Technical Memo

Date:	Tuesday, September 28, 2021
Project:	US14A / US85 Deadwood Box Corridor Study
To:	Study Advisory Team
From:	HDR
Subject:	2020 Existing Conditions Traffic Operations

1.0 Introduction

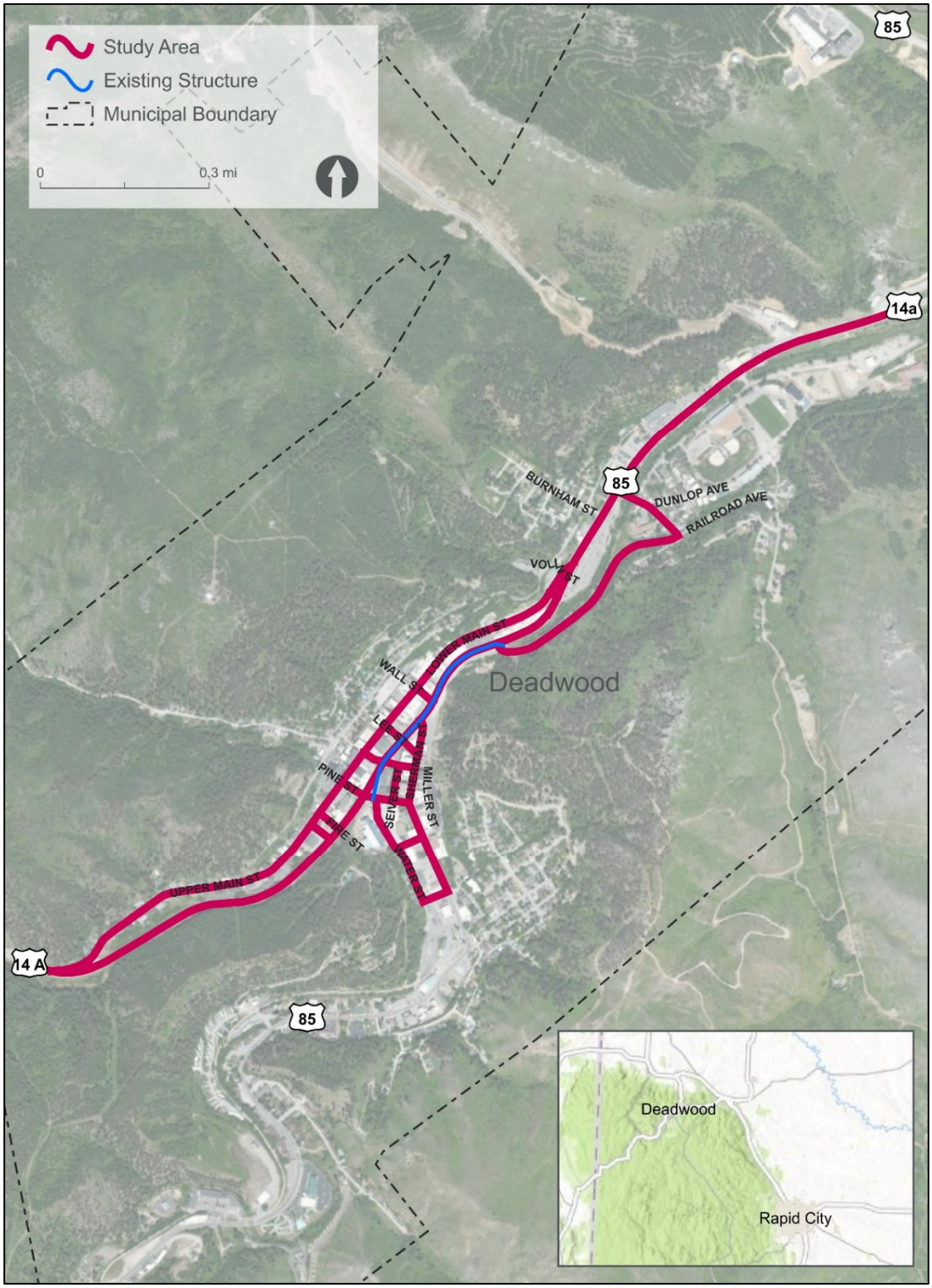
The South Dakota Department of Transportation (SDDOT), in conjunction with the City of Deadwood, South Dakota (the City) and the Federal Highway Administration (FHWA), intends to perform a corridor planning study for a portion of US Highway 14 Alternate (US14A) / US Highway 85 (US85) / Pioneer Way within the city limits. This segment includes the Deadwood Box structure beneath US14A, which was recommended for replacement in the recent Major Bridge Investment Study. The replacement is tentatively planned for Fiscal Year 2026. Given the developmental, environmental, and geographical constraints above and surrounding the structure, replacement while maintaining highway continuity and access within the City during construction will be complex. The 2008 Deadwood Pedestrian Circulation and Enhancement Study concluded with some long-term recommendations to alter the US14A / US85 / Pioneer Way alignment to improve circulation and safety in the pedestrian-heavy downtown area. Replacement of the Deadwood Box culvert could provide the opportunity to bring some of these recommendations to fruition.

The study area for this project is shown in Figure 1, bounded by the following limits:

- US14A / Pioneer Way - Upper Main Street to US85;
- US85 / Sherman Street - Cemetery Street / Water Street to Pine Street;
- US85 / Pine Street - Sherman Street to US14A / Pioneer Way;
- Upper/Lower Main Street - Armory Street to US14A / Pioneer Way;
- Sherman Street - US85 / Pine Street to US14A / Pioneer Way;
- Pine Street - US14A / Pioneer Way to Main Street;
- Armory Street - US14A / Pioneer Way to Upper Main Street;
- Fire Street - US14A / Pioneer Way to Upper Main Street;
- Siever Street - US85 / Pine Street to Deadwood Street;
- Deadwood Street - Sherman Street to Main Street;
- Lee Street - Sherman Street to Lower Main Street;
- Wall Street - US14A / Pioneer Way to Lower Main Street;
- Railroad Avenue - US14A / Pioneer Way to Dunlop Avenue;
- Dunlop Avenue / McKinley Street - Railroad Avenue to US14A / Pioneer Way;
- Water Street - US85 / Sherman Street to US85 / Pine Street; and
- Center Street - US85 / Sherman Street to Water Street.

The corridor limits are located within Lawrence County and within the Deadwood city limits.

Figure 1: Project Study Area



2.0 Traffic Data

To support the Existing Conditions traffic analysis, 12-hour (6:00AM-6:00PM) turning movement and pedestrian crossing volume counts were collected at each study intersection on Tuesday, September 15, 2020 (Table 1).

Table 1: Intersection Turning Movement Count Locations

#	Primary Street	Side Street
1	US14A / Pioneer Way	Upper Main Street (South Junction)
2	US14A / Pioneer Way	Upper Main Street (North Junction)
3	US14A / Pioneer Way	Armory Street
4*	US14A / Pioneer Way	US85 / Pine Street
5	US14A / Pioneer Way	Deadwood Street
6	US14A / Pioneer Way	Lee Street
7*	US14A / Pioneer Way	Sherman Street
8*	US14A / Pioneer Way	Wall Street
9	US14A / Pioneer Way	Railroad Avenue
10	US14A / Pioneer Way	Lower Main Street (South Junction)
11	US14A / Pioneer Way	Lower Main Street (North Junction)
12	US14A / Lower Main Street	Burnham Avenue
13	US14A / Lower Main Street	Dunlop Avenue / McKinley Street
14	US14A / Lower Main Street	US85
15	US85 / Sherman Street	Cemetery Street / Water Street
16*	US85 / Pine Street	Sherman Street
17	Main Street	Pine Street
18	Railroad Avenue	Dunlop Avenue / McKinley Street
19	Main Street	Deadwood Street

Locations marked with an asterisk (*) were also counted from 6:00AM-6:00AM on Friday, August 28, 2020 during the Kool Deadwood Nites event. These “event counts” reflect traffic volumes when Main Street is closed to traffic. They will be discussed in detail in a separate memorandum as maintenance of traffic (MOT) plans are developed for construction.

24-hour (generally 12:00PM-12:00PM) segment counts were also collected on September 15 and 16, 2020 to determine daily patterns and serve as the basis for design volume development. The segment count locations were:

- US14A between:
  - Upper Main Street and US85 / Pine Street
  - US85 / Pine Street and Deadwood Street
  - Deadwood Street and Sherman Street
  - Sherman Street and Railroad Avenue

    - Lower Main Street and US85
- US85 / Sherman Street between:
    - Cemetery Street / Water Street and Pine Street
- US85 / Pine Street between:
    - Sherman Street and US14A
- Sherman Street between:
    - US85 / Pine Street and US14A

Seasonal adjustment factors provided by SDDOT were applied to all counted volumes to reflect a June design month. These adjustment factors were 0.83 for locations along US14A / US85 and 0.82 for locations along other local streets and collectors.

SDDOT also provided timing and phasing information for signalized intersections within the study area (US14A at US85 / Pine Street, Deadwood Street, Lower Main Street, Dunlop Avenue, and US85; and US85 at Cemetery Street / Water Street). This data was used to develop the Existing Conditions traffic models.

Free flow speeds in the urbanized areas of the City were assumed to be the posted speed limit plus five (5) miles per hour. For longer segments with less friction, such as along US14A between Sherman Street and Lower Main Street, free flow speeds were assumed to be the posted speed limit plus seven (7) miles per hour per the Highway Capacity Manual (HCM) methodology. Field travel speeds were assumed to be equal to the posted speed limit.

3.0 Existing Volumes

Existing Conditions traffic data is the basis for both assessment of current field conditions and development of future year (2027, 2050) volume forecasts. Seasonal adjustment factors provided by SDDOT were applied to all counted volumes to reflect a June design month. The resulting average daily traffic (ADT) volumes are shown in Table 2. Light, medium, and heavy vehicle proportions based on the FHWA vehicle classification scheme are shown in Table 3.

Table 2: 2020 Existing Conditions Segment Average Daily Traffic Volumes

Corridor	Location (Relative to Box Culvert)	Segment		2020 AADT (vpd)
		Start	End	
US 14A/ Pioneer Way	South	Upper Main Street	US 85/Pine Street	6,800
	Within Limits	US 85/Pine Street	Deadwood Street	5,600
		Deadwood Street	Sherman Street	8,500
		Sherman Street	Lower Main Street	11,600
	North	Lower Main Street	US 85	11,700
US 85/ Pine Street	n/a	Cemetery Street	Sherman Street	9,200
		Sherman Street	US 14A/Pioneer Way	4,000
Sherman	n/a	US 85/Pine Street	US 14A/Pioneer Way	6,500

Table 3: 2020 Existing Conditions Segment Vehicle Classifications

Main Corridor	Location (Relative to Box Culvert)	Design Hour Volume by FHWA Classification (veh)		
		Light	Medium	Heavy
US 14A/ Pioneer Way	South	95.8%	3.4%	0.8%
	Within Limits	97.6%	2.0%	0.4%
	North	97.2%	2.2%	0.6%
US 85/ Pine Street	n/a	97.3%	2.0%	0.7%

Based on the count data, it was determined that one AM and one PM hour would be selected to represent peak conditions. The selected peak hours are 7:30AM-8:30AM and 3:30PM-4:30PM, respectively. Generally, these see the highest or near-highest volumes across their respective peak periods.

Peak hour factors and heavy vehicle percentages were determined based on this data. After applying the seasonal adjustment factors to reflect a June peak, the resulting set of turning movement volumes was balanced according to the guidelines set forth in NCHRP Report 765: Analytical Approaches for Project-Level Planning. This methodology is to increase or decrease volumes along a route proportional to the downstream turning movement proportions.

Three “sources” or “sinks” were included at locations where intermediate driveways to businesses and parking areas may generate and/or attract a large number of trips; these were along US85 / Pine Street and Dunlop Avenue / McKinley Street south of US14A and Pine Street north of US14A. Other than along these segments, volumes were increased where necessary to balance traffic throughout the network.

The final set of turning movement volumes is provided in Figure 2. Pedestrian crossing volumes at each study intersection are provided in Figure 3.

Figure 2: 2020 Existing Conditions Turning Movement Volumes

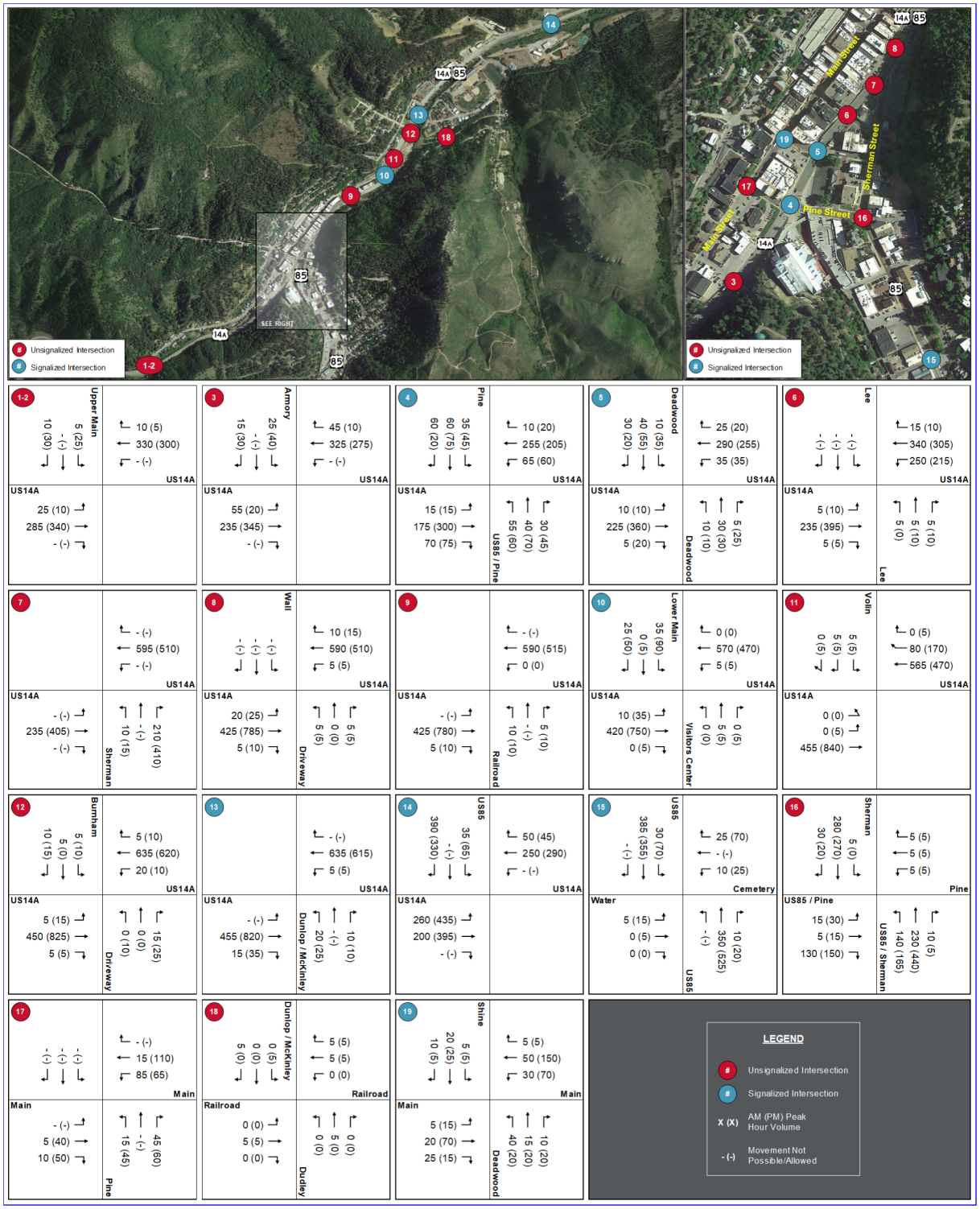
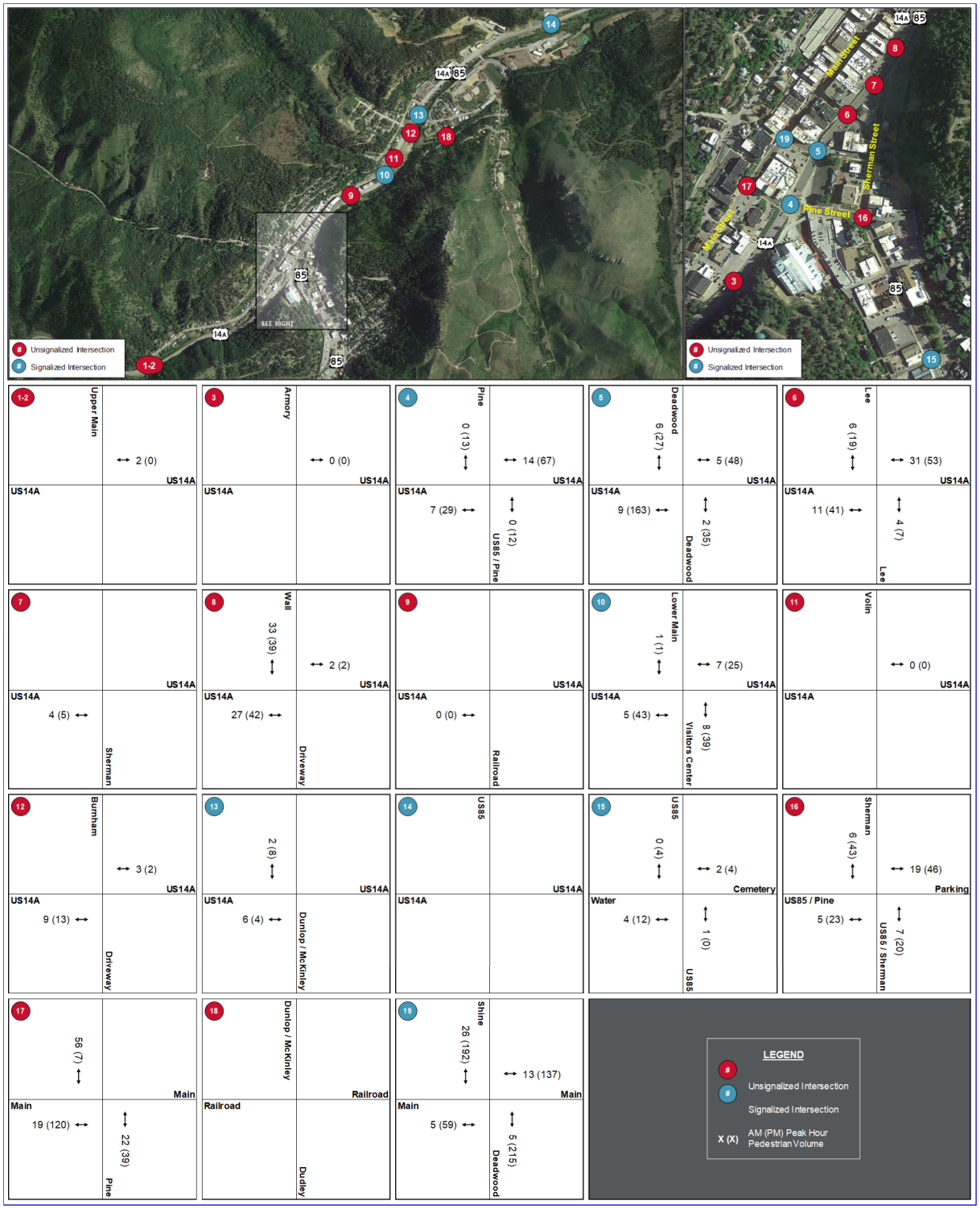


Figure 3: 2020 Existing Conditions Pedestrian Crossing Volumes



4.0 Analysis Methodology

The effectiveness of traffic operations in the study area were primarily based on the appropriate HCM 6th Edition (HCM6) level of service (LOS) measurement.

4.1 Intersection LOS

Intersection LOS was determined using Synchro 10 software and followed the threshold scheme shown in Table 4, based on intersection delay. Per the Study's Methods and Assumptions Document, LOS C is the minimum value that intersections should operate at.

Table 4: Intersection LOS Thresholds

LOS	**Intersection Delay per Vehicle** (sec/veh)	
	Signalized Intersections	Two-Way Stop-Control*, All-Way Stop-Control, and Roundabouts
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	>25-35
E	> 55-80	> 35-50
F	Demand exceeds capacity; >80	Demand exceeds capacity; >50

Source: Transportation Research Board, HCM6.
*Two-way stop-control LOS reflects worst-case stop-controlled approach.

Note that, though HCM6 methodology prescribes that two-way stop-control LOS reflect the worst-case stop-controlled approach, for this project intersection LOS—signalized and unsignalized—was calculated based on a weighted average of all approach delays. This method accounts for the operational benefits afforded to the major, high-volume through movements that are not stop- nor signal-controlled.

4.2 Urban Streets Segment LOS

HCM6 methodology was also used to analyze urban corridor segments between signalized intersections. This included the segment of US14A between US85 / Pine Street and Dunlop Avenue / McKinley Street, US85 between Cemetery Street / Water Street and US14A, Deadwood Street between US14A and Main Street, and Main Street between Deadwood Street and US 14A to the northeast. The HCS7 Streets module was used to evaluate travel times and pedestrian and bicycle LOS along these segments, which will be used as a basis on which to compare Build alternatives.

4.3 Multilane Highway Segment LOS

The multilane highway segment of US14A / Lower Main Street between Dunlop Avenue / McKinley Street and US85 to the northeast were also evaluated using the HCM6 methodology. The primary MOE for this segment evaluation is LOS, which will be the basis for determining

future lane requirements along US14A. Per the Study's Methods and Assumptions Document, LOS C is the minimum value that segments should operate at and LOS B is desirable.

4.4 Two-Lane Highway Segment LOS

Finally, the segment of Upper Main Street between US14A to the west and Deadwood Street downtown was analyzed for LOS as a two-lane highway segment. Though the short segment of Pine Street between US14A and Main Street is also a two-lane segment, it was determined that future lane requirements here would be best determined based on operations at the adjacent intersections.

5.0 Traffic Analysis

A summary of the overall Synchro intersection delay and LOS for each of the 19 study area intersections is provided in Table 5. Due to their unique signal phasing or low approach speeds, intersections marked with an asterisk (*) were evaluated using HCM 2000 methodology. For example, the HCM6 methodology is not compatible with the split signal phasing along US14A at its intersection with US85 / Pine Street, nor is it compatible with many intersections that have approaches with posted speeds below 25 miles per hour (such as along Main Street).

Table 5: Existing Conditions Intersection Operations

#	Primary Street	Cross Street	HCM6 Evaluation Type	AM Peak Hour		PM Peak Hour	
				Delay (s)	LOS	Delay (s)	LOS
1*	US14A / Pioneer Way	Upper Main Street (South Junction)	TWSC	0.3	A	0.6	A
2	US14A / Pioneer Way	Upper Main Street (North Junction)	TWSC	0.5	A	0.7	A
3	US14A / Pioneer Way	Armory Street	TWSC	1.7	A	1.8	A
4*	US14A / Pioneer Way	US85 / Pine Street	Signal	21.1	C	23.7	C
5*	US14A / Pioneer Way	Deadwood Street	Signal	6.2	A	7.8	A
6	US14A / Pioneer Way	Lee Street	TWSC	3.3	A	2.8	A
7	US14A / Pioneer Way	Sherman Street	TWSC	2.4	A	5.7	A
8	US14A / Pioneer Way	Wall Street	TWSC	0.5	A	0.6	A
9	US14A / Pioneer Way	Railroad Avenue	TWSC	0.2	A	0.4	A
10*	US14A / Pioneer Way	Lower Main Street (South Junction)	Signal	4.8	A	6.7	A
11	US14A / Pioneer Way	Lower Main Street (North Junction)	TWSC	8.1	A	6.7	A
12	US14A / Lower Main Street	Burnham Avenue	TWSC	0.9	A	1.5	A
13*	US14A / Lower Main Street	Dunlop Avenue / McKinley Street	Signal	3.5	A	4.0	A
14*	US14A / Lower Main Street	US85	Signal	17.8	B	17.2	B
15*	US85 / Sherman Street	Cemetery Street/Water Street	Signal	5.7	A	11.2	B
16	US85 / Pine Street	Sherman Street	AWSC	13.2	B	20.7	C
17	Main Street	Pine Street	AWSC	7.6	A	8.6	A
18	Railroad Avenue	Dunlop Avenue / McKinley Street	AWSC	5.7	A	0.0	A
19*	Main Street	Deadwood Street	Signal	6.8	A	7.1	A

As shown in Table 5, nearly all study area intersections currently operate at or above LOS B, as required by SDDOT. One intersection, US85 / Pine Street and Sherman Street, however, operates at LOS C during both peak hours—the northbound queue in particular was noted in the field as having queues over eight (8) vehicles long, indicating an operational need at this location. As alternatives and mitigation strategies (i.e. continuing to evaluate peak season planning-level traffic signal warrants) are developed, this intersection should be closely watched to ensure operations do not fall below the LOS C threshold.

A summary of the HCS7 segment results for vehicle travel times and pedestrian and bicycle LOS along the roadway segments between each signalized intersection is provided in Table 6.

Table 6: Existing Conditions Urban Street Segment Operations

Corridor	Segment Start	Segment End	AM Peak Hour						PM Peak Hour					
			Vehicle		Pedestrian		Bicycle		Vehicle		Pedestrian		Bicycle	
			Through Delay (s)	Travel Time (s)	Score	LOS	Score	LOS	Through Delay (s)	Travel Time (s)	Score	LOS	Score	LOS
Direction: Eastbound/Northbound														
US14A / Pioneer Way	US85 / Pine Street	Deadwood Street	5.2	17.6	1.80	A	2.52	B	5.9	18.4	1.99	A	2.69	B
	Deadwood Street	Lower Main Street	3.7	53.7	1.88	A	3.01	C	6.8	57.1	2.03	B	3.23	C
	Lower Main Street	Dunlop Avenue / McKinley Street	2.4	22.8	2.18	B	3.32	C	2.8	23.3	2.34	B	3.45	C
	Segment Total		***11.3***	***94.1***	***1.96***	***A***	***3.06***	***C***	***15.5***	***98.8***	***2.12***	***B***	***3.25***	***C***
US85	Cemetery Street / Water Street	US14A / Pioneer Way	8.7	46.3	2.15	B	3.15	C	11.1	49.7	2.51	B	3.27	C
Deadwood Street	US14A / Pioneer Way	Main Street	6.1	23.4	1.60	A	1.68	A	8.2	25.5	1.61	A	1.92	A
Lower Main Street	Deadwood Street	US14A / Pioneer Way	0.0	80.5	1.62	A	1.36	A	9.8	90.9	1.72	A	2.10	B
Direction: Westbound/Southbound														
US14A / Pioneer Way	Dunlop / McKinley Street	Lower Main Street	9.9	22.8	2.40	B	3.07	C	11.1	23.9	2.37	B	3.06	C
	Lower Main Street	Deadwood Street	6.7	60.8	2.15	B	3.33	C	6.9	61.1	2.15	B	3.32	C
	Deadwood Street	US85 / Pine Street	4.2	24.6	2.29	B	3.44	C	6.6	27.0	2.27	B	3.42	C
	Segment Total		***20.8***	***108.2***	***2.21***	***B***	***3.34***	***C***	***24.6***	***112.0***	***2.21***	***B***	***3.33***	***C***
US85	US14A / Pioneer Way	Cemetery Street / Water Street	7.8	44.8	1.90	A	2.98	C	8.1	45.2	1.98	A	3.01	C
Deadwood Street	Main Street	US14A / Pioneer Way	9.2	26.5	1.94	A	1.99	A	9.4	26.8	1.74	A	2.22	B
Lower Main Street	Deadwood Street	US14A / Pioneer Way	7.1	87.4	1.59	A	1.14	A	7.1	87.6	1.63	A	1.49	A

As shown in Table 6, segments throughout the study area operate as expected, with minimal through delay and similar travel times in both directions and peaks. Pedestrian LOS is at or better than LOS B for all study segments, while bicycle LOS is generally LOS C along US14A and US85 but LOS A/B along Deadwood Street and Lower Main Street.

Finally, a summary of the HCS7 LOS results for the multilane and two-lane highway segments within the study area is provided in Table 7.

Table 7: Existing Conditions Multilane and Two-Lane Highway Operations

Corridor	Segment Start	Segment End	HCM6 Evaluation Type	AM Peak Hour			PM Peak Hour		
				Density (pc/mi/ln)	v/c	LOS	Density (pc/mi/ln)	v/c	LOS
Direction: Eastbound/Northbound									
US14A/Pioneer Way	Upper Main Street	US85 / Pine Street	Multilane	4.6	0.10	A	6.3	0.14	A
US14A/Lower Main Street	Dunlop Avenue / McKinley Street	US 85	Multilane	6.4	0.15	A	10.0	0.23	A
Upper Main Street	US14A / Pioneer Way	Deadwood Street	Two-Lane	-	0.01	A	-	0.09	B
Direction: Westbound/Southbound									
US14A/Pioneer Way	Upper Main Street	US85 / Pine Street	Multilane	5.5	0.13	A	5.4	0.12	A
US14A/Lower Main Street	Dunlop Avenue / McKinley Street	US 85	Multilane	9.4	0.22	A	8.2	0.19	A
Upper Main Street	US14A / Pioneer Way	Deadwood Street	Two-Lane	-	0.01	A	-	0.09	B

As shown in Table 7, multilane segments of US14A operate at LOS A and the two-lane segment of Upper Main Street between US14A / Pioneer Way and Deadwood Street operates at LOS B. Volume-to-capacity (v/c) ratios are low; therefore, all of these roadway segments have additional capacity available for detour traffic and/or potential changes to traffic circulation.

Full Synchro and HCS reports are included in Appendix A and Appendix B, respectively.

6.0 Conclusions

SDDOT, in conjunction with the City of Deadwood and FHWA, intends to perform a corridor planning study for a portion of US14A / US85 within the city limits, including the Deadwood Box culvert. Given the many constraints above and surrounding the structure, replacement while maintaining highway continuity and access within the City during construction will be complex.

To support the eventual future/alternatives traffic analyses, an Existing Conditions analysis was conducted using Synchro 10 and HCS7 software to evaluate intersection and segment operations, respectively. Based on this analysis, it was determined that all study intersections and segments operate at acceptable levels today; however, the intersection of US85 / Pine Street and Sherman Street operates at LOS C and therefore should be monitored as detour routes and alternatives are developed to avoid operations that deteriorate below the SDDOT threshold. All study roadway segments have available capacity to accommodate detour traffic and/or potential changes to traffic circulation.

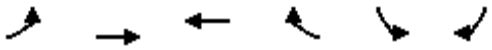
It should be noted that the 2008 Deadwood Pedestrian Circulation and Enhancement Study concluded with some long-term recommendations to alter the US14A / US85/Pioneer Way alignment to improve circulation and safety in the downtown area. These should be considered as alternatives are developed and the project progresses, as replacement of the Deadwood Box culvert could provide the opportunity to bring some of these recommendations to fruition.

Attachment A

Synchro 10 Outputs

Existing AM

2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	310	330	0	0	10
Future Volume (Veh/h)	0	310	330	0	0	10
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.82	0.82	0.55	0.55
Hourly flow rate (vph)	0	360	402	0	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	402				582	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402				582	402
tC, single (s)	4.2				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	1132				449	604

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	180	180	402	18
Volume Left	0	0	0	0
Volume Right	0	0	0	18
cSH	1700	1700	1700	604
Volume to Capacity	0.11	0.11	0.24	0.03
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	11.1
Lane LOS				B
Approach Delay (s)	0.0		0.0	11.1
Approach LOS				B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	285	330	10	5	0
Future Vol, veh/h	25	285	330	10	5	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	86	86	82	82	55	55
Heavy Vehicles, %	5	5	8	8	0	0
Mvmt Flow	29	331	402	12	9	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	414	0	-	0	632	408
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	224	-
Critical Hdwy	4.175	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2475	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1125	-	-	-	432	648
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1125	-	-	-	421	648
Mov Cap-2 Maneuver	-	-	-	-	421	-
Stage 1	-	-	-	-	658	-
Stage 2	-	-	-	-	798	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1125	-	-	-	421
HCM Lane V/C Ratio	0.026	-	-	-	0.022
HCM Control Delay (s)	8.3	-	-	-	13.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	235	325	45	25	15
Future Vol, veh/h	55	235	325	45	25	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	88	88	73	73
Heavy Vehicles, %	6	6	7	7	10	10
Mvmt Flow	66	283	369	51	34	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	420	0	-	0	669	210
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	274	-
Critical Hdwy	4.22	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.26	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	1108	-	-	-	373	771
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	724	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1108	-	-	-	347	771
Mov Cap-2 Maneuver	-	-	-	-	347	-
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	724	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1108	-	-	-	437
HCM Lane V/C Ratio	0.06	-	-	-	0.125
HCM Control Delay (s)	8.5	0.2	-	-	14.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	175	70	65	255	10	55	40	30	35	60	60
Future Volume (vph)	15	175	70	65	255	10	55	40	30	35	60	60
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			6.0		6.5	6.5			6.5	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	
Frt		0.96			1.00		1.00	0.94			0.95	
Flt Protected		1.00			0.99		0.95	1.00			0.99	
Satd. Flow (prot)		2894			2839		1455	1433			1562	
Flt Permitted		1.00			0.99		0.59	1.00			0.90	
Satd. Flow (perm)		2894			2839		901	1433			1423	
Peak-hour factor, PHF	0.87	0.87	0.87	0.99	0.99	0.99	0.78	0.78	0.78	0.59	0.59	0.59
Adj. Flow (vph)	17	201	80	66	258	10	71	51	38	59	102	102
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	298	0	0	334	0	71	89	0	0	263	0
Confl. Peds. (#/hr)			7			14						
Heavy Vehicles (%)	6%	6%	6%	12%	12%	12%	11%	11%	11%	2%	2%	2%
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	1			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)		11.9			12.0		16.4	16.4			16.4	
Effective Green, g (s)		11.9			12.0		16.4	16.4			16.4	
Actuated g/C Ratio		0.20			0.21		0.28	0.28			0.28	
Clearance Time (s)		5.5			6.0		6.5	6.5			6.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		590			584		253	403			400	
v/s Ratio Prot		c0.10			c0.12			0.06				
v/s Ratio Perm							0.08				c0.18	
v/c Ratio		0.51			0.57		0.28	0.22			0.66	
Uniform Delay, d1		20.6			20.8		16.3	16.1			18.5	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7			1.4		0.6	0.3			3.9	
Delay (s)		21.3			22.2		17.0	16.3			22.3	
Level of Service		C			C		B	B			C	
Approach Delay (s)		21.3			22.2			16.6			22.3	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	225	5	35	290	25	10	30	5	10	40	30
Future Volume (vph)	10	225	5	35	290	25	10	30	5	10	40	30
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			5.5			5.5			5.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.98			0.95	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		2836			2866			1650			1546	
Flt Permitted		0.93			0.91			0.90			0.95	
Satd. Flow (perm)		2657			2607			1499			1471	
Peak-hour factor, PHF	0.86	0.86	0.86	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85
Adj. Flow (vph)	12	262	6	38	312	27	11	34	6	12	47	35
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	280	0	0	377	0	0	51	0	0	94	0
Confl. Peds. (#/hr)	29		52	52		29	16		15	15		16
Heavy Vehicles (%)	13%	13%	13%	10%	10%	10%	0%	0%	0%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		18.2			18.2			5.0			5.0	
Effective Green, g (s)		18.2			18.2			5.0			5.0	
Actuated g/C Ratio		0.53			0.53			0.15			0.15	
Clearance Time (s)		5.5			5.5			5.5			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1413			1387			219			215	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.14			0.03			c0.06	
v/c Ratio		0.20			0.27			0.23			0.44	
Uniform Delay, d1		4.2			4.4			12.9			13.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.1			0.5			1.4	
Delay (s)		4.3			4.5			13.5			14.7	
Level of Service		A			A			B			B	
Approach Delay (s)		4.3			4.5			13.5			14.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	34.2	Sum of lost time (s)	11.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	235	5	250	340	15	5	5	5	0	0	0
Future Vol, veh/h	5	235	5	250	340	15	5	5	5	0	0	0
Conflicting Peds, #/hr	31	0	11	11	0	31	6	0	4	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	80	80	80	88	88	88	92	92	92
Heavy Vehicles, %	10	10	10	8	8	8	0	0	0	2	2	2
Mvmt Flow	6	264	6	313	425	19	6	6	6	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	475	0	0	281	0	0	1135	1391	150
Stage 1	-	-	-	-	-	-	290	290	-
Stage 2	-	-	-	-	-	-	845	1101	-
Critical Hdwy	4.3	-	-	4.26	-	-	6.8	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.8	5.5	-
Follow-up Hdwy	2.3	-	-	2.28	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1029	-	-	1236	-	-	199	143	876
Stage 1	-	-	-	-	-	-	740	676	-
Stage 2	-	-	-	-	-	-	387	290	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1029	-	-	1223	-	-	128	0	864
Mov Cap-2 Maneuver	-	-	-	-	-	-	128	0	-
Stage 1	-	-	-	-	-	-	727	0	-
Stage 2	-	-	-	-	-	-	253	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	4	22.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	223	1029	-	-	1223	-	-
HCM Lane V/C Ratio	0.076	0.005	-	-	0.256	-	-
HCM Control Delay (s)	22.5	8.5	0	-	9	0.6	-
HCM Lane LOS	C	A	A	-	A	A	-
HCM 95th %tile Q(veh)	0.2	0	-	-	1	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	235	0	0	595	10	210
Future Vol, veh/h	235	0	0	595	10	210
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	85	85	92	92	83	83
Heavy Vehicles, %	12	12	8	8	2	2
Mvmt Flow	276	0	0	647	12	253

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	600	138
Stage 1	-	-	-	-	276	-
Stage 2	-	-	-	-	324	-
Critical Hdwy	-	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	-	0	0	-	432	885
Stage 1	-	0	0	-	746	-
Stage 2	-	0	0	-	705	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	432	885
Mov Cap-2 Maneuver	-	-	-	-	432	-
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	705	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	432	885	-	-
HCM Lane V/C Ratio	0.028	0.286	-	-
HCM Control Delay (s)	13.6	10.7	-	-
HCM Lane LOS	B	B	-	-
HCM 95th %tile Q(veh)	0.1	1.2	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Traffic Vol, veh/h	20	425	5	5	590	10	5	0	5	0	0	0
Future Vol, veh/h	20	425	5	5	590	10	5	0	5	0	0	0
Conflicting Peds, #/hr	4	0	53	53	0	4	21	0	50	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	88	88	88	69	69	69	92	92	92
Heavy Vehicles, %	6	6	6	9	9	9	0	0	0	2	2	2
Mvmt Flow	22	462	5	6	670	11	7	0	7	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	685	0	0	520	0	0	930	1259	337
Stage 1	-	-	-	-	-	-	562	562	-
Stage 2	-	-	-	-	-	-	368	697	-
Critical Hdwy	4.22	-	-	4.28	-	-	6.8	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.8	5.5	-
Follow-up Hdwy	2.26	-	-	2.29	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	878	-	-	995	-	-	270	172	665
Stage 1	-	-	-	-	-	-	540	513	-
Stage 2	-	-	-	-	-	-	676	446	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	878	-	-	945	-	-	240	0	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	240	0	-
Stage 1	-	-	-	-	-	-	496	0	-
Stage 2	-	-	-	-	-	-	656	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.5	0.1	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	343	878	-	-	945	-	-
HCM Lane V/C Ratio	0.042	0.025	-	-	0.006	-	-
HCM Control Delay (s)	16	9.2	0.1	-	8.8	0	-
HCM Lane LOS	C	A	A	-	A	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-

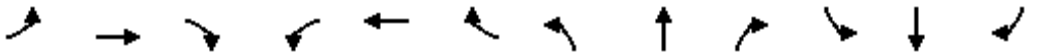
Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	425	5	0	590	10	5
Future Vol, veh/h	425	5	0	590	10	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	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	77	77	88	88
Heavy Vehicles, %	6	6	7	7	0	0
Mvmt Flow	472	6	0	766	11	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	478	0	858	239
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	-	-	4.24	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.27	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1046	-	300	768
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	665	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1046	-	300	768
Mov Cap-2 Maneuver	-	-	-	-	300	-
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	665	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	376	-	-	1046	-
HCM Lane V/C Ratio	0.045	-	-	-	-
HCM Control Delay (s)	15	-	-	0	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	420	0	5	570	0	0	5	0	35	0	25
Future Volume (vph)	10	420	0	5	570	0	0	5	0	35	0	25
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			1.00		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1501	3019		1505	3019			1133		1581	1399	
Flt Permitted	0.40	1.00		0.49	1.00			1.00		0.91	1.00	
Satd. Flow (perm)	637	3019		774	3019			1133		1513	1399	
Peak-hour factor, PHF	0.92	0.92	0.92	0.87	0.87	0.87	0.50	0.50	0.50	0.85	0.85	0.85
Adj. Flow (vph)	11	457	0	6	655	0	0	10	0	41	0	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	11	457	0	6	655	0	0	10	0	41	29	0
Confl. Peds. (#/hr)	16		7	7		16	1		3	3		1
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	50%	50%	50%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	22.3	22.3		22.3	22.3			4.4		4.4	4.4	
Effective Green, g (s)	22.3	22.3		22.3	22.3			4.4		4.4	4.4	
Actuated g/C Ratio	0.59	0.59		0.59	0.59			0.12		0.12	0.12	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	376	1785		457	1785			132		176	163	
v/s Ratio Prot		0.15			c0.22			0.01			0.02	
v/s Ratio Perm	0.02			0.01						c0.03		
v/c Ratio	0.03	0.26		0.01	0.37			0.08		0.23	0.18	
Uniform Delay, d1	3.2	3.7		3.2	4.0			14.8		15.1	15.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.1		0.0	0.1			0.2		0.7	0.5	
Delay (s)	3.2	3.8		3.2	4.1			15.1		15.8	15.5	
Level of Service	A	A		A	A			B		B	B	
Approach Delay (s)		3.8			4.1			15.1			15.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	11.0
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	WBT	WBR	SEL	SER	SWL	SWR
Lane Configurations								
Traffic Vol, veh/h	0	455	565	80	0	0	5	5
Future Vol, veh/h	0	455	565	80	0	0	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-
Storage Length	50	-	-	200	-	-	0	-
Veh in Median Storage, #	-	0	0	-	16965	-	0	-
Grade, %	-	0	0	-	0	-	0	-
Peak Hour Factor	92	92	89	89	92	92	50	50
Heavy Vehicles, %	7	7	7	7	2	2	0	0
Mvmt Flow	0	495	635	90	0	0	10	10

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	90	0	0	0		1608	90
Stage 1	-	-	-	-		1360	-
Stage 2	-	-	-	-		248	-
Critical Hdwy	4.205	-	-	-		6.6	6.2
Critical Hdwy Stg 1	-	-	-	-		5.4	-
Critical Hdwy Stg 2	-	-	-	-		5.8	-
Follow-up Hdwy	2.2665	-	-	-		3.5	3.3
Pot Cap-1 Maneuver	1471	-	-	-		107	973
Stage 1	-	-	-	-		241	-
Stage 2	-	-	-	-		776	-
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1471	-	-	-		42	973
Mov Cap-2 Maneuver	-	-	-	-		42	-
Stage 1	-	-	-	-		241	-
Stage 2	-	-	-	-		301	-

Approach	EB	WB	SW
HCM Control Delay, s	0	12.1	63.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	WBR2	SWLn1
Capacity (veh/h)	1471	-	1037	-	-	81
HCM Lane V/C Ratio	-	-	0.612	-	-	0.247
HCM Control Delay (s)	0	-	13.8	-	-	63.4
HCM Lane LOS	A	-	B	-	-	F
HCM 95th %tile Q(veh)	0	-	4.4	-	-	0.9

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	450	5	20	635	5	0	0	15	5	5	10
Future Vol, veh/h	5	450	5	20	635	5	0	0	15	5	5	10
Conflicting Peds, #/hr	1	0	1	1	0	1	10	0	1	1	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	56	56	56	60	60	60
Heavy Vehicles, %	7	7	7	7	7	7	15	15	15	0	0	0
Mvmt Flow	5	489	5	22	690	5	0	0	27	8	8	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	696	0	0	495	0	0	906	1243	249	994	1243	359
Stage 1	-	-	-	-	-	-	503	503	-	738	738	-
Stage 2	-	-	-	-	-	-	403	740	-	256	505	-
Critical Hdwy	4.24	-	-	4.24	-	-	7.8	6.8	7.2	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.8	5.8	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.8	5.8	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.27	-	-	3.65	4.15	3.45	3.5	4	3.3
Pot Cap-1 Maneuver	863	-	-	1031	-	-	212	156	713	202	176	643
Stage 1	-	-	-	-	-	-	487	508	-	380	427	-
Stage 2	-	-	-	-	-	-	561	391	-	732	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	862	-	-	1030	-	-	193	151	712	190	171	636
Mov Cap-2 Maneuver	-	-	-	-	-	-	193	151	-	190	171	-
Stage 1	-	-	-	-	-	-	484	504	-	377	418	-
Stage 2	-	-	-	-	-	-	519	382	-	700	540	-

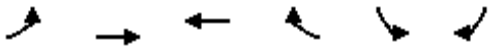
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	10.3	19.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	712	862	-	-	1030	-	-	281
HCM Lane V/C Ratio	0.038	0.006	-	-	0.021	-	-	0.119
HCM Control Delay (s)	10.3	9.2	-	-	8.6	-	-	19.5
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	455	15	5	635	20	10
Future Volume (vph)	455	15	5	635	20	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.5		5.5	5.5	5.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3002		1508	3019	1404	
Flt Permitted	1.00		0.47	1.00	0.97	
Satd. Flow (perm)	3002		740	3019	1404	
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.65	0.65
Adj. Flow (vph)	489	16	6	713	31	15
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	505	0	6	713	46	0
Confl. Peds. (#/hr)		3	3		2	
Heavy Vehicles (%)	7%	7%	7%	7%	12%	12%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	32.7		32.7	32.7	3.4	
Effective Green, g (s)	32.7		32.7	32.7	3.4	
Actuated g/C Ratio	0.70		0.70	0.70	0.07	
Clearance Time (s)	5.5		5.5	5.5	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2106		519	2118	102	
v/s Ratio Prot	0.17			c0.24	c0.03	
v/s Ratio Perm			0.01			
v/c Ratio	0.24		0.01	0.34	0.45	
Uniform Delay, d1	2.5		2.1	2.7	20.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.0	0.1	3.1	
Delay (s)	2.6		2.1	2.8	23.9	
Level of Service	A		A	A	C	
Approach Delay (s)	2.6			2.8	23.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	10.5
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	260	200	250	50	35	390
Future Volume (vph)	260	200	250	50	35	390
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	7.0	5.5	5.5		7.0	7.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1468	1545	1511		1482	1326
Flt Permitted	0.30	1.00	1.00		0.95	1.00
Satd. Flow (perm)	461	1545	1511		1482	1326
Peak-hour factor, PHF	0.96	0.96	0.76	0.76	0.77	0.77
Adj. Flow (vph)	271	208	329	66	45	506
RTOR Reduction (vph)	0	0	0	0	0	476
Lane Group Flow (vph)	271	208	395	0	45	30
Heavy Vehicles (%)	10%	10%	10%	10%	9%	9%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	37.4	37.4	18.6		3.1	3.1
Effective Green, g (s)	37.4	37.4	18.6		3.1	3.1
Actuated g/C Ratio	0.71	0.71	0.35		0.06	0.06
Clearance Time (s)	7.0	5.5	5.5		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	549	1090	530		86	77
v/s Ratio Prot	c0.11	0.13	c0.26		c0.03	
v/s Ratio Perm	0.24					0.02
v/c Ratio	0.49	0.19	0.75		0.52	0.38
Uniform Delay, d1	4.6	2.7	15.1		24.2	24.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.1	5.6		5.6	3.2
Delay (s)	5.3	2.7	20.8		29.9	27.2
Level of Service	A	A	C		C	C
Approach Delay (s)		4.2	20.8		27.4	
Approach LOS		A	C		C	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	53.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	0	10	0	25	0	350	10	30	385	0
Future Volume (vph)	5	0	0	10	0	25	0	350	10	30	385	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			5.5			5.5		3.0	5.5	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.90			1.00		1.00	1.00	
Flt Protected		0.95			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1614			1461			1597		1537	1619	
Flt Permitted		1.00			0.92			1.00		0.47	1.00	
Satd. Flow (perm)		1698			1368			1597		763	1619	
Peak-hour factor, PHF	0.58	0.58	0.58	0.74	0.74	0.74	0.89	0.89	0.89	0.95	0.95	0.95
Adj. Flow (vph)	9	0	0	14	0	34	0	393	11	32	405	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	9	0	0	48	0	0	404	0	32	405	0
Confl. Peds. (#/hr)	1		6	6		1	6		4	4		6
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	6%	6%	6%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA			NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		2.8			2.8			26.6		31.6	31.6	
Effective Green, g (s)		2.8			2.8			26.6		31.6	31.6	
Actuated g/C Ratio		0.06			0.06			0.59		0.70	0.70	
Clearance Time (s)		5.5			5.5			5.5		3.0	5.5	
Vehicle Extension (s)		3.0			3.0			3.2		3.0	3.2	
Lane Grp Cap (vph)		104			84			935		565	1126	
v/s Ratio Prot								c0.25		0.00	c0.25	
v/s Ratio Perm		0.01			c0.04					0.04		
v/c Ratio		0.09			0.57			0.43		0.06	0.36	
Uniform Delay, d1		20.1			20.7			5.2		2.2	2.8	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.4			9.1			0.3		0.0	0.2	
Delay (s)		20.5			29.8			5.6		2.3	3.0	
Level of Service		C			C			A		A	A	
Approach Delay (s)		20.5			29.8			5.6			3.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	45.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	5	130	5	5	5	140	230	10	5	280	30
Future Vol, veh/h	15	5	130	5	5	5	140	230	10	5	280	30
Peak Hour Factor	0.83	0.83	0.83	0.88	0.88	0.88	0.92	0.92	0.92	0.86	0.86	0.86
Heavy Vehicles, %	9	9	9	13	13	13	5	5	5	2	2	2
Mvmt Flow	18	6	157	6	6	6	152	250	11	6	326	35
Number of Lanes	0	1	1	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	10.8	10.3	11.8	16.1
HCM LOS	B	B	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	75%	0%	33%	2%
Vol Thru, %	0%	96%	25%	0%	33%	89%
Vol Right, %	0%	4%	0%	100%	33%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	240	20	130	15	315
LT Vol	140	0	15	0	5	5
Through Vol	0	230	5	0	5	280
RT Vol	0	10	0	130	5	30
Lane Flow Rate	152	261	24	157	17	366
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.26	0.408	0.047	0.261	0.033	0.575
Departure Headway (Hd)	6.161	5.626	7.095	6.002	7.045	5.649
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	584	642	505	598	508	641
Service Time	3.884	3.349	4.833	3.739	5.094	3.671
HCM Lane V/C Ratio	0.26	0.407	0.048	0.263	0.033	0.571
HCM Control Delay	11	12.2	10.2	10.9	10.3	16.1
HCM Lane LOS	B	B	B	B	B	C
HCM 95th-tile Q	1	2	0.1	1	0.1	3.7

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	5	10	85	15	15	45
Future Vol, veh/h	5	10	85	15	15	45
Peak Hour Factor	0.85	0.85	0.86	0.86	0.84	0.84
Heavy Vehicles, %	0	0	2	2	6	6
Mvmt Flow	6	12	99	17	18	54
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	6.8	7.9	7.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	25%	0%	85%
Vol Thru, %	0%	33%	15%
Vol Right, %	75%	67%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	60	15	100
LT Vol	15	0	85
Through Vol	0	5	15
RT Vol	45	10	0
Lane Flow Rate	71	18	116
Geometry Grp	1	1	1
Degree of Util (X)	0.076	0.018	0.137
Departure Headway (Hd)	3.833	3.712	4.242
Convergence, Y/N	Yes	Yes	Yes
Cap	924	956	845
Service Time	1.902	1.767	2.27
HCM Lane V/C Ratio	0.077	0.019	0.137
HCM Control Delay	7.2	6.8	7.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.1	0.5

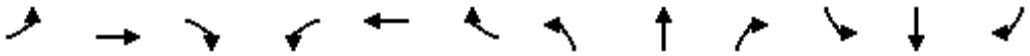
Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	5	0	0	5	5	0	5	0	0	0	5
Future Vol, veh/h	0	5	0	0	5	5	0	5	0	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	42	42	42	42	42	42	56	56	56	43	43	43
Heavy Vehicles, %	0	0	0	10	10	10	22	22	22	16	16	16
Mvmt Flow	0	12	0	0	12	12	0	9	0	0	0	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	27	15	6	21	21	9	12	0	0	9	0	0
Stage 1	6	6	-	9	9	-	-	-	-	-	-	-
Stage 2	21	9	-	12	12	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.2	6.6	6.3	4.32	-	-	4.26	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.59	4.09	3.39	2.398	-	-	2.344	-	-
Pot Cap-1 Maneuver	988	883	1083	972	857	1050	1486	-	-	1524	-	-
Stage 1	1021	895	-	992	872	-	-	-	-	-	-	-
Stage 2	1003	892	-	988	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	966	883	1083	962	857	1050	1486	-	-	1524	-	-
Mov Cap-2 Maneuver	966	883	-	962	857	-	-	-	-	-	-	-
Stage 1	1021	895	-	992	872	-	-	-	-	-	-	-
Stage 2	978	892	-	975	870	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	8.9	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1486	-	-	883	944	1524	-	-
HCM Lane V/C Ratio	-	-	-	0.013	0.025	-	-	-
HCM Control Delay (s)	0	-	-	9.1	8.9	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



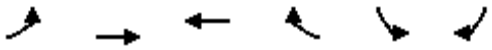
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	20	25	30	50	5	40	15	10	5	20	10
Future Volume (vph)	5	20	25	30	50	5	40	15	10	5	20	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			5.5			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.98	
Flpb, ped/bikes		1.00			1.00			0.96			0.99	
Frt		0.93			0.99			0.98			0.96	
Flt Protected		1.00			0.98			0.97			0.99	
Satd. Flow (prot)		1492			1594			1473			1493	
Flt Permitted		0.95			0.86			1.00			0.93	
Satd. Flow (perm)		1424			1391			1519			1402	
Peak-hour factor, PHF	0.80	0.80	0.80	0.77	0.77	0.77	0.75	0.75	0.75	0.72	0.72	0.72
Adj. Flow (vph)	6	25	31	39	65	6	53	20	13	7	28	14
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	62	0	0	110	0	0	86	0	0	49	0
Confl. Peds. (#/hr)	59		17	17		59	95		127	127		95
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	4%	4%	4%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		5.0			5.0			2.7			2.7	
Effective Green, g (s)		5.0			5.0			2.7			2.7	
Actuated g/C Ratio		0.27			0.27			0.14			0.14	
Clearance Time (s)		5.5			5.5			5.5			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		380			371			219			202	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.08			c0.06			0.03	
v/c Ratio		0.16			0.30			0.39			0.24	
Uniform Delay, d1		5.2			5.5			7.3			7.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.4			1.2			0.6	
Delay (s)		5.5			5.9			8.4			7.7	
Level of Service		A			A			A			A	
Approach Delay (s)		5.5			5.9			8.4			7.7	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	18.7	Sum of lost time (s)	11.0
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Existing PM

2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	350	300	0	0	30
Future Volume (Veh/h)	0	350	300	0	0	30
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.71	0.71	0.75	0.75
Hourly flow rate (vph)	0	385	423	0	0	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	423				616	423
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	423				616	423
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	100				100	93
cM capacity (veh/h)	1105				414	568

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	192	192	423	40
Volume Left	0	0	0	0
Volume Right	0	0	0	40
cSH	1700	1700	1700	568
Volume to Capacity	0.11	0.11	0.25	0.07
Queue Length 95th (ft)	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	11.8
Lane LOS				B
Approach Delay (s)	0.0		0.0	11.8
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	340	300	5	25	0
Future Vol, veh/h	10	340	300	5	25	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	91	91	71	71	75	75
Heavy Vehicles, %	6	6	3	3	6	6
Mvmt Flow	11	374	423	7	33	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	430	0	-	0	636	427
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	209	-
Critical Hdwy	4.19	-	-	-	6.69	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.89	-
Follow-up Hdwy	2.257	-	-	-	3.557	3.357
Pot Cap-1 Maneuver	1103	-	-	-	418	617
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	796	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1103	-	-	-	414	617
Mov Cap-2 Maneuver	-	-	-	-	414	-
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	796	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1103	-	-	-	414
HCM Lane V/C Ratio	0.01	-	-	-	0.081
HCM Control Delay (s)	8.3	-	-	-	14.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	345	275	10	40	30
Future Vol, veh/h	20	345	275	10	40	30
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	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	66	66	68	68
Heavy Vehicles, %	6	6	3	3	4	4
Mvmt Flow	25	426	417	15	59	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	432	0	-	0	688	216
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	263	-
Critical Hdwy	4.22	-	-	-	6.88	6.98
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	2.26	-	-	-	3.54	3.34
Pot Cap-1 Maneuver	1096	-	-	-	376	782
Stage 1	-	-	-	-	621	-
Stage 2	-	-	-	-	751	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1096	-	-	-	365	782
Mov Cap-2 Maneuver	-	-	-	-	365	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	751	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1096	-	-	-	473
HCM Lane V/C Ratio	0.023	-	-	-	0.218
HCM Control Delay (s)	8.4	0.1	-	-	14.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	300	75	60	205	20	60	70	45	45	75	20
Future Volume (vph)	15	300	75	60	205	20	60	70	45	45	75	20
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			6.0		6.5	6.5			6.5	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		0.99			0.99		1.00	0.99			1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			1.00	
Frt		0.97			0.99		1.00	0.94			0.98	
Flt Protected		1.00			0.99		0.95	1.00			0.98	
Satd. Flow (prot)		2944			2989		1523	1509			1581	
Flt Permitted		1.00			0.99		0.59	1.00			0.84	
Satd. Flow (perm)		2944			2989		952	1509			1355	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.89	0.89	0.89	0.54	0.54	0.54
Adj. Flow (vph)	18	366	91	73	250	24	67	79	51	83	139	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	475	0	0	347	0	67	130	0	0	259	0
Confl. Peds. (#/hr)			36			61	24		21	21		24
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		1	1			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)		13.3			12.2		17.0	17.0			17.0	
Effective Green, g (s)		13.3			12.2		17.0	17.0			17.0	
Actuated g/C Ratio		0.22			0.20		0.28	0.28			0.28	
Clearance Time (s)		5.5			6.0		6.5	6.5			6.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		647			602		267	424			380	
v/s Ratio Prot		c0.16			c0.12			0.09				
v/s Ratio Perm							0.07				c0.19	
v/c Ratio		0.73			0.58		0.25	0.31			0.68	
Uniform Delay, d1		22.0			21.8		16.8	17.1			19.3	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		4.3			1.3		0.5	0.4			5.0	
Delay (s)		26.3			23.2		17.3	17.5			24.3	
Level of Service		C			C		B	B			C	
Approach Delay (s)		26.3			23.2			17.5			24.3	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	360	20	35	255	20	10	30	25	35	55	20
Future Volume (vph)	10	360	20	35	255	20	10	30	25	35	55	20
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			5.5			5.5			5.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.99			0.99			0.95			0.98	
Flt Protected		1.00			0.99			0.99			0.98	
Satd. Flow (prot)		3017			2984			1510			1576	
Flt Permitted		0.94			0.87			0.92			0.86	
Satd. Flow (perm)		2848			2610			1398			1376	
Peak-hour factor, PHF	0.78	0.78	0.78	0.93	0.93	0.93	0.74	0.74	0.74	0.69	0.69	0.69
Adj. Flow (vph)	13	462	26	38	274	22	14	41	34	51	80	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	501	0	0	334	0	0	89	0	0	160	0
Confl. Peds. (#/hr)	51		125	125		51	8		23	23		8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		17.0			17.0			8.0			8.0	
Effective Green, g (s)		17.0			17.0			8.0			8.0	
Actuated g/C Ratio		0.47			0.47			0.22			0.22	
Clearance Time (s)		5.5			5.5			5.5			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1344			1232			310			305	
v/s Ratio Prot												
v/s Ratio Perm		c0.18			0.13			0.06			c0.12	
v/c Ratio		0.37			0.27			0.29			0.52	
Uniform Delay, d1		6.1			5.8			11.6			12.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.1			0.5			1.6	
Delay (s)		6.3			5.9			12.1			14.0	
Level of Service		A			A			B			B	
Approach Delay (s)		6.3			5.9			12.1			14.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	395	5	215	305	10	0	10	10	0	0	0
Future Vol, veh/h	10	395	5	215	305	10	0	10	10	0	0	0
Conflicting Peds, #/hr	50	0	31	31	0	50	12	0	16	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	85	85	85	68	68	68	92	92	92
Heavy Vehicles, %	3	3	3	2	2	2	0	0	0	2	2	2
Mvmt Flow	11	420	5	253	359	12	0	15	15	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	421	0	0	456	0	0	1174	1403	260
Stage 1	-	-	-	-	-	-	476	476	-
Stage 2	-	-	-	-	-	-	698	927	-
Critical Hdwy	4.16	-	-	4.14	-	-	6.8	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.8	5.5	-
Follow-up Hdwy	2.23	-	-	2.22	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1128	-	-	1101	-	-	188	141	745
Stage 1	-	-	-	-	-	-	597	560	-
Stage 2	-	-	-	-	-	-	460	350	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1128	-	-	1068	-	-	125	0	712
Mov Cap-2 Maneuver	-	-	-	-	-	-	125	0	-
Stage 1	-	-	-	-	-	-	571	0	-
Stage 2	-	-	-	-	-	-	319	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	4.2	10.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	712	1128	-	-	1068	-	-
HCM Lane V/C Ratio	0.041	0.009	-	-	0.237	-	-
HCM Control Delay (s)	10.3	8.2	0.1	-	9.4	0.6	-
HCM Lane LOS	B	A	A	-	A	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-	0.9	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	405	0	0	510	15	410
Future Vol, veh/h	405	0	0	510	15	410
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	95	95	85	85	82	82
Heavy Vehicles, %	3	3	2	2	1	1
Mvmt Flow	426	0	0	600	18	500

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	726	213
Stage 1	-	-	-	-	426	-
Stage 2	-	-	-	-	300	-
Critical Hdwy	-	-	-	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	-	-	3.51	3.31
Pot Cap-1 Maneuver	-	0	0	-	362	795
Stage 1	-	0	0	-	629	-
Stage 2	-	0	0	-	728	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	362	795
Mov Cap-2 Maneuver	-	-	-	-	362	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	728	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	362	795	-	-
HCM Lane V/C Ratio	0.051	0.629	-	-
HCM Control Delay (s)	15.5	16.9	-	-
HCM Lane LOS	C	C	-	-
HCM 95th %tile Q(veh)	0.2	4.5	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	785	10	5	510	15	5	0	5	0	0	0
Future Vol, veh/h	25	785	10	5	510	15	5	0	5	0	0	0
Conflicting Peds, #/hr	3	0	34	34	0	3	7	0	15	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	82	82	82	75	75	75	92	92	92
Heavy Vehicles, %	3	3	3	2	2	2	0	0	0	2	2	2
Mvmt Flow	26	818	10	6	622	18	7	0	7	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	643	0	0	862	0	0	1239	1564	463
Stage 1	-	-	-	-	-	-	909	909	-
Stage 2	-	-	-	-	-	-	330	655	-
Critical Hdwy	4.16	-	-	4.14	-	-	6.8	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.8	5.5	-
Follow-up Hdwy	2.23	-	-	2.22	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	931	-	-	776	-	-	170	113	551
Stage 1	-	-	-	-	-	-	358	357	-
Stage 2	-	-	-	-	-	-	707	466	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	931	-	-	751	-	-	153	0	526
Mov Cap-2 Maneuver	-	-	-	-	-	-	153	0	-
Stage 1	-	-	-	-	-	-	329	0	-
Stage 2	-	-	-	-	-	-	694	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.5	0.2	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	237	931	-	-	751	-	-
HCM Lane V/C Ratio	0.056	0.028	-	-	0.008	-	-
HCM Control Delay (s)	21.1	9	0.2	-	9.8	0.1	-
HCM Lane LOS	C	A	A	-	A	A	-
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	780	10	0	515	10	10
Future Vol, veh/h	780	10	0	515	10	10
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	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	84	84	69	69
Heavy Vehicles, %	3	3	2	2	0	0
Mvmt Flow	839	11	0	613	14	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	850	0	1152	425
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	307	-
Critical Hdwy	-	-	4.14	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.22	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	784	-	194	583
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	725	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	784	-	194	583
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	291	-	-	784	-
HCM Lane V/C Ratio	0.1	-	-	-	-
HCM Control Delay (s)	18.7	-	-	0	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	750	5	5	470	0	0	5	5	90	5	50
Future Volume (vph)	35	750	5	5	470	0	0	5	5	90	5	50
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00		0.98	1.00	
Frt	1.00	1.00		1.00	1.00			0.93		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1517	3102		1561	3167			1300		1551	1423	
Flt Permitted	0.47	1.00		0.33	1.00			1.00		0.75	1.00	
Satd. Flow (perm)	752	3102		546	3167			1300		1220	1423	
Peak-hour factor, PHF	0.91	0.91	0.91	0.95	0.95	0.95	0.63	0.63	0.63	0.89	0.89	0.89
Adj. Flow (vph)	38	824	5	5	495	0	0	8	8	101	6	56
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	38	829	0	5	495	0	0	16	0	101	62	0
Confl. Peds. (#/hr)	47		46	46		47	4		42	42		4
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	20%	20%	20%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	24.4	24.4		24.4	24.4			7.8		7.8	7.8	
Effective Green, g (s)	24.4	24.4		24.4	24.4			7.8		7.8	7.8	
Actuated g/C Ratio	0.56	0.56		0.56	0.56			0.18		0.18	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	424	1752		308	1788			234		220	256	
v/s Ratio Prot		c0.27			0.16			0.01			0.04	
v/s Ratio Perm	0.05			0.01						c0.08		
v/c Ratio	0.09	0.47		0.02	0.28			0.07		0.46	0.24	
Uniform Delay, d1	4.3	5.6		4.1	4.8			14.7		15.8	15.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.0	0.1			0.1		1.5	0.5	
Delay (s)	4.4	5.8		4.1	4.9			14.8		17.3	15.7	
Level of Service	A	A		A	A			B		B	B	
Approach Delay (s)		5.7			4.9			14.8			16.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	43.2	Sum of lost time (s)	11.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	WBT	WBR	SEL	SER	SWL	SWR
Lane Configurations								
Traffic Vol, veh/h	5	840	470	170	0	0	5	5
Future Vol, veh/h	5	840	470	170	0	0	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-
Storage Length	50	-	-	200	-	-	0	-
Veh in Median Storage, #	-	0	0	-	16965	-	0	-
Grade, %	-	0	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	92	92	55	55
Heavy Vehicles, %	4	4	2	2	2	2	8	8
Mvmt Flow	5	875	490	177	0	0	9	9

Major/Minor	Major1		Major2			Minor2	
Conflicting Flow All	182	0	0	0		1608	180
Stage 1	-	-	-	-		1160	-
Stage 2	-	-	-	-		448	-
Critical Hdwy	4.16	-	-	-		6.72	6.32
Critical Hdwy Stg 1	-	-	-	-		5.52	-
Critical Hdwy Stg 2	-	-	-	-		5.92	-
Follow-up Hdwy	2.238	-	-	-		3.576	3.376
Pot Cap-1 Maneuver	1379	-	-	-		100	845
Stage 1	-	-	-	-		286	-
Stage 2	-	-	-	-		597	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	1379	-	-	-		36	845
Mov Cap-2 Maneuver	-	-	-	-		36	-
Stage 1	-	-	-	-		285	-
Stage 2	-	-	-	-		217	-

Approach	EB	WB	SW
HCM Control Delay, s	0	12.8	74.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	WBR2	SWLn1
Capacity (veh/h)	1379	-	769	-	-	69
HCM Lane V/C Ratio	0.004	-	0.637	-	-	0.264
HCM Control Delay (s)	7.6	-	17.5	-	-	74.9
HCM Lane LOS	A	-	C	-	-	F
HCM 95th %tile Q(veh)	0	-	4.6	-	-	0.9

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	825	5	10	620	10	10	0	25	10	0	15
Future Vol, veh/h	15	825	5	10	620	10	10	0	25	10	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0	13	0	0	0	0	13
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	94	94	94	64	64	64	60	60	60
Heavy Vehicles, %	4	4	4	2	2	2	9	9	9	0	0	0
Mvmt Flow	16	868	5	11	660	11	16	0	39	17	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	671	0	0	873	0	0	1268	1596	437	1154	1593	349
Stage 1	-	-	-	-	-	-	903	903	-	688	688	-
Stage 2	-	-	-	-	-	-	365	693	-	466	905	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.68	6.68	7.08	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.59	4.09	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	902	-	-	768	-	-	118	99	548	155	108	653
Stage 1	-	-	-	-	-	-	285	339	-	407	450	-
Stage 2	-	-	-	-	-	-	608	426	-	551	358	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	902	-	-	768	-	-	109	96	548	140	105	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	96	-	140	105	-
Stage 1	-	-	-	-	-	-	280	333	-	400	444	-
Stage 2	-	-	-	-	-	-	569	420	-	503	352	-

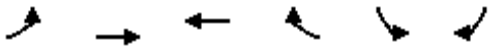
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	22.9	21.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	255	902	-	-	768	-	-	264
HCM Lane V/C Ratio	0.214	0.018	-	-	0.014	-	-	0.158
HCM Control Delay (s)	22.9	9.1	-	-	9.8	-	-	21.2
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0	-	-	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	820	35	5	615	25	10
Future Volume (vph)	820	35	5	615	25	10
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	5.5		5.5	5.5	5.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3114		1582	3167	1532	
Flt Permitted	1.00		0.32	1.00	0.97	
Satd. Flow (perm)	3114		537	3167	1532	
Peak-hour factor, PHF	0.97	0.97	0.94	0.94	0.52	0.52
Adj. Flow (vph)	845	36	5	654	48	19
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	881	0	5	654	67	0
Confl. Peds. (#/hr)		3	3		14	
Heavy Vehicles (%)	3%	3%	2%	2%	3%	3%
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	31.9		31.9	31.9	3.6	
Effective Green, g (s)	31.9		31.9	31.9	3.6	
Actuated g/C Ratio	0.69		0.69	0.69	0.08	
Clearance Time (s)	5.5		5.5	5.5	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2159		372	2196	119	
v/s Ratio Prot	c0.28			0.21	c0.04	
v/s Ratio Perm			0.01			
v/c Ratio	0.41		0.01	0.30	0.56	
Uniform Delay, d1	3.0		2.2	2.7	20.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.0	0.1	6.0	
Delay (s)	3.1		2.2	2.8	26.4	
Level of Service	A		A	A	C	
Approach Delay (s)	3.1			2.8	26.4	
Approach LOS	A			A	C	

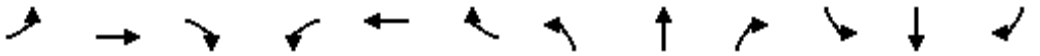
Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	435	395	290	45	65	330
Future Volume (vph)	435	395	290	45	65	330
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700
Total Lost time (s)	7.0	5.5	5.5		7.0	7.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1553	1635	1605		1583	1417
Flt Permitted	0.29	1.00	1.00		0.95	1.00
Satd. Flow (perm)	478	1635	1605		1583	1417
Peak-hour factor, PHF	0.93	0.93	0.86	0.86	0.89	0.89
Adj. Flow (vph)	468	425	337	52	73	371
RTOR Reduction (vph)	0	0	0	0	0	350
Lane Group Flow (vph)	468	425	389	0	73	21
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	38.1	38.1	18.1		3.0	3.0
Effective Green, g (s)	38.1	38.1	18.1		3.0	3.0
Actuated g/C Ratio	0.71	0.71	0.34		0.06	0.06
Clearance Time (s)	7.0	5.5	5.5		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	600	1162	541		88	79
v/s Ratio Prot	c0.19	0.26	0.24		c0.05	
v/s Ratio Perm	c0.36					0.01
v/c Ratio	0.78	0.37	0.72		0.83	0.26
Uniform Delay, d1	5.8	3.0	15.5		25.0	24.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.5	0.2	4.6		44.8	1.8
Delay (s)	12.3	3.2	20.1		69.8	26.0
Level of Service	B	A	C		E	C
Approach Delay (s)		8.0	20.1		33.2	
Approach LOS		A	C		C	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	19.5
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	5	0	25	0	70	0	525	20	70	355	0
Future Volume (vph)	15	5	0	25	0	70	0	525	20	70	355	0
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			5.5			5.5		3.0	5.5	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.90			1.00		1.00	1.00	
Flt Protected		0.96			0.99			1.00		0.95	1.00	
Satd. Flow (prot)		1517			1477			1625		1583	1667	
Flt Permitted		0.80			0.90			1.00		0.28	1.00	
Satd. Flow (perm)		1259			1343			1625		469	1667	
Peak-hour factor, PHF	0.54	0.54	0.54	0.84	0.84	0.84	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	9	0	30	0	83	0	583	22	78	394	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	37	0	0	113	0	0	605	0	78	394	0
Confl. Peds. (#/hr)			12	12			9		2			9
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA			NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		7.9			7.9			26.3		32.8	32.8	
Effective Green, g (s)		7.9			7.9			26.3		32.8	32.8	
Actuated g/C Ratio		0.15			0.15			0.51		0.63	0.63	
Clearance Time (s)		5.5			5.5			5.5		3.0	5.5	
Vehicle Extension (s)		3.0			3.0			3.2		3.0	3.2	
Lane Grp Cap (vph)		192			205			826		372	1057	
v/s Ratio Prot								c0.37		0.01	c0.24	
v/s Ratio Perm		0.03			c0.08					0.12		
v/c Ratio		0.19			0.55			0.73		0.21	0.37	
Uniform Delay, d1		19.1			20.3			9.9		4.8	4.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.5			3.2			3.4		0.3	0.2	
Delay (s)		19.6			23.4			13.4		5.1	4.8	
Level of Service		B			C			B		A	A	
Approach Delay (s)		19.6			23.4			13.4			4.8	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	14.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	20.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	15	150	5	5	5	165	440	5	0	270	20
Future Vol, veh/h	30	15	150	5	5	5	165	440	5	0	270	20
Peak Hour Factor	0.84	0.84	0.84	0.45	0.45	0.45	0.90	0.90	0.90	0.84	0.84	0.84
Heavy Vehicles, %	3	3	3	0	0	0	3	3	3	1	1	1
Mvmt Flow	36	18	179	11	11	11	183	489	6	0	321	24
Number of Lanes	0	1	1	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	2
HCM Control Delay	12.1	11.3	25.2	18.4
HCM LOS	B	B	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	67%	0%	33%	0%
Vol Thru, %	0%	99%	33%	0%	33%	93%
Vol Right, %	0%	1%	0%	100%	33%	7%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	165	445	45	150	15	290
LT Vol	165	0	30	0	5	0
Through Vol	0	440	15	0	5	270
RT Vol	0	5	0	150	5	20
Lane Flow Rate	183	494	54	179	33	345
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.329	0.817	0.113	0.324	0.071	0.601
Departure Headway (Hd)	6.46	5.946	7.591	6.533	7.715	6.262
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	555	608	471	548	467	577
Service Time	4.214	3.698	5.362	4.304	5.715	4.319
HCM Lane V/C Ratio	0.33	0.813	0.115	0.327	0.071	0.598
HCM Control Delay	12.4	30	11.3	12.4	11.3	18.4
HCM Lane LOS	B	D	B	B	B	C
HCM 95th-tile Q	1.4	8.3	0.4	1.4	0.2	4

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	50	65	110	45	60
Future Vol, veh/h	40	50	65	110	45	60
Peak Hour Factor	0.58	0.58	0.84	0.84	0.84	0.84
Heavy Vehicles, %	5	5	3	3	5	5
Mvmt Flow	69	86	77	131	54	71
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.1	9.1	8.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	43%	0%	37%
Vol Thru, %	0%	44%	63%
Vol Right, %	57%	56%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	105	90	175
LT Vol	45	0	65
Through Vol	0	40	110
RT Vol	60	50	0
Lane Flow Rate	125	155	208
Geometry Grp	1	1	1
Degree of Util (X)	0.157	0.18	0.259
Departure Headway (Hd)	4.531	4.175	4.48
Convergence, Y/N	Yes	Yes	Yes
Cap	793	861	804
Service Time	2.552	2.193	2.497
HCM Lane V/C Ratio	0.158	0.18	0.259
HCM Control Delay	8.4	8.1	9.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.7	1

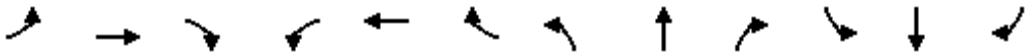
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	5	0	0	5	5	0	0	0	5	0	0
Future Vol, veh/h	0	5	0	0	5	5	0	0	0	5	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	29	29	29	29	29	29	38	38	38	31	31	31
Heavy Vehicles, %	0	0	0	0	0	0	33	33	33	0	0	0
Mvmt Flow	0	17	0	0	17	17	0	0	0	16	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	49	32	0	41	32	0	0	0	0	0	0	0
Stage 1	32	32	-	0	0	-	-	-	-	-	-	-
Stage 2	17	0	-	41	32	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.43	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.497	-	-	2.2	-	-
Pot Cap-1 Maneuver	956	865	-	968	865	-	-	-	-	-	-	-
Stage 1	990	872	-	-	-	-	-	-	-	-	-	-
Stage 2	1008	-	-	979	872	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	865	-	-	865	-	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	865	-	-	865	-	-	-	-	-	-	-
Stage 1	990	872	-	-	-	-	-	-	-	-	-	-
Stage 2	1008	-	-	960	872	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	-	-	-	-
HCM Lane LOS	A	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	70	15	70	150	5	20	20	20	5	25	5
Future Volume (vph)	15	70	15	70	150	5	20	20	20	5	25	5
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Total Lost time (s)		5.5			5.5			5.5			5.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.94			0.98	
Flpb, ped/bikes		0.99			0.99			0.96			0.98	
Frt		0.98			1.00			0.95			0.98	
Flt Protected		0.99			0.98			0.98			0.99	
Satd. Flow (prot)		1598			1585			1436			1597	
Flt Permitted		0.90			0.85			1.00			0.94	
Satd. Flow (perm)		1441			1365			1460			1508	
Peak-hour factor, PHF	0.78	0.78	0.78	0.90	0.90	0.90	0.79	0.79	0.79	0.93	0.93	0.93
Adj. Flow (vph)	19	90	19	78	167	6	25	25	25	5	27	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	128	0	0	251	0	0	75	0	0	37	0
Confl. Peds. (#/hr)	133		52	52		133	153		217	217		153
Heavy Vehicles (%)	2%	2%	2%	4%	4%	4%	1%	1%	1%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		6.8			6.8			2.6			2.6	
Effective Green, g (s)		6.8			6.8			2.6			2.6	
Actuated g/C Ratio		0.33			0.33			0.13			0.13	
Clearance Time (s)		5.5			5.5			5.5			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		480			455			186			192	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.18			c0.05			0.02	
v/c Ratio		0.27			0.55			0.40			0.19	
Uniform Delay, d1		5.0			5.6			8.2			8.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			1.4			1.4			0.5	
Delay (s)		5.3			7.0			9.6			8.5	
Level of Service		A			A			A			A	
Approach Delay (s)		5.3			7.0			9.6			8.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	20.4	Sum of lost time (s)	11.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Attachment B

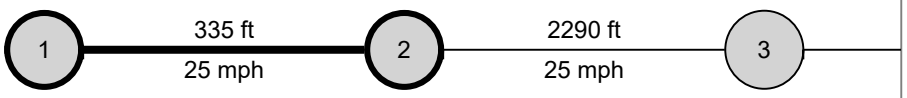
HCS7 Outputs

Existing AM

2020

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	4
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	3
Jurisdiction	Deadwood	Time Period	7:30 AM	Number of Iterations	15
File Name	Existing AM_US 14A_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	US 85/Pine	Deadwood		Analysis Period	1> 7:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
1	25	25	2	1	335	335	50	50	0	0	70	70	0.0	0.0

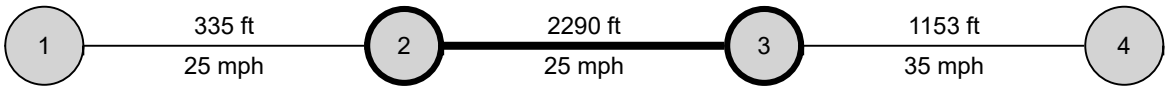
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	16
1	Bay/Lane Spillback Time, h		never			never	
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	33.46			33.46		
1	Running Time, s	12.46			12.82		
1	Running Speed, mph	18.33			17.82		
1	Through Delay, s/veh	5.18			9.93		
1	Travel Time, s	17.64			22.75		
1	Travel Speed, mph	25.00			25.00		
1	Stop Rate, stops/veh	0.48			0.58		
1	Spatial Stop Rate, stops/mi	7.55			9.09		
1	Through vol/cap Ratio	0.19			0.74		
1	Percent of Base FFS	74.72			74.72		
1	Level of Service	B			B		
1	Auto Traveler Perception Score	3.72			4.03		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	1.80		A	2.40		B
1	Bicycle Segment LOS Score / LOS	2.52		B	3.07		C
1	Transit Segment LOS Score / LOS	1.67		A	1.90		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	94.05	108.18
Facility Travel Speed, mph	27.39	23.81
Facility Base Free Flow Speed, mph	35.42	33.82
Facility Percent of Base FFS	77.32	70.41
Facility Level of Service	B	B
Facility Auto Traveler Perception Score	2.54	2.55

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	1.96	A	2.21	B
Bicycle Facility LOS Score / LOS	3.06	C	3.34	C
Transit Facility LOS Score / LOS	0.82	A	0.95	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	4
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	3
Jurisdiction	Deadwood	Time Period	7:30 AM	Number of Iterations	15
File Name	Existing AM_US 14A_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	Deadwood	Lower Main		Analysis Period	1> 7:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
2	25	25	2	2	2290	2290	50	50	0	0	70	70	0.0	0.0

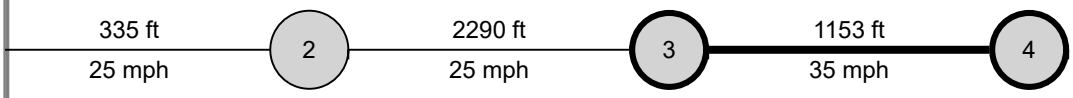
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	16
2	Bay/Lane Spillback Time, h		never			never	
2	Shared Lane Spillback Time, h	never					
2	Base Free-Flow Speed, mph	32.18			30.05		
2	Running Time, s	49.92			54.15		
2	Running Speed, mph	31.28			28.84		
2	Through Delay, s/veh	3.73			6.69		
2	Travel Time, s	53.65			60.84		
2	Travel Speed, mph	25.00			25.00		
2	Stop Rate, stops/veh	0.43			0.53		
2	Spatial Stop Rate, stops/mi	0.98			1.22		
2	Through vol/cap Ratio	0.29			0.52		
2	Percent of Base FFS	77.68			83.20		
2	Level of Service	B			A		
2	Auto Traveler Perception Score	2.43			2.47		
Multimodal Results (Segment)							
2	Pedestrian Segment LOS Score / LOS	1.88		A	2.15		B
2	Bicycle Segment LOS Score / LOS	3.01		C	3.33		C
2	Transit Segment LOS Score / LOS	0.83		A	0.91		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	94.05	108.18
Facility Travel Speed, mph	27.39	23.81
Facility Base Free Flow Speed, mph	35.42	33.82
Facility Percent of Base FFS	77.32	70.41
Facility Level of Service	B	B
Facility Auto Traveler Perception Score	2.54	2.55

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	1.96	A	2.21	B
Bicycle Facility LOS Score / LOS	3.06	C	3.34	C
Transit Facility LOS Score / LOS	0.82	A	0.95	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	4
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	3
Jurisdiction	Deadwood	Time Period	7:30 AM	Number of Iterations	15
File Name	Existing AM_US 14A_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	Lower Main	Dunlop/McKinley		Analysis Period	1> 7:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
3	35	35	2	2	1153	1153	50	50	0	0	70	70	0.0	0.0

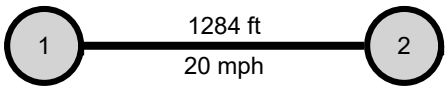
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	
3	Bay/Lane Spillback Time, h		never			never	
3	Shared Lane Spillback Time, h				never		
3	Base Free-Flow Speed, mph	45.24			45.24		
3	Running Time, s	20.36			20.44		
3	Running Speed, mph	38.62			38.46		
3	Through Delay, s/veh	2.40			4.15		
3	Travel Time, s	22.76			24.59		
3	Travel Speed, mph	35.00			35.00		
3	Stop Rate, stops/veh	0.25			0.43		
3	Spatial Stop Rate, stops/mi	1.17			1.97		
3	Through vol/cap Ratio	0.25			0.43		
3	Percent of Base FFS	77.36			77.36		
3	Level of Service	B			B		
3	Auto Traveler Perception Score	2.53			2.44		
Multimodal Results (Segment)							
3	Pedestrian Segment LOS Score / LOS	2.18		B	2.29		B
3	Bicycle Segment LOS Score / LOS	3.32		C	3.44		C
3	Transit Segment LOS Score / LOS	0.56		A	0.75		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	94.05	108.18
Facility Travel Speed, mph	27.39	23.81
Facility Base Free Flow Speed, mph	35.42	33.82
Facility Percent of Base FFS	77.32	70.41
Facility Level of Service	B	B
Facility Auto Traveler Perception Score	2.54	2.55

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	1.96	A	2.21	B
Bicycle Facility LOS Score / LOS	3.06	C	3.34	C
Transit Facility LOS Score / LOS	0.82	A	0.95	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	2
Analyst		Analysis Date	Oct 30, 2020	Number of Segments	1
Jurisdiction	Deadwood	Time Period	7:30 AM	Number of Iterations	15
File Name	Existing AM_US 85.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	US 14A/Pioneer	Cemetery		Analysis Period	1> 7:30
Project Description					



Basic Segment Information (US 85/Pioneer-Cemetery)

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
1	20	20	1	1	1284	1284	50	50	0	0	70	70	0.0	0.0

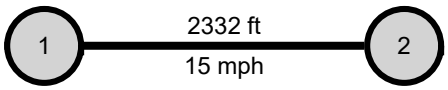
		Southbound			Northbound		
Segment Output Data		SBL	SBT	SBR	NBL	NBT	NBR
Segment	Movement	1	6	16	5	2	12
1	Bay/Lane Spillback Time, h		never			never	
1	Shared Lane Spillback Time, h	never			never		
1	Base Free-Flow Speed, mph	25.00			25.00		
1	Running Time, s	36.95			37.61		
1	Running Speed, mph	23.69			23.28		
1	Through Delay, s/veh	7.83			8.69		
1	Travel Time, s	44.78			46.30		
1	Travel Speed, mph	20.00			20.00		
1	Stop Rate, stops/veh	0.54			0.61		
1	Spatial Stop Rate, stops/mi	2.24			2.52		
1	Through vol/cap Ratio	0.59			0.23		
1	Percent of Base FFS	79.99			79.99		
1	Level of Service	B			B		
1	Auto Traveler Perception Score	2.60			2.65		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	1.90		A	2.15		B
1	Bicycle Segment LOS Score / LOS	2.98		C	3.15		C
1	Transit Segment LOS Score / LOS	1.60		A	1.33		A

Facility Output Data	Southbound	Northbound
Facility Travel Time, s	44.78	46.30
Facility Travel Speed, mph	19.55	18.91
Facility Base Free Flow Speed, mph	25.00	25.00
Facility Percent of Base FFS	78.19	75.62
Facility Level of Service	B	B
Facility Auto Traveler Perception Score	2.60	2.65

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	1.90	A	2.15	B
Bicycle Facility LOS Score / LOS	2.98	C	3.15	C
Transit Facility LOS Score / LOS	1.60	A	1.33	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	2
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	1
Jurisdiction	Deadwood	Time Period	7:30 AM	Number of Iterations	15
File Name	Existing AM_Main_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	Deadwood	US 14A/Pioneer		Analysis Period	1> 7:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
1	15	15	1	1	2332	2332	50	50	0	0	70	70	0.0	0.0

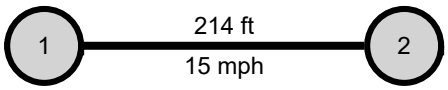
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	16
1	Bay/Lane Spillback Time, h		never			never	
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	20.00			20.00		
1	Running Time, s	80.48			80.32		
1	Running Speed, mph	19.76			19.80		
1	Through Delay, s/veh	0.00			7.07		
1	Travel Time, s	80.48			87.39		
1	Travel Speed, mph	15.00			15.00		
1	Stop Rate, stops/veh	0.00			0.62		
1	Spatial Stop Rate, stops/mi	0.00			1.41		
1	Through vol/cap Ratio	0.00			0.03		
1	Percent of Base FFS	75.00			75.00		
1	Level of Service	B			B		
1	Auto Traveler Perception Score	2.14			2.57		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	1.62		A	1.59		A
1	Bicycle Segment LOS Score / LOS	1.36		A	1.14		A
1	Transit Segment LOS Score / LOS	1.50		A	1.49		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	80.48	87.39
Facility Travel Speed, mph	19.76	18.19
Facility Base Free Flow Speed, mph	20.00	20.00
Facility Percent of Base FFS	98.78	90.97
Facility Level of Service	A	A
Facility Auto Traveler Perception Score	2.14	2.57

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	1.62	A	1.59	A
Bicycle Facility LOS Score / LOS	1.36	A	1.14	A
Transit Facility LOS Score / LOS	1.50	A	1.49	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	2
Analyst		Analysis Date	Oct 30, 2020	Number of Segments	1
Jurisdiction	Deadwood	Time Period	7:30 AM	Number of Iterations	15
File Name	Existing AM_Deadwood.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	US 14A/Pioneer	Main		Analysis Period	1> 7:30
Project Description					



Basic Segment Information (Deadwood/Pioneer-Main)

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
1	15	15	1	1	214	214	50	50	0	0	70	70	0.0	0.0

		Northbound			Southbound		
Segment Output Data		NBL	NBT	NBR	SBL	SBT	SBR
Segment	Movement	5	2	12	1	6	16
1	Bay/Lane Spillback Time, h		never			never	
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	15.00			15.00		
1	Running Time, s	0.00			0.00		
1	Running Speed, mph	0.00			0.00		
1	Through Delay, s/veh	0.00			0.00		
1	Travel Time, s	0.00			0.00		
1	Travel Speed, mph	15.00			15.00		
1	Stop Rate, stops/veh	0.00			0.00		
1	Spatial Stop Rate, stops/mi	0.00			0.00		
1	Through vol/cap Ratio	0.00			0.00		
1	Percent of Base FFS	0.00			0.00		
1	Level of Service	F			F		
1	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
1	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
1	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Northbound	Southbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	7:30AM-8:30AM
Project Description	US14A / Pioneer Way from Upper Main Street to Pine Street		

Direction 1 Geometric Data

Direction 1 Description	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	2.0	Free-Flow Speed (FFS), mi/h	42.9

Direction 1 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 1 Demand and Capacity

Volume (V), veh/h	290	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.83	Flow Rate (v_p), pc/h/ln	186
Total Trucks, %	6.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.10

Direction 1 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	40.8
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	4.6
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.5		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}), veh/h	175	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	2.96
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	C

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	7:30AM-8:30AM
Project Description	US14A / Pioneer Way from Upper Main Street to Pine Street		

Direction 2 Geometric Data

Direction 2 Description	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	2.0	Free-Flow Speed (FFS), mi/h	42.9

Direction 2 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 2 Demand and Capacity

Volume (V), veh/h	370	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.88	Flow Rate (v_p), pc/h/ln	225
Total Trucks, %	7.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.13

Direction 2 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	40.8
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	5.5
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.5		

Direction 2 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}), veh/h	210	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	3.32
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	C

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	7:30AM-8:30AM
Project Description	US14A / Pioneer Way from Dunlop Avenue to US85		

Direction 1 Geometric Data

Direction 1 Description	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	43.2

Direction 1 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 1 Demand and Capacity

Volume (V), veh/h	460	Heavy Vehicle Adjustment Factor (f_{HV})	0.909
Peak Hour Factor (PHF)	0.96	Flow Rate (v_p), pc/h/ln	264
Total Trucks, %	10.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.15

Direction 1 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	41.0
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	6.4
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}), veh/h	240	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	4.29
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	D

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	7:30AM-8:30AM
Project Description	US14A / Pioneer Way from Dunlop Avenue to US85		

Direction 2 Geometric Data

Direction 2 Description	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	43.2

Direction 2 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 2 Demand and Capacity

Volume (V), veh/h	640	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.89	Flow Rate (v_p), pc/h/ln	384
Total Trucks, %	7.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.22

Direction 2 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	41.0
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	9.4
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 2 Bicycle LOS

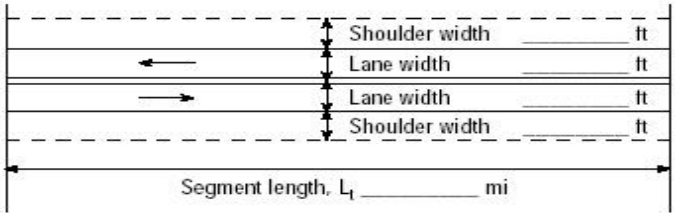
Flow Rate in Outside Lane (v_{OL}), veh/h	360	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	3.59
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	D

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*THopkins*	Highway / Direction of Travel	*Upper Main Street*
Agency or Company	*HDR, Inc.*	From/To	*US14A to Deadwood*
Date Performed	*11/5/2020*	Jurisdiction	*Deadwood*
Analysis Time Period	*7:30AM-8:30AM*	Analysis Year	*2020*

Project Description: *Deadwood Box - Upper Main 2-Ln*

Input Data



Analysis direction vol., V_d *15*veh/h
Opposing direction vol., V_o *30*veh/h
Shoulder width ft *0.0*
Lane Width ft *12.0*
Segment Length mi *0.7*

☐ Class I highway ☐ Class II highway ☑ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.85*
No-passing zone *0%*
% Trucks and Buses , P_T *4 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.965*	*0.965*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*18*	*37*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*4.2 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*40.3 mi/h*
		Percent free flow speed, PFFS	*98.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.996*	*0.996*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*18*	*35*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*2.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*10.3*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*5.8*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*A*
Volume to capacity ratio, *v/c*	*0.01*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*98.7*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*17.6*
Effective width, Wv (Eq. 15-29) ft	*23.10*
Effective speed factor, S_t (Eq. 15-30)	
Bicycle level of service score, BLOS (Eq. 15-31)	
Bicycle level of service (Exhibit 15-4)	
Notes	
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

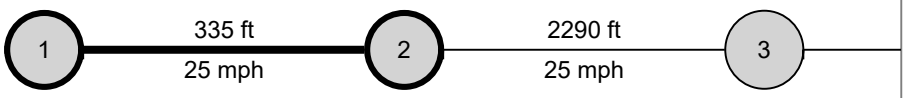
 HCS™ TwoLane Version 7.5 Generated: 11/5/2020 3:39 PM

Existing PM

2020

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	4
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	3
Jurisdiction	Deadwood	Time Period	3:30 PM	Number of Iterations	15
File Name	Existing PM_US 14A_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	US 85/Pine	Deadwood		Analysis Period	1> 15:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
1	25	25	2	1	335	335	50	50	0	0	70	70	0.0	0.0

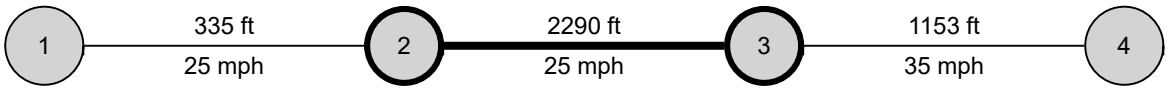
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	16
1	Bay/Lane Spillback Time, h		never			never	
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	33.46			33.46		
1	Running Time, s	0.00			0.00		
1	Running Speed, mph	0.00			0.00		
1	Through Delay, s/veh	0.00			0.00		
1	Travel Time, s	0.00			0.00		
1	Travel Speed, mph	25.00			25.00		
1	Stop Rate, stops/veh	0.00			0.00		
1	Spatial Stop Rate, stops/mi	0.00			0.00		
1	Through vol/cap Ratio	0.00			0.00		
1	Percent of Base FFS	0.00			0.00		
1	Level of Service	F			F		
1	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
1	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
1	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	4
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	3
Jurisdiction	Deadwood	Time Period	3:30 PM	Number of Iterations	15
File Name	Existing PM_US 14A_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	Deadwood	Lower Main		Analysis Period	1> 15:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
2	25	25	2	2	2290	2290	50	50	0	0	70	70	0.0	0.0

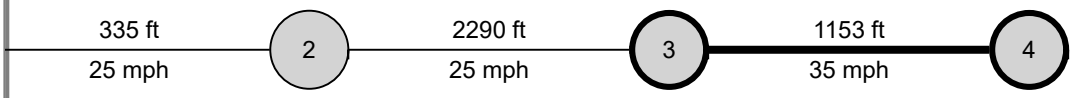
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	16
2	Bay/Lane Spillback Time, h		never			never	
2	Shared Lane Spillback Time, h	never					
2	Base Free-Flow Speed, mph	32.18			30.05		
2	Running Time, s	0.00			0.00		
2	Running Speed, mph	0.00			0.00		
2	Through Delay, s/veh	0.00			0.00		
2	Travel Time, s	0.00			0.00		
2	Travel Speed, mph	25.00			25.00		
2	Stop Rate, stops/veh	0.00			0.00		
2	Spatial Stop Rate, stops/mi	0.00			0.00		
2	Through vol/cap Ratio	0.00			0.00		
2	Percent of Base FFS	0.00			0.00		
2	Level of Service	F			F		
2	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
2	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
2	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
2	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	4
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	3
Jurisdiction	Deadwood	Time Period	3:30 PM	Number of Iterations	15
File Name	Existing PM_US 14A_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	Lower Main	Dunlop/McKinley		Analysis Period	1> 15:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
3	35	35	2	2	1153	1153	50	50	0	0	70	70	0.0	0.0

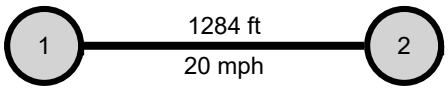
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	
3	Bay/Lane Spillback Time, h		never			never	
3	Shared Lane Spillback Time, h				never		
3	Base Free-Flow Speed, mph	45.24			45.24		
3	Running Time, s	0.00			0.00		
3	Running Speed, mph	0.00			0.00		
3	Through Delay, s/veh	0.00			0.00		
3	Travel Time, s	0.00			0.00		
3	Travel Speed, mph	35.00			35.00		
3	Stop Rate, stops/veh	0.00			0.00		
3	Spatial Stop Rate, stops/mi	0.00			0.00		
3	Through vol/cap Ratio	0.00			0.00		
3	Percent of Base FFS	0.00			0.00		
3	Level of Service	F			F		
3	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
3	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
3	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
3	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	2
Analyst		Analysis Date	Oct 30, 2020	Number of Segments	1
Jurisdiction	Deadwood	Time Period	3:30 PM	Number of Iterations	15
File Name	Existing PM_US 85.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	US 14A/Pioneer	Cemetery		Analysis Period	1> 15:30
Project Description					



Basic Segment Information (US 85/Pioneer-Cemetery)

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
1	20	20	1	1	1284	1284	50	50	0	0	70	70	0.0	0.0

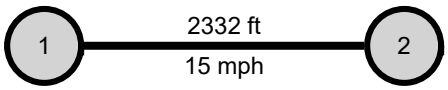
		Southbound			Northbound		
Segment Output Data		SBL	SBT	SBR	NBL	NBT	NBR
Segment	Movement	1	6	16	5	2	12
1	Bay/Lane Spillback Time, h						
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	25.00			25.00		
1	Running Time, s	0.00			0.00		
1	Running Speed, mph	0.00			0.00		
1	Through Delay, s/veh	0.00			0.00		
1	Travel Time, s	0.00			0.00		
1	Travel Speed, mph	20.00			20.00		
1	Stop Rate, stops/veh	0.00			0.00		
1	Spatial Stop Rate, stops/mi	0.00			0.00		
1	Through vol/cap Ratio	0.00			0.00		
1	Percent of Base FFS	0.00			0.00		
1	Level of Service	F			F		
1	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
1	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
1	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Southbound	Northbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	2
Analyst		Analysis Date	Oct 29, 2020	Number of Segments	1
Jurisdiction	Deadwood	Time Period	3:30 PM	Number of Iterations	15
File Name	Existing PM_Main_Urban.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	Deadwood	US 14A/Pioneer		Analysis Period	1> 15:30
Project Description					



Basic Segment Information

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
1	15	15	1	1	2332	2332	50	50	0	0	70	70	0.0	0.0

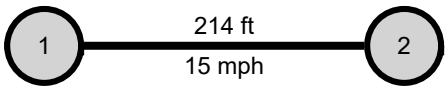
		Eastbound			Westbound		
Segment Output Data		EBL	EBT	EBR	WBL	WBT	WBR
Segment	Movement	5	2	12	1	6	16
1	Bay/Lane Spillback Time, h						
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	20.00			20.00		
1	Running Time, s	0.00			0.00		
1	Running Speed, mph	0.00			0.00		
1	Through Delay, s/veh	0.00			0.00		
1	Travel Time, s	0.00			0.00		
1	Travel Speed, mph	15.00			15.00		
1	Stop Rate, stops/veh	0.00			0.00		
1	Spatial Stop Rate, stops/mi	0.00			0.00		
1	Through vol/cap Ratio	0.00			0.00		
1	Percent of Base FFS	0.00			0.00		
1	Level of Service	F			F		
1	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
1	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
1	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Eastbound	Westbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Urban Street Segment Report

General Information				Streets Information	
Agency	HDR, Inc.			Number of Intersections	2
Analyst		Analysis Date	Oct 30, 2020	Number of Segments	1
Jurisdiction	Deadwood	Time Period	3:30 PM	Number of Iterations	15
File Name	Existing PM_Deadwood.xus	Analysis Year	2020	System Cycle Length, s	60
Intersections	US 14A/Pioneer	Main		Analysis Period	1> 15:30
Project Description					



Basic Segment Information (Deadwood/Pioneer-Main)

Segment	Speed Limit		Through Lanes		Segment Length		Intersection Wid		Length of RM		Percent Curb		Other Delay	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
1	15	15	1	1	214	214	50	50	0	0	70	70	0.0	0.0

		Northbound			Southbound		
Segment Output Data		NBL	NBT	NBR	SBL	SBT	SBR
Segment	Movement	5	2	12	1	6	16
1	Bay/Lane Spillback Time, h						
1	Shared Lane Spillback Time, h						
1	Base Free-Flow Speed, mph	15.00			15.00		
1	Running Time, s	0.00			0.00		
1	Running Speed, mph	0.00			0.00		
1	Through Delay, s/veh	0.00			0.00		
1	Travel Time, s	0.00			0.00		
1	Travel Speed, mph	15.00			15.00		
1	Stop Rate, stops/veh	0.00			0.00		
1	Spatial Stop Rate, stops/mi	0.00			0.00		
1	Through vol/cap Ratio	0.00			0.00		
1	Percent of Base FFS	0.00			0.00		
1	Level of Service	F			F		
1	Auto Traveler Perception Score	0.00			0.00		
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS	0.00		F	0.00		F
1	Bicycle Segment LOS Score / LOS	0.00		A	0.00		A
1	Transit Segment LOS Score / LOS	0.00		A	0.00		A

Facility Output Data	Northbound	Southbound
Facility Travel Time, s	0.00	0.00
Facility Travel Speed, mph	0.00	0.00
Facility Base Free Flow Speed, mph	0.00	0.00
Facility Percent of Base FFS	0.00	0.00
Facility Level of Service	F	F
Facility Auto Traveler Perception Score	0.00	0.00

Multimodal Results (Facility)				
Pedestrian Facility LOS Score / LOS	0.00	F	0.00	F
Bicycle Facility LOS Score / LOS	0.00	A	0.00	A
Transit Facility LOS Score / LOS	0.00	A	0.00	A

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	7:30AM-8:30AM
Project Description	US14A / Pioneer Way from Upper Main Street to Pine Street		

Direction 1 Geometric Data

Direction 1 Description	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	2.0	Free-Flow Speed (FFS), mi/h	42.9

Direction 1 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 1 Demand and Capacity

Volume (V), veh/h	390	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.81	Flow Rate (v_p), pc/h/ln	256
Total Trucks, %	6.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.14

Direction 1 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	40.8
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	6.3
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.5		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}), veh/h	241	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	3.12
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	C

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	7:30AM-8:30AM
Project Description	US14A / Pioneer Way from Upper Main Street to Pine Street		

Direction 2 Geometric Data

Direction 2 Description	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	2.0	Free-Flow Speed (FFS), mi/h	42.9

Direction 2 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 2 Demand and Capacity

Volume (V), veh/h	305	Heavy Vehicle Adjustment Factor (f_{HV})	0.971
Peak Hour Factor (PHF)	0.71	Flow Rate (v_p), pc/h/ln	221
Total Trucks, %	3.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.12

Direction 2 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	40.8
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	5.4
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.5		

Direction 2 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}), veh/h	215	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	2.36
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	B

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	3:30PM-4:30PM
Project Description	US14A / Pioneer Way from Dunlop Avenue to US85		

Direction 1 Geometric Data

Direction 1 Description	Eastbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	43.2

Direction 1 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 1 Demand and Capacity

Volume (V), veh/h	730	Heavy Vehicle Adjustment Factor (f_{HV})	0.962
Peak Hour Factor (PHF)	0.93	Flow Rate (v_p), pc/h/ln	408
Total Trucks, %	4.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.23

Direction 1 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	41.0
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	10.0
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 1 Bicycle LOS

Flow Rate in Outside Lane (v_{OL}), veh/h	392	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	2.89
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	C

HCS7 Multilane Highway Report

Project Information

Analyst	HDR	Date	11/4/2020
Agency	SDDOT	Analysis Year	2020
Jurisdiction	Deadwood	Time Period Analyzed	3:30PM-4:30PM
Project Description	US14A / Pioneer Way from Dunlop Avenue to US85		

Direction 2 Geometric Data

Direction 2 Description	Westbound		
Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	45.0	Right-Side Lateral Clearance (LC_R), ft	6
Lane Width, ft	12	Left-Side Lateral Clearance (LC_L), ft	6
Median Type	Undivided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	1.0	Free-Flow Speed (FFS), mi/h	43.2

Direction 2 Adjustment Factors

Driver Population	Balanced Mix	Final Speed Adjustment Factor (SAF)	0.950
Driver Population SAF	0.950	Final Capacity Adjustment Factor (CAF)	0.939
Driver Population CAF	0.939		

Direction 2 Demand and Capacity

Volume (V), veh/h	620	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor (PHF)	0.94	Flow Rate (v_p), pc/h/ln	336
Total Trucks, %	2.00	Capacity (c), pc/h/ln	1900
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1784
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.19

Direction 2 Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	41.0
Total Lateral Clearance Adj. (f_{TLC})	0.0	Density (D), pc/mi/ln	8.2
Median Type Adjustment (f_M)	1.6	Level of Service (LOS)	A
Access Point Density Adjustment (f_A)	0.3		

Direction 2 Bicycle LOS

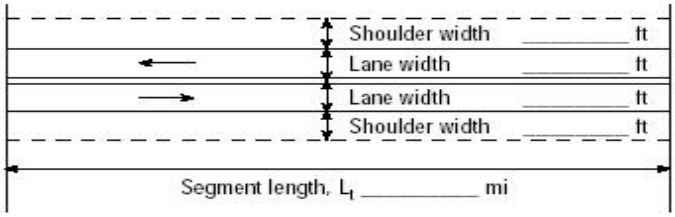
Flow Rate in Outside Lane (v_{OL}), veh/h	330	Effective Speed Factor (S_t)	3.84
Effective Width of Volume (W_v), ft	18	Bicycle LOS Score (BLOS)	2.38
Average Effective Width (W_e), ft	24	Bicycle Level of Service (LOS)	B

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*THopkins*	Highway / Direction of Travel	*Upper Main Street*
Agency or Company	*HDR, Inc.*	From/To	*US14A to Deadwood*
Date Performed	*11/5/2020*	Jurisdiction	*Deadwood*
Analysis Time Period	*3:30PM-4:30PM*	Analysis Year	*2020*

Project Description: *Deadwood Box - Upper Main 2-Ln*

Input Data



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

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.58*

No-passing zone *0%*

Analysis direction vol., V_d *90*veh/h

Opposing direction vol., V_o *155*veh/h

% Trucks and Buses , P_T *5 %*

% Recreational vehicles, P_R *0%*

Shoulder width ft *0.0*

Lane Width ft *12.0*

Access points *mi* *0*/mi

Segment Length mi *0.7*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.7*	*1.4*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.966*	*0.980*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*161*	*273*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*4.2 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.9 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.8 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*36.5 mi/h*
		Percent free flow speed, PFFS	*89.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.1*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.995*	*0.995*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*156*	*269*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*19.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.3*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*24.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*B*
Volume to capacity ratio, *v/c*	*0.09*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*89.5*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*155.2*
Effective width, Wv (Eq. 15-29) ft	*18.60*
Effective speed factor, S_t (Eq. 15-30)	
Bicycle level of service score, BLOS (Eq. 15-31)	
Bicycle level of service (Exhibit 15-4)	

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

 HCS™ TwoLane Version 7.5 Generated: 11/5/2020 3:55 PM