APPENDIX A
Field Review Photo Log







PHOTO 1: RP 0.0, IN GARDINER LOOKING NORTH AT THE INTERSECTION WITH PARK STREET

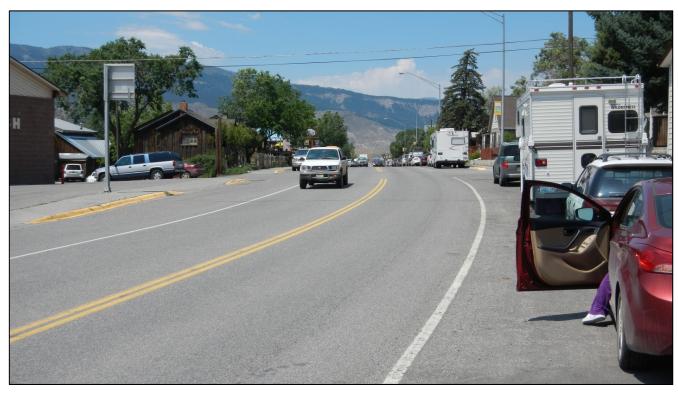


PHOTO 2: RP 0.3, IN GARDINER LOOKING WEST



PHOTO 3: RP 0.4, IN GARDINER LOOKING WEST (NOTE PARKING)



PHOTO 4: RP 0.6, IN GARDINER LOOKING WEST



PHOTO 5: RP 1.0, LEAVING GARDINER IN A WESTERLY DIRECTION



PHOTO 6: RP 2.0, US 89 NEAR THE GARDINER AIRPORT (LOOKING WEST)

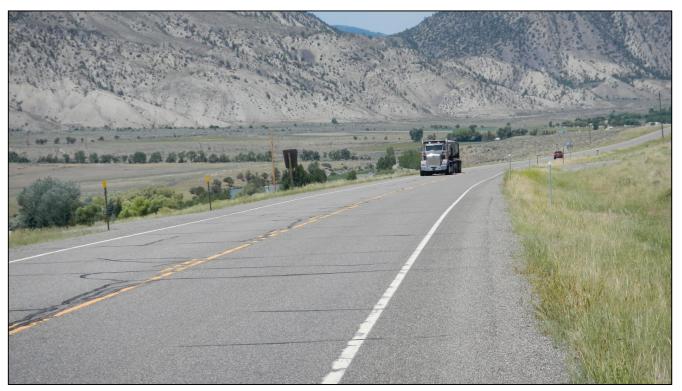


PHOTO 7: RP 3.1, LOOKING NORTHWEST



PHOTO 8: RP 4.3, LOOKING NORTH



PHOTO 9: RP 5.2, LOOKING NORTHWEST



PHOTO 10: RP 6.0, LOOKING NORTH

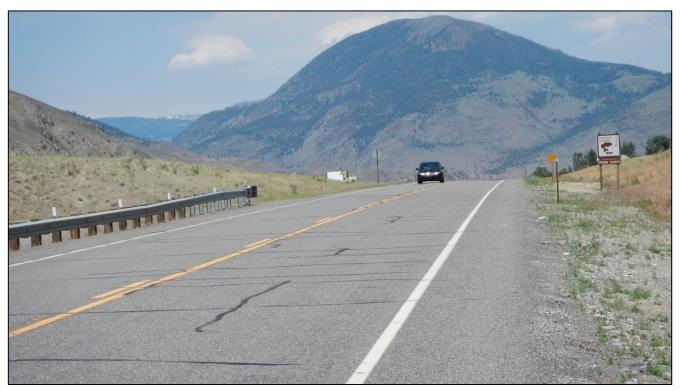


PHOTO 11: RP 6.8, LOOKING NORTHWEST



PHOTO 12: RP 8.0, LOOKING NORTH



PHOTO 13: RP 8.9, LOOKING NORTHWEST (NOTE CHANGE IN ROAD GRADE)

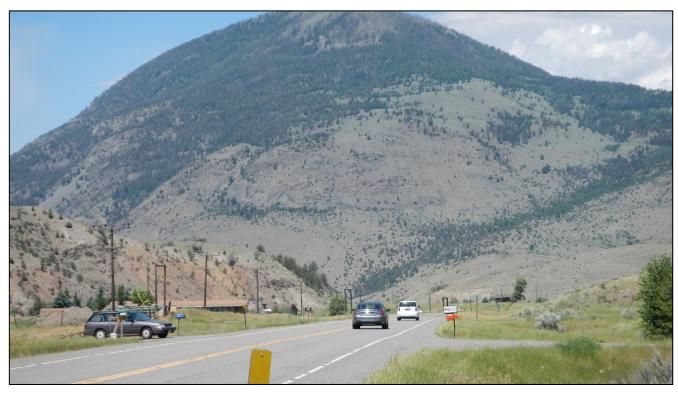


PHOTO 14: RP 10.0, LOOKING NORTHWEST

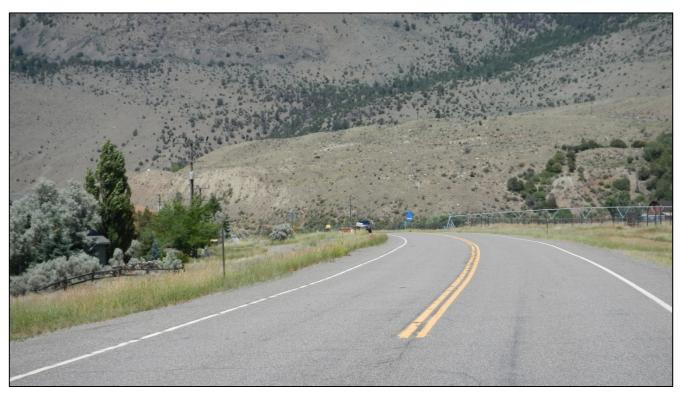


PHOTO 15: RP 10.8, LOOKING NORTHWEST

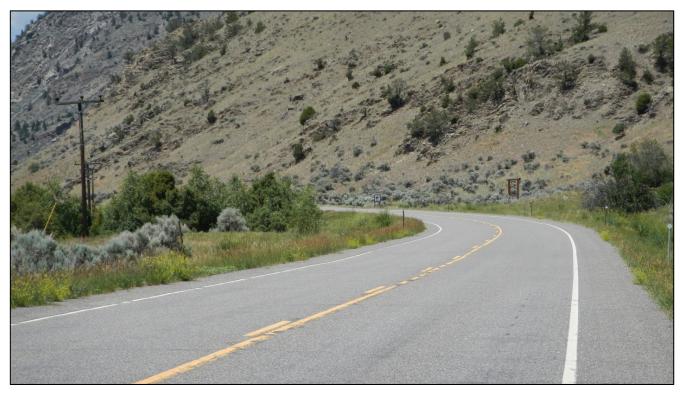


PHOTO 16: RP 12.0, LOOKING WEST

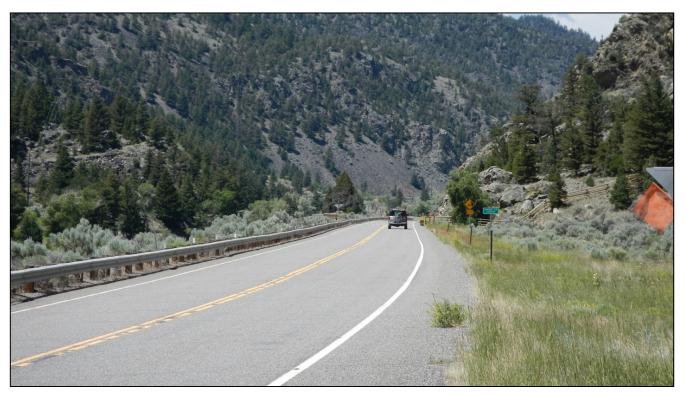


PHOTO 17: RP 13.0, LOOKING WEST (ENTERING YANKEE JIM CANYON)



PHOTO 18: RP 13.5, LOOKING WEST (NOTE ROCKFALL ON RIGHT)



PHOTO 19: RP 13.5, LOOKING WEST (NOTE ROCKFALL ON RIGHT)

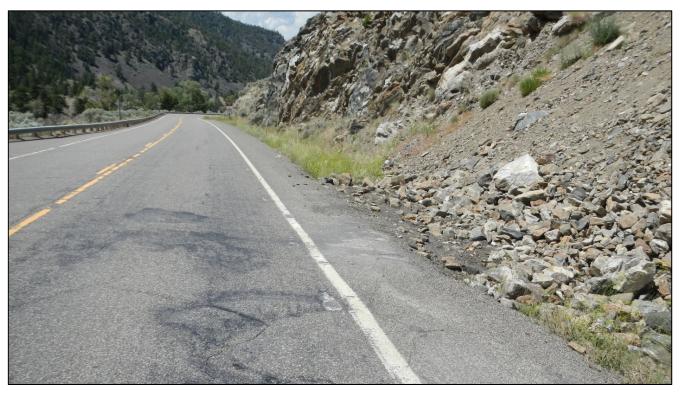


PHOTO 20: RP 13.5, LOOKING WEST (NOTE ROCKFALL ON RIGHT)

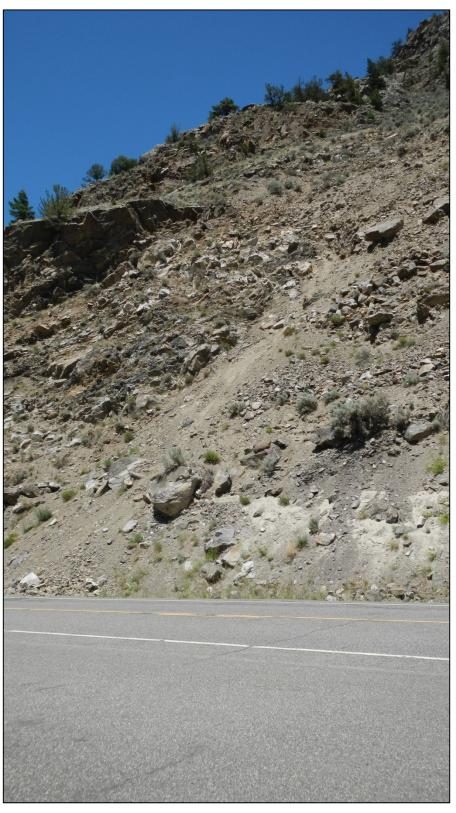


PHOTO 21: RP 13.5, LOOKING WEST (NOTE ROCKFALL ON RIGHT)



PHOTO 22: RP 13.9, LOOKING EAST (IN YANKEE JIM CANYON)



PHOTO 23: RP 14.9, LOOKING WEST



PHOTO 24: RP 15.9, LOOKING NORTH (YELLOWSTONE RIVER IS ON THE LEFT)



PHOTO 25: RP 16.6, LOOKING NORTHEAST (NOTE PUBLIC ROAD INTERSECTION)



PHOTO 26: RP 17.0, LOOKING NORTHEAST



PHOTO 27: RP 18.0, LOOKING NORTHEAST



PHOTO 28: RP 19.5, LOOKING NORTH

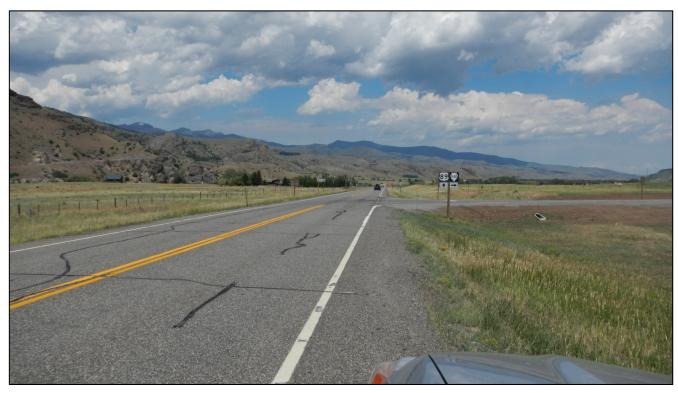


PHOTO 29: RP 19.9, LOOKING NORTH (NOTE INTERSECTION WITH S-540)



PHOTO 30: RP 19.9, LOOKING NORTH (NOTE INTERSECTION WITH S-540)



PHOTO 31: RP 20.9, LOOKING NORTHEAST

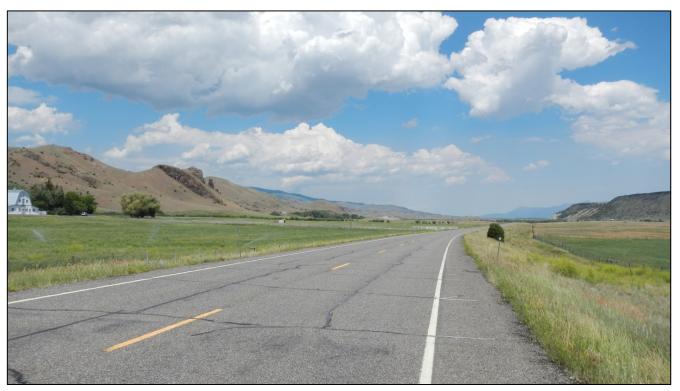


PHOTO 32: RP 22.0, LOOKING NORTHEAST



PHOTO 33: RP 23.0, LOOKING NORTHEAST



PHOTO 34: RP 23.0, LOOKING NORTHEAST



PHOTO 35: RP 23.9, LOOKING NORTHEAST



PHOTO 36: RP 25.0, LOOKING NORTHEAST

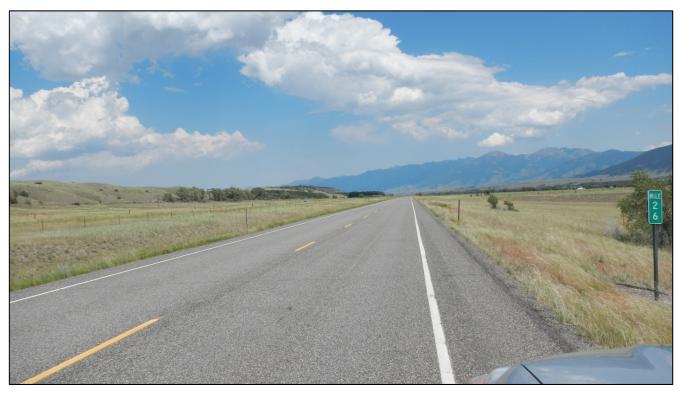


PHOTO 37: RP 26.0, LOOKING EAST



PHOTO 38: RP 26.9, LOOKING EAST



PHOTO 39: RP 28.0, LOOKING NORTHEAST



PHOTO 40: RP 29.3, LOOKING NORTHEAST



PHOTO 41: RP 29.9, LOOKING NORTHEAST



PHOTO 42: RP 30.6, LOOKING NORTHEAST (NEAR EMIGRANT)



PHOTO 43: RP 31.9, LOOKING NORTHEAST



PHOTO 44: RP 32.9, LOOKING NORTHEAST



PHOTO 45: RP 34.7, LOOKING EAST



PHOTO 46: RP 35.1, LOOKING EAST (NOTE RV PARK ON RIGHT SIDE)



PHOTO 47: RP 36.1, LOOKING EAST



PHOTO 48: RP 36.9, LOOKING EAST



PHOTO 49: RP 37.9, LOOKING NORTH



PHOTO 50: RP 38.9, LOOKING NORTH



PHOTO 51: RP 40.0, LOOKING NORTH



PHOTO 52: RP 40.9, LOOKING NORTH



PHOTO 53: RP 41.9, LOOKING NORTH



PHOTO 54: RP 42.8, LOOKING NORTH



PHOTO 55: RP 43.9, LOOKING NORTH



PHOTO 56: RP 45.0, LOOKING NORTHEAST



PHOTO 57: RP 46.0, LOOKING NORTHEAST



PHOTO 58: RP 46.9, LOOKING NORTHEAST



PHOTO 59: RP 48.4, LOOKING EAST



PHOTO 60: RP 48.9, LOOKING NORTHEAST



PHOTO 61: RP 50.0, LOOKING NORTH

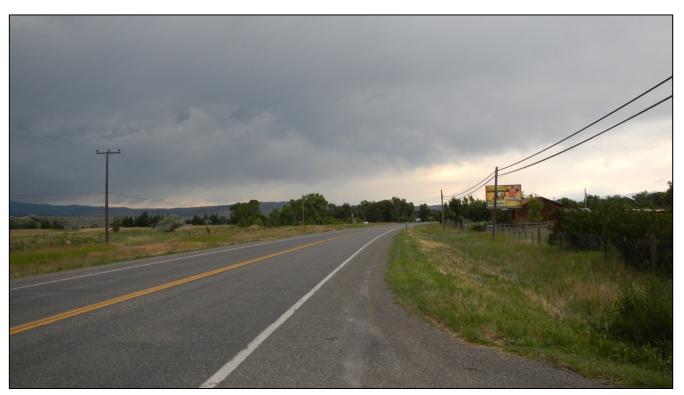


PHOTO 62: RP 51.0, LOOKING NORTH



PHOTO 63: RP 52.0, LOOKING NORTH (NOTE NON-MOTORIZED PATH ON LEFT)

APPENDIX B

As-Built Data Summary



Hydraulic Data Summary

F 43-1(2)						
Station (ft)	RP	Size (in)		Туре	Stream Name	
344+00	9.94	70	92	SPPS		
346+25	9.90	2(78)		CMP	Cedar Creek	
352+00	9.79	70	92	SPPS		
418+63	8.53	48		CMP		
427+15	8.37	30		CMP		
480+36	7.36	60		CMP	Basset Creek	
489+23	7.19	36		CMP		
493+32	7.11	30		CMP		

F-217(13)						
Station (ft)	RP	Size (in)	Туре	Stream Name		
NONE						

F-217(9)					
Station (ft)	RP	Size (i	n)	Туре	Stream Name
47+00	20.21	70	91	SPPS	
61+12	20.48	48		RCP	
84+55	20.92	84	61	SPPAC	
146+96	22.10	30		RCP	
154+75	22.25	36.25	22.5	RCPAC	
169+82	22.54	28.5	18	RCPAC	
184+90	22.82	48		RCP	
231+70	23.71	42		RCP	
246+00	23.98	36.25	22.5	RCPAC	
278+06	24.59	142	91	SPPAC	No. Fork Big Cr
295+46	24.92	36		RCP	
313+80	25.26	139	89	SPPAC	
386+12	26.63	36		RCP	
388+42	26.68	30		RCP	
419+50	27.27	58.5	36	RCPAC	
505+80	28.90	114	77	SPPAC	Fridley Cr
546+56	29.67	43.75	26.625	RCAPC	Irrigation Dt
557+94	29.89	70	91	SPPS	Spring
560+13	29.93	36		RCP	
575+00	30.21	73.5	45	RCAP	No. Fork Fridley Cr
602+60	30.73	36		RCP	

F-217(10)					
Station (ft)	RP	Size (in)		Туре	Stream Name
621+40	31.12	154	100	SPPAC	Park Branch Canal
664+00	31.92	43.75	26.625	RCAP	
734+22	33.25	36	22	CMAP	
734+40	33.26	91	70	SPP	
785+00	34.21	199	121	SPPAC	Eight Mile Creek
848+00	35.41	91	70	SPP	
863+05	35.69	36		RCP	
1056+50	39.36	91	70	SPP	

F-217(11)					
Station (ft)	RP	Size	(in)	Туре	Stream Name
1166+50	41.44	36		CMP	
1192+23	41.93	72		RCP	
1193+02	41.94	72		RCP	
1207+70	42.22	81	59	SPPAC	
1249+65	43.01	36		RCP	
1304+28	44.05	36		RCP	
1325+18	44.44	65	40	RCPA	
1416+61	46.18	30		CMP	
1505+70	47.86	72		CMP	
1519+70	48.13	36		RCP	
1537+05	48.46	72		RCP	
1558+00	48.85	60		CMP	
1585+98	49.38	112	75	SPPAC	

Horizontal Curve Summary

	F 43-1(2)										
PI (STA ft)	PI (STA ft) PI (RP) Radius (ft)										
291+82.26	10.93	11,459.20	952.50								
300+84.96	10.76	4,583.68	1,174.67								
334+73.45	10.12	5,729.60	701.67								
431+60.58	8.28	11,459.20	2,166.67								
469+93.65	7.56	22,918.40	3,760.00								
528+93.77	6.44	1,637.03	350.00								
549+97.98	6.04	1,909.87	300.00								
568+61.81	5.69	1,145.92	250.00								
592+98.89	5.23	1,909.87	300.00								

F-217(13)									
PI (STA ft)	PI (STA ft) PI (RP) Radius (ft) Length (ft)								
76+98.90	18.07	5,730.00	520.00						

	F 217(9)										
PI (STA ft)	PI (RP)	Radius (ft)	Length (ft)								
6+78.20	19.45	3,820.00	1,263.30								
67+25.00	20.59	2,865.00	745.80								
139+64.80	21.97	5,730.00	2,243.30								
182+64.00	22.78	5,730.00	906.70								
236+44.60	23.80	11,460.00	810.00								
315+37.00	25.29	2,865.00	1,103.30								
327+75.90	25.53	11,460.00	375.00								
436+72.80	27.59	7,640.00	2,686.70								
490+12.70	28.60	1,910.00	936.70								
503+98.50	28.87	1,910.00	1,061.90								

F 217(10)										
PI (STA ft)	PI (RP)	Radius (ft)	Length (ft)							
704+56.20	32.69	5,730.00	762.50							
759+65.60	33.73	5,730.00	220.00							
780+92.70	34.14	6,250.70	2,019.90							
839+53.20	35.25	5,730.00	3,700.00							
881+93.70	36.05	2,292.00	790.00							
955+07.30	37.44	5,730.00	4,688.30							
1066+18.80	39.54	5,730.00	1,515.80							
1130+97.20	40.77	5,730.00	880.80							

F 217(11)									
PI (STA ft)	PI (RP)	Radius (ft)	Length (ft)						
1189+01.20	41.87	11,460.00	830.00						
1504+34.30	47.84	7,640.00	3,546.70						
1551+32.20	48.73	3,820.00	1,433.50						
1569+20.00	49.07	1,432.50	329.80						
1573+78.20	49.15	1,432.50	329.80						
1588+34.00	49.43	2,546.70	1,594.80						

Vertical Curve Summary

	F 43-1(2)*										
Center (STA ft)	Center (RP)	Length (ft)	G1	G2	Α	K-Value	Туре	SSD (S <l)< th=""><th>SSD (S>L)</th><th>SSD</th><th>L (Driver Comfort)</th></l)<>	SSD (S>L)	SSD	L (Driver Comfort)
297+00.00	10.83	2,000.00	2.30%	-0.48%	2.78	718.7	Crest	1245.4	1387.7	1245.4	-
374+00.00	9.37	700.00	-0.48%	3.82%	4.31	162.5	Sag	-	-	-	333.4
395+50.00	8.97	1,600.00	3.82%	0.24%	3.58	446.5	Crest	981.6	1101.1	981.6	-
417+00.00	8.56	1,600.00	0.24%	-4.06%	4.30	372.4	Crest	896.5	1051.1	896.5	-
429+00.00	8.33	800.00	-4.06%	1.30%	5.36	149.4	Sag	-	-	-	414.6
451+00.00	7.92	2,400.00	1.30%	-1.02%	2.32	1032.9	Crest	1493.0	1664.4	1493.0	-
472+00.00	7.52	1,000.00	-1.02%	1.08%	2.10	475.5	Sag	-	-	-	162.8
511+20.00	6.78	1,600.00	1.08%	-2.24%	3.32	482.6	Crest	1020.5	1125.4	1020.5	-
534+35.00	6.34	800.00	-2.24%	1.71%	3.95	202.6	Sag	-	-	-	305.7
547+00.00	6.10	1,600.00	1.71%	-0.86%	2.57	623.0	Crest	1159.5	1220.1	1159.5	-
566+00.00	5.74	1,600.00	-0.86%	2.56%	3.42	467.8	Sag	-	-	-	264.8

^{*}Stationing in opposite direction of Reference Points, therefore grades are reversed

	F-217(13)										
Center (STA ft)	Center (RP)	Length (ft)	G1	G2	Α	K-Value	Туре	SSD (S <l)< th=""><th>SSD (S>L)</th><th>SSD</th><th>L (Driver Comfort)</th></l)<>	SSD (S>L)	SSD	L (Driver Comfort)
31+00.00	17.20	800.00	-0.95%	0.55%	1.50	533.3	Sag	-	-	-	116.1
47+00.00	17.50	1,000.00	0.55%	-0.80%	1.35	740.7	Crest	1264.3	1299.3	1299.3	-
56+00.00	17.67	800.00	-0.80%	1.05%	1.85	431.7	Sag	-	-	-	143.5
71+00.00	17.95	800.00	1.05%	-0.65%	1.70	471.1	Crest	1008.3	1035.5	1035.5	-
93+00.00	18.37	1,000.00	-0.65%	-1.77%	1.13	888.9	Crest	1385.0	1459.1	1459.1	-
103+00.00	18.56	800.00	-1.77%	-0.43%	1.35	594.8	Sag	-	-	-	104.1
123+00.00	18.94	800.00	-0.43%	3.06%	3.48	229.7	Sag	-	-	-	269.7
135+00.00	19.17	1,200.00	3.06%	0.24%	2.81	426.4	Crest	959.3	983.4	959.3	-

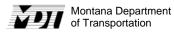
					F-2	217(9)					
Center (STA ft)	Center (RP)	Length (ft)	G1	G2	Α	K-Value	Туре	SSD (S <l)< th=""><th>SSD (S>L)</th><th>SSD</th><th>L (Driver Comfort)</th></l)<>	SSD (S>L)	SSD	L (Driver Comfort)
6+00.00	19.43	1,000.00	0.66%	-2.68%	3.34	299.0	Crest	803.3	822.7	803.3	-
23+00.00	19.76	800.00	-2.68%	-1.20%	1.48	539.1	Sag	-	-	-	114.9
45+00.00	20.17	800.00	-1.20%	-0.30%	0.90	888.9	Sag	-	-	-	69.7
79+50.00	20.83	800.00	-0.30%	0.97%	1.27	629.1	Sag	-	-	-	98.4
102+00.00	21.25	800.00	0.97%	-0.12%	1.09	732.9	Crest	1257.6	1388.5	1388.5	-
128+00.00	21.75	800.00	-0.12%	-1.15%	1.03	777.1	Crest	1295.0	1448.1	1448.1	-
149+00.00	22.14	800.00	-1.15%	0.34%	1.49	535.5	Sag	-	-	-	115.7
172+00.00	22.58	1,200.00	0.34%	-0.96%	1.30	920.0	Crest	1409.0	1427.2	1427.2	-
203+00.00	23.17	1,200.00	-0.96%	0.15%	1.11	1081.5	Sag	-	-	-	85.9
229+00.00	23.66	800.00	0.15%	1.06%	0.91	878.3	Sag	-	-	-	70.5
245+50.00	23.97	1,600.00	1.06%	-0.74%	1.80	889.1	Crest	1385.2	1399.6	1385.2	-
320+00.00	25.38	800.00	-0.15%	0.76%	0.91	878.3	Sag	-	-	-	70.5
348+00.00	25.91	800.00	0.76%	0.15%	0.61	1309.8	Crest	1681.2	2166.5	2166.5	-
385+00.00	26.61	800.00	0.15%	-0.47%	0.62	1300.8	Crest	1675.5	2154.5	2154.5	-
395+00.00	26.80	600.00	-0.47%	-0.20%	0.26	2294.3	Sag	-	-	-	20.2
418+00.00	27.24	800.00	-0.20%	-0.52%	0.32	2527.5	Crest	2335.4	3808.9	3808.9	-
439+00.00	27.64	1,000.00	-0.52%	-1.64%	1.12	892.9	Crest	1388.1	1463.4	1463.4	-
456+00.00	27.96	800.00	-1.64%	-0.24%	1.40	571.4	Sag	-	-	-	108.4
473+00.00	28.28	800.00	-0.24%	0.51%	0.75	1063.8	Sag	-	-	-	58.2
493+00.00	28.66	800.00	0.51%	0.70%	0.19	4255.3	Sag	-	-	-	14.6
503+00.00	28.85	800.00	0.70%	1.82%	1.12	714.3	Sag	-	-	-	86.7
520+00.00	29.17	1,400.00	1.82%	-1.84%	3.66	382.5	Crest	908.6	994.8	908.6	-
533+00.00	29.42	1,000.00	-1.84%	-0.13%	1.71	584.4	Sag	-	-	-	132.5
550+00.00	29.74	800.00	-0.13%	-0.90%	0.77	1035.1	Crest	1494.5	1796.0	1796.0	-
563+33.00	29.99	800.00	-0.90%	-0.46%	0.44	1811.2	Sag	-	-	-	34.2
582+80.00	30.36	1,000.00	-0.46%	-1.37%	0.91	1098.9	Crest	1539.9	1685.7	1685.7	-
603+00.00	30.74	2,000.00	-1.37%	0.62%	1.99	1005.0	Sag	-	-	-	154.1

	F-217(10)										
Center (STA ft)	Center (RP)	Length (ft)	G1		Α	K-Value	Туре	SSD (S <l)< th=""><th>SSD (S>L)</th><th>SSD</th><th>L (Driver Comfort)</th></l)<>	SSD (S>L)	SSD	L (Driver Comfort)
617+50.00	31.04	900.00	0.62%	-1.36%	1.98	453.8	Crest	989.6	994.1	994.1	-
627+00.00	31.22	1,000.00	-1.36%	-0.26%	1.10	906.5	Sag	-	-	-	85.4
677+00.00	32.17	800.00	-0.26%	-0.16%	0.10	8113.6	Sag	-	-	-	7.6
749+00.00	33.53	600.00	0.46%	1.17%	0.71	845.1	Sag	-	-	-	55.0
760+00.00	33.74	1,600.00	1.17%	0.00%	1.17	1367.5	Crest	1717.9	1722.2	1722.2	-
773+00.00	33.99	1,000.00	0.00%	-1.18%	1.18	847.5	Crest	1352.3	1414.4	1414.4	-
785+00.00	34.21	1,000.00	-1.18%	-0.17%	1.01	987.2	Sag	-	-	-	78.4
835+00.00	35.16	1,000.00	-0.17%	-0.66%	0.49	2028.4	Crest	2092.2	2688.6	2688.6	-
854+50.00	35.53	1,000.00	-0.64%	1.15%	1.78	560.6	Sag	-	-	-	138.1
868+00.00	35.79	1,000.00	1.15%	-0.14%	1.28	780.6	Crest	1297.9	1342.3	1342.3	-
905+00.00	36.49	1,000.00	-0.14%	-0.32%	0.18	5409.5	Crest	3416.7	6336.8	6336.8	-
930+00.00	36.96	1,000.00	-0.32%	0.07%	0.39	2564.1	Sag	-	-	-	30.2
945+00.00	37.24	1,000.00	0.07%	-0.40%	0.47	2127.7	Crest	2142.8	2795.7	2795.7	-
995+00.00	38.19	1,000.00	-0.40%	-0.64%	0.24	4166.7	Crest	2998.6	4995.8	4995.8	-
1012+00.00	38.51	1,000.00	-0.64%	-0.22%	0.42	2360.2	Sag	-	-	-	32.8
1056+00.00	39.35	1,200.00	-0.22%	2.32%	2.54	473.1	Sag	-	-	-	196.4
1075+50.00	39.72	1,600.00	2.32%	-0.42%	2.74	583.9	Crest	1122.6	1193.8	1122.6	-
1118+00.00	40.52	800.00	-0.42%	-0.66%	0.24	3340.3	Crest	2684.8	4905.2	4905.2	-

	F-217(11)										
Center (STA ft)	Center (RP)	Length (ft)	G1	G2	Α	K-Value	Туре	SSD (S <l)< th=""><th>SSD (S>L)</th><th>SSD</th><th>L (Driver Comfort)</th></l)<>	SSD (S>L)	SSD	L (Driver Comfort)
1140+00.00	40.94	1,000.00	-0.66%	-0.74%	0.08	12345.7	Crest	5161.6	13821.0	13821.0	-
1157+00.00	41.26	800.00	-0.74%	-0.51%	0.23	3463.2	Sag	-	-	-	17.9
1170+00.00	41.51	1,000.00	-0.51%	-0.98%	0.47	2127.7	Crest	2142.8	2795.7	2795.7	-
1203+00.00	42.13	1,000.00	-0.98%	-0.61%	0.37	2702.7	Sag	-	-	-	28.6
1231+00.00	42.66	1,000.00	-0.61%	-0.55%	0.06	16666.7	Sag	-	-	-	4.6
1250+00.00	43.02	1,000.00	-0.55%	-0.38%	0.17	5882.4	Sag	-	-	-	13.2
1270+00.00	43.40	800.00	-0.38%	-0.27%	0.11	7272.7	Sag	-	-	-	8.5
1280+00.00	43.59	800.00	-0.27%	-0.51%	0.24	3333.3	Crest	2682.0	4895.8	4895.8	-
1320+00.00	44.35	1,000.00	-0.51%	-0.53%	0.02	50000.0	Crest	10387.5	54450.0	54450.0	-
1351+00.00	44.93	1,000.00	-0.53%	-0.41%	0.12	8333.3	Sag	-	-	-	9.3
1400+00.00	45.86	400.00	-0.41%	-0.36%	0.05	8602.2	Sag	-	-	-	3.6
1440+00.00	46.62	800.00	-0.36%	-0.52%	0.16	5111.8	Crest	3321.3	7294.6	7294.6	-
1468+00.00	47.15	800.00	-0.52%	-0.77%	0.25	3200.0	Crest	2627.9	4716.0	4716.0	-
1487+00.00	47.51	800.00	-0.77%	-0.25%	0.52	1538.5	Sag	-	-	-	40.3
1504+00.00	47.83	1,400.00	-0.25%	-0.97%	0.72	1955.3	Crest	2054.2	2207.0	2207.0	-
1520+00.00	48.13	800.00	-0.97%	-0.48%	0.49	1649.5	Sag	-	-	-	37.5
1547+00.00	48.65	400.00	-0.48%	-2.20%	1.72	232.7	Crest	708.6	827.7	827.7	-
1552+85.00	48.76	450.00	-2.20%	1.03%	3.23	139.3	Sag	-	-	-	250.1
1563+50.00	48.96	600.00	1.03%	0.34%	0.69	869.6	Crest	1369.9	1863.8	1863.8	-
1575+80.00	49.19	400.00	0.34%	-2.54%	2.88	138.9	Crest	547.5	574.7	574.7	-
1582+60.00	49.32	500.00	-2.54%	-0.72%	1.82	275.3	Sag	-	-	-	140.6
1589+84.00	49.46	500.00	-0.72%	-0.33%	0.39	1276.2	Sag	-	-	-	30.3
1609+00.00	49.82	400.00	-0.33%	-0.58%	0.25	1612.9	Crest	1865.6	4550.8	4550.8	-

APPENDIX C
Bridge Inspection Reports





General Location Data

INITIAL ASSESSMENT FORM FOR STRUCTURE:

WENT FORWIFOR STRUCTU

2 %

Location: GARDINER Structure Name: none

P00011000+01651

MDT Maintenance Section: None

District Code, Number, Location: 02 Dist 2 BUTTE Division Code, Location: 22 BOZEMAN

County Code, Location: **067 PARK** City Code, Location: **00000**

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

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

Intersecting Feature: YELLOWSTONE RIVER Kilometer Post, Mile Post: 0.26 km 0.16

Percent Trucks:

Structure on the State Highway System : X Latitude : 45°01'56"

Structure on the National Highway System : X Longitude : 110°42'20"

Str Meet or Exceed NBIS Bridge Length:

Construction Data

Construction Project Number : FHP 43 D

Construction Station Number : 397+31.00

Construction Drawing Number : RECORDSE

Construction Year : 1930

Reconstruction Year : 1975

Structure Loading, Rating and Posting Data

Loading Data:

Traffic Data

Current ADT: 4,490

Design Loading :		2 M 13.5 (H 15)
Inventory Load, Design:	17.2 mton	2 AS Allowable Stress
Operating Load, Design:	27.2 mton	2 AS Allowable Stress
Posting :		5 At/Above Legal Loads

ADT Count Year: 2009

Rating Data:	Operating	Inventory	Posting
Truck 1 Type 3:			
Truck 2 Type 3-S3:			
Truck 3 Type 3-3 :	52		

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data:

Structure Length: 124.66 m

Deck Area: 1,900.00 m sq

Deck Roadway Width: 11.58 m

Approach Roadway Width: 11.58 m

Median Code, Description: 0 No median

Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

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

Vertical Clearance Under the Structure: 0.00 m

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

Minimum Lateral Under Clearance Right : 0.00 m

Minimum Lateral Under Clearance Left : 0.00 m

Span Data

Main Span

Number Spans : 3

Material Type Code, Description : 4 Steel continuous Span Design Code, Description : 9 Truss - Deck

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

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

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

Approach Span

Number of Spans : 2

Material Type Code, Description: 1 Concrete
Span Design Code, Description: 4 Tee Beam

(52) Out-to-Out Width: 15.24 m

(50A) Curb Width : **1.22 m**

(50B) Curb Width :

1.22 m

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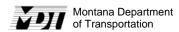
Printing Date: Wednesday, May 15 2013

RURAL AREA

Skew Angle: '

Structure Vertical and Horizontal Clearance Data Inventory Route:

Over / Under Direction	Inventory	South, We	est or Bi-direction	nal Travel	North or East Travel			
Name	Route	Direction	Vertical	Horizontal	Direction	Vertical	Horizontal	
Route On Structure	P00011	Both	99.99 m	11.58 m	N/A			
]							



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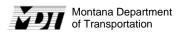
Continue

Inspection Data

Inspection Due Date: 18 April 2015

(91) Inspection Fequency (months): 24

(90) Inspection Date : Inspected By : (58) Deck Rating : 5	Rating: 0 (71) N Rating: 0 (71) N Deck Surfacing Depth:	Vaterway Adequacy: 8 (113) Scour Critical: 5 0.00 in
(58) Deck Rating: (68) Deck Geometry: (58) Deck Rating: (7) (69) Superstructure Rating: (7) (60) Substructure Rating: (7) (69) Under Clearance: (72) App Rdwy Align: (69) Under Clearance: (72) App Rdwy Align: (71) Waterway Adequacy: (72) App Rdwy Align: (73) Deck Surfacing Depth: (74) Posting Status: (74) Posting Status: (75) Snooper Required:	Rating: 0 (71) N Rating: 0 (71) N Deck Surfacing Depth:	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(58) Deck Rating: 5 (68) Deck Geometry: 5 (36A) Bridge Rail Rating: 1 (62) Culvert Rating: N (59) Superstructure Rating: 7 (67) Structure Rating: 4 (36B) Transition Rating: 0 (61) Channel Rating: 8 (60) Substructure Rating: 7 (69) Under Clearance: (41) Posting Status: A (36D) End Rail Rating: 0 (71) Waterway Adequacy: 8 (71) Waterway Adequacy: 8 (113) Scour Critical: 5 (113) Scour Critical: 5 (114) Posting Status: 10 m sq Deck Surfacing Depth: 0.00 in Spection Hours Crew Hours for inspection: 1 Snooper Required: 1 Snooper Required: 1 Snooper Hours: 1 Snooper H	Rating: 0 (71) V Rating: 0	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(90) Inspection Date: (58) Deck Rating: 5 (68) Deck Geometry: 5 (36A) Bridge Rail Rating: 1 (62) Culvert Rating: N (59) Superstructure Rating: 7 (67) Structure Rating: 4 (36B) Transition Rating: 0 (61) Channel Rating: 8 (71) Waterway Adequacy: 8 (72) App Rdwy Align: 8 (69) Under Clearance: (41) Posting Status: A (36D) End Rail Rating: 0 (113) Scour Critical: 5 (113) Scour Critical: 5 (113) Scour Critical: 5 (114) Posting Status: 10 m sq (115) Deck Surfacing Depth: 0.00 in Spection Hours Crew Hours for inspection: 1 Snooper Required: Y Snooper Hours for inspection: 1 Flagger Hours: 1 Snooper	Rating: 0 (71) V Rating: 0	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(90) Inspection Date : Inspected By : (58) Deck Rating : 5	Rating: 0 (71) V Rating: 0	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(90) Inspection Date : Inspected By : (58) Deck Rating : 5	Rating: 0 (71) V Rating: 0	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(90) Inspection Date : Inspected By : (58) Deck Rating : 68) Deck Geometry : 5 (67) Structure Rating : 4 (67) Structure Rating : 4 (69) Under Clearance : (69) Under Clearance : (41) Posting Status : A (36D) End Rail Rating : 0 (62) Culvert Rating : N (61) Channel Rating : N (71) Waterway Adequacy : 8 (36C) Approach Rail Rating : N (71) Waterway Adequacy : 8 (36D) End Rail Rating : 0 (113) Scour Critical : 5	Rating: 0 (71) V Rating: 0	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(90) Inspection Date : Inspected By : (58) Deck Rating : 5	Rating: 0 (71) V Rating: 0	61) Channel Rating : 8 Waterway Adequacy : 8 (113) Scour Critical : 5
(90) Inspection Date : Inspected By : (58) Deck Rating : 5	Rating: 0 (71) N	61) Channel Rating : 8 Waterway Adequacy : 8
(90) Inspection Date : Inspected By : (58) Deck Rating : 5	Rating: 0 (71) N	61) Channel Rating : 8 Waterway Adequacy : 8
(90) Inspection Date : Inspected By : Inspected By : (62) Culvert Rating : No. (59) Superstructure Rating : 7 (67) Structure Rating : 4 (36A) Bridge Rail Rating : 0 (61) Channel Rating : 8	Rating: 0	61) Channel Rating :
(90) Inspection Date : Inspected By : (58) Deck Rating : 5 (68) Deck Geometry : 5 (36A) Bridge Rail Rating : 1 (62) Culvert Rating : N		
(90) Inspection Date : Inspected By :		(62) Culvert Deting
(30) Date of Last Inspection .		
(90) Date of Last Inspection : Daniel Gravage - 71	ed By :	
19 April 2012	ed By : Daniel Gravage - 71	
·	Daniel Crayage 71	
NBI Inspection Data		и ву



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Continue

Element Inspection Data

Span: Main-0 - -1 * * * * * * * * * Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck 4 1440 X 100 sq.m. 0 0 % % % Previous Inspection Notes: 04/18/2013 - Deck surface in much the same condition as previous. Will continue with State 2. 04/17/2013 - None 04/30/2011 - Random 1/8 inch wide cracks spaced approximately 1 to 5 feet apart. 04/17/2009 - Minor increase of spalled and delaminated areas of deck, left in State 2 for this inspection. 03/08/2007 - An aspahlt patch covers the cracked approach section on the north end, but is ravelling. Note photo of the underside of the deck in this location. The rest of the deck has light random/transverse cracking throughout. 02/01/2005 - Conditions are unchanged from previous inspection. 09/10/2002 - The expansion joint at Bt.2 is now 'aligator' cracking also. Spall has increased in the areas around the construction joints. 07/19/2000 - Cracking at the east end seems to be getting worse, some settlement appears. This also is creating a "duckpond" after rain or snowmelt occurrs. 04/24/1998 - Minor delamination at east bridge end. Two small delaminations at midspan eastbound lane. Light random cracking throughout deck surface. Inspection Notes: Element 113 - Paint Stl Stringer 2 800 m. 95 % % % % Previous Inspection Notes: 04/18/2013 - Minor rust areas, primarily along top flanges of stringers. 04/17/2013 - None 04/30/2011 - Stringers exhibited a loss of paint coating on approximately 5 percent of the surface area with moderate surface corrosion and negligible loss of section. 04/17/2009 - None 03/08/2007 - None 02/01/2005 - None 09/10/2002 - None 07/19/2000 - None 04/24/1998 - _ Inspection Notes:

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							t.) * * * * * * *			
Element Des	•									
Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 131	- Paint Stl Deck	k Truss								
	1	4	300	m.		95	0	5	0	
						%	%	%	%	
Previous Ins	pection Notes :									
)4/18/2013 -	No changes to	previous c	ondition states.							SGIH
04/17/2013 -	_									SFIG
		hibited a lo	ss of painted c	nating c	n approxima	ately 5 percent o	f the surface are	a with moderate	surface corrosion	
negligible los	s of section. Si	mall amour	nts of pack rust	were ol	bserved at a	few lower chord	gusset connecti	ons.		
04/17/2009 -										YEDI
		ie very min	or rusting on a	rew of t	ne lower cor	inection plates, t	the truss system	is in very good c	ondition.	IZCZ
02/01/2005 -										HZLZ
09/10/2002 -										TZKK
07/19/2000 -										BHBC
04/24/1998 -	_									VBDL
Inspection I	Notes:									
Element 163	- Paint Gusset	Plate								
	1	3	192	ea.		50	45	5	0	
						%	%	%	%	
Previous Ins	pection Notes :									
04/18/2013 -										SGIH
04/16/2013 - 04/17/2013 -										SFIG
		ruet obsorv	rad in random la	ocations	along the le	war chard Tha	ro are two 1/2 in	sh by 1/2 inch ac	uges in the south	
	at L6'-west.	usi observ	eu iii iailuoiii i	Callons	along the ic	wei choid. The	ie ale two 1/2 iii	on by 1/2 mon go	ages in the south	iace VZLL
Inspection I	Notes:									
Element 205	- R/Conc Colur	nn								
	1	2	6	ea.		90	10	0	0	
						%	%	%	%	
Previous Ins	pection Notes :									
		an grouth								SC111
04/18/2013 - 04/17/2013 -	See photo of tr	ee growin.								SGIH SFIG
		o to 1/225	diaabuuidadam	م مادام م	Thora is he	traa ayarara	with an the newth	food of pion 2		
		ie (0 1/32N)	a mon widea cr	acking.	There is he	avy tiee overgro	wth on the north	lace of pier 2.		VZEE
)4/17/2009 -										YEDI
03/08/2007 -										IZCZ
02/01/2005 -										HZLZ
09/10/2002 -										TZKK
	No change.	th		l	and a time t	nto O cont. t				BHBC
)4/24/1998 -	Hairline crackir	ng througho	out concrete co	lumns a	and struts be	nts 3 and 4.				VBDL
Inspection I	Notes:									

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

| Element Desc | | | | | | | | | | |
|---------------------------|------------------|--------------|------------------|-----------|---------------|------------------|------------|------------|------------|--------------|
| | | | | | | | | | | |
| - | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 234 | - R/Conc Cap | | | | | | | | | |
| | 1 | 4 | 9 | m. | | 90 | 10 | 0 | 0 | |
| | | | | | | % | % | % | % | |
| Previous Insp | ection Notes : | | | | | | <u> </u> | | | |
| 04/18/2013 - | None | | | | | | | | | SGIH |
| 04/17/2013 - | None | | | | | | | | | |
| 04/30/2011 - | There is randor | m hairline t | o 1/32nd inch | racking | ı . | | | | | VZEE |
| 04/17/2009 - | None | | | | | | | | | YEDI |
| 03/08/2007 - | None | | | | | | | | | IZCZ |
| 02/01/2005 - | None | | | | | | | | | HZLZ |
| 09/10/2002 - | None | | | | | | | | | TZKK |
| 07/19/2000 - | None | | | | | | | | | BHBQ |
| 04/24/1998 - | Hairline crackir | ng of concr | ete column cap | s. | | | | | | VBDL |
| Element 304 | - Open Expans | ion Joint | | | | | | | | |
| | 1 | 4 | 24 | m. | | 100 | 0 | 0 | | |
| | | | | | | % | % | % | % | |
| Previous Insp | ection Notes : | 1 | | | _ | | 1 | | <u> </u> | |
| 04/18/2013 - | None | | | | | | | | | SGIH |
| 04/17/2013 - | None | | | | | | | | | |
| 04/30/2011 - | There are mind | or scrapes | from snowplow | s. | | | | | | VZEE |
| 04/17/2009 - | (2) expansion j | oints on ma | ain span. Slidin | g plate j | joints are pa | rt of approach s | pans | | | YEDI |
| 03/08/2007 - | None | | | | | | | | | IZCZ |
| 02/01/2005 - | None | | | | | | | | | HZLZ |
| | None | | | | | | | | | TZKK |
| 09/10/2002 - | | | | | | | | | | |
| 09/10/2002 - 07/19/2000 - | | | | | | | | | | BHBC |
| 07/19/2000 - | | der sliding | plate but joints | are still | tight. | | | | | BHBQ
VBDL |

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

| Element Des | • | | | | | | | | | |
|--|------------------------------|-------------|------------------|--------|------------|--------------------|-------------------|------------------|--------------------|----------------|
| | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 311 | - Moveable Bea | aring | | | | | | | | |
| | 1 | 4 | 3 | ea. | | 95 | 5 | 0 | | |
| | | | | | | % | % | % | % | C |
| Previous Ins | pection Notes : | | | | | | l l | | | |
| 04/18/2013 · | - None | | | | | | | | | SGIH |
| 04/17/2013 - | - None | | | | | | | | | |
| 04/30/2011 -
percent loss
04/17/2009 - | of section. | ited a loss | of paint coating | on app | roximately | 5 percent of the s | surface area with | moderate corros | sion and less than | 5 VZEE
YEDI |
| 03/08/2007 - | | | | | | | | | | IZCZ |
| 02/01/2005 - | | | | | | | | | | HZLZ |
| 09/10/2002 | | | | | | | | | | TZKK |
| 07/19/2000 - | | | | | | | | | | BHBQ |
| 04/24/1998 | | | | | | | | | | VBDL |
| Inspection | | | | | | | | | | |
| | 1 pection Notes : | 4 | 3 | ea. | | 90
% | | 0 | | C |
| 04/18/2013 - | · | | | | | | | | | SGIH |
| 04/17/2013 - | | | | | | | | | | SFIG |
| 04/30/2011 -
percent loss | - Bearings exhib of section. | ited a loss | of paint coating | on app | roximately | 10 percent of the | surface area wit | h moderate corre | osion and less tha | n 5 VZEE |
| 04/17/2009 - | | | | | | | | | | YEDI |
| 03/08/2007 - | | | | | | | | | | IZCZ |
| 02/01/2005 - | | | | | | | | | | HZLZ |
| 09/10/2002 - | | | | | | | | | | TZKK |
| 07/19/2000 · | | | | | | | | | | BHBQ |
| 04/24/1998 -
I | _ | | | | | | | | | VBDL |
| Inspection | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

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

| Element Description | | | | | • | | | | |
|--|------------------|--------------------|----------|---------------|----------------------|---------------------|-------------------|------------------|---------------|
| Element Description Smart Flag Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 334 - Metal Rail Co | | Quantity | Ormo | mop Edon | r or orar r | . 0. 0.0. 2 | 1 01 0101 0 | 1 01 0141 1 | 1 01 0141 0 |
| 1 | 4 | 499 | m. | | 100 | 0 | 0 | 0 | C |
| | | | | | % | % | % | % | % |
| Previous Inspection Notes : | | | | | | ,, | | | |
| 04/18/2013 - None | | | | | | | | | SGIH |
| 04/17/2013 - None | | | | | | | | | |
| 04/30/2011 - There are mind | or scranes i | on the rail | | | | | | | VZEE |
| 04/17/2009 - None | 00.4600 | o., ., o . a | | | | | | | YEDI |
| 03/08/2007 - None | | | | | | | | | IZCZ |
| 02/01/2005 - None | | | | | | | | | HZLZ |
| 09/10/2002 - None | | | | | | | | | TZKK |
| 07/19/2000 - A couple of loo | se bolts, of | therwise good. | | | | | | | BHBQ |
| Inspection Notes: | | | | | | | | | |
| mapeonom reces. | | | | | | | | | |
| | | | | | | | | | |
| Element 358 - Deck Cracking | a SmFlaa | | | | | | | | |
| X 1 | 3 | 1 | ea. | X | 0 | 100 | 0 | 0 | |
| | | | ou. | | % | | | | |
| Draviaus Inspection Notes | | | | | 70 | 70 | 70 | /0 | 70 |
| Previous Inspection Notes : | | | | | | | | | 2011 |
| 04/18/2013 - None | | | | | | | | | SGIH |
| 04/17/2013 - None | a a a la d 1 /0+ | ih inah wida tra | | ora alsa an a | and from 1 to E f | | | | SFIG
VZEE |
| 04/30/2011 - There were uns
04/17/2009 - None | sealeu 1/ol | ii iiicii wide iia | nsverse | CIACKS Spai | cea iroini i to 5 ii | еет арап. | | | YEDI |
| | | | | | | | | | ILDI |
| Inspection Notes: | | | | | | | | | |
| | | | | | | | | | |
| Element 359 - Soffit Smart F | lag | | | | | | | | |
| X 1 | | 1 | | X | 0 | 0 | 100 | | |
| A 1 | 3 | | ea. | _ ^ | | | | | |
| | | | | | % | % | % | % | % |
| Previous Inspection Notes : | | | | | | | | | |
| 04/18/2013 - None | | | | | | | | | SGIH |
| 04/17/2013 - None | | | | | | | | | SFIG |
| 04/30/2011 - Large areas of truss spans before the wider | | | | | | | | s, which are the | orignial VZEE |
| Inspection Notes: | ig. 1110 t | 2. Jud of ordord | .9 00001 | . Ja on the | Some an oddy oor | . s.ato mai trio to | police oracining. | | |
| , | | | | | | | | | |
| | | | | | | | | | |
| | | * * * | * * * * | * * * Snai | ∩ : Appr-11 * | ****** | k | | |
| Element Description | | | | - Opai | | | | | |
| Smart Flag Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| | | | | 1 | | | | | |

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******* Span : Appr-1 --1 (cont) ******

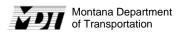
| lement Des | scription | | | | | | | | | |
|--|--|--|---|---|---|---|--------------------------------------|---------------------------------------|-----------------------------------|--|
| | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| lement 62 - | - Bare Top Flang | 9 | | | | | | | | |
| | 1 | 3 | 276 | sq.m. | X | 0 | 0 | 100 | 0 | |
| | | | | | | % | % | % | % | |
| revious Ins | pection Notes : | | | | | | | | | |
| 4/18/2013 - | No apparent ch | nange to pr | evious conditio | ns, con | tinuing with S | State 3. | | | | SGII |
| 4/17/2013 - | None | | | | ŭ | | | | | |
| 4/30/2011 - | Large areas of | map crack | ing primarily in | the sou | thbound lan | e which is the or | iginal truss, in the | e approach span | s only. The areas | of VZE |
| eavy cracki | ng exhibited del | amination | | | | | | | | YED |
| | (2)spans, 11.5 lligator" cracking | | mination on eac | h of the | approach s | pans, with heavy | y cracking and ef | florescence seer | on the underside | |
| ne deck (ph | otos). | | | | | | | | | |
| Inspection I | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| lomont 110 | - R/Conc Open | Girdor | | | | | | | | |
| ement 110 | 1 | 4 | 146 | m. | | 95 | 0 | 5 | 0 | |
| | · | 7 | 140 | | | % | % | % | % | |
| | | | | | | /6 | 70 | /6 | /0 | |
| | pection Notes : | | | | | | | | | |
| 4/18/2013 - | | | | | | | | | | SGI |
| 4/17/2013 - | None | | | | | | | | | SFI |
| | | | | | | | | | | |
| 4/30/2011 - | Girder haunch | | | st inspe | ction. There | is random hairli | ine cracking on a | ll girders and a s | mall spall above th | he VZE |
| 4/30/2011 -
econd colur | | st at bent 3 | | | | is random hairli | ine cracking on a | ll girders and a s | mall spall above th | |
| 4/30/2011 -
econd colur
4/17/2009 - | Girder haunch of the Girder haunch of the Girder haunch | st at bent 3
er haunch | are planned for | summe | | is random hairli | ine cracking on a | ll girders and a s | mall spall above th | YE |
| 4/30/2011 -
econd colur
4/17/2009 -
3/08/2007 - | Girder haunch of the Girder ha | st at bent 3
er haunch
urrent cond | are planned for
dition of girder h | summe | er 2009. | | ine cracking on a | ll girders and a s | mall spall above tl | YEI
IZC |
| 4/30/2011 -
econd colur
4/17/2009 -
3/08/2007 -
2/01/2005 - | Girder haunch of the mession of the Girder Repairs to girder See photo of current characteristics. | st at bent 3
er haunch
urrent cond
nange from | are planned for
dition of girder h
previous condi | summe
naunch.
itions of | er 2009.
girder beam | n seats (photo). | | | mall spall above the | YEI
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HZL |
| 4/30/2011 -
econd colur
4/17/2009 -
3/08/2007 -
2/01/2005 -
9/10/2002 - | Girder haunch of the mession of the Girder Repairs to girder See photo of current characteristics. | et at bent 3
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girder beam | n seats (photo). | | | | YED
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(4/17/2009 -
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(2/01/2005 -
(9/10/2002 -
(7/19/2000 - | Girder haunch on from the west Repairs to girder See photo of curing No apparent che Concrete deterior Delamination a | et at bent 3 er haunch urrent cond nange from ioration of the beam | . are planned for dition of girder h previous condi the outer (south | summer
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3/08/2007 -
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9/10/2002 -
7/19/2000 - | Girder haunch mn from the west Repairs to girder See photo of cut. No apparent che Concrete deterior Delamination at Hairline cracking | et at bent 3 er haunch urrent cond nange from ioration of the beam | . are planned for dition of girder h previous condi the outer (south | summer
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4/17/2009 -
3/08/2007 -
2/01/2005 -
9/10/2002 -
7/19/2000 -
4/24/1998 - | Girder haunch mn from the west Repairs to girder See photo of cut. No apparent che Concrete deterior Delamination at Hairline cracking | et at bent 3 er haunch urrent cond nange from ioration of the beam | . are planned for dition of girder h previous condi the outer (south | summer
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| 4/30/2011 - econd colum 4/17/2009 - 3/08/2007 - 2/01/2005 - 9/10/2002 - 7/19/2000 - 4/24/1998 - nspection N Ilement 205 revious Ins 4/18/2013 - 4/17/2013 - 4/30/2011 - 4/17/2009 - 3/08/2007 - | Girder haunch mn from the west Repairs to girder See photo of cut No apparent che Concrete determined to Delamination at Hairline cracking Notes: 6 - R/Conc Column 1 pection Notes: None None None None None | et at bent 3 er haunch current conc mange from continuous from | are planned for dition of girder he previous condithe outer (south seat continues d in place conc | summenaunch. itions of itions of itions of itions of itions of itions of | er 2009.
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crete beam brg u | inspection - see
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erioration of cond | eased since last
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******* Span : Appr-1 - -1 (cont.) * * * * * * * *

| | | | **** | | * Span : 🗚 | ppr-11 (con | t.) * * * * * * * | * * * | | |
|--------------|-------------------|-----------------|-------------------|--------|------------|--------------------|-------------------|------------|------------|------------|
| Element Des | | | | | | | | | | |
| | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 215 | - R/Conc Abutr | | | | | | | | | |
| | 1 | 2 | 50 | m. | | 100 | 0 | 0 | | |
| | | | | | | % | % | % | % | 9/ |
| Previous Ins | pection Notes : | | | | _ | - | 1 | | | |
| 04/18/2013 - | - None | | | | | | | | | SGIH |
| 04/17/2013 - | - None | | | | | | | | | |
| 04/30/2011 - | No defects not | ed at this ir | nspection. | | | | | | | VZEE |
| 04/17/2009 - | - None | | | | | | | | | YEDI |
| 03/08/2007 - | - None | | | | | | | | | IZCZ |
| 02/01/2005 - | - None | | | | | | | | | HZLZ |
| 09/10/2002 - | - None | | | | | | | | | TZKK |
| 07/19/2000 - | - None | | | | | | | | | BHBQ |
| 04/24/1998 - | - Hairline cracks | showing ir | n concrete wing | walls. | | | | | | VBDL |
| Inspection I | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Element 234 | - R/Conc Cap | | | | | | | | | |
| | 1 | 2 | 6 | m. | | 90 | 10 | 0 | 0 | |
| | | | | | | % | % | % | % | 9/ |
| Previous Ins | pection Notes : | | | | | | | | | |
| 04/18/2013 - | | | | | | | | | | SGIH |
| 04/17/2013 - | | | | | | | | | | |
| | There is rando | m hairline (| cracking | | | | | | | VZEE |
| 04/17/2009 - | | iii iidiiiiio (| ordoning. | | | | | | | YEDI |
| 03/08/2007 - | | | | | | | | | | IZCZ |
| 02/01/2005 - | | | | | | | | | | HZLZ |
| 09/10/2002 - | | | | | | | | | | TZKK |
| 07/19/2000 - | | | | | | | | | | BHBQ |
| | Scaling of cond | crete caps | with light cracki | na. | | | | | | VBDL |
| | | | g | | | | | | | |
| Inspection I | Notes. | | | | | | | | | |
| | | | | | | | | | | |
| Element 305 | 5 - Assm Jt w/o S | Seal | | | | | | | | |
| | 1 | 3 | 24 | m. | | 100 | 0 | 0 | | |
| | • | | 2-1 | 111. | | % | % | % | | 9, |
| Danie de | C Ni-t | | | | | /0 | /0 | /0 | /6 | |
| | pection Notes : | | | | | | | | | 2011 |
| 04/18/2013 - | | | | | | | | | | SGIH |
| 04/17/2013 - | | | | | | | | | | |
| | No defects not | | | | | | | | | VZEE |
| | Sliding plate jo | ints appeai | r to be function | ng. | | | | | | YEDI |
| Inspection I | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | - | | | | | | | | |



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| | | * * * * * | * * * * | * Span : 🗛 | opr-11 (con | t.) * * * * * * * * | * * * | | |
|---|----------------------------|-------------------|--------------------|--------------------------------|---------------------|---------------------|-----------------|-------------------|--------------|
| Element Description | | | | | | | | | |
| Smart Flag Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 334 - Metal Rail Coa | ated | | | | | | | | |
| 1 | 3 | 48 | m. | | 100 | 0 | 0 | 0 | C |
| | | | | | % | % | % | % | % |
| Previous Inspection Notes : | | | | | | | | | |
| 04/18/2013 - None | | | | | | | | | SGIH |
| 04/17/2013 - None | | | | | | | | | |
| 04/30/2011 - Minor scrapes t | to the rail. | | | | | | | | VZEE |
| 04/17/2009 - None | | | | | | | | | YEDI |
| Inspection Notes: | | | | | | | | | |
| | | | | | | | | | |
| General Inspection N | Notes | | | | | | | | |
| 04/18/2013 - None | | | | | | | | | SGIH |
| 04/17/2013 - None | | | | | | | | | |
| 04/30/2011 - This inspection | | | | | formed by Todd | Demski and Dre | w Garceau of Co | ollins Engineers. | |
| bridge is labeled from north t | o south pe | r the original br | idge dr | awings. | | | | | |
| Deleted the cross-frame elen
04/17/2009 - None | ment 7/12/2 | 2012. AKJ | | | | | | | YEDI |
| 03/08/2007 - None | | | | | | | | | IZCZ |
| 02/01/2005 - None | | | | | | | | | HZLZ |
| 09/10/2002 - None | | | | | | | | | TZKK |
| 07/19/2000 - None | | | | | | | | | BHBQ |
| 04/24/1998 - None | | | | | | | | | VBDL |
| 08/06/1996 - Sufficiency Rati
Sufficiency Rating Calculatio
OPS\$U5963 inspection com
Structure P00011000+01651
Date 8/6/96 -
Previous comments > (none)
05/01/1994 - | n Accepted
ments -
- | ation Accepted I | oy ops
04 at 2/ | \$u5963 at 3/1
19/97 14:34: | 0/97 11:34:34
21 | | | | APVE
REFI |
| 02/01/1992 - Updated with ta | ape 1994 | | | | | | | | NB94 |
| 04/01/1990 - Updated with ta | pe 1992 | | | | | | | | NB92 |
| 02/01/1988 - Updated with ta | pe 1989 | | | | | | | | NB89 |
| 07/01/1985 - Updated with ta | pe 1987 | | | | | | | | NB87 |
| 12/01/1982 - Updated with ta | pe 1984 | | | | | | | | NB84 |
| 02/01/1980 - Updated with ta | pe 1982 | | | | | | | | NB82 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |



N appr, view South
Notes
None

South profile

None None

Inspection Photos

P00011000+01651

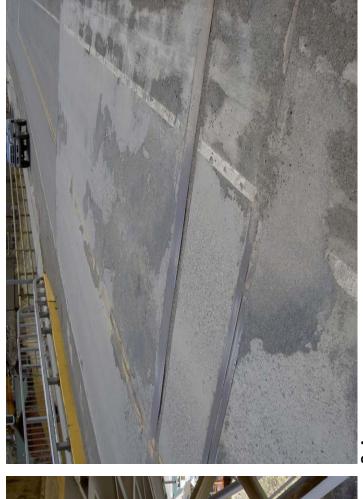
Location GARDINER Stucture Name: none



Inspection Photos

Location GARDINER Stucture Name: none

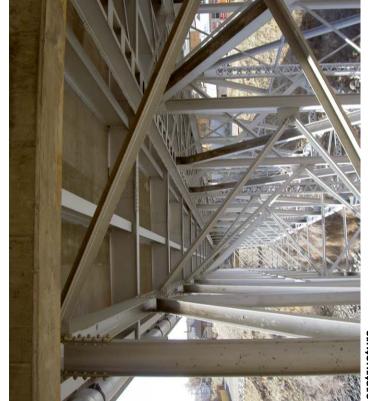




S. Appr. span

Notes

Asphalt patching hides heavy "aligator" cracking of deck.



Superstructure None None



Inspection Photos

Location GARDINER Stucture Name: none





S. Appr. span soffit

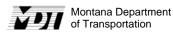
Notes

Extensive cracking and efflorescence. Note (full-depth)spall and rusting rebar exposed in left bay.



N. Appr. soffit <u>Notes</u>

Much the same conditions exist on the north approach span.



Form: bms001d

RURAL AREA

Page 1 of 7

Printing Date: Wednesday, May 15 2013

P00011020+04171 Location: 11M SW EMIGRANT Structure Name: none

General Location Data

MDT Maintenance Section: None

BUTTE District Code, Number, Location: 02

BOZEMAN Division Code, Location:22

County Code, Location: 067 **PARK** City Code, Location: 00000

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

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

Intersecting Feature: YELLOWSTONE RIVER Kilometer Post, Mile Post: 32.85 km 20.41

Structure on the State Highway System: Latitude: 45°15'15"

Structure on the National Highway System: Longitude: 110°52'05"

Str Meet or Exceed NBIS Bridge Length:

Construction Data

Construction Project Number: F 217-9 Construction Station Number: 57+31.00

Construction Drawing Number: 3892

Construction Year: 1958

Traffic Data Current ADT: 2,140

ADT Count Year: 2009 2 % Percent Trucks:

Reconstruction Year:

Structure Loading, Rating and Posting Data

Loading Data:

| Design Loading: | | 5 MS 18 (HS 20) |
|-------------------------|-----------|------------------------|
| Inventory Load, Design: | 32.6 mton | B ASD Assigned |
| Operating Load, Design: | 75.2 mton | B ASD Assigned |
| Posting : | | 5 At/Above Legal Loads |

| Rating Data : | Operating | Inventory | Posting |
|--------------------|-----------|-----------|---------|
| Truck 1 Type 3: | | | |
| Truck 2 Type 3-S3: | | | |
| Truck 3 Type 3-3: | 99 | | |

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data:

138.68 m Structure Length:

> Deck Area: 1,340.00 m sq

8.53 m Deck Roadway Width: 9.75 m Approach Roadway Width:

Median Code, Description: 0 No median

Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

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

0.00 m Vertical Clearance Under the Structure:

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

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

Span Data

Main Span

Approach Span Number Spans: 4

Material Type Code, Description: 4 Steel continuous

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

Deck

Deck Structure Type: 1 Concrete Cast-in-Place

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

Deck Protection Type: 0 None Deck Membrain Type: 0 None Material Type Code, Description: Span Design Code, Description:

Number of Spans: 0

(52) Out-to-Out Width:

9.66 m (50B) Curb Width:

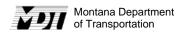
0.00 m

(50A) Curb Width: 0.00 m

Skew Angle: 30°

Structure Vertical and Horizontal Clearance Data Inventory Route:

| Over / Under Direction | Inventory | South, W | est or Bi-direction | nal Travel | North or East Travel | | | |
|------------------------|-----------|-----------|---------------------|------------|----------------------|----------|------------|--|
| Name | Route | Direction | Vertical | Horizontal | Direction | Vertical | Horizontal | |
| Route On Structure | P00011 | Both | 99.99 m | 8.53 m | N/A | | | |
| | | | | | | | | |



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P00011020+04171

Continue

Inspection Data

Candidate ID

Sufficiency Rating: 65.5

Inspection Due Date: 02 October 2014 (91) Inspection Fequency (months): 24

Next Under Water Insp: 02 Oct 2016

States

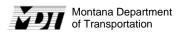
Under Water Insp Type : Type I

| Structure Status : Not Defic | eient | | | | | | |
|--|----------------|--|-----------------|--|--|--------------------------------|---|
| NBI Inspection Data | | | | | | | |
| (90) Date of Last Inspection | o : 02 October | 2012 | | La | st Inspected By: Daniel Gra | vage - 71 | |
| (90) Inspection Date | e : | | | | Inspected By : | | |
| (58) Deck Rating (59) Superstructure Rating (60) Substructure Rating (72) App Rdwy Align | 7 | (68) Deck Geo
(67) Structure
(69) Under Clea
(41) Posting | Rating : 7 | (36B) | Bridge Rail Rating: 1 Transition Rating: 1 proach Rail Rating: 1 D) End Rail Rating: 1 | (61) Channe
(71) Waterway A | rt Rating : N el Rating : 8 dequacy :8 r Critical : 5 |
| Increation Hours | Unrepaired S | palls : 2 m | sq | | Deck Surfacin | g Depth : 0. | 00 in |
| Inspection Hours Crew Hours for inspection: Helper Hours: Special Crew Hours: Special Equipment Hours: | -1
-1
-1 | | Snooper Hours f | per Required
or inspection
agger Hours | 1 | | |
| Inspection Work Car | ndidates | Status | Priority | Effected
Structure | Scope of
Work | Action | Covered
Condition |

Unit

Date

Requested



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P00011020+04171

Continue

Element Inspection Data

Span: Main-0 - -1 * * * * * * * * * Element Description Smart Flag Scale Factor Env Quantity Units Insp Each Pct Stat 1 Pct Stat 2 Pct Stat 3 Pct Stat 4 Pct Stat 5 Element 12 - Bare Concrete Deck Х 100 3 1340 sq.m. 0 0 % % % Previous Inspection Notes: 10/02/2012 - Agree with Sttae 2 condition. 10/13/2010 - New HMWM surface treatment since last inspection. 10/01/2008 - No apparent changes to previous conditions. 03/06/2007 - Small spall area at Pier 3 joint hasn't changed much, thanks to periodic asphalt patching. (138.68 X 9.66 = 1339.649) 02/10/2005 - Conditions remain much the same, with slight increase of spalled areas mentioned previously. 09/10/2002 - None 07/19/2000 - No changes. 04/27/1998 - Several small spall areas thru out deck surface showing delamination, spall in deck surface over pier 3 at compression joint at edge of driving lanes. Underside of deck showing some efflor. 06/06/1996 - None 05/01/1994 - None Inspection Notes: Element 107 - Paint Stl Opn Girder 2 549 95 m. 0 % Previous Inspection Notes: 10/02/2012 - Minor paint chips with associated light rusting. 10/13/2010 - None 10/01/2008 - None 03/06/2007 - None 02/10/2005 - None 09/10/2002 - None 07/19/2000 - None 04/27/1998 - None 06/06/1996 - None 05/01/1994 - None Inspection Notes:

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P00011020+04171 Continue

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

| | cription | | | | | | | | | |
|--|--|-------------|----------------|------------|---------------|------------------|------------|------------|------------|--|
| Smart Flag | | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 205 | - R/Conc Colun | nn | | | | | | | | |
| | 1 | 3 | 6 | ea. | | 90 | 10 | 0 | C | |
| | | | | | | % | % | % | % | 9 |
| Previous Insp | ection Notes : | | | | | I | L | | | |
| 10/02/2012 - | None | | | | | | | | | FZKZ |
| 10/13/2010 - | Typical expose | d aggregat | e along the wa | iterline o | of columns ar | nd web walls. | | | | |
| 10/01/2008 - | None | | | | | | | | | GICO |
| 03/06/2007 - 1 | None | | | | | | | | | HZIF |
| 02/10/2005 - 1 | None | | | | | | | | | PNJZ |
| 09/10/2002 - 1 | None | | | | | | | | | TZKZ |
| 07/19/2000 - | Piers 2, 3 & 4 a | re two colu | umns joined by | a web | wall and spar | nned with a cap. | | | | BHBN |
| 04/27/1998 - 1 | None | | | | | | | | | VJJX |
| 06/06/1996 - 1 | None | | | | | | | | | CSBZ |
| 05/01/1994 - | None | | | | | | | | | REFI |
| Inspection N | otes: | | | | | | | | | |
| Element 215 | - R/Conc Abutn
1 | 2 | 29 | m. | | 100 | 0 | 0 | | |
| Previous Insp | ection Notes : | | | | | | | | | |
| 10/02/2012 - 1 | None | | | | | | | | | FZKZ |
| 10/13/2010 - 1 | None | | | | | | | | | |
| 10/01/2008 - 1 | None | | | | | | | | | GICO |
| | | | | | | | | | | |
| 03/06/2007 - 1 | | | | | | | | | | HZIF |
| 03/06/2007 -
02/10/2005 - | None | | | | | | | | | |
| | None
None | | | | | | | | | HZIF |
| 02/10/2005 - | None
None
None | | | | | | | | | HZIF
PNJZ |
| 02/10/2005 -
09/10/2002 - | None
None
None
None | | | | | | | | | HZIF
PNJZ
TZKZ |
| 02/10/2005 -
09/10/2002 -
07/19/2000 - | None
None
None
None
None | | | | | | | | | HZIF
PNJZ
TZKZ
BHBN |
| 02/10/2005 -
09/10/2002 -
07/19/2000 -
04/27/1998 - | None
None
None
None
None | | | | | | | | | HZIF
PNJZ
TZKZ
BHBN
VJJX |
| 02/10/2005 -
09/10/2002 -
07/19/2000 -
04/27/1998 -
06/06/1996 - | None
None
None
None
None
None | | | | | | | | | HZIF
PNJZ
TZKZ
BHBN
VJJX
CSBZ |
| 02/10/2005 -
09/10/2002 -
07/19/2000 -
04/27/1998 -
06/06/1996 -
05/01/1994 - | None
None
None
None
None
None | | | | | | | | | HZIF
PNJZ
TZKZ
BHBN
VJJX
CSBZ |

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P00011020+04171 Continue

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

| | | | | | | u o . (00 | , | | | |
|--------------|----------------------------|------------|----------|-------|-----------|------------|------------|------------|------------|------------|
| Element Des | | | | | | | | | | |
| | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 234 | I - R/Conc Cap | | | | | | | | | |
| | 1 | 2 | 31 | m. | | 100 | 0 | 0 | 0 | |
| | | | | | | % | % | % | % | 9/ |
| Previous Ins | pection Notes : | | | | | | L | | | |
| 10/02/2012 | - None | | | | | | | | | FZKZ |
| 10/13/2010 | - None | | | | | | | | | |
| 10/01/2008 | - None | | | | | | | | | GICO |
| 03/06/2007 | - None | | | | | | | | | HZIF |
| 02/10/2005 | - None | | | | | | | | | PNJZ |
| 09/10/2002 | - None | | | | | | | | | TZKZ |
| 07/19/2000 | | | | | | | | | | BHBN |
| Inspection | Notes: | | | | | | | | | |
| ' | | | | | | | | | | |
| | | | | | | | | | | |
| Element 305 | 5 - Assm Jt w/o S | Seal | | | | | | | | |
| | 1 | 3 | 22 | m. | | 100 | 0 | 0 | | |
| | | | | | _ | % | % | % | % | 0 |
| Previous Ins | spection Notes : | | | | | | | | | |
| 10/02/2012 | | | | | | | | | | FZKZ |
| | - None
- Clean and in w | orking con | dition | | | | | | | TZJC |
| 10/01/2008 | | orking con | dition. | | | | | | | GICO |
| 03/06/2007 | | | | | | | | | | HZIF |
| 02/10/2005 | | | | | | | | | | PNJZ |
| 09/10/2002 | | | | | | | | | | TZKZ |
| 07/19/2000 | | | | | | | | | | BHBN |
| 04/27/1998 | | | | | | | | | | VJJX |
| 06/06/1996 | | | | | | | | | | CSBZ |
| 05/01/1994 | | | | | | | | | | REFI |
| Inspection | | | | | | | | | | |
| mspection | INULES. | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

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

| Element De | | | | | | | | | | |
|--------------|--------------------|--------------|------------------|----------|----------------|--------------|------------|------------|------------|------------|
| Smart Flag | | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 31 | 1 - Moveable Be | | | | | | | | | |
| | 1 | 2 | 16 | ea. | | 95 | 5 | C | | |
| | | | | | | % | % | % | % | % |
| Previous Ins | spection Notes : | | | | | | | | <u>l</u> | |
| 10/02/2012 | - Five pct. State | 2 for rustin | ng of rockers. | | | | | | | FZKZ |
| 10/13/2010 | - None | | | | | | | | | |
| 10/01/2008 | - None | | | | | | | | | GICO |
| 03/06/2007 | - None | | | | | | | | | HZIF |
| 02/10/2005 | - None | | | | | | | | | PNJZ |
| 09/10/2002 | - None | | | | | | | | | TZKZ |
| 07/19/2000 | - Same. | | | | | | | | | BHBN |
| 04/27/1998 | - Light rusting of | rocker bea | arings under sli | ding pla | te joints at a | but 1 and 5. | | | | VJJX |
| 06/06/1996 | - None | | | | | | | | | CSBZ |
| 05/01/1994 | - None | | | | | | | | | REFI |
| Inspection | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Element 313 | 3 - Fixed Bearing | 1 | | | | | | | | |
| | 1 | 2 | 4 | ea. | | 100 | 0 | 0 | | |
| | | | | | | % | | % | % | % |
| Previous Ins | spection Notes : | | | | | | | | | |
| 10/02/2012 | · | | | | | | | | | FZKZ |
| 10/13/2010 | | | | | | | | | | TZJC |
| 10/01/2008 | | | | | | | | | | GICO |
| 03/06/2007 | | | | | | | | | | HZIF |
| 02/10/2005 | | | | | | | | | | PNJZ |
| 09/10/2002 | | | | | | | | | | TZKZ |
| 07/19/2000 | | | | | | | | | | BHBN |
| 04/27/1998 | | | | | | | | | | VJJX |
| 06/06/1996 | | | | | | | | | | CSBZ |
| 05/01/1994 | | | | | | | | | | REFI |
| Inspection | | | | | | | | | | |
| Пороскоп | . 10.00. | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

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P00011020+04171 Continue

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

| Element Description Smart Flag Scale Factor Element 331 - Conc Bridge Ra 1 Previous Inspection Notes : 10/02/2012 - None | Env ailing 2 | Quantity 277 | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
|--|--------------|---------------------------|----------------------|-----------------------------|-------------------------|-------------|-------------|-------------|--------------|
| Element 331 - Conc Bridge Ra 1 Previous Inspection Notes : | ailing | , | 21110 | op Euon | | . 5. 5.4. 2 | . 5. 5.4. 6 | . 5. 5.4. 7 | |
| 1 Previous Inspection Notes : | | 277 | | | | | | | |
| Previous Inspection Notes : | _ | | m. | | 100 | 0 | 0 | 0 | |
| · | | | | | % | % | % | % | |
| · | | | | | /0 | 70 | /0 | /0 | |
| 10/02/2012 - None | | | | | | | | | |
| | | | | | | | | | FZKZ |
| 10/13/2010 - None | | | | | | | | | TZJC |
| 10/01/2008 - None | | | | | | | | | GICO |
| 03/06/2007 - None. (138.68 X | (2 = 277.3 | 86) | | | | | | | HZIF |
| 02/10/2005 - None | | | | | | | | | PNJZ |
| 09/10/2002 - None | | | | | | | | | TZKZ |
| 07/19/2000 - None | | | | | | | | | BHBN |
| 04/27/1998 - None | | | | | | | | | VJJX |
| 06/06/1996 - None | | | | | | | | | CSBZ |
| 05/01/1994 - None | | | | | | | | | REFI |
| Inspection Notes: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| General Inspection No | otes | | | | | | | | |
| 10/02/2012 - None | | | | | | | | | FZKZ |
| 10/13/2010 - Deleted cross-fra | ame eleme | ent 7/12/2012. | AKJ | | | | | | TZJC |
| 10/01/2008 - None | | , | | | | | | | GICO |
| 03/06/2007 - None | | | | | | | | | HZIF |
| 02/10/2005 - None | | | | | | | | | PNJZ |
| 09/10/2002 - None | | | | | | | | | TZKZ |
| 07/19/2000 - None | | | | | | | | | BHBN |
| 04/27/1998 - None | | | | | | | | | VJJX |
| 06/06/1996 - Sufficiency Rating
Sufficiency Rating Calculation
U5963 inspection comments -
Structure P00011020+04171 -
Date 9/4/96 -
Previous comments > (none)
05/01/1994 - | Accepted | ion Accepted by OPS\$U900 | oy ops\$
04 at 2/ | Su5963 at 3/
19/97 14:34 | (10/97 11:34:34
::23 | | | | CSBZ |
| | 2004 | | | | | | | | |
| 11/01/1991 - Updated with tap
04/01/1990 - Updated with tap | | | | | | | | | NB94
NB92 |
| 02/01/1988 - Updated with tap | | | | | | | | | NB89 |
| | | | | | | | | | NB88 |
| 07/01/1985 - Updated with tape
12/01/1982 - Updated with tape | | | | | | | | | NB84 |
| | | | | | | | | | |
| 02/01/1980 - Updated with tap | De 1962 | | | | | | | | NB82 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

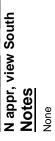
Inspection Photos

P00011020+04171

Location 11M SW EMIGRANT Stucture Name: none









Notes
View downstream. West profile

Inspection Photos

P00011020+04171

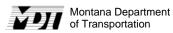
Location 11M SW EMIGRANT Stucture Name: none



Superstructure

None

MONTANA EPARTMENT OF TRANSPORTATION



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Form: bms001d

P00011024+00721

Location: 7M SW EMIGRANT Structure Name: none

General Location Data

MDT Maintenance Section: None

BUTTE District Code, Number, Location: 02 **BOZEMAN** Division Code, Location:22

County Code, Location: 067 **PARK** City Code, Location: 00000 **RURAL AREA**

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

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

Intersecting Feature: BIG CREEK Kilometer Post, Mile Post: 38.74 km 24.07

Structure on the State Highway System: Latitude: 45°17'57"

Structure on the National Highway System: Longitude: 110°49'53"

Str Meet or Exceed NBIS Bridge Length:

Construction Data

Construction Project Number: F 217-9 Construction Station Number: 250+21.00

Construction Drawing Number: 3903

Construction Year: 1960

Current ADT: 2,140 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year:

Structure Loading, Rating and Posting Data

Loading Data:

Traffic Data

| Design Loading : | | 5 MS 18 (HS 20) |
|-------------------------|-----------|------------------------|
| Inventory Load, Design: | 32.6 mton | B ASD Assigned |
| Operating Load, Design: | 37.1 mton | B ASD Assigned |
| Posting : | | 5 At/Above Legal Loads |

| Rating Data: | Operating | Inventory | Posting |
|--------------------|-----------|-----------|---------|
| Truck 1 Type 3: | | | |
| Truck 2 Type 3-S3: | | | |
| Truck 3 Type 3-3 : | 74 | | |

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data:

27.43 m Structure Length:

> Deck Area: 267.00 m sq

8.53 m Deck Roadway Width: 9.80 m Approach Roadway Width:

Median Code, Description: 0 No median

Structure Vertical and Horizontal Clearance Data:

Vertical Clearance Over the Structure: 99.99 m

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

0.00 m Vertical Clearance Under the Structure:

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

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

Span Data

Main Span Approach Span

Number Spans: 3 Material Type Code, Description: 2 Concrete continuous

Span Design Code, Description: 4 Tee Beam

Deck

Deck Structure Type: N Not applicable

Deck Surfacing Type: 0 None (no additional concrete thickness or wearing s

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

Material Type Code, Description:

Span Design Code, Description:

(52) Out-to-Out Width:

Skew Angle: "

(50A) Curb Width:

(50B) Curb Width:

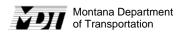
9.74 m

0.55 m

0.55 m

Structure Vertical and Horizontal Clearance Data Inventory Route:

| Over / Under Direction | Inventory | South, W | est or Bi-direction | nal Travel | N | North or East Travel | | | |
|------------------------|-----------|-----------|---------------------|------------|-----------|----------------------|------------|--|--|
| Name | Route | Direction | Vertical | Horizontal | Direction | Vertical | Horizontal | | |
| Route On Structure | P00011 | Both | 99.99 m | 8.53 m | N/A | | | | |
| | | | | | | | | | |



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P00011024+00721 Continue

Inspection Data

Inspection Due Date: 29 December 2014
(91) Inspection Feduracy (months): 24

| Sufficiency Rating: 6
Structure Status: Not | | (91) Inspect | on Fequency | (Months) . 24 | • | | | | |
|---|------------------------------|--|--------------------------------|-----------------------|--|--|--|--|--|
| NBI Inspection Da | nta | | | | | | | | |
| (90) Date of Last Insp | pection : 02 January | 2013 | | La | Last Inspected By: Daniel Gravage - 71 | | | | |
| (90) Inspectio | n Date : | | | | Inspected By : | | | | |
| (58) Deck I (59) Superstructure I (60) Substructure I (72) App Rdwy | Rating: 7 Rating: 7 Align: 8 | (68) Deck Geor
(67) Structure R
(69) Under Clear
(41) Posting S | eating : 7 ance : N status : A | (36B) | Bridge Rail Rating: 1 Dynamics Property of the Property of th | (61) Channe
(71) Waterway A
(113) Scou | rt Rating : N el Rating : 8 dequacy : 8 r Critical : 5 | | |
| Inspection Hours | Unrepaired S | pails: | 5 4 | | Deck Surfacing | Depth : 0. | oo in | | |
| Crew Hours for inspec | tion : | | Snoo | per Required | : N | | | | |
| Helper Ho | ours: -1 | Sr | nooper Hours | for inspection | -1 | | | | |
| Special Crew Ho | ours: -1 | | F | lagger Hours | -1 | | | | |
| Special Equipment Ho | ours : -1 | | | | • | _ | | | |
| Inspection Worl | c Candidates | Status | Priority | Effected
Structure | Scope of
Work | Action | Covered
Condition | | |
| Candidate ID | Date | Siatus | Filority | Unit | VVOIK | Action | States | | |

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Continue

Element Inspection Data

| Smart Flag | cription
Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
|--|--|------------------------------|-------------------------------------|--------------------|--------------|------------------|-------------------|------------------|--------------------|--|
| _ | Bare Top Flang | | , | Ullits | IIISP Lacii | FCI Stat 1 | FCI Stat 2 | FCI SIAI 3 | FCI Stat 4 | FUI SIAI 5 |
| | 1 | 3 | | sq.m. | Х | 100 | 0 | 0 | 0 | |
| | ' | 3 | 201 | 3 q .111. | ^ | | | | | |
| | | | | | | % | % | % | % | |
| | ection Notes : | | | | | | | | | |
|)1/02/2013 - N | None | | | | | | | | | EOJ |
| | HMWM seal su | | | | | | | | | ZZL |
|)1/16/2009 - N
267.168) | Minor transvers | se and rand | dom hairline cra | acking t | hroughout de | ck surface. No d | elamination note | ed w/chain drag. | (27.43 X 9.74 = | WZC |
| Inspection No | otes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| lement 110 - | - R/Conc Open | Girder | | | | | | | | |
| | 1 | 3 | 110 | m. | | 100 | 0 | 0 | 0 | |
| | ' | 3 | 110 | 111. | | | | | | |
| | | | | | | % | % | % | % | |
| | ection Notes : | | | | | | | | | |
| 1/02/2013 - N | | | | | | | | | | EO |
| 2/29/2010 - N | | | | | | | | | | ZZL |
| 1/16/2009 - N | None | | | | | | | | | WZC |
| ., | | | | | | | | | | |
| | None | | | | | | | | | ZZL |
| 2/26/2006 - N | | | | | | | | | | |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N | None
None | | | | | | | | | KPk
TZk |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N | None
None | | | | | | | | | KPk
TZk |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N
12/04/1997 - E | None
None
No change.
Deck has sevel | ral small sp | oall areas with r | minor tr | ansverse and | d random crackin | g thru out deck s | surface. 4" long | section of exposed | KPk
TZk
JBJ |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N
12/04/1997 - E
rebar B-3 area | None
None
No change.
Deck has sevel
a. Chain drag c | ral small sp
lid not reve | oall areas with r
al any delamin | minor tr
ation. | ansverse and | d random crackin | g thru out deck s | surface. 4" long | section of exposed | KPK
TZK
JBJ |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N
12/04/1997 - E
rebar B-3 area
11/01/1995 - N | None
None
No change.
Deck has sevel
a. Chain drag c
None | ral small sp
lid not reve | oall areas with r
al any delamin | minor tr
ation. | ansverse and | d random crackin | g thru out deck s | surface. 4" long | section of exposed | KPK
TZK
JBJ
d VJK
YDN |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N
12/04/1997 - E
rebar B-3 area
11/01/1995 - N | None
None
No change.
Deck has seve
a. Chain drag c
None
None | ral small sp
lid not reve | oall areas with r
al any delamin | minor tr
ation. | ansverse and | d random crackin | g thru out deck s | surface. 4" long | section of exposed | KPk
JBJ
d VJk
YDN |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N
12/04/1997 - E
ebar B-3 area
11/01/1995 - N | None
None
No change.
Deck has seve
a. Chain drag c
None
None | ral small sp
lid not reve | oall areas with r
al any delamin | minor tr
ation. | ansverse and | d random crackin | g thru out deck s | surface. 4" long | section of exposed | KPk
JBJ
d VJk
YDN |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
2/04/1997 - E
ebar B-3 area
1/01/1995 - N
0/01/1993 - N | None
None
No change.
Deck has seve
a. Chain drag c
None
None | ral small sp
lid not reve | oall areas with r
al any delamin | minor tr
ation. | ansverse and | d random crackin | g thru out deck s | surface. 4" long | section of exposed | KPK
TZK
JBJ
d VJK
YDN |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
2/04/1997 - E
ebar B-3 area
1/01/1995 - N
0/01/1993 - N
Inspection No | None None No change. Deck has sever a. Chain drag of None None otes: | lid not reve | oall areas with r
al any delamin | minor tr
ation. | ansverse and | I random crackin | g thru out deck s | surface. 4" long | section of exposed | KPk
JBJ
d VJk
YDN |
| 12/26/2006 - N
12/08/2004 - N
09/09/2002 - N
02/07/2000 - N
12/04/1997 - E
debar B-3 area
11/01/1995 - N
10/01/1993 - N | None None No change. Deck has sever a. Chain drag of None None otes: | lid not reve | al any delamin | ation. | ansverse and | | | | | ZZL'
KPK
TZK
JBJ
VJK
YDN
REF |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
2/04/1997 - E
ebar B-3 area
1/01/1995 - N
0/01/1993 - N
Inspection No | None None No change. Deck has sever a. Chain drag of None None otes: | lid not reve | oall areas with ral any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPk
JBJ
d VJk
YDN |
| 2/26/2006 - N
2/08/2004 - N
9/09/2002 - N
9/09/2000 - N
9/09/2000 - N
9/04/1997 - D
ebar B-3 area
1/01/1993 - N
0/01/1993 - N
Inspection No | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum | lid not reve | al any delamin | ation. | ansverse and | | | | 0 | KPk
JBJ
d VJk
YDN |
| 2/26/2006 - N
2/08/2004 - N
9/09/2002 - N
9/09/2000 - N
9/09/2000 - N
9/04/1997 - D
ebar B-3 area
1/01/1993 - N
0/01/1993 - N
Inspection No | None None No change. Deck has sever a. Chain drag of None None otes: | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPk
JBJ
d VJk
YDN |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
02/04/1997 - E
ebar B-3 area
1/01/1995 - N
0/01/1993 - N
Inspection No | None None No change. Deck has sevel a. Chain drag c None None otes: - R/Conc Colum 1 | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF
TZK
JBJ
VJK
YDF
RE |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
02/04/1997 - E
ebar B-3 area
1/01/1993 - N
0/01/1993 - N
Inspection No | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum 1 rection Notes: | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF
TZK
JBJ
d VJK
YDN
REI |
| 2/26/2006 - N
2/08/2004 - N
9/09/2002 - N
9/09/2000 - N
9/09/2013 - N
9/1/02/2013 - N
9/1/02/2010 - N | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum 1 rection Notes: | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF
TZK
JBJ
S VJK
YDN
REI |
| 2/26/2006 - N
2/08/2004 - N
9/09/2002 - N
2/07/2000 - N
2/04/1997 - E
ebar B-3 area
1/01/1995 - N
0/01/1993 - N
Inspection No
Element 205 -
Previous Inspection
1/02/2013 - N
2/29/2010 - N | None None No change. Deck has several. Chain drag of None None otes: - R/Conc Column 1 - Rection Notes: None None | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF
TZK
JBJ
d VJK
YDN
REI
EO.
ZZL
WZC |
| 2/26/2006 - N
2/08/2004 - N
9/09/2002 - N
2/07/2000 - N
2/04/1997 - E
ebar B-3 area
1/01/1993 - N
0/01/1993 - N
Inspection No
2/20/2013 - N
2/29/2010 - N
1/16/2009 - N
2/26/2006 - N | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum 1 rection Notes: None None None None None None None | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF
TZK
JBJ
YDN
REI
EO.
ZZL
WZC |
| 2/26/2006 - N
2/08/2004 - N
9/09/2002 - N
9/09/2000 - N
9/09/2000 - N
9/09/2000 - N
9/09/2000 - N
9/09/2000 - N
9/09/2000 - N
9/09/2013 - N
9/09/2013 - N
9/19/2013 - N
11/16/2009 - N
12/26/2006 - N
12/26/2004 - N | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum 1 rection Notes: None None None None None None None | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPP TZK JBJ YDN RE EO. ZZL KPP |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
0/01/1993 - N
Inspection No
0/01/1993 - N
Inspection No
01/02/2013 - N
01/02/2013 - N
01/16/2009 - N
02/26/2006 - N
02/08/2004 - N
09/09/2002 - N | None None No change. Deck has several Chain drag of None None otes: - R/Conc Colum 1 rection Notes: None None None None None None None None | lid not reve | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF TZK JBJ I VJK YDN REI EO. ZZL WZC ZZL KPF TZK |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
0/01/1993 - N
0/01/1993 - N
0/01/1993 - N
0/01/1993 - N
0/02/2013 - N
01/02/2013 - N
01/16/2009 - N
02/26/2006 - N
02/08/2004 - N
09/09/2002 - N
02/07/2000 - N | None None No change. Deck has several Chain drag of None None otes: - R/Conc Colum 1 rection Notes: None None None None None None None None | nn 2 | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF TZK JBJ YDN RE EO. ZZL KPF TZK JBJ |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
0/01/1993 - N
0/01/1993 - N
0/01/1993 - N
0/01/1993 - N
0/02/2013 - N
01/02/2013 - N
01/16/2009 - N
02/26/2006 - N
02/08/2004 - N
09/09/2002 - N
02/07/2000 - N | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum 1 rection Notes: None None None None None None None None | nn 2 | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPk
JBJ
d VJk
YDN |
| 2/26/2006 - N
2/08/2004 - N
09/09/2002 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
02/07/2000 - N
0/01/1993 - N
0/01/1993 - N
0/01/1993 - N
0/02/2013 - N
02/29/2010 - N
02/26/2006 - N
02/26/2004 - N
02/07/2000 - N | None None No change. Deck has sever a. Chain drag of None None otes: - R/Conc Colum 1 rection Notes: None None None None None None None None | nn 2 | al any delamin | ation. | ansverse and | 100 | 0 | 0 | 0 | KPF
TZK
JBJ
d VJK
YDN
REI
EO.
ZZL
WZC
ZZL
KPF
TZK
JBJ
VJK |

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

| Element Des | | | | | | | | | | |
|--|--------------------------------------|-----|----------|-------|-----------|------------|------------|------------|------------|--------------------------------------|
| | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Element 215 | - R/Conc Abutn | | | | | | | | | |
| | 1 | 2 | 23 | m. | | 100 | 0 | 0 | 0 | |
| | | | | | | % | % | % | % | 9 |
| Previous Ins | pection Notes : | | | | | | I | | | |
| 01/02/2013 - | - None | | | | | | | | | EOJN |
| 12/29/2010 - | - None | | | | | | | | | ZZLS |
| 01/16/2009 - | - None | | | | | | | | | WZCG |
| 12/26/2006 - | - None | | | | | | | | | ZZLW |
| 12/08/2004 - | - None | | | | | | | | | KPKZ |
| 09/09/2002 - | - None | | | | | | | | | TZKZ |
| 02/07/2000 - | - None | | | | | | | | | JBJS |
| 12/04/1997 - | - None | | | | | | | | | VJKF |
| 11/01/1995 - | - None | | | | | | | | | YDNF |
| 10/01/1993 - | - None | | | | | | | | | REFI |
| Inspection I | Notes: | | | | | | | | | |
| Previous Ins
01/02/2013 -
12/29/2010 -
01/16/2009 -
12/26/2006 -
12/08/2004 - | - None
- None
- None
- None | 2 | 18 | m. | | 100 | 0 % | %
% | | EOJN
ZZLS
WZCG
ZZLW
KPKZ |
| 09/09/2002 - | | | | | | | | | | TZKZ |
| 02/07/2000 - | | | | | | | | | | JBJS |
| 12/04/1997 - | | | | | | | | | | VJKF |
| 11/01/1995 - | | | | | | | | | | YDNF |
| 10/01/1993 - | - None | | | | | | | | | REFI |
| Inspection I | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

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| lement Des | 1 41 | | | | | | | | | |
|--------------|---|--------------|---------------------------------------|------------|--------------|----------------|--------------------------------------|---------------------------------|--------------------------------|-------------------|
| | • | | | 1 | I | | | | | |
| | Scale Factor | Env | Quantity | Units | Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| lement 313 | - Fixed Bearing | | | -1 | | 1 | -1 | _ | | |
| | 1 | 2 | 8 | ea. | | 100 | 0 | С | | |
| | | | | | | % | % | % | % | |
| revious Insp | pection Notes: | | | | | | 1 | | | |
| 1/02/2013 - | None | | | | | | | | | EOJN |
| 2/29/2010 - | None | | | | | | | | | ZZLS |
| 1/16/2009 - | None | | | | | | | | | WZC |
| 2/26/2006 - | None | | | | | | | | | ZZLV |
| 2/08/2004 - | None | | | | | | | | | KPKZ |
| 9/09/2002 - | None | | | | | | | | | TZKZ |
| 2/07/2000 - | None | | | | | | | | | JBJS |
| 2/04/1997 - | None | | | | | | | | | VJKF |
| 1/01/1995 - | None | | | | | | | | | YDNF |
| 0/01/1993 - | None | | | | | | | | | REFI |
| Inspection N | lotes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| lement 331 | - Conc Bridge F | Railing | | | | | | | | |
| | 1 | 2 | 55 | m. | | 100 | 0 | C | 0 | |
| | • | 2 | 3. |) 111. | | | | | | |
| | | | | | | % | % | % | % | |
| · | pection Notes : | | | | | | | | | |
|)1/02/2013 - | None | | | | | | | | | EOJN |
| 2/29/2010 - | None | | | | | | | | | ZZLS |
| 1/16/2009 - | None | | | | | | | | | WZC |
| 2/26/2006 - | None. (27.43 X | < 2 = 54.86 | 5) | | | | | | | ZZLV |
| 2/08/2004 - | None | | | | | | | | | KPKZ |
| 9/09/2002 - | | | | | | | | | | TZKZ |
| pproach rail | New reinforced
ling both sides of
. BRIDGE RAII | of structure | and roadway | tieing int | o new barrie | r rail. ELEMEN | ginal metal rail A
T 334 (METAL B | lug 1998. Also
RIDGE RAIL) W | installed was
AS DELETED FR | JBJS
OM |
| Inspection N | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| lement 358 | - Deck Cracking | g SmFlag | | | | | | | | |
| Х | 1 | 3 | | l ea. | Х | 100 | 0 | C | 0 | |
| | | | | | | % | % | % | % | |
| revious Incr | pection Notes : | | | | | | | | | |
| 1/02/2013 - | | | | | | | | | | EOJN |
| | | | | | | | | | | |
| 2/29/2010 - | | | 4 - - - - - - - - - - - - | 0 | | | | | | ZZLS |
| | HMWM surface | protectan | t added in 200 | δ | | | | | | WZC |
| Inspection N | Notes: | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

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| General Inspection Notes | |
|--|------|
| 01/02/2013 - None | EOJN |
| 12/29/2010 - None | ZZLS |
| 01/16/2009 - None | WZCG |
| 12/26/2006 - None | ZZLW |
| 12/08/2004 - None | KPKZ |
| 09/09/2002 - None | TZKZ |
| 02/07/2000 - None | JBJS |
| 12/04/1997 - None | VJKF |
| 11/01/1995 - Sufficiency Rating Calculation Accepted by ops\$u5963 at 3/10/97 11:34:34 Sufficiency Rating Calculation Accepted by OPS\$U9004 at 2/19/97 14:34:24 | YDNF |
| 10/01/1993 - | REFI |
| 11/01/1991 - Updated with tape 1994 | NB94 |
| 02/01/1990 - Updated with tape 1992 | NB92 |
| 02/01/1988 - Updated with tape 1989 | NB89 |
| 07/01/1985 - Updated with tape 1988 | NB88 |
| 12/01/1982 - Updated with tape 1984 | NB84 |
| 02/01/1980 - Updated with tape 1982 | NB82 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Inspection Photos

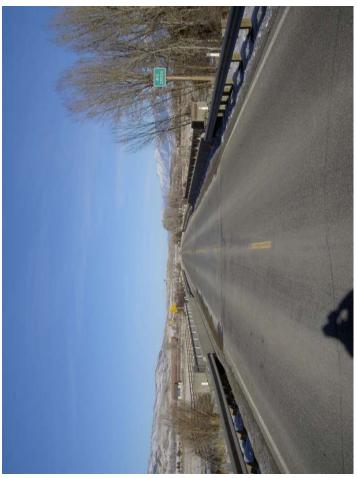
P00011024+00721







None None



S appr, view North
Notes

Inspection Photos

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Location 7M SW EMIGRANT Stucture Name: none



Superstructure

None None

MONTANA PARTMENT OF TRANSPORTATION

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Location: 10 KM S LIVINGSTON Structure Name:

General Location Data MDT Maintenance Section: None **BUTTE** District Code, Number, Location: 02 **BOZEMAN** Division Code, Location:22 County Code, Location: 067 **PARK** City Code, Location: 00000 **RURAL AREA** Kind fo Hwy Code, Description: 2 2 U.S. Numbered Hwy Signed Route Number: 00089 State Highway Agency State Highway Agency Str Owner Code, Description: 1 Maintained by Code, Description:1 Intersecting Feature: FARM ACCESS 77.00 km Kilometer Post, Mile Post: 47.85 Structure on the State Highway System: Latitude: 45°34'27" **Construction Data** Structure on the National Highway System: Longitude: 110°35'13" Construction Project Number: Str Meet or Exceed NBIS Bridge Length: Construction Station Number: Construction Drawing Number: **Traffic Data** Construction Year: 1964 Current ADT: 3,350 ADT Count Year: 2009 2 % Percent Trucks: Reconstruction Year:

Structure Loading, Rating and Posting Data

Loading Data:

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

| Rating Data : | Operating | Inventory | Posting |
|--------------------|-----------|-----------|---------|
| Truck 1 Type 3: | | | |
| Truck 2 Type 3-S3: | | | |
| Truck 3 Type 3-3: | 40 | | |

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data:

4.80 m Structure Length:

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

9.10 m Approach Roadway Width:

Median Code, Description: 0 No median

Structure Vertical and Horizontal Clearance Data:

99.99 m Vertical Clearance Over the Structure:

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

4.50 m Vertical Clearance Under the Structure:

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

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

Number of Spans: 0

(52) Out-to-Out Width:

Span Data

Main Span Approach Span

Number Spans: 1

Material Type Code, Description: 3 Steel

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

Deck

Deck Structure Type: N Not applicable

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

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

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

Span Design Code, Description:

(50A) Curb Width:

Material Type Code, Description:

0.00 m

(50B) Curb Width:

0.00 m

0.00 m

Skew Angle: "

Structure Vertical and Horizontal Clearance Data Inventory Route:

| Over / Under Direction | Inventory | South, West or Bi-directional Travel | | | North or East Travel | | | |
|------------------------|-----------|--------------------------------------|----------|------------|----------------------|----------|------------|--|
| Name | Route | Direction | Vertical | Horizontal | Direction | Vertical | Horizontal | |
| Route On Structure | P00011 | Both | 99.99 m | 9.10 m | N/A | | | |
| FARM ACCESS | 1 | | | | | | | |

Page 2 of 2 Form: bms001d Printing Date: Wednesday, May 15 2013

P00011047+09001 Continue

Inspection Data

Inspection Due Date: 23 August 2013 (91) Inspection Fequency (months): 24

| NBI Inspection Da | | | | | | | | |
|--|---------------------------|-------------------|------------------|-----------------------|--------------------|-------------------------|-----------------|----------------------|
| (90) Date of Last Ins | pection : 23 Augu | st 2011 | | La | ast Inspected By | Daniel Grava | ge - 71 | |
| (90) Inspection | on Date : | | | | Inspected By | | | |
| (58) Deck | Rating : N | (68) Deck | k Geometry : N | (36A) | Bridge Rail Ratin | g : N | (62) Culve | rt Rating : 7 |
| (59) Superstructure | Rating : N | (67) Struc | cture Rating : 7 | (36B) | Transition Rating | g : N | (61) Channe | el Rating : N |
| (60) Substructure | Rating : N | 7 | Clearance : N | (36C) Ap | proach Rail Ratir | ıg :N | (71) Waterway A | dequacy : N |
| (72) App Rdw | y Align : 6 | 1 | sting Status : | (361 | D) End Rail Rating | g : N | (113) Scou | r Critical : N |
| Inspection Hours | Unrepaire | d Spalls : | 0 m sq | | De | ck Surfacing | Depth : 0. | 00 in |
| Crew Hours for inspec | | 2 | | ooper Required | | | _ | |
| Helper H | | 0 | Snooper Hour | s for inspection | J | | _ | |
| Special Crew H | | 0 | _ | Flagger Hours | : 0 | | J | |
| Special Equipment H | | 0 | | | | | | |
| Inspection Work | | Status | Priority | Effected
Structure | Scope
Worl | | Action | Covered
Condition |
| Candidate ID | Date
Requested | | | Unit | | | | States |
| | on Data | * * * * * * * * * | * Span : Main-0 | - Update Desc | ription * * * * * | * * * * | | |
| Element Description Smart Flag Scale Fa | actor Env | | * Span : Main-0 | - Update Desc | Pct Stat 2 | * * * * *
Pct Stat 3 | Pct Stat 4 | Pct Stat 5 |
| Smart Flag Scale Fa
Element 240 - Steel C | actor Env | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | | Pct Stat 5 |
| Smart Flag Scale Fa | actor Env | Quantity U | · | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | |
| Smart Flag Scale Fa
Element 240 - Steel C | actor Env ulvert | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | | |
| Smart Flag Scale Fa
Element 240 - Steel C | actor Env ulvert | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No | actor Env ulvert | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | 9 |
| Smart Flag Scale Fa
Element 240 - Steel C
1
Previous Inspection No
08/23/2011 - None | actor Env ulvert | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | %
ZMCZ |
| Smart Flag Scale Fa
Element 240 - Steel C
1
Previous Inspection No
08/23/2011 - None
08/25/2009 - None | actor Env ulvert | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | 9
ZMCZ |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No 08/23/2011 - None 08/25/2009 - None Inspection Notes: General Inspect | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No 08/23/2011 - None 08/25/2009 - None Inspection Notes: General Inspect 08/23/2011 - None | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ
ZMCZ |
| Smart Flag Scale Far
Element 240 - Steel C
1
Previous Inspection No
08/23/2011 - None
08/25/2009 - None
Inspection Notes: | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No 08/23/2011 - None 08/25/2009 - None Inspection Notes: General Inspect 08/23/2011 - None | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ
ZMCZ |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No 08/23/2011 - None 08/25/2009 - None Inspection Notes: General Inspect 08/23/2011 - None | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ
ZMCZ |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No 08/23/2011 - None 08/25/2009 - None Inspection Notes: General Inspect 08/23/2011 - None | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ
ZMCZ |
| Smart Flag Scale Fa Element 240 - Steel C 1 Previous Inspection No 08/23/2011 - None 08/25/2009 - None Inspection Notes: General Inspect 08/23/2011 - None | actor Env ulvert 2 otes: | Quantity U | nits Insp Each | Pct Stat 1 | Pct Stat 2 | Pct Stat 3 | 0 0 | ZMCZ
RZBZ
ZMCZ |

Inspection Photos

P00011047+09001 Location 10 KM S LIVINGSTON Stucture Name:







E appr view West None None



APPENDIX D

Highway LOS Analysis



| DIRECTIONAL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|--|--|
| General Information | Site Information | |
| Analyst Scott Randall Agency or Company RPA Date Performed 9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 0.0 to 0.4 (34-3-10)
MDT |
| Analysis Time Period Average Annual | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley Input Data | | |
| L | | |
| \$\ Shoulder width ft | | |
| Lane widthtt | Class I I | nighway 🔲 Class II |
| Lane width tt | highway 🗸 | Class III highway |
| | Terrain | ✓ Level Rolling |
| Segment length, L ₁ mi | Grade Length
Peak-hour far
No-passing z | ctor, PHF 0.88 |
| Analysis direction vol., V _d 329veh/h | Show North Arrow % Trucks and | d Buses , P _T 6 % |
| Opposing direction vol., V _o 219veh/h Shoulder width ft 4.0 | % Recreation Access points | nal vehicles, P _R 4%
s <i>mi</i> 40/mi |
| Lane Width ft 12.0 Segment Length mi 0.4 | Access points | 70/III |
| Average Travel Speed | | |
| | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12) | 1.3 | 1.5 |
| Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | 0.982 | 0.971 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | 381 | 256 |
| Free-Flow Speed from Field Measurement | i | ee-Flow Speed |
| | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | Adj. for lane and shoulder width, | |
| Total demand flow rate, both directions, <i>v</i> | Adj. for access points ⁴ , f _A (Exhib | it 15-8) 10.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(v/ f _{HV.ATS}) | Free-flow speed, FFS (FSS=BFI | FS-f _{LS} -f _A) 48.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.6 <i>mi/h</i> | Average travel speed, ATS _d =FFS-0.00776(v _{d,ATS} + 40.1 mi/t | |
| | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 82.4 % |
| 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)) | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | 1.00 | 1.00 |
| Directional flow rate ² , v _/ (pc/h) v _i =V _/ (PHF*f _{HV,PTSF} * f _{g,PTSF}) | 376 250 | |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | 38.0 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | 52.8 | |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} + (v_{d,PTSF} / v_{d,PTSF} + v$ | + 69.7 | |
| v _{o,PTSF}) Level of Service and Other Performance Measures | | |
| Level of Service and Other Performance Measures Level of Service, LOS (Exhibit 15-3) | 1 | C |
| Volume to capacity ratio, <i>v/c</i> | <u> </u> | 0.22 |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 | |
|---|-------|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 82.4 | |
| Bicycle Level of Service | | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 373.9 | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.09 | |
| Bicycle level of service (Exhibit 15-4) | E | |
| 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.

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^{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.

| DIRECTION | IAL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|---|---|---|
| General Information | | Site Information | |
| Analyst Agency or Company Date Performed | Scott Randall
RPA
9/5/2013 | Jurisdiction | US 89
RP 0.4 to 2.4 (34-3-9)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Average Annual | Analysis Year | Existing (2012) |
| Input Data | | | |
| | L | | |
| | Shoulder widthtt | | |
| | Lane widthft Lane width ft | Class I h | ighway L Class II |
| | Shoulder width tt | highway 🔽 | Class III highway |
| | | Terrain | ✓ Level Rolling |
| Segment length | , L _t mi | Grade Length
Peak-hour fac
No-passing zo | ctor, PHF 0.88 |
| Analysis direction vol., V _d 270ve | eh/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V 180ve | eh/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | * * |
| Lane Width ft 12.0
Segment Length mi 2.0 | | | |
| Average Travel Speed | | <u> </u> | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-11 or 15-12) | 1.4 | 1.5 |
| Passenger-car equivalents for RVs, E _R (| Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | $_{S}$ =1/(1+ $P_{T}(E_{T}$ -1)+ $P_{R}(E_{R}$ -1)) | 0.977 | 0.971 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 314 | 211 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Total demand flow rate, both directions, | V | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 5.3 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 53.5 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhib | | Average travel speed, ATS _d =FFS | 3-0.00776(v _{d,ATS} + 45.7 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 85.5 % |
| 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)) | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF)$ | irectional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$ 309 | | 206 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 30.7 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | oit 15-21) | 53.2 | |
| Percent time-spent-following, PTSF _d (%): | =BPTSF _d +f _{np,PTSF} $*(v_{d,PTSF} / v_{d,PTSF} +$ | 62.6 | |
| v _{o,PTSF})
Level of Service and Other Performan | co Mossuros |] | |
| Level of service, LOS (Exhibit 15-3) | บ _ั ธ เพียงอนเ ยัง | 1 | В |
| Volume to capacity ratio, <i>v/c</i> | | | .18 |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 | |
|---|-------|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 85.5 | |
| Bicycle Level of Service | | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 306.8 | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.99 | |
| Bicycle level of service (Exhibit 15-4) | E | |
| 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.

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^{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.

| | IAL TWO-LANE HIGHWA | | <u> </u> |
|--|--|---|--|
| General Information | 0# D#- | Site Information | 110.00 |
| Analyst
Agency or Company | Scott Randall
RPA | | US 89
RP 2.4 to 10.4 (34-3-1) |
| Date Performed | 9/5/2013 | Jurisdiction | MDT |
| <u> </u> | Average Annual | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley | | | |
| Input Data | T . | 1 | |
| [| Shoulder widthft | | |
| - | Lane widthtt | Class I b | ighway 🔲 Class II |
| | Lane width tt | | • |
| | Shoulder widthft | | Class III highway |
| | | / Terrain | ✓ Level Rolling |
| Segment length | , L _t mi | Grade Length | |
| 30 E | | Peak-hour fact No-passing zo | |
| Analysis direction vol., V _a 184ve | ob/b | Show North Arrow % Trucks and | |
| , , | | | · |
| Opposing direction vol., V _o 123ve | eh/h | | al vehicles, P _R 4% |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | Access points | <i>mi</i> 9/mi |
| Segment Length mi 8.0 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-11 or 15-12) | 1.5 | 1.7 |
| Passenger-car equivalents for RVs, E _R (| Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | s=1/ (1+ P _T (E _T -1)+P _R (E _R -1)) | 0.971 | 0.960 |
| Grade adjustment factor ¹ , f _{g,ATS} (Exhibi | it 15-9) | 1.00 | 1.00 |
| Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 215 | 146 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| 2 | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for access points ⁴ , f _A (Exhibit | |
| Total demand flow rate, both directions, | | , , | |
| Free-flow speed, FFS= S_{FM} +0.00776(v / f | HV,ATS) | Free-flow speed, FFS (FSS=BFF | 20 / (|
| Adj. for no-passing zones, f _{np.ATS} (Exhib | it 15-15) 2.5 <i>mi/h</i> | Average travel speed, ATS _d =FFS | -0.00776(v _{d,ATS} + <i>51.1 mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS} | 31.1 min |
| | | Percent free flow speed, PFFS | 90.6 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (c) |
| Descender our equivalente for trucke E | (Eyhibit 15 19 or 15 10) | Analysis Direction (d) 1.1 | Opposing Direction (o) 1.1 |
| Passenger-car equivalents for trucks, E _T | | | |
| Passenger-car equivalents for RVs, E _R (| | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV} =1/ (1+ P _T (E _T -1)+P _R (E _R -1)) | | 0.994 | 0.994 |
| 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* $f_{HV,PTSF}$ * $f_{g,PTSF}$) | | 210 141 | |
| Base percent time-spent-following ⁴ , BPT | | 22.5 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | | 49.8 | |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 5. | 2.3 |
| v _{o,PTSF}) | | | |
| | | | |
| Level of Service and Other Performan Level of service, LOS (Exhibit 15-3) | ce Measures | • | C |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1632 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 90.6 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 209.1 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.79 |
| Bicycle level of service (Exhibit 15-4) | Е |
| 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.

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^{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.

| | NAL TWO-LANE HIGHWA | | OHEE I |
|---|--|---|---|
| General Information | 0 " 0 " 1 " | Site Information | 110.00 |
| Analyst Agency or Company | Scott Randall
RPA | 5 - 7 | US 89
RP 10.4 to 24.4 (34-3-2) |
| Date Performed | 9/5/2013 | | MDT |
| Analysis Time Period | Average Annual | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley | | | |
| Input Data | 1 T | 1 | |
| | Shoulder widthft | | |
| - | Lane widthtt | ✓ Class I b | ighway |
| | Lane width ft | | |
| | Shoulder widthft | | Class III highway |
| | | / Terrain | ✓ Level Rolling |
| Segment length | n, L _t mi | Grade Length Peak-hour fac | |
| 3.1 | at | No-passing zo | |
| Analysis direction vol., V _d 172v | eh/h | Show North Arrow % Trucks and | |
| · · | | | · |
| Opposing direction vol., V _o 115v | en/n | % Recreations Access points | , R |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | Access points | 7/111 |
| Segment Length mi 13.9 | | | |
| Average Travel Speed | | | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E | (Exhibit 15-11 or 15-12) | 1.5 | 1.8 |
| Passenger-car equivalents for RVs, E_R | (Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | $S=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | 0.971 | 0.954 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 201 | 137 |
| Free-Flow Speed fro | m Field Measurement | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for access points ⁴ , f _A (Exhibit | |
| Total demand flow rate, both directions, | v | ** | |
| Free-flow speed, FFS= S_{FM} +0.00776($v/$ | f _{HV,ATS}) | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np.ATS} (Exhib | oit 15-15) 2.6 mi/h | Average travel speed, ATS _d =FFS | -0.00776(v _{d,ATS} + 52.5 mi/h |
| ηρ,, ττο | | v _{o,ATS}) - f _{np,ATS} | 32.3 111/11 |
| | | Percent free flow speed, PFFS | 91.0 % |
| Percent Time-Spent-Following | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E- | _r (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/ | | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| | rectional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$ | | 131 |
| Base percent time-spent-following ⁴ , BP7 | TSF _d (%)=100(1-e ^{av} d ^D) | 21.3 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhit | pit 15-21) | 50.4 | |
| Percent time-spent-following, PTSF _d (%) | =BPTSF _d +f _{np,PTSF} $*(v_{d,PTSF} / v_{d,PTSF} +$ | 51.6 | |
| v _{o,PTSF}) | W | · | |
| Level of Service and Other Performan | nce Measures | | |
| Level of service LOS (Evhibit 15.2) | Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | С |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1622 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 91.0 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 195.5 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.76 |
| Bicycle level of service (Exhibit 15-4) | Е |
| 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.

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^{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.

| | IAL TWO-LANE HIGHWA | | <u> </u> |
|---|--|--|---|
| General Information | Oceth Davidell | Site Information | 110.00 |
| Analyst
Agency or Company | Scott Randall
RPA | 5 - 7 | US 89
RP 24.4 to 40.7 (34-3-3) |
| Date Performed | 9/5/2013 | Jurisdiction | MDT |
| | Average Annual | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley | | | |
| Input Data | T . | 1 | |
| | Shoulder widthtt | | |
| - | Lane widthft | Class I b | ighway |
| | Lane width tt | | |
| | Shoulder widthft | highway 🔲 | Class III highway |
| | | Terrain | ✓ Level Rolling |
| Segment length, | . L _t mi | Grade Length | |
| | al al | Peak-hour fact No-passing zo | |
| Analysis direction vol. // 195ys | sh/h | Show North Arrow % Trucks and | |
| Analysis direction vol., V _d 185ve | | | • |
| Opposing direction vol., V _o 124ve | eh/h | | al vehicles, P _R 4% |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | Access points | <i>mi 4</i> /mi |
| Segment Length mi 16.3 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.5 | 1.7 |
| 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)) | | 0.971 | 0.960 |
| Grade adjustment factor ¹ , f _{g,ATS} (Exhibi | t 15-9) | 1.00 | 1.00 |
| Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 217 | 147 |
| Free-Flow Speed from | m Field Measurement | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| _ | | Adj. for lane and shoulder width, ⁴ | f _{LC} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for access points ⁴ , f _A (Exhibi | =- |
| Total demand flow rate, both directions, | / | · · | |
| Free-flow speed, FFS= S_{FM} +0.00776(v / f | HV,ATS) | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np.ATS} (Exhib | it 15-15) | Average travel speed, ATS _d =FFS | -0.00776(v _{d,ATS} + |
| пр,лто | | v _{o,ATS}) - f _{np,ATS} | ¹ 4,A13 53.4 mi/h |
| | | Percent free flow speed, PFFS | 92.5 % |
| Percent Time-Spent-Following | | 1 | |
| | | 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/ | | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF)$ | | 211 | 142 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 22.6 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | it 15-21) | 38.5 | |
| Percent time-spent-following, PTSF _d (%): | =BPTSF $_{d}$ +f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + | F + 45.6 | |
| v _{o,PTSF}) | | <u> </u> | |
| | | <u> </u> | |
| Level of Service and Other Performan Level of service, LOS (Exhibit 15-3) | ce Measures | ı | В |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1632 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 92.5 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 210.2 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.80 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | Y SEGMENT WORK | SHEET |
|---|---|---|---|
| General Information | | Site Information | |
| Agency or Company
Date Performed | Scott Randall
RPA
9/5/2013 | From/To
Jurisdiction | US 89
RP 40.7 to 50.6 (34-2-2)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Average Annual | Analysis Year | Existing (2012) |
| Input Data | | | |
| | -= | | |
| | Shoulder widthtt Lane width tt | | |
| | Lane width ft | _ | ighway Class II |
| | Shoulder widthft | highway 🔲 | Class III highway |
| Segment length, | L _t mi | Terrain Grade Length Peak-hour fac | |
| Analysis direction vol., V _d 273ve | h/h | Show North Arrow % Trucks and | one 38% |
| Opposing direction vol., V 182ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 Lane Width ft 12.0 Segment Length mi 9.9 | | Access points | s <i>mi</i> 6/mi |
| Average Travel Speed | | | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.4 | 1.5 |
| Passenger-car equivalents for RVs, E_R (I | Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | =1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$) | 0.977 | 0.971 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 318 | 213 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Total demand flow rate, both directions, v | , | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.5 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f | HVATS) | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.2 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.5 mi/h | | Average travel speed, ATS _d =FFS | 5-0.00776(v _{d,ATS} + 50.6 mi/h |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 88.5 % |
| 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 (I | 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)) | 0.994 | 0.994 |
| 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 | $(pc/h) v_i = V_i / (PHF^* f_{HV,PTSF}^* f_{g,PTSF})$ 312 208 | | 208 |
| Base percent time-spent-following ⁴ , BPT | $SF_{d}(\%)=100(1-e^{av_{d}^{b}})$ | 30.9 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | t 15-21) | 43.5 | |
| Percent time-spent-following, PTSF _d (%)= | * BPTSF $_{d}$ +f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + | + 57.0 | |
| v _{o,PTSF})
Level of Service and Other Performan | eo Moscuros | | |
| Level of Service and Other Performant
Level of service, LOS (Exhibit 15-3) | ,c mcasures | | C |
| Volume to capacity ratio, <i>v/c</i> | | | .19 |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 88.5 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 310.2 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.99 |
| Bicycle level of service (Exhibit 15-4) | Е |
| 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.

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^{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.

| DIRECTIONAL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|---|--|
| General Information | Site Information | |
| Analyst Scott Randall Agency or Company RPA Date Performed 9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 50.6 to 52.4 (34-2A-5)
MDT |
| Analysis Time Period Average Annual | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley Input Data | | |
| L | | |
| \$\frac{1}{2} \text{ Shoulder width } \tag{tt} | _ | _ |
| Lane width tt | Class I | highway Class II |
| Lane width tt | highway 🗹 | Class III highway |
| | Terrain | ✓ Level Rolling |
| Segment length, L _t mi | Grade Lengt
Peak-hour fa
No-passing z | ctor, PHF 0.88 |
| Analysis direction vol., V _d 400veh/h | | d Buses , P _T 6 % |
| Opposing direction vol., V _o 267veh/h Shoulder width ft 4.0 | % Recreation Access point | nal vehicles, P _R 4%
s <i>mi</i> 20/mi |
| Lane Width ft 12.0 Segment Length mi 1.8 | 7100030 point | 201111 |
| Average Travel Speed | | |
| | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12) | 1.2 | 1.4 |
| Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | 0.988 | 0.977 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | 460 | 311 |
| Free-Flow Speed from Field Measurement | | ee-Flow Speed |
| | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S_{FM} | Adj. for lane and shoulder width, | |
| Total demand flow rate, both directions, <i>v</i> | Adj. for access points ⁴ , f _A (Exhib | |
| Free-flow speed, FFS=S $_{FM}$ +0.00776(ν / f $_{HV,ATS}$) | Free-flow speed, FFS (FSS=BF | 20 /1 |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.4 mi/h | Average travel speed, ATS _d =FF | S-0.00776(v _{d,ATS} + 44.4 mi/h |
| | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 82.6 % |
| Percent Time-Spent-Following | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19) | 1.0 | 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)) | 1.000 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | 1.00 | 1.00 |
| Directional flow rate ² , v _f (pc/h) v _i =V _f (PHF*f _{HV,PTSF} * f _{g,PTSF}) | 455 | 305 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | 44.7 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | 44.0 | |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + f_{np,PTSF})$ | 71.0 | |
| V _{o,PTSF}) | | |
| Level of Service and Other Performance Measures Level of service, LOS (Exhibit 15-3) | | С |
| Volume to capacity ratio, v/c | † | 0.27 |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 82.6 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 454.5 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.19 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|--|---|---|
| General Information | | Site Information | |
| Agency or Company
Date Performed | Scott Randall
RPA
9/5/2013 | | US 89
RP 0.0 to 0.4 (34-3-10)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Average Annual | Analysis Year | Future (2035) |
| Input Data | | | |
| · | | | |
| | Shoulder widthtt Lane width tt | | |
| | Lane widthtt | Class I h | |
| | Shoulder width tt | highway 🔽 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, | L _t mi | Grade Length
Peak-hour fac
No-passing zo | ctor, PHF 0.88 |
| Analysis direction vol., V _d 463ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 309ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 40/mi |
| Lane Width ft 12.0
Segment Length mi 0.4 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.2 | 1.3 |
| Passenger-car equivalents for RVs, E_R (I | Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | =1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$) | 0.988 | 0.982 |
| Grade adjustment factor ¹ , f _{g,ATS} (Exhibit | | 1.00 | 1.00 |
| Demand flow rate ² , v_i (pc/h) v_i = V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 533 | 358 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Total demand flow rate, both directions, v | , | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 10.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _I | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 48.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | 3-0.00776(v _{d,ATS} + 38.8 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 79.7 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (I | 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)) | 1.000 | 0.994 |
| Grade adjustment factor ¹ , f _{q,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}) | 526 | 353 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 50.3 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | it 15-21) | 39.5 | |
| Percent time-spent-following, $PTSF_d(\%)$ = | ${}^{*}BPTSF_{d} + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{d,PTSF$ | 73.9 | |
| V _{o,PTSF}) | oo Mooouroo | | |
| Level of Service and Other Performance Level of Service LOS (Exhibit 15-3) | ce weasures | 1 | C |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, v/c | | | ~ |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1669 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 79.7 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 526.1 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.26 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|---|---|--|
| General Information | | Site Information | |
| Agency or Company
Date Performed | Scott Randall
RPA
9/5/2013 | Jurisdiction | US 89
RP 0.4 to 2.4 (34-3-9)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Average Annual | Analysis Year | Future (2035) |
| Input Data | | | |
| | | | |
| | Shoulder widthtt Lane width tt | | |
| | Lane width tt | Class I h | |
| | Shoulder widthtt | highway 🔽 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, | L _t mi | Grade Length
Peak-hour fac
No-passing zo | ctor, PHF 0.88 |
| Analysis direction vol., V _d 380ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 254ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | Access points | <i>s mi</i> 21/mi |
| Segment Length mi 2.0 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-11 or 15-12) | 1.3 | 1.4 |
| Passenger-car equivalents for RVs, E_R (I | | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | | 0.982 | 0.977 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 440 | 295 |
| Free-Flow Speed from Field Measurement | | i e | ee-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for lane and shoulder width,4 | =- |
| Total demand flow rate, both directions, v | , | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 5.3 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f | _{HV,ATS}) | Free-flow speed, FFS (FSS=BFF | $FS-f_{LS}-f_A$) 53.5 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhib | | Average travel speed, ATS _d =FFS | 6-0.00776(v _{d,ATS} + 44.6 mi/h |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 83.4 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (I | 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)) | 1.000 | 0.994 |
| Grade adjustment factor ¹ , f _{q,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}) | 432 | 290 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 43.9 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | it 15-21) | 44.4 | |
| Percent time-spent-following, PTSF _d (%)= | EBPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | 70.5 | |
| v _{o,PTSF}) | | | |
| Level of Service and Other Performance | ce Measures | 1 | В |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, v/c | | | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 83.4 |
| Bicycle Level of Service | • |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 431.8 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.16 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTIONAL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET | |
|---|---|---|--|
| General Information | Site Information | | |
| Analyst Scott Randall Agency or Company RPA Date Performed 9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 2.4 to 10.4 (34-3-1)
MDT | |
| Analysis Time Period Average Annual | Analysis Year | Future (2035) | |
| Project Description: Paradise Valley Input Data | | | |
| | | | |
| \$\frac{1}{2} \text{ Shoulder width } \tag{t} | | _ | |
| Lane width tt | ✓ Class I I | nighway 🔲 Class II | |
| Shoulder width ft | highway 🗌 | Class III highway | |
| | Terrain | ✓ Level Rolling | |
| Segment length, L _t mi | Grade Length
Peak-hour fa
No-passing z | ctor, PHF 0.88 | |
| Analysis direction vol., V _d 260veh/h | Show North Arrow % Trucks and | d Buses , P _T 6 % | |
| Opposing direction vol., V _o 173veh/h | % Recreation | nal vehicles, P _R 4% | |
| Shoulder width ft 4.0 | Access points | s <i>mi</i> 9/mi | |
| Lane Width ft 12.0 Segment Length mi 8.0 | | | |
| Average Travel Speed | | | |
| | Analysis Direction (d) | Opposing Direction (o) | |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12) | 1.4 | 1.5 | |
| 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)) | 0.977 | 0.971 | |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | 302 | 202 | |
| Free-Flow Speed from Field Measurement | | ee-Flow Speed | |
| | Base free-flow speed ⁴ , BFFS | 60.0 mi/h | |
| Mean speed of sample ³ , S _{FM} | Adj. for lane and shoulder width, | | |
| Total demand flow rate, both directions, <i>v</i> | Adj. for access points ⁴ , f _A (Exhib | it 15-8) 2.3 mi/h | |
| Free-flow speed, FFS=S _{FM} +0.00776(v/ f _{HV.ATS}) | Free-flow speed, FFS (FSS=BFI | FS-f _{LS} -f _A) 56.5 <i>mi/h</i> | |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.2 <i>mi/h</i> | Average travel speed, ATS _d =FFS | S-0.00776(v _{d,ATS} + 49.3 <i>mi/h</i> | |
| | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 87.4 % | |
| 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)) | 0.994 | 0.994 | |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | 1.00 | 1.00 | |
| Directional flow rate ² , $v_j(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$ | 297 | 198 | |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | 30.0 | | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | 49.5 | | |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v$ | 59.7 | | |
| V _{o,PTSF}) | | | |
| Level of Service and Other Performance Measures Level of service, LOS (Exhibit 15-3) | | С | |
| 25.5. 5. 50.1100, 250 (Exhibit 10 0) | | - | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 87.4 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 295.5 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.97 |
| Bicycle level of service (Exhibit 15-4) | Е |
| 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.

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^{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.

| DIRECTIONAL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|---|---|
| General Information | Site Information | |
| Analyst Scott Randall Agency or Company RPA Date Performed 9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 10.4 to 24.4 (34-3-2)
MDT |
| Analysis Time Period Average Annual | Analysis Year | Future (2035) |
| Project Description: Paradise Valley Input Data | | |
| L | | |
| \$\ Shoulder width ft | | |
| Lane widthtt | ✓ Class I I | nighway 🔲 Class II |
| Lane width tt | highway 🗌 | Class III highway |
| | Terrain | ✓ Level Rolling |
| Segment length, L _t mi | Grade Lengtl
Peak-hour fa
No-passing z | ctor, PHF 0.88 |
| Analysis direction vol., V _d 243veh/h | Show North Arrow % Trucks and | |
| Opposing direction vol., V _o 162veh/h Shoulder width ft 4.0 | % Recreation Access points | nal vehicles, P _R 4%
s <i>mi</i> 4/mi |
| Lane Width ft 12.0 Segment Length mi 13.9 | Access points | 3/III -7 /IIII |
| Average Travel Speed | | |
| | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12) | 1.4 | 1.6 |
| Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | 0.977 | 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | 283 | 191 |
| Free-Flow Speed from Field Measurement | | ee-Flow Speed |
| | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S_{FM} | Adj. for lane and shoulder width, | |
| Total demand flow rate, both directions, <i>v</i> | Adj. for access points ⁴ , f _A (Exhib | |
| Free-flow speed, FFS= S_{FM} +0.00776(v / $f_{HV,ATS}$) | Free-flow speed, FFS (FSS=BFI | FS-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.3 <i>mi/h</i> | Average travel speed, ATS _d =FFS-0.00776(v _{d,ATS} + 50.8 mi/ | |
| Description Operat Fallenting | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 88.0 % |
| 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)) | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | 1.00 | 1.00 |
| Directional flow rate ² , v _f (pc/h) v _i =V _f (PHF*f _{HV,PTSF} * f _{g,PTSF}) | 278 | 185 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | 28.4 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | 50.6 | |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} + (v_{d,PTSF} / v_{d,PTSF} + v$ | 58.8 | |
| v _{o,PTSF}) Level of Service and Other Performance Measures | | |
| Level of Service and Other Performance Measures Level of Service, LOS (Exhibit 15-3) | | С |
| Volume to capacity ratio, <i>v/c</i> | † | 0.17 |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1641 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 88.0 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 276.1 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.93 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|---|---|---|
| General Information | | Site Information | |
| Agency or Company
Date Performed | Scott Randall
RPA
9/5/2013 | | US 89
RP 24.4 to 40.7 (34-3-3)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Average Annual | Analysis Year | Future (2035) |
| Input Data | | | |
| | | | |
| | Shoulder widthtt Lane width tt | | |
| | Lane width tt | _ | ighway Lass II |
| | Shoulder widthtt | highway 🔲 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, | L _t mi | Grade Length
Peak-hour fac
No-passing zo | ctor, PHF 0.88 |
| Analysis direction vol., V _d 261ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 174ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 4/mi |
| Lane Width ft 12.0
Segment Length mi 16.3 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.4 | 1.5 |
| Passenger-car equivalents for RVs, E_R (I | 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)) | 0.977 | 0.971 |
| 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* $f_{q,ATS}$ * $f_{HV,ATS}$) | | 304 | 204 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Total demand flow rate, both directions, v | , | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _I | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | 5-0.00776(v _{d,ATS} + 51.7 mi/h |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 89.6 % |
| 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 (I | 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)) | 0.994 | 0.994 |
| 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 | onal flow rate ² , $v_j(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$ 298 | | 199 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 30.1 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib | it 15-21) | 39.7 | |
| Percent time-spent-following, $PTSF_d(\%)$ = | $\text{-BPTSF}_{\text{d}}\text{+f}_{\text{np,PTSF}}\text{*}(\text{v}_{d,\text{PTSF}}\text{/}\text{v}_{d,\text{PTSF}}\text{+}$ | 53.9 | |
| V _{o,PTSF}) | Maranes | | |
| Level of Service and Other Performand Level of Service LOS (Exhibit 15-3) | ce measures | T | C |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, v/c | | <u> </u> | <u> </u> |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 |
|--|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 89.6 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, $v_{\rm OL}$ (Eq. 15-24) veh/h | 296.6 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 4.97 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | IAL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|---|--|---|---|
| General Information | | Site Information | |
| Date Performed | Scott Randall
RPA
9/5/2013 | | US 89
RP 40.7 to 50.6 (34-2-2)
MDT |
| - | Average Annual | Analysis Year | Future (2035) |
| Project Description: Paradise Valley Input Data | | | |
| L | | | |
| | Shoulder widthtt | _ | _ |
| <u> </u> | Lane widthtt | ✓ Class I h | ighway 🔲 Class II |
| | Lane widthtt Shoulder widthtt | highway 🗌 | Class III highway |
| | | Terrain | ✓ Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 38% | |
| Analysis direction vol., V _d 385ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 256ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 6/mi |
| Lane Width ft 12.0
Segment Length mi 9.9 | | | |
| Average Travel Speed | | | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.3 | 1.4 |
| Passenger-car equivalents for RVs, E_R (l | 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)) | 0.982 | 0.977 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 446 | 298 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM}
Total demand flow rate, both directions, ν | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.5 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(v/ f | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.2 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhib | | Average travel speed, ATS _d =FFS | G-0.00776(v _{d,ATS} + 49.2 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 86.0 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (l | 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)) | 1.000 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| Directional flow rate ² , v _f (pc/h) v _i =V _f (PHF*f _{HV,PTSF} * f _{g,PTSF}) | | 438 | 293 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | | 44.1 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 6.4 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 6 | 5.9 |
| v _{o,PTSF}) | | | |
| Level of Service and Other Performan | ce Measures | <u> </u> | D |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 | |
|---|-------|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 86.0 | |
| Bicycle Level of Service | | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 437.5 | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.17 | |
| Bicycle level of service (Exhibit 15-4) | E | |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|--|---|---|---|
| General Information | | Site Information | |
| Agency or Company
Date Performed | Scott Randall
RPA
9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 50.6 to 52.4 (34-2A-5)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Average Annual | Analysis Year | Future (2035) |
| Input Data | | | |
| ļ . | | | |
| | Shoulder widthtt Lane width tt | | |
| | Lane widthtt | Class I h | |
| | Shoulder widthtt | highway 🗹 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% | |
| Analysis direction vol., V _d 564ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V ₀ 376ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 20/mi |
| Lane Width ft 12.0
Segment Length mi 1.8 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.1 | 1.3 |
| Passenger-car equivalents for RVs, E_R (I | Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | =1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$) | 0.994 | 0.982 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 645 | 435 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ S | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 5.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 53.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.6 mi/h | | Average travel speed, ATS _d =FFS | s-0.00776(v _{d,ATS} + 42.7 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 79.5 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-18 or 15-19) | 1.0 | 1.0 |
| Passenger-car equivalents for RVs, E _R (I | 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)) | 1.000 | 1.000 |
| Grade adjustment factor ¹ , f _{q.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}) | 641 | 427 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 57.5 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 5.0 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 7 | 8.5 |
| v _{o,PTSF}) | | ĺ | |
| Level of Service and Other Performance | ce Measures | _ | C |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1669 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 79.5 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 640.9 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.36 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| | NAL TWO-LANE HIGHWA | Site Information | |
|---|---|---|--|
| General Information | Scott Randall | Highway / Direction of Travel | US 89 |
| Analyst Agency or Company | RPA | From/To | RP 0.0 to 0.4 (34-3-10) |
| Date Performed | 9/5/2013
Back Sagan | Jurisdiction | MDT |
| Analysis Time Period Project Description: Paradise Valley | Peak Season | Analysis Year | Existing (2012) |
| Input Data | | | |
| L | | | |
| | Shoulder widthtt | | |
| - | Lane widtht | Class I | highway Class II |
| | Lane widtht | | Class III highway |
| | Shoulder widthft _ | | |
| Segment length | ı, Lı mi | Terrain Grade Lengt | _ |
| Segment length | lr Lt IIII | Peak-hour fa | ctor, PHF 0.88 |
| | | Show North Arrow of Trucks and | |
| Analysis direction vol., V _d 574v | eh/h | % Trucks and | d Buses , P _T 6 % |
| Opposing direction vol., V _o 383v | eh/h | % Recreation | nal vehicles, P _R 4% |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | Access point | s <i>mi</i> 40/mi |
| Segment Length mi 0.4 | | | |
| Average Travel Speed | | | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E- | _(Exhibit 15-11 or 15-12) | 1.1 | 1.3 |
| Passenger-car equivalents for RVs, E _R | (Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | | 0.994 | 0.982 |
| Grade adjustment factor ¹ , f _{g,ATS} (Exhib | | 1.00 | 1.00 |
| Demand flow rate ² , v_i (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 656 | 443 |
| Free-Flow Speed from Field Measurement | | Estimated Fr | ee-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| | | Adj. for lane and shoulder width, | ⁴ f _{I.S} (Exhibit 15-7) <i>1.3 mi/h</i> |
| Mean speed of sample ³ , S _{FM} | | Adj. for access points ⁴ , f _A (Exhib | |
| Total demand flow rate, both directions, | | Free-flow speed, FFS (FSS=BF | |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / | | | 20 // |
| Adj. for no-passing zones, f _{np,ATS} (Exhil | oit 15-15) 2.5 mi/h | Average travel speed, ATS _d =FFS | S-0.00776(v _{d,ATS} + 37.6 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS} | |
| Paraont Time Spont Following | | Percent free flow speed, PFFS | 77.3 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E- | _r (Exhibit 15-18 or 15-19) | 1.0 | 1.0 |
| 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)) | 1.000 | 1.000 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| Directional flow rate ² , $v_j(pc/h) v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$ | | 652 | 435 |
| Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$ | | 59.2 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | ; | 34.6 |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{d,PTSF})$ | | | 80.0 |
| v _{o,PTSF}) | | | |
| 1 | | | |
| Level of Service and Other Performan | ace Measures | | ^ |
| Level of Service and Other Performar
Level of service, LOS (Exhibit 15-3)
Volume to capacity ratio, v/c | nce Measures | | C
0.39 |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1669 | |
|---|-------|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 77.3 | |
| Bicycle Level of Service | | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 652.3 | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.37 | |
| Bicycle level of service (Exhibit 15-4) | E | |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|--|--|---|---|
| General Information | | Site Information | |
| Agency or Company Date Performed | Scott Randall
RPA
9/5/2013 | Jurisdiction | US 89
RP 0.4 to 2.4 (34-3-9)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Peak Season | Analysis Year | Existing (2012) |
| Input Data | | | |
| L | | | |
| 1 | Shoulder widthtt | | _ |
| - | Lane widthtt | Class I h | ighway 🔲 Class II |
| | Shoulder width ft | highway 🔽 | Class III highway |
| | | Terrain | ✓ Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 73% | |
| Analysis direction vol., V _d 472ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 315ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | ** |
| Lane Width ft 12.0
Segment Length mi 2.0 | | | |
| Average Travel Speed | | <u> </u> | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.2 | 1.3 |
| Passenger-car equivalents for RVs, E_R (E_R) | Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | =1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$) | 0.988 | 0.982 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 543 | 365 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Moon spood of sample ³ | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 5.3 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _F | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 53.5 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | 3-0.00776(v _{d,ATS} + 43.6 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 81.7 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (| Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (I | | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV} =1/ (| 1+ P _T (E _T -1)+P _R (E _R -1)) | 1.000 | 0.994 |
| 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}) | 536 | 360 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | | 50.5 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 7.3 |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{d,PTSF})$ | | 7 | 2.8 |
| V _{o,PTSF}) | no Monauras | | |
| Level of Service and Other Performand Level of Service LOS (Exhibit 15-3) | e weasures | 1 | C |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | <u> </u> | <u> </u> |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1669 | |
|---|-------|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 81.7 | |
| Bicycle Level of Service | | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 536.4 | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.27 | |
| Bicycle level of service (Exhibit 15-4) | E | |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|--|---|---|---|
| General Information | | Site Information | |
| Agency or Company
Date Performed | Scott Randall
RPA
9/5/2013 | From/To
Jurisdiction | US 89
RP 2.4 to 10.4 (34-3-1)
MDT |
| | Peak Season | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley Input Data | | | |
| L | | | |
| | Shoulder widthtt | _ | _ |
| <u> </u> | Lane widthtt | ✓ Class I h | ighway 🔲 Class II |
| | Lane width tt | highway 🗌 (| Class III highway |
| _ | | Terrain | ✓ Level Rolling |
| Segment length, | L _t mi | Grade Length
Peak-hour fac
No-passing zo | ctor, PHF 0.88 |
| Analysis direction vol., V _d 322ve | h/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V ₀ 215ve | h/h | % Recreations | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>mi</i> 9/mi |
| Lane Width ft 12.0
Segment Length mi 8.0 | | | |
| Average Travel Speed | | <u> </u> | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.3 | 1.5 |
| Passenger-car equivalents for RVs, E_R (I | 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)) | 0.982 | 0.971 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 373 | 252 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ S | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM}
Total demand flow rate, both directions, ν | | Adj. for access points ⁴ , f _A (Exhibit | t 15-8) 2.3 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 56.5 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | i-0.00776(v _{d,ATS} + 48.6 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 86.2 % |
| 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 (I | | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV} =1/ | (1+ P _T (E _T -1)+P _R (E _R -1)) | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibi | it 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}) | 368 | 246 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | | 37.4 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 4 | 7.8 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 6 | 6.0 |
| V _{o,PTSF}) | oo Mooouroo | | |
| Level of Service and Other Performand Level of Service LOS (Exhibit 15-3) | ce measures | 1 | D |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | 1 | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 | |
|---|-------|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 86.2 | |
| Bicycle Level of Service | | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 365.9 | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.08 | |
| Bicycle level of service (Exhibit 15-4) | E | |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|--|---|---|---|
| General Information | | Site Information | |
| Agency or Company Date Performed | Scott Randall
RPA
9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 10.4 to 24.4 (34-3-2)
MDT
Eviating (2012) |
| Analysis Time Period Project Description: Paradise Valley | Peak Season | Analysis Year | Existing (2012) |
| Input Data | | | |
| | | | |
| l | Shoulder widthtt Lane width tt | | |
| | Lane width ft | ✓ Class I h | • |
| Ĭ. | Shoulder widthft | highway 🔲 | Class III highway |
| | - | Terrain | Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 55% | |
| Analysis direction vol., V _d 301veh/h | | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V ₀ 201ve | h/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 4/mi |
| Lane Width ft 12.0
Segment Length mi 13.9 | | | |
| Average Travel Speed | | | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.4 | 1.5 |
| Passenger-car equivalents for RVs, E_R (E | 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)) | 0.977 | 0.971 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 350 | 235 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ S | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _F | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | 5-0.00776(v _{d,ATS} + 50.0 mi/h |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 86.6 % |
| 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 (E | 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)) | 0.994 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibi | t 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}) | 344 | 230 |
| Base percent time-spent-following ⁴ , BPT | SF _d (%)=100(1-e ^{av} d ^b) | 34.3 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 4 | 9.6 |
| Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} *(v_{d,PTSF} / v_{d,PTSF} + v_{d,PTSF})$ | | 6 | 4.0 |
| v _{o,PTSF}) | | | |
| Level of Service and Other Performance Level of Service LOS (Evhibit 15-3) | ce Measures | | C |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | - | <u>-</u> |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 86.6 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 342.0 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.04 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|--|--|---|---|
| General Information | | Site Information | |
| Agency or Company Date Performed | Scott Randall
RPA
9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 24.4 to 40.7 (34-3-3)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Peak Season | Analysis Year | Existing (2012) |
| Input Data | | | |
| | | | |
| | Shoulder widthtt Lane width tt | | |
| | Lane width ft Lane width tt | ✓ Class I h | • |
| 1 | Shoulder widthft | highway 🔲 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 28% | |
| Analysis direction vol., V _d 324veh/h | | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V ₀ 216veh/h | | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 4/mi |
| Lane Width ft 12.0
Segment Length mi 16.3 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.3 | 1.5 |
| Passenger-car equivalents for RVs, E_R (E | Exhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | =1/ (1+ $P_T(E_T-1)+P_R(E_R-1)$) | 0.982 | 0.971 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 375 | 253 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ S | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _F | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | 5-0.00776(v _{d,ATS} + 50.9 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 88.2 % |
| 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 (E | 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)) | 0.994 | 0.994 |
| 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}) | 370 | 247 |
| Base percent time-spent-following ⁴ , BPTS | SF _d (%)=100(1-e ^{av} d ^b) | 37.5 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 8.9 |
| Percent time-spent-following, PTSF $_{\rm d}$ (%)=BPTSF $_{\rm d}$ +f $_{\rm np,PTSF}$ *(v $_{\rm d,PTSF}$ / v $_{\rm d,PTSF}$ + | | 6 | 0.8 |
| V _{o,PTSF}) | oo Moooyyoo | | |
| Level of Service and Other Performant
Level of service, LOS (Exhibit 15-3) | ce weasures | 1 | C |
| Volume to capacity ratio, <i>v/c</i> | | | <u> </u> |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1651 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 88.2 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 368.2 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.08 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHWA | AY SEGMENT WORK | SHEET |
|--|--|---|---|
| General Information | | Site Information | |
| Agency or Company Date Performed | Scott Randall
RPA
9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 40.7 to 50.6 (34-2-2)
MDT |
| Analysis Time Period Project Description: Paradise Valley | Peak Season | Analysis Year | Existing (2012) |
| Input Data | | | |
| | | | |
| <u> </u> | Shoulder widthtt Lane width tt | | |
| + | Lane widthtt | ✓ Class I h | • |
| <u> </u> | Shoulder width ft | highway 🔲 | Class III highway |
| | | Terrain | ✓ Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 38% | |
| Analysis direction vol., V _d 477veh/h | | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V ₀ 318veh/h | | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 6/mi |
| Lane Width ft 12.0
Segment Length mi 9.9 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E_T | (Exhibit 15-11 or 15-12) | 1.2 | 1.3 |
| Passenger-car equivalents for RVs, E_R (E | 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)) | | 0.988 | 0.982 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 549 | 368 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Moon spood of sample ³ S | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM}
Total demand flow rate, both directions, ν | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.5 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _F | | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.2 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibi | | Average travel speed, ATS _d =FFS | 3-0.00776(v _{d,ATS} + 48.1 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 84.1 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (| Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (E | 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)) | 1.000 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibi | | 1.00 | 1.00 |
| Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF | f _{HV,PTSF} * f _{g,PTSF}) | 542 | 364 |
| Base percent time-spent-following ⁴ , BPTS | SF _d (%)=100(1-e ^{av} d ^b) | 52.4 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibi | t 15-21) | 3 | 0.9 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} $*(v_{d,PTSF} / v_{d,PTSF} + v_{d,PTSF})$ | | 7 | 0.9 |
| v _{o,PTSF}) | | | |
| Level of Service and Other Performand | ce Measures | _ | |
| Level of service, LOS (Exhibit 15-3) | | | D |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1669 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 84.1 |
| Bicycle Level of Service | • |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 542.0 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.28 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTIONAL TWO-LANE HIGHWA | AY SEGMENT WORK | (SHEET |
|--|--|--|
| General Information | Site Information | |
| Analyst Scott Randall Agency or Company RPA Date Performed 9/5/2013 | Highway / Direction of Travel
From/To
Jurisdiction | US 89
RP 50.6 to 52.4 (34-2A-5)
MDT |
| Analysis Time Period Peak Season | Analysis Year | Existing (2012) |
| Project Description: Paradise Valley | | |
| Input Data | | |
| 1 Shoulder width tt | | |
| Lane width | Class I | highway |
| Lane widthtt | | Class III highway |
| \$\ \tag\$ Shoulder widthft | | |
| • Samura Israeli I mi | Terrain Grade Lengt | Level Rolling h mi Up/down |
| Segment length, L _t mi | Peak-hour fa | ctor, PHF 0.88 |
| | Show North Arrow of Trucks on | |
| Analysis direction vol., V _d 699veh/h | % Hucks an | • |
| Opposing direction vol., V _o 466veh/h | % Recreational vehicles, P _R 4% Access points <i>mi</i> 20/mi | |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | |
| Segment Length mi 1.8 | | |
| Average Travel Speed | | |
| | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12) | 1.1 | 1.2 |
| 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)) | 0.994 | 0.988 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | 799 | 536 |
| Free-Flow Speed from Field Measurement | Estimated Fr | ee-Flow Speed |
| | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S_{FM} | Adj. for lane and shoulder width, | ⁴ f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Total demand flow rate, both directions, <i>v</i> | Adj. for access points ⁴ , f _A (Exhib | it 15-8) 5.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(v/ f _{HV ATS}) | Free-flow speed, FFS (FSS=BF | FS-f _{LS} -f _A) 53.7 mi/h |
| Adj. for no-passing zones, f _{np.ATS} (Exhibit 15-15) 2.2 <i>mi/h</i> | Average travel speed, ATS _d =FF | S-0.00776(v _{d ATS} + |
| Adj. 101 110-passing 2011cs, Inp,ATS (Exhibit 10-10) | v _{o,ATS}) - f _{np,ATS} | ` d,ATS 41.2 mi/h |
| | Percent free flow speed, PFFS | 76.6 % |
| Percent Time-Spent-Following | | |
| | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19) | 1.0 | 1.0 |
| 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)) | 1.000 | 1.000 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | 1.00 | 1.00 |
| Directional flow rate ² , v _/ (pc/h) v _i =V _/ (PHF*f _{HV,PTSF} * f _{g,PTSF}) | 794 | 530 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | 66.6 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | : | 29.1 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + | | 84.1 |
| v _{o,PTSF}) | , | |
| | | |
| Level of Service and Other Performance Measures Level of Service, LOS (Exhibit 15-3) | 1 | С |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1680 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 76.6 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 794.3 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.47 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| Class I highway Class II Way Class III highway ain Level Rolling Te-hour factor, PHF assing zone ucks and Buses , P _T cerceational vehicles, P _R 4% ss points mi US 89 RP 0.0 to 0.4 (34-3-10) MDT Future (2035) Class II Nay Class II Polydown Rolling Rolling 100% |
|--|
| RP 0.0 to 0.4 (34-3-10) MDT Future (2035) Class I highway Class II way Class III highway ain Level Rolling e Length mi Up/down c-hour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| MDT Future (2035) Class I highway □ Class II way ☑ Class III highway ain ☑ Level □ Rolling le Length mi Up/down c-hour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| Class I highway Class II way Class III highway ain Level Rolling le Length mi Up/down c-hour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| characteristics and Buses , P _T 6 % Class III highway Rolling |
| Class III highway ain Level Rolling be Length mi Up/down chour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| characteristics and Buses , P _T 6 % Class III highway Rolling |
| Class III highway ain Level Rolling be Length mi Up/down chour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| Class III highway ain |
| ain Level Rolling le Length mi Up/down L-hour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| te Length mi Up/down te-hour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| A-hour factor, PHF 0.88 assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| assing zone 100% ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| ucks and Buses , P _T 6 % ecreational vehicles, P _R 4% |
| ecreational vehicles, P _R 4% |
| , R |
| -ss μοιπις <i>ππ 40</i> /mi |
| |
| |
| |
| (d) Opposing Direction (o) |
| 1.2 |
| 1.0 |
| 0.988 |
| 1.00 |
| 553 |
| ated Free-Flow Speed |
| BFFS 60.0 mi/h |
| er width, ⁴ f _{LS} (Exhibit 15-7) 1.3 mi/h |
| A (Exhibit 15-8) 10.0 mi/h |
| • |
| $FSS=BFFS-f_{LS}-f_A$) 48.7 mi/h |
| TS _d =FFS-0.00776(v _{d,ATS} + 35.9 <i>mi/h</i> |
| 33.3 111111 |
| PFFS 73.8 % |
| |
| (d) Opposing Direction (o) |
| 1.0 |
| 1.0 |
| 1.000 |
| |
| 1.00 |
| 1.00
547 |
| |
| 547 |
| 547
67.7 |
| 547
67.7
28.1 |
| 547
67.7
28.1 |
| , |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1680 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 73.8 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 820.5 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.49 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| | NAL TWO-LANE HIGHWA | • | | |
|---|---|---|---|--|
| General Information | Soott Bondoll | Site Information Highway / Direction of Travel | US 89 | |
| Analyst Agency or Company | Scott Randall
RPA | From/To | RP 0.4 to 2.4 (34-3-9) | |
| Date Performed | 9/5/2013 | Jurisdiction | MDT | |
| Analysis Time Period | Peak Season | Analysis Year | Future (2035) | |
| Project Description: Paradise Valley Input Data | | | | |
| L | | | | |
| | Shoulder widthtt | | | |
| - | Lane widtht | Class I I | nighway 🔲 Class II | |
| | Lane widtht | | Class III highway | |
| | Shoulder width tt | | | |
| <u> </u> | | Terrain Grade Length | Level Rolling n mi Up/down | |
| Segment length, L _t mi | | Peak-hour fa | | |
| | | No-passing z | | |
| Analysis direction vol., V _d 593veh/h | | Show North Arrow % Trucks and Buses , P _T 6 % | | |
| Opposing direction vol., V ₀ 395veh/h | | % Recreation | % Recreational vehicles, P _R 4% | |
| Shoulder width ft 4.0 | | Access points <i>mi</i> 21/mi | | |
| Lane Width ft 12.0
Segment Length mi 2.0 | | | | |
| Average Travel Speed | | | | |
| on and a second | | Analysis Direction (d) | Opposing Direction (o) | |
| Passenger-car equivalents for trucks, E- | _T (Exhibit 15-11 or 15-12) | 1.1 | 1.3 | |
| Passenger-car equivalents for RVs, E _R | (Exhibit 15-11 or 15-13) | 1.0 | 1.0 | |
| Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | | 0.994 | 0.982 | |
| Grade adjustment factor ¹ , f _{g,ATS} (Exhib | it 15-9) | 1.00 | 1.00 | |
| Demand flow rate ² , v_i (pc/h) v_i = V_i / (PHF* $f_{q,ATS}$ * $f_{HV,ATS}$) | | 678 | 457 | |
| Free-Flow Speed from Field Measurement | | Estimated Fro | ee-Flow Speed | |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h | |
| 2 | | Adj. for lane and shoulder width, | ⁴ f _{I.S} (Exhibit 15-7) 1.3 mi/h | |
| Mean speed of sample ³ , S _{FM} | | Adj. for access points ⁴ , f _A (Exhib | =- | |
| Total demand flow rate, both directions, | | Free-flow speed, FFS (FSS=BFI | | |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / | | | 20 // | |
| Adj. for no-passing zones, f _{np,ATS} (Exhil | oit 15-15) 2.3 mi/h | Average travel speed, ATS _d =FFS | S-0.00776(v _{d,ATS} + 42.3 <i>mi/h</i> | |
| | | v _{o,ATS}) - f _{np,ATS} | | |
| Paraont Time Spont Following | | Percent free flow speed, PFFS | 79.2 % | |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) | |
| Passenger-car equivalents for trucks, E- | _T (Exhibit 15-18 or 15-19) | 1.0 | 1.0 | |
| 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)) | 1.000 | 1.000 | |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhil | oit 15-16 or Ex 15-17) | 1.00 | 1.00 | |
| Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHI | F*f _{HV,PTSF} * f _{g,PTSF}) | 674 | 449 | |
| Base percent time-spent-following ⁴ , BP | | 60.8 | | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 32.2 | |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + | | | 30.1 | |
| v _{o,PTSF}) | | | JU. 1 | |
| Level of Service and Other Performar | nce Measures | | | |
| Level of service, LOS (Exhibit 15-3) | | С | | |
| Volume to capacity ratio, <i>v/c</i> | | | 0.40 | |
| volume to capacity ratio, we | | | | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1669 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 79.2 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 673.9 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.39 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| | AL TWO-LANE HIGHWA | | OTILLI |
|--|-----------------------------------|--|---|
| General Information | 0 11 0 | Site Information | 110.00 |
| Analyst
Agency or Company | Scott Randall
RPA | Highway / Direction of Travel From/To | US 89
RP 2.4 to 10.4 (34-3-1) |
| Date Performed | 9/5/2013 | Jurisdiction | MDT |
| 3 | Peak Season | Analysis Year | Future (2035) |
| Project Description: Paradise Valley | | | |
| Input Data | | | |
| | Shoulder widthft | | |
| - | Lane widthft | ✓ Class I t | nighway |
| | Lane widthtt | | - |
| | Shoulder widthft | highway 🖂 | Class III highway |
| - | | / Terrain | ✓ Level Rolling |
| Segment length, | L _t mi | Grade Length Peak-hour fac | |
| .s.t | а | No-passing z | |
| Analysis direction vol., V _d 405ve | h/h | Show North Arrow % Trucks and | I Buses , P _T 6 % |
| ~ | | | al vehicles, P _R 4% |
| Opposing direction vol., V _o 270ve
Shoulder width ft 4.0 | 11/11 | Access points | ′ R |
| Lane Width ft 12.0 | | , tooos pointe | 27110 |
| Segment Length mi 8.0 | | | |
| Average Travel Speed | | • | T |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-11 or 15-12) | 1.2 | 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+ $P_T(E_T-1)+P_R(E_R-1)$) | 0.988 | 0.977 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 466 | 314 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | ee-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| 2 | | Adj. for lane and shoulder width, ⁴ | f _{I S} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for access points ⁴ , f _A (Exhibi | |
| Total demand flow rate, both directions, v | | * * | |
| Free-flow speed, FFS= S_{FM} +0.00776(v / f | _{HV,ATS}) | Free-flow speed, FFS (FSS=BFF | 20 7. |
| Adj. for no-passing zones, f _{np.ATS} (Exhib | t 15-15) 2.7 mi/h | Average travel speed, ATS _d =FFS | S-0.00776(v _{d,ATS} + <i>47.7 mi/h</i> |
| Ε, | | v _{o,ATS}) - f _{np,ATS} | 77.7 1110/11 |
| | | Percent free flow speed, PFFS | 84.6 % |
| Percent Time-Spent-Following | | I | l o : 5: :: () |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E_R (| | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV} =1/ | | 1.000 | 0.994 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| Directional flow rate ² , $v_i(pc/h) v_i = V_i/(PHF)$ | | 460 | 309 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | | 44.8 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 8.6 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 6 | 7.9 |
| v _{o,PTSF}) | | | |
| Level of Service and Other Performan | ce Measures | | |
| Level of service, LOS (Exhibit 15-3) | | | D |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 | | |
|---|-------|--|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 84.6 | | |
| Bicycle Level of Service | | | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 460.2 | | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.19 | | |
| Bicycle level of service (Exhibit 15-4) | E | | |
| 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.

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^{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.

| GHWAY SEGMENT WORKS | J | |
|---|--|--|
| | JS 89 | |
| From/To | RP 10.4 to 24.4 (34-3-2) | |
| | MDT
Future (2035) | |
| Allalysis I cal | uture (2000) | |
| | | |
| 4 | | |
| <u>ft</u> | _ | |
| Class i ni | ghway 🔲 Class II | |
| highway (| Class III highway | |
| | Level Rolling | |
| Grade Length | mi Up/down | |
| | | |
| CT N. T. | | |
| | · | |
| | 13 | |
| Access points | <i>mi 4</i> /mi | |
| | | |
| | | |
| Analysis Direction (d) | Opposing Direction (o) | |
| 1.3 | 1.4 | |
| 1.0 | 1.0 | |
| 0.982 | 0.977 | |
| 1.00 | 1.00 | |
| 439 | 293 | |
| Estimated Fre | e-Flow Speed | |
| Base free-flow speed ⁴ , BFFS | 60.0 mi/h | |
| Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h | |
| Adj. for access points ⁴ , f _A (Exhibit | 15-8) 1.0 mi/h | |
| · · · | | |
| | 20 // | |
| | Average travel speed, ATS _d =FFS-0.00776(v _{d,ATS} + 49.1 mi/l | |
| v _{o,ATS}) - f _{np,ATS} | | |
| Percent free flow speed, PFFS | 85.2 % | |
| Analysis Direction (d) | Opposing Direction (o) | |
| 1.0 | 1.1 | |
| 1.0 | 1.0 | |
| 1.000 | 0.994 | |
| 1.00 | 1.00 | |
| 431 | 288 | |
| 43 | 43.8 | |
| 42 | ······································ | |
| | | |
| [/] d,PTSF ⁺ | 0.0 | |
| /d,PTSF ⁺ | 0.0 | |
| 08 | 0.0 | |
| | Site Information Highway / Direction of Travel From/To Jurisdiction Analysis Year Class I his highway Class I his highway Compassing zo the Yeak-hour fact No-passing zo the Yeak-hour fact No-passi | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 | | |
|--|-------|--|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 | | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 85.2 | | |
| Bicycle Level of Service | | | |
| Directional demand flow rate in outside lane, $v_{\rm OL}$ (Eq. 15-24) veh/h | 430.7 | | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.16 | | |
| Bicycle level of service (Exhibit 15-4) | E | | |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHW <i>A</i> | AY SEGMENT WORK | SHEET |
|--|--|---|---|
| General Information | | Site Information | |
| Agency or Company For Agency or Company Pate Performed 9 | cott Randall
PA
/5/2013 | | US 89
RP 24.4 to 40.7 (34-3-3)
MDT |
| , | eak Season | Analysis Year | Future (2035) |
| Project Description: Paradise Valley Input Data | | | |
| L | | | |
| 1 | Shoulder widthtt | _ | _ |
| + | Lane width tt | ✓ Class I h | ighway 🔲 Class II |
| | Lane widthtt Shoulder width tt | highway 🗌 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 28% | |
| Analysis direction vol., V _d 407veh | /h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 272veh | /h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 4/mi |
| Lane Width ft 12.0
Segment Length mi 16.3 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, \boldsymbol{E}_{T} (| Exhibit 15-11 or 15-12) | 1.2 | 1.4 |
| Passenger-car equivalents for RVs, \boldsymbol{E}_{R} (E | xhibit 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)) | 0.988 | 0.977 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 468 | 316 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S_{FM}
Total demand flow rate, both directions, v | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.0 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(v/ f _H | ,, _{ATS}) | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.7 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.8 mi/h | | Average travel speed, ATS _d =FFS | G-0.00776(v _{d,ATS} + 49.8 <i>mi/h</i> |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 86.3 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (E | Exhibit 15-18 or 15-19) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (E | xhibit 15-18 or 15-19) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ | | 1.000 | 0.994 |
| 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* $f_{HV,PTSF}$ * $f_{g,PTSF}$) | | 463 | 311 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av_db}) | | 44.8 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 3 | 1.5 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 6 | 3.6 |
| v _{o,PTSF}) | | | |
| Level of Service and Other Performance | e Measures | <u> </u> | |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | | С |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1661 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1690 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 86.3 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 462.5 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.20 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| DIRECTION | AL TWO-LANE HIGHW <i>A</i> | AY SEGMENT WORK | SHEET |
|--|--|---|---|
| General Information | | Site Information | |
| Agency or Company F Date Performed 9 | Scott Randall
RPA
V5/2013 | | US 89
RP 40.7 to 50.6 (34-2-2)
MDT |
| Analysis Time Period F Project Description: Paradise Valley | Peak Season | Analysis Year | Future (2035) |
| Input Data | | | |
| | | | |
| l | Shoulder widthtt Lane width tt | | |
| * | Lane width tt | ✓ Class I h | • |
| * | Shoulder widthtt | highway 🔲 | Class III highway |
| | | Terrain | Level Rolling |
| Segment length, L _t mi | | Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 38% | |
| Analysis direction vol., V _d 600veh | n/h | Show North Arrow % Trucks and | Buses , P _T 6 % |
| Opposing direction vol., V _o 400vel | n/h | % Recreation | al vehicles, P _R 4% |
| Shoulder width ft 4.0 | | Access points | <i>s mi</i> 6/mi |
| Lane Width ft 12.0
Segment Length mi 9.9 | | | |
| Average Travel Speed | | • | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, \boldsymbol{E}_{T} (| Exhibit 15-11 or 15-12) | 1.1 | 1.2 |
| Passenger-car equivalents for RVs, \boldsymbol{E}_{R} (E | xhibit 15-11 or 15-13) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} = | $1/(1+P_T(E_T-1)+P_R(E_R-1))$ | 0.994 | 0.988 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 686 | 460 |
| Free-Flow Speed from Field Measurement | | Estimated Fre | e-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| Mean speed of sample ³ , S _{FM} | | Adj. for lane and shoulder width, ⁴ | f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Total demand flow rate, both directions, <i>v</i> | | Adj. for access points ⁴ , f _A (Exhibi | t 15-8) 1.5 mi/h |
| Free-flow speed, FFS=S _{FM} +0.00776(<i>v</i> / f _H | VATS) | Free-flow speed, FFS (FSS=BFF | S-f _{LS} -f _A) 57.2 mi/h |
| Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.7 mi/h | | Average travel speed, ATS _d =FFS | 3-0.00776(v _{d,ATS} + 46.6 mi/h |
| | | v _{o,ATS}) - f _{np,ATS}
Percent free flow speed, PFFS | 81.5 % |
| Percent Time-Spent-Following | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (I | Exhibit 15-18 or 15-19) | 1.0 | 1.0 |
| Passenger-car equivalents for RVs, E _R (E | xhibit 15-18 or 15-19) | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV} =1/ (| I+P _T (E _T -1)+P _R (E _R -1)) | 1.000 | 1.000 |
| Grade adjustment factor ¹ , f _{q,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}) | | 682 | 455 |
| Base percent time-spent-following ⁴ , BPTSF _d (%)=100(1-e ^{av} d ^b) | | 60.8 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | 2 | 6.6 |
| Percent time-spent-following, PTSF _d (%)=BPTSF _d +f _{np,PTSF} *(v _{d,PTSF} / v _{d,PTSF} + | | 7 | 6.8 |
| v _{o,PTSF}) | | , | |
| Level of Service and Other Performanc | e Measures | 1 | D |
| Level of service, LOS (Exhibit 15-3) Volume to capacity ratio, <i>v/c</i> | | - | |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1680 |
|---|-------|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 81.5 |
| Bicycle Level of Service | |
| Directional demand flow rate in outside lane, v _{OL} (Eq. 15-24) veh/h | 681.8 |
| Effective width, Wv (Eq. 15-29) ft | 16.00 |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.39 |
| Bicycle level of service (Exhibit 15-4) | E |
| 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.

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^{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.

| Canaval Information | IAL TWO-LANE HIGHWA | • | |
|---|--|--|--|
| General Information | Scott Randall | Site Information Highway / Direction of Travel | US 89 |
| Analyst
Agency or Company | RPA | From/To | RP 50.6 to 52.4 (34-2A-5) |
| Date Performed | 9/5/2013 | Jurisdiction | MDT |
| Analysis Time Period Project Description: Paradise Valley | Peak Season | Analysis Year | Future (2035) |
| Input Data | | | |
| L | | | |
| | Shoulder widthft | | |
| - | , Lane widthtt | Class I | highway Class II |
| | Lane widthtt | | Class III highway |
| _ | Shoulder widthft _ | | |
| Segment length | , L, mi | Terrain Grade Lengt | _ |
| Segment length | , L ₁ | Peak-hour fa | ector, PHF 0.88 |
| | | Show North Arrow of Trucks on | |
| Analysis direction vol., V _d 879ve | eh/h | % Trucks an | d Buses , P _T 6 % |
| Opposing direction vol., V _o 586ve | eh/h | | nal vehicles, P _R 4% |
| Shoulder width ft 4.0 Lane Width ft 12.0 | | Access point | ts <i>mi</i> 20/mi |
| Lane Width ft 12.0
Segment Length mi 1.8 | | | |
| Average Travel Speed | | <u> </u> | |
| | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T | (Exhibit 15-11 or 15-12) | 1.0 | 1.1 |
| Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13) | | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, f _{HV,ATS} | $_{S}$ =1/ (1+ $P_{T}(E_{T}$ -1)+ $P_{R}(E_{R}$ -1)) | 1.000 | 0.994 |
| 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* $f_{g,ATS}$ * $f_{HV,ATS}$) | | 999 | 670 |
| Free-Flow Speed from Field Measurement | | Estimated Fr | ee-Flow Speed |
| | | Base free-flow speed ⁴ , BFFS | 60.0 mi/h |
| | | Adj. for lane and shoulder width, | ⁴ f _{LS} (Exhibit 15-7) 1.3 mi/h |
| Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, | | Adj. for access points ⁴ , f _A (Exhib | oit 15-8) 5.0 mi/h |
| • | | Free-flow speed, FFS (FSS=BF | |
| Free-flow speed, FFS=S _{FM} +0.00776(v/ f | | | 20 /. |
| Adj. for no-passing zones, f _{np,ATS} (Exhib | it 15-15) | Average travel speed, ATS_d =FFS-0.00776($v_{d,ATS}$ + 39.0 mi/ | |
| | | V _{o,ATS}) - f _{np,ATS} | 70.7.0/ |
| Percent Time-Spent-Following | | Percent free flow speed, PFFS | 72.7 % |
| r ercent rime-opent-r onowing | | Analysis Direction (d) | Opposing Direction (o) |
| Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19) | | 1.0 | 1.0 |
| Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19) | | 1.0 | 1.0 |
| Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_{T}-1)+P_R(E_{R}-1))$ | | 1.000 | 1.000 |
| Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17) | | 1.00 | 1.00 |
| Directional flow rate ² , $v_j(pc/h)$ $v_i = V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$ | | 999 | 666 |
| Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$ | | 75.0 | |
| Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21) | | | 22.9 |
| Adj. for no-passing zone, f _{np,PTSF} (Exhib
— | Percent time-spent-following, PTSF $_{\rm d}$ (%)=BPTSF $_{\rm d}$ +f $_{\rm np,PTSF}$ * (v $_{\rm d,PTSF}$ / v $_{\rm d,PTSF}$ + | | |
| | =BPTSF _d +f $_{\rm np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + | | 88.7 |
| Percent time-spent-following, $PTSF_d(\%)$:
$v_{o,PTSF}$) | | | 88.7 |
| Percent time-spent-following, PTSF _d (%) | | | 88.7
D |

| Capacity, C _{d,ATS} (Equation 15-12) pc/h | 1690 | | |
|---|-------|--|--|
| Capacity, C _{d,PTSF} (Equation 15-13) pc/h | 1700 | | |
| Percent Free-Flow Speed PFFS _d (Equation 15-11 - Class III only) | 72.7 | | |
| Bicycle Level of Service | | | |
| Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h | 998.9 | | |
| Effective width, Wv (Eq. 15-29) ft | 16.00 | | |
| Effective speed factor, S_t (Eq. 15-30) | 4.79 | | |
| Bicycle level of service score, BLOS (Eq. 15-31) | 5.59 | | |
| Bicycle level of service (Exhibit 15-4) | F | | |
| 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.

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^{3.} For the analysis direction only and for v>200 veh/h.
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