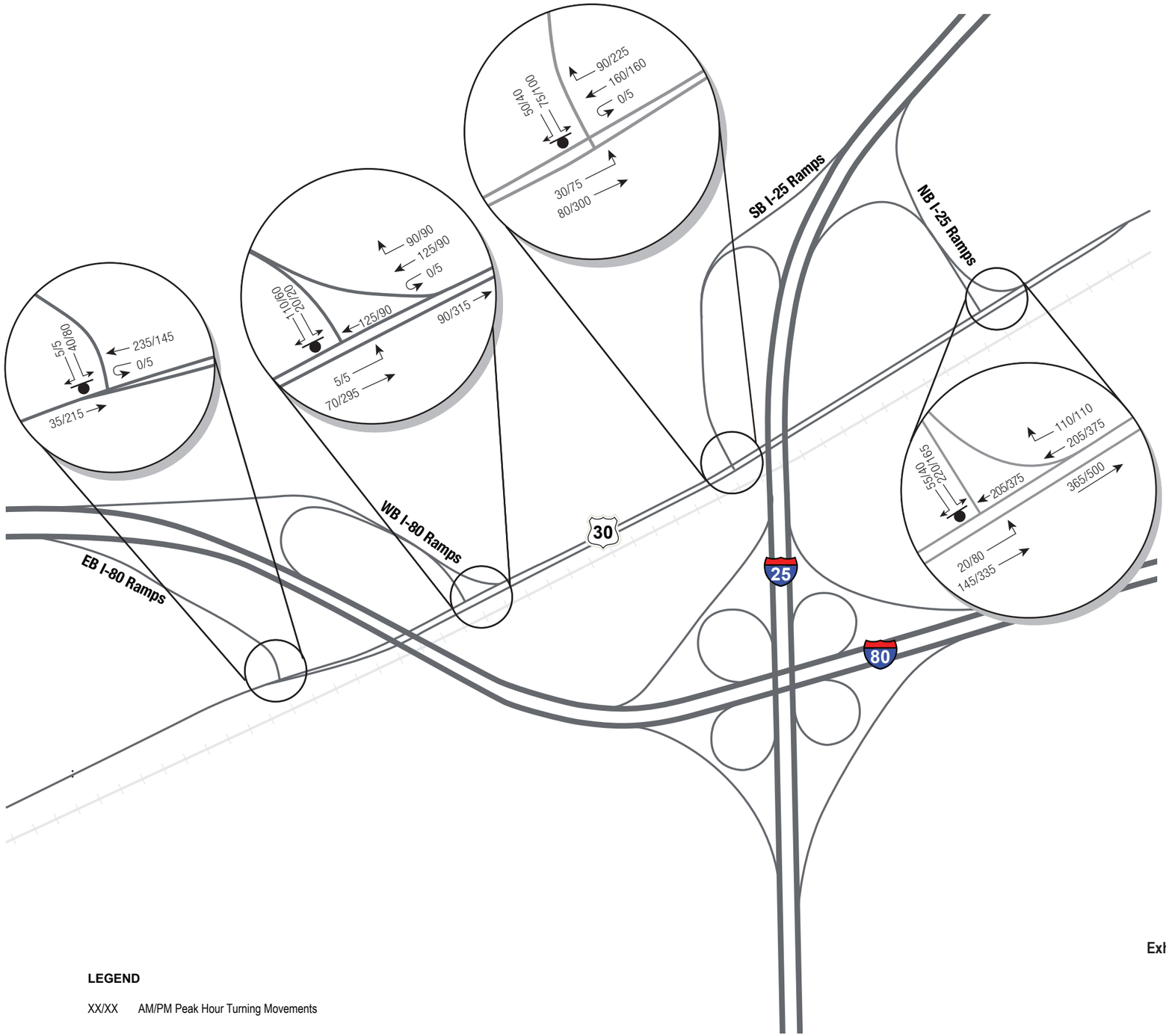
The method requires directional link volume forecasts and an estimate of intersection turning movement percentages. Estimated turning percentages can be based on existing turning movement counts, turning movement patterns at similar intersections, or professional judgment. The method alternatively balances intersection approach (inflow) and departure (outflow) volumes in an iterative process until an acceptable level of convergence is reached. Volumes will be generally rounded to the nearest ten for each movement value.

Similar to the existing turning movement volumes, the forecasted volumes for the future conditions were balanced so that all traffic entering and leaving one intersection or junction is accounted for at the next intersection or junction, if no mid-block access points were present. This helps with conservation of traffic volumes. Volume differences on links where sinks and sources did exist were maintained within generally acceptable limits for the facilities that are being accessed through the mid-block driveways. Volumes were generally rounded to the nearest ten for each movement value.

Exhibits 7 and 8 show the future year (2040) a.m. and p.m. peak hour turning movement volumes for both No Build and Build Alternatives, respectively.

The turning movement volumes grow at an annual average rate of 3 to 6 percent from the existing year to future year (2040) during the a.m. and p.m. peak hours, with higher growth rate occurring at the I-80 ramp intersections.

In the future Build Alternatives, the reconfiguration of the Lincolnway interchange with I-25 relocates the ramp terminal intersections, resulting in some change in traffic patterns. The Build Alternatives also assume additional roadway network in the northwest quadrant of the I-25 and I-80 interchange that links to the crossroad in the reconfigured Lincolnway diamond interchange. These network additions and changes results in an increase in traffic volumes at the I-25 ramp intersections with better access to the interstates. A slight reduction in the traffic on Lincolnway through the interchange is expected because the access to the SB I-25 ramp connections is moved further east.



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XX/XX AM/PM Peak Hour Turning Movements

Exhibit 7. 2040 No Build Turning Movement Volumes
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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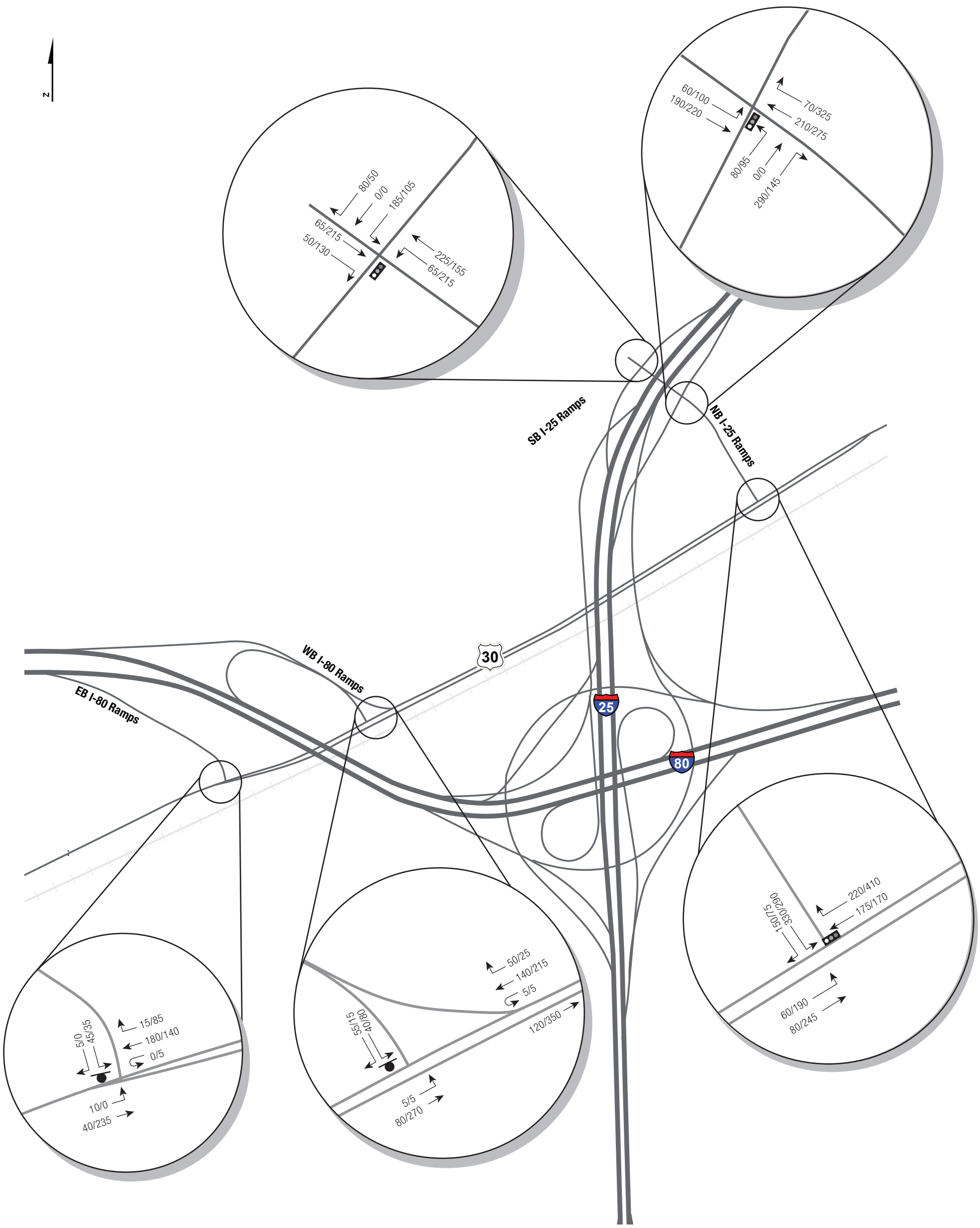

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XX/XX AM/PM Peak Hour Turning Movements

Exhibit 8. 2040 Build Turning Movement Volumes
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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2.4: Performance Measures

The travel demand forecasting results were used to understand the transportation effects of the analysis scenarios, in terms of traffic operations and environmental impact (noise and air quality). The forecasting effort supplied the following performance measures from the Cheyenne Model to support the Environmental Assessment:

- AADT
- a.m. and p.m. peak hour volumes for interstate mainline and ramps
- a.m. and p.m. peak hour turning movement volumes for intersections
- Vehicle miles of travel (VMT)
- Vehicle hours of travel (VHT)

Table 1 summarizes the VMT, VHT, and congestion levels calculated as link volumes per link length for the analysis scenarios.

Table 1. VMT, VHT, and Congestion Level Summary from Cheyenne Model

	Model Base Year 2 010	Future Year			
		2040 No Build	Annual Growth % between 2010 and 2040	2040 Build	Delta % between 2040 No Build and 2040 Build
Cheyenne Model Network Facilities					
VMT (miles)	1,939,000	3,603,000	3,514,000	2%	-2%
VHT (miles)	51,200	93,300	89,800	2%	-4%
Model Link Volumes (vehicles)	9,037,000	14,878,000	14,413,000	2%	-3%
Model Link Length (miles)	751	762	823	0%	8%
Link Volume/Link Length (vehicles/mile)	12,030	19,530	17,510	2%	-10%
Project Study Area Facilities					
VMT (miles)	143,000	339,000	351,000	3%	4%
VHT (miles)	2,400	5,700	5,900	3%	4%
Model Link Volumes (vehicles)	571,000	1,354,000	1,295,000	3%	-4%
Model Link Length (miles)	23	23	25	0%	9%
Link Volume/Link Length (vehicles/mile)	24,510	58,080	51,630	3%	-11%

The citywide VMT and VHT are expected to grow at a 2 percent annual growth, while it is expected to grow with a slightly higher annual rate of 3 percent in the project study area. In the future, with newer road facilities (in both the No Build and Build Alternatives), the congestion level per mile of roadway facilities will change compared to the existing condition. Like VMT and VHT growth trends, the congestion level per mile increases at a rate of 2 percent annually citywide and 3 percent in the study area. With the project improvements in the study area, this congestion level per mile is expected to reduce by about 10 percent from the 2040 No Build to 2040 Build Alternatives.

Chapter 3 Traffic Operations Analysis

An analysis was performed to assess the operating conditions and determine the level of service (LOS) provided by the facilities. The existing and future volumes used in the operations analysis are derived from the forecasting effort and are shown in Exhibits 3 through 8. The existing year uses a combination of WYDOT volumes collected in 2018 (interstates and ramps) and 2019 (intersection turning movement volumes). The future analysis year of 2040 aligns with the current MPO travel demand model's horizon year. Existing and future No Build roadway geometry, lane configurations, gore points, and posted speed limits were determined from Google Earth imagery. Future conditions were obtained from design files and parameters established during the conduct of this Environmental Assessment and preliminary design effort.

Once the updated Cheyenne Model is approved and year 2045 volumes forecasted, a traffic operations analysis will be conducted with the 2045 Build forecast volumes and documented in a separate technical memorandum. The same traffic operations analysis methodology as discussed in this chapter will be followed to project peak hour operations for the proposed Build configuration with the 2045 Build volumes.

3.1: Methodology

The existing and future traffic operations were analyzed with Highway Capacity Software (HCS) and Synchro Studio (Synchro) programs. HCS defines the following four types of segments used in the freeway analysis:

- Basic Freeway: Segments that do not have traffic streams entering or exiting the freeway.
- Freeway Merge: Segments with two traffic streams that combine to form a single traffic stream.
- Freeway Diverge: Segments where a single traffic stream divides to form two traffic streams.
- Freeway Weaving: Segments with two traffic streams traveling in the same direction with crossing paths, typically when a diverge segment closely follows a merge segment.

After selecting the appropriate freeway segment type, the following operational inputs are coded into HCS:

- Geometric data: Number of lanes, percent grade, lane width, free flow speed, ramp density, right-side clearance, and freeway segment length
- Demand data: Freeway mainline volume, merge/diverge volume, peak hour factor, and truck percentages
- Adjustment factors: Weather type and percent of familiar drivers

Based on *Highway Capacity Manual* (HCM) methodology (TRB 2016), HCS uses these inputs to calculate the following performance measures:

- Freeway density in passenger cars per mile per lane (pc/mi/ln)
- Average freeway segment speed
- Freeway segment LOS

LOS is a quantitative measure based on segment density. LOS is measured from A to F, with A as the best and F as the worst operating condition. The segment LOS is determined based on freeway segment type (i.e., basic, merge, diverge, and weaving) and thresholds of segment density. If a freeway segment's demand volume exceeds capacity, the segment LOS is automatically assigned as LOS F. WYDOT has defined LOS C as the threshold of acceptable LOS for both existing and future conditions on freeway segments.

Synchro was used to analyze the capacity of signalized and unsignalized intersections within the study area. The following operational inputs are coded into Synchro:

- Geometric data: Number of lanes, intersection channelization (left turn, through, or right turn), lane width, free flow speed, turn pocket storage length, percent grade, and right turn on red restrictions
- Demand data: Hourly traffic volumes by movement (left turn, through, right turn), truck percentages, and peak hour factors
- Intersection control data (unsignalized): Stop-sign control by approach
- Intersection control data (signalized): Left-turn phasing (protected, permissive, protected/permissive), cycle length, green/yellow/all-red times, and pedestrian walk and flashing don't walk times

Based on HCM methodology, Synchro uses these inputs to calculate the performance measures of average vehicle delay and intersection LOS. For signalized intersections, Synchro calculates delay associated with the assumed signal timing plan and provides an overall intersection delay and LOS. For unsignalized intersections, Synchro calculates the delay based on the ability of drivers on the stop-controlled approach to find a gap in the conflicting traffic stream. Rather than reporting an overall intersection delay, unsignalized intersections report the movement with the highest delay and the corresponding LOS. WYDOT has defined LOS D as the threshold of acceptable LOS for both existing and future conditions on freeway interchange crossroads and intersections. Table 2 presents LOS criteria for the different analysis elements.

Table 2. Level of Service Thresholds

Freeway Density (passenger cars/mile/lane)	LOS	Average Vehicle Delay (seconds/vehicle)	LOS
HCS		***Synchro***	
LOS Thresholds – Basic Segments		***LOS Thresholds – Unsignalized Intersections***	
≤ 11	A	≤ 10	A
> 11 – 18	B	> 10 – 15	B
>18 – 26	C	> 15 – 25	C
>26 – 35	D	> 25 – 35	D
>35 – 45	E	> 35 – 50	E
> 45 or v/c > 1.0	F	> 50	F
LOS Thresholds – Weaving Segments		***LOS Thresholds – Signalized Intersections***	
≤ 10	A	≤ 10	A
> 10 – 20	B	> 10 – 20	B

Table 2. Level of Service Thresholds

Freeway Density (passenger cars/mile/lane)	LOS	Average Vehicle Delay (seconds/vehicle)	LOS
> 20 – 28	C	> 20 – 35	C
> 28 – 35	D	> 35 – 55	D
> 35 – 43	E	> 55 – 80	E
> 43 or v/c > 1.0	F	> 80	F
LOS Thresholds – Merge/Diverge Segments			
≤ 10	A		
> 10 – 20	B		
> 20 – 28	C		
> 28 – 35	D		
> 35	E		
v/c > 1.0	F		

> = greater than
< = less than
≤ = less than or equal to
v/c = volume/capacity ratio

The traffic operations analysis study area focuses on the system interchange between I-25 and I-80 and the service interchange between I-25 and Lincolnway. Freeway segments on I-25 were analyzed from Lincolnway on the north to just south of the I-80 interchange. Freeway segments on I-80 were analyzed from Lincolnway on the west to just east of the I-25 interchange.

The following intersections were analyzed for the existing and future No Build Alternatives:

1. Lincolnway and EB I-80 ramps
2. Lincolnway and WB I-80 ramps
3. Lincolnway and SB I-25 ramps
4. Lincolnway and NB I-25 ramps

The proposed diamond configuration for the I-25 and Lincolnway service interchange in the Build Alternative relocates the ramp terminal intersections with Lincolnway to a new road (New Road) that connects the interchange with Lincolnway. The following intersections were analyzed for the future Build Alternative:

1. Lincolnway and EB I-80 off-ramp
2. Lincolnway and WB I-80 ramps
3. New Road and SB I-25 ramps
4. New Road and NB I-25 ramps
5. New Road and Lincolnway

3.2: Existing Traffic Operations

This section presents the results of the existing traffic operations analysis. These results reflect a combination of data collected in years 2018 and 2019.

Intersection Operations

Table 3 shows the existing intersection LOS and delay results from Synchro for the a.m. and p.m. peak hours with the existing roadway network. All existing intersections are one-way stop controlled (OWSC), so the reported delay and LOS are for the worst-operating movement (typically the left turn from the stop-controlled side street). The average delay at each intersection for the worst movement is generally the same between the two peak hours, with the one exception being an additional 3 seconds of average delay in the evening as compared to the morning peak hour at the Lincolnway intersection with the NB I-25 ramps. Although the turning movement volumes from the NB off ramp are similar between these two peak hours, the bi-directional volume on Lincolnway nearly doubles in the evening as compared to the morning. This additional volume reduces the available turning gaps, resulting in additional delay in the p.m. peak hour. Overall, all study area intersections provide LOS A or B operating conditions with minimal average delay per vehicle. Therefore, all intersections meet the LOS threshold for acceptable operations in the peak hours. Exhibit 9 graphically depicts the LOS for both peak hours and the stop-controlled movement at the intersections with black text. Appendix A contains the Synchro output reports.

Table 3. Existing Intersection Delay, Level of Service Summary

Intersection Name	Traffic Control	Existing					
		a.m. Peak Hour			p.m. Peak Hour		
		LOS	Delay (Sec/Veh)	v/c	LOS	Delay (Sec/Veh)	v/c
W Lincolnway and EB I-80 Off-Ramp	OWSC	A	9.1	0.03	B	10.1	0.10
W Lincolnway and WB I-80 Ramps	OWSC	A	9.3	0.02	A	9.4	0.01
W Lincolnway and SB I-25 Ramps	OWSC	B	10.1	0.08	B	11.0	0.14
W Lincolnway and NB I-25 Ramps	OWSC	B	11.2	0.16	B	14.3	0.22

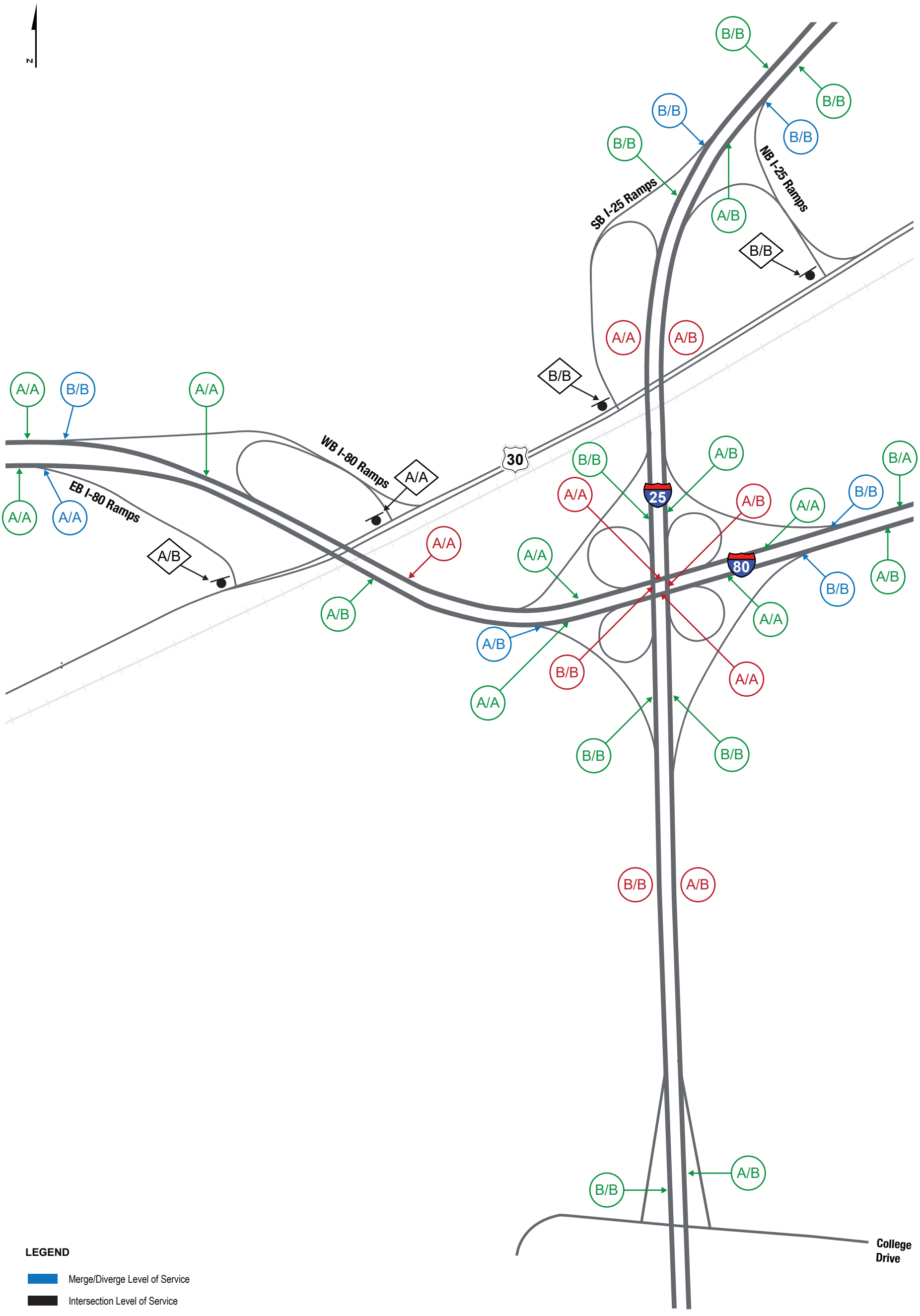
Notes:

Shaded cells indicate intersections operating at LOS E or F.

Signalized and stop-controlled intersections were analyzed in Synchro, version 10. Synchro results are based on HCM 2010 methodology (TRB 2016).

v/c is reported for the worst movement at stop-controlled intersections.

Sec/Veh = second(s) per vehicle



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- Merge/Diverge Level of Service
- Intersection Level of Service
- Weave Level of Service
- Mainline Level of Service
- Signalized Intersection
- Stop-Controlled Movement, Unsignalized Intersection
- X/X AM/PM Level of Service
- X/X AM/PM Intersection Level of Service

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Exhibit 9. Existing Level of Service
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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Freeway Operations

Table 4 shows the existing I-25 and I-80 freeway average densities, average speeds, and corresponding LOS by segment for the existing roadway network as reported from HCS. The table stratifies the freeway facility into basic, weaving, merge, and diverge segments by direction, and reports the LOS for each segment. The LOS entries are color coded, with green indicating LOS D or better; yellow, LOS E; and red, LOS F. The lower volumes in the a.m. correspond to lower densities and higher speeds than are experienced in the p.m. peak hour. All segments operate at LOS A or B throughout the study area in both existing a.m. and p.m. peak hours. Average mainline speeds in both directions are 53 miles per hour (mph) or greater on I-25 and 54 mph or greater on I-80.

Exhibit 9 graphically depicts the LOS results in Table 4, with green representing basic segments; blue, merge and diverge segments; and red, weaving segments. The segments in both peak hours operate with low densities and correspondingly high speeds, providing acceptable operating conditions that are above the LOS C threshold. These results suggest travel in both directions typically operates with minimal to no congestion in the a.m. and p.m. peak hours through the study area. Appendix A contains the HCS output reports.

Table 4. Existing Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	Existing							
				a.m. Peak Hour				p.m. Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-25	NB	Mainline Begins – South of College Drive On-Ramp	Basic	715	53	10	A	1140	53	17	B
		On-Ramp from College Drive to Off-Ramp to I-80 EB	Weaving	1040	58	9	A	1505	56	13	B
		Between I-80 EB Off-Ramp and On-Ramp	Basic	765	53	12	B	1195	53	18	B
		On-Ramp from I-80 EB to Off-Ramp to I-80 WB	Weaving	860	58	8	A	1290	57	12	B
		Between I-80 WB Off-Ramp and On-Ramp	Basic	620	55	9	A	1045	55	15	B
		On-Ramp from I-80 WB to Off-Ramp to Lincolnway	Weaving	1125	58	8	A	1445	58	11	B
		Between Lincolnway Off-Ramp and Lincolnway On-Ramp	Basic	1010	65	10	A	1325	65	15	B
		On-Ramp from Lincolnway	Merge	1110	58	16	B	1470	57	20	B
		Between On-Ramp Lincolnway and End of Study Area	Basic	1110	61	12	B	1470	61	17	B
	SB	Mainline Begins – North of Lincolnway On-Ramp	Basic	970	58	12	B	1125	58	14	B
		Off-Ramp to Lincolnway	Diverge	970	57	17	B	1125	56	19	B
		Between Lincolnway Off-Ramp and On-Ramp	Basic	895	53	13	B	1020	53	14	B
		Lincolnway On-Ramp to I-80 WB Off-Ramp	Weaving	975	61	8	A	1150	60	9	A
		Between I-80 WB Off-Ramp and On-Ramp	Basic	910	53	13	B	1055	53	15	B
		I-80 WB On-Ramp to I-80 EB Off-Ramp	Weaving	1170	56	10	B	1370	54	12	B
		Between I-80 EB Off-Ramp and On-Ramp	Basic	965	55	13	B	1100	55	15	B
		I-80 EB On-Ramp to College Drive Off-Ramp	Weaving	1160	58	10	B	1345	57	12	B
		Between College Drive Off-Ramp and End of Study Area	Basic	900	59	12	B	1005	59	13	B
I-80	EB	Mainline Begins – West of Lincolnway Off-Ramp	Basic	540	67	4	A	1065	67	8	A
		Off-Ramp to Lincolnway	Diverge	540	75	4	A	1065	75	7	A
		Between Lincolnway Off-Ramp and I-25 SB Off-Ramp	Basic	510	65	6	A	995	65	12	B
		Off-Ramp to I-25 SB	Diverge	510	66	9	A	995	66	16	B
		Between I-25 SB Off-Ramp and On-Ramp	Basic	315	65	4	A	750	65	9	A
		I-25 SB On-Ramp to I-25 NB Off-Ramp	Weaving	520	64	4	A	1020	65	7	A
		Between I-25 NB Off-Ramp and On-Ramp	Basic	425	69	5	A	925	69	10	A
		On-Ramp from I-25 NB	Merge	700	65	12	B	1235	65	18	B
		Between I-25 NB On-Ramp and End of Study Area	Basic	700	72	7	A	1235	72	13	B

Table 4. Existing Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	Existing							
				a.m. Peak Hour				p.m. Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-80	WB	Mainline Begins – East of I-25 NB Off-Ramp	Basic	1,115	72	12	B	1,035	72	11	A
		Off-Ramp to I-25 NB	Diverge	1,115	61	17	B	1,035	62	16	B
		Between I-25 NB Off-Ramp and On-Ramp	Basic	610	63	7	A	635	63	8	A
		I-25 NB On-Ramp to I-25 SB Off-Ramp	Weaving	850	55	9	A	880	54	9	A
		Between I-25 SB Off-Ramp and On-Ramp	Basic	590	65	7	A	565	65	6	A
		I-25 SB On-Ramp to Lincolnway Off-Ramp	Weaving	655	72	5	A	660	72	5	A
		Between Lincolnway Off-Ramp and On-Ramp	Basic	635	67	7	A	645	67	7	A
		On-Ramp from Lincolnway	Merge	690	65	12	B	700	65	12	B
		Between On-Ramp Lincolnway and End of Study Area	Basic	690	72	7	A	700	72	7	A

vph = vehicles per hour

3.3: Future Traffic Operations

This section presents the results of the traffic operations analysis for the future No Build and Build alternatives.

Intersection Operations

The Synchro files for the existing conditions were the basis for the intersection analysis files created for the future operating conditions. Tables 5 and 6 show the intersection LOS and average vehicle delay results for a.m. and p.m. peak hours for the No Build and Build Alternatives, respectively. Exhibits 10 and 11 graphically depict the LOS for both peak hours and the stop-controlled movement at the intersections with black text. Appendix B contains the Synchro output reports.

No Build Alternative

Because of the traffic volume growth between the existing and horizon years, the average delay increases and the corresponding LOS decreases by one letter designation for most of the stop-controlled movements in the No Build Alternative. While all turn movements are projected to operate above LOS D standards in the a.m. peak hour, one movement in the p.m. peak hour is projected to drop below the LOS D standard and provide LOS E operating conditions in the p.m. peak hour. The delay for the NB off-ramp left-turn movement to EB Lincolnway is projected to experience 36 seconds of delay per vehicle on average, which is more than double the existing average delay for this movement. However, 36 seconds is at the LOS D/E threshold of 35 seconds of average delay per vehicle, suggesting a minimal drop below the acceptable operating conditions.

Table 5. 2040 No Build Intersection Delay, Level of Service Summary

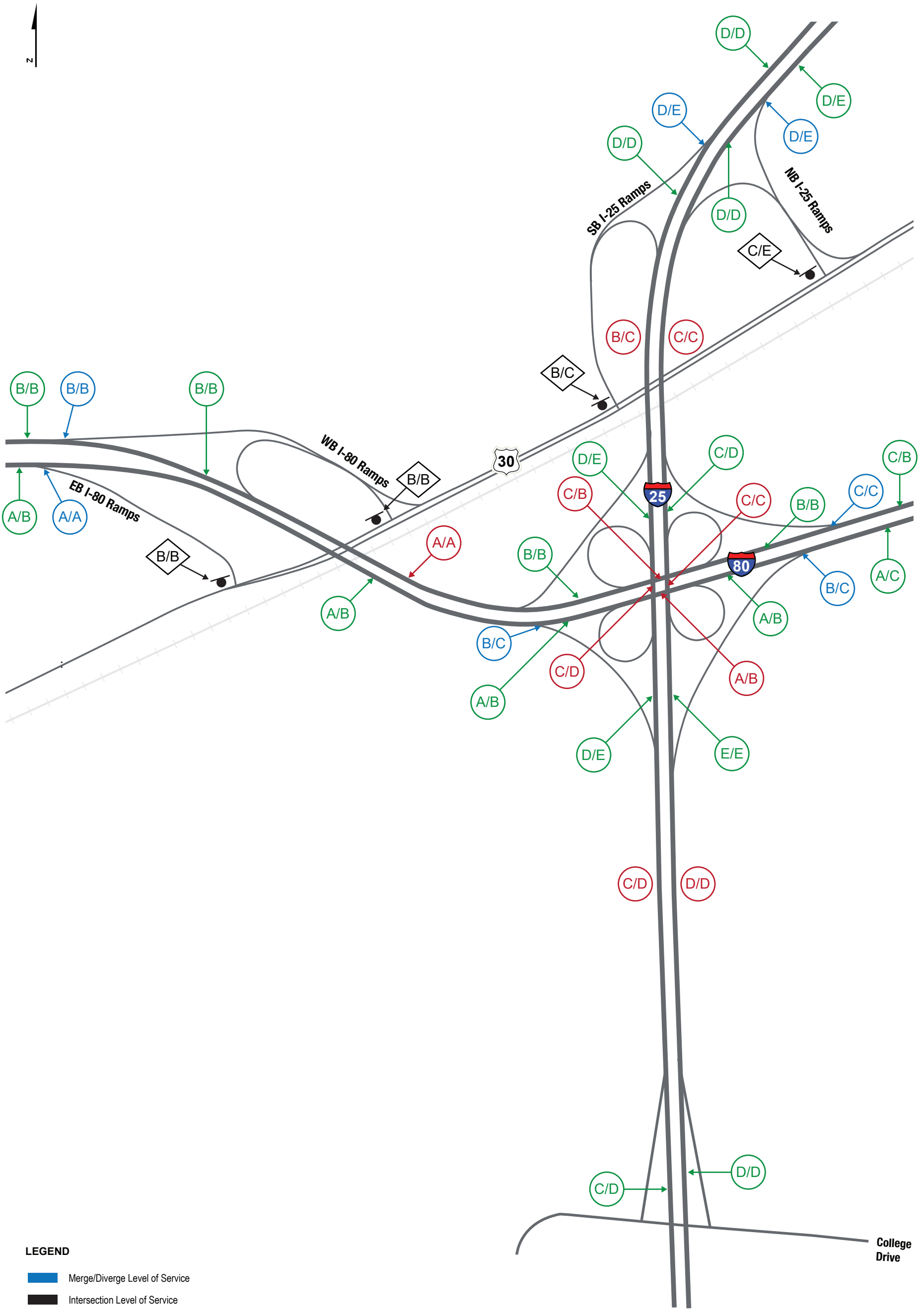
Intersection Name	Traffic Control	2040 No Build					
		a.m. Peak Hour			p.m. Peak Hour		
		LOS	Delay (Sec/Veh)	v/c	LOS	Delay (Sec/Veh)	v/c
W Lincolnway and EB I-80 Off-Ramp	OWSC	B	10.4	0.06	B	12.5	0.16
W Lincolnway and WB I-80 Ramps	OWSC	B	10.2	0.15	B	10.7	0.04
W Lincolnway and SB I-25 Ramps	OWSC	B	11.6	0.14	C	16.1	0.26
W Lincolnway and NB I-25 Ramps	OWSC	C	15.4	0.41	**E**	**36.3**	**0.63**

Notes:

Shaded cells indicate intersections operating at LOS E or F.

Signalized and stop-controlled intersections were analyzed in Synchro, version 10. Synchro results are based on HCM 2010 methodology.

v/c is reported for the worst movement at stop-controlled intersections.



LEGEND

- Merge/Diverge Level of Service
- Intersection Level of Service
- Weave Level of Service
- Mainline Level of Service
- Signalized Intersection
- Stop-Controlled Movement, Unsignalized Intersection
- X/X — AM/PM Level of Service
- X/X — AM/PM Intersection Level of Service

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Exhibit 10. 2040 No Build Level of Service
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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Build Alternative

In the Build Alternative, the two I-25 ramp terminal intersections with Lincolnway are relocated to the diamond interchange and converted to signalized intersections. The existing NB I-25 ramp terminal intersection with Lincolnway is converted to a signalized intersection with the new interchange crossroad. The two I-80 ramp terminal intersections with Lincolnway remain as unsignalized intersections with their existing geometric configurations.

Table 6 shows that every study area intersection is projected to meet LOS standards and generally operate with the same or less delay than the No Build Alternative for both the a.m. and p.m. peak hours. Signalizing the left-turn movement from the interchange to EB Lincolnway improves the LOS and reduces the average delay per vehicle. All intersections in the recommended alternative are projected to provide LOS C or better operating conditions in 2040 in both peak hours.

Table 6. 2040 Build Intersection Delay, Level of Service Summary

Intersection Name	Traffic Control	2040 Build					
		a.m. Peak Hour			p.m. Peak Hour		
		LOS	Delay (Sec/Veh)	V/C	LOS	Delay (Sec/Veh)	V/C
W Lincolnway and EB I-80 Off-Ramp	OWSC	B	10.3	0.07	B	12.4	0.08
W Lincolnway and WB I-80 Ramps	OWSC	B	10.6	0.07	B	13.1	0.17
New Road and SB I-25 Ramps	Signal	B	10.1	-	B	14.8	-
New Road and NB I-25 Ramps	Signal	A	8.9	-	B	10.4	-
New Road and W Lincolnway	Signal	B	14.5	-	C	25.1	-

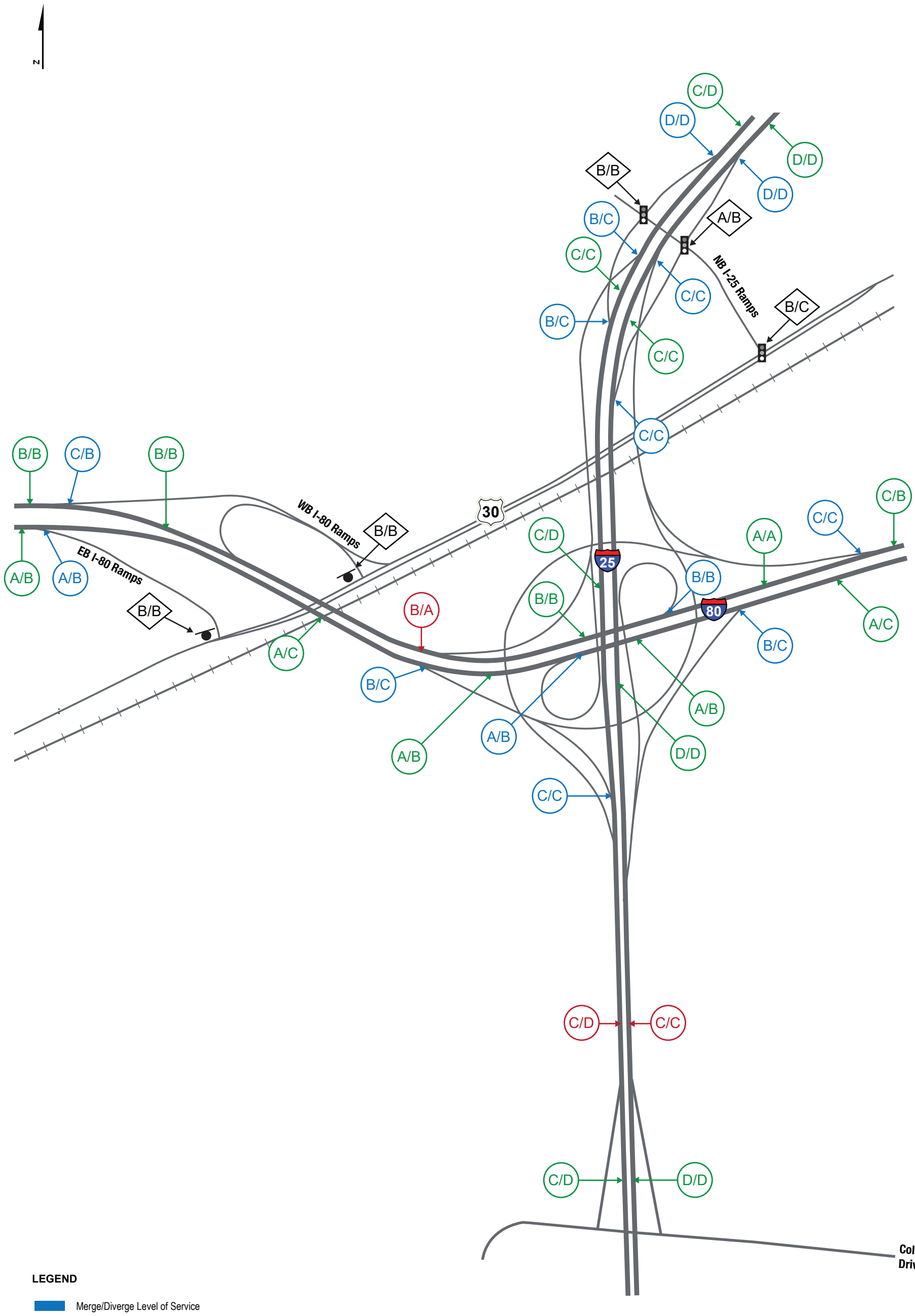
Notes:

Shaded cells indicate intersections operating at LOS E or F.

Signalized and stop-controlled intersections are analyzed in Synchro, version 10. Synchro results are based on HCM 2010 methodology.

v/c is reported for the worst movement at stop-controlled intersections. v/c ratios for signalized intersections are not available in the HCM 2010 methodology and therefore Synchro does not calculate or report this value.

The recommended alternative as presented in the feasibility study included signal control for the three New Road intersections. This traffic operations analysis also considered the potential LOS if these intersections were operated with stop control for the ramps at the interchange intersections and for the New Road at the Lincolnway intersection. Although the LOS would be lower and the average vehicular delay slightly higher for the turn movements with stop-control, the ramp terminal intersections would meet LOS standards in the 2040 peak hours. The SB I-25 Ramps intersection is projected to operate at LOS C in the a.m. and LOS D in the p.m. peak hour whereas the NB I-25 Ramps intersection is projected to operate at LOS B in the a.m. and LOS C in the p.m. peak hour. However, the intersection of New Road and W Lincolnway would not meet LOS standards with one-way stop control because the intersection is projected to operate at LOS E in the a.m. and LOS F in the p.m. peak hour. Without signal control, the left-turn from New Road to EB Lincolnway degrades to LOS F from the LOS E projected for the No Build Alternative. These results suggest stop-control could be installed when the project is opened and upgraded to signal control in the future when warranted by increasing delay.



LEGEND

- Merge/Diverge Level of Service
- Intersection Level of Service
- Weave Level of Service
- Mainline Level of Service
- Signalized Intersection
- Stop-Controlled Movement, Unsignalized Intersection
- X/X AM/PM Level of Service
- X/X AM/PM Intersection Level of Service

BI0828190859DEN

Exhibit 11. 2040 Build Level of Service
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

JACOBS®

Freeway Operations

The HCS files for the existing conditions were the basis for the freeway analysis files created for the future operating conditions. Tables 7 and 8 show the future freeway average densities, average speeds, and corresponding LOS by segment for the existing (No Build) and proposed (Build) roadway networks as reported by HCS. The additional volume travelling on the existing roadway configuration in the No Build Alternative causes the average speeds and densities to decrease as compared to the existing condition in both peak hours. Several basic and merge segments drop below acceptable operating conditions and provide LOS E in the No Build Alternative.

The improvements proposed by the recommended alternative are projected to improve future traffic operations on both interstates as compared to the No Build Alternative. Advantages of this alternative include eliminating the closely spaced weaving segments at the existing cloverleaf interchange by replacing two loop ramps with free-flowing, high-speed directional ramps and improving the design of the existing directional ramps to permit higher speed merge and diverge movements with the mainline. Loop ramps will be re-constructed with higher design speeds for the SB I-25 to EB I-80 and NB I-25 to WB I-80 ramps. Additional benefits include braiding ramps between the I-80 system interchange and the Lincolnway service interchange, eliminating another existing weaving segment.

Although consideration has been given to providing three lanes per direction for the ultimate configuration, the opening day configuration will provide two lanes per direction for both interstates. This analysis uses the two-lane configuration for the horizon year of 2040 because the projected date for the third-lane expansion is unknown at this time. If the third lanes are open sooner, the two-lane analysis represents a worst-case scenario of the operations for the horizon year volumes.

Exhibits 10 and 11 graphically depict the LOS results in Tables 7 and 8, with green representing basic segments; blue, merge and diverge segments; and red, weaving segments. Appendix C contains the HCS output reports.

No Build Alternative

Table 7 shows that most segments will operate at or above the LOS D threshold in the a.m. peak hour, with average speeds of 49 mph or greater. However, the basic segment of NB I-25 between the I-80 EB off-ramp and on-ramp will operate at LOS E, with a projected density of 36 pc/mi/ln, just above the LOS D/E threshold. The I-80 freeway segments are projected to operate similarly to existing conditions with slightly higher densities and lower speeds due to traffic growth. All segments are projected to operate at LOS C or better in both directions, with average speeds of 47 mph or greater in the a.m. peak hour.

In the p.m. peak hour, most segments on I-25 will operate at or above the LOS D threshold, with average speeds of 47 mph or greater with the existing roadway network configuration. However, six basic, merge, and diverge segments are projected to provide LOS E operating conditions in the No Build p.m. peak hour, as compared to none in the existing condition. The NB and SB directions of I-25 each have three segments projected to operate at LOS E in 2040. These segments will likely experience congestion due to the proximity of the I-80 and Lincolnway interchanges. The I-80 freeway segments are projected to operate similarly to existing with slightly higher densities and

lower speeds due to traffic growth. In both directions, all I-80 segments are projected to operate at LOS D or better in the p.m. peak hour, with average speeds of 48 mph or greater.

Build Alternative

Table 8 shows that all freeway segments in both directions of I-25 are projected to operate at LOS D or better in the a.m. peak hour. Therefore, approximately one-third of the segments would operate below the LOS C standard. The NB segment of I-25 between the I-80 EB off- and on-ramps that would operate at LOS E in the No Build Alternative is projected to operate at LOS D in the Build Alternative. The operational improvement results from consolidation of two separate off-ramps to I-80 into one off-ramp from the NB I-25 mainline, which provides more capacity for mainline through volume. Along I-80, all freeway segments are projected to perform the same or better than No Build in the a.m. peak hour and provide LOS C or better operating conditions, with average speeds of 60 mph or higher. The improved operations result from elimination of the existing short weaving sections at the I-25 system interchange and provision of free-flowing, high-speed ramps to I-25 in both directions.

In the p.m. peak hour, the Build Alternative would provide better operations than No Build and improve the operations along the six segments from LOS E to LOS D. Although all the I-25 freeway segments are projected to operate at or above LOS D, nearly half of them are projected to operate below the LOS C standard in the p.m. peak hour. Along I-80, speeds are projected to increase and density decrease in the p.m. peak hour in the Build Alternative. With projected operating conditions of LOS C or better and average speeds of 60 mph or higher, all I-80 freeway segments would perform better than No Build in the p.m. peak hour.

While project elements of the Build Alternative aim to eliminate existing freeway weaving sections, two segments will remain: the I-25 NB and SB weave segments between the I-80 and College Drive interchanges. The weaving segments are projected to operate at LOS C or better in both peak hours in the Build Alternative. The provision of auxiliary lanes and adequate lane changing distance allow these weaving segments to meet LOS standards in the 2040 Build Alternative.

Table 7. 2040 No Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2040 No Build							
				a.m. Peak Hour				p.m. Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-25	NB	Mainline Begins – South of College Drive On-Ramp	Basic	1,935	53	28	D	2,195	53	32	D
		On-Ramp from College Drive to Off-Ramp to I-80 EB	Weaving	2,855	49	29	D	3,190	47	33	D
		Between I-80 EB Off-Ramp and On-Ramp	Basic	2,420	53	36	E	2,590	52	39	E
		On-Ramp from I-80 EB to Off-Ramp to I-80 WB	Weaving	2,525	51	25	C	2,730	52	27	C
		Between I-80 WB Off-Ramp and On-Ramp	Basic	2,045	65	24	C	2,315	55	33	D
		On-Ramp from I-80 WB to Off-Ramp to Lincolnway	Weaving	2,605	53	22	C	2,775	54	23	C
		Between Lincolnway Off-Ramp and Lincolnway On-Ramp	Basic	2,330	64	27	D	2,570	61	32	D
		On-Ramp from Lincolnway	Merge	2,460	55	32	D	2,760	53	35	E
		Between On-Ramp Lincolnway and End of Study Area	Basic	2,460	60	30	D	2,760	57	36	E
	SB	Mainline Begins – North of Lincolnway On-Ramp	Basic	2,070	58	27	D	2,500	57	33	D
		Off-Ramp to Lincolnway	Diverge	2,070	56	32	D	2,500	56	37	E
		Between Lincolnway Off-Ramp and On-Ramp	Basic	1,945	53	28	D	2,360	53	34	D
		Lincolnway On-Ramp to I-80 WB Off-Ramp	Weaving	2,065	57	18	B	2,660	54	24	C
		Between I-80 WB Off-Ramp and On-Ramp	Basic	1,940	53	28	D	2,525	53	36	E
		I-80 WB On-Ramp to I-80 EB Off-Ramp	Weaving	2,470	50	24	C	3,055	48	31	D
		Between I-80 EB Off-Ramp and On-Ramp	Basic	2,225	55	31	D	2,690	54	38	E
		I-80 EB On-Ramp to College Drive Off-Ramp	Weaving	2,480	50	25	C	3,115	49	31	D
		Between College Drive Off-Ramp and End of Study Area	Basic	1,680	59	22	C	2,175	59	28	D
I-80	EB	Mainline Begins – West of Lincolnway Off-Ramp	Basic	660	67	5	A	1,545	67	12	B
		Off-Ramp to Lincolnway	Diverge	660	75	5	A	1,545	75	11	A
		Between Lincolnway Off-Ramp and I-25 SB Off-Ramp	Basic	625	65	7	A	1,460	65	17	B
		Off-Ramp to I-25 SB	Diverge	625	66	11	B	1,460	65	22	C
		Between I-25 SB Off-Ramp and On-Ramp	Basic	370	65	4	A	1,035	65	12	B
		I-25 SB On-Ramp to I-25 NB Off-Ramp	Weaving	615	62	4	A	1,400	62	11	B
		Between I-25 NB Off-Ramp and On-Ramp	Basic	510	69	6	A	1,260	69	14	B
		On-Ramp from I-25 NB	Merge	945	65	14	B	1,860	64	25	C
		Between I-25 NB On-Ramp and End of Study Area	Basic	945	72	10	A	1,860	71	20	C

Table 7. 2040 No Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2040 No Build							
				a.m. Peak Hour				p.m. Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-80	WB	Mainline Begins – East of I-25 NB Off-Ramp	Basic	1,850	71	20	C	1,590	72	17	B
		Off-Ramp to I-25 NB	Diverge	1,850	61	26	C	1,590	61	23	C
		Between I-25 NB Off-Ramp and On-Ramp	Basic	1,290	63	16	B	1,130	63	14	B
		I-25 NB On-Ramp to I-25 SB Off-Ramp	Weaving	1,770	47	21	C	1,545	48	18	B
		Between I-25 SB Off-Ramp and On-Ramp	Basic	1,240	65	14	B	1,015	65	12	B
		I-25 SB On-Ramp to Lincolnway Off-Ramp	Weaving	1,365	69	9	A	1,150	70	8	A
		Between Lincolnway Off-Ramp and On-Ramp	Basic	1,235	67	14	B	1,070	67	12	B
		On-Ramp from Lincolnway	Merge	1,330	64	20	B	1,165	65	18	B
		Between On-Ramp Lincolnway and End of Study Area	Basic	1,330	72	14	B	1,165	72	12	B

Table 8. 2040 Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2040 Build							
				a.m. Peak Hour				p.m. Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-25	NB	Mainline Begins – South of College Drive On-Ramp	Basic	1,930	53	28	D	2,150	53	31	D
		College Drive On-Ramp to I-80 EB/WB Off-Ramp	Weaving	2,845	52	27	C	2,930	53	27	C
		Between I-80 EB/WB Off-Ramp and Lincolnway Off-Ramp	Basic	1,995	53	29	D	1,990	53	30	D
		Off-Ramp to Lincolnway	Diverge	1,995	54	23	C	1,990	55	24	C
		Between Lincolnway Off-Ramp and I-80 EB/WB On-Ramp	Basic	1,625	55	24	C	1,750	55	26	C
		On-Ramp from I-80 EB/WB	Merge	2,255	57	24	C	2,300	57	26	C
		On-Ramp from Lincolnway	Merge	2,385	56	28	D	2,725	54	32	D
		Between Lincolnway On-Ramp and End of Study Area	Basic	2,385	62	27	D	2,725	59	34	D
	SB	Mainline Begins – North of Lincolnway On-Ramp	Basic	2,060	58	25	C	2,345	58	31	D
		Off-Ramp to Lincolnway	Diverge	2,060	56	30	D	2,345	56	34	D
		Off-Ramp to I-80 EB/WB	Diverge	1,795	54	19	B	2,190	54	26	C
		Between I-80 EB/WB Off-Ramp and Lincolnway On-Ramp	Basic	1,435	58	19	C	1,785	58	25	C
		On-Ramp from Lincolnway	Merge	1,550	58	19	B	2,130	57	25	C
		Between On-Ramp from Lincolnway and On-Ramp from I-80 EB	Basic	1,550	62	20	C	2,130	62	27	D
		On-Ramp from I-80 EB	Merge	1,810	65	13	B	2,600	65	17	B
		I-80 WB On-Ramp to College Drive Off-Ramp	Weaving	2,255	53	16	B	3,090	49	23	C
		Between College Drive Off-Ramp and End of Study Area	Basic	1,675	62	21	C	2,245	61	28	D
I-80	EB	Mainline Begins – West of Lincolnway Off-Ramp	Basic	745	67	6	A	1,785	67	14	B
		Off-Ramp to Lincolnway	Diverge	745	75	5	A	1,785	75	12	B
		Between Off-Ramp to Lincolnway and Off-Ramp to I-25 NB/SB	Basic	695	65	8	A	1,750	65	21	C

Table 8. 2040 Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2040 Build							
				a.m. Peak Hour				p.m. Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
		Off-Ramp to I-25 NB/SB	Diverge	695	66	12	B	1,750	65	25	C
		Between Off-Ramp to I-25 NB/SB and On-Ramp from I-25 SB	Basic	335	65	4	A	1,160	65	14	B
		On-Ramp from I-25 SB	Merge	530	65	8	A	1,395	65	18	B
		Between On-Ramp from I-25 SB and On-Ramp from I-25 NB	Basic	530	69	6	A	1,395	69	15	B
		On-Ramp from I-25 NB	Merge	965	65	15	B	1,965	63	26	C
		Between On-Ramp from I-25 NB and End of Study Area	Basic	965	72	10	A	1,965	70	21	C
	WB	Mainline Begins – East of I-25 NB Off-Ramp	Basic	1,880	71	20	C	1,625	72	17	B
		Off-Ramp to I-25 NB/SB	Diverge	1,880	60	27	C	1,625	60	23	C
		Between I-25 NB/SB Off-Ramp and I-25 NB On-Ramp	Basic	905	63	11	A	705	63	9	A
		On-Ramp from I-25 NB	Merge	1,320	75	6	A	1,075	75	5	A
		On-Ramp from I-25 SB	Merge	1,485	69	12	B	1,245	69	9	A
		Off-Ramp to Lincolnway	Diverge	1,485	66	12	B	1,245	66	9	A
		Between Lincolnway Off-Ramp and On-Ramp from Lincolnway (3 Lanes)	Basic	1,390	67	10	A	1,150	67	9	A
		Between Lincolnway Off-Ramp and On-Ramp from Lincolnway (2 Lanes)	Basic	1,390	67	16	B	1,150	67	13	B
		On-Ramp from Lincolnway	Merge	1,445	64	21	C	1,180	65	18	B
		Between On-Ramp Lincolnway and End of Study Area	Basic	1,445	72	15	B	1,180	72	12	B

3.4: Traffic Volume Sensitivity Analysis

A sensitivity analysis was conducted to estimate how much additional traffic volume growth the freeway segments can accommodate before reaching oversaturated, LOS F operating conditions. Because the forecast volumes are based on the growth assumptions in the current travel demand model, this analysis provides a measure of how much flexibility the proposed alternative would have to accommodate additional volume should the development and growth patterns change in a manner that differs from the model assumptions. This sensitivity analysis also provides an estimate of the additional capacity the Build Alternative with the recommended alternative would provide compared to the No Build Alternative with the existing roadway network.

The sensitivity analysis followed the same methodology to project freeway segment density, average speed, and corresponding LOS for volume scenarios that were developed by growing the a.m. and p.m. peak hour volumes in 10 percent increments. Table 9 summarizes the results of this analysis. The table shows the mainline entry volume, or the volume per direction at each limit of the study area, that represents the percentage growth over the 2040 forecast volume that would result in a failing segment somewhere along that direction of travel. The table lists these failing segments. In summary, reconstructing the proposed interchange with four mainline lanes on each interstate would result in I-25 reaching LOS F peak hour operating conditions in 2050 (which is 10 years beyond the 2040 forecast year), and I-80 in 2078 (which is 38 years beyond the 2040 forecast year). Compared to the No Build (existing) configuration, the interim four-lane interchange provides an additional 5 years for I-25 and 10 years for I-80 before LOS F operating conditions would be reached during peak hours. Appendix D contains the HCS output reports.

Table 9. Sensitivity Analysis Summary

Facility	Direction	Peak Hour	No Build			Build		
			% Growth	Mainline Entry Volume (veh/hr)	Failing Segments (LOS F)	% Growth	Mainline Entry Volume (veh/hr)	Failing Segments (LOS F)
I-25	NB	a.m.	20%	2,320	• Basic – Between I-80 EB Off-Ramp and On-Ramp	40%	2,700	• Weaving – College Drive On-Ramp to I-80 EB/WB Off-Ramp • Basic – Between Lincolnway On-Ramp and End of Study Area
I-25	SB	a.m.	40%	2,900	• Basic – Mainline Begins – North of Lincolnway On-Ramp • Diverge – Off-Ramp to Lincolnway • Basic – Between Lincolnway Off-Ramp and On-Ramp • Weaving – Lincolnway On-Ramp to I-80 WB Off-Ramp • Basic – Between I-80 WB Off-Ramp and On-Ramp • Weaving – I-80 WB On-Ramp to I-80 EB Off-Ramp • Basic – Between I-80 EB Off-Ramp and On-Ramp	60%	3,295	• Basic – Mainline Begins – North of Lincolnway On-Ramp
I-80	EB	a.m.	230%	2,210	• Basic – Between I-25 NB On-Ramp and End of Study Area	230%	2,460	• Basic – Between On-Ramp from I-25 NB and End of Study Area
I-80	WB	a.m.	50%	2,775	• Weaving – I-25 NB On-Ramp to I-25 SB Off-Ramp	70%	3,195	• Basic – Mainline Begins – East of I-25 NB Off-Ramp • Diverge – Off-Ramp to I-25 NB/SB
I-25	NB	p.m.	10%	2,415	• Basic – Between I-80 EB Off-Ramp and On-Ramp	20%	2,580	• Merge – On-Ramp from Lincolnway • Basic – Between Lincolnway On-Ramp and End of Study Area

Table 9. Sensitivity Analysis Summary

Facility	Direction	Peak Hour	No Build			Build		
			% Growth	Mainline Entry Volume (veh/hr)	Failing Segments (LOS F)	% Growth	Mainline Entry Volume (veh/hr)	Failing Segments (LOS F)
I-25	SB	p.m.	20%	3,000	• Basic – Mainline Begins – North of Lincolnway On-Ramp • Diverge – Off-Ramp to Lincolnway • Basic – Between Lincolnway Off-Ramp and On-Ramp • Weaving – Lincolnway On-Ramp to I-80 WB Off-Ramp. • Basic – Between I-80 WB Off-Ramp and On-Ramp • Weaving – I-80 WB On-Ramp to I-80 EB Off-Ramp • Basic – Between I-80 EB Off-Ramp and On-Ramp	30%	3,050	• Basic – Mainline Begins – North of Lincolnway On-Ramp • Diverge – Off-Ramp to Lincolnway • Diverge – Off-Ramp to I-80 EB/WB • Basic – Between I-80 EB/WB Off-Ramp and Lincolnway On-Ramp • Merge – On-Ramp from Lincolnway • Basic – Between On-Ramp from Lincolnway and On-Ramp from I-80 EB • Merge – On-Ramp from I-80 EB • Weaving – I-80 WB On-Ramp to College Drive Off-Ramp
I-80	EB	p.m.	70%	2,625	• Basic – Between I-25 NB On-Ramp and End of Study Area	70%	3,015	• Merge – On-Ramp from I-25 NB • Basic – Between On-Ramp from I-25 NB and End of Study Area
I-80	WB	p.m.	60%	2,545	• Weaving – I-25 NB On-Ramp to I-25 SB Off-Ramp	100%	3,250	• Basic – Mainline Begins – East of I-25 NB Off-Ramp • Diverge – Off-Ramp to I-25 NB/SB

veh/hr = vehicle(s) per hour

No Build a.m. Peak Hour

The No Build analysis shows that all I-80 segments and all but one I-25 segment (the basic NB segment between the EB I-80 off- and on-ramps; see Table 7) are projected to meet LOS standards with the forecasted 2040 No Build a.m. peak hour volumes. For I-25 in the NB direction, a 20 percent increase in these volumes is projected to result in LOS F operations for the basic freeway segment between the EB I-80 off- and on-ramps. A 20 percent increase would result in 2,320 vehicles per hour (veh/hr) on NB I-25 entering the study area at the College Drive interchange. The three segments that are north of the diverge to the Lincolnway off-ramp are projected to operate at LOS E in the a.m. peak hour with this additional volume growth of 20 percent. In addition, the weaving segment between College Drive and the off-ramp to EB I-80 is projected to operate at LOS E. All other NB I-25 segments are projected to operate at or above the LOS D threshold with the 20 percent No Build a.m. peak hour volume increase, estimated to occur in year 2047.

For I-25 in the SB direction, a 30 percent increase in the 2040 forecasted No Build a.m. peak hour volume would result in six out of the nine freeway analysis segments operating at LOS E, with the remaining three segments operating at LOS C or D. With a 40 percent increase in volume (2,900 veh/hr entering the study area on I-25 SB just north of the Lincolnway on-ramp) projected to occur in year 2057, all but the two southern-most I-25 NB segments (weaving segment between EB I-80 on-ramp and College Drive off-ramp and basic segment between College Drive off-ramp and end of study area) would operate at LOS F. With a projected average speed of 18 mph, the worst performing segment on SB I-25 with this volume set would be the weaving segment between the Lincolnway on-ramp and the off-ramp to WB I-80.

Even with the projected growth in traffic between existing and 2040, EB I-80 in the a.m. peak hour will have relatively low traffic volumes. As shown in Table 7, all EB I-80 freeway segments would operate at LOS A or B, with average speeds ranging from 62 to 75 mph with the forecast 2040 No Build a.m. peak hour volumes. These volumes would have to grow by 240 percent, the equivalent of 2,210 veh/hr entering the study area west of the off-ramp to Lincolnway, for an EB I-80 freeway segment to exceed capacity and operate at LOS F conditions. This segment would be at the eastern end of the study area, downstream of the merge from the on-ramp from NB I-25. This level of volume growth would occur well beyond the year 2070, which is 30 years beyond the current horizon planning year of 2040.

For I-80 in the WB direction, all freeway segments operate at LOS C or better in the No Build a.m. peak hour. The forecasted No Build a.m. volumes would have to grow by 50 percent for a freeway segment to exceed capacity, which is estimated to occur in year 2068. A 50 percent increase in volume would result in 2,775 veh/hr entering the study area on WB I-80 just east of the off-ramp to NB I-25. The segment exceeding capacity would be the weaving section between the on-ramp from NB I-25 and the off-ramp to SB I-25. This short weaving section between low-speed loop ramps is projected to operate at LOS F, with an average speed of 41 mph, with this volume level.

Build a.m. Peak Hour

The Build Alternative would accommodate more traffic volume in 2040 than the No Build Alternative in the a.m. peak hour. For I-25 in the NB direction, the Build Alternative forecasted volume would have to increase by 40 percent to 2,700 veh/hr to cause two segments to operate at LOS F. One of these segments is projected to be the weaving segment between College Drive and

I-80, which results a volume increase from 2,845 veh/hr to 3,980 veh/hr and a projection for LOS F operating conditions in year 2054. Likewise, the 40 percent entry volume results in a volume increase from 2,385 veh/hr to 2,970 veh/hr for the basic segment north of the Lincolnway on-ramp merge and a projection of LOS F operating conditions. By contrast, the No Build Alternative is projected to have a freeway segment operating at LOS F with just a 20 percent increase in NB freeway volumes (485 veh/hr volume increase over forecast in the a.m. peak hour).

Likewise, the SB I-25 Build Alternative would accommodate more volume than the No Build before reaching an operating condition with at least one LOS F segment in the a.m. peak hour. A 60 percent increase in traffic volume on SB I-25 in year 2065 (3,295 veh/hr entering the study area on the north) is projected to result in the northern-most freeway segment, the basic section between the beginning of the study area to the Lincolnway off-ramp, operating at LOS F. The other SB segments are projected to operate at LOS E with these volume conditions. In contrast, a 40 percent increase, or 2,900 veh/hr entering the study area, in the 2040 No Build volume is projected to result in seven of the nine SB I-25 segments operating at LOS F.

Similar to under No Build Alternatives, 2040 forecasted Build traffic volumes would be relatively low for EB I-80 in the a.m. peak hour. Based on these volumes, all EB I-80 freeway segments are projected to operate at LOS A or B, with average speeds ranging between 65 and 75 mph. The Build a.m. peak hour volumes for EB I-80 would have to grow by 230 percent for a freeway segment to operate overcapacity at LOS F. This segment, which is the same as for the No Build Alternative, would be at the eastern end of the study area downstream of the merge from the on-ramp from NB I-25. This level of volume growth is projected to occur beyond the year 2070. Although No Build volumes would have to grow by the same percentage to reach overcapacity operating conditions, the net result is that the Build a.m. peak hour volume that causes overcapacity operating conditions is 85 veh/hr higher than No Build at the EB I-80 mainline entry point of the study area.

Table 8 shows that all WB I-80 freeway segments are projected to operate at LOS C or better, with average speeds ranging between 60 and 75 mph with the 2040 forecast Build volumes in the a.m. peak hour. These volumes for WB I-80 would have to grow by 70 percent, to 3,195 veh/hr at the mainline entry point for I-80 WB, for a freeway segment to exceed capacity and provide LOS F operating conditions. These segments would be the basic segment at the eastern end of the study area and the diverge to the I-25 NB and SB on-ramps. This level of volume growth is projected to occur beyond the year 2070. The Build Alternative would have more capacity available for volume growth than No Build, which could only accommodate a 50 percent increase (to 2,775 veh/hr at the mainline entry point) above the forecast volumes before a freeway segment would operate at LOS F.

No Build p.m. Peak Hour

Table 7 shows that three segments in each direction of I-25 are projected to operate at LOS E with the future 2040 No Build p.m. peak hour forecast volumes, with all other segments meeting or exceeding the LOS D threshold. In the NB direction of I-25, a volume increase of just ten percent (2,415 veh/hr at the mainline entry point) in year 2045 would result in one segment operating at LOS F (between the EB I-80 off- and on-ramps) and four segments operating at LOS E. The remaining four segments are projected to operate at LOS D with this 10 percent volume increase. A NB I-25 No Build p.m. volume increase of 20 percent, to 2,635 veh/hr at the mainline entry, is projected to increase the number of NB I-25 segments operating at LOS F conditions to four segments.

For the SB I-25 freeway segments, a 10 percent increase in No Build a.m. volume (to 2,750 veh/hr at the mainline entry point) would result in all but three freeway segments operating at LOS E (projected to occur in year 2048). These three segments, (the weaving segment between Lincolnway on-ramp and WB I-80 off-ramp, the weaving segment between the EB I-80 on-ramp and College Drive off-ramp, and the basic segment between College Drive off-ramp and the end of the study area) are projected to operate at LOS C or D. With a 20 percent increase in volume, to 3,000 veh/hr at the mainline entry point, all but two segments would operate at LOS F with average speeds as low as 23 mph. The I-25 SB freeway segments operating at LOS F would stretch from the north at the beginning of the study area through the basic segment between the I-80 EB off- and on-ramps.

Based on the forecast 2040 No Build p.m. peak hour volumes, all the EB I-80 freeway segments are projected to operate at LOS C or better, with average speeds ranging between 62 and 75 mph. No Build p.m. peak hour volumes would have to grow by 70 percent, to 2,625 veh/hr at the mainline entry point west of the Lincolnway off-ramp, before an EB I-80 freeway segment would operate overcapacity and provide LOS F conditions. This basic segment at the eastern end of the study area, downstream of the merge from the on-ramp from NB I-25, is projected to operate at LOS F with an average speed of 57 mph with this volume. This level of volume growth would occur well beyond the year 2070.

All WB I-80 freeway segments are projected to operate at LOS C or better based on the forecast 2040 No Build p.m. peak hour volumes. The forecast volumes would have to grow by 60 percent (2,545 veh/hr at the mainline entry point east of the off-ramp to I-25 NB) to result in a WB I-80 freeway segment exceeding capacity. This segment would be the weaving section between the on-ramp from NB I-25 and the off-ramp to SB I-25. This short weaving section between low-speed loop ramps is projected to operate at LOS F with an average speed of 41 mph. This level of volume growth is projected to occur beyond the year 2070.

Build p.m. Peak Hour

Table 8 shows that all segments in both directions of I-25 are projected to operate at LOS D or better and meet LOS standards with the future Build p.m. peak hour forecast volumes. Increasing the I-25 NB forecast volumes by 20 percent, to 2,580 veh/hr at the mainline entry, is projected to cause the merge from the Lincolnway on-ramp and downstream basic segments to degrade to LOS F operating conditions in year 2050. This is an improvement over No Build because an additional peak hour entry volume of 165 vehicles could be accommodated at the mainline entry prior to reaching LOS F conditions.

In the SB direction of I-25, LOS F operating conditions for most of the segments are projected with a 30 percent increase above the forecast 2040 Build p.m. peak hour, to a volume of 3,050 veh/hr at the mainline entry point north of the on-ramp from Lincolnway in year 2053. This is a slight improvement over No Build because an additional peak hour entry volume of 50 vehicles could be accommodated at the mainline entry prior to reaching LOS F conditions.

Based on the forecast 2040 Build p.m. peak hour volumes, all the EB I-80 freeway segments would operate at LOS C or better with average speeds ranging between 63 to 75 mph (Table 8). Build p.m. peak hour volumes would have to grow by 70 percent, to 3,015 veh/hr at the mainline entry point west of the Lincolnway off-ramp, before segments would exceed capacity and provide LOS F operating conditions, with average speeds of 47 mph and 44 mph, respectively. These two segments

are projected to be the merge area from the NB I-25 on-ramp and the basic segment downstream of this merge area at the eastern end of the study area. This level of volume growth is projected to occur beyond the year 2070. While EB I-80 in the No Build p.m. peak would also require a 70 percent growth in volumes, the forecast volumes for EB I-80 in the Build p.m. peak are approximately 15 percent (240 veh/hr) higher than No Build, which illustrates the additional capacity the Build Alternative provides.

Table 8 shows that all freeway segments in the WB I-80 direction are projected to operate at LOS C or better in the 2040 Build p.m. peak hour. WB I-80 volumes would have to double from 1,625 veh/hr to 3,250 veh/hr at the mainline entry point east of the I-25 interchange to result in a freeway segment exceeding capacity. This doubling of volume is projected to result in LOS F operations for the basic section at the western end of the study area and downstream of the diverge to the NB and SB I-25 on-ramps. This level of volume growth is projected to occur beyond the year 2070. In the No Build p.m. peak hour, WB I-80 can only accommodate up to 2,545 veh/hr at the mainline entry point east of the I-25 interchange before a freeway segment is projected to operate at LOS F.

Chapter 4 Safety Assessment

The safety assessment included a review of the safety segment reports prepared by WYDOT along with an analysis of the crash data to identify patterns and trends. The patterns were compared to the over-represented crash factors stated in the segment reports to assist with the identification of safety strategies that would address the issues and provide the potential to reduce crashes. This safety analysis also recommends strategies to be considered for inclusion in the design to further address identified crash issues and enhance safety for motorists navigating through the study area.

4.1: Crash History Overview

Within this study area, 351 crashes in total were reported between 2014 and 2018, an average of 70 per year. Severe crashes equaled 18 percent of all crashes, which was lower than the national severe crash percentage of 30 percent for 2017 (NHTSA 2017a).

The crash severity distribution was as follows:

- 1 crash resulted in a single fatality
- 63 injury (non-fatal) crashes resulted in 90 injuries
- 287 crashes resulted in property damage only

The proportion of injury to total crashes was approximately 18 percent for both mainline facilities. The one fatal crash occurred on Lincolnway at its intersection with the WB I-80 off-ramp. This angle collision involved passenger vehicles and occurred in dark, lighted conditions with fair weather and road conditions.

Heavy trucks were involved in 17 percent of the total crashes and 14 percent of the injury crashes within the study area. Heavy trucks represented 43 percent of the traffic streams on both I-25 and I-80 in the middle of the study period in 2016, suggesting that crashes involving heavy trucks do not occur as frequently as would be expected on the interstate mainlines (WYDOT 2016). On the I-25 mainline, heavy trucks were involved in 10 percent of the total crashes and 10 percent of the injury crashes. On the I-80 mainline, 24 percent of the total crashes and 18 percent of the injury crashes involved heavy trucks. Therefore, the potential for injury is the same or lower if a heavy truck is involved in a crash on these mainline facilities. On the interchange ramps, heavy trucks were involved in 27 percent of the total crashes and one of the two injury crashes.

Except for the EB I-80 to SB I-25 ramp, the percentage of heavy trucks involved in ramp crashes is greater than their proportion of the traffic stream on the ramps, suggesting that truck-related crashes occur more often than expected on ramps. In general, the proportions of heavy truck-involved crashes were much greater than the national percentages of 4 percent for total crashes and 3 percent for injury crashes (NHTSA 2017b). However, because of the significant freight movement and relatively low passenger-vehicle volumes, the volume of traffic on these facilities includes more heavy trucks than what is typically experienced in other areas. As a result, a somewhat elevated percentage of crashes involving trucks can be expected within this study area.

4.2: Highway Safety Segment Report Summaries

WYDOT produced Highway Safety Segment Reports for I-25, I-80, and Lincolnway based on 5 years of recorded crash data. The reports provide three indices that compare the crash history of a given segment to similar facilities statewide (WYDOT 2019a, 2019b):

- The **Safety Index Score** represents the number of critical crashes (equivalent) per mile per year and is an indication of the number, severity, or both of the crashes that occurred on that segment. A crash is labeled as critical if a fatality or incapacitating injury results from the crash. The equivalent value is a weighted average of the critical crashes that occurred on each subsegment based on the corresponding traffic volume associated with each subsegment.
- The **Safety Index Compare** is the ratio of the segment's Safety Index Score over the statewide average for the same facility type. A ratio lower than 1 suggests that the segment experienced fewer critical crashes than the statewide average, while a ratio greater than 1 suggests the segment experienced more critical crashes than the statewide average.
- The **Safety Index Rating** indicates how a segment's score compares to the statewide distribution for the same facility type:
  - 1: The segment has much fewer crashes and/or less severe crashes than average.
  - 2: The segment has somewhat fewer crashes and/or less severe crashes than average.
  - 3: The segment has somewhat more crashes and/or more severe crashes than average.
  - 4: The segment has many more crashes and/or more severe crashes than average.

Although subsegments within a segment may have varying ratings, the highest Safety Index Rating (1 is lowest, 4 is highest) is applied to the entire segment.

Report Statistics

Table 10 summarizes the statistics from the reports. As these summaries suggest, the recorded crash history on these facilities is greater than expected per the statewide averages. Therefore, there is opportunity to improve safety and reduce the potential for crashes to occur on these routes.

Table 10. WYDOT Highway Safety Segment Report Statistics

Roadway	Facility Classification	Safety Index Score	Safety Index Compare	Safety Index Rating	Over-represented Crash Factors
I-25 NB	Urban Interstate	.15	.83	4	Multiple vehicles Lane departure Run off road Guardrail Speed Improper passing Dark-lighted conditions
I-25 SB	Urban Interstate	.12	.67	4	Multiple vehicles Run off road to left Median barrier Rear end Improper passing Dark-lighted conditions
I-80 EB	Urban Interstate	.11	.61	2	Multiple vehicles Lane departure Run off road Median barrier Weather Improper passing
I-80 WB	Urban Interstate	.11	.61	4	Multiple vehicles Lane departure Run off road to left Guardrail Weather Dark-lighted conditions
Lincolnway	Urban	.00896	8.96	4	Multiple vehicles Improper driver action Dusk/dawn lighting conditions

Sources: WYDOT 2019a, 2019b

For I-25, the Safety Index Score indicates 0.15 equivalent critical crash per mile per year occurred on this segment of I-25 for the NB, or increasing milepost, direction between mileposts 7.850 and 10.586 over the 5-year period between 2013 and 2017. The Safety Index Compare value of 0.83 suggests that 17 percent fewer equivalent critical crashes occurred per mile on an annual basis compared to the statewide average for similar facilities. A Safety Index Score of 0.12 equivalent critical crash per mile per year for the SB direction equates to a Safety Index Compare value of 0.67, suggesting that 33 percent fewer equivalent critical crashes occurred per mile on an annual basis as compared to the statewide average for similar facilities. The Safety Index Rating equaled 4 for both directions, which indicates that these segments of 2-lane, urban interstate recorded more total crashes and/or more severe crashes than average for similar facility types throughout the state. The entire segment was rated as 4 for each direction even though the equivalent critical crash measures were less than the statewide average for urban interstate facilities, indicating that either more total crashes occurred as compared to the statewide average or at least one of the 1-mile subsegments in each direction likely experienced more severe crashes than the statewide average.

For I-80, the Safety Index Scores indicate 0.11 equivalent critical crash per mile per year occurred on this segment of I-80 for both directions between mileposts 357.600 and 360.800 over the 5-year period between 2013 and 2017. The Safety Index Compare value of 0.61 suggests that 39 percent fewer equivalent critical crashes occurred per mile on an annual basis compared to the statewide average for similar facilities. The Safety Index Rating equaled 4 for the WB, or decreasing, direction, which indicates that this segment recorded more total crashes and/or more severe crashes than average for similar facility types throughout the state. Note that the entire segment was rated as 4 even though the equivalent critical crash measures were less than the statewide average for urban interstate facilities, indicating that either more total crashes occurred as compared to the statewide average or at least one of the 1-mile subsegments in the WB direction likely experienced more severe crashes than the statewide average. The EB direction's Safety Index Rating was 2, indicating this segment experienced fewer crashes and/or less severe crashes than similar facilities across the state.

The Safety Index Score for Lincolnway indicates 0.00896 equivalent critical crash per mile per year occurred on this urban segment for both directions between mileposts 358.014 and 360.750 over the 5-year period between 2013 and 2017. The Safety Index Compare value of 8.96 suggests that a much greater number of equivalent critical crashes occurred per mile on an annual basis compared to the statewide average for similar facilities. The Safety Index Rating equaled 4, which indicates that this segment recorded more total crashes and/or more severe crashes than average for similar facility types throughout the state.

Per the *WYDOT Design Guide for Interstate Highways* (2014), interstate reconstruction projects will include improvements that have the potential to reduce the frequency and/or severity of crashes in locations that receive a Safety Index Rating of 3 or 4. Therefore, all three of these roadways within the study area will require improvements that target the identified crash patterns and safety issues.

Diagnostic Factors

The Highway Safety Segment Reports also included diagnostic information about crash factors, or contributing circumstances, to the reported crashes. A crash factor that occurs more often than expected compared to similar facilities statewide suggests the crash data should be reviewed to identify strategies that could be deployed to reduce the potential for crashes to occur. The reconstruction of the interchanges provides the opportunity to include relative strategies that address these crash factors in the design.

The primary over-represented crash factors for both interstates are multiple vehicles, run off road, lane departure, improper passing, dark-lighted conditions, and certain fixed objects such as guardrails and median barriers. The run-off-road factor is related to the fixed-objects factor, which indicates drivers did not recover from the lane departure before leaving the roadway. Likewise, lane departure and improper passing are related to the multiple-vehicle factor, as these factors suggest an errant vehicle struck another vehicle rather than departing the roadway and hitting a fixed object. Weather was an over-represented contributing factor to I-80 mainline crashes. Rear-end was an over-represented crash factor for the SB I-25 mainline crashes, which is also related to the multiple vehicles crash factor. The primary crash factors that are over-represented in the Lincolnway crash data are multiple vehicles, improper driver action, and dusk/dawn lighting conditions.

4.3: Crash Characteristics

Crashes by Year

Exhibit 12 shows the total crashes per year according to roadway location. Approximately 46 percent occurred on the I-25 mainline and 43 percent occurred on the I-80 mainline (including the merge/diverge and weaving areas within the interchanges). The remaining 11 percent occurred on Lincolnway and on the interchange ramps. The yearly crashes for the study area range from a low of 57 to a high of 88, with the greatest fluctuations in the first half of the study period. The frequency of I-25 crashes varied minimally from year to year. However, a much higher frequency of total crashes occurred on I-80 during the first year of the study period, 2014 compared to the other 4 years. The crashes on Lincolnway and the interchange ramps peaked in 2017.

Exhibit 12. Total Crashes Per Year by Roadway

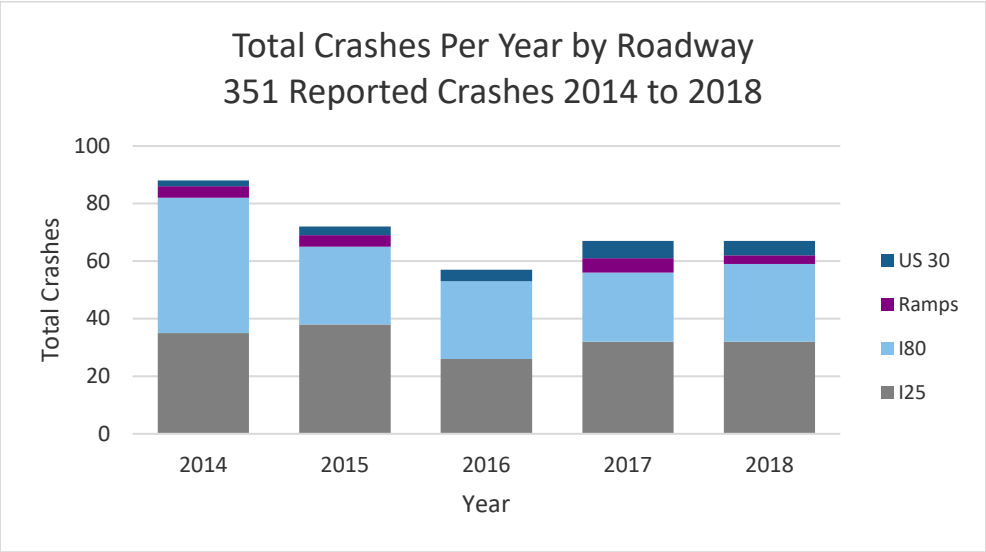


Table 11 shows a breakdown of crashes per year by severity. The yearly variance of the severe crashes does not follow the variance pattern for the property damage only crashes and, hence, the total crashes. Although it was not the year with the fewest total crashes, the data indicate that the fewest injury crashes occurred in 2018. The one fatal crash occurred in 2016.

Table 11. Crashes Per Year by Severity

Year	Injury	Fatality	Property Damage Only	Total
2014	13	0	75	**88**
2015	17	0	56	**73**
2016	12	1	44	**57**
2017	12	0	54	**66**
2018	9	0	58	**67**
Total	**63**	**1**	**287**	**351**

Types of Collisions for All Crashes

In general, the types of collisions that occurred on both mainlines and within the whole study area are similar. This result is expected as the mainline crashes on I-25 and I-80 represented 89 percent of the crash data records. Single-vehicle collisions represented 61 percent of the crashes for the whole study area, while 57 percent of the crashes on I-25 and 69 percent of the crashes on I-80 involved single vehicles. The over-represented crash factors of run off road, guardrail, and median barrier (i.e., guardrail, cable barrier, concrete barrier) shown in Table 10 for I-25 and I-80 are related to single-vehicle crashes. Given that more mainline crashes involved single vehicles, the over-representation of multiple vehicles as a crash factor indicates there is more conflict between vehicles within the interchange area than expected as compared to other urban interstate segments throughout the state. Exhibits 13 through 17 show the percentage breakdown by crash type for all crashes for the entire study area and for each facility.

Exhibit 13. Types of Collisions for All Crashes within the Study Area

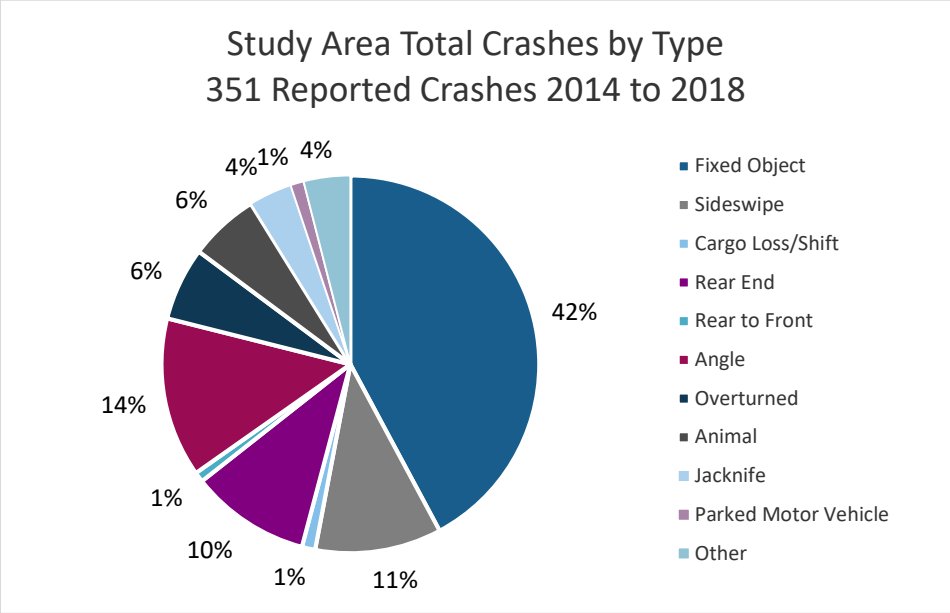


Exhibit 14. Types of Collisions for All Crashes on I-25

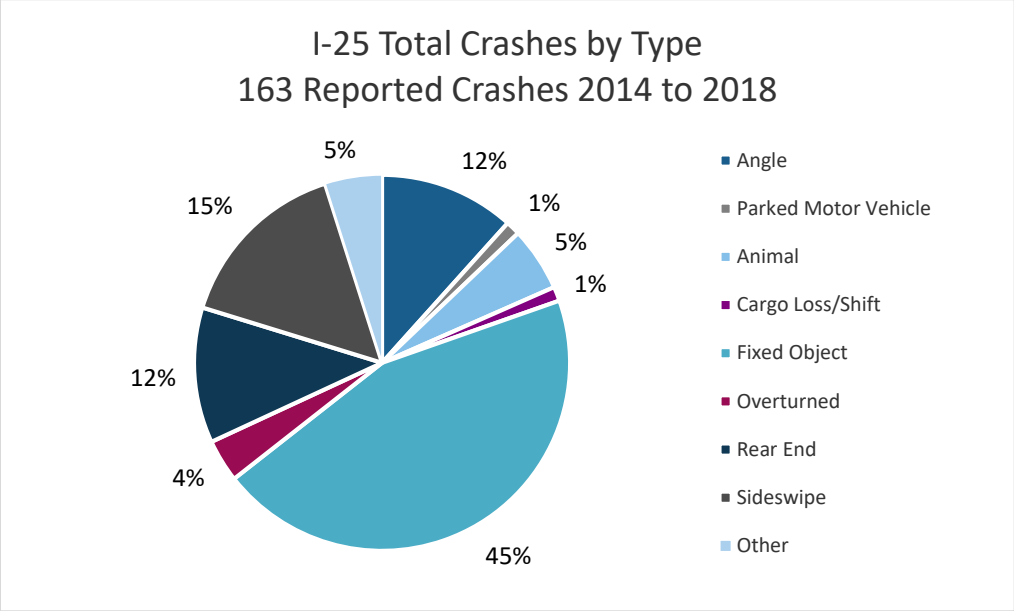


Exhibit 15. Types of Collisions for All Crashes on I-80

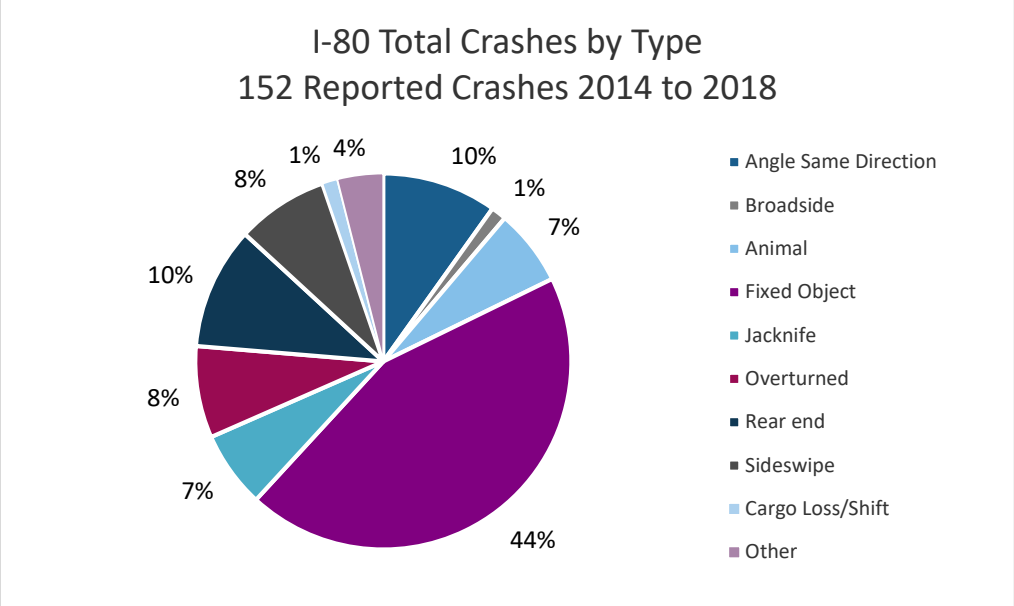


Exhibit 16. Types of Collisions for All Crashes on Ramps

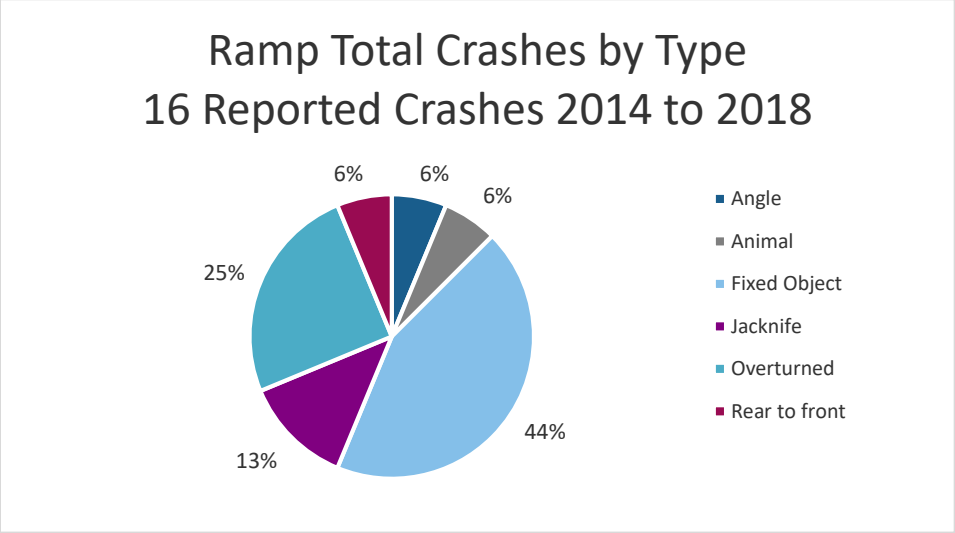
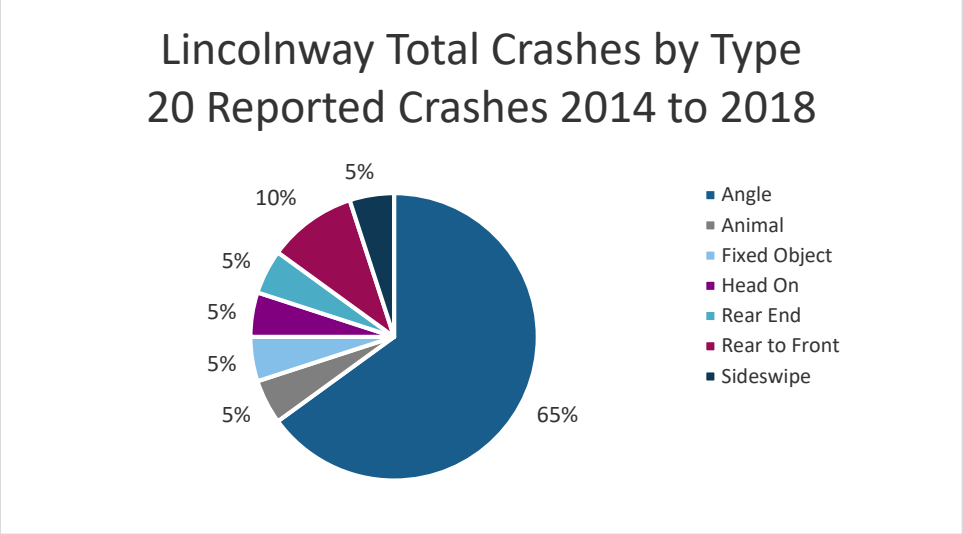


Exhibit 17. Types of Collisions for All Crashes on Lincolnway



The most common single-vehicle crashes in the study area were fixed object and overturned. As Table 10 shows, guardrails and median barriers are fixed objects that are over-represented in the interstate mainline crash dataset. These two objects represented 70 percent of the objects struck in these crashes. Nearly half of the ramp crashes were fixed-object collisions, while only one fixed-object collision occurred on Lincolnway. Half of the overturned crashes involved heavy trucks; two of these occurred on ramps during fair conditions.

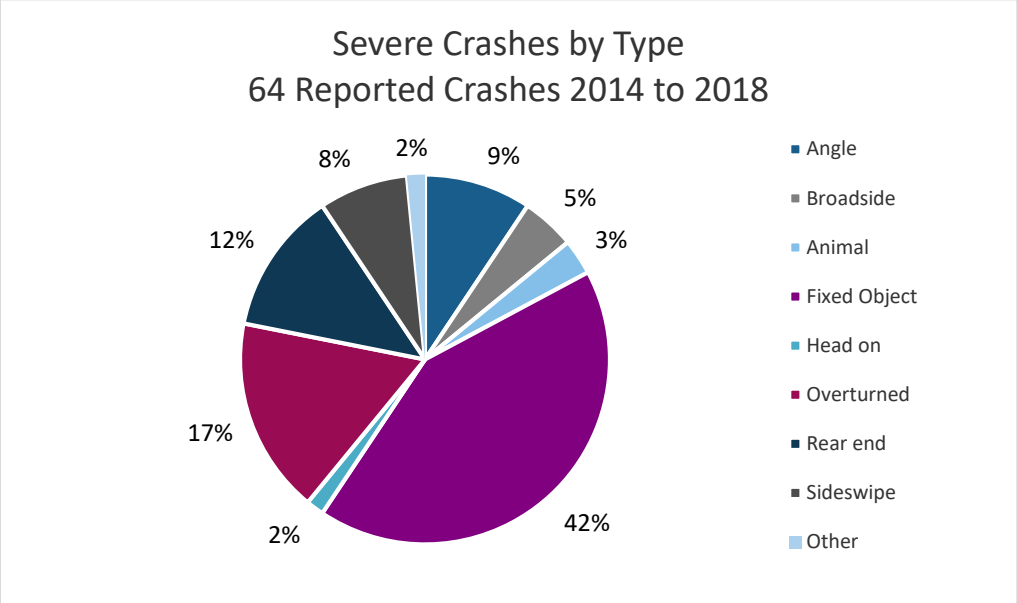
The most common multiple-vehicle collisions were angle, sideswipe in the same direction (passing), and rear-end. The angle collisions occurred at intersections on Lincolnway and at merge/diverge points adjacent to the interchange ramps. The over-represented crash factors shown in Table 10 for Lincolnway are indicative of intersection-type crashes, which tend to occur because of an increased number of potential conflict points. There are several intersections within the approximately 2.8-mile stretch of Lincolnway included in the study area. The sideswipe collisions are related to the

improper passing and multiple-vehicle crash factors shown in Table 10. Sideswipe collisions were nearly twice as prevalent on I-25 as on I-80, while rear-end collisions occurred in the same proportion for both interstates.

Types of Collisions for Severe Crashes

Severe crashes are those that involve fatalities and injuries. Severe crashes accounted for 18 percent of the total crashes in the study area between 2014 and 2018. The fatal crash was an angle collision involving two vehicles at an intersection on Lincolnway. Single-vehicle crashes, primarily hit fixed object and overturned, accounted for 65 percent of all the injury crashes and 60 percent of the most severe injury crashes (those not coded as possible injury). Half of the overturned crashes resulted in injuries, representing a proportion that was three times greater among severe crashes than total crashes. On the other hand, the proportions of fixed-object and sideswipe collisions were similar between the total and severe crash datasets. This suggests that fixed object and sideswipe collisions were not as harmful to the vehicle's occupants as overturning. The rear-end collisions represented a slightly higher proportion of the severe crashes than the total crashes. Exhibit 18 shows the percentage breakdown by crash type for the severe crashes within the study area and for each facility.

Exhibit 18. Types of Collisions for Severe Crashes in the Study Area



Fixed Objects

Table 12 presents a list of the typical objects hit once a vehicle left the travelway. The severity proportion of 18 percent for fixed object collisions is the same as the entire dataset. As previously mentioned, a guardrail was the most common object hit for all crashes, followed by cable barrier. Nearly 86 percent of the total crashes involving fixed objects occurred on the interstate mainlines and were not coded as occurring in the merge/diverge areas, suggesting that the increased conflict potential in these areas did not contribute to most fixed object crashes. While guardrail and cable barrier accounted for 81 percent of the injury crashes, they represented only 40 percent of the most

serious of these injury crashes. This is indicative of the typical minor angle at which vehicles tend to hit these objects and of the intended design of these objects to reduce the impact severity by redirecting errant vehicles once they strike the guardrail or barrier.

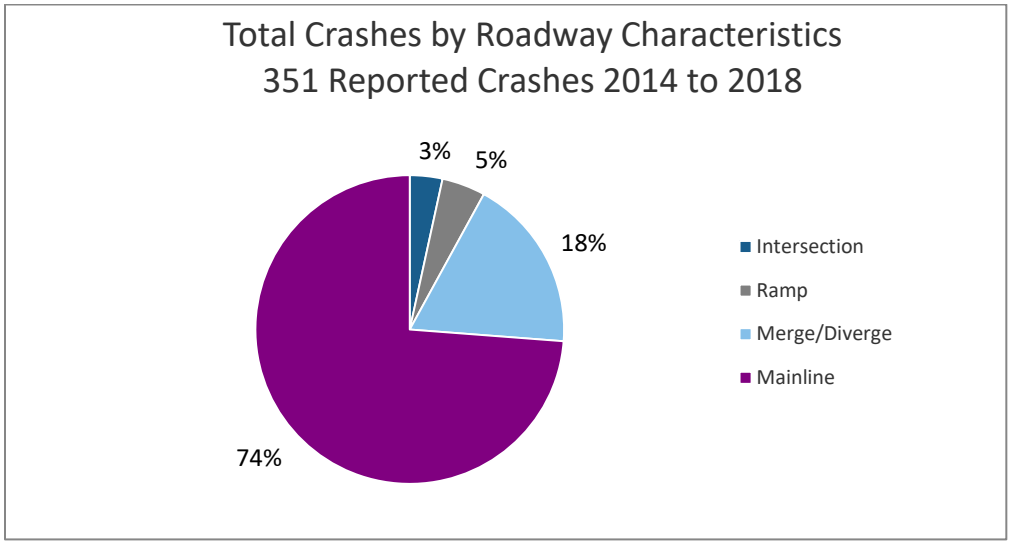
Table 12. Fixed Objects Hit in All Single-Vehicle Crashes

Object	I-25 and Ramps	I-80 and Ramps	Lincolnway	Total	Percent
Bridge structure or rail	1	3	0	**4**	3
Cable barrier	27	21	0	**48**	32
Concrete traffic barrier	1	5	0	**6**	4
Delineator post	5	4	0	**9**	6
Fence (including posts)	2	3	0	**5**	3
Fixed object (other)	2	1	1	**4**	3
Guardrail	31	26	0	**57**	39
Sign	9	6	0	**15**	10
Total	**101**	**77**	**1**	**148**	**100**

Roadway Characteristics of All Crashes

As Exhibit 19 shows, most of the crashes occurred on the interstate mainline. These mainline crashes included all of the crash types. The merge/diverge crashes occurred within the interchange areas where the ramps intersect with the mainline. These crashes were primarily angle and sideswipe collision types. When added together, the ramp and merge/diverge crashes accounted for nearly 25 percent of all crashes. The ramp crashes had the least severe outcomes, with only one crash resulting in a possible injury. About 33 percent of the twelve intersection crashes on Lincolnway resulted in injuries and a fatality, which is a higher proportion than the dataset for the whole study area.

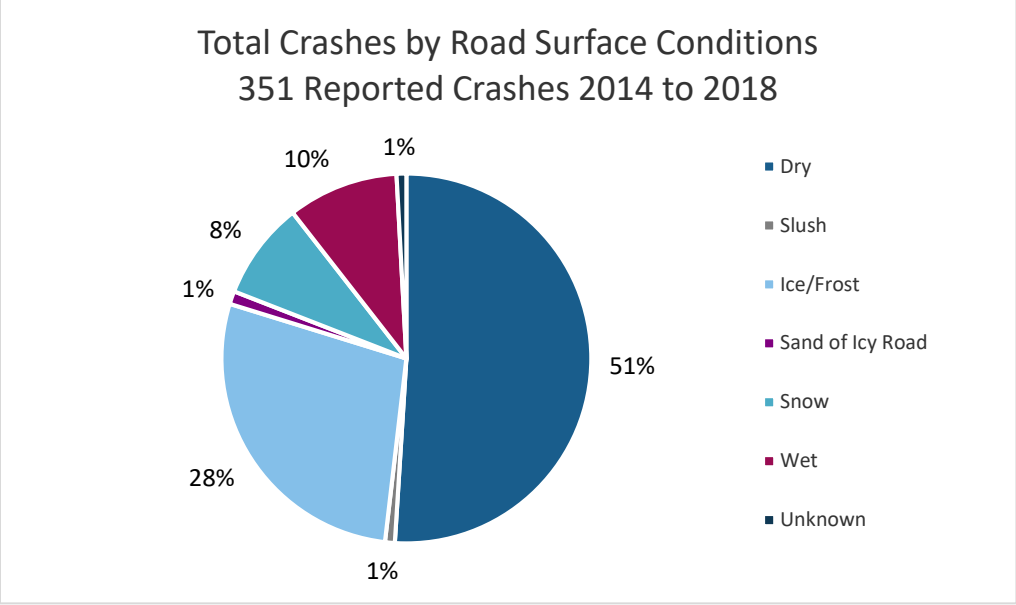
Exhibit 19. Roadway Characteristics for All Crashes



Road Surface Conditions for All Crashes

As Exhibit 20 shows for the whole study area, just over 50 percent of the crashes occurred on dry pavement. The most common non-dry pavement condition was ice/frost. Snowy and wet pavement was the condition for nearly 20 percent of the crashes. Likewise, 52 percent of the crashes on I-80 occurred on non-dry pavement, while 45 percent of the crashes on I-25 occurred on non-dry pavement. Nearly 43 percent of the injury crashes occurred on non-dry pavement. Relative to total crashes, non-dry pavements represented a similar potential for injury crashes. Roadway surface condition is not an over-represented crash factor, suggesting this crash pattern is like road surface crash patterns for similar facilities across the state. Nearly 33 percent of the non-dry pavement surface crashes occurred when the weather was clear or cloudy, suggesting precipitation lingers on the pavement beyond the weather event.

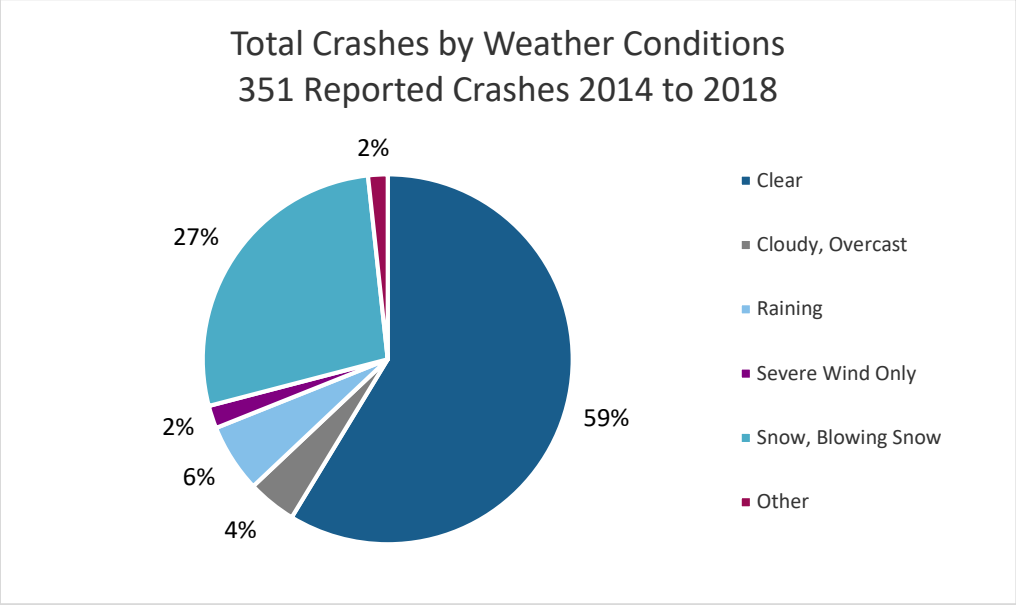
Exhibit 20. Road Surface Conditions for All Crashes



Weather Conditions for All Crashes

As Exhibit 21 shows, 60 percent of crashes occurred in fair weather conditions. The next most common weather condition was snowing, with 27 percent of the crashes. Approximately 55 percent of the crashes that occurred during snow events resulted in fixed-object collisions; this is a higher proportion than the whole crash dataset, suggesting the potential for this type of crash increases during snow events. Furthermore, the proportion of fixed-object crashes was 86 percent during events specifically coded as blowing snow, which is likely from reduced visibility that drivers encounter during this type of weather event. Although the proportion of crashes that occurred during weather events was similar between I-25 and I-80, weather was an over-represented crash factor for EB I-80. Four of the seven crashes that occurred during a severe wind event involved a heavy truck on the I-25 mainline; three of these resulted in the truck overturning with a property-damage-only outcome.

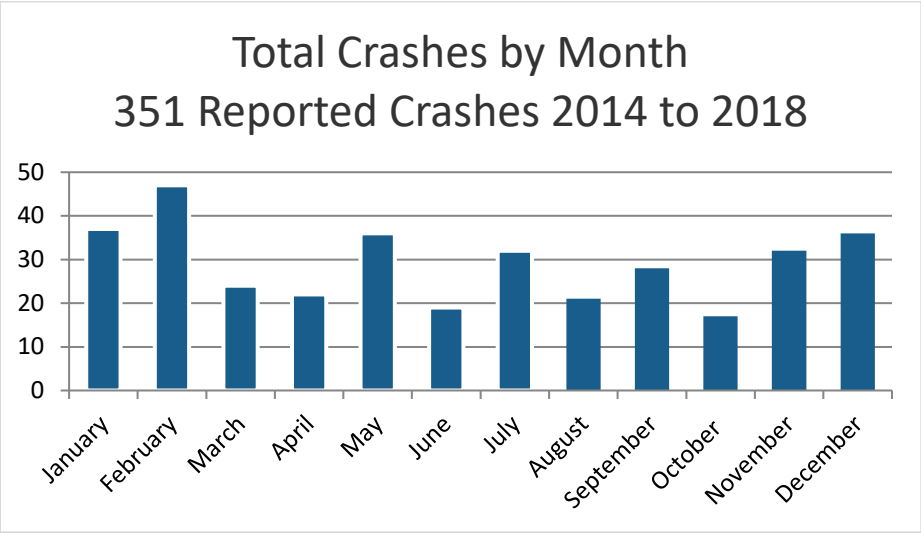
Exhibit 21. Weather Conditions for All Crashes



Total Crashes by Month for All Crashes

As Exhibit 22 shows, there was a significant monthly variation of crash frequency within the study area. February had the most crashes, followed by January, December, and May. Most crashes during a snowing weather event occurred between November and February, which is likely a contributing factor to the higher crash frequencies during these months. Likewise, most of the crashes during a raining weather event occurred in May and July, which are the months with the highest crash frequencies during the warmer weather months. I-25 experienced the most crashes in February and May, while I-80 experienced the most crashes in December followed by February.

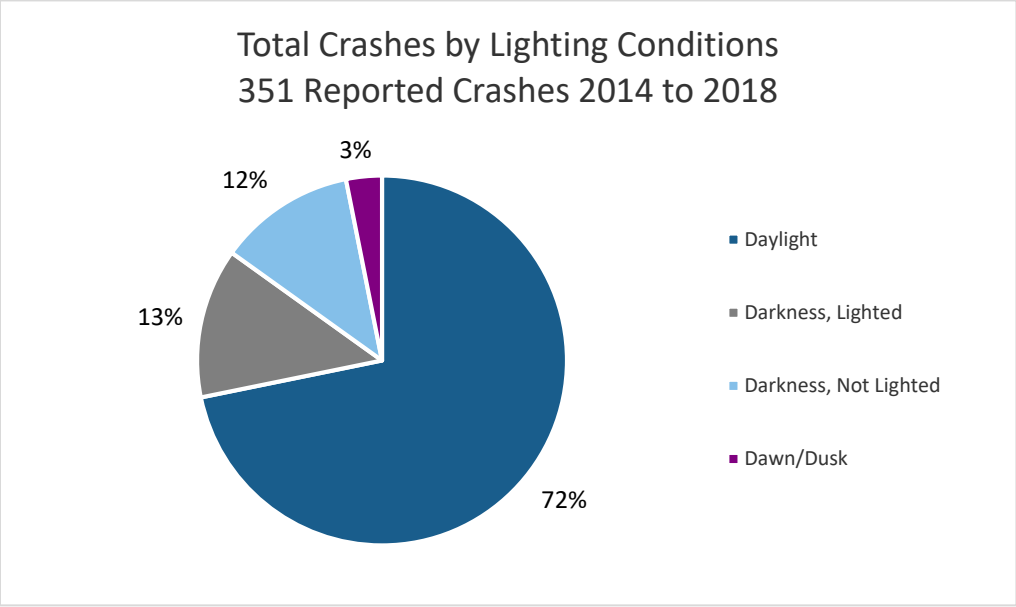
Exhibit 22. Total Crashes by Month for All Crashes



Lighting Conditions for All Crashes

As Exhibit 23 shows, 72 percent of all crashes occurred during daylight conditions, while 25 percent occurred in darkness. Thirty percent of the severe crashes occurred in darkness, suggesting lighting conditions increase the potential for a severe crash outcome within the study area. The one fatal crash occurred at a Lincolnway intersection in darkness, lighted conditions. Dusk/dawn lighting conditions were an over-represented factor in Lincolnway crashes. Nearly 50 percent of the crashes between November and February occurred in darkness conditions. Likewise, 64 percent of the crashes that occurred on non-dry pavement surfaces in fair weather conditions occurred in darkness conditions. These conditions suggest lower temperatures that resulted in icy or wet pavement conditions, which may have contributed to some of the darkness crashes.

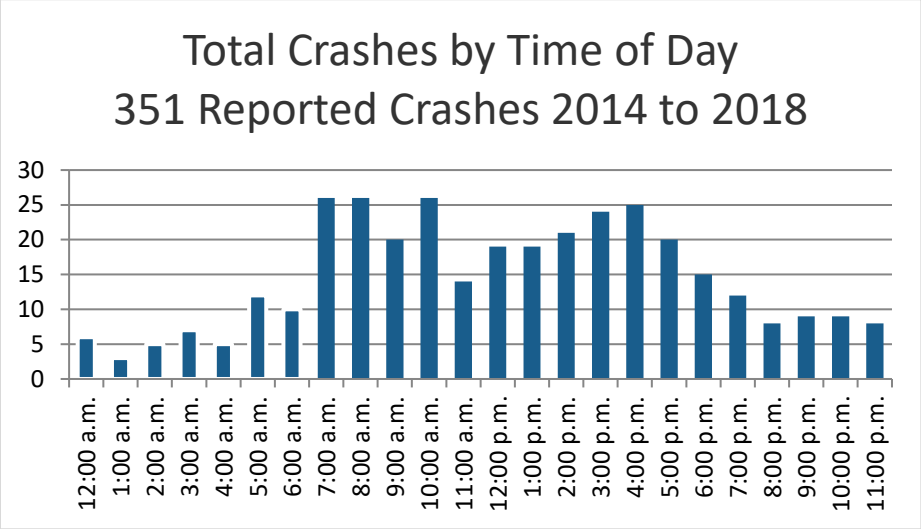
Exhibit 23. Lighting Conditions for All Crashes



Time of Day for All Crashes

As Exhibit 24 shows, 80 percent of crashes occurred between the hours of 7 a.m. and 8 p.m. The crashes peaked in the morning during the 7 a.m., 8 a.m., and 10 a.m. hours, and again between 3 p.m. and 5 p.m. Comparing this crash factor to the lighting condition crash factor suggests that poor visibility because of lighting or darkness is not a contributing factor to most crashes.

Exhibit 24. Time of Day for All Crashes



4.4: Crash Pattern Analysis

The crash characteristics provide information on the nature of the crashes within the study area. Analyzing the specific locations of the crashes can show if and where a significant number of crashes is clustered. Analyzing these clustered crashes often shows prevailing patterns, which can suggest areas to focus on to determine strategies that could improve safety.

Cluster Analysis

Although crashes occurred throughout the study area, 40 percent of them were clustered on the interstate mainlines at the five locations shown in Exhibit 25, all of which are within interchanges. While this assessment is based on the mileposts included in the crash data, it is possible that some of these crashes occurred slightly before or after the exact milepost location and were coded to the closest whole milepost. The following crash locations are located by interstate mileposts:

- Milepost 8.00 on NB I-25 (within the College Avenue interchange)
- Milepost 9.00 on I-25 (within the I-80 interchange)
- Milepost 358.00 on WB I-80 (within the Round Top Road interchange)
- Milepost 359.00 on I-80 (within the Lincolnway interchange)
- Milepost 360.00 on EB I-80 (I-80 bridges over Southwest Drive)

I-25/I-80
Interchange Project

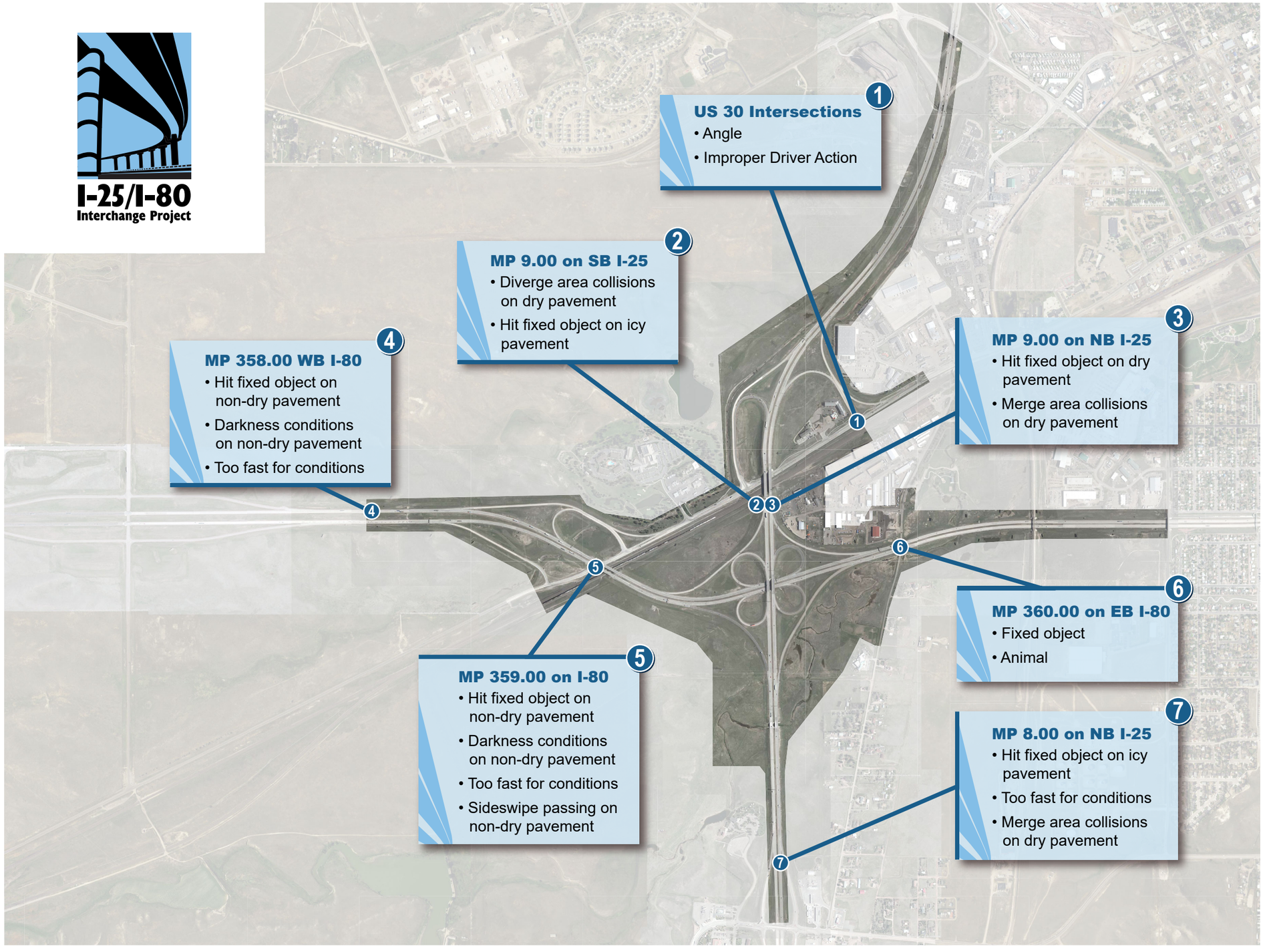


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Exhibit 25. Crash Clusters
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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There were also several crashes on Lincolnway clustered at intersections. The following sections describe the prevalent crashes at each location.

Milepost 8.00 on NB I-25

Over 60 percent of the 14 NB crashes occurred during a snowing weather event on icy roadway surfaces and resulted primarily in property damage only. This is a greater proportion than for the entire dataset, suggesting these conditions contributed to collisions with signs, cable rail, and parked motor vehicles (an inclement weather event can lead to abandoned, or parked, motor vehicles within the travelway). The reported speeds at the time of these collisions were generally close to (within 15 mph of) the posted speed limit of 65 mph, suggesting drivers may have been driving too fast for the conditions. About 66 percent of the multiple-vehicle collisions occurred in the on-ramp merge area during fair weather conditions. Even though this interchange provides access to several truck stops, heavy trucks were not involved in this crash cluster.

Milepost 9.00 on I-25

This location is north of I-80 within the interchange. Most SB crashes involved multiple vehicles during fair weather and road surface conditions and were likely related to drivers maneuvering through the off-ramp diverge area, because they were sideswipe-same-direction and angle collisions. One of the two injury crashes was an overturning crash that occurred on an icy road during a sleet or freezing rain weather event. The two fixed object crashes occurred during a snowing weather event on icy roadway surfaces and resulted in property damage only when the vehicles struck the cable rail. About 66 percent of the crashes at this location in the NB direction were single-vehicle, fixed-object crashes that occurred primarily in fair weather conditions and resulted in mostly property damage only. The multiple-vehicle crashes were likely related to drivers maneuvering through the on-ramp merge area, because they were sideswipe-same-direction and angle collisions that occurred in fair weather and road surface conditions.

Milepost 358.00 on WB I-80

Although these 12 crashes occurred on WB I-80 within the interchange area, none are coded to the diverge area for the off-ramp. They were mostly single-vehicle crashes with fixed objects with a few multiple-vehicle collisions involving passing maneuvers. Nine of the crashes occurred on non-dry surfaces in darkness conditions. This is a greater proportion than for the entire dataset, suggesting these conditions contributed to the crashes that resulted in mostly fixed-object collisions with guardrail. One crash resulted in a jackknifed heavy truck. The reported speeds at the time of these collisions was close to the posted speed limit of 75 mph, suggesting drivers may have been driving too fast for the conditions.

Milepost 359.08 on I-80

I-80 is on a structure over Lincolnway at this milepost. Eighty percent of the 29 crashes occurred during weather events when the roadway surface was not dry, which was a contributing factor to vehicles running off the road and striking fixed objects in single-vehicle collisions. This is a greater proportion than for the entire dataset, suggesting these conditions contributed to collisions with guardrail, cable barrier, fence, and a sign. The reported speeds at the time of these collisions was generally close to the posted speed limit of 75 mph, suggesting drivers may have been driving too fast for the conditions. The lone multiple-vehicle crash in the WB direction occurred during a

snowing event and resulted in an angle collision, likely because the driver lost control on a wet road surface. Half of the EB crashes at this location involved multiple vehicles, mostly during passing maneuvers on wet or icy roadway surfaces. Thirty-three percent of the crashes occurred in darkness, lighted conditions.

Milepost 360.00 on EB I-80

I-80 is on structure over Southwest Drive at this milepost. These 12 crashes occurred on EB I-80 in mostly fair lighting, roadway surface, and weather conditions. The crash types included fixed-object collisions with guardrail, barrier, and a delineator post. Two of the crashes were animal collisions. The only severe crash resulted in a possible injury when two vehicles were involved in an angle collision on dry pavement.

Lincolnway Intersections

In addition to the I-25 ramp terminal, there are several business accesses that intersect Lincolnway at unsignalized intersections within the study area. Approximately 75 percent of the intersection crashes were angle collisions that occurred in mostly fair lighting, roadway surface, and weather conditions. Because Table 10 indicates improper driver action was an over-represented crash factor, it can be assumed that the crash reports listed this as the primary contributing factor. Thirty-three percent of these intersection crashes occurred at the NB I-25 on- and off-ramp intersection.

Prevailing Patterns

The analysis of the crashes at the cluster locations specifically and the entire crash dataset suggests prevailing patterns among the crashes in the study area. The following issues surfaced repeatedly during the crash pattern analysis and serve to focus the discussion of strategies that may reduce these types of crashes:

- **Roadway Surface Conditions** – Nearly 60 percent of the crashes in the I-80 cluster locations and 50 percent in the I-25 locations occurred on non-dry pavement, which is a higher proportion than the 47 percent of the crashes in the entire dataset that occurred during these conditions. Most of these crashes also occurred during a weather event, although 16 percent did occur during clear conditions after the weather event subsided. Most of the icy and snowy pavement crashes resulted in a single vehicle leaving the travelway and hitting a fixed object. Roadway surface condition is not an over-represented crash factor per Table 10, suggesting that this may be a typical contributing factor to crashes on Wyoming urban interstates.
- **Driving Too Fast for the Conditions** – The conditions refer to roadway surface and roadway curvature. Nearly 66 percent of the cluster crashes could be attributed to driving too fast for the pavement conditions of icy, snowy, or wet roads. Note that this analysis assumes that a reported speed within 15 mph of the posted speed is too fast for a non-dry pavement condition; the crash records did not include contributing factors that may have been included in the crash reports. Although not included in the cluster analysis, the dataset contains two crash records that indicate the two overturning crashes on interchange ramps involving heavy trucks occurred when the drivers were exceeding the posted speed limit by 15 and 20 mph; this is another example of driving too fast for the conditions.

- **Run-Off-Road** – Single-vehicle crashes occur more often than is expected per the statewide experience with urban interstates (Table 10). Likewise, this pattern is prevalent in these interstate cluster locations. When the vehicles leave the travelway, they either overturn or hit a fixed object such as a sign or guardrail. Roadway surface and excessive speed for the conditions may be causal factors to the vehicle departing the roadway.
- **Sideswipe Passing** – A related crash type is angle collision, front to rear. These two crash types were more prevalent in the entire dataset than in the five interstate cluster locations; suggesting these types of collisions occur near all the ramp merge/diverge areas in the study area. These collisions are overrepresented and occur more frequently than expected (Table 10) when compared to similar facilities across the state. They are the most prominent crash types coded to the interchange merge/diverge areas, accounting for 55 percent of the total and 60 percent of the severe crashes. These same-direction crashes suggest there may not be adequate length for the weaving maneuvers to occur.
- **Intersection Angle Collisions** – Most of these crashes occurred in fair conditions, suggesting that drivers making improper decisions about when to turn through these unsignalized intersections are the primary cause of these collisions. Improper driver action occurs more often than expected when compared to similar facilities across the state.

4.5: Applicability of Recommended Alternative to Address Current Safety Issues

The previous interchange study selected the recommended alternative because it "addressed the key operational and safety issues of the interchanges identified at that time: weaving conditions, interchange spacing, and maintaining or improving accesses. By accommodating traffic via free-flowing directional movements with two loop ramps and two turban rams, this alternative balances improved mobility and safety with increased costs and amount of new right-of way needed" (CH2M HILL 2008). Exhibit 26 shows the proposed improvements for the first two phases.

Complete reconstruction within the interchange areas would permit the new facilities to meet current design standards for design elements such as shoulder/lane width, super-elevation, horizontal and vertical curvature, sideslopes, guardrails/barriers, and acceleration/deceleration lane lengths. Furthermore, the geometric configuration of the recommended alternative would provide the potential to reduce the frequency and severity of crashes within the study area because it addresses the following crash patterns identified in the recent crash dataset.

Run Off Road

Several geometric features of the recommended alternative would assist drivers to stay in the travelway and not run off the road:

- Wider inside and outside shoulders would provide more recovery room for drivers to redirect errant vehicles once they have departed their lane. The ability to recover should reduce the potential for single-vehicle and fixed-object crashes to occur.
- Improved horizontal ramp curvature would eliminate compound curves and reduce the severity of the curves. These improvements would lessen the driver workload required to properly

negotiate ramp curvature. Four of the six existing loop ramps would be eliminated and the remaining two would have a larger radius. These improvements would allow the ramps to be negotiated at higher operating speeds that are closer to the typical mainline speeds, reducing the potential for drivers to run off the road because they did not reduce their operating speed enough after leaving the mainline or because they accelerated too soon along the ramp in an attempt to achieve a merging speed close to the prevailing mainline speed. Elimination of compound curves does not require drivers to modify their path partway through a curve, thus reducing the potential for an error to occur that could result in a lane departure.

- Appropriate super-elevation would further assist drivers with staying in their lanes through horizontal curves on the mainline and on the ramps, provided the drivers travel at or near the design speed. As previously mentioned, reduced severity of ramp curves should result in drivers negotiating the ramps at speeds appropriate for the ramp geometric conditions and reduce the potential for run-off-road crashes.

Merge/Diverge Areas

The interchange configurations in the recommended alternative would provide several benefits that would reduce the potential for crashes to occur in ramp merge/diverge areas and improve safety for motorists:

- The system interchange would eliminate the weaving segments associated with the cloverleafs and reduce the potential for sideswipe passing and angle crashes to occur in these locations.
- The system interchange would consolidate the ramp merge and diverge points, thereby reducing the number of conflict points by half. Fewer merge/diverge areas would simplify the sign requirements for driver guidance, reduce the driver workload, and lessen the turbulence in the traffic stream through the interchange areas.
- Fewer merge/diverge locations would allow for increased spacing between ramp merge/diverge locations and provide for full length acceleration and deceleration lanes. Adequate distance to change speeds out of the mainline lanes reduces the potential for conflict and turbulence in the traffic stream through the interchange. The result should be a lower potential for sideswipe-passing, angle, and rear-end crashes to occur.
- The ramp geometry would allow for higher navigating speeds and reduce the magnitude of the speed reduction required for off-ramps. Likewise, drivers would be able to accelerate along the on-ramps to a speed that is closer to the prevailing mainline speed before entering the merge area. Vehicles exiting and entering the mainline at speeds closer to the prevailing speeds would reduce turbulence and the potential for sideswipe-passing, angle, and rear-end crashes to occur.
- The distance between the system and service interchanges would be increased and the ramps braided. This design would eliminate the weaving section between the interchanges and reduce turbulence in the traffic stream. The result should be a lower potential for sideswipe-passing, angle, and rear-end crashes to occur.

I-25/I-80
Interchange Project

LEGEND

Recommended Alternative

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Exhibit 26. Recommended Alternative
WYDOT I-80/I-25 Interchange
Cheyenne, Wyoming

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Unsignalized Intersections on Lincolnway

The I-25 service interchange with Lincolnway would be converted to a diamond interchange. The crossroad for this interchange intersects Lincolnway at a signalized intersection that would be lighted. This configuration eliminates one intersection on Lincolnway and provides signal control to assist drivers with executing turning maneuvers. Although not part of the first two phases, the recommended alternative also consolidates the Lincolnway access to I-80 into one intersection on Lincolnway. Reducing intersections reduces the number of conflict points and the potential for multiple-vehicle and angle crashes to occur.

4.6: Safety Recommendations

The recommended alternative provides the opportunity to improve safety by addressing crash issues identified in recent crash records. The configuration presented in the interchange study is a concept that is now proceeding forward into preliminary design. This safety analysis recommends the following strategies be considered for inclusion in the design to further address identified crash issues and enhance safety for motorists navigating through the study area:

- **Non-dry Pavement** – these elements encourage drivers to slow down accordingly and maintain ideal surface conditions
  - Changeable message signs and variable speed limit signs to alert drivers about compromised road surface conditions
  - Adequate drainage – pavement crown, inlets, and collection system for paved medians
  - Skid-resistant pavement to improve tire friction
  - Deicing systems – manual application on roads before storms or automatic systems for bridge structures
  - Maintenance to clear snow from travel lanes
- **Lighting Condition** – these elements assist to illuminate the roadway during low light conditions
  - Roadside delineators
  - High-visibility pavement markings
  - Retroreflective sign faces
  - Strip delineation on concrete median barriers
  - Guardrail and cable rail reflectors
  - Lighting at intersections and merge/diverge locations
- **Driver Guidance** – these elements assist driver navigation and reduce driving complexity
  - Retroreflective overhead guide signs with appropriate text/symbol height
  - Locate guide signs to provide adequate distance for drivers to comprehend the messaging and change lanes as necessary

  - Separate guide signs, regulatory, and warning signs to allow adequate distance/time to comprehend the messaging
  - Locate guide signs so there is adequate visibility distance
- **Stay on Travelway** – these elements increase the likelihood that drivers will maintain their vehicle path on the travelway
  - Rumble strips
  - Safety edge along outside shoulder
  - Standard inside and outside shoulder widths
  - Wind walls on elevated ramp structures
  - Pavement design and grooving to improve tire friction
  - Appropriate warning signs and advisory speed plaques for curves
- **Animal Collisions** – This crash type is a small proportion of the total crashes and an even smaller proportion of the severe crashes. However, there may be an opportunity to design drainage features such as box culverts that would accommodate animal passage under the roadways rather than across them.

Chapter 5 Conclusions

Traffic operations and safety analyses were conducted in support of an Environmental Assessment and design effort for the first two phases of the recommended alternative for the reconstruction of the I-25 interchanges with I-80 and Lincolnway. A traffic forecasting process was followed to determine existing volumes and forecast future volumes for use in the operations analysis and in the air quality and noise modelling conducted as part of the Environmental Assessment. The forecasts indicate the traffic volumes on the interstate segments will grow at an annual average rate of 2 to 4 percent from existing year to future year (2040), with higher growth rate occurring on the I-25 mainline segments. The interstate ramp segments grow at a lower rate compared to mainline segments. The turning movement volumes grow at an annual average rate of 3 to 6 percent from the existing year to future year (2040) during the a.m. and p.m. peak hours, with higher growth rate occurring at the I-80 ramp intersections.

The traffic analysis results suggest the recommended Build Alternative would provide traffic operations benefits for freeway segments and at-grade intersections compared to the No Build roadway network that would not include the improvements. The proposed configuration would provide results of LOS D or higher during both the morning and evening peak hours. Traffic operations benefits are a result of project elements such as reconfiguring the service interchange and eliminating the unsignalized ramp terminal intersections on Lincolnway, braiding the Lincolnway and I-80 interchange ramps with I-25, and eliminating existing closely-spaced weaving sections between low-speed loop ramps at the I-25/I-80 system interchange. The traffic volume growth sensitivity analysis estimates the Build Alternative would serve higher freeway traffic volumes than the existing roadway network in the No Build configuration while meeting LOS standards and providing additional capacity for volume growth beyond the 2040 forecasts.

In total, 351 crashes were reported between 2014 and 2018 within the I-25 and I-80 system interchange and the adjacent service interchanges, including the I-25 interchanges with Lincolnway to the north and the I-80 interchange with Lincolnway to the west, or an average of 70 per year. Severe crashes equaled 18 percent of all crashes and occurred at a rate of about 1 per month. Heavy trucks were involved in 17 percent of the total crashes and 14 percent of the injury crashes within the study area.

The primary crash factors for both interstates are multiple vehicles, run off road, lane departure, improper passing, dark-lighted conditions, and hitting fixed objects such as guardrails and median barriers. The primary crash factors in the Lincolnway crash data are multiple vehicles, improper driver action, and dusk/dawn lighting conditions. I-25, I-80, and Lincolnway received Safety Index Ratings of 4 for the 5-year study period, indicating that they will require improvements that target the identified crash patterns and safety issues.

The geometric configuration of the recommended alternative presented in the *I-25/I-80 Interchange Study* report (CH2M HILL 2008) will provide the potential to reduce the frequency and severity of crashes within the study area because it addresses the crash patterns identified in the recent crash dataset. Recommended strategies to be considered for inclusion in the design further address identified crash issues related to staying in the travelway, non-dry roadway surfaces, lighting condition, and intersection collisions.

Chapter 6 Additional Analyses

Due to uncertainties about the provision of four or six lanes for the interstate mainlines, the traffic operations analyses assumed a four-lane configuration for the 2040 horizon year to represent a worst-case scenario for operating conditions with forecasted 2040 peak hour volumes. After completion of the traffic operations analysis, the progression of the Environmental Assessment and design effort commenced a discussion regarding provision of four or six lanes for the interstate mainlines with these initial two phases. Two additional traffic operations analyses were subsequently conducted to provide input for this discussion. The scope and results for each are summarized here whereas appendixes contain the techincal memorandums produced to document the analyses processes and results.

6.1: Year 2030 Four-Lane Analysis

The first additional analysis was performed to estimate if the four-lane configuration would provide acceptable peak hour traffic operations for the interstate mainlines within the immediate lifetime of the pavement constructed with the interchange reconfiguration projects. The year 2030 was selected as the analysis year. As reported by HCS, all basic, weaving, and merge/diverge segments would operate at LOS C or better during both peak hours on both interstates. These results indicate that acceptable peak hour operations are achievable with four-lane configurations on both interstates at least through year 2030. Appendix E contains the technical memorandum.

6.2: Year 2040 Six-Lane Analysis

The second additional analysis was performed to estimate if the six-lane configuration would provide acceptable peak hour traffic operations in the horizon planning year 2040. As reported by HCS, all basic, weaving, and merge/diverge segments would operate at LOS C or better during both peak hours on both interstates. The additional lane in each direction on I-25 would decrease the average lane density and provide more maneuverability within the traffic stream for the entering and exiting movements at the interchanges. The improved traffic flow increases the level of service enough to meet the WYDOT standards for acceptable traffic operations in peak hours. Appendix F contains the technical memorandum.

Chapter 7 References

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Appendix A: Existing Conditions Analysis Reports

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2018 Existing - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB Off-Ramp	3000	3
3	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	2200	2
4	Weaving	Weaving	I-80 EB On-Ramp to I-80 WB Off-Ramp	550	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1000	2
6	Weaving	Weaving	I-80 WB On-Ramp to W Lincolnway Off-Ramp	2100	3
7	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
8	Merge	Merge	W Lincolnway On-Ramp	1500	2
9	Basic	Basic	W Lincolnway On-Ramp to Mainline End	400	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1088	4452	0.24	52.6	10.3	A

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1516	5721	0.26	57.7	8.8	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.667	1220	4452	0.27	52.6	11.6	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	1314	5596	0.23	57.5	7.6	A

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.694	950	4494	0.21	54.7	8.7	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.775	1439	5225	0.28	57.5	8.3	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.763	1408	4700	0.30	65.0	10.8	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.763	0.926	1523	115	4700	2000	0.32	0.06	57.7	57.7	13.2	15.5	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.775	1524	4626	0.33	61.3	12.4	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	57.5	9.8	6.9	2.8	B

Facility Overall Results

Space Mean Speed, mi/h	57.5	Density, veh/mi/ln	6.9
Average Travel Time, min	2.8	Density, pc/mi/ln	9.8

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2018 Existing - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
4	Weaving	Weaving	W Lincolnway On-Ramp to I-80 WB Off-Ramp	350	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1500	2
6	Weaving	Weaving	I-80 WB On-Ramp to I-80 EB Off-Ramp	500	3
7	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	1600	2
8	Weaving	Weaving	I-80 EB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to MainLine End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.725	1423	4556	0.31	57.8	12.3	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.709	0.917	1455	87	4700	2000	0.31	0.04	56.5	56.5	12.9	16.8	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	1343	4452	0.30	52.6	12.8	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	1422	6172	0.23	60.9	7.8	A

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	1365	4452	0.31	52.6	13.0	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.735	1682	5608	0.30	55.6	10.1	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	1448	4494	0.32	54.7	13.2	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1777	6042	0.29	57.4	10.3	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1370	4584	0.30	59.2	11.6	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	55.9	11.8	8.2	2.6	B

Facility Overall Results

Space Mean Speed, mi/h	55.9	Density, veh/mi/ln	8.2
Average Travel Time, min	2.6	Density, pc/mi/ln	11.8

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2018 Existing - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 SB Off-Ramp	2300	2
4	Diverge	Diverge	I-25 SB Off-Ramp	1500	2
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	1900	2
6	Weaving	Weaving	I-25 SB On-Ramp to I-25 NB Off-Ramp	1170	3
7	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1600	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	822	7107	0.12	66.9	4.1	A

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	822	35	7200	2100	0.11	0.02	75.0	-	3.7	-	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	776	4694	0.17	64.7	6.0	A

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.667	776	311	4800	2100	0.16	0.15	66.4	66.4	5.8	9.1	A

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	479	4694	0.10	64.7	3.7	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	692	4067	0.17	63.6	3.6	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	647	4784	0.14	69.2	4.7	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	1001	354	4800	2100	0.21	0.17	65.0	65.0	7.7	11.8	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1065	4800	0.22	71.8	7.4	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.9	5.2	3.6	2.3	A

Facility Overall Results

Space Mean Speed, mi/h	66.9	Density, veh/mi/ln	3.6
Average Travel Time, min	2.3	Density, pc/mi/ln	5.2

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2018 Existing - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blvd) to I-25 NB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1500	2
4	Weaving	Weaving	I-25 NB On-Ramp to I-25 SB Off-Ramp	200	3
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	2100	2
6	Weaving	Weaving	I-25 SB On-Ramp to W Lincolnway WB off-Ramp	600	3
7	Basic	Basic	W Lincolnway WB off-Ramp to W Lincolnway WB On-Ramp	2300	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1697	4800	0.35	71.8	11.8	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	1697	596	4800	2000	0.35	0.30	61.2	61.2	13.9	16.6	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	928	4652	0.20	62.6	7.4	A

Segment 4: Weaving

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.94	0.699	1441	4244	0.34	55.4	8.7	A

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	898	4694	0.19	64.7	6.9	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	973	6331	0.15	72.2	4.5	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	966	4738	0.20	66.9	7.2	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1030	64	4800	2000	0.21	0.03	64.9	64.9	7.9	12.2	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1050	4800	0.22	71.8	7.3	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.1	8.4	5.8	2.2	B

Facility Overall Results

Space Mean Speed, mi/h	66.1	Density, veh/mi/ln	5.8
Average Travel Time, min	2.2	Density, pc/mi/ln	8.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2018 Existing - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB Off-Ramp	3000	3
3	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	2200	2
4	Weaving	Weaving	I-80 EB On-Ramp to I-80 WB Off-Ramp	550	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1000	2
6	Weaving	Weaving	I-80 WB On-Ramp to W Lincolnway Off-Ramp	2100	3
7	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
8	Merge	Merge	W Lincolnway On-Ramp	1500	2
9	Basic	Basic	W Lincolnway On-Ramp to Mainline End	400	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1735	4452	0.39	52.6	16.5	B

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2215	5939	0.37	56.1	13.2	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.676	1881	4452	0.42	52.6	17.9	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	1982	5930	0.33	57.2	11.6	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.694	1602	4494	0.36	54.7	14.6	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.741	1956	5736	0.34	57.5	11.3	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	1931	4700	0.41	65.0	14.9	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.730	0.926	2098	167	4700	2000	0.45	0.08	57.4	57.4	18.3	20.0	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.746	2096	4626	0.45	61.3	17.1	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	56.8	14.5	10.0	2.9	C

Facility Overall Results

Space Mean Speed, mi/h	56.8	Density, veh/mi/ln	10.0
Average Travel Time, min	2.9	Density, pc/mi/ln	14.5

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2018 Existing - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
4	Weaving	Weaving	W Lincolnway On-Ramp to I-80 WB Off-Ramp	350	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1500	2
6	Weaving	Weaving	I-80 WB On-Ramp to I-80 EB Off-Ramp	500	3
7	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	1600	2
8	Weaving	Weaving	I-80 EB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to MainLine End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	1639	4556	0.36	57.8	14.2	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.714	0.917	1676	122	4700	2000	0.36	0.06	56.4	56.4	14.9	18.7	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.714	1520	4452	0.34	52.6	14.4	B

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.725	1661	6074	0.27	59.6	9.3	A

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.714	1572	4452	0.35	52.6	14.9	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.735	1967	5529	0.36	53.9	12.2	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	1651	4494	0.37	54.7	15.1	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1967	5768	0.34	56.9	11.5	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1530	4584	0.33	59.2	12.9	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	55.7	13.4	9.4	2.6	B

Facility Overall Results

Space Mean Speed, mi/h	55.7	Density, veh/mi/ln	9.4
Average Travel Time, min	2.6	Density, pc/mi/ln	13.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2018 Existing - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 SB Off-Ramp	2300	2
4	Diverge	Diverge	I-25 SB Off-Ramp	1500	2
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	1900	2
6	Weaving	Weaving	I-25 SB On-Ramp to I-25 NB Off-Ramp	1170	3
7	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1600	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1621	7107	0.23	66.9	8.1	A

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1621	82	7200	2100	0.23	0.04	75.0	-	7.2	-	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1514	4694	0.32	64.7	11.7	B

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.667	1514	391	4800	2100	0.32	0.19	66.2	66.2	11.4	15.5	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1141	4694	0.24	64.7	8.8	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1433	5491	0.26	64.7	7.4	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1408	4784	0.29	69.2	10.2	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	1807	399	4800	2100	0.38	0.19	64.6	64.6	14.0	18.1	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1880	4800	0.39	71.8	13.1	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.8	10.3	7.2	2.3	B

Facility Overall Results

Space Mean Speed, mi/h	66.8	Density, veh/mi/ln	7.2
Average Travel Time, min	2.3	Density, pc/mi/ln	10.3

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2018	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2018 Existing - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blvd) to I-25 NB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1500	2
4	Weaving	Weaving	I-25 NB On-Ramp to I-25 SB Off-Ramp	200	3
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	2100	2
6	Weaving	Weaving	I-25 SB On-Ramp to W Lincolnway WB off-Ramp	600	3
7	Basic	Basic	W Lincolnway WB off-Ramp to W Lincolnway WB On-Ramp	2300	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1575	4800	0.33	71.8	11.0	A

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	1575	472	4800	2000	0.33	0.24	61.6	61.6	12.8	15.5	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	966	4652	0.21	62.6	7.7	A

Segment 4: Weaving

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.94	0.699	1488	3963	0.38	53.6	9.3	A

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	860	4694	0.18	64.7	6.6	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	973	6210	0.16	71.8	4.5	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	982	4738	0.21	66.9	7.3	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1046	64	4800	2000	0.22	0.03	64.9	64.9	8.1	12.3	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1065	4800	0.22	71.8	7.4	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.1	8.2	5.8	2.2	B

Facility Overall Results

Space Mean Speed, mi/h	66.1	Density, veh/mi/ln	5.8
Average Travel Time, min	2.2	Density, pc/mi/ln	8.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	119	146	0	99	14
Future Vol, veh/h	9	119	146	0	99	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	216	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	9	9	13	13	12	12
Mvmt Flow	10	131	160	0	109	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	160	0	-	0	246	80
Stage 1	-	-	-	-	160	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.28	-	-	-	7.04	7.14
Critical Hdwy Stg 1	-	-	-	-	6.04	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.29	-	-	-	3.62	3.42
Pot Cap-1 Maneuver	1367	-	-	0	694	933
Stage 1	-	-	-	0	823	-
Stage 2	-	-	-	0	899	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1367	-	-	-	689	933
Mov Cap-2 Maneuver	-	-	-	-	689	-
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	899	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1367	-	-	689	933
HCM Lane V/C Ratio	0.007	-	-	0.158	0.016
HCM Control Delay (s)	7.7	-	-	11.2	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	0.6	0.1

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	59	91	67	57	18
Future Vol, veh/h	11	59	91	67	57	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	215	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	16	16	19	19	7	7
Mvmt Flow	13	69	106	78	66	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	106	0	-	0	206	92
Stage 1	-	-	-	-	145	-
Stage 2	-	-	-	-	61	-
Critical Hdwy	4.42	-	-	-	6.94	7.04
Critical Hdwy Stg 1	-	-	-	-	5.94	-
Critical Hdwy Stg 2	-	-	-	-	5.94	-
Follow-up Hdwy	2.36	-	-	-	3.57	3.37
Pot Cap-1 Maneuver	1386	-	-	-	749	931
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1386	-	-	-	742	931
Mov Cap-2 Maneuver	-	-	-	-	742	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1386	-	-	-	742	931
HCM Lane V/C Ratio	0.009	-	-	-	0.089	0.022
HCM Control Delay (s)	7.6	-	-	-	10.3	9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0.1

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↰	↱
Traffic Vol, veh/h	0	15	75	0	26	0
Future Vol, veh/h	0	15	75	0	26	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	20	20	8	8	0	0
Mvmt Flow	0	17	83	0	29	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	100	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	17	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	904	982
Stage 1	0	-	-	0	945	-
Stage 2	0	-	-	0	1011	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	904	982
Mov Cap-2 Maneuver	-	-	-	-	904	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	904	-
HCM Lane V/C Ratio	-	-	0.032	-
HCM Control Delay (s)	-	-	9.1	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	41	61	0	5	14
Future Vol, veh/h	0	41	61	0	5	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	160	-	-	-	160	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	7	7	16	16	16	16
Mvmt Flow	0	50	74	0	6	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	74	0	-	0	99	37
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	25	-
Critical Hdwy	4.24	-	-	-	7.12	7.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.27	-	-	-	3.66	3.46
Pot Cap-1 Maneuver	1488	-	-	0	850	983
Stage 1	-	-	-	0	900	-
Stage 2	-	-	-	0	955	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1488	-	-	-	850	983
Mov Cap-2 Maneuver	-	-	-	-	850	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1488	-	-	850	983
HCM Lane V/C Ratio	-	-	-	0.007	0.017
HCM Control Delay (s)	0	-	-	9.3	8.7
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	43	232	206	0	97	22
Future Vol, veh/h	43	232	206	0	97	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	216	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	6	6	6	6	13	13
Mvmt Flow	47	255	226	0	107	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	226	0	-	0	448	113
Stage 1	-	-	-	-	226	-
Stage 2	-	-	-	-	222	-
Critical Hdwy	4.22	-	-	-	7.06	7.16
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	2.26	-	-	-	3.63	3.43
Pot Cap-1 Maneuver	1311	-	-	0	512	884
Stage 1	-	-	-	0	758	-
Stage 2	-	-	-	0	762	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1311	-	-	-	494	884
Mov Cap-2 Maneuver	-	-	-	-	494	-
Stage 1	-	-	-	-	731	-
Stage 2	-	-	-	-	762	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1311	-	-	494	884
HCM Lane V/C Ratio	0.036	-	-	0.216	0.027
HCM Control Delay (s)	7.8	-	-	14.3	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.1

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	177	99	114	85	18
Future Vol, veh/h	15	177	99	114	85	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	215	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	9	9	8	8	6	6
Mvmt Flow	17	203	114	131	98	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	114	0	-	0	316	123
Stage 1	-	-	-	-	180	-
Stage 2	-	-	-	-	136	-
Critical Hdwy	4.28	-	-	-	6.92	7.02
Critical Hdwy Stg 1	-	-	-	-	5.92	-
Critical Hdwy Stg 2	-	-	-	-	5.92	-
Follow-up Hdwy	2.29	-	-	-	3.56	3.36
Pot Cap-1 Maneuver	1423	-	-	-	641	892
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	864	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1423	-	-	-	633	892
Mov Cap-2 Maneuver	-	-	-	-	633	-
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	864	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1423	-	-	-	633	892
HCM Lane V/C Ratio	0.012	-	-	-	0.154	0.023
HCM Control Delay (s)	7.6	-	-	-	11.7	9.1
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0.1

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↰	↱
Traffic Vol, veh/h	0	70	45	0	69	1
Future Vol, veh/h	0	70	45	0	69	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	0	81	52	0	80	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	133	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	81	-
Critical Hdwy	-	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	0	-	-	0	842	994
Stage 1	0	-	-	0	950	-
Stage 2	0	-	-	0	922	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	842	994
Mov Cap-2 Maneuver	-	-	-	-	842	-
Stage 1	-	-	-	-	950	-
Stage 2	-	-	-	-	922	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	842	994
HCM Lane V/C Ratio	-	-	0.095	0.001
HCM Control Delay (s)	-	-	9.7	8.6
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	140	42	0	9	4
Future Vol, veh/h	0	140	42	0	9	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	160	-	-	-	160	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	7	7	10	10	8	8
Mvmt Flow	0	165	49	0	11	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	49	0	-	0	132	25
Stage 1	-	-	-	-	49	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	4.24	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.27	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	1520	-	-	0	831	1026
Stage 1	-	-	-	0	950	-
Stage 2	-	-	-	0	913	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1520	-	-	-	831	1026
Mov Cap-2 Maneuver	-	-	-	-	831	-
Stage 1	-	-	-	-	950	-
Stage 2	-	-	-	-	913	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1520	-	-	831	1026
HCM Lane V/C Ratio	-	-	-	0.013	0.005
HCM Control Delay (s)	0	-	-	9.4	8.5
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0

Appendix B: Future Conditions Intersection Analysis Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	60	190	0	0	210	70	80	0	290	0	0	0
Future Volume (veh/h)	60	190	0	0	210	70	80	0	290	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1743	1743	0	0	1681	1900	1900	1696	1696			
Adj Flow Rate, veh/h	66	209	0	0	231	77	88	0	0			
Adj No. of Lanes	1	2	0	0	2	0	0	1	1			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	9	9	0	0	13	13	12	12	12			
Cap, veh/h	248	1812	0	0	551	179	196	0	175			
Arrive On Green	0.15	0.55	0.00	0.00	0.23	0.23	0.12	0.00	0.00			
Sat Flow, veh/h	1660	3399	0	0	2456	771	1616	0	1442			
Grp Volume(v), veh/h	66	209	0	0	154	154	88	0	0			
Grp Sat Flow(s),veh/h/ln	1660	1656	0	0	1597	1545	1616	0	1442			
Q Serve(g_s), s	1.1	0.9	0.0	0.0	2.5	2.6	1.5	0.0	0.0			
Cycle Q Clear(g_c), s	1.1	0.9	0.0	0.0	2.5	2.6	1.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.50	1.00		1.00			
Lane Grp Cap(c), veh/h	248	1812	0	0	371	359	196	0	175			
V/C Ratio(X)	0.27	0.12	0.00	0.00	0.41	0.43	0.45	0.00	0.00			
Avail Cap(c_a), veh/h	330	3295	0	0	1007	974	1072	0	957			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	11.4	3.3	0.0	0.0	9.8	9.9	12.3	0.0	0.0			
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.7	0.8	1.6	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.5	0.4	0.0	0.0	1.1	1.2	0.8	0.0	0.0			
LnGrp Delay(d),s/veh	11.9	3.3	0.0	0.0	10.6	10.7	13.9	0.0	0.0			
LnGrp LOS	B	A			B	B	B					
Approach Vol, veh/h		275			308			88				
Approach Delay, s/veh		5.4			10.6			13.9				
Approach LOS		A			B			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		21.5		8.7	9.5	12.0		
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		
Max Green Setting (Gmax), s		30.0		20.0	6.0	19.0		
Max Q Clear Time (g_c+I1), s		2.9		3.5	3.1	4.6		
Green Ext Time (p_c), s		1.3		0.3	0.0	1.5		

Intersection Summary	
HCM 2010 Ctrl Delay	8.9
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	65	50	65	225	0	0	0	0	185	0	80
Future Volume (veh/h)	0	65	50	65	225	0	0	0	0	185	0	80
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1638	1900	1597	1597	0				1900	1776	1776
Adj Flow Rate, veh/h	0	76	58	76	262	0				215	0	0
Adj No. of Lanes	0	2	0	1	2	0				0	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86				0.86	0.86	0.86
Percent Heavy Veh, %	0	16	16	19	19	0				7	7	7
Cap, veh/h	0	407	283	119	1442	0				327	0	292
Arrive On Green	0.00	0.23	0.23	0.08	0.48	0.00				0.19	0.00	0.00
Sat Flow, veh/h	0	1837	1223	1521	3113	0				1691	0	1509
Grp Volume(v), veh/h	0	67	67	76	262	0				215	0	0
Grp Sat Flow(s),veh/h/ln	0	1556	1422	1521	1517	0				1691	0	1509
Q Serve(g_s), s	0.0	1.0	1.2	1.5	1.5	0.0				3.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.0	1.2	1.5	1.5	0.0				3.5	0.0	0.0
Prop In Lane	0.00		0.86	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	361	330	119	1442	0				327	0	292
V/C Ratio(X)	0.00	0.18	0.20	0.64	0.18	0.00				0.66	0.00	0.00
Avail Cap(c_a), veh/h	0	927	847	352	3013	0				1120	0	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.3	9.4	13.5	4.6	0.0				11.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.3	5.6	0.1	0.0				2.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.5	0.8	0.6	0.0				1.8	0.0	0.0
LnGrp Delay(d),s/veh	0.0	9.6	9.7	19.2	4.6	0.0				13.5	0.0	0.0
LnGrp LOS		A	A	B	A					B		
Approach Vol, veh/h		134			338						215	
Approach Delay, s/veh		9.6			7.9						13.5	
Approach LOS		A			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			7.4	12.0		10.8		19.4
Change Period (Y+Rc), s			5.0	5.0		5.0		5.0
Max Green Setting (Gmax), s			7.0	18.0		20.0		30.0
Max Q Clear Time (g_c+I1), s			3.5	3.2		5.5		3.5
Green Ext Time (p_c), s			0.0	0.6		1.0		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	10.0
HCM 2010 LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	60	80	175	220	330	150
Future Volume (veh/h)	60	80	175	220	330	150
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1743	1681	1900	1696	1696
Adj Flow Rate, veh/h	66	88	192	242	363	0
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	9	9	13	13	12	12
Cap, veh/h	110	1510	413	369	454	405
Arrive On Green	0.07	0.46	0.26	0.26	0.28	0.00
Sat Flow, veh/h	1660	3399	1681	1429	1616	1442
Grp Volume(v), veh/h	66	88	192	242	363	0
Grp Sat Flow(s),veh/h/ln	1660	1656	1597	1429	1616	1442
Q Serve(g_s), s	1.5	0.6	3.8	5.7	7.9	0.0
Cycle Q Clear(g_c), s	1.5	0.6	3.8	5.7	7.9	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	110	1510	413	369	454	405
V/C Ratio(X)	0.60	0.06	0.47	0.66	0.80	0.00
Avail Cap(c_a), veh/h	306	2703	799	715	1021	911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.3	5.8	11.9	12.6	12.7	0.0
Incr Delay (d2), s/veh	5.2	0.0	0.8	2.0	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.3	1.7	2.4	3.9	0.0
LnGrp Delay(d),s/veh	22.5	5.8	12.7	14.6	16.0	0.0
LnGrp LOS	C	A	B	B	B	
Approach Vol, veh/h		154	434		363	
Approach Delay, s/veh		12.9	13.7		16.0	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		22.3		15.7	7.5	14.8		
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		
Max Green Setting (Gmax), s		31.0		24.0	7.0	19.0		
Max Q Clear Time (g_c+I1), s		2.6		9.9	3.5	7.7		
Green Ext Time (p_c), s		0.5		1.0	0.0	2.1		

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	80	140	0	40	55
Future Vol, veh/h	5	80	140	0	40	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	160	-	-	-	160	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	7	7	16	16	16	16
Mvmt Flow	6	98	171	0	49	67

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	171	0	-	0	232	86
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	61	-
Critical Hdwy	4.24	-	-	-	7.12	7.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.27	-	-	-	3.66	3.46
Pot Cap-1 Maneuver	1368	-	-	0	698	912
Stage 1	-	-	-	0	801	-
Stage 2	-	-	-	0	914	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1368	-	-	-	695	912
Mov Cap-2 Maneuver	-	-	-	-	695	-
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	914	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1368	-	-	695	912
HCM Lane V/C Ratio	0.004	-	-	0.07	0.074
HCM Control Delay (s)	7.6	-	-	10.6	9.3
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	40	180	15	45	5
Future Vol, veh/h	10	40	180	15	45	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	20	20	8	8	0	0
Mvmt Flow	11	44	200	17	50	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	217	0	-	0	275	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	66	-
Critical Hdwy	4.3	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.38	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1253	-	-	-	719	836
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	962	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1253	-	-	-	713	836
Mov Cap-2 Maneuver	-	-	-	-	713	-
Stage 1	-	-	-	-	824	-
Stage 2	-	-	-	-	962	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1253	-	-	-	713	836
HCM Lane V/C Ratio	0.009	-	-	-	0.07	0.007
HCM Control Delay (s)	7.9	0	-	-	10.4	9.3
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	100	220	0	0	275	325	95	0	145	0	0	0
Future Volume (veh/h)	100	220	0	0	275	325	95	0	145	0	0	0
Number	5	2	12	1	6	16	7	4	14			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1792	1792	0	0	1792	1900	1900	1681	1681			
Adj Flow Rate, veh/h	110	242	0	0	302	357	104	0	0			
Adj No. of Lanes	1	2	0	0	2	0	0	1	1			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	6	6	0	0	6	6	13	13	13			
Cap, veh/h	161	1983	0	0	584	522	205	0	183			
Arrive On Green	0.09	0.58	0.00	0.00	0.34	0.34	0.13	0.00	0.00			
Sat Flow, veh/h	1707	3495	0	0	1792	1524	1601	0	1429			
Grp Volume(v), veh/h	110	242	0	0	302	357	104	0	0			
Grp Sat Flow(s),veh/h/ln	1707	1703	0	0	1703	1524	1601	0	1429			
Q Serve(g_s), s	2.2	1.1	0.0	0.0	4.9	6.9	2.1	0.0	0.0			
Cycle Q Clear(g_c), s	2.2	1.1	0.0	0.0	4.9	6.9	2.1	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	161	1983	0	0	584	522	205	0	183			
V/C Ratio(X)	0.68	0.12	0.00	0.00	0.52	0.68	0.51	0.00	0.00			
Avail Cap(c_a), veh/h	346	2961	0	0	888	795	928	0	829			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	15.1	3.2	0.0	0.0	9.1	9.7	14.0	0.0	0.0			
Incr Delay (d2), s/veh	5.0	0.0	0.0	0.0	0.7	1.6	1.9	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.2	0.5	0.0	0.0	2.4	3.1	1.0	0.0	0.0			
LnGrp Delay(d),s/veh	20.1	3.3	0.0	0.0	9.8	11.3	16.0	0.0	0.0			
LnGrp LOS	C	A			A	B	B					
Approach Vol, veh/h		352			659			104				
Approach Delay, s/veh		8.5			10.6			16.0				
Approach LOS		A			B			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		25.1		9.4	8.3	16.8		
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		
Max Green Setting (Gmax), s		30.0		20.0	7.0	18.0		
Max Q Clear Time (g_c+I1), s		3.1		4.1	4.2	8.9		
Green Ext Time (p_c), s		1.6		0.4	0.1	2.9		

Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	215	130	215	155	0	0	0	0	105	0	50
Future Volume (veh/h)	0	215	130	215	155	0	0	0	0	105	0	50
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1743	1900	1759	1759	0				1900	1792	1792
Adj Flow Rate, veh/h	0	247	149	247	178	0				121	0	0
Adj No. of Lanes	0	2	0	1	2	0				0	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87				0.87	0.87	0.87
Percent Heavy Veh, %	0	9	9	8	8	0				6	6	6
Cap, veh/h	0	461	269	304	1871	0				241	0	215
Arrive On Green	0.00	0.23	0.23	0.18	0.56	0.00				0.14	0.00	0.00
Sat Flow, veh/h	0	2104	1175	1675	3431	0				1707	0	1524
Grp Volume(v), veh/h	0	201	195	247	178	0				121	0	0
Grp Sat Flow(s),veh/h/ln	0	1656	1536	1675	1671	0				1707	0	1524
Q Serve(g_s), s	0.0	3.6	3.7	4.7	0.8	0.0				2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	3.6	3.7	4.7	0.8	0.0				2.2	0.0	0.0
Prop In Lane	0.00		0.76	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	379	351	304	1871	0				241	0	215
V/C Ratio(X)	0.00	0.53	0.55	0.81	0.10	0.00				0.50	0.00	0.00
Avail Cap(c_a), veh/h	0	891	827	351	2998	0				1021	0	911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.3	11.4	13.1	3.4	0.0				13.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.2	1.4	12.0	0.0	0.0				1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	1.7	3.1	0.4	0.0				1.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	12.5	12.8	25.1	3.4	0.0				14.9	0.0	0.0
LnGrp LOS		B	B	C	A					B		
Approach Vol, veh/h		396			425						121	
Approach Delay, s/veh		12.6			16.0						14.9	
Approach LOS		B			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			11.1	12.6		9.7		23.7
Change Period (Y+Rc), s			5.0	5.0		5.0		5.0
Max Green Setting (Gmax), s			7.0	18.0		20.0		30.0
Max Q Clear Time (g_c+I1), s			6.7	5.7		4.2		2.8
Green Ext Time (p_c), s			0.0	1.9		0.5		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	190	245	170	410	290	75
Future Volume (veh/h)	190	245	170	410	290	75
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1900	1681	1681
Adj Flow Rate, veh/h	209	269	187	451	319	0
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	6	6	6	6	13	13
Cap, veh/h	255	1948	559	501	384	342
Arrive On Green	0.15	0.57	0.33	0.33	0.24	0.00
Sat Flow, veh/h	1707	3495	1792	1524	1601	1429
Grp Volume(v), veh/h	209	269	187	451	319	0
Grp Sat Flow(s),veh/h/ln	1707	1703	1703	1524	1601	1429
Q Serve(g_s), s	6.3	1.9	4.4	15.0	10.0	0.0
Cycle Q Clear(g_c), s	6.3	1.9	4.4	15.0	10.0	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	255	1948	559	501	384	342
V/C Ratio(X)	0.82	0.14	0.33	0.90	0.83	0.00
Avail Cap(c_a), veh/h	257	1990	578	517	724	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.9	5.3	13.4	17.0	19.2	0.0
Incr Delay (d2), s/veh	18.5	0.0	0.3	18.5	4.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.9	2.1	8.8	4.9	0.0
LnGrp Delay(d),s/veh	40.4	5.3	13.8	35.5	23.9	0.0
LnGrp LOS	D	A	B	D	C	
Approach Vol, veh/h		478	638		319	
Approach Delay, s/veh		20.7	29.1		23.9	
Approach LOS		C	C		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		35.3		17.7	12.9	22.4		
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		
Max Green Setting (Gmax), s		31.0		24.0	8.0	18.0		
Max Q Clear Time (g_c+I1), s		3.9		12.0	8.3	17.0		
Green Ext Time (p_c), s		1.8		0.8	0.0	0.5		

Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	270	215	0	80	15
Future Vol, veh/h	5	270	215	0	80	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	160	-	-	-	160	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	7	7	10	10	8	8
Mvmt Flow	6	318	253	0	94	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	253	0	-	0	424	127
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	171	-
Critical Hdwy	4.24	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.27	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	1274	-	-	0	543	881
Stage 1	-	-	-	0	748	-
Stage 2	-	-	-	0	824	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1274	-	-	-	540	881
Mov Cap-2 Maneuver	-	-	-	-	540	-
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	824	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1274	-	-	540	881
HCM Lane V/C Ratio	0.005	-	-	0.174	0.02
HCM Control Delay (s)	7.8	-	-	13.1	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	0.6	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	235	140	85	35	0
Future Vol, veh/h	0	235	140	85	35	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	0	273	163	99	41	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	262	0	-	0	486	213
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	4.13	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.227	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	1296	-	-	-	526	807
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	755	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1296	-	-	-	526	807
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	755	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1296	-	-	-	526	-
HCM Lane V/C Ratio	-	-	-	-	0.077	-
HCM Control Delay (s)	0	-	-	-	12.4	0
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3	-

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	145	205	0	220	55
Future Vol, veh/h	20	145	205	0	220	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	216	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	9	9	13	13	12	12
Mvmt Flow	22	159	225	0	242	60

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	225	0	-	0	349	113
Stage 1	-	-	-	-	225	-
Stage 2	-	-	-	-	124	-
Critical Hdwy	4.28	-	-	-	7.04	7.14
Critical Hdwy Stg 1	-	-	-	-	6.04	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.29	-	-	-	3.62	3.42
Pot Cap-1 Maneuver	1291	-	-	0	596	887
Stage 1	-	-	-	0	762	-
Stage 2	-	-	-	0	859	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1291	-	-	-	586	887
Mov Cap-2 Maneuver	-	-	-	-	586	-
Stage 1	-	-	-	-	749	-
Stage 2	-	-	-	-	859	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1291	-	-	586	887
HCM Lane V/C Ratio	0.017	-	-	0.413	0.068
HCM Control Delay (s)	7.8	-	-	15.4	9.4
HCM Lane LOS	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	-	-	2	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	80	160	90	75	50
Future Vol, veh/h	30	80	160	90	75	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	215	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	16	16	19	19	7	7
Mvmt Flow	35	93	186	105	87	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	186	0	-	0	356	146
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	117	-
Critical Hdwy	4.42	-	-	-	6.94	7.04
Critical Hdwy Stg 1	-	-	-	-	5.94	-
Critical Hdwy Stg 2	-	-	-	-	5.94	-
Follow-up Hdwy	2.36	-	-	-	3.57	3.37
Pot Cap-1 Maneuver	1289	-	-	-	603	859
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1289	-	-	-	587	859
Mov Cap-2 Maneuver	-	-	-	-	587	-
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	881	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1289	-	-	-	587	859
HCM Lane V/C Ratio	0.027	-	-	-	0.149	0.068
HCM Control Delay (s)	7.9	-	-	-	12.2	9.5
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5	0.2

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↰	↱
Traffic Vol, veh/h	0	35	235	0	40	5
Future Vol, veh/h	0	35	235	0	40	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	20	20	8	8	0	0
Mvmt Flow	0	39	261	0	44	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	300	261
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	696	783
Stage 1	0	-	-	0	787	-
Stage 2	0	-	-	0	989	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	696	783
Mov Cap-2 Maneuver	-	-	-	-	696	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	989	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	696	783
HCM Lane V/C Ratio	-	-	0.064	0.007
HCM Control Delay (s)	-	-	10.5	9.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	70	125	0	20	110
Future Vol, veh/h	5	70	125	0	20	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	160	-	-	-	160	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	7	7	16	16	16	16
Mvmt Flow	6	85	152	0	24	134

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	152	0	-	0	207	76
Stage 1	-	-	-	-	152	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	4.24	-	-	-	7.12	7.22
Critical Hdwy Stg 1	-	-	-	-	6.12	-
Critical Hdwy Stg 2	-	-	-	-	6.12	-
Follow-up Hdwy	2.27	-	-	-	3.66	3.46
Pot Cap-1 Maneuver	1391	-	-	0	724	926
Stage 1	-	-	-	0	820	-
Stage 2	-	-	-	0	921	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1391	-	-	-	721	926
Mov Cap-2 Maneuver	-	-	-	-	721	-
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	921	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1391	-	-	721	926
HCM Lane V/C Ratio	0.004	-	-	0.034	0.145
HCM Control Delay (s)	7.6	-	-	10.2	9.5
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	335	375	0	165	40
Future Vol, veh/h	80	335	375	0	165	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	216	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	6	6	6	6	13	13
Mvmt Flow	88	368	412	0	181	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	412	0	-	0	772	206
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	360	-
Critical Hdwy	4.22	-	-	-	7.06	7.16
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	2.26	-	-	-	3.63	3.43
Pot Cap-1 Maneuver	1115	-	-	0	314	767
Stage 1	-	-	-	0	606	-
Stage 2	-	-	-	0	645	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1115	-	-	-	289	767
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	645	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	31.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1115	-	-	289	767
HCM Lane V/C Ratio	0.079	-	-	0.627	0.057
HCM Control Delay (s)	8.5	-	-	36.3	10
HCM Lane LOS	A	-	-	E	B
HCM 95th %tile Q(veh)	0.3	-	-	3.9	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	300	160	225	100	40
Future Vol, veh/h	75	300	160	225	100	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	Yield
Storage Length	215	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	9	9	8	8	6	6
Mvmt Flow	86	345	184	259	115	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	184	0	-	0	659	222
Stage 1	-	-	-	-	314	-
Stage 2	-	-	-	-	345	-
Critical Hdwy	4.28	-	-	-	6.92	7.02
Critical Hdwy Stg 1	-	-	-	-	5.92	-
Critical Hdwy Stg 2	-	-	-	-	5.92	-
Follow-up Hdwy	2.29	-	-	-	3.56	3.36
Pot Cap-1 Maneuver	1339	-	-	-	388	769
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	677	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1339	-	-	-	363	769
Mov Cap-2 Maneuver	-	-	-	-	363	-
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	677	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1339	-	-	-	363	769
HCM Lane V/C Ratio	0.064	-	-	-	0.317	0.06
HCM Control Delay (s)	7.9	-	-	-	19.4	10
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1.3	0.2

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↰	↱
Traffic Vol, veh/h	0	215	145	0	80	5
Future Vol, veh/h	0	215	145	0	80	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	9	9	10	10
Mvmt Flow	0	250	169	0	93	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	419	169
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	250	-
Critical Hdwy	-	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	0	-	-	0	576	855
Stage 1	0	-	-	0	842	-
Stage 2	0	-	-	0	773	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	576	855
Mov Cap-2 Maneuver	-	-	-	-	576	-
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	773	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	576	855
HCM Lane V/C Ratio	-	-	0.161	0.007
HCM Control Delay (s)	-	-	12.5	9.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.6	0

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	295	90	0	20	60
Future Vol, veh/h	5	295	90	0	20	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	160	-	-	-	160	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	7	7	10	10	8	8
Mvmt Flow	6	347	106	0	24	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	106	0	-	0	292	53
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	4.24	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.27	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	1447	-	-	0	659	984
Stage 1	-	-	-	0	889	-
Stage 2	-	-	-	0	810	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1447	-	-	-	656	984
Mov Cap-2 Maneuver	-	-	-	-	656	-
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	810	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1447	-	-	656	984
HCM Lane V/C Ratio	0.004	-	-	0.036	0.072
HCM Control Delay (s)	7.5	-	-	10.7	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2

Appendix C: Future Conditions Freeway Analysis Reports

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	8
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB/WB Off-Ramp	2000	3
3	Basic	Basic	I-80 EB/WB Off-Ramp to Lincolnway Off-Ramp	2600	2
4	Diverge	Diverge	Lincolnway Off-Ramp	1500	2
5	Basic	Basic	Lincolnway Off-Ramp to I-80 EB/WB On-Ramp	1800	2
6	Merge	Merge	I-80 EB/WB On-Ramp	1500	2
7	Merge	Merge	Lincolnway On-Ramp	1500	2
8	Basic	Basic	W Lincolnway On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2937	4452	0.66	52.6	27.9	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4259	5594	0.76	52.1	27.2	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.690	3076	4452	0.69	52.6	29.2	D

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	0.94	0.94	0.690	0.870	3076	452	4700	2000	0.65	0.23	54.2	54.2	28.4	23.5	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	2627	4494	0.58	54.7	24.0	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.741	0.901	3077	744	4700	2000	0.65	0.37	57.0	57.0	27.0	24.2	C

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.752	0.926	3339	149	4700	2000	0.71	0.07	55.9	55.9	29.9	28.4	D

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.752	3374	4644	0.73	61.7	27.3	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	54.7	27.6	19.3	2.9	D

Facility Overall Results

Space Mean Speed, mi/h	54.7	Density, veh/mi/ln	19.3
Average Travel Time, min	2.9	Density, pc/mi/ln	27.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	10
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Diverge	Diverge	Off-Ramp to I-80 EB/WB	1100	2
4	Basic	Basic	Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	1700	2
5	Merge	Merge	On-Ramp from Linconway	1500	2
6	Basic	Basic	Between On-Ramp from Linconway & On-Ramp from I-80 EB	2200	2
7	Merge	Basic	On-Ramp from I-80 EB	1500	3
8	Weaving	Weaving	I-80 WB On-Ramp to College Dr Off-Ramp	1500	4
9	Basic	Basic	College Dr to Mainline Merge	500	3
10	Basic	Basic	Mainline Merge to End of Study Area	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.746	2938	4556	0.64	57.8	25.4	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.746	0.917	2938	307	4700	2000	0.63	0.15	56.0	56.0	26.2	29.5	D

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.725	0.901	2634	425	4700	2000	0.56	0.21	54.3	54.3	24.3	19.7	B

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.662	2306	4560	0.51	58.0	19.9	C

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.676	0.862	2400	142	4700	2000	0.51	0.07	57.9	57.9	20.7	19.2	B

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.676	2439	4636	0.53	61.8	19.7	C

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.676	0.667	2854	415	7050	2000	0.35	0.21	65.0	-	12.5	-	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3318	6845	0.48	53.0	15.7	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2549	6876	0.37	59.2	14.4	B

Segment 10: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2549	4636	0.55	61.8	20.6	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	58.2	19.4	13.5	2.8	C

Facility Overall Results

Space Mean Speed, mi/h	58.2	Density, veh/mi/ln	13.5
Average Travel Time, min	2.8	Density, pc/mi/ln	19.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 NB/SB Off-Ramp	2900	2
4	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
5	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 SB On-Ramp	500	2
6	Merge	Merge	I-25 SB On-Ramp to I-25 NB Off-Ramp	1500	2
7	Basic	Basic	I-25 SB On-Ramp to I-25 NB On-Ramp	800	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1134	7107	0.16	66.9	5.7	A

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1134	59	7200	2100	0.16	0.03	75.0	-	5.0	-	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1058	4694	0.23	64.7	8.2	A

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.719	1058	533	4800	2100	0.22	0.25	65.7	65.7	8.1	11.6	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	510	4694	0.11	64.7	3.9	A

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.885	744	234	4800	2000	0.16	0.12	65.3	65.3	5.7	8.1	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	807	4784	0.17	69.2	5.8	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	1367	560	4800	2100	0.28	0.27	64.6	64.6	10.6	14.6	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1469	4800	0.31	71.8	10.2	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.9	7.5	5.2	2.1	B

Facility Overall Results

Space Mean Speed, mi/h	66.9	Density, veh/mi/ln	5.2
Average Travel Time, min	2.1	Density, pc/mi/ln	7.5

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	10
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blcvvd) to I-25 NB/SB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 NB On-Ramp	2000	2
4	Merge	Basic	I-25 NB On-Ramp	1600	3
5	Merge	Merge	I-25 SB On-Ramp	800	3
6	Diverge	Diverge	W Lincolnway WB off-Ramp	1500	3
7	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp (3 Lanes)	500	3
8	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp (2 Lanes)	600	2
9	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
10	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2861	4800	0.60	70.8	20.2	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	2861	1151	4800	2000	0.60	0.58	59.6	59.6	24.0	26.6	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1377	4652	0.30	62.6	11.0	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.663	0.658	2123	671	7200	2000	0.20	0.34	75.4	-	6.4	-	A

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.687	0.917	2235	191	7200	2000	0.31	0.10	68.8	66.0	10.8	11.5	B

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.668	0.935	2365	108	7200	2000	0.33	0.05	65.9	60.8	12.0	11.5	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.706	2095	7107	0.29	66.9	10.4	A

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.706	2095	4746	0.44	67.3	15.6	B

Segment 9: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	2179	64	4800	2000	0.45	0.03	64.2	64.2	17.0	20.9	C

Segment 10: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2199	4800	0.46	72.2	15.2	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.9	13.8	9.5	2.2	B

Facility Overall Results

Space Mean Speed, mi/h	66.9	Density, veh/mi/ln	9.5
Average Travel Time, min	2.2	Density, pc/mi/ln	13.8

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	8
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB/WB Off-Ramp	2000	3
3	Basic	Basic	I-80 EB/WB Off-Ramp to Lincolnway Off-Ramp	2600	2
4	Diverge	Diverge	Lincolnway Off-Ramp	1500	2
5	Basic	Basic	Lincolnway Off-Ramp to I-80 EB/WB On-Ramp	1800	2
6	Merge	Merge	I-80 EB/WB On-Ramp	1500	2
7	Merge	Merge	Lincolnway On-Ramp	1500	2
8	Basic	Basic	W Lincolnway On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3272	4452	0.73	52.6	31.1	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4353	5655	0.77	53.0	27.4	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.680	3113	4452	0.70	52.6	29.6	D

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	0.94	0.94	0.680	0.870	3113	293	4700	2000	0.66	0.15	54.6	54.6	28.5	23.8	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	2829	4494	0.63	54.7	25.9	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.704	0.901	3293	649	4700	2000	0.70	0.32	56.5	56.5	29.1	25.9	C

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.730	0.926	3840	488	4700	2000	0.82	0.24	54.3	54.3	35.4	32.1	D

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	3971	4644	0.86	58.6	33.9	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	54.4	29.7	20.5	2.9	E

Facility Overall Results

Space Mean Speed, mi/h	54.4	Density, veh/mi/ln	20.5
Average Travel Time, min	2.9	Density, pc/mi/ln	29.7

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	10
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Diverge	Diverge	Off-Ramp to I-80 EB/WB	1100	2
4	Basic	Basic	Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	1700	2
5	Merge	Merge	On-Ramp from Linconway	1500	2
6	Basic	Basic	Between On-Ramp from Linconway & On-Ramp from I-80 EB	2200	2
7	Merge	Basic	On-Ramp from I-80 EB	1500	3
8	Weaving	Weaving	I-80 WB On-Ramp to College Dr Off-Ramp	1500	4
9	Basic	Basic	College Dr to Mainline Merge	500	3
10	Basic	Basic	Mainline Merge to End of Study Area	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	3544	4556	0.78	57.7	30.7	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.704	0.917	3544	180	4700	2000	0.75	0.09	56.3	56.3	31.5	34.7	D

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.690	0.901	3377	478	4700	2000	0.72	0.24	54.2	54.2	31.2	26.1	C

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	2886	4560	0.63	58.0	24.9	C

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.685	0.862	3198	426	4700	2000	0.68	0.21	56.7	56.7	28.2	25.3	C

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	3308	4636	0.71	61.5	26.9	D

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.680	0.667	4082	750	7050	2000	0.47	0.38	65.0	-	17.1	-	B

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4574	6989	0.65	49.4	23.1	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3417	6876	0.50	59.2	19.2	C

Segment 10: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3417	4636	0.74	61.3	27.9	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	57.5	25.6	17.5	2.9	D

Facility Overall Results

Space Mean Speed, mi/h	57.5	Density, veh/mi/ln	17.5
Average Travel Time, min	2.9	Density, pc/mi/ln	25.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 NB/SB Off-Ramp	2900	2
4	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
5	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 SB On-Ramp	500	2
6	Merge	Merge	I-25 SB On-Ramp to I-25 NB Off-Ramp	1500	2
7	Basic	Basic	I-25 SB On-Ramp to I-25 NB On-Ramp	800	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2717	7107	0.38	66.9	13.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	2717	41	7200	2100	0.38	0.02	75.0	-	12.1	-	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2663	4694	0.57	64.7	20.6	C

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.719	2663	873	4800	2100	0.55	0.42	64.7	64.7	20.6	25.4	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1765	4694	0.38	64.7	13.6	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.885	2047	282	4800	2000	0.43	0.14	64.6	64.6	15.8	18.2	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2123	4784	0.44	69.2	15.3	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	2857	734	4800	2100	0.60	0.35	62.9	62.9	22.7	26.1	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2991	4800	0.62	70.3	21.3	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.1	18.1	12.6	2.1	C

Facility Overall Results

Space Mean Speed, mi/h	66.1	Density, veh/mi/ln	12.6
Average Travel Time, min	2.1	Density, pc/mi/ln	18.1

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	10
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blcvvd) to I-25 NB/SB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 NB On-Ramp	2000	2
4	Merge	Basic	I-25 NB On-Ramp	1600	3
5	Merge	Merge	I-25 SB On-Ramp	800	3
6	Diverge	Diverge	W Lincolnway WB off-Ramp	1500	3
7	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp (3 Lanes)	500	3
8	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp (2 Lanes)	600	2
9	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
10	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2473	4800	0.52	71.7	17.2	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	2473	1086	4800	2000	0.52	0.54	59.8	59.8	20.7	23.3	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1073	4652	0.23	62.6	8.6	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.663	0.658	1729	598	7200	2000	0.16	0.30	75.4	-	5.0	-	A

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.687	0.917	1862	197	7200	2000	0.26	0.10	69.0	66.1	9.0	9.8	A

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.668	0.891	1983	113	7200	2000	0.28	0.06	65.6	60.8	10.1	9.4	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.706	1733	7107	0.24	66.9	8.6	A

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.706	1733	4746	0.37	67.3	12.9	B

Segment 9: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1785	35	4800	2000	0.37	0.02	64.6	64.6	13.8	17.9	B

Segment 10: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1796	4800	0.37	72.2	12.4	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.1	11.4	7.9	2.2	B

Facility Overall Results

Space Mean Speed, mi/h	67.1	Density, veh/mi/ln	7.9
Average Travel Time, min	2.2	Density, pc/mi/ln	11.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB Off-Ramp	3000	3
3	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	2200	2
4	Weaving	Weaving	I-80 EB On-Ramp to I-80 WB Off-Ramp	550	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1000	2
6	Weaving	Weaving	I-80 WB On-Ramp to W Lincolnway Off-Ramp	2100	3
7	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
8	Merge	Merge	W Lincolnway On-Ramp	1500	2
9	Basic	Basic	W Lincolnway On-Ramp to Mainline End	400	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2945	4452	0.66	52.6	28.0	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4235	5904	0.72	49.1	28.8	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.680	3786	4452	0.85	52.6	36.0	E

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.690	3890	6049	0.64	51.4	25.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3112	4700	0.66	64.7	24.0	C

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.735	3575	5848	0.61	53.1	22.4	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	3447	4700	0.73	63.5	27.1	D

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.719	0.926	3596	149	4700	2000	0.77	0.07	54.8	54.8	32.8	31.6	D

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	3585	4626	0.77	60.3	29.7	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.9	28.2	19.4	3.0	D

Facility Overall Results

Space Mean Speed, mi/h	53.9	Density, veh/mi/ln	19.4
Average Travel Time, min	3.0	Density, pc/mi/ln	28.2

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
4	Weaving	Weaving	W Lincolnway On-Ramp to I-80 WB Off-Ramp	350	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1500	2
6	Weaving	Weaving	I-80 WB On-Ramp to I-80 EB Off-Ramp	500	3
7	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	1600	2
8	Weaving	Weaving	I-80 EB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to MainLine End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.714	3084	4556	0.68	57.8	26.7	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.694	0.917	3173	145	4700	2000	0.68	0.07	56.4	56.4	28.1	31.5	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.694	2981	4452	0.67	52.6	28.3	D

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	3077	6239	0.49	57.4	17.9	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.694	2974	4452	0.67	52.6	28.3	D

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	3626	5816	0.62	50.0	24.2	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	3362	4494	0.75	54.7	30.7	D

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3786	5911	0.64	50.0	25.2	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2557	4584	0.56	59.2	21.6	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.9	26.4	18.1	2.7	D

Facility Overall Results

Space Mean Speed, mi/h	53.9	Density, veh/mi/ln	18.1
Average Travel Time, min	2.7	Density, pc/mi/ln	26.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 SB Off-Ramp	2300	2
4	Diverge	Diverge	I-25 SB Off-Ramp	1500	2
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	1900	2
6	Weaving	Weaving	I-25 SB On-Ramp to I-25 NB Off-Ramp	1170	3
7	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1600	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1004	7107	0.14	66.9	5.0	A

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1004	41	7200	2100	0.14	0.02	75.0	-	4.5	-	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	951	4694	0.20	64.7	7.4	A

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.667	951	407	4800	2100	0.20	0.19	66.1	66.1	7.2	10.6	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	563	4694	0.12	64.7	4.4	A

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	821	4136	0.20	62.4	4.4	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	776	4784	0.16	69.2	5.6	A

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	1336	560	4800	2100	0.28	0.27	64.9	64.9	10.3	14.3	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1438	4800	0.30	71.8	10.0	A

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.8	6.5	4.5	2.3	B

Facility Overall Results

Space Mean Speed, mi/h	66.8	Density, veh/mi/ln	4.5
Average Travel Time, min	2.3	Density, pc/mi/ln	6.5

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blvd) to I-25 NB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1500	2
4	Weaving	Weaving	I-25 NB On-Ramp to I-25 SB Off-Ramp	200	3
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	2100	2
6	Weaving	Weaving	I-25 SB On-Ramp to W Lincolnway WB off-Ramp	600	3
7	Basic	Basic	W Lincolnway WB off-Ramp to W Lincolnway WB On-Ramp	2300	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2816	4800	0.59	70.9	19.9	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	2816	661	4800	2000	0.59	0.33	61.1	61.1	23.0	26.2	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1963	4652	0.42	62.6	15.7	B

Segment 4: Weaving

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.94	0.699	2989	4345	0.69	46.9	21.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1887	4694	0.40	64.7	14.6	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1994	6127	0.33	68.8	9.7	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1880	4738	0.40	66.9	14.1	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1991	111	4800	2000	0.41	0.06	64.3	64.3	15.5	19.6	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2024	4800	0.42	71.8	14.1	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.5	16.1	11.2	2.2	C

Facility Overall Results

Space Mean Speed, mi/h	65.5	Density, veh/mi/ln	11.2
Average Travel Time, min	2.2	Density, pc/mi/ln	16.1

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB Off-Ramp	3000	3
3	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	2200	2
4	Weaving	Weaving	I-80 EB On-Ramp to I-80 WB Off-Ramp	550	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1000	2
6	Weaving	Weaving	I-80 WB On-Ramp to W Lincolnway Off-Ramp	2100	3
7	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
8	Merge	Merge	W Lincolnway On-Ramp	1500	2
9	Basic	Basic	W Lincolnway On-Ramp to Mainline End	400	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3341	4452	0.75	52.6	31.7	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4705	5855	0.80	47.4	33.1	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.676	4076	4452	0.92	52.0	39.2	E

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	4213	6093	0.69	51.5	27.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.690	3569	4494	0.79	54.7	32.6	D

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.763	3744	6081	0.62	53.8	23.2	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	3856	4700	0.82	61.1	31.6	D

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.709	0.926	4074	218	4700	2000	0.87	0.11	52.8	52.8	38.6	35.3	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	4084	4626	0.88	57.2	35.7	E

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.5	32.0	22.0	3.1	E

Facility Overall Results

Space Mean Speed, mi/h	52.5	Density, veh/mi/ln	22.0
Average Travel Time, min	3.1	Density, pc/mi/ln	32.0

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
4	Weaving	Weaving	W Lincolnway On-Ramp to I-80 WB Off-Ramp	350	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1500	2
6	Weaving	Weaving	I-80 WB On-Ramp to I-80 EB Off-Ramp	500	3
7	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	1600	2
8	Weaving	Weaving	I-80 EB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to MainLine End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	3751	4556	0.82	57.1	32.9	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.709	0.917	3751	162	4700	2000	0.80	0.08	56.3	56.3	33.3	36.5	E

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3592	4452	0.81	52.6	34.1	D

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.714	3910	6145	0.64	53.9	24.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	3816	4452	0.86	52.6	36.3	E

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.725	4448	5867	0.76	47.9	31.0	D

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	4065	4494	0.90	53.5	38.0	E

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4487	5681	0.79	48.6	30.8	D

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3310	4584	0.72	59.2	28.0	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.1	32.6	22.6	2.7	E

Facility Overall Results

Space Mean Speed, mi/h	53.1	Density, veh/mi/ln	22.6
Average Travel Time, min	2.7	Density, pc/mi/ln	32.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 SB Off-Ramp	2300	2
4	Diverge	Diverge	I-25 SB Off-Ramp	1500	2
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	1900	2
6	Weaving	Weaving	I-25 SB On-Ramp to I-25 NB Off-Ramp	1170	3
7	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1600	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2351	7107	0.33	66.9	11.7	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	2351	99	7200	2100	0.33	0.05	75.0	-	10.5	-	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2222	4694	0.47	64.7	17.2	B

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.667	2222	678	4800	2100	0.46	0.32	65.3	65.3	17.0	21.6	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1575	4694	0.34	64.7	12.2	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1965	5478	0.36	61.9	10.6	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1918	4784	0.40	69.2	13.9	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	2691	773	4800	2100	0.56	0.37	63.5	63.5	21.2	24.8	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2831	4800	0.59	70.9	20.0	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.2	15.0	10.4	2.3	C

Facility Overall Results

Space Mean Speed, mi/h	66.2	Density, veh/mi/ln	10.4
Average Travel Time, min	2.3	Density, pc/mi/ln	15.0

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blvd) to I-25 NB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1500	2
4	Weaving	Weaving	I-25 NB On-Ramp to I-25 SB Off-Ramp	200	3
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	2100	2
6	Weaving	Weaving	I-25 SB On-Ramp to W Lincolnway WB off-Ramp	600	3
7	Basic	Basic	W Lincolnway WB off-Ramp to W Lincolnway WB On-Ramp	2300	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2420	4800	0.50	71.7	16.9	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	2420	543	4800	2000	0.50	0.27	61.4	61.4	19.7	22.8	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1720	4652	0.37	62.6	13.7	B

Segment 4: Weaving

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.94	0.699	2604	4095	0.64	47.6	18.2	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1545	4694	0.33	64.7	11.9	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1688	6183	0.27	69.9	8.0	A

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1628	4738	0.34	66.9	12.2	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	1739	111	4800	2000	0.36	0.06	64.5	64.5	13.5	17.7	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1773	4800	0.37	71.8	12.3	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.7	13.7	9.6	2.2	B

Facility Overall Results

Space Mean Speed, mi/h	65.7	Density, veh/mi/ln	9.6
Average Travel Time, min	2.2	Density, pc/mi/ln	13.7

Appendix D: Future Conditions Sensitivity Analysis Reports

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	8
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB/WB Off-Ramp	2000	3
3	Basic	Basic	I-80 EB/WB Off-Ramp to Lincolnway Off-Ramp	2600	2
4	Diverge	Diverge	Lincolnway Off-Ramp	1500	2
5	Basic	Basic	Lincolnway Off-Ramp to I-80 EB/WB On-Ramp	1800	2
6	Merge	Merge	I-80 EB/WB On-Ramp	1500	2
7	Merge	Merge	Lincolnway On-Ramp	1500	2
8	Basic	Basic	W Lincolnway On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4109	4452	0.92	52.6	34.9	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4563	4579	1.18	33.9	45.0	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.690	3724	4452	0.97	52.1	30.0	D

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	0.94	0.94	0.690	0.870	3724	636	4700	2000	0.92	0.32	53.8	53.8	34.6	29.1	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	3088	4494	0.82	54.6	23.9	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.741	0.901	4127	1039	4700	2000	0.91	0.52	53.3	53.3	38.7	32.2	D

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.752	0.926	4334	207	4700	2000	0.99	0.10	51.6	51.6	42.0	36.1	E

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.752	4334	4644	1.01	56.7	38.2	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	48.8	36.2	25.8	3.2	F

Facility Overall Results

Space Mean Speed, mi/h	48.8	Density, veh/mi/ln	25.8
Average Travel Time, min	3.2	Density, pc/mi/ln	36.2

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Diverge	Diverge	Off-Ramp to I-80 EB/WB	1100	2
4	Basic	Basic	Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	1700	2
5	Merge	Merge	On-Ramp from Linconway	1500	2
6	Basic	Basic	Between On-Ramp from Linconway & On-Ramp from I-80 EB	2200	2
7	Merge	Basic	On-Ramp from I-80 EB	1500	2
8	Weaving	Weaving	I-80 WB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.746	4556	4556	1.03	54.1	42.1	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.746	0.917	4556	493	4700	2000	1.00	0.25	55.6	55.6	41.0	43.4	E

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.725	0.901	4063	679	4700	2000	0.90	0.34	53.8	53.8	37.8	32.0	D

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.662	3384	4560	0.81	57.6	26.5	D

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.676	0.862	3612	228	4700	2000	0.82	0.11	55.6	55.6	32.5	28.6	D

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.676	3612	4636	0.84	61.5	28.8	D

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.676	0.667	4274	662	4700	2000	0.83	0.33	52.5	-	40.7	-	E

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	5355	5530	0.93	45.8	37.3	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3939	4584	0.89	58.5	32.6	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	53.8	35.2	24.9	3.1	F

Facility Overall Results

Space Mean Speed, mi/h	53.8	Density, veh/mi/ln	24.9
Average Travel Time, min	3.1	Density, pc/mi/ln	35.2

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 NB/SB Off-Ramp	2900	2
4	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
5	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 SB On-Ramp	500	2
6	Merge	Merge	I-25 SB On-Ramp to I-25 NB Off-Ramp	1500	2
7	Basic	Basic	I-25 SB On-Ramp to I-25 NB On-Ramp	800	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3744	7107	0.53	66.9	16.8	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	3744	193	7200	2100	0.52	0.09	69.2	-	18.0	-	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3551	4694	0.74	64.7	26.0	C

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.719	3551	1761	4800	2100	0.73	0.84	62.1	62.1	28.6	33.0	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1790	4694	0.36	64.2	11.9	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.885	2565	775	4800	2000	0.51	0.39	63.9	63.9	20.1	22.1	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2565	4784	0.56	68.4	17.3	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	4413	1848	4800	2100	0.94	0.88	54.5	54.5	40.5	37.7	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4413	4800	1.01	58.9	37.5	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	62.2	25.5	17.8	2.2	F

Facility Overall Results

Space Mean Speed, mi/h	62.2	Density, veh/mi/ln	17.8
Average Travel Time, min	2.2	Density, pc/mi/ln	25.5

HCS7 Freeway Facilities Report

Project Information

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Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blcvvd) to I-25 NB/SB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 NB On-Ramp	2000	2
4	Merge	Basic	I-25 NB On-Ramp	1600	3
5	Merge	Merge	I-25 SB On-Ramp	800	3
6	Diverge	Basic	W Lincolnway WB off-Ramp	1500	3
7	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp	1100	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4800	4800	1.01	53.3	45.0	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	4800	1954	4800	2000	1.01	0.98	57.2	57.2	42.0	43.3	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2846	4652	0.50	62.3	19.5	C

Segment 4: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.663	0.658	3986	1140	7200	2000	0.34	0.57	66.1	-	20.1	-	C

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.687	0.917	4311	325	7200	2000	0.53	0.16	67.0	64.6	21.4	21.6	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.668	0.935	4311	182	7200	2000	0.56	0.09	66.3	-	21.7	-	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.684	4129	4738	0.78	62.5	33.0	D

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	4240	111	4800	2000	0.77	0.06	56.3	56.3	37.7	37.0	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4240	4800	0.78	61.1	34.7	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	60.4	29.2	20.2	2.4	F

Facility Overall Results

Space Mean Speed, mi/h	60.4	Density, veh/mi/ln	20.2
Average Travel Time, min	2.4	Density, pc/mi/ln	29.2

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	8
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB/WB Off-Ramp	2000	3
3	Basic	Basic	I-80 EB/WB Off-Ramp to Lincolnway Off-Ramp	2600	2
4	Diverge	Diverge	Lincolnway Off-Ramp	1500	2
5	Basic	Basic	Lincolnway Off-Ramp to I-80 EB/WB On-Ramp	1800	2
6	Merge	Merge	I-80 EB/WB On-Ramp	1500	2
7	Merge	Merge	Lincolnway On-Ramp	1500	2
8	Basic	Basic	W Lincolnway On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3927	4452	0.88	52.6	32.5	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	5350	5614	0.92	51.1	33.9	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.680	3630	4452	0.84	52.6	29.0	D

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	0.94	0.94	0.680	0.870	3630	355	4700	2000	0.79	0.18	54.4	54.4	33.4	28.3	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	3275	4494	0.75	54.7	25.5	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.704	0.901	4054	779	4700	2000	0.84	0.39	53.7	53.7	37.7	31.8	D

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.730	0.926	4640	586	4700	2000	0.98	0.29	49.1	49.1	47.3	38.3	F

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	4640	4644	1.02	53.0	43.8	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.4	34.6	24.3	3.0	F

Facility Overall Results

Space Mean Speed, mi/h	52.4	Density, veh/mi/ln	24.3
Average Travel Time, min	3.0	Density, pc/mi/ln	34.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Diverge	Diverge	Off-Ramp to I-80 EB/WB	1100	2
4	Basic	Basic	Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	1700	2
5	Merge	Merge	On-Ramp from Linconway	1500	2
6	Basic	Basic	Between On-Ramp from Linconway & On-Ramp from I-80 EB	2200	2
7	Merge	Basic	On-Ramp from I-80 EB	1500	2
8	Weaving	Weaving	I-80 WB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	4276	4556	1.01	39.7	53.9	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.704	0.917	4196	232	4700	2000	0.98	0.12	38.7	56.2	54.3	43.9	F

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.690	0.901	3894	620	4700	2000	0.93	0.31	32.1	53.9	60.6	34.8	F

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	3102	4560	0.82	21.1	73.4	F

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.685	0.862	3553	555	4700	2000	0.89	0.28	23.8	53.1	74.5	32.8	F

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	3403	4636	0.93	21.3	79.9	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.680	0.667	4376	973	4700	2000	0.92	0.49	51.8	-	42.2	-	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4888	4888	1.05	36.2	45.0	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3669	4584	0.97	58.1	29.4	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	32.3	56.8	39.2	5.2	F

Facility Overall Results

Space Mean Speed, mi/h	32.3	Density, veh/mi/ln	39.2
Average Travel Time, min	5.2	Density, pc/mi/ln	56.8

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 NB/SB Off-Ramp	2900	2
4	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
5	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 SB On-Ramp	500	2
6	Merge	Merge	I-25 SB On-Ramp to I-25 NB Off-Ramp	1500	2
7	Basic	Basic	I-25 SB On-Ramp to I-25 NB On-Ramp	800	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4589	7107	0.65	66.9	21.3	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	4589	70	7200	2100	0.64	0.03	69.6	-	22.0	-	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4519	4694	0.96	57.5	39.3	E

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.719	4519	1480	4800	2100	0.94	0.70	62.9	62.9	35.9	41.3	E

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3039	4694	0.63	64.3	21.1	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.885	3514	475	4800	2000	0.72	0.24	61.2	61.2	28.7	29.6	D

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3514	4784	0.75	68.0	25.6	C

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	4757	1243	4800	2100	1.00	0.59	50.2	50.2	47.4	40.7	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4757	4800	1.05	54.0	44.1	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	59.0	33.6	23.5	2.3	F

Facility Overall Results

Space Mean Speed, mi/h	59.0	Density, veh/mi/ln	23.5
Average Travel Time, min	2.3	Density, pc/mi/ln	33.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blcvvd) to I-25 NB/SB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 NB On-Ramp	2000	2
4	Merge	Basic	I-25 NB On-Ramp	1600	3
5	Merge	Merge	I-25 SB On-Ramp	800	3
6	Diverge	Basic	W Lincolnway WB off-Ramp	1500	3
7	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp	1100	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4800	4800	1.03	53.3	45.0	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	4800	2173	4800	2000	1.03	1.09	53.3	56.6	45.0	43.3	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2627	4652	0.46	62.1	17.8	B

Segment 4: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.663	0.658	3823	1196	7200	2000	0.31	0.60	66.2	-	19.2	-	C

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.687	0.917	4217	394	7200	2000	0.52	0.20	67.0	64.6	21.0	21.3	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.668	0.891	4217	227	7200	2000	0.55	0.11	66.1	-	21.3	-	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.684	3990	4738	0.75	64.1	31.1	D

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	4060	70	4800	2000	0.74	0.04	57.8	57.8	35.1	35.6	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4060	4800	0.75	63.3	32.1	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	60.2	28.4	19.6	2.5	F

Facility Overall Results

Space Mean Speed, mi/h	60.2	Density, veh/mi/ln	19.6
Average Travel Time, min	2.5	Density, pc/mi/ln	28.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	8
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB/WB Off-Ramp	2000	3
3	Basic	Basic	I-80 EB/WB Off-Ramp to Lincolnway Off-Ramp	2600	2
4	Diverge	Diverge	Lincolnway Off-Ramp	1500	2
5	Basic	Basic	Lincolnway Off-Ramp to I-80 EB/WB On-Ramp	1800	2
6	Merge	Merge	I-80 EB/WB On-Ramp	1500	2
7	Merge	Merge	Lincolnway On-Ramp	1500	2
8	Basic	Basic	W Lincolnway On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3927	4452	0.88	52.6	32.5	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	5350	5614	0.92	51.1	33.9	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.680	3630	4452	0.84	52.6	29.0	D

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	

1	0.94	0.94	0.680	0.870	3630	355	4700	2000	0.79	0.18	54.4	54.4	33.4	28.3	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	3275	4494	0.75	54.7	25.5	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.704	0.901	4054	779	4700	2000	0.84	0.39	53.7	53.7	37.7	31.8	D

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.730	0.926	4640	586	4700	2000	0.98	0.29	49.1	49.1	47.3	38.3	F

Segment 8: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	4640	4644	1.02	53.0	43.8	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	52.4	34.6	24.3	3.0	F

Facility Overall Results

Space Mean Speed, mi/h	52.4	Density, veh/mi/ln	24.3
Average Travel Time, min	3.0	Density, pc/mi/ln	34.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Diverge	Diverge	Off-Ramp to I-80 EB/WB	1100	2
4	Basic	Basic	Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	1700	2
5	Merge	Merge	On-Ramp from Linconway	1500	2
6	Basic	Basic	Between On-Ramp from Linconway & On-Ramp from I-80 EB	2200	2
7	Merge	Basic	On-Ramp from I-80 EB	1500	2
8	Weaving	Weaving	I-80 WB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	4276	4556	1.01	39.7	53.9	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.704	0.917	4196	232	4700	2000	0.98	0.12	38.7	56.2	54.3	43.9	F

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.690	0.901	3894	620	4700	2000	0.93	0.31	32.1	53.9	60.6	34.8	F

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.658	3102	4560	0.82	21.1	73.4	F

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.685	0.862	3553	555	4700	2000	0.89	0.28	23.8	53.1	74.5	32.8	F

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	3403	4636	0.93	21.3	79.9	F

Segment 7: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.680	0.667	4376	973	4700	2000	0.92	0.49	51.8	-	42.2	-	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4888	4888	1.05	36.2	45.0	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3669	4584	0.97	58.1	29.4	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	32.3	56.8	39.2	5.2	F

Facility Overall Results

Space Mean Speed, mi/h	32.3	Density, veh/mi/ln	39.2
Average Travel Time, min	5.2	Density, pc/mi/ln	56.8

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 NB/SB Off-Ramp	2900	2
4	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
5	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 SB On-Ramp	500	2
6	Merge	Merge	I-25 SB On-Ramp to I-25 NB Off-Ramp	1500	2
7	Basic	Basic	I-25 SB On-Ramp to I-25 NB On-Ramp	800	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4589	7107	0.65	66.9	21.3	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	4589	70	7200	2100	0.64	0.03	69.6	-	22.0	-	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4519	4694	0.96	57.5	39.3	E

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.719	4519	1480	4800	2100	0.94	0.70	62.9	62.9	35.9	41.3	E

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3039	4694	0.63	64.3	21.1	C

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.885	3514	475	4800	2000	0.72	0.24	61.2	61.2	28.7	29.6	D

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3514	4784	0.75	68.0	25.6	C

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	4757	1243	4800	2100	1.00	0.59	50.2	50.2	47.4	40.7	F

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4757	4800	1.05	54.0	44.1	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	59.0	33.6	23.5	2.3	F

Facility Overall Results

Space Mean Speed, mi/h	59.0	Density, veh/mi/ln	23.5
Average Travel Time, min	2.3	Density, pc/mi/ln	33.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blcvvd) to I-25 NB/SB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB/SB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB/SB Off-Ramp to I-25 NB On-Ramp	2000	2
4	Merge	Basic	I-25 NB On-Ramp	1600	3
5	Merge	Merge	I-25 SB On-Ramp	800	3
6	Diverge	Basic	W Lincolnway WB off-Ramp	1500	3
7	Basic	Basic	W Lincolnway WB Off-Ramp to W Lincolnway WB On-Ramp	1100	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4800	4800	1.03	53.3	45.0	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	4800	2173	4800	2000	1.03	1.09	53.3	56.6	45.0	43.3	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2627	4652	0.46	62.1	17.8	B

Segment 4: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.663	0.658	3823	1196	7200	2000	0.31	0.60	66.2	-	19.2	-	C

Segment 5: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.687	0.917	4217	394	7200	2000	0.52	0.20	67.0	64.6	21.0	21.3	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.668	0.891	4217	227	7200	2000	0.55	0.11	66.1	-	21.3	-	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.684	3990	4738	0.75	64.1	31.1	D

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	4060	70	4800	2000	0.74	0.04	57.8	57.8	35.1	35.6	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4060	4800	0.75	63.3	32.1	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	60.2	28.4	19.6	2.5	F

Facility Overall Results

Space Mean Speed, mi/h	60.2	Density, veh/mi/ln	19.6
Average Travel Time, min	2.5	Density, pc/mi/ln	28.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB Off-Ramp	3000	3
3	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	2200	2
4	Weaving	Weaving	I-80 EB On-Ramp to I-80 WB Off-Ramp	550	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1000	2
6	Weaving	Weaving	I-80 WB On-Ramp to W Lincolnway Off-Ramp	2100	3
7	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
8	Merge	Merge	W Lincolnway On-Ramp	1500	2
9	Basic	Basic	W Lincolnway On-Ramp to Mainline End	400	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3531	4452	0.79	52.6	28.0	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	5213	5853	0.86	46.4	36.2	E

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.680	4421	4452	1.02	52.5	39.7	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.690	4614	5972	0.77	49.2	31.2	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3728	4700	0.79	60.5	30.1	D

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.735	4697	6086	0.73	50.8	29.2	D

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	4220	4700	0.88	57.9	36.5	E

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.719	0.926	4398	178	4700	2000	0.92	0.09	50.8	50.8	43.3	37.9	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.730	4398	4626	0.93	56.0	39.3	E

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.4	34.8	25.0	3.2	F

Facility Overall Results

Space Mean Speed, mi/h	51.4	Density, veh/mi/ln	25.0
Average Travel Time, min	3.2	Density, pc/mi/ln	34.8

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
4	Weaving	Weaving	W Lincolnway On-Ramp to I-80 WB Off-Ramp	350	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1500	2
6	Weaving	Weaving	I-80 WB On-Ramp to I-80 EB Off-Ramp	500	3
7	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	1600	2
8	Weaving	Weaving	I-80 EB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to MainLine End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.714	4235	4556	0.95	46.9	45.1	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.694	0.917	4168	203	4700	2000	0.95	0.10	42.8	56.2	48.7	42.5	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.694	3880	4452	0.94	35.4	54.8	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	4081	6233	0.69	18.0	75.4	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.694	3752	4452	0.94	29.1	64.5	F

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	4695	5816	0.87	21.9	71.5	F

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	4185	4494	1.05	48.7	35.9	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4725	5206	0.91	45.9	34.5	D

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3020	4584	0.78	58.5	23.3	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	38.8	45.6	32.0	3.7	F

Facility Overall Results

Space Mean Speed, mi/h	38.8	Density, veh/mi/ln	32.0
Average Travel Time, min	3.7	Density, pc/mi/ln	45.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 SB Off-Ramp	2300	2
4	Diverge	Diverge	I-25 SB Off-Ramp	1500	2
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	1900	2
6	Weaving	Weaving	I-25 SB On-Ramp to I-25 NB Off-Ramp	1170	3
7	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1600	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3417	7107	0.48	66.9	15.2	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	3417	140	7200	2100	0.47	0.07	69.3	-	16.4	-	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3277	4694	0.69	64.7	23.2	C

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.667	3277	1380	4800	2100	0.67	0.66	63.2	63.2	25.9	30.6	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	1897	4694	0.41	64.6	12.6	B

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3167	4089	0.68	49.5	18.7	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2627	4784	0.55	67.1	17.8	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	4533	1906	4800	2100	0.95	0.91	53.3	53.3	42.5	38.6	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4533	4800	1.02	57.3	39.6	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	60.2	23.1	16.3	2.5	F

Facility Overall Results

Space Mean Speed, mi/h	60.2	Density, veh/mi/ln	16.3
Average Travel Time, min	2.5	Density, pc/mi/ln	23.1

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 No Build - AM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blvd) to I-25 NB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1500	2
4	Weaving	Weaving	I-25 NB On-Ramp to I-25 SB Off-Ramp	200	3
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	2100	2
6	Weaving	Weaving	I-25 SB On-Ramp to W Lincolnway WB off-Ramp	600	3
7	Basic	Basic	W Lincolnway WB off-Ramp to W Lincolnway WB On-Ramp	2300	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4223	4800	0.88	61.3	34.4	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	4223	992	4800	2000	0.88	0.50	60.1	60.1	35.1	38.3	E

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3231	4652	0.63	62.4	22.8	C

Segment 4: Weaving

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.94	0.699	4327	4917	0.97	41.3	38.5	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3117	4694	0.60	61.1	21.8	C

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3406	6780	0.48	65.9	16.6	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3109	4738	0.60	66.8	21.7	C

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	3279	170	4800	2000	0.62	0.09	61.8	61.8	26.5	29.7	D

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3279	4800	0.63	70.5	23.3	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	62.7	25.6	17.9	2.3	F

Facility Overall Results

Space Mean Speed, mi/h	62.7	Density, veh/mi/ln	17.9
Average Travel Time, min	2.3	Density, pc/mi/ln	25.6

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 NB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin-South of College Dr On-Ramp	1500	2
2	Weaving	Weaving	College Dr On-Ramp to I-80 EB Off-Ramp	3000	3
3	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	2200	2
4	Weaving	Weaving	I-80 EB On-Ramp to I-80 WB Off-Ramp	550	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1000	2
6	Weaving	Weaving	I-80 WB On-Ramp to W Lincolnway Off-Ramp	2100	3
7	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
8	Merge	Merge	W Lincolnway On-Ramp	1500	2
9	Basic	Basic	W Lincolnway On-Ramp to Mainline End	400	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3675	4452	0.83	52.6	29.5	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	5342	5796	0.89	46.0	37.2	E

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.676	4337	4452	1.01	52.5	38.3	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.685	4578	5966	0.76	50.4	30.1	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.690	3871	4494	0.87	53.5	31.8	D

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.763	4575	6565	0.67	52.3	28.2	D

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	4261	4700	0.90	57.4	37.1	E

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.709	0.926	4502	241	4700	2000	0.95	0.12	50.0	50.0	45.0	38.7	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.719	4502	4626	0.97	54.7	41.1	E

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.0	35.1	25.2	3.2	F

Facility Overall Results

Space Mean Speed, mi/h	51.0	Density, veh/mi/ln	25.2
Average Travel Time, min	3.2	Density, pc/mi/ln	35.1

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-25 SB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin to North of of W Lincolnway Off-Ramp	1500	2
2	Diverge	Diverge	W Lincolnway Off-Ramp	1500	2
3	Basic	Basic	W Lincolnway Off-Ramp to W Lincolnway On-Ramp	2000	2
4	Weaving	Weaving	W Lincolnway On-Ramp to I-80 WB Off-Ramp	350	3
5	Basic	Basic	I-80 WB Off-Ramp to I-80 WB On-Ramp	1500	2
6	Weaving	Weaving	I-80 WB On-Ramp to I-80 EB Off-Ramp	500	3
7	Basic	Basic	I-80 EB Off-Ramp to I-80 EB On-Ramp	1600	2
8	Weaving	Weaving	I-80 EB On-Ramp to College Dr Off-Ramp	2200	3
9	Basic	Basic	College Dr to MainLine End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.709	4091	4556	0.99	34.2	59.8	F

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.709	0.917	4016	197	4700	2000	0.96	0.10	33.6	56.2	59.8	43.0	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3727	4452	0.97	28.9	64.5	F

Segment 4: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.714	4214	6147	0.76	16.0	87.5	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	3934	4452	1.03	32.8	60.0	F

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.725	4830	5867	0.91	23.4	68.8	F

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.704	4185	4494	1.08	49.0	35.9	F

Segment 8: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4826	4826	0.97	46.9	33.2	D

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3241	4584	0.86	58.6	25.2	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	35.9	49.4	35.2	4.0	F

Facility Overall Results

Space Mean Speed, mi/h	35.9	Density, veh/mi/ln	35.2
Average Travel Time, min	4.0	Density, pc/mi/ln	49.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 EB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin- West of I-80 EB to W Lincolnway Off-Ramp	1500	3
2	Diverge	Basic	W Lincolnway Off-Ramp	500	3
3	Basic	Basic	W Lincolnway Off-Ramp to I-25 SB Off-Ramp	2300	2
4	Diverge	Diverge	I-25 SB Off-Ramp	1500	2
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	1900	2
6	Weaving	Weaving	I-25 SB On-Ramp to I-25 NB Off-Ramp	1170	3
7	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1600	2
8	Merge	Merge	I-25 NB On-Ramp	1500	2
9	Basic	Basic	I-25 NB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3995	7107	0.56	66.9	18.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	3995	170	7200	2100	0.55	0.08	69.3	-	19.2	-	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3825	4694	0.80	64.7	29.1	D

Segment 4: Diverge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.667	3825	1156	4800	2100	0.79	0.55	63.9	63.9	29.9	35.3	E

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2669	4694	0.57	64.6	18.1	C

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3613	5469	0.61	56.2	19.7	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3247	4784	0.68	67.8	23.0	C

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.826	4561	1314	4800	2100	0.95	0.63	53.0	53.0	43.0	39.1	E

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	4561	4800	1.00	56.9	40.1	F

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	61.5	26.4	18.6	2.5	F

Facility Overall Results

Space Mean Speed, mi/h	61.5	Density, veh/mi/ln	18.6
Average Travel Time, min	2.5	Density, pc/mi/ln	26.4

HCS7 Freeway Facilities Report

Project Information

Analyst	JACOBS	Agency	WYDOT
Jurisdiction		Time Period Analyzed	
Analysis Year	2040	Date	08-22-2019
Project Description	I-80 & I-25 Interchange Study - I-80 WB - 2040 No Build - PM Peak Hour		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Begin (West of S Parsley Blvd) to I-25 NB Off-Ramp	1500	2
2	Diverge	Diverge	I-25 NB Off-Ramp	1500	2
3	Basic	Basic	I-25 NB Off-Ramp to I-25 NB On-Ramp	1500	2
4	Weaving	Weaving	I-25 NB On-Ramp to I-25 SB Off-Ramp	200	3
5	Basic	Basic	I-25 SB Off-Ramp to I-25 SB On-Ramp	2100	2
6	Weaving	Weaving	I-25 SB On-Ramp to W Lincolnway WB off-Ramp	600	3
7	Basic	Basic	W Lincolnway WB off-Ramp to W Lincolnway WB On-Ramp	2300	2
8	Merge	Merge	W Lincolnway WB On-Ramp	1500	2
9	Basic	Basic	W Lincolnway WB On-Ramp to Mainline End	1500	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3873	4800	0.81	65.3	29.7	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.901	3873	868	4800	2000	0.81	0.43	60.4	60.4	32.1	35.3	E

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3005	4652	0.59	62.4	20.8	C

Segment 4: Weaving

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.94	0.699	4017	4596	0.96	41.2	35.8	F

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2723	4694	0.53	61.1	18.5	C

Segment 6: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3051	6769	0.44	66.6	14.7	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	2853	4738	0.55	66.9	19.5	C

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.94	0.94	0.699	0.909	3029	176	4800	2000	0.58	0.09	62.6	62.6	24.2	27.7	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.94	0.699	3029	4800	0.59	71.0	21.0	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	63.5	22.9	16.0	2.3	F

Facility Overall Results

Space Mean Speed, mi/h	63.5	Density, veh/mi/ln	16.0
Average Travel Time, min	2.3	Density, pc/mi/ln	22.9

Appendix E: Year 2030 Four-Lane Traffic Operations Analysis

Memorandum

Project: I-25/I-80 Interchange, WYDOT Project No. WXXX9500

Author: Jacobs Engineering Group, Inc. (Jacobs)

Date: February 7, 2020

Subject: 2030 Traffic Operations Analysis Memorandum

Introduction

In 2019, WYDOT initiated an Environmental Assessment and design effort for the first two phases of the 2008 recommended alternative, which include the system interchange between I-25 and I-80 and the service interchange between I-25 and US 30 (Lincolnway). A traffic operations analysis was conducted to determine the traffic operating conditions of the current facilities with existing and future forecast volumes, and to analyze the operations benefits of the build condition compared to the no build condition with future forecast volumes. The build condition is defined as the recommended alternative with a few modifications, such as two-lane exit ramps and additional auxiliary lanes, that were added in this recent assessment and design effort.

After completion of the traffic operations analyses, the progression of the Environmental Assessment and design effort commenced a discussion regarding construction of four or six lanes for the interstate mainlines with these initial two phases. Thus, an additional traffic operations analysis assessment was performed to estimate if the four-lane configuration would provide acceptable peak hour traffic operations for the interstate mainlines within the immediate lifetime of the pavement constructed with the interchange reconfiguration projects. The year 2030 was selected as the analysis year. Furthermore, WYDOT determined after completion of the initial traffic operations analyses that acceptable peak hour operating conditions for mainline freeways is defined as LOS C or higher. The purpose of this technical memorandum is to summarize the methodology and results for the year 2030 traffic operations analysis effort.

Methodology

The year 2030 peak hour volumes were estimated using the annual growth rate calculated between the existing and 2040 forecast volumes. These volumes were inserted into the Highway Capacity Software (HCS) analysis files used for the year 2040 build condition. Other than volume, no parameters or input data were changed in these files. Refer to the main body of the traffic report for a detailed discussion of the analysis methodology to include the input parameters and assumptions. Table 1 presents LOS criteria for the different analysis elements.

Table 1. Level of Service Thresholds

Freeway Density (passenger cars/mile/lane)	LOS
HCS	
LOS Thresholds - Basic Segments	
<= 11	A
> 11 - 18	B
>18 - 26	C
>26 - 35	D
>35 - 45	E
> 45 or v/c > 1.0	F
LOS Thresholds - Weaving Segments	
<= 12	A
> 12 - 24	B
> 24 - 32	C
> 32 - 36	D
> 36 - 40	E
> 40 or v/c > 1.0	F
LOS Thresholds - Weaving Segments	
<= 10	A
> 10 - 20	B
> 20 - 28	C
> 28 - 35	D
> 35	E
v/c > 1.0	F

> = greater than

< = less than

2030 Traffic Operations Analysis Results

Table 2 shows the future freeway average densities, average speeds, and corresponding LOS by segment for the build roadway network with the estimated 2030 peak hour volumes. As reported by HCS, all basic, weaving, and merge/diverge segments would operate at LOS C or better during both peak hours on both interstates. These results indicate that acceptable peak hour operations are achievable with four-lane configurations on both interstates at least through year 2030.

Table 2. 2030 Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2030 Build							
				AM Peak Hour				PM Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-25	NB	Mainline Begins - South of College Dr On-Ramp	Basic	1380	53	20	C	1690	53	24	C
		College Dr On-Ramp to I-80 EB/WB Off-Ramp	Weaving	2025	55	18	B	2285	55	20	B
		Between I-80 EB/WB Off-Ramp & Lincolnway Off-Ramp	Basic	1330	53	19	C	1520	53	23	C
		Off-Ramp to Lincolnway	Diverge	1330	55	15	C	1520	55	17	B
		Between Lincolnway Off-Ramp & I-80 EB/WB On-Ramp	Basic	1075	55	16	B	1330	55	20	C
		On-Ramp from I-80 EB/WB	Merge	1690	58	18	B	1855	58	21	C
		On-Ramp from Lincolnway	Merge	1805	57	22	C	2155	57	26	C
		Between Lincolnway On-Ramp & End of Study Area	Basic	1805	62	21	C	2155	62	25	C
	SB	Mainline Begins - North of Lincolnway On-Ramp	Basic	1565	58	19	C	1790	58	23	C
		Off-Ramp to Lincolnway	Diverge	1565	56	23	C	1790	56	28	C
		Off-Ramp to I-80 EB/WB	Diverge	1385	54	15	B	1660	54	19	B
		Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	Basic	1065	58	15	B	1270	58	18	B
		On-Ramp from Lincolnway	Merge	1165	58	15	B	1520	58	18	B
		Between On-Ramp from Lincolnway & On-Ramp from I-80 EB	Basic	1165	62	15	B	1520	62	19	C
		On-Ramp from I-80 EB	Merge	1395	65	9	A	1885	65	12	B
		I-80 WB On-Ramp to College Dr Off-Ramp	Weaving	1760	55	12	A	2295	53	16	B
		Between College Dr Off-Ramp & End of Study Area	Basic	1355	62	16	B	1680	62	21	C
I-80	EB	Mainline Begins - West of Lincolnway Off-Ramp	Basic	650	67	5	A	1460	67	11	A
		Off-Ramp to Lincolnway	Diverge	650	75	4	A	1460	75	9	A
		Between Off-Ramp to Lincolnway & Off-Ramp to I-25 NB/SB	Basic	610	65	7	A	1405	65	17	B
		Off-Ramp to I-25 NB/SB	Diverge	610	66	11	B	1405	65	21	C
		Between Off-Ramp to I-25 NB/SB & On-Ramp from I-25 SB	Basic	285	65	3	A	930	65	11	A
		On-Ramp from I-25 SB	Merge	485	65	8	A	1180	65	16	B
		Between On-Ramp from I-25 SB & On-Ramp from I-25 NB	Basic	485	69	5	A	1180	69	13	B
		On-Ramp from I-25 NB	Merge	845	65	13	B	1635	64	23	C
		Between On-Ramp from I-25 NB & End of Study Area	Basic	845	72	9	A	1635	72	17	B
	WB	Mainline Begins - East of I-25 NB Off-Ramp	Basic	1535	72	16	B	1355	72	14	B
		Off-Ramp to I-25 NB/SB	Diverge	1535	60	22	C	1355	60	19	B
		Between I-25 NB/SB Off-Ramp & I-25 NB On-Ramp	Basic	655	63	8	A	530	63	6	A
		On-Ramp from I-25 NB	Merge	990	75	5	A	845	75	4	A
		On-Ramp from I-25 SB	Merge	1110	69	9	A	980	69	8	A

Table 2. 2030 Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2030 Build							
				AM Peak Hour				PM Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
		Off-Ramp to Lincolnway	Diverge	1110	66	8	A	980	66	7	A
		Between Lincolnway Off-Ramp & On-Ramp from Lincolnway (3 Lanes)	Basic	1045	67	8	A	920	67	7	A
		Between Lincolnway Off-Ramp & On-Ramp from Lincolnway (2 Lanes)	Basic	1045	67	12	B	920	67	10	A
		On-Ramp from Lincolnway	Merge	1100	65	17	B	960	65	15	B
		Between On-Ramp Lincolnway & End of Study Area	Basic	1100	72	12	B	960	72	10	A

References

CH2M HILL, Inc. (CH2M). 2008. *I-25/I-80 Interchange Study*. November.

Jacobs Engineering Group, Inc. (Jacobs). 2019. *Traffic Forecasting Methodology*. Technical Memorandum. September.

Transportation Research Board (TRB). 2016. *Highway Capacity Manual , Sixth Edition: A Guide for Multimodal Mobility Analysis*.

Appendix F: Year 2040 Six-Lane Traffic Operations Analysis

Memorandum

Project: I-25/I-80 Interchange, WYDOT Project No. WXXX9500

Author: Jacobs Engineering Group, Inc. (Jacobs)

Date: February 7, 2020

Subject: Year 2040 Six-Lanes Traffic Operations Analysis Memorandum

Introduction

In 2019, WYDOT initiated an Environmental Assessment and design effort for the first two phases of the 2008 recommended alternative, which include the system interchange between I-25 and I-80 and the service interchange between I-25 and US 30 (Lincolnway). A traffic operations analysis was conducted to determine the traffic operating conditions of the current facilities with existing and future forecast volumes, and to analyze the operations benefits of the build condition compared to the no build condition with future forecast volumes. The build condition is defined as the recommended alternative with a few modifications, such as two-lane exit ramps and additional auxiliary lanes, that were added in this recent assessment and design effort.

Due to uncertainties about the provision of four or six interstate lanes in the ultimate configuration, the traffic operations analysis initially assumed a four-lane configuration for the 2040 horizon year to represent a worse-case scenario for operating conditions with forecasted 2040 peak hour volumes. After completion of the traffic operations analyses, the progression of the Environmental Assessment and design effort commenced a discussion regarding provision of four or six lanes for the interstate mainlines with these initial two phases. Furthermore, WYDOT determined after completion of the initial traffic operations analyses that acceptable peak hour operating conditions for mainline freeways is defined as LOS C or higher.

Thus, an additional traffic operations analysis assessment was performed to estimate if the six-lane configuration would provide acceptable peak hour traffic operations in the horizon planning year 2040. Acceptable peak hour operations for interstates are level of service (LOS) C or higher. The purpose of this technical memorandum is to summarize the methodology and operational results for the year 2040 six-lane traffic operations analysis effort.

Methodology

The Highway Capacity Software (HCS) files used for the initial analyses were modified to reflect the six lane mainline configuration. Other than the number of lanes, no parameters or input data were revised for the analysis files. Refer to the main body of the traffic report for a detailed discussion of the analysis methodology to include the input parameters and assumptions. Table 1 presents LOS criteria for the different analysis elements.

Table 1. Level of Service Thresholds

Freeway Density (passenger cars/mile/lane)	LOS
HCS	
LOS Thresholds - Basic Segments	
<= 11	A
> 11 - 18	B
>18 - 26	C
>26 - 35	D
>35 - 45	E
> 45 or v/c > 1.0	F
LOS Thresholds - Weaving Segments	
<= 12	A
> 12 - 24	B
> 24 - 32	C
> 32 - 36	D
> 36 - 40	E
> 40 or v/c > 1.0	F
LOS Thresholds - Weaving Segments	
<= 10	A
> 10 - 20	B
> 20 - 28	C
> 28 - 35	D
> 35	E
v/c > 1.0	F

> = greater than

< = less than

2040 Six-Lanes Traffic Operations Analysis Results

Table 2 shows the future freeway average densities, average speeds, and corresponding LOS by segment for the build roadway network with the six-lane configuration. As reported by HCS, all basic, weaving, and merge/diverge segments would operate at LOS C or better during both peak hours on both interstates. The additional lane in each direction on I-25 would decrease the average lane density and provide more maneuverability within the traffic stream for the entering and exiting movements at the interchanges. The improved traffic flow increases the level of service enough to meet the WYDOT standards for acceptable traffic operations in peak hours (LOS C or higher).

Table 2. 2040 Six-Lane Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2040 Six-Lane Build							
				AM Peak Hour				PM Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
I-25	NB	Mainline Begins - South of College Dr On-Ramp	Basic	1930	53	19	C	2150	53	21	C
		College Dr On-Ramp to I-80 EB/WB Off-Ramp	Weaving	2845	53	20	C	2930	54	20	C
		Between I-80 EB/WB Off-Ramp & Lincolnway Off-Ramp	Basic	1995	53	20	C	1990	53	20	C
		Off-Ramp to Lincolnway	Diverge	1995	58	16	B	1990	59	16	B
		Between Lincolnway Off-Ramp & I-80 EB/WB On-Ramp	Basic	1625	55	16	B	1750	55	17	B
		On-Ramp from I-80 EB/WB	Merge	2255	60	17	B	2300	60	18	B
		On-Ramp from Lincolnway	Merge	2385	59	18	B	2725	59	22	C
		Between Lincolnway On-Ramp & End of Study Area	Basic	2385	62	18	C	2725	62	21	C
	SB	Mainline Begins - North of Lincolnway On-Ramp	Basic	2060	58	17	B	2345	58	20	C
		Off-Ramp to Lincolnway	Diverge	2060	60	22	C	2345	60	25	C
		Off-Ramp to I-80 EB/WB	Diverge	1795	58	14	B	2190	58	18	B
		Between I-80 EB/WB Off-Ramp & Lincolnway On-Ramp	Basic	1435	58	13	B	1785	58	17	B
		On-Ramp from Lincolnway	Merge	1550	60	12	B	2130	60	17	B
		Between On-Ramp from Lincolnway & On-Ramp from I-80 EB	Basic	1550	62	13	B	2130	62	18	B
		On-Ramp from I-80 EB	Merge	1810	65	9	A	2600	65	13	B
		I-80 WB On-Ramp to College Dr Off-Ramp	Weaving	2255	53	12	B	3090	50	18	B
		Between College Dr Off-Ramp & End of Study Area	Basic	1675	62	14	B	2245	62	18	C
I-80	EB	Mainline Begins - West of Lincolnway Off-Ramp	Basic	745	67	4	A	1785	67	10	A
		Off-Ramp to Lincolnway	Diverge	745	75	4	A	1785	75	9	A
		Between Off-Ramp to Lincolnway & Off-Ramp to I-25 NB/SB	Basic	695	65	6	A	1750	65	14	B
		Off-Ramp to I-25 NB/SB	Diverge	695	68	10	B	1750	68	20	B
		Between Off-Ramp to I-25 NB/SB & On-Ramp from I-25 SB	Basic	335	65	3	A	1160	65	9	A
		On-Ramp from I-25 SB	Merge	530	68	7	A	1395	68	13	B
		Between On-Ramp from I-25 SB & On-Ramp from I-25 NB	Basic	530	69	4	A	1395	69	10	A
		On-Ramp from I-25 NB	Merge	965	67	12	B	1965	67	19	B
		Between On-Ramp from I-25 NB & End of Study Area	Basic	965	72	7	A	1965	72	14	B
	WB	Mainline Begins - East of I-25 NB Off-Ramp	Basic	1880	72	13	B	1625	72	12	B
		Off-Ramp to I-25 NB/SB	Diverge	1880	63	21	C	1625	63	19	B
		Between I-25 NB/SB Off-Ramp & I-25 NB On-Ramp	Basic	905	63	7	A	705	63	6	A
		On-Ramp from I-25 NB	Merge	1320	75	5	A	1075	75	4	A
		On-Ramp from I-25 SB	Merge	1485	70	9	A	1245	70	8	A

Table 2. 2040 Six-Lane Build Freeway Operations Summary

Facility	Direction	Location	HCM Segment Type	2040 Six-Lane Build							
				AM Peak Hour				PM Peak Hour			
				Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS	Volume [vph]	Speed [mph]	Density [pc/mi/ln]	LOS
		Off-Ramp to Lincolnway	Diverge	1485	71	6	A	1245	71	5	A
		Between Lincolnway Off-Ramp & On-Ramp from Lincolnway (3 Lanes)	Basic	1390	67	8	A	1150	67	7	A
		Between Lincolnway Off-Ramp & On-Ramp from Lincolnway (2 Lanes)	Basic	1390	67	10	A	1150	67	9	A
		On-Ramp from Lincolnway	Merge	1445	68	14	B	1180	69	12	B
		Between On-Ramp Lincolnway & End of Study Area	Basic	1445	72	10	A	1180	72	8	A

References

CH2M HILL, Inc. (CH2M). 2008. *I-25/I-80 Interchange Study*. November.

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