

**Appendix N. Capacity Reports for the Major Intersections of
Alternative 1, 2 and 3**

Alternative 1 Capacity Reports for Major Intersections

Summary of Intersection Queues and Lane Geometrics

Alternative 1 Queue Lengths and Lane Lengths			
Movement	95% Queue (ft)		Auxiliary Lane Length (ft)
	Morning	Evening	
Mendenhall Loop Road & UAS/Guard Access (UAS and Guard Access under Stop Sign Control)			
Eastbound Left (MLR)	25	25	175 (2)
Westbound Left (MLR)	25	25	175 (2)
Northbound Thru-Left (UAS)	25	122	-
Northbound Right	25	25	100 (1)
Southbound Thru-Left (Guard Access)	25	25	-
Southbound Right	25	25	100 (1)
Mendenhall Loop Road & Glacier Highway (180-ft. Diameter Roundabout, 2-Lane Circulation)			
Northbound Glacier	25	50	Flare 12' to 14' over 40' taper
Southbound MLR	25	25	Flare 12' to 24' over 150' taper
Eastbound Glacier	25	25	Flare 12' to 14' over 40' taper
Glacier Highway & Fritz Cove Road (180-ft. Diameter Roundabout, 2-Lane Circulation)			
Northbound Fritz Cove Rd	25	25	Flare 12' to 14' over 40' taper
Eastbound Glacier	25	25	Flare 12' to 24' over 150' taper
Southbound UAS	25	25	Flare 12' to 14' over 40' taper
Westbound Glacier	25	100	Flare 12' to 24' over 150' taper

(1) Storage Only

(2) Storage and Deceleration

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Access

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		+		+	+			+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	70	106	32	159	4	1	0	4	10	3	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	78	118	36	177	4	1	0	4	11	3	8
Pedestrians		10			10						10	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		1077										
pX, platoon unblocked												
vC, conflicting volume	181			206			451	500	189	453	443	157
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	181			206			451	500	189	453	443	157
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			100	100	99	98	99	99
cM capacity (veh/h)	1382			1343			485	446	841	483	481	869
Direction, Lane #	EB 1	WB 1	WB 2	SE 1	NW 1							
Volume Total	218	36	181	6	22							
Volume Left	22	36	0	1	11							
Volume Right	118	0	4	4	8							
cSH	1382	1343	1700	733	571							
Volume to Capacity	0.02	0.03	0.11	0.01	0.04							
Queue Length (ft)	1	2	0	1	3							
Control Delay (s)	0.9	7.8	0.0	9.9	11.6							
Lane LOS	A	A		A	B							
Approach Delay (s)	0.9	1.3		9.9	11.6							
Approach LOS				A	B							
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization			31.8%		ICU Level of Service			A				

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Access

11/8/2003



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		+		+	+			+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	231	104	56	139	45	2	2	2	114	3	55
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	27	257	116	62	154	50	2	2	2	127	3	61
Pedestrians		10			10						10	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		1078										
pX, platoon unblocked												
vC, conflicting volume	204			382			744	739	189	670	707	334
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204			382			744	739	189	670	707	334
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			95			99	99	100	62	99	91
cM capacity (veh/h)	1355			1156			276	315	840	337	329	691
Direction, Lane #	EB 1	WB 1	WB 2	SE 1	NW 1							
Volume Total	399	62	204	7	191							
Volume Left	27	62	0	2	127							
Volume Right	116	0	50	2	61							
cSH	1355	1156	1700	376	403							
Volume to Capacity	0.02	0.05	0.12	0.02	0.47							
Queue Length (ft)	2	4	0	1	62							
Control Delay (s)	0.7	8.3	0.0	14.8	21.7							
Lane LOS	A	A		B	C							
Approach Delay (s)	0.7	1.9		14.8	21.7							
Approach LOS				B	C							
Intersection Summary												
Average Delay				5.8								
Intersection Capacity Utilization			65.6%		ICU Level of Service					B		

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Access

11/8/2003



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		+		+	+			+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	77	139	37	189	4	1	0	4	10	3	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	86	154	41	210	4	1	0	4	11	3	10
Pedestrians		10			10						10	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		1077										
pX, platoon unblocked												
vC, conflicting volume	214			250			523	589	222	524	514	183
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			250			523	589	222	524	514	183
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			100	100	99	97	99	99
cM capacity (veh/h)	1344			1293			430	395	806	431	436	840
Direction, Lane #	EB 1	WB 1	WB 2	SE 1	NW 1							
Volume Total	262	41	214	6	24							
Volume Left	22	41	0	1	11							
Volume Right	154	0	4	4	10							
cSH	1344	1293	1700	686	540							
Volume to Capacity	0.02	0.03	0.13	0.01	0.05							
Queue Length (ft)	1	2	0	1	4							
Control Delay (s)	0.8	7.9	0.0	10.3	12.0							
Lane LOS	A	A		B	B							
Approach Delay (s)	0.8	1.3		10.3	12.0							
Approach LOS				B	B							
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization			36.2%			ICU Level of Service			A			

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Access

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		+		+	+			+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	267	132	71	166	45	2	2	2	139	3	75
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	27	297	147	79	184	50	2	2	2	154	3	83
Pedestrians		10			10						10	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			1						1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		1078										
pX, platoon unblocked												
vC, conflicting volume	234			453			886	874	219	789	826	390
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			453			886	874	219	789	826	390
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			99	99	100	44	99	87
cM capacity (veh/h)	1321			1088			208	258	808	276	275	643
Direction, Lane #	EB 1	WB 1	WB 2	SE 1	NW 1							
Volume Total	470	79	234	7	241							
Volume Left	27	79	0	2	154							
Volume Right	147	0	50	2	83							
cSH	1321	1088	1700	302	343							
Volume to Capacity	0.02	0.07	0.14	0.02	0.70							
Queue Length (ft)	2	6	0	2	127							
Control Delay (s)	0.6	8.6	0.0	17.2	36.8							
Lane LOS	A	A		C	E							
Approach Delay (s)	0.6	2.2		17.2	36.8							
Approach LOS				C	E							
Intersection Summary												
Average Delay				9.7								
Intersection Capacity Utilization			74.9%		ICU Level of Service				C			

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS North Access





















11/10/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	↶	↷		↶	↷			↶	↷		↶	↷
Sign Control	Free		Free		Stop		Stop		Stop		Stop	
Grade	0%		0%		0%		0%		0%		0%	
Volume (veh/h)	20	98	145	44	218	4	1	0	4	10	3	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	109	161	49	242	4	1	0	4	11	3	10
Pedestrians	10		10		10		10		10		10	
Lane Width (ft)	12.0		12.0		12.0		12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0		4.0		4.0		4.0	
Percent Blockage	1		1		1		1		1		1	
Right turn flare (veh)							4		4		4	
Median type							None		None		None	
Median storage veh												
Upstream signal (ft)	1074											
pX, platoon unblocked												
vC, conflicting volume	247			280			512	667	254	596	588	209
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	247			280			512	667	254	596	588	209
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			100	100	99	97	99	99
cM capacity (veh/h)	1308			1261			435	353	773	384	392	812
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	NW 1						
Volume Total	22	270	49	247	6	24						
Volume Left	22	0	49	0	1	11						
Volume Right	0	161	0	4	4	10						
cSH	1308	1700	1261	1700	966	653						
Volume to Capacity	0.02	0.16	0.04	0.15	0.01	0.04						
Queue Length (ft)	1	0	3	0	0	3						
Control Delay (s)	7.8	0.0	8.0	0.0	10.4	12.6						
Lane LOS	A		A		B	B						
Approach Delay (s)	0.6		1.3		10.4	12.6						
Approach LOS					B	B						
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			37.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Morning Peak Hour

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS North Access

11/10/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	24	334	132	71	203	45	2	2	2	139	3	75
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	27	371	147	79	226	50	2	2	2	154	3	83
Pedestrians	10			10						10		
Lane Width (ft)	12.0			12.0						12.0		
Walking Speed (ft/s)	4.0			4.0						4.0		
Percent Blockage	1			1						1		
Right turn flare (veh)										4		4
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	1078											
pX, platoon unblocked												
vC, conflicting volume	276			528			886	989	261	903	941	464
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	276			528			886	989	261	903	941	464
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			99	99	100	33	99	86
cM capacity (veh/h)	1276			1021			204	219	767	229	234	584
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SE 1	NW 1						
Volume Total	27	518	79	276	7	241						
Volume Left	27	0	79	0	2	154						
Volume Right	0	147	0	50	2	83						
cSH	1276	1700	1021	1700	317	350						
Volume to Capacity	0.02	0.30	0.08	0.16	0.02	0.69						
Queue Length (ft)	2	0	6	0	2	122						
Control Delay (s)	7.9	0.0	8.8	0.0	18.2	36.6						
Lane LOS	A		A		C	E						
Approach Delay (s)	0.4			2.0			18.2	36.6				
Approach LOS					C	E						
Intersection Summary												
Average Delay			8.6									
Intersection Capacity Utilization			58.6%		ICU Level of Service			B				
Analysis Period (min)			15									

Evening Peak Hour

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT1 2009          57
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min 90          *
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min   15          *
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min 15 75          *
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00          *
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min 15 75          *
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh   VEH          *
* GRAD SEP      0       0       0       0          * FLOW PEAK    am/op/pm   AM          *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 78   3   30  0          *.67 *50*0.89 1.110 0.89*15 45 75 *
*WB GLACIER*1.04* 56 282 15 0          *.73 *50*0.89 1.110 0.89*15 45 75 *
*SB UAS   *1.04*  6   1  13  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04* 20 616 11 0          *.70 *50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      74      258      20      453          *
* CAPACITY  veh     943     1790     1047     1793          * AVDEL s      2.7 *
* AVE DELAY mins   0.07   0.04   0.06   0.04          * L O S      A *
* MAX DELAY mins   0.08   0.04   0.07   0.05          * VEH HRS     0.6 *
* AVE QUEUE  veh      0       0       0       0          * COST $      9.0 *
* MAX QUEUE  veh      0       0       0       0          *
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*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT1 2009          58 *
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*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD      min      90 *
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE       min      15 *
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD   min     15 75 *
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST        $/hr   15.00 *
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD      min     15 75 *
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE        pcu/veh  VEH *
* GRAD SEP      0       0       0       0          * FLOW PEAK        am/op/pm  PM *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 65   4   40  0          *.68 *50*0.89 1.110 0.89*15 45 75 *
*WB GLACIER*1.04* 109 1121 109 0         *.68 *50*0.89 1.110 0.89*15 45 75 *
*SB UAS   *1.04* 21   6   78  0         *1.00*50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04* 63   657 20  0         *.68 *50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW          veh          74   911   105   503          *
* CAPACITY     veh          902  1782   745  1713          * AVDEL s      3.8 *
* AVE DELAY    mins        0.07  0.07  0.09  0.05          * L O S      A *
* MAX DELAY    mins        0.08  0.08  0.11  0.06          * VEH HRS    1.7 *
* AVE QUEUE    veh          0       1       0       0          * COST $     25.3 *
* MAX QUEUE    veh          0       1       0       0          *
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*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT1 2019          56  *
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*
* E      (m)      4.30   7.2   4.3   4.3          * TIME PERIOD   min  90      *
* L'     (m)     12.00  50.00 12.00 12.00        * TIME SLICE    min   15      *
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min  15 75  *
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00  *
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min  15 75  *
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh  VEH  *
* GRAD SEP      0       0       0       0          * FLOW PEAK     am/op/pm  AM  *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04*  78   3   30  0          *.77 *50*0.89 1.110 0.89*15 45 75 *
*WB GLACIER*1.04* 56 282 15 0          *.95 *50*0.89 1.110 0.89*15 45 75 *
*SB UAS   *1.04*   6   1  13  0          *1.0 *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04* 20 616 11 0          *.81 *50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      85   335   20   524          *
* CAPACITY  veh      910  1788  1014  1147        * AVDEL s      4.4  *
* AVE DELAY mins  0.07  0.04  0.06  0.09        * L O S      A  *
* MAX DELAY mins  0.08  0.05  0.07  0.11        * VEH HRS     1.2  *
* AVE QUEUE  veh      0     0     0     1          * COST $     17.6  *
* MAX QUEUE  veh      0     0     0     1          *
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*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT1 2019          57 *
*
*****
*
* E      (m)      4.30   7.2   4.3   4.3          * TIME PERIOD   min      90 *
* L'     (m)     12.00  50.00 12.00 12.00        * TIME SLICE    min      15 *
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min    15 75 *
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr   15.00 *
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min    15 75 *
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh  VEH *
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm  PM *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 65 4 40 0 * .80 *50*0.89 1.110 0.89*15 45 75 *
*WB GLACIER*1.04* 109 1121 109 0 * .8 *50*0.89 1.110 0.89*15 45 75 *
*SB UAS *1.04* 21 6 78 0 * 1.00*50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04* 63 657 20 0 * .82 *50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      87  1071  105  607          *
* CAPACITY  veh      856 1777  672 1079          * AVDEL s      5.9 *
* AVE DELAY mins  0.08 0.08  0.10 0.12          * L O S      A *
* MAX DELAY mins  0.09 0.10  0.12 0.15          * VEH HRS     3.0 *
* AVE QUEUE  veh      0    2    0    1          * COST $     45.6 *
* MAX QUEUE  veh      0    2    0    1          *
*
*****

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT1 2029          54  *
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min 90      *
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min   15      *
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min 15 75  *
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00  *
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min 15 75  *
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh  VEH  *
* GRAD SEP      0       0       0       0          * FLOW PEAK     am/op/pm  AM  *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 78 3 30 0 *1.00*50*0.89 1.110 0.89*15 45 75 *
*WB GLACIER*1.04* 56 282 15 0 *1.00*50*0.89 1.110 0.89*15 45 75 *
*SB UAS *1.04* 6 1 13 0 *1.00*50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04* 20 616 11 0 *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      111   353   20   647          *
* CAPACITY  veh      853   1782  1004  1791        * AVDEL s      3.1  *
* AVE DELAY mins  0.08  0.04  0.06  0.05        * L O S       A  *
* MAX DELAY mins  0.09  0.05  0.07  0.06        * VEH HRS     1.0  *
* AVE QUEUE  veh      0     0     0     1          * COST $      14.5 *
* MAX QUEUE  veh      0     0     0     1          *
*
*****

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT1 2029          55  *
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min   90  *
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min   15  *
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min  15 75 *
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00 *
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min  15 75 *
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh VEH *
* GRAD SEP      0       0       0       0          * FLOW PEAK     am/op/pm PM *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 65   4   40  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*WB GLACIER*1.04* 109 1121 109 0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*SB UAS   *1.04* 21   6   78  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04* 63   657 20  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      109   1339   105   740          *
* CAPACITY  veh      798   1770   550   1692          * AVDEL s      6.6 *
* AVE DELAY mins  0.09  0.14  0.13  0.06          * L O S      A *
* MAX DELAY mins  0.10  0.18  0.16  0.07          * VEH HRS     4.2 *
* AVE QUEUE  veh      0     3     0     1          * COST $     63.3 *
* MAX QUEUE  veh      0     4     0     1          *
*
*****

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*****
*
* 10:11:03          GLACIER HWY MENDENHALL LP RD ALT 1 2009          64  *
*
*****
*
* E      (m)   7.2   4.3   7.2   4          * TIME PERIOD   min  90      *
* L'     (m)   50    12    50    6          * TIME SLICE    min   15     *
* V      (m)   3.60  3.60  3.60  4          * RESULTS PERIOD min  15 75  *
* RAD    (m)  10.00  10.00  10.00  10         * TIME COST     $/hr  15.00  *
* PHI    (d)  30.00  30.00  30.00  30         * FLOW PERIOD   min  15 75  *
* DIA    (m)   55    55.00  55.00  55         * FLOW TYPE     pcu/veh  VEH  *
* GRAD SEP      0      0      0  0          * FLOW PEAK     am/op/pm  AM  *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB GLACIER*1.04* 195 176  0  0          *.74 *50*0.89 1.110 0.89*15 45 75 *
*SB MLR    *1.04*  59  0 173  0          *.74 *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04*  0 424  68  0          *.74 *50*0.89 1.110 0.89*15 45 75 *
*          *1.04*  0  0  0  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      275   172   364   0          *
* CAPACITY  veh     1778  1098  1731  876          * AVDEL s      2.8  *
* AVE DELAY mins   0.04  0.06  0.04  0.00          * L O S      A  *
* MAX DELAY mins   0.04  0.07  0.05  0.00          * VEH HRS    0.6  *
* AVE QUEUE  veh      0      0      0      0          * COST $     9.4  *
* MAX QUEUE  veh      0      0      0      0          *
*
*****

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*****
*
* 10:11:03          GLACIER HWY MENDENHALL LP RD ALT 1 2009          65  *
*
*****
*
* E      (m)   7.2   4.3   7.2   4          * TIME PERIOD   min   90  *
* L'     (m)   50    12    50    6          * TIME SLICE    min   15  *
* V      (m)   3.60  3.60  3.60  4          * RESULTS PERIOD min  15 75 *
* RAD    (m)  10.00  10.00  10.00  10         * TIME COST     $/hr 15.00 *
* PHI    (d)  30.00  30.00  30.00  30         * FLOW PERIOD   min  15 75 *
* DIA    (m)   55    55.00  55.00  55         * FLOW TYPE     pcu/veh  VEH  *
* GRAD SEP      0      0      0  0          * FLOW PEAK    am/op/pm   PM  *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB GLACIER*1.04* 383  740  0  0          *.69 *50*0.89 1.110 0.89*15 45 75 *
*SB MLR    *1.04*  81   0  263  0          *.90 *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04*  0  292  107  0          *.73 *50*0.89 1.110 0.89*15 45 75 *
*          *1  *   0   0   0  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      775   310   291   0          *
* CAPACITY  veh     1761   915  1665  894          * AVDEL s      3.9  *
* AVE DELAY mins  0.06  0.10  0.04  0.00          * L O S      A  *
* MAX DELAY mins  0.07  0.12  0.05  0.00          * VEH HRS    1.5  *
* AVE QUEUE  veh      1     1     0     0          * COST $     22.2 *
* MAX QUEUE  veh      1     1     0     0          *
*
*****

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*****
*
* 10:11:03          GLACIER HWY MENDENHALL LP RD ALT 1 2019          71 *
*
*****
*
* E      (m)  7.2  4.3  7.2  4          * TIME PERIOD   min  90      *
* L'     (m)  50   15   50   6          * TIME SLICE    min   15     *
* V      (m)  3.60 3.60 3.60 4          * RESULTS PERIOD min  15 75  *
* RAD    (m)  10.00 10.00 10.00 10      * TIME COST     $/hr  15.00  *
* PHI    (d)  30.00 30.00 30.00 30      * FLOW PERIOD   min  15 75  *
* DIA    (m)  55   55.00 55.00 55      * FLOW TYPE     pcu/veh  VEH  *
* GRAD SEP      0     0     0  0      * FLOW PEAK     am/op/pm  AM  *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U)*FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB GLACIER*1.04* 195 176  0  0          *.83 *50*0.89 1.110 0.89*15 45 75 *
*SB MLR    *1.04*  59  0 173  0          *.88 *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04*  0 424  68  0          *.83 *50*0.89 1.110 0.89*15 45 75 *
*          *1.04*  0  0  0  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      308    204    408    0          *
* CAPACITY  veh     1774   1096   1716   844          * AVDEL s      2.9 *
* AVE DELAY mins    0.04   0.07   0.05   0.00          * L O S       A *
* MAX DELAY mins    0.05   0.08   0.05   0.00          * VEH HRS     0.7 *
* AVE QUEUE  veh      0      0      0      0          * COST $      11.1 *
* MAX QUEUE  veh      0      0      0      0          *
*
*****

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*****
*
* 10:11:03          GLACIER HWY MENDENHALL LP RD ALT 1 2019          72  *
*
*****
*
* E      (m)   7.2   4.3   7.2   4          * TIME PERIOD   min   90  *
* L'     (m)   50    15    50    6          * TIME SLICE    min   15  *
* V      (m)   3.60  3.60  3.60  4          * RESULTS PERIOD min  15 75 *
* RAD    (m)  10.00  10.00  10.00  10         * TIME COST     $/hr 15.00 *
* PHI    (d)  30.00  30.00  30.00  30         * FLOW PERIOD   min  15 75 *
* DIA    (m)   55    55.00  55.00  55         * FLOW TYPE     pcu/veh VEH *
* GRAD SEP      0      0      0  0          * FLOW PEAK    am/op/pm   PM *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB GLACIER*1.04* 383  740  0  0          *.81 *50*0.89 1.110 0.89*15 45 75 *
*SB MLR    *1.04*  81   0  263  0          *.89 *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04*  0  292  107  0          *.82 *50*0.89 1.110 0.89*15 45 75 *
*          *1  *   0   0   0  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      910   306   327   0          *
* CAPACITY  veh     1755   877  1667   878          * AVDEL s      4.3 *
* AVE DELAY mins  0.07  0.10  0.04  0.00          * L O S      A *
* MAX DELAY mins  0.08  0.12  0.05  0.00          * VEH HRS    1.8 *
* AVE QUEUE  veh      1     1     0     0          * COST $     27.4 *
* MAX QUEUE  veh      1     1     0     0          *
*
*****

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*****
*
* 10:11:03          GLACIER HWY MENDENHALL LP RD ALT 1 2029          69 *
*
*****
*
* E      (m)   7.6   4.3   7.2   4           * TIME PERIOD   min 90      *
* L'     (m)   50    15    50    6           * TIME SLICE    min   15     *
* V      (m)   3.60  3.60  3.60  4           * RESULTS PERIOD min 15 75 *
* RAD    (m)  10.00 10.00 10.00 10           * TIME COST     $/hr 15.00 *
* PHI    (d)  30.00 30.00 30.00 30           * FLOW PERIOD   min 15 75 *
* DIA    (m)   55    55.00 55.00 55           * FLOW TYPE     pcu/veh  VEH *
* GRAD SEP      0      0      0  0           * FLOW PEAK     am/op/pm  AM *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB GLACIER*1.04* 195 176  0  0           *1 *50*0.89 1.110 0.89*15 45 75 *
*SB MLR    *1.04*  59  0 173  0           *1 *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04*  0 424  68  0           *1 *50*0.89 1.110 0.89*15 45 75 *
*          *1.04*  0  0  0  0           *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      371   232   492   0           *
* CAPACITY  veh     1838  1081  1704  795           * AVDEL s      3.0 *
* AVE DELAY mins  0.04  0.07  0.05  0.00           * L O S      A *
* MAX DELAY mins  0.05  0.08  0.06  0.00           * VEH HRS    0.9 *
* AVE QUEUE  veh      0      0      0      0           * COST $     13.8 *
* MAX QUEUE  veh      0      0      0      0           *
*
*****

```

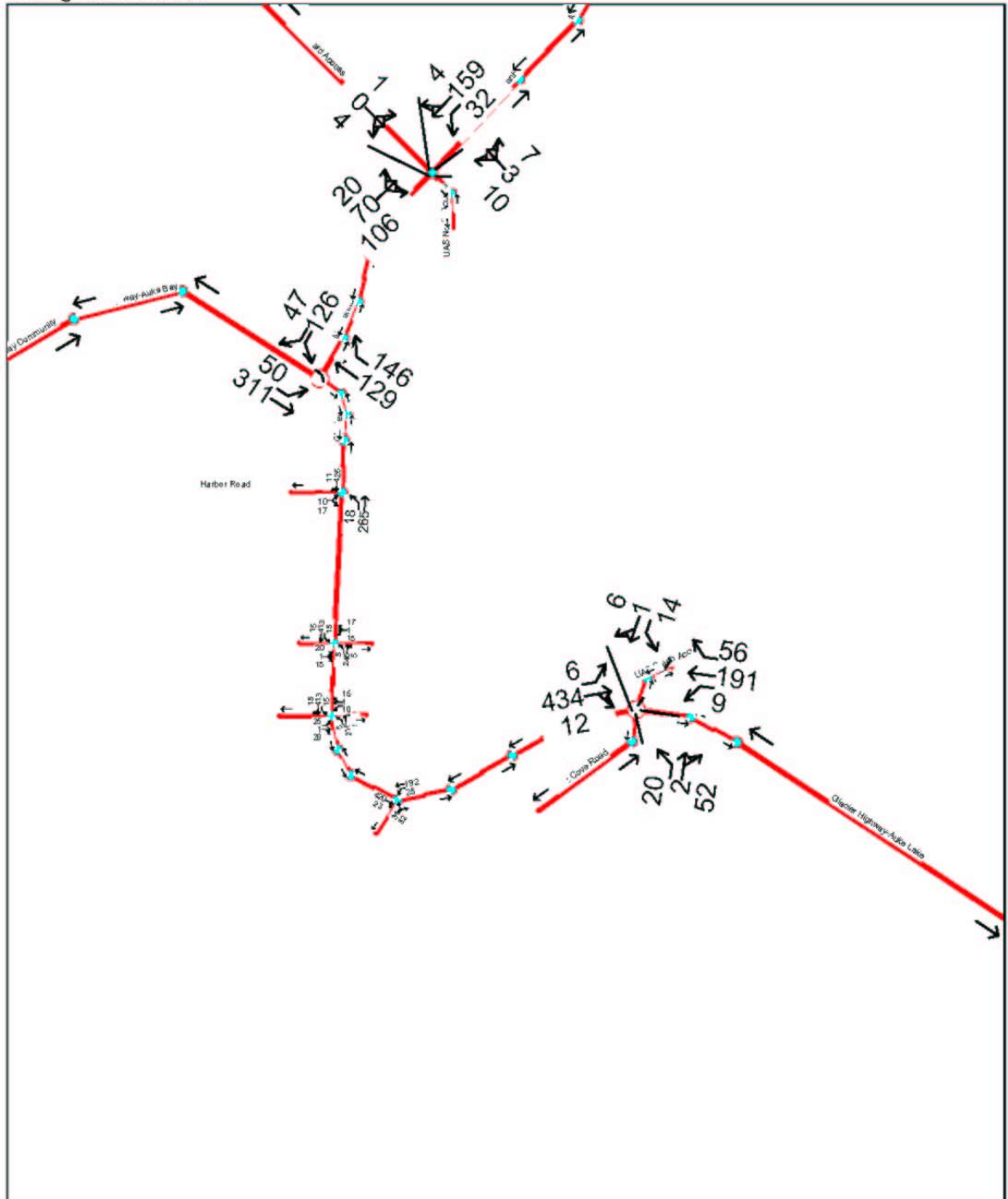
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*****
*
* 10:11:03          GLACIER HWY MENDENHALL LP RD ALT 1 2029          70 *
*
*****
*
* E      (m)   7.6   4.3   7.2   4           * TIME PERIOD   min   90 *
* L'     (m)   50    15    50    6           * TIME SLICE    min   15 *
* V      (m)   3.60  3.60  3.60  4           * RESULTS PERIOD min  15 75 *
* RAD    (m)  10.00  10.00  10.00  10          * TIME COST     $/hr  15.00 *
* PHI    (d)  30.00  30.00  30.00  30          * FLOW PERIOD   min  15 75 *
* DIA    (m)   55    55.00  55.00  55          * FLOW TYPE     pcu/veh  VEH *
* GRAD SEP      0      0      0  0          * FLOW PEAK     am/op/pm  PM *
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB GLACIER*1.04* 383  740  0  0          *1  *50*0.89 1.110 0.89*15 45 75 *
*SB MLR    *1.04*  81   0  263  0          *1  *50*0.89 1.110 0.89*15 45 75 *
*EB GLACIER*1.04*  0  292  107  0          *1  *50*0.89 1.110 0.89*15 45 75 *
*          *1  *   0   0   0  0          *1.00*50*0.89 1.110 0.89*15 45 75 *
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh   1123   344   399   0           *
* CAPACITY  veh   1814   809  1650  828          * AVDEL s      5.1 *
* AVE DELAY mins  0.09  0.13  0.05  0.00          * L O S       A *
* MAX DELAY mins  0.11  0.16  0.05  0.00          * VEH HRS     2.6 *
* AVE QUEUE  veh     2     1     0     0           * COST $      39.5 *
* MAX QUEUE  veh     2     1     0     0           *
*
*****

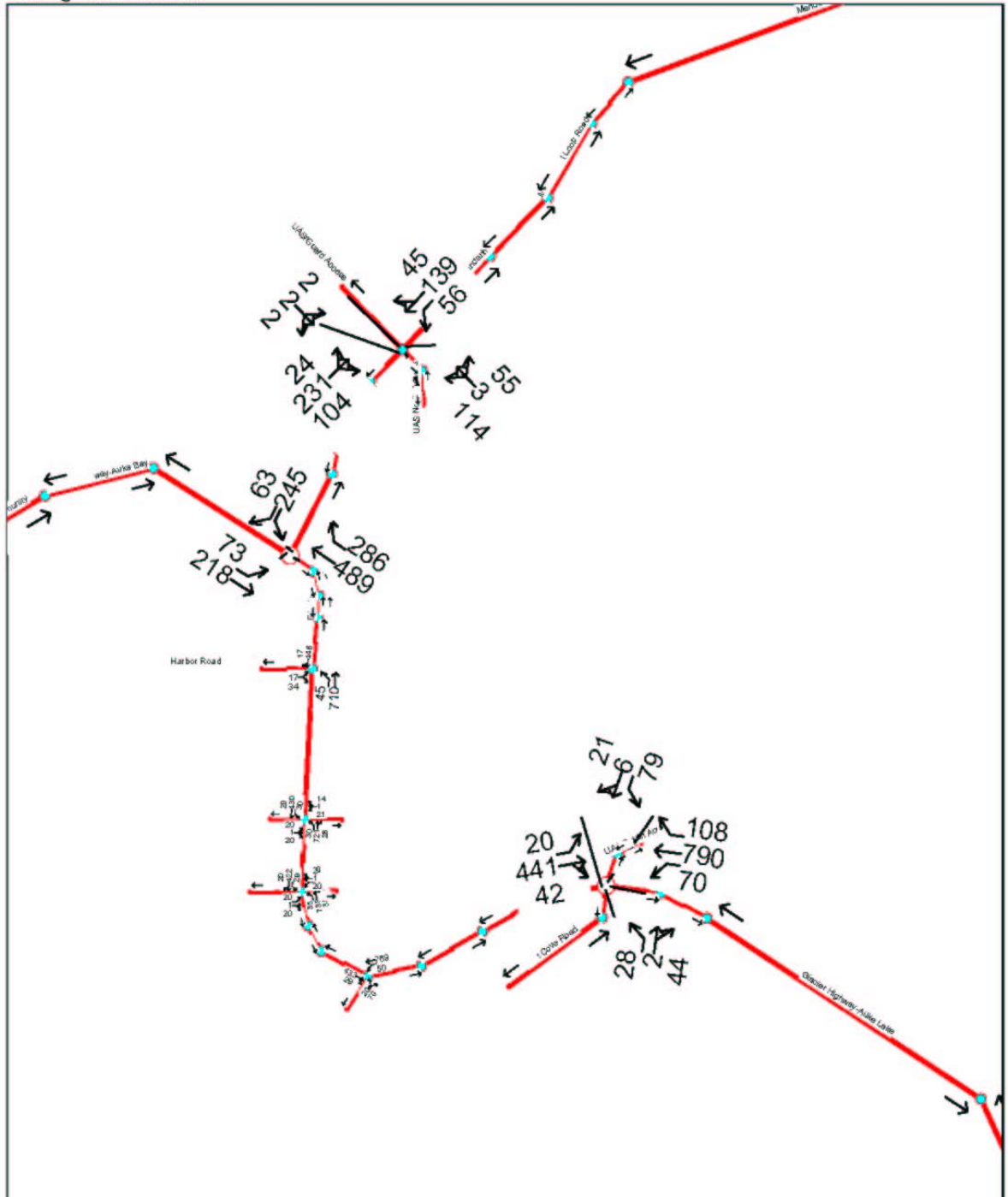
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Alternative 1 Peak Hour Turning Movements

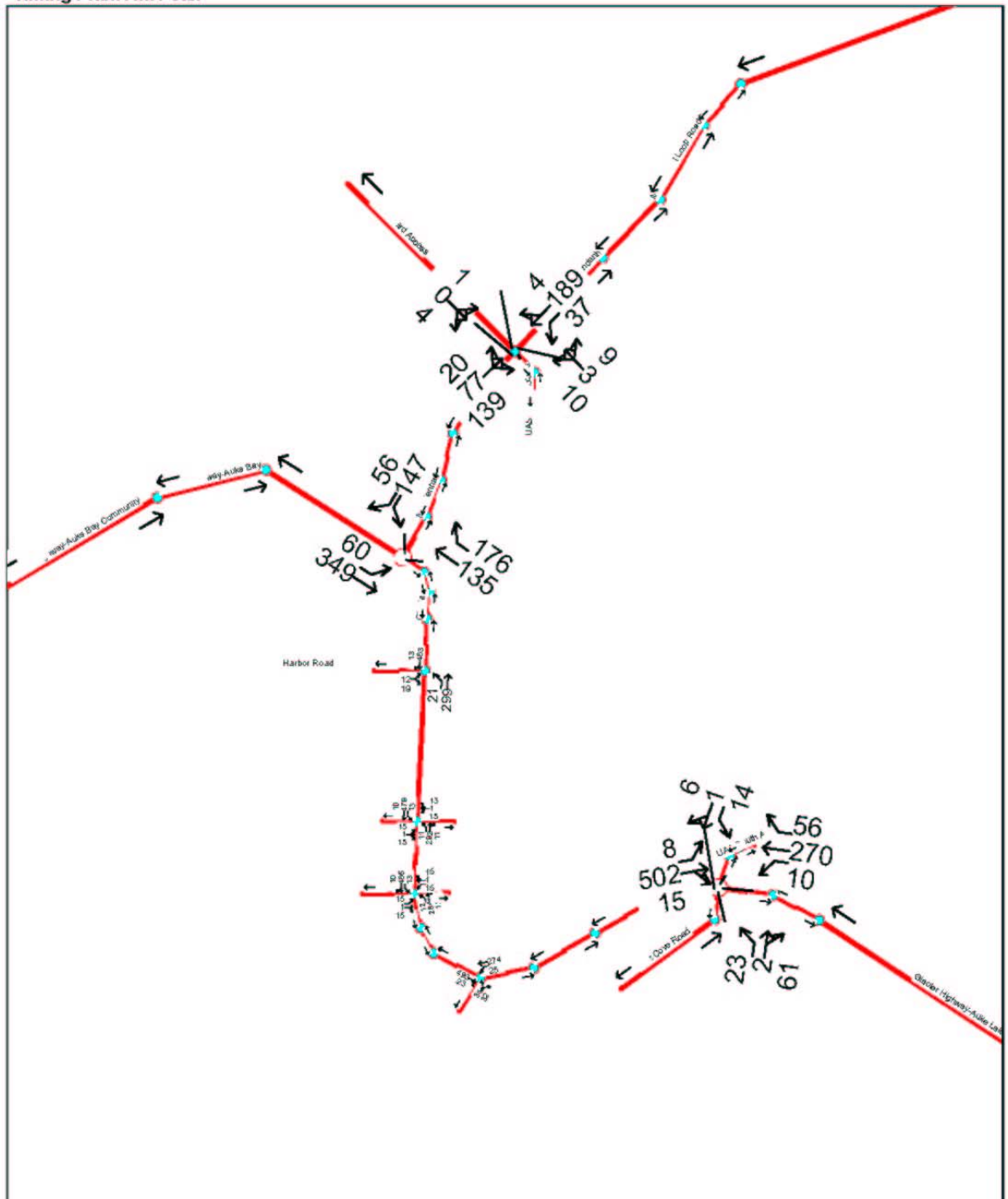
Alternative A Year 2009
Timing Plan: AM Peak



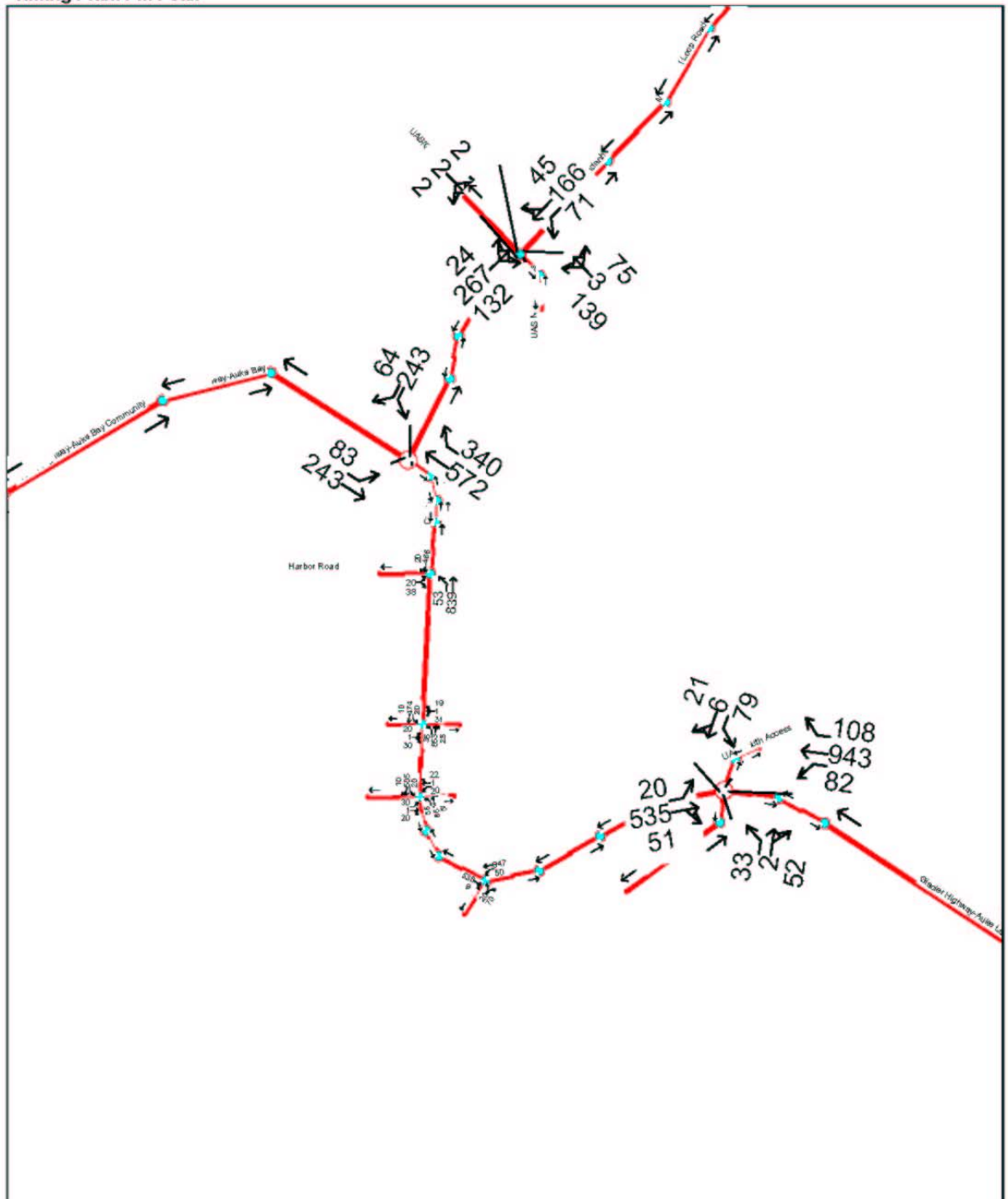
Alternative A Year 2009
Timing Plan: PM Peak



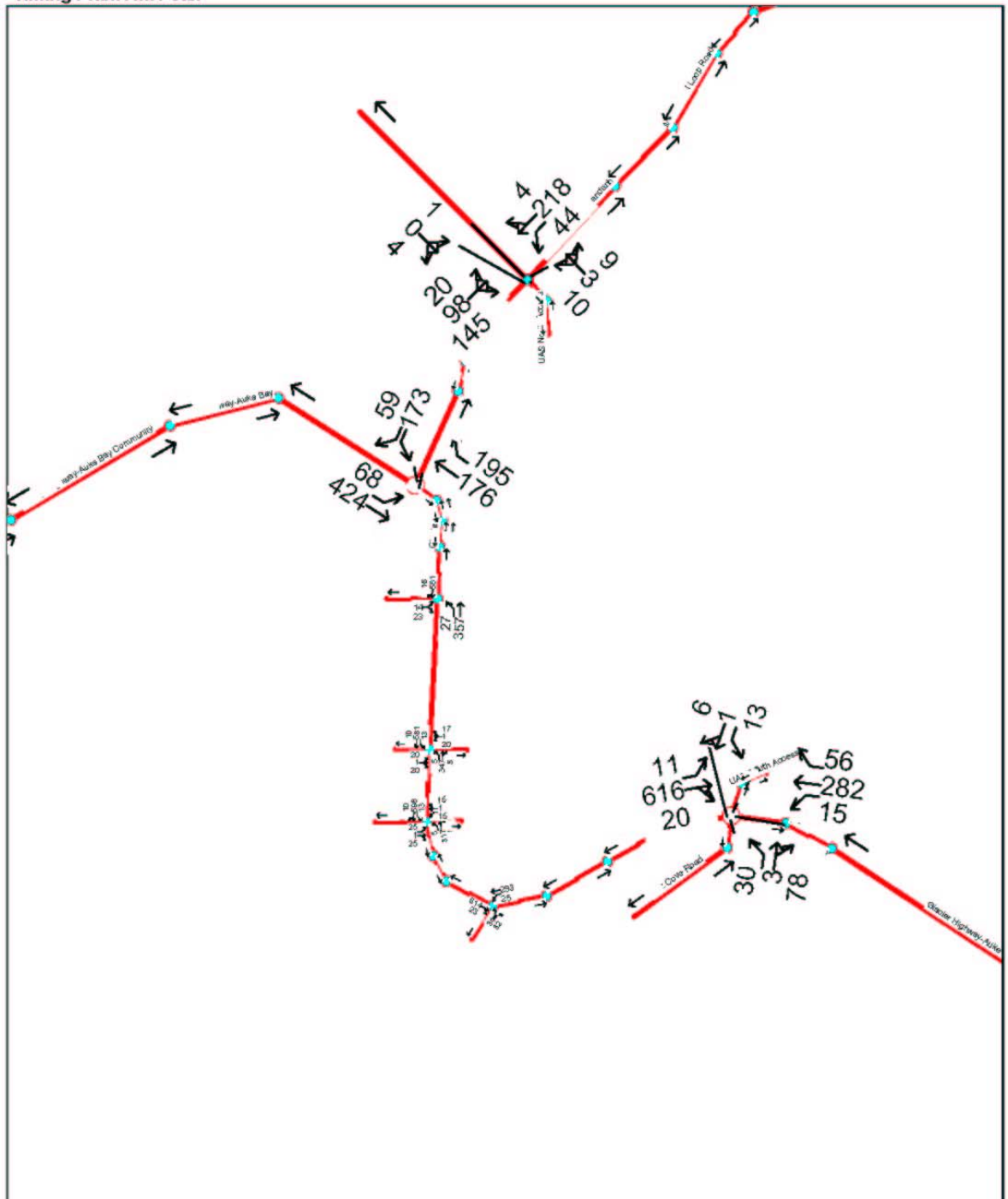
Alternative A Year 2019
Timing Plan: AM Peak



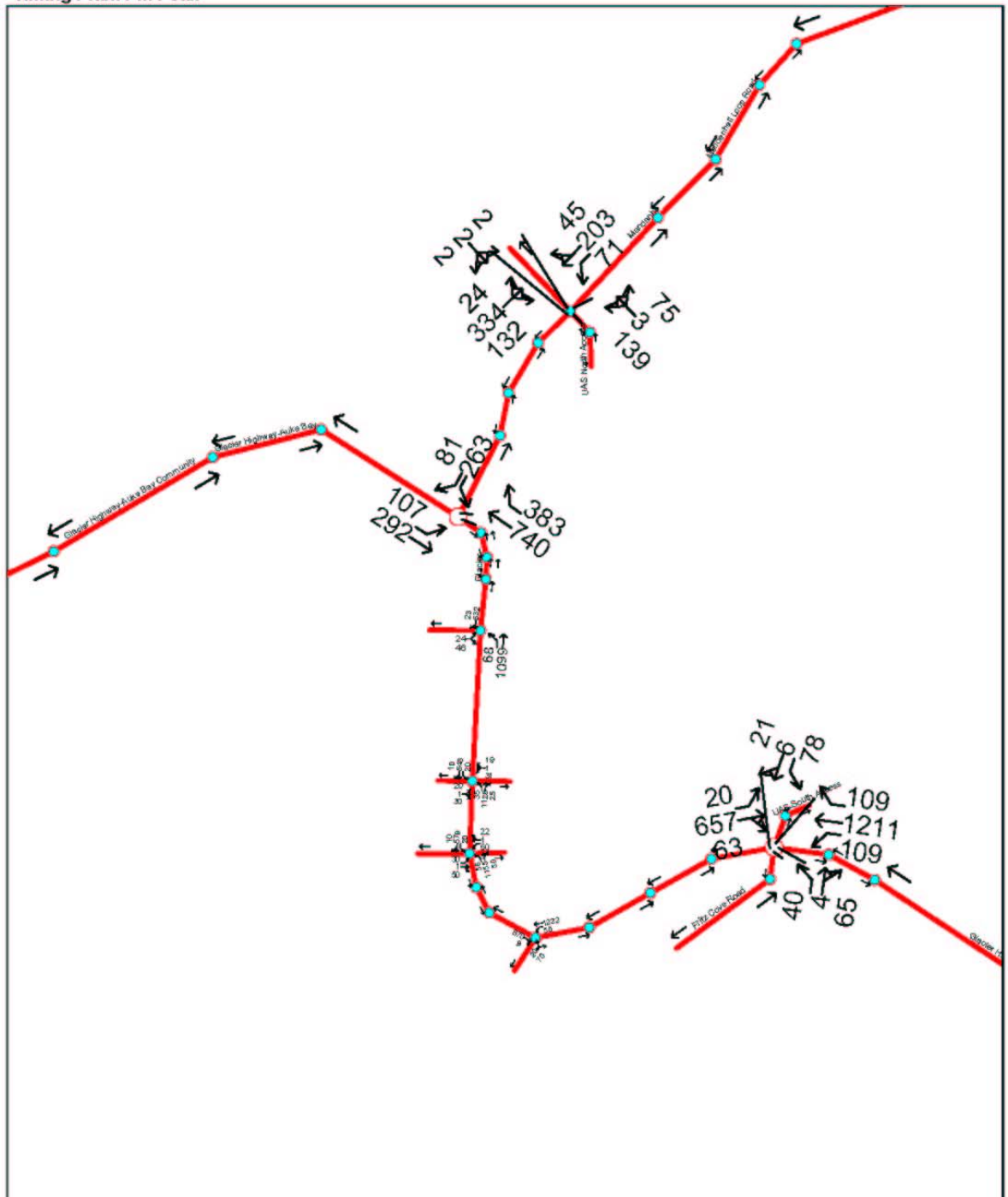
Alternative A Year 2019
Timing Plan: PM Peak



Alternative A Year 2029
Timing Plan: AM Peak



Alternative A Year 2029
Timing Plan: PM Peak



Alternative 2 Capacity Reports for Major Intersections

Summary of Intersection Queues and Lane Geometrics













Alternative 2 Queue Lengths and Lane Lengths			
Movement	95% Queue (ft)		Auxiliary Lane Length (ft)
	Morning	Evening	
Glacier Hwy & Mendenhall Loop Road, Signal Control Intersection			
EBL	53	111	250 (2)
EBR	300	128	-
NBL	115	488	630 (2) (400 max)
NBT	29	42	-
SBT/R	158	433	-
By-Pass and Glacier Hwy, Stop Control Intersection			
WBL	7.9	6	300 (2)
NBL/R	9.8	16	25 (1) (100 min)
Glacier Highway & Fritz Cove Road (180-ft. Diameter Roundabout, 2-Lane Circulation)			
Northbound Fritz Cove Rd	25	25	Flare 12' to 14' over 40' taper
Eastbound Glacier	25	25	Flare 12' to 24' over 150' taper
Southbound UAS	25	25	Flare 12' to 14' over 40' taper
Westbound Glacier	25	100	Flare 12' to 24' over 150' taper
Mendenhall Loop Road & Glacier Highway (140-ft. Diameter Roundabout, 1-Lane Circulation)			
Northeast Bound MLR	25	25	Flare 12' to 14' over 40' taper
Northwest Bound UAS Access	25	25	Flare 12' to 14' over 40' taper
Southwest Bound MLR	25	25	Flare 12' to 14' over 40' taper
Southeast Bound Guard Access	25	25	Flare 12' to 14' over 40' taper

- (1) Storage Only
- (2) Storage and Deceleration

HCM Signalized Intersection Capacity Analysis

17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1690	1502	1690	1779	1701	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1690	1502	1690	1779	1701	
Volume (vph)	21	311	129	145	135	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	23	346	143	161	150	44
Lane Group Flow (vph)	23	346	143	161	194	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type		pm+ov	Prot			
Protected Phases	3	5	5		6	
Permitted Phases	8	3		2		
Actuated Green, G (s)	4.0	26.1	22.1	81.0	53.9	
Effective Green, g (s)	5.0	28.1	23.1	82.0	54.9	
Actuated g/C Ratio	0.05	0.30	0.24	0.86	0.58	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	89	508	411	1536	983	
v/s Ratio Prot	0.01	c0.17	0.08		c0.11	
v/s Ratio Perm		0.06		0.09		
v/c Ratio	0.26	0.68	0.35	0.10	0.20	
Uniform Delay, d1	43.2	29.5	29.7	1.0	9.6	
Progression Factor	1.00	1.00	0.94	0.62	1.00	
Incremental Delay, d2	1.8	3.9	0.6	0.1	0.4	
Delay (s)	45.0	33.4	28.6	0.7	10.0	
Level of Service	D	C	C	A	B	
Approach Delay (s)	34.1			13.8	10.0	
Approach LOS	C			B	B	
Intersection Summary						
HCM Average Control Delay			21.6		HCM Level of Service	C
HCM Volume to Capacity ratio			0.38			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

31: Glacier Highway-Ferry Terminal & Glacier Highway Bypass

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	34	0	29	222	0	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	38	0	32	247	0	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	163	156			279	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	163	156			279	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			100	
cM capacity (veh/h)	823	885			1272	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	38	279	0	8		
Volume Left	38	0	0	0		
Volume Right	0	247	0	0		
cSH	823	1700	1700	1700		
Volume to Capacity	0.05	0.16	0.00	0.00		
Queue Length (ft)	4	0	0	0		
Control Delay (s)	9.6	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.6	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization	27.4%		ICU Level of Service	A		

HCM Signalized Intersection Capacity Analysis

17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1690	1505	1690	1779	1722	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1690	1505	1690	1779	1722	
Volume (vph)	63	218	489	315	210	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	70	242	543	350	233	44
Lane Group Flow (vph)	70	242	543	350	277	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type	pm+ov		Prot			
Protected Phases	3	5	5		6	
Permitted Phases	8	3		2		
Actuated Green, G (s)	9.3	62.0	52.7	100.7	43.0	
Effective Green, g (s)	10.3	64.0	53.7	101.7	44.0	
Actuated g/C Ratio	0.09	0.53	0.45	0.85	0.37	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	145	853	756	1508	631	
v/s Ratio Prot	c0.04	0.13	c0.32		c0.16	
v/s Ratio Perm		0.03		0.20		
v/c Ratio	0.48	0.28	0.72	0.23	0.44	
Uniform Delay, d1	52.3	15.4	27.0	1.7	28.7	
Progression Factor	1.00	1.00	0.87	0.59	1.00	
Incremental Delay, d2	3.0	0.2	2.9	0.3	2.2	
Delay (s)	55.3	15.6	26.3	1.3	30.9	
Level of Service	E	B	C	A	C	
Approach Delay (s)	24.5			16.5	30.9	
Approach LOS	C			B	C	
Intersection Summary						
HCM Average Control Delay			20.9		HCM Level of Service	C
HCM Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			64.4%		ICU Level of Service	B

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

31: Glacier Highway-Ferry Terminal & Glacier Highway Bypass

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	198	0	21	78	0	19
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	220	0	23	87	0	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	88	67			110	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88	67			110	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	100			100	
cM capacity (veh/h)	908	991			1468	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	220	110	0	21		
Volume Left	220	0	0	0		
Volume Right	0	87	0	0		
cSH	908	1700	1700	1700		
Volume to Capacity	0.24	0.06	0.00	0.01		
Queue Length (ft)	24	0	0	0		
Control Delay (s)	10.2	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	10.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			6.4			
Intersection Capacity Utilization			25.9%	ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis

17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	0.99	1.00	1.00	0.99	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1690	1503	1690	1779	1696	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1690	1503	1690	1779	1696	
Volume (vph)	23	349	136	183	149	48
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	388	151	203	166	53
Lane Group Flow (vph)	26	388	151	203	219	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type	pm+ov		Prot			
Protected Phases	3	5	5		6	
Permitted Phases	8	3		2		
Actuated Green, G (s)	4.0	28.9	24.9	81.0	51.1	
Effective Green, g (s)	5.0	30.9	25.9	82.0	52.1	
Actuated g/C Ratio	0.05	0.33	0.27	0.86	0.55	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	89	552	461	1536	930	
v/s Ratio Prot	0.02	c0.19	0.09		c0.13	
v/s Ratio Perm		0.07		0.11		
v/c Ratio	0.29	0.70	0.33	0.13	0.24	
Uniform Delay, d1	43.3	28.0	27.6	1.0	11.1	
Progression Factor	1.00	1.00	0.94	0.61	1.00	
Incremental Delay, d2	2.2	4.2	0.5	0.2	0.6	
Delay (s)	45.5	32.2	26.3	0.8	11.7	
Level of Service	D	C	C	A	B	
Approach Delay (s)	33.1			11.7	11.7	
Approach LOS	C			B	B	
Intersection Summary						
HCM Average Control Delay			20.7		HCM Level of Service	C
HCM Volume to Capacity ratio			0.42			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			44.9%		ICU Level of Service	A

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

31: Glacier Highway-Ferry Terminal & Glacier Highway Bypass

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	36	0	30	234	0	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	40	0	33	260	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	172	163			293	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	163			293	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			100	
cM capacity (veh/h)	813	876			1257	

Direction, Lane #	NW 1	NE 1	SW 1	SW 2
Volume Total	40	293	0	9
Volume Left	40	0	0	0
Volume Right	0	260	0	0
cSH	813	1700	1700	1700
Volume to Capacity	0.05	0.17	0.00	0.01
Queue Length (ft)	4	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.7	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization	28.3%	ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis

17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1690	1505	1690	1779	1724	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1690	1505	1690	1779	1724	
Volume (vph)	72	243	572	365	248	45
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	80	270	636	406	276	50
Lane Group Flow (vph)	80	270	636	406	326	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type	pm+ov		Prot			
Protected Phases	3	5	5		6	
Permitted Phases	8	3		2		
Actuated Green, G (s)	9.8	65.2	55.4	100.2	39.8	
Effective Green, g (s)	10.8	67.2	56.4	101.2	40.8	
Actuated g/C Ratio	0.09	0.56	0.47	0.84	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	152	893	794	1500	586	
v/s Ratio Prot	c0.05	0.14	c0.38		c0.19	
v/s Ratio Perm		0.04		0.23		
v/c Ratio	0.53	0.30	0.80	0.27	0.56	
Uniform Delay, d1	52.2	14.0	27.0	1.9	32.2	
Progression Factor	1.00	1.00	0.91	0.59	1.00	
Incremental Delay, d2	3.7	0.2	4.5	0.3	3.8	
Delay (s)	55.9	14.2	29.2	1.5	36.0	
Level of Service	E	B	C	A	D	
Approach Delay (s)	23.7		18.4		36.0	
Approach LOS	C		B		D	
Intersection Summary						
HCM Average Control Delay			22.8	HCM Level of Service		C
HCM Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization			72.3%	ICU Level of Service		C

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

31: Glacier Highway-Ferry Terminal & Glacier Highway Bypass

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	232	0	17	82	0	23
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	258	0	19	91	0	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	90	64			110	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	64			110	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	72	100			100	
cM capacity (veh/h)	906	994			1468	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	258	110	0	26		
Volume Left	258	0	0	0		
Volume Right	0	91	0	0		
cSH	906	1700	1700	1700		
Volume to Capacity	0.28	0.06	0.00	0.02		
Queue Length (ft)	29	0	0	0		
Control Delay (s)	10.5	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	10.5	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			6.9			
Intersection Capacity Utilization		28.1%		ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis

17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	0.99	1.00	1.00	0.99	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1690	1503	1690	1779	1695	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1690	1503	1690	1779	1695	
Volume (vph)	36	424	175	196	172	56
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	471	194	218	191	62
Lane Group Flow (vph)	40	471	194	218	253	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type	pm+ov		Prot			
Protected Phases	3	5	5		6	
Permitted Phases	8	3		2		
Actuated Green, G (s)	5.8	33.7	27.9	79.2	46.3	
Effective Green, g (s)	6.8	35.7	28.9	80.2	47.3	
Actuated g/C Ratio	0.07	0.38	0.30	0.84	0.50	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	121	628	514	1502	844	
v/s Ratio Prot	0.02	c0.23	0.11		c0.15	
v/s Ratio Perm		0.09		0.12		
v/c Ratio	0.33	0.75	0.38	0.15	0.30	
Uniform Delay, d1	41.9	25.8	26.0	1.3	14.1	
Progression Factor	1.00	1.00	0.91	0.75	1.00	
Incremental Delay, d2	1.9	5.2	0.5	0.2	0.9	
Delay (s)	43.8	31.0	24.3	1.2	15.0	
Level of Service	D	C	C	A	B	
Approach Delay (s)	32.0			12.1	15.0	
Approach LOS	C			B	B	
Intersection Summary						
HCM Average Control Delay			21.3		HCM Level of Service	C
HCM Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			52.1%		ICU Level of Service	A

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

31: Glacier Highway-Ferry Terminal & Glacier Highway Bypass

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	50	0	32	247	0	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	56	0	36	274	0	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	184	173			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	184	173			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	801	866			1239	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	56	310	0	11		
Volume Left	56	0	0	0		
Volume Right	0	274	0	0		
cSH	801	1700	1700	1700		
Volume to Capacity	0.07	0.18	0.00	0.01		
Queue Length (ft)	6	0	0	0		
Control Delay (s)	9.8	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.8	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			29.3%	ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis

17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1690	1506	1690	1779	1728	1728
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1690	1506	1690	1779	1728	1728
Volume (vph)	75	292	740	396	276	45
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	324	822	440	307	50
Lane Group Flow (vph)	83	324	822	440	357	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type	pm+ov		Prot			
Protected Phases	3	5	5		6	
Permitted Phases	8	3		2		
Actuated Green, G (s)	9.9	70.6	60.7	100.1	34.4	
Effective Green, g (s)	10.9	72.6	61.7	101.1	35.4	
Actuated g/C Ratio	0.09	0.60	0.51	0.84	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	154	961	869	1499	510	
v/s Ratio Prot	c0.05	0.17	c0.49		c0.21	
v/s Ratio Perm		0.04		0.25		
v/c Ratio	0.54	0.34	0.95	0.29	0.70	
Uniform Delay, d1	52.1	11.8	27.6	2.0	37.6	
Progression Factor	1.00	1.00	0.93	0.62	1.00	
Incremental Delay, d2	4.0	0.2	10.6	0.2	7.8	
Delay (s)	56.2	12.0	36.2	1.4	45.4	
Level of Service	E	B	D	A	D	
Approach Delay (s)	21.0			24.1	45.4	
Approach LOS	C			C	D	

Intersection Summary

HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	D

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

31: Glacier Highway-Ferry Terminal & Glacier Highway Bypass

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	300	10	22	86	10	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	333	11	24	96	11	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type: None						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	123	72			120	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	123	72			120	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	61	99			99	
cM capacity (veh/h)	860	984			1455	
Direction, Lane #						
	NW 1	NE 1	SW 1	SW 2		
Volume Total	344	120	11	29		
Volume Left	333	0	11	0		
Volume Right	11	96	0	0		
cSH	864	1700	1455	1700		
Volume to Capacity	0.40	0.07	0.01	0.02		
Queue Length (ft)	48	0	1	0		
Control Delay (s)	11.9	0.0	7.5	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.9	0.0	2.1			
Approach LOS	B					
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utilization			33.7%		ICU Level of Service	A

```

*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT2 2009          61
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min 90
* L'     (m)     12.00  50.00 12.00 50.00       * TIME SLICE    min 15
* V      (m)      3.60   3.60  3.60  3.60       * RESULTS PERIOD min 15 75
* RAD    (m)     10.00  10.00 10.00 10.00       * TIME COST     $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00       * FLOW PERIOD   min 15 75
* DIA    (m)     55.00  55.00 55.00 55.00       * FLOW TYPE     pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm AM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NB FRITZ *1.04* 78 3 30 0 *.67 *50*0.89 1.110 0.89*15 45 75
*WB GLACIER*1.04* 56 282 15 0 *.73 *50*0.89 1.110 0.89*15 45 75
*SB UAS *1.04* 6 1 13 0 *1.00*50*0.89 1.110 0.89*15 45 75
*EB GLACIER*1.04* 20 616 11 0 *.67 *50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW veh 74 258 20 433
* CAPACITY veh 953 1791 1047 1793
* AVE DELAY mins 0.07 0.04 0.06 0.04
* MAX DELAY mins 0.08 0.04 0.07 0.05
* AVE QUEUE veh 0 0 0 0
* MAX QUEUE veh 0 0 0 0
*
*****

```

```

*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT2 2009          62
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min   90
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min   15
* V      (m)      3.60   3.60   3.60   3.60        * RESULTS PERIOD min  15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min  15 75
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm PM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 65   4   40  0          *.69 *50*0.89 1.110 0.89*15 45 75
*WB GLACIER*1.04* 109 1121 109 0          *.70 *50*0.89 1.110 0.89*15 45 75
*SB UAS   *1.04* 21   6   78  0          *1.00*50*0.89 1.110 0.89*15 45 75
*EB GLACIER*1.04* 63   657 20  0          *.70 *50*0.89 1.110 0.89*15 45 75
*
*          *
*          *
*          *
*****
*
* FLOW      veh      75   937   105   518          *
* CAPACITY  veh      895  1782   733  1712        * AVDEL s      3.9
* AVE DELAY mins    0.07  0.07   0.09  0.05        * L O S       A
* MAX DELAY mins    0.08  0.08   0.11  0.06        * VEH HRS     1.8
* AVE QUEUE  veh      0     1     0     0          * COST $      26.6
* MAX QUEUE  veh      0     1     0     0
*
*****

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT2 2019          61
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min 90
* L'    (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min 15
* V     (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min 15 75
* RAD   (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00
* PHI   (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min 15 75
* DIA   (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm AM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 78   3   30  0          *.77 *50*0.89 1.110 0.89*15 45 75
*WB GLACIER*1.04* 56 282 15 0          *.82 *50*0.89 1.110 0.89*15 45 75
*SB UAS   *1.04* 6    1  13  0          *1.00*50*0.89 1.110 0.89*15 45 75
*EB GLACIER*1.04* 20 616 11 0          *.79 *50*0.89 1.110 0.89*15 45 75
*
*          *
*          *
*          *
*****
*
* FLOW      veh      85   289   20   511          *
* CAPACITY  veh      916  1788  1033 1792        * AVDEL s      2.8
* AVE DELAY mins   0.07  0.04  0.06 0.05        * L O S        A
* MAX DELAY mins   0.08  0.05  0.07 0.05        * VEH HRS      0.7
* AVE QUEUE  veh      0     0     0     0          * COST $       10.6
* MAX QUEUE  veh      0     0     0     0          *
*
*****

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT2 2019          62
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min   90
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min   15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min  15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min  15 75
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh  VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm  PM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 65   4   40  0          *.81 *50*0.89 1.110 0.89*15 45 75
*WB GLACIER*1.04* 109 1121 109 0          *.82 *50*0.89 1.110 0.89*15 45 75
*SB UAS   *1.04* 21   6   78  0          *1   *50*0.89 1.110 0.89*15 45 75
*EB GLACIER*1.04* 63   657 20  0          *.75 *50*0.89 1.110 0.89*15 45 75
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      88   1098   105   555          *
* CAPACITY  veh      879   1778   660   1704        * AVDEL s      4.6
* AVE DELAY mins    0.07   0.09   0.11   0.05        * L O S       A
* MAX DELAY mins    0.09   0.11   0.13   0.06        * VEH HRS     2.4
* AVE QUEUE  veh      0      2      0      0          * COST $      35.4
* MAX QUEUE  veh      0      2      0      1          *
*
*****

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT2 2029          56
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min 90
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min 15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min 15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min 15 75
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm AM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NB FRITZ *1.04* 78 3 30 0 *1.00*50*0.89 1.110 0.89*15 45 75
*WB GLACIER*1.04* 56 282 15 0 *1.00*50*0.89 1.110 0.89*15 45 75
*SB UAS *1.04* 6 1 13 0 *1.00*50*0.89 1.110 0.89*15 45 75
*EB GLACIER*1.04* 20 616 11 0 *1.00*50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW      veh      111   353   20   647
* CAPACITY  veh      853  1782  1004 1791
* AVE DELAY mins    0.08  0.04  0.06 0.05
* MAX DELAY mins    0.09  0.05  0.07 0.06
* AVE QUEUE  veh      0      0      0      1
* MAX QUEUE  veh      0      0      0      1
*
*****

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*****
*
* 10:11:03          GLACIER HIGHWAY FRITZ COVE ALT2 2029          57
*
*****
*
* E      (m)      4.30   7.2   4.3   7.2          * TIME PERIOD   min   90
* L'     (m)     12.00  50.00 12.00 50.00        * TIME SLICE    min   15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min  15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min  15 75
* DIA    (m)     55.00  55.00 55.00 55.00        * FLOW TYPE     pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK     am/op/pm PM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NB FRITZ *1.04* 65   4   40  0          *1.00*50*0.89 1.110 0.89*15 45 75
*WB GLACIER*1.04* 109 1121 109 0          *1.00*50*0.89 1.110 0.89*15 45 75
*SB UAS   *1.04* 21   6   78  0          *1.00*50*0.89 1.110 0.89*15 45 75
*EB GLACIER*1.04* 63   657 20  0          *1.00*50*0.89 1.110 0.89*15 45 75
*
*          *
*          *
*          *
*****
*
* FLOW      veh      109   1339   105   740          *
* CAPACITY  veh      798   1770   550   1692        * AVDEL s      6.6
* AVE DELAY mins    0.09   0.14   0.13   0.06        * L O S       A
* MAX DELAY mins    0.10   0.18   0.16   0.07        * VEH HRS     4.2
* AVE QUEUE  veh      0      3      0      1          * COST $      63.3
* MAX QUEUE  veh      0      4      0      1          *
*
*****

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*****
*
* 10:11:03          MENDENHALL LP RD-UAS-BYPASS ALT2 2009          57
*
*****
*
* E      (m)      4.30   4.3   4.3   4.3          * TIME PERIOD      min 90
* L'     (m)     12.00  12.00 12.00 12.00        * TIME SLICE       min 15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD   min 15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST        $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD      min 15 75
* DIA    (m)     42.00  42.00 42.00 42.00        * FLOW TYPE        pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK        am/op/pm AM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NEB MLR   *1.04* 131   81   20   0          *.72 *50*0.89 1.110 0.89*15 45 75
*NWB UAS   *1.04*  10    1    9    0          *.85 *50*0.89 1.110 0.89*15 45 75
*SWB MLR   *1.04*  12  214  44   0          *.73 *50*0.89 1.110 0.89*15 45 75
*SEB BYPASS*1.04*   4   14   18   0          *.67 *50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW      veh      167      17      197      24
* CAPACITY  veh     1133     1117     1149     1058
* AVE DELAY mins     0.06     0.05     0.06     0.06
* MAX DELAY mins     0.07     0.06     0.07     0.07
* AVE QUEUE  veh       0       0       0       0
* MAX QUEUE  veh       0       0       0       0
*
*****

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```

*****
*
* 10:11:03          MENDENHALL LP RD-UAS-BYPASS ALT2 2009          58
*
*****
*
* E      (m)      4.30   4.3   4.3   4.3          * TIME PERIOD      min      90
* L'     (m)     12.00  12.00 12.00 12.00        * TIME SLICE       min      15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD   min     15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST        $/hr    15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD      min     15 75
* DIA    (m)     42.00  42.00 42.00 42.00        * FLOW TYPE        pcu/veh   VEH
* GRAD SEP      0       0       0       0          * FLOW PEAK        am/op/pm   PM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NEB MLR   *1.04* 127   327  17  0          *.80 *50*0.89 1.110 0.89*15 45 75
*NWB UAS   *1.04*  71    10 136  0          *.78 *50*0.89 1.110 0.89*15 45 75
*SWB MLR   *1.04*  81   167  81  0          *.68 *50*0.89 1.110 0.89*15 45 75
*SEB BYPASS*1.04*  19     6  13  0          *.71 *50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW      veh      377   169   224   27          *
* CAPACITY  veh     1125  1012  1094  1017        * AVDEL s      4.4
* AVE DELAY mins    0.08  0.07  0.07  0.06        * L O S        A
* MAX DELAY mins    0.09  0.08  0.08  0.07        * VEH HRS      1.0
* AVE QUEUE  veh      1     0     0     0          * COST $      14.6
* MAX QUEUE  veh      1     0     0     0          *
*
*****

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*****
*
* 10:11:03          MENDENHALL LP RD-UAS-BYPASS ALT2 2019          57
*
*****
*
* E      (m)      4.30   4.3   4.3   4.3          * TIME PERIOD   min 90
* L'     (m)     12.00  12.00 12.00 12.00        * TIME SLICE    min 15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min 15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min 15 75
* DIA    (m)     42.00  42.00 42.00 42.00        * FLOW TYPE     pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK    am/op/pm AM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NEB MLR   *1.04* 131   81   20   0          *.89 *50*0.89 1.110 0.89*15 45 75
*NWB UAS   *1.04*  10    1    9    0          *1.00*50*0.89 1.110 0.89*15 45 75
*SWB MLR   *1.04*  12  214  44   0          *.85 *50*0.89 1.110 0.89*15 45 75
*SEB BYPASS*1.04*   4   14   18   0          *.67 *50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW      veh      206      20      230      24          *
* CAPACITY  veh     1130     1108     1146     1041        * AVDEL s      3.8
* AVE DELAY mins    0.06    0.05    0.06    0.06        * L O S       A
* MAX DELAY mins    0.07    0.06    0.07    0.07        * VEH HRS     0.5
* AVE QUEUE  veh      0      0      0      0          * COST $      7.6
* MAX QUEUE  veh      0      0      0      0          *
*
*****

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```

*****
*
* 10:11:03          MENDENHALL LP RD-UAS-BYPASS ALT2 2019          58
*
*****
*
* E      (m)      4.30   4.3   4.3   4.3          * TIME PERIOD   min    90
* L'     (m)     12.00  12.00 12.00 12.00        * TIME SLICE    min    15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min   15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr   15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min   15 75
* DIA    (m)     42.00  42.00 42.00 42.00        * FLOW TYPE     pcu/veh  VEH
* GRAD SEP      0       0       0       0          * FLOW PEAK    am/op/pm   PM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NEB MLR   *1.04* 127   327  17  0          *.93 *50*0.89 1.110 0.89*15 45 75
*NWB UAS   *1.04*  71    10 136  0          *1.00*50*0.89 1.110 0.89*15 45 75
*SWB MLR   *1.04*  81   167  81  0          *.80 *50*0.89 1.110 0.89*15 45 75
*SEB BYPASS*1.04*  19     6  13  0          *.61 *50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW      veh      438   217   263   23          *
* CAPACITY  veh     1121   989  1076  986          * AVDEL s      4.8
* AVE DELAY mins    0.09  0.08  0.07  0.06          * L O S       A
* MAX DELAY mins    0.10  0.09  0.08  0.07          * VEH HRS     1.2
* AVE QUEUE  veh      1     0     0     0          * COST $      18.7
* MAX QUEUE  veh      1     0     0     0          *
*
*****

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*****
*
* 10:11:03          MENDENHALL LP RD-UAS-BYPASS ALT2 2029          55
*
*****
*
* E      (m)      4.30   4.3   4.3   4.3          * TIME PERIOD      min 90
* L'     (m)     12.00  12.00 12.00 12.00        * TIME SLICE       min 15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD   min 15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST        $/hr 15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD      min 15 75
* DIA    (m)     42.00  42.00 42.00 42.00        * FLOW TYPE        pcu/veh VEH
* GRAD SEP      0      0      0      0          * FLOW PEAK        am/op/pm AM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*
*NEB MLR   *1.04* 131   81   20   0          *1.00*50*0.89 1.110 0.89*15 45 75
*NWB UAS   *1.04*  10    1    9    0          *1.00*50*0.89 1.110 0.89*15 45 75
*SWB MLR   *1.04*  12  214  44   0          *1.00*50*0.89 1.110 0.89*15 45 75
*SEB BYPASS*1.04*   4   14   18   0          *1.00*50*0.89 1.110 0.89*15 45 75
*
*
*
*****
*
* FLOW      veh      232    20    270    36
* CAPACITY  veh     1121   1099   1145   1021
* AVE DELAY mins    0.07   0.05   0.07   0.06
* MAX DELAY mins    0.08   0.06   0.08   0.07
* AVE QUEUE  veh      0      0      0      0
* MAX QUEUE  veh      0      0      0      0
*
*****

```

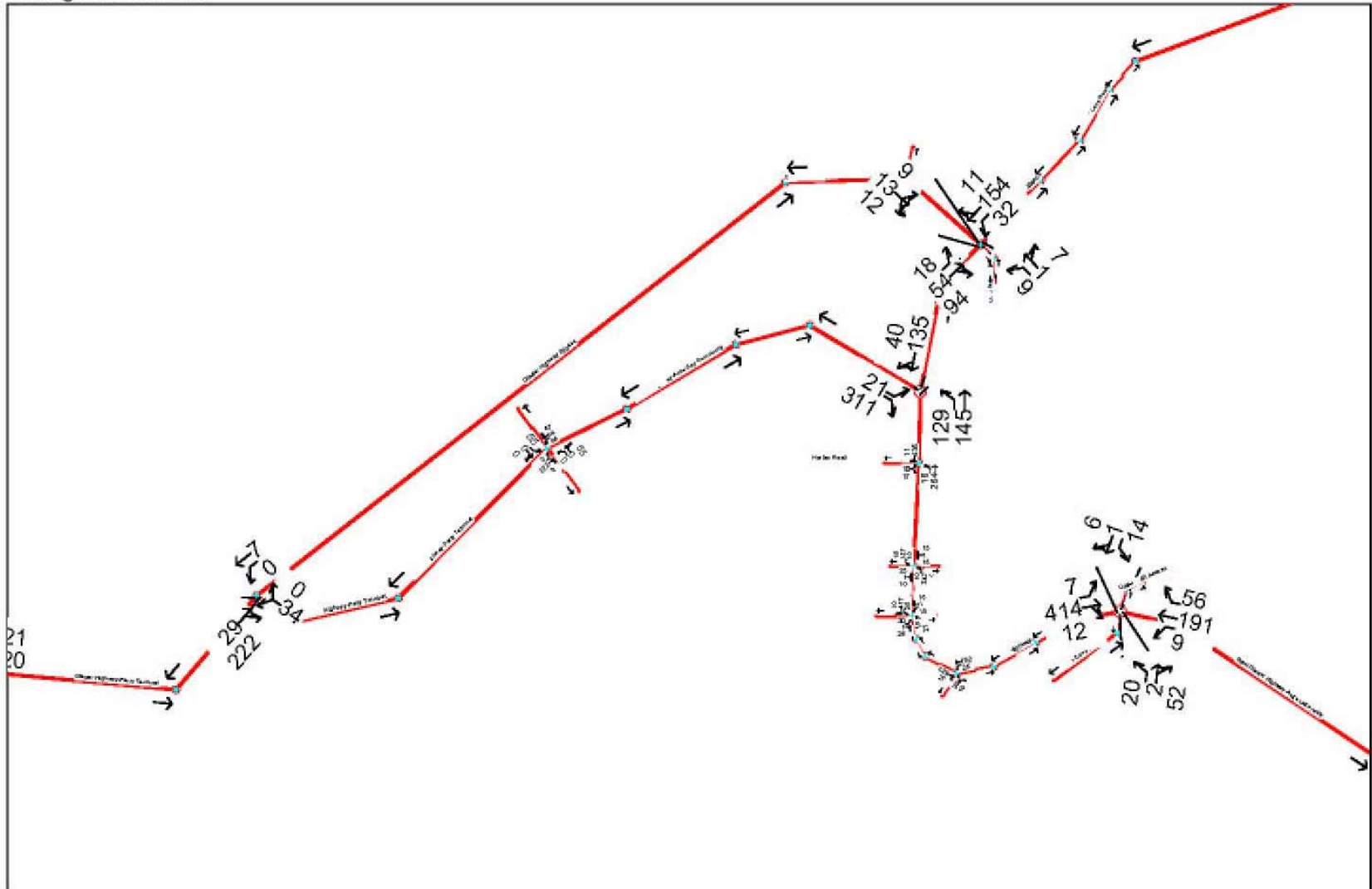
```

*****
*
* 10:11:03          MENDENHALL LP RD-UAS-BYPASS ALT2 2029          56
*
*****
*
* E      (m)      4.30   4.3   4.3   4.3          * TIME PERIOD   min    90
* L'     (m)     12.00  12.00 12.00 12.00        * TIME SLICE    min    15
* V      (m)      3.60   3.60  3.60  3.60        * RESULTS PERIOD min   15 75
* RAD    (m)     10.00  10.00 10.00 10.00        * TIME COST     $/hr   15.00
* PHI    (d)     30.00  30.00 30.00 30.00        * FLOW PERIOD   min   15 75
* DIA    (m)     42.00  42.00 42.00 42.00        * FLOW TYPE     pcu/veh  VEH
* GRAD SEP      0       0       0       0          * FLOW PEAK     am/op/pm  PM
*
*****
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U) *FLOF*CL* FLOW RATIO *FLOW TIME*
*          *   *
*NEB MLR   *1.04* 127   327  17  0          *1.00*50*0.89 1.110 0.89*15 45 75
*NWB UAS   *1.04*  71    10 136  0          *1.00*50*0.89 1.110 0.89*15 45 75
*SWB MLR   *1.04*  81   167  81  0          *1.00*50*0.89 1.110 0.89*15 45 75
*SEB BYPASS*1.04*  19     6  13  0          *1.00*50*0.89 1.110 0.89*15 45 75
*          *   *
*          *   *
*          *   *
*****
*
* FLOW      veh      471   217   329   38          *
* CAPACITY  veh     1109   974  1076   960        * AVDEL s      5.1
* AVE DELAY mins    0.09   0.08   0.08   0.06        * L O S       A
* MAX DELAY mins    0.11   0.09   0.09   0.07        * VEH HRS     1.5
* AVE QUEUE  veh      1     0     0     0          * COST $      22.2
* MAX QUEUE  veh      1     0     0     0          *
*
*****

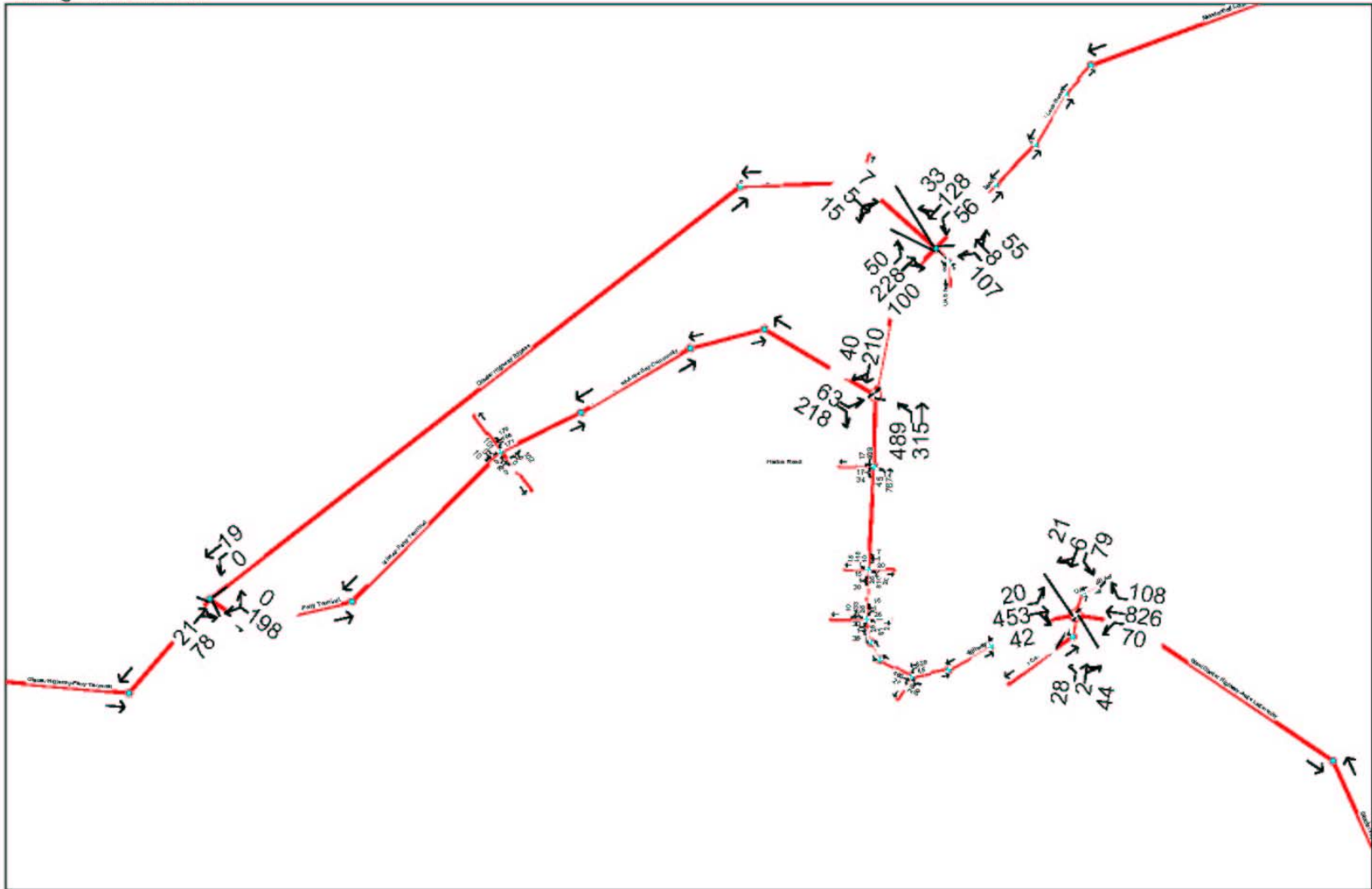
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Alternative 2 Peak Hour Turning Movements

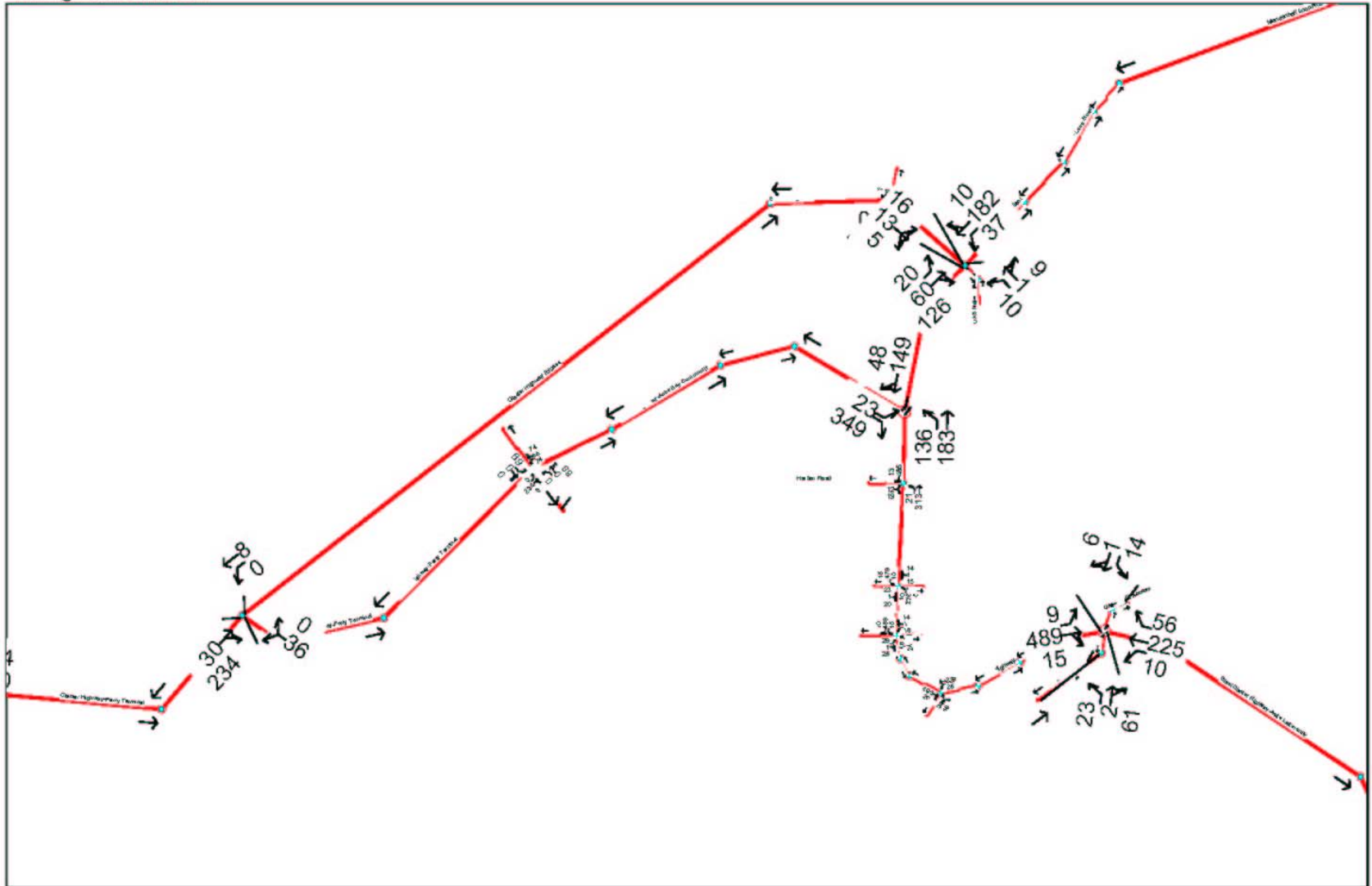
Alternative 2 Year 2009
Timing Plan: AM Peak



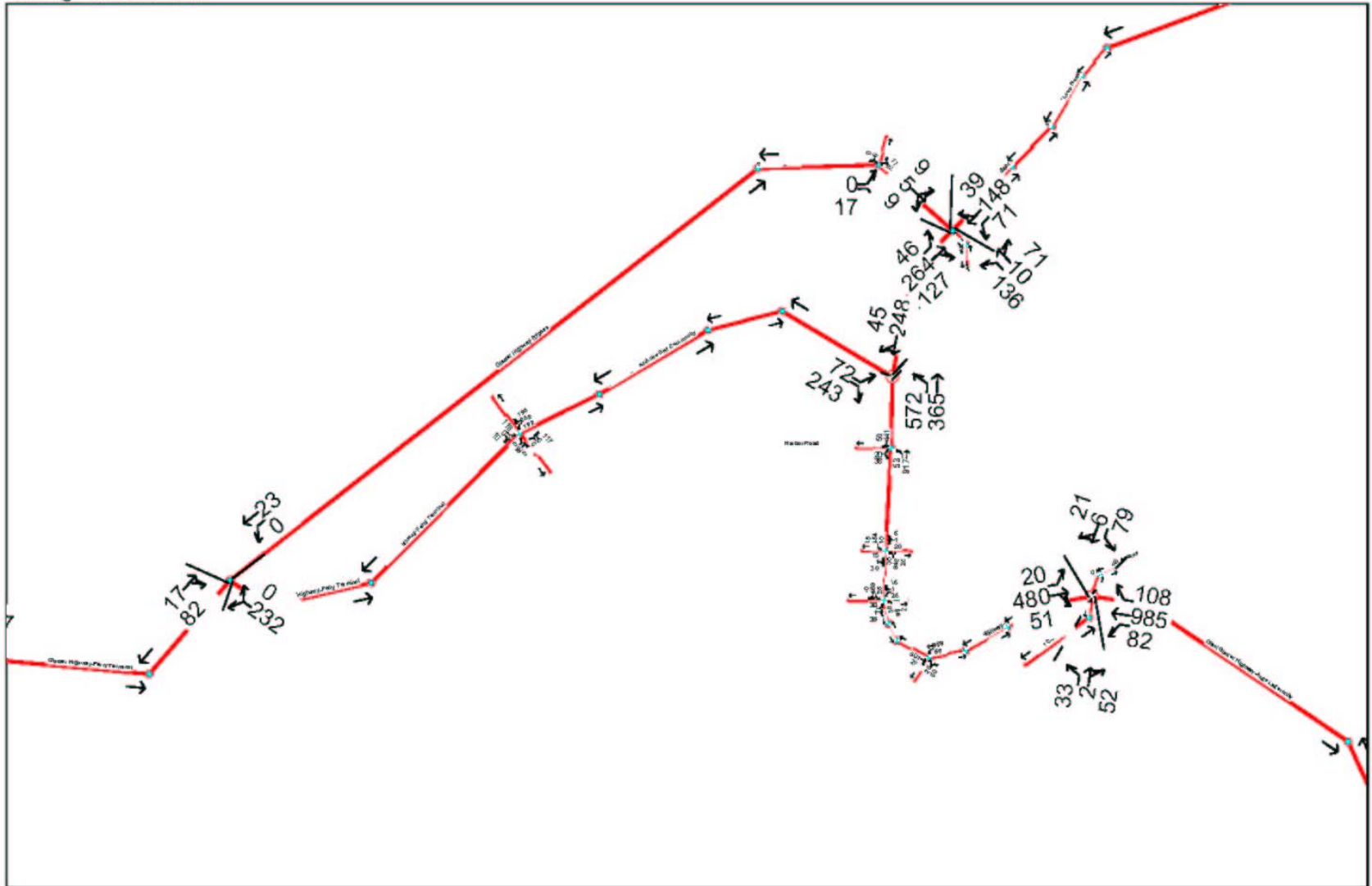
Alternative 2 Year 2009
Timing Plan: PM Peak



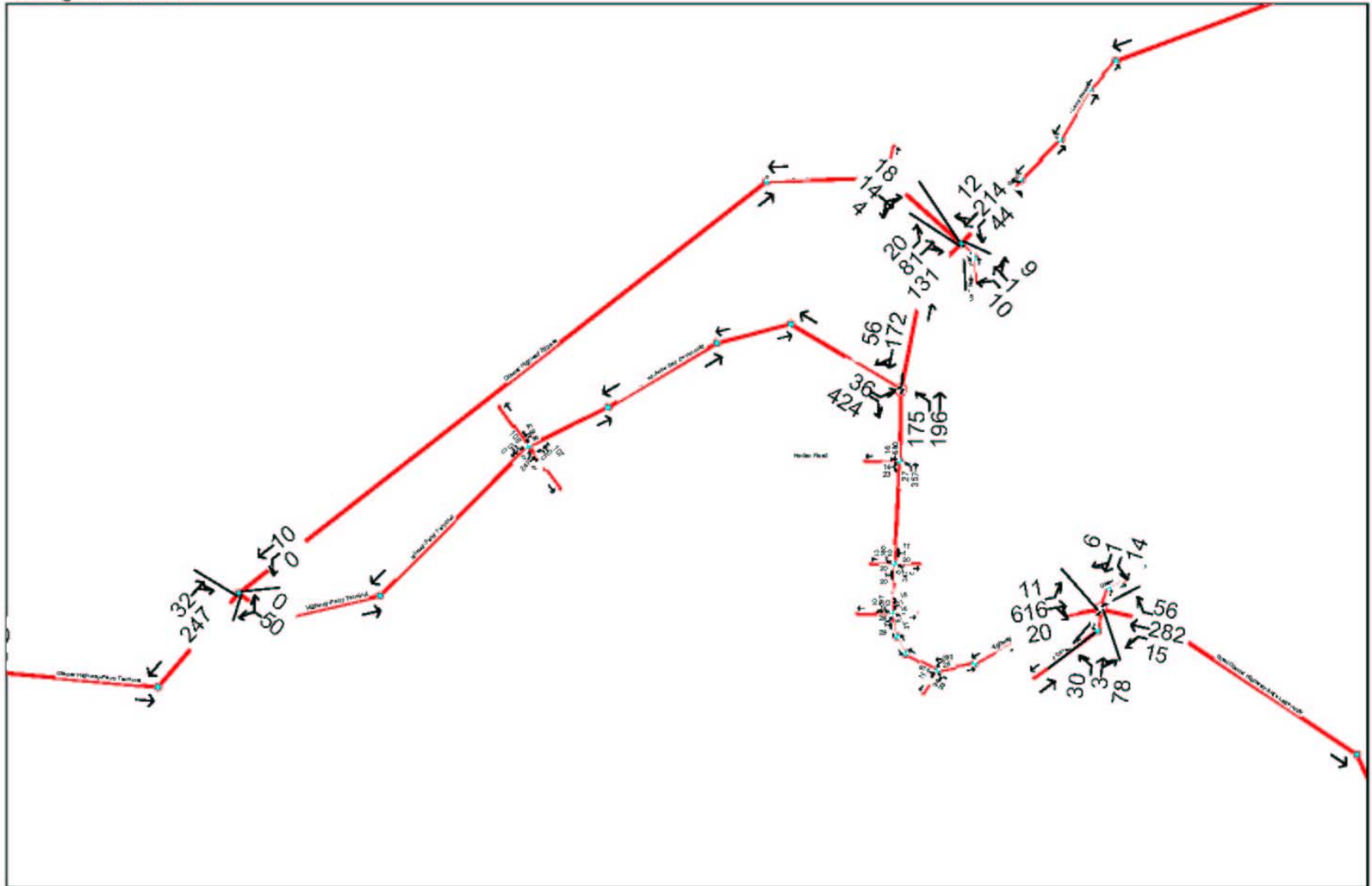
Alternative 2 Year 2019
Timing Plan: AM Peak



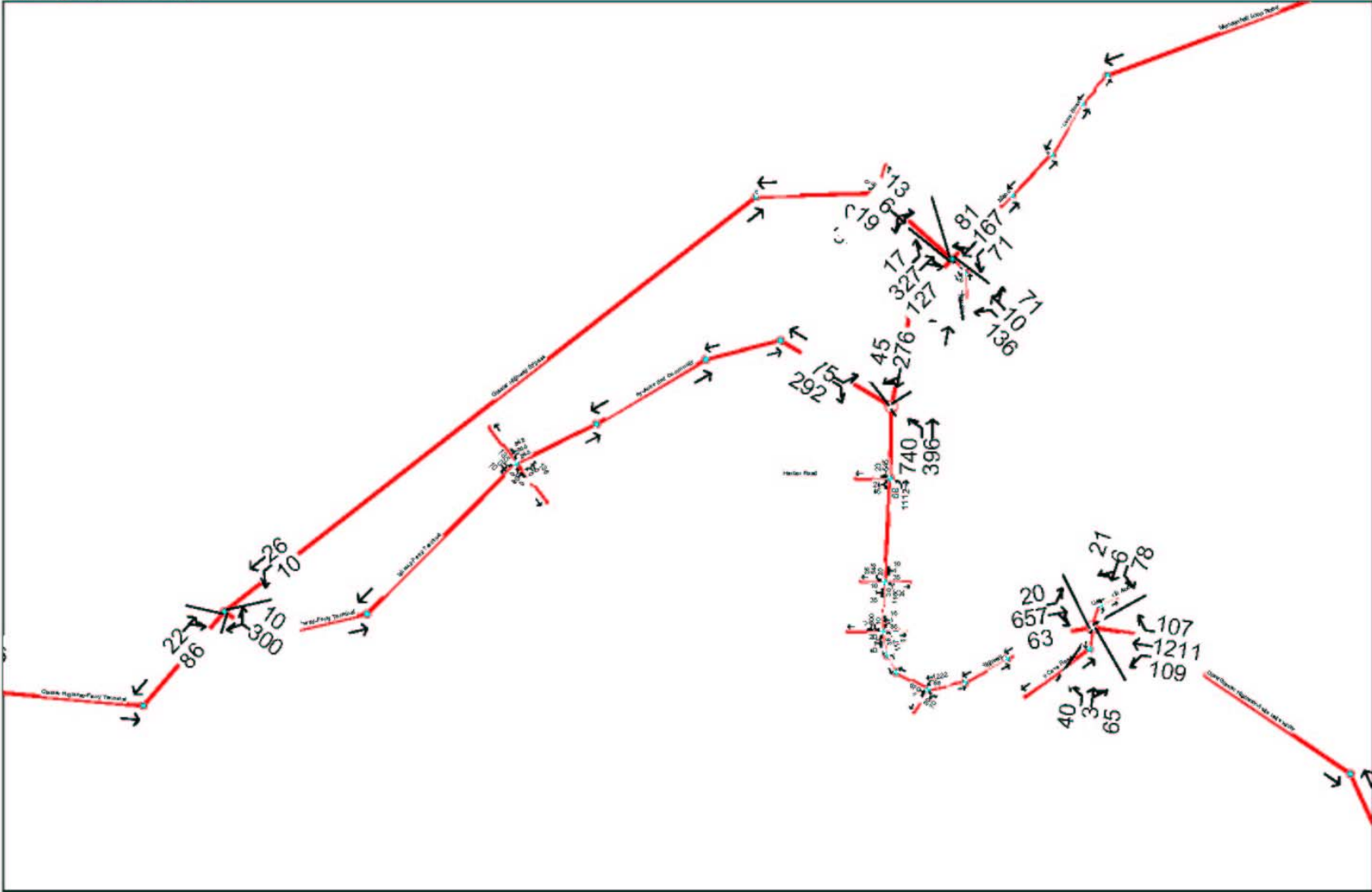
Alternative 2 Year 2019
Timing Plan: PM Peak



Alternative 2 Year 2029
Timing Plan: AM Peak



Alternative 2 Year 2029
Timing Plan: PM Peak



Alternative 2 Capacity Reports for Major Intersections

Summary of Intersection Queues and Lane Geometrics

Alternative 3 Queue Lengths and Lane Lengths			
Movement	95% Queue (ft)		Auxiliary Lane Length (ft)
	Morning	Evening	
Mendenhall Loop & Bypass			
EBL	7	16	150 (2)
EBT/R	61	166	-
WBL	13	67	200 (2)
WBT/R	76	76	-
NBL	61	81	360 (2)
NBT	74	207	-
NBR	18	24	300 (2)
SBL	14	28	300 (2)
SBT	122	93	-
SBR	14	13	290 (2)
Glacier Hwy & Bypass East			
EBL	9	14	240 (2)
EBT/R	333	420	-
WBL	9	14	240 (2)
WBT	103	834	-
WBR	42	60	280 (2)
NBL	8	34	140 (2)
NBT/R	28	55	-
SBL	220	218	500 (2) (400 max)
SBT/R	28	50	-
Glacier Hwy & Fritz Cove			
EBL	1	2	240 (2)
EBT/R	0	0	-
WBL	1	10	245 (2)
WBT/R	0	0	-
NBL	6	58	25 (1) (100 min)
NBT/R	12	14	-
SBL	4	169	25 (1) (100 min)
SBT/R	1	11	-
Glacier Hwy & Mendenhall Loop Road			
EBL	2	8	120 (2)
EBT	0	0	-
WBT	0	0	-
WBR	0	0	93 (2) (100 min)
SBL/R	23	32.6	-
Mendenhall Loop & UAS/Guard Access			
EBLTR	2	1	-
WBLTR	6	9	-
NBL	1	11	25 (2) (100 min)
NBT/R	2	58	-
SBLTR	20	34	-

Bypass & UAS/Guard Access			
EBT/R	0	0	-
WBL	4	5	308 (2)
WBT/R	0	0	-
NBL/R	2	13	-
Glacier Hwy & Bypass West (ferry terminal)			
EBT/R	0	0	-
WBL	0	1	308 (2)
WBT	0	0	-
NBL/R	3	9	-

(1) Storage Only

(2) Storage and Deceleration

HCM Unsignalized Intersection Capacity Analysis
 17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	148	107	46	72	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	21	164	119	51	80	11
Pedestrians		10			10	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	180				336	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	180				336	139
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				88	99
cM capacity (veh/h)	1372				640	889
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	21	164	119	51	91	
Volume Left	21	0	0	0	80	
Volume Right	0	0	0	51	11	
cSH	1372	1700	1700	1700	663	
Volume to Capacity	0.02	0.10	0.07	0.03	0.14	
Queue Length (ft)	1	0	0	0	12	
Control Delay (s)	7.7	0.0	0.0	0.0	11.3	
Lane LOS	A				B	
Approach Delay (s)	0.9		0.0		11.3	
Approach LOS					B	
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			23.2%		ICU Level of Service	A























HCM Unsignalized Intersection Capacity Analysis
 31: Glacier Highway-Ferry Terminal & Future Bypass, Alt. 3

11/8/2003

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↙		→		↘	↗
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	11	10	192	59	10	30
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	12	11	213	66	11	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	302	246			279	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	302	246			279	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	680	788			1272	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	23	279	11	33		
Volume Left	12	0	11	0		
Volume Right	11	66	0	0		
cSH	727	1700	1272	1700		
Volume to Capacity	0.03	0.16	0.01	0.02		
Queue Length (ft)	2	0	1	0		
Control Delay (s)	10.1	0.0	7.9	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	2.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			25.6%	ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis
 42: Mendenhall Loop Road & Future Bypass, Alt. 3

11/8/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.89		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1585		1690	1757		1690	1779	1512	1690	1779	1512
Flt Permitted	0.70	1.00		0.55	1.00		0.59	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1250	1585		970	1757		1047	1779	1512	1267	1779	1512
Volume (vph)	10	33	88	21	69	6	49	62	22	10	166	16
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	37	98	23	77	7	54	69	24	11	184	18
Lane Group Flow (vph)	11	135	0	23	84	0	54	69	24	11	184	18
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	9.4	8.0		12.2	9.4		37.0	32.8	32.8	31.4		30.0
Effective Green, g (s)	11.4	9.0		14.2	10.4		39.0	33.8	33.8	33.4		31.0
Actuated g/C Ratio	0.18	0.14		0.22	0.16		0.60	0.52	0.52	0.51		0.48
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0		5.0
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
Lane Grp Cap (vph)	235	219		254	281		680	925	786	667		848
v/s Ratio Prot	0.00	c0.09		c0.01	0.05		c0.01	0.04		0.00		c0.10
v/s Ratio Perm	0.01			0.01			0.04		0.02	0.01		0.01
v/c Ratio	0.05	0.62		0.09	0.30		0.08	0.07	0.03	0.02		0.22
Uniform Delay, d1	22.2	26.4		20.2	24.1		5.4	7.8	7.6	7.7		9.9
Progression Factor	1.00	1.00		1.00	1.00		1.36	1.28	1.54	1.00		1.00
Incremental Delay, d2	0.1	5.3		0.2	0.7		0.1	0.2	0.1	0.0		0.6
Delay (s)	22.3	31.7		20.3	24.8		7.4	10.1	11.8	7.7		10.5
Level of Service	C	C		C	C		A	B	B	A		B
Approach Delay (s)		31.0			23.8			9.4				10.2
Approach LOS		C			C			A				B
Intersection Summary												
HCM Average Control Delay			17.4				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			29.8%				ICU Level of Service			A		
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 44: Glacier Highway-Auke Lake & Future Bypass, Alt. 3

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.89		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1746		1690	1779	1512	1690	1587		1690	1657	
Flt Permitted	0.67	1.00		0.54	1.00	1.00	0.74	1.00		0.67	1.00	
Satd. Flow (perm)	1196	1746		968	1779	1512	1319	1587		1188	1657	
Volume (vph)	12	213	30	12	119	121	5	12	30	253	12	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	237	33	13	132	134	6	13	33	281	13	11
Lane Group Flow (vph)	13	270	0	13	132	134	6	46	0	281	24	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	29.2	27.8		29.2	27.8	27.8	15.0	8.0		16.6	8.8	
Effective Green, g (s)	31.2	28.8		31.2	28.8	28.8	17.0	9.0		18.6	9.8	
Actuated g/C Ratio	0.48	0.44		0.48	0.44	0.44	0.26	0.14		0.29	0.15	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	592	774		491	788	670	391	220		408	250	
v/s Ratio Prot	0.00	c0.15		c0.00	0.07		0.00	0.03		c0.09	0.01	
v/s Ratio Perm	0.01			0.01		0.09	0.00			c0.10		
v/c Ratio	0.02	0.35		0.03	0.17	0.20	0.02	0.21		0.69	0.10	
Uniform Delay, d1	8.9	11.9		8.9	10.9	11.1	17.8	24.8		19.9	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.41	1.57	
Incremental Delay, d2	0.0	1.2		0.0	0.1	0.2	0.0	0.6		4.9	0.2	
Delay (s)	8.9	13.2		8.9	11.0	11.2	17.8	25.4		33.0	37.5	
Level of Service	A	B		A	B	B	B	C		C	D	
Approach Delay (s)		13.0			11.0			24.5			33.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM Average Control Delay			19.8				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			44.2%				ICU Level of Service				A	
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 46: Glacier Highway-Auke Bay Community & Fritz Cove Road

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	7	162	12	9	60	56	20	2	52	14	1	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	8	180	13	10	67	62	22	2	58	16	1	7
Pedestrians	10			10			10			10		
Lane Width (ft)	12.0			12.0			12.0			12.0		
Walking Speed (ft/s)	4.0			4.0			4.0			4.0		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	139			203			316	371	207	392	347	118
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	139			203			316	371	207	392	347	118
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	100	93	97	100	99
cM capacity (veh/h)	1420			1345			603	539	815	502	557	913
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	8	193	10	129	22	60	16	8				
Volume Left	8	0	10	0	22	0	16	0				
Volume Right	0	13	0	62	0	58	0	7				
cSH	1420	1700	1345	1700	603	800	502	837				
Volume to Capacity	0.01	0.11	0.01	0.08	0.04	0.08	0.03	0.01				
Queue Length (ft)	0	0	1	0	3	6	2	1				
Control Delay (s)	7.5	0.0	7.7	0.0	11.2	9.9	12.4	9.3				
Lane LOS	A		A		B	A	B	A				
Approach Delay (s)	0.3	0.6		10.2		11.4						
Approach LOS			B		B							
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			25.3%		ICU Level of Service		A					

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Drive

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+		+	+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	16	33	16	34	71	29	3	1	13	15	52	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	18	37	18	38	79	32	3	1	14	17	58	9
Pedestrians		10			10			10				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		1			1			1				
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	111			64			309	278	66	277	271	105
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	111			64			309	278	66	277	271	105
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	100	99	97	90	99
cM capacity (veh/h)	1466			1512			558	599	976	633	604	936
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	72	149	3	16	83							
Volume Left	18	38	3	0	17							
Volume Right	18	32	0	14	9							
cSH	1466	1512	558	934	634							
Volume to Capacity	0.01	0.02	0.01	0.02	0.13							
Queue Length (ft)	1	2	0	1	11							
Control Delay (s)	1.9	2.0	11.5	8.9	11.5							
Lane LOS	A	A	B	A	B							
Approach Delay (s)	1.9	2.0	9.4		11.5							
Approach LOS			A		B							
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			27.9%			ICU Level of Service			A			

HCM Unsignalized Intersection Capacity Analysis
 16: Future Bypass, Alt. 3 & UAS/Guard Drive

11/8/2003



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↵	↕	↵	↕
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	70	4	44	175	8	69
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	78	4	49	194	9	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			82		372	80
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			82		372	80
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		99	92
cM capacity (veh/h)			1502		604	975
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	82	49	194	86		
Volume Left	0	49	0	9		
Volume Right	4	0	0	77		
cSH	1700	1502	1700	916		
Volume to Capacity	0.05	0.03	0.11	0.09		
Queue Length (ft)	0	3	0	8		
Control Delay (s)	0.0	7.5	0.0	9.3		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.5	9.3			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			22.5%	ICU Level of Service	A	

HCM Unsignalized Intersection Capacity Analysis
 17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↑	↗	↵	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	56	159	326	104	77	19
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	62	177	362	116	86	21
Pedestrians		10	10		10	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		1	1		1	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	488				683	382
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	488				683	382
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				78	97
cM capacity (veh/h)	1056				381	650
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	62	177	362	116	107	
Volume Left	62	0	0	0	86	
Volume Right	0	0	0	116	21	
cSH	1056	1700	1700	1700	415	
Volume to Capacity	0.06	0.10	0.21	0.07	0.26	
Queue Length (ft)	5	0	0	0	25	
Control Delay (s)	8.6	0.0	0.0	0.0	16.7	
Lane LOS	A				C	
Approach Delay (s)	2.2		0.0		16.7	
Approach LOS					C	
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			41.5%	ICU Level of Service	A	

HCM Unsignalized Intersection Capacity Analysis
 31: Glacier Highway-Ferry Terminal & Future Bypass, Alt. 3

11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↙		↔		↘	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	35	0	74	19	10	173
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	39	0	82	21	11	192
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	307	93			103	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	307	93			103	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	100			99	
cM capacity (veh/h)	676	959			1476	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	39	103	11	192		
Volume Left	39	0	11	0		
Volume Right	0	21	0	0		
cSH	676	1700	1476	1700		
Volume to Capacity	0.06	0.06	0.01	0.11		
Queue Length (ft)	5	0	1	0		
Control Delay (s)	10.7	0.0	7.5	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.7	0.0	0.4			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			20.4%	ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis
 42: Mendenhall Loop Road & Future Bypass, Alt. 3

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1615		1690	1744		1690	1779	1512	1690	1779	1512
Flt Permitted	0.69	1.00		0.30	1.00		0.64	1.00	1.00	0.62	1.00	1.00
Satd. Flow (perm)	1233	1615		526	1744		1139	1779	1512	1096	1779	1512
Volume (vph)	2	73	116	62	77	12	120	205	102	27	100	12
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	81	129	69	86	13	133	228	113	30	111	13
Lane Group Flow (vph)	2	210	0	69	99	0	133	228	113	30	111	13
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	15.2	13.8		24.0	18.2		53.5	46.2	46.2	47.3	43.1	43.1
Effective Green, g (s)	17.2	14.8		25.6	19.2		55.5	47.2	47.2	49.3	44.1	44.1
Actuated g/C Ratio	0.19	0.16		0.28	0.21		0.62	0.52	0.52	0.55	0.49	0.49
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	248	266		238	372		753	933	793	635	872	741
v/s Ratio Prot	0.00	c0.13		c0.02	0.06		c0.02	c0.13		0.00	0.06	
v/s Ratio Perm	0.00			0.06			0.09		0.07	0.02		0.01
v/c Ratio	0.01	0.79		0.29	0.27		0.18	0.24	0.14	0.05	0.13	0.02
Uniform Delay, d1	29.5	36.1		24.6	29.5		7.2	11.7	11.0	9.4	12.5	11.8
Progression Factor	1.00	1.01		1.00	1.00		0.91	0.89	0.65	1.00	1.00	1.00
Incremental Delay, d2	0.0	14.8		0.8	0.5		0.1	0.6	0.4	0.0	0.3	0.0
Delay (s)	29.5	51.1		25.4	30.0		6.7	11.0	7.5	9.4	12.8	11.8
Level of Service	C	D		C	C		A	B	A	A	B	B
Approach Delay (s)		50.9			28.1			9.0			12.0	
Approach LOS		D			C			A			B	
Intersection Summary												
HCM Average Control Delay			21.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			42.6%				ICU Level of Service			A		
c Critical Lane Group												






















HCM Signalized Intersection Capacity Analysis
 44: Glacier Highway-Auke Lake & Future Bypass, Alt. 3

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1758		1690	1779	1512	1690	1587		1690	1562	
Flt Permitted	0.29	1.00		0.44	1.00	1.00	0.71	1.00		0.60	1.00	
Satd. Flow (perm)	524	1758		788	1779	1512	1267	1587		1076	1562	
Volume (vph)	12	348	30	12	565	403	15	12	30	216	12	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	387	33	13	628	448	17	13	33	240	13	56
Lane Group Flow (vph)	13	420	0	13	628	448	17	46	0	240	69	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	52.7	51.3		52.7	51.3	51.3	15.4	8.4		19.2	10.3	
Effective Green, g (s)	54.7	52.3		54.7	52.3	52.3	17.4	9.4		21.2	11.3	
Actuated g/C Ratio	0.61	0.58		0.61	0.58	0.58	0.19	0.10		0.24	0.13	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	350	1022		503	1034	879	283	166		321	196	
v/s Ratio Prot	c0.00	0.24		0.00	c0.35		0.01	0.03		c0.08	0.04	
v/s Ratio Perm	0.02			0.02		0.30	0.01			c0.09		
v/c Ratio	0.04	0.41		0.03	0.61	0.51	0.06	0.28		0.75	0.35	
Uniform Delay, d1	8.5	10.4		7.3	12.2	11.2	29.6	37.2		30.9	36.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.12	1.37	
Incremental Delay, d2	0.1	1.2		0.0	1.1	0.6	0.1	1.1		9.2	1.3	
Delay (s)	8.5	11.6		7.3	13.3	11.8	29.7	38.2		43.9	50.6	
Level of Service	A	B		A	B	B	C	D		D	D	
Approach Delay (s)		11.5			12.6			35.9			45.4	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay			18.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			60.9%			ICU Level of Service				B		
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 46: Glacier Highway-Auke Bay Community & Fritz Cove Road

11/8/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	20	225	42	70	402	108	28	2	44	79	6	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	250	47	78	447	120	31	2	49	88	7	23
Pedestrians	10			10			10			10		
Lane Width (ft)	12.0			12.0			12.0			12.0		
Walking Speed (ft/s)	4.0			4.0			4.0			4.0		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	577			307			967	1060	293	1027	1023	527
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	577			307			967	1060	293	1027	1023	527
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			94			84	99	93	50	97	96
cM capacity (veh/h)	979			1232			197	200	729	177	210	538
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	22	297	78	567	31	51	88	30				
Volume Left	22	0	78	0	31	0	88	0				
Volume Right	0	47	0	120	0	49	0	23				
cSH	979	1700	1232	1700	197	654	177	400				
Volume to Capacity	0.02	0.17	0.06	0.33	0.16	0.08	0.50	0.08				
Queue Length (ft)	2	0	5	0	14	6	60	6				
Control Delay (s)	8.8	0.0	8.1	0.0	26.7	11.0	43.7	14.7				
Lane LOS	A		A		D	B	E	B				
Approach Delay (s)	0.6	1.0		16.9		36.3						
Approach LOS			C		E							
Intersection Summary												
Average Delay			5.6									
Intersection Capacity Utilization			57.3%		ICU Level of Service		A					

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Drive

11/8/2003



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+		+	+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	31	100	15	99	69	41	24	77	69	4	47	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	34	111	17	110	77	46	27	86	77	4	52	3
Pedestrians		10			10			10				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		1			1			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	122			138			557	541	139	637	526	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			138			557	541	139	637	526	109
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			93	79	91	98	87	100
cM capacity (veh/h)	1453			1422			356	398	888	270	406	931
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	162	232	27	162	60							
Volume Left	34	110	27	0	4							
Volume Right	17	46	0	77	3							
cSH	1453	1422	356	538	403							
Volume to Capacity	0.02	0.08	0.07	0.30	0.15							
Queue Length (ft)	2	6	6	31	13							
Control Delay (s)	1.8	4.0	15.9	14.5	15.5							
Lane LOS	A	A	C	B	C							
Approach Delay (s)	1.8	4.0	14.7		15.5							
Approach LOS			B		C							
Intersection Summary												
Average Delay				7.7								
Intersection Capacity Utilization			44.4%		ICU Level of Service				A			

HCM Unsignalized Intersection Capacity Analysis
 16: Future Bypass, Alt. 3 & UAS/Guard Drive

11/8/2003



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↖	↗	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	189	24	59	31	11	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	210	27	66	34	12	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			237		389	223
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			237		389	223
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		98	98
cM capacity (veh/h)			1319		581	811
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	237	66	34	29		
Volume Left	0	66	0	12		
Volume Right	27	0	0	17		
cSH	1700	1319	1700	694		
Volume to Capacity	0.14	0.05	0.02	0.04		
Queue Length (ft)	0	4	0	3		
Control Delay (s)	0.0	7.9	0.0	10.4		
Lane LOS		A		B		
Approach Delay (s)	0.0	5.2		10.4		
Approach LOS				B		
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			30.1%		ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↑	↵	↵	↵
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	25	177	111	51	85	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	28	197	123	57	94	11
Pedestrians		10			10	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	190				386	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	190				386	143
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				84	99
cM capacity (veh/h)	1360				596	884
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	28	197	123	57	106	
Volume Left	28	0	0	0	94	
Volume Right	0	0	0	57	11	
cSH	1360	1700	1700	1700	617	
Volume to Capacity	0.02	0.12	0.07	0.03	0.17	
Queue Length (ft)	2	0	0	0	15	
Control Delay (s)	7.7	0.0	0.0	0.0	12.0	
Lane LOS	A				B	
Approach Delay (s)	1.0		0.0		12.0	
Approach LOS					B	
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			25.5%		ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 31: Glacier Highway-Ferry Terminal & Future Bypass, Alt. 3























11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↘		↔		↙	↗
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	12	10	203	62	10	32
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	13	11	226	69	11	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	318	260			294	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	318	260			294	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	665	774			1256	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	24	294	11	36		
Volume Left	13	0	11	0		
Volume Right	11	69	0	0		
cSH	711	1700	1256	1700		
Volume to Capacity	0.03	0.17	0.01	0.02		
Queue Length (ft)	3	0	1	0		
Control Delay (s)	10.2	0.0	7.9	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.2	0.0	1.9			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			26.5%		ICU Level of Service	A

HCM Signalized Intersection Capacity Analysis
 42: Mendenhall Loop Road & Future Bypass, Alt. 3

11/8/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.89		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1582		1690	1757		1690	1779	1512	1690	1779	1512
Flt Permitted	0.69	1.00		0.48	1.00		0.58	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1234	1582		860	1757		1031	1779	1512	1246	1779	1512
Volume (vph)	5	37	104	25	81	7	65	78	30	15	172	17
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	41	116	28	90	8	72	87	33	17	191	19
Lane Group Flow (vph)	6	157	0	28	98	0	72	87	33	17	191	19
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	9.4	8.0		12.2	9.4		37.2	32.8	32.8	31.2		29.8
Effective Green, g (s)	11.4	9.0		14.2	10.4		39.2	33.8	33.8	33.2		30.8
Actuated g/C Ratio	0.18	0.14		0.22	0.16		0.60	0.52	0.52	0.51		0.47
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0		5.0
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
Lane Grp Cap (vph)	233	219		236	281		677	925	786	653		843
v/s Ratio Prot	0.00	c0.10		c0.01	0.06		c0.01	0.05		0.00		c0.11
v/s Ratio Perm	0.00			0.02			0.06		0.02	0.01		0.01
v/c Ratio	0.03	0.72		0.12	0.35		0.11	0.09	0.04	0.03		0.23
Uniform Delay, d1	22.2	26.8		20.2	24.3		5.4	7.9	7.7	7.9		10.1
Progression Factor	1.00	1.00		1.00	1.00		1.36	1.29	1.56	1.00		1.00
Incremental Delay, d2	0.1	11.0		0.3	0.9		0.1	0.2	0.1	0.0		0.6
Delay (s)	22.2	37.8		20.5	25.2		7.5	10.4	12.0	7.9		10.7
Level of Service	C	D		C	C		A	B	B	A		B
Approach Delay (s)		37.2			24.1			9.6				10.4
Approach LOS		D			C			A				B
Intersection Summary												
HCM Average Control Delay			18.8			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			65.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			35.7%			ICU Level of Service				A		
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 44: Glacier Highway-Auke Lake & Future Bypass, Alt. 3

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1765		1690	1779	1512	1690	1579		1690	1657	
Flt Permitted	0.67	1.00		0.48	1.00	1.00	0.74	1.00		0.66	1.00	
Satd. Flow (perm)	1191	1765		857	1779	1512	1319	1579		1166	1657	
Volume (vph)	10	280	15	10	123	153	5	10	30	279	12	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	311	17	11	137	170	6	11	33	310	13	11
Lane Group Flow (vph)	11	328	0	11	137	170	6	44	0	310	24	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	29.0	27.6		29.0	27.6	27.6	15.0	8.0		17.0	9.0	
Effective Green, g (s)	31.0	28.6		31.0	28.6	28.6	17.0	9.0		19.0	10.0	
Actuated g/C Ratio	0.48	0.44		0.48	0.44	0.44	0.26	0.14		0.29	0.15	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	586	777		439	783	665	391	219		413	255	
v/s Ratio Prot	0.00	c0.19		c0.00	0.08		0.00	0.03		c0.10	0.01	
v/s Ratio Perm	0.01			0.01		0.11	0.00			c0.12		
v/c Ratio	0.02	0.42		0.03	0.17	0.26	0.02	0.20		0.75	0.09	
Uniform Delay, d1	9.0	12.5		9.1	11.0	11.5	17.8	24.8		20.1	23.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.35	1.50	
Incremental Delay, d2	0.0	1.7		0.0	0.1	0.2	0.0	0.5		7.6	0.2	
Delay (s)	9.0	14.2		9.1	11.2	11.7	17.8	25.3		34.8	35.6	
Level of Service	A	B		A	B	B	B	C		C	D	
Approach Delay (s)		14.0			11.4			24.4			34.9	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM Average Control Delay		20.4										
HCM Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		65.0								12.0		
Intersection Capacity Utilization		48.8%										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 46: Glacier Highway-Auke Bay Community & Fritz Cove Road

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	9	205	15	10	67	56	23	2	61	14	1	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	10	228	17	11	74	62	26	2	68	16	1	7
Pedestrians	10			10			10			10		
Lane Width (ft)	12.0			12.0			12.0			12.0		
Walking Speed (ft/s)	4.0			4.0			4.0			4.0		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	147			254			380	435	256	464	412	126
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	147			254			380	435	256	464	412	126
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	100	91	96	100	99
cM capacity (veh/h)	1411			1288			546	495	765	440	510	904
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	10	244	11	137	26	70	16	8				
Volume Left	10	0	11	0	26	0	16	0				
Volume Right	0	17	0	62	0	68	0	7				
cSH	1411	1700	1288	1700	546	752	440	814				
Volume to Capacity	0.01	0.14	0.01	0.08	0.05	0.09	0.04	0.01				
Queue Length (ft)	1	0	1	0	4	8	3	1				
Control Delay (s)	7.6	0.0	7.8	0.0	11.9	10.3	13.5	9.5				
Lane LOS	A		A		B	B	B	A				
Approach Delay (s)	0.3	0.6		10.7		12.1						
Approach LOS					B		B					
Intersection Summary												
Average Delay	2.8											
Intersection Capacity Utilization	27.8%			ICU Level of Service				A				

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Drive

11/8/2003



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+		+	+			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	37	19	91	81	29	4	1	15	10	67	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	41	21	101	90	32	4	1	17	11	74	11
Pedestrians		10			10			10			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	132			72			473	441	72	442	435	126
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			72			473	441	72	442	435	126
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			99	100	98	98	84	99
cM capacity (veh/h)	1428			1503			393	458	969	467	462	904
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	84	223	4	18	97							
Volume Left	22	101	4	0	11							
Volume Right	21	32	0	17	11							
cSH	1428	1503	393	906	490							
Volume to Capacity	0.02	0.07	0.01	0.02	0.20							
Queue Length (ft)	1	5	1	2	18							
Control Delay (s)	2.1	3.7	14.3	9.1	14.1							
Lane LOS	A	A	B	A	B							
Approach Delay (s)	2.1	3.7	10.1		14.1							
Approach LOS			B		B							
Intersection Summary												
Average Delay			6.1									
Intersection Capacity Utilization			32.1%			ICU Level of Service			A			

HCM Unsignalized Intersection Capacity Analysis
 16: Future Bypass, Alt. 3 & UAS/Guard Drive

11/8/2003



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↵	↕	↵	↕
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	74	10	64	211	15	88
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	82	11	71	234	17	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			93		464	88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			93		464	88
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		97	90
cM capacity (veh/h)			1488		526	965
Direction, Lane #						
	EB 1	WB 1	WB 2	NB 1		
Volume Total	93	71	234	114		
Volume Left	0	71	0	17		
Volume Right	11	0	0	98		
cSH	1700	1488	1700	860		
Volume to Capacity	0.05	0.05	0.14	0.13		
Queue Length (ft)	0	4	0	11		
Control Delay (s)	0.0	7.5	0.0	9.8		
Lane LOS		A		A		
Approach Delay (s)	0.0	1.8		9.8		
Approach LOS				A		
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			26.5%		ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/8/2003



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↑	↵	↵	↵
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	67	182	380	118	96	28
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	74	202	422	131	107	31
Pedestrians		10	10		10	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		1	1		1	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	563				793	442
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563				793	442
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				67	95
cM capacity (veh/h)	990				322	601
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	74	202	422	131	138	
Volume Left	74	0	0	0	107	
Volume Right	0	0	0	131	31	
cSH	990	1700	1700	1700	360	
Volume to Capacity	0.08	0.12	0.25	0.08	0.38	
Queue Length (ft)	6	0	0	0	44	
Control Delay (s)	8.9	0.0	0.0	0.0	21.1	
Lane LOS	A				C	
Approach Delay (s)	2.4		0.0		21.1	
Approach LOS					C	
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			46.8%		ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 31: Glacier Highway-Ferry Terminal & Future Bypass, Alt. 3























11/8/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↙		↔		↘	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	40	5	79	20	10	216
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	44	6	88	22	11	240
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type None						
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	361	99			110	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361	99			110	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	99			99	
cM capacity (veh/h)	629	951			1468	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	50	110	11	240		
Volume Left	44	0	11	0		
Volume Right	6	22	0	0		
cSH	654	1700	1468	1700		
Volume to Capacity	0.08	0.06	0.01	0.14		
Queue Length (ft)	6	0	1	0		
Control Delay (s)	11.0	0.0	7.5	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.0	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			23.0%	ICU Level of Service	A	






















HCM Signalized Intersection Capacity Analysis
 42: Mendenhall Loop Road & Future Bypass, Alt. 3

11/8/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1618		1690	1734		1690	1779	1512	1690	1779	1512
Flt Permitted	0.69	1.00		0.26	1.00		0.62	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	1236	1618		454	1734		1098	1779	1512	1033	1779	1512
Volume (vph)	10	93	140	74	72	14	151	251	116	35	115	12
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	103	156	82	80	16	168	279	129	39	128	13
Lane Group Flow (vph)	11	259	0	82	96	0	168	279	129	39	128	13
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.7	16.3		26.7	20.8		51.6	43.6	43.6	44.0		39.8
Effective Green, g (s)	19.7	17.3		28.2	21.8		53.6	44.6	44.6	46.0		40.8
Actuated g/C Ratio	0.22	0.19		0.31	0.24		0.60	0.50	0.50	0.51		0.45
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0		5.0
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
Lane Grp Cap (vph)	283	311		237	420		713	882	749	566		685
v/s Ratio Prot	0.00	c0.16		c0.03	0.06		c0.02	c0.16		0.00		0.07
v/s Ratio Perm	0.01			0.08			0.12		0.09	0.03		0.01
v/c Ratio	0.04	0.83		0.35	0.23		0.24	0.32	0.17	0.07		0.16
Uniform Delay, d1	27.6	35.0		23.2	27.4		8.3	13.6	12.5	11.0		14.5
Progression Factor	1.01	1.01		1.00	1.00		0.90	0.90	0.65	1.00		1.00
Incremental Delay, d2	0.1	17.5		1.0	0.3		0.2	0.9	0.5	0.1		0.4
Delay (s)	28.0	52.7		24.2	27.7		7.6	13.0	8.6	11.1		14.9
Level of Service	C	D		C	C		A	B	A	B		B
Approach Delay (s)		51.7			26.1			10.5				14.0
Approach LOS		D			C			B				B
Intersection Summary												
HCM Average Control Delay			22.5			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			55.5%			ICU Level of Service			A			
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 44: Glacier Highway-Auke Lake & Future Bypass, Alt. 3

11/8/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1759		1690	1779	1512	1690	1619		1690	1566	
Flt Permitted	0.22	1.00		0.38	1.00	1.00	0.70	1.00		0.59	1.00	
Satd. Flow (perm)	394	1759		680	1779	1512	1250	1619		1058	1566	
Volume (vph)	15	409	33	15	647	483	20	20	30	254	15	60
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	454	37	17	719	537	22	22	33	282	17	67
Lane Group Flow (vph)	17	491	0	17	719	537	22	55	0	282	84	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt				pm+pt	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	52.6	49.8		52.6	49.8	49.8	15.4	8.4		19.4	10.4	
Effective Green, g (s)	54.6	50.8		54.6	50.8	50.8	17.4	9.4		21.4	11.4	
Actuated g/C Ratio	0.61	0.56		0.61	0.56	0.56	0.19	0.10		0.24	0.13	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	294	993		455	1004	853	281	169		322	198	
v/s Ratio Prot	c0.00	0.28		0.00	c0.40		0.01	0.03		c0.10	0.05	
v/s Ratio Perm	0.03			0.02		0.36	0.01			c0.11		
v/c Ratio	0.06	0.49		0.04	0.72	0.63	0.08	0.33		0.88	0.42	
Uniform Delay, d1	9.8	11.8		7.7	14.3	13.2	29.7	37.4		32.1	36.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.13	1.42	
Incremental Delay, d2	0.1	1.8		0.0	2.5	1.5	0.1	1.3		22.0	1.7	
Delay (s)	9.9	13.6		7.7	16.9	14.8	29.8	38.7		58.3	53.3	
Level of Service	A	B		A	B	B	C	D		E	D	
Approach Delay (s)		13.5			15.9			36.2			57.1	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM Average Control Delay		22.8			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		68.3%			ICU Level of Service			B				
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 46: Glacier Highway-Auke Bay Community & Fritz Cove Road

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free		Free		Stop		Stop					
Grade	0%		0%		0%		0%					
Volume (veh/h)	20	278	51	82	453	108	33	2	52	79	6	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	309	57	91	503	120	37	2	58	88	7	23
Pedestrians	10		10		10		10					
Lane Width (ft)	12.0		12.0		12.0		12.0					
Walking Speed (ft/s)	4.0		4.0		4.0		4.0					
Percent Blockage	1		1		1		1					
Right turn flare (veh)												
Median type					None		None					
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	633			376			1114	1207	357	1178	1176	583
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	633			376			1114	1207	357	1178	1176	583
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			76	99	91	35	96	95
cM capacity (veh/h)	932			1162			152	161	671	135	168	500
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	22	366	91	623	37	60	88	30				
Volume Left	22	0	91	0	37	0	88	0				
Volume Right	0	57	0	120	0	58	0	23				
cSH	932	1700	1162	1700	152	600	135	347				
Volume to Capacity	0.02	0.22	0.08	0.37	0.24	0.10	0.65	0.09				
Queue Length (ft)	2	0	6	0	22	8	88	7				
Control Delay (s)	9.0	0.0	8.4	0.0	35.9	11.7	71.5	16.3				
Lane LOS	A		A		E	B	F	C				
Approach Delay (s)	0.5		1.1		20.9		57.5					
Approach LOS					C		F					
Intersection Summary												
Average Delay			7.4									
Intersection Capacity Utilization			60.4%		ICU Level of Service				B			

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Drive

11/8/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+		↖	↗			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	140	15	99	70	66	30	98	88	15	60	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	33	156	17	110	78	73	33	109	98	17	67	27
Pedestrians		10			10			10				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		1			1			1				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	151			182			645	612	184	727	583	124
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	151			182			645	612	184	727	583	124
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			92			88	70	88	92	82	97
cM capacity (veh/h)	1418			1369			290	361	839	208	375	913
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	206	261	33	207	110							
Volume Left	33	110	33	0	17							
Volume Right	17	73	0	98	27							
cSH	1418	1369	290	495	383							
Volume to Capacity	0.02	0.08	0.12	0.42	0.29							
Queue Length (ft)	2	7	10	51	29							
Control Delay (s)	1.4	3.7	19.0	17.4	18.1							
Lane LOS	A	A	C	C	C							
Approach Delay (s)	1.4	3.7	17.6		18.1							
Approach LOS			C		C							
Intersection Summary												
Average Delay				9.2								
Intersection Capacity Utilization			49.8%		ICU Level of Service				A			

HCM Unsignalized Intersection Capacity Analysis
 16: Future Bypass, Alt. 3 & UAS/Guard Drive

11/7/2003



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑		↵	↑	↵	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	200	24	59	45	2	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	222	27	66	50	2	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			249		417	236
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			249		417	236
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	98
cM capacity (veh/h)			1305		559	799
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	249	66	50	19		
Volume Left	0	66	0	2		
Volume Right	27	0	0	17		
cSH	1700	1305	1700	760		
Volume to Capacity	0.15	0.05	0.03	0.02		
Queue Length (ft)	0	4	0	2		
Control Delay (s)	0.0	7.9	0.0	9.9		
Lane LOS		A		A		
Approach Delay (s)	0.0	4.5		9.9		
Approach LOS				A		
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization		30.7%		ICU Level of Service	A	

HCM Unsignalized Intersection Capacity Analysis
 17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/7/2003



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↑	↵	↵	↵
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	36	242	138	62	100	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	40	269	153	69	111	10
Pedestrians		10			10	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	232				512	173
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232				512	173
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				78	99
cM capacity (veh/h)	1313				498	851
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	40	269	153	69	121	
Volume Left	40	0	0	0	111	
Volume Right	0	0	0	69	10	
cSH	1313	1700	1700	1700	516	
Volume to Capacity	0.03	0.16	0.09	0.04	0.23	
Queue Length (ft)	2	0	0	0	23	
Control Delay (s)	7.8	0.0	0.0	0.0	14.1	
Lane LOS	A				B	
Approach Delay (s)	1.0		0.0		14.1	
Approach LOS					B	
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			30.0%		ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 31: Glacier Highway-Ferry Terminal & Future Bypass, Alt. 3























11/7/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↙		↔		↘	↕
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	13	11	213	66	0	47
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	14	12	237	73	0	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	326	273			310	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326	273			310	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			100	
cM capacity (veh/h)	664	761			1239	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	27	310	0	52		
Volume Left	14	0	0	0		
Volume Right	12	73	0	0		
cSH	705	1700	1700	1700		
Volume to Capacity	0.04	0.18	0.00	0.03		
Queue Length (ft)	3	0	0	0		
Control Delay (s)	10.3	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	10.3	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			27.4%	ICU Level of Service	A	

HCM Signalized Intersection Capacity Analysis
 42: Mendenhall Loop Road & Future Bypass, Alt. 3

11/7/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1594		1690	1758		1690	1779	1512	1690	1779	1512
Flt Permitted	0.68	1.00		0.42	1.00		0.53	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1214	1594		750	1758		950	1779	1512	1230	1779	1512
Volume (vph)	5	47	105	42	96	8	91	91	19	17	181	18
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	52	117	47	107	9	101	101	21	19	201	20
Lane Group Flow (vph)	6	169	0	47	116	0	101	101	21	19	201	20
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	10.4	9.0		16.0	11.8		36.2	30.4	30.4	27.4		26.0
Effective Green, g (s)	12.4	10.0		18.0	12.8		37.8	31.4	31.4	29.4		27.0
Actuated g/C Ratio	0.19	0.15		0.28	0.20		0.58	0.48	0.48	0.45		0.42
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0		5.0
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
Lane Grp Cap (vph)	249	245		283	346		630	859	730	573		739
v/s Ratio Prot	0.00	c0.11		c0.01	0.07		c0.02	0.06		0.00		c0.11
v/s Ratio Perm	0.00			0.03			0.08		0.01	0.01		0.01
v/c Ratio	0.02	0.69		0.17	0.34		0.16	0.12	0.03	0.03		0.27
Uniform Delay, d1	21.4	26.0		17.6	22.4		6.2	9.2	8.8	9.9		12.5
Progression Factor	1.00	1.00		1.00	1.00		1.30	1.25	1.48	1.00		1.00
Incremental Delay, d2	0.0	8.2		0.3	0.7		0.1	0.3	0.1	0.0		0.9
Delay (s)	21.4	34.2		18.0	23.1		8.2	11.8	13.1	9.9		13.4
Level of Service	C	C		B	C		A	B	B	A		B
Approach Delay (s)		33.7			21.6			10.3				13.0
Approach LOS		C			C			B				B
Intersection Summary												
HCM Average Control Delay			18.5				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			36.9%				ICU Level of Service			A		
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

44: Glacier Highway-Auke Lake & Future Bypass, Alt. 3

11/7/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1769		1690	1779	1512	1690	1587		1690	1657	
Flt Permitted	0.65	1.00		0.35	1.00	1.00	0.74	1.00		0.65	1.00	
Satd. Flow (perm)	1148	1769		625	1779	1512	1319	1587		1164	1657	
Volume (vph)	10	398	15	10	159	179	5	12	30	306	12	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	442	17	11	177	199	6	13	33	340	13	11
Lane Group Flow (vph)	11	459	0	11	177	199	6	46	0	340	24	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	29.0	27.6		29.0	27.6	27.6	15.0	8.0		17.0	9.0	
Effective Green, g (s)	31.0	28.6		31.0	28.6	28.6	17.0	9.0		19.0	10.0	
Actuated g/C Ratio	0.48	0.44		0.48	0.44	0.44	0.26	0.14		0.29	0.15	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	568	778		337	783	665	391	220		413	255	
v/s Ratio Prot	0.00	c0.26		c0.00	0.10		0.00	0.03		c0.11	0.01	
v/s Ratio Perm	0.01			0.01		0.13	0.00			c0.13		
v/c Ratio	0.02	0.59		0.03	0.23	0.30	0.02	0.21		0.82	0.09	
Uniform Delay, d1	9.0	13.8		9.5	11.3	11.7	17.8	24.8		20.7	23.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.42	1.50	
Incremental Delay, d2	0.0	3.3		0.0	0.2	0.3	0.0	0.6		12.6	0.2	
Delay (s)	9.0	17.0		9.6	11.5	12.0	17.8	25.4		42.1	35.5	
Level of Service	A	B		A	B	B	B	C		D	D	
Approach Delay (s)		16.8			11.7			24.5			41.6	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM Average Control Delay			22.7				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			57.6%				ICU Level of Service			A		
c Critical Lane Group												













HCM Unsignalized Intersection Capacity Analysis
 46: Glacier Highway-Auke Bay Community & Fritz Cove Road

11/7/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Sign Control	Free		Free		Stop		Stop					
Grade	0%		0%		0%		0%					
Volume (veh/h)	11	306	20	15	103	56	30	3	78	14	1	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	12	340	22	17	114	62	33	3	87	16	1	7
Pedestrians	10		10		10		10					
Lane Width (ft)	12.0		12.0		12.0		12.0					
Walking Speed (ft/s)	4.0		4.0		4.0		4.0					
Percent Blockage	1		1		1		1					
Right turn flare (veh)												
Median type					None		None					
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	187			372			551	606	371	652	586	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187			372			551	606	371	652	586	166
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			92	99	87	95	100	99
cM capacity (veh/h)	1364			1166			418	393	659	312	403	859
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	12	362	17	177	33	90	16	8				
Volume Left	12	0	17	0	33	0	16	0				
Volume Right	0	22	0	62	0	87	0	7				
cSH	1364	1700	1166	1700	418	643	312	740				
Volume to Capacity	0.01	0.21	0.01	0.10	0.08	0.14	0.05	0.01				
Queue Length (ft)	1	0	1	0	6	12	4	1				
Control Delay (s)	7.7	0.0	8.1	0.0	14.4	11.5	17.2	9.9				
Lane LOS	A		A		B	B	C	A				
Approach Delay (s)	0.3		0.7		12.3		14.7					
Approach LOS					B		B					
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			35.1%		ICU Level of Service		A					

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Drive

11/7/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+		↑	↑			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	27	47	24	97	96	12	4	1	15	11	67	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	30	52	27	108	107	13	4	1	17	12	74	10
Pedestrians		10			10			10				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		1			1			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	120			89			522	471	86	482	478	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	120			89			522	471	86	482	478	123
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			99	100	98	97	83	99
cM capacity (veh/h)	1455			1482			362	439	952	442	436	914
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	109	228	4	18	97							
Volume Left	30	108	4	0	12							
Volume Right	27	13	0	17	10							
cSH	1455	1482	362	887	461							
Volume to Capacity	0.02	0.07	0.01	0.02	0.21							
Queue Length (ft)	2	6	1	2	20							
Control Delay (s)	2.2	3.9	15.1	9.1	14.9							
Lane LOS	A	A	C	A	B							
Approach Delay (s)	2.2	3.9	10.3		14.9							
Approach LOS			B		B							
Intersection Summary												
Average Delay			6.1									
Intersection Capacity Utilization			32.2%			ICU Level of Service			A			

HCM Unsignalized Intersection Capacity Analysis
 16: Future Bypass, Alt. 3 & UAS/Guard Drive

11/9/2003



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↖	↗	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	83	14	79	279	20	88
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	92	16	88	310	22	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
tF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	108	88	310	120		
Volume Left	0	88	0	22		
Volume Right	16	0	0	98		
cSH	1700	1470	1700	783		
Volume to Capacity	0.06	0.06	0.18	0.15		
Queue Length (ft)	0	5	0	13		
Control Delay (s)	0.0	7.6	0.0	10.4		
Lane LOS		A		B		
Approach Delay (s)	0.0	1.7		10.4		
Approach LOS				B		
Intersection Summary						
Average Delay						
Intersection Capacity Utilization						
ICU Level of Service						

HCM Unsignalized Intersection Capacity Analysis
 17: Glacier Highway-Auke Bay Community & Mendenhall Loop Road

11/9/2003



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑	↑	↗	↵	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	75	257	486	149	98	25
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	83	286	540	166	109	28
Pedestrians		10	10		10	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		1	1		1	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	716				1012	560
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	716				1012	560
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				53	95
cM capacity (veh/h)	868				234	515
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	83	286	540	166	137	
Volume Left	83	0	0	0	109	
Volume Right	0	0	0	166	28	
cSH	868	1700	1700	1700	263	
Volume to Capacity	0.10	0.17	0.32	0.10	0.52	
Queue Length (ft)	8	0	0	0	69	
Control Delay (s)	9.6	0.0	0.0	0.0	32.6	
Lane LOS	A				D	
Approach Delay (s)	2.2		0.0		32.6	
Approach LOS					D	
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			53.5%		ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 31: Glacier Highway-Ferry Terminal & Future Bypass, Alt. 3























11/9/2003



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↔		↔		↔	↔
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	46	15	82	21	20	279
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	51	17	91	23	22	310
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	457	103			114	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	457	103			114	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	98			98	
cM capacity (veh/h)	549	947			1462	
Direction, Lane #	NW 1	NE 1	SW 1	SW 2		
Volume Total	68	114	22	310		
Volume Left	51	0	22	0		
Volume Right	17	23	0	0		
cSH	613	1700	1462	1700		
Volume to Capacity	0.11	0.07	0.02	0.18		
Queue Length (ft)	9	0	1	0		
Control Delay (s)	11.6	0.0	7.5	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.6	0.0	0.5			
Approach LOS	B					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization	27.4%		ICU Level of Service	A		

HCM Signalized Intersection Capacity Analysis
 42: Mendenhall Loop Road & Future Bypass, Alt. 3

11/9/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1609		1690	1728		1690	1779	1512	1690	1779	1512
Flt Permitted	0.70	1.00		0.24	1.00		0.61	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	1238	1609		428	1728		1089	1779	1512	883	1779	1512
Volume (vph)	12	87	152	85	68	16	176	330	151	40	118	13
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	13	97	169	94	76	18	196	367	168	44	131	14
Lane Group Flow (vph)	13	266	0	94	94	0	196	367	168	44	131	14
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.6	16.2		27.0	20.9		51.9	43.5	43.5	43.5	39.3	39.3
Effective Green, g (s)	19.6	17.2		28.3	21.9		53.7	44.5	44.5	45.5	40.3	40.3
Actuated g/C Ratio	0.22	0.19		0.31	0.24		0.60	0.49	0.49	0.51	0.45	0.45
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	282	307		234	420		713	880	748	493	797	677
v/s Ratio Prot	0.00	c0.17		c0.03	0.05		c0.03	c0.21		0.01	0.07	
v/s Ratio Perm	0.01			0.09			0.14		0.11	0.04		0.01
v/c Ratio	0.05	0.87		0.40	0.22		0.27	0.42	0.22	0.09	0.16	0.02
Uniform Delay, d1	27.7	35.3		23.4	27.2		8.4	14.5	12.9	11.4	14.8	13.9
Progression Factor	1.01	1.01		1.00	1.00		0.90	0.91	0.67	1.00	1.00	1.00
Incremental Delay, d2	0.1	22.1		1.3	0.3		0.2	1.2	0.6	0.1	0.4	0.1
Delay (s)	28.2	57.7		24.7	27.6		7.8	14.4	9.2	11.5	15.3	13.9
Level of Service	C	E		C	C		A	B	A	B	B	B
Approach Delay (s)		56.4			26.1			11.5			14.3	
Approach LOS		E			C			B			B	
Intersection Summary												
HCM Average Control Delay			22.9				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			60.7%				ICU Level of Service		B			
c Critical Lane Group												






















HCM Signalized Intersection Capacity Analysis
 44: Glacier Highway-Auke Lake & Future Bypass, Alt. 3

11/9/2003

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.91		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1760		1690	1779	1512	1690	1626		1690	1574	
Flt Permitted	0.09	1.00		0.29	1.00	1.00	0.70	1.00		0.58	1.00	
Satd. Flow (perm)	168	1760		522	1779	1512	1238	1626		1037	1574	
Volume (vph)	20	513	40	20	820	607	30	30	40	270	20	65
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	570	44	22	911	674	33	33	44	300	22	72
Lane Group Flow (vph)	22	614	0	22	911	674	33	77	0	300	94	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	52.6	49.8		52.6	49.8	49.8	15.4	8.4		19.4	10.4	
Effective Green, g (s)	54.6	50.8		54.6	50.8	50.8	17.4	9.4		21.4	11.4	
Actuated g/C Ratio	0.61	0.56		0.61	0.56	0.56	0.19	0.10		0.24	0.13	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	166	993		366	1004	853	280	170		319	199	
v/s Ratio Prot	c0.01	0.35		0.00	c0.51		0.01	0.05		c0.10	0.06	
v/s Ratio Perm	0.07			0.03		0.45	0.01			c0.12		
v/c Ratio	0.13	0.62		0.06	0.91	0.79	0.12	0.45		0.94	0.47	
Uniform Delay, d1	14.6	13.1		8.6	17.5	15.4	29.9	37.9		32.7	36.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.11	1.37	
Incremental Delay, d2	0.4	2.9		0.1	11.8	5.2	0.2	2.3		34.1	2.0	
Delay (s)	15.0	16.0		8.7	29.3	20.6	30.1	40.1		70.4	52.1	
Level of Service	B	B		A	C	C	C	D		E	D	
Approach Delay (s)		16.0			25.3			37.1			66.0	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM Average Control Delay			29.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			79.7%				ICU Level of Service			C		
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 46: Glacier Highway-Auke Bay Community & Fritz Cove Road

11/9/2003

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Volume (veh/h)	20	369	63	109	605	107	40	3	65	78	6	21
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	410	70	121	672	119	44	3	72	87	7	23
Pedestrians	10			10			10			10		
Lane Width (ft)	12.0			12.0			12.0			12.0		
Walking Speed (ft/s)	4.0			4.0			4.0			4.0		
Percent Blockage	1			1			1			1		
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	801			490			1451	1543	465	1522	1518	752
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	801			490			1451	1543	465	1522	1518	752
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			89			47	97	88	0	93	94
cM capacity (veh/h)	807			1054			83	96	583	71	100	400
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	22	480	121	791	44	76	87	30				
Volume Left	22	0	121	0	44	0	87	0				
Volume Right	0	70	0	119	0	72	0	23				
cSH	807	1700	1054	1700	83	477	71	240				
Volume to Capacity	0.03	0.28	0.11	0.47	0.53	0.16	1.22	0.13				
Queue Length (ft)	2	0	10	0	58	14	169	11				
Control Delay (s)	9.6	0.0	8.9	0.0	89.2	14.0	279.6	22.2				
Lane LOS	A		A		F	B	F	C				
Approach Delay (s)	0.4	1.2		41.8		213.4						
Approach LOS					E		F					
Intersection Summary												
Average Delay			18.9									
Intersection Capacity Utilization			69.3%		ICU Level of Service				B			

HCM Unsignalized Intersection Capacity Analysis
 55: Mendenhall Loop Road & UAS/Guard Drive

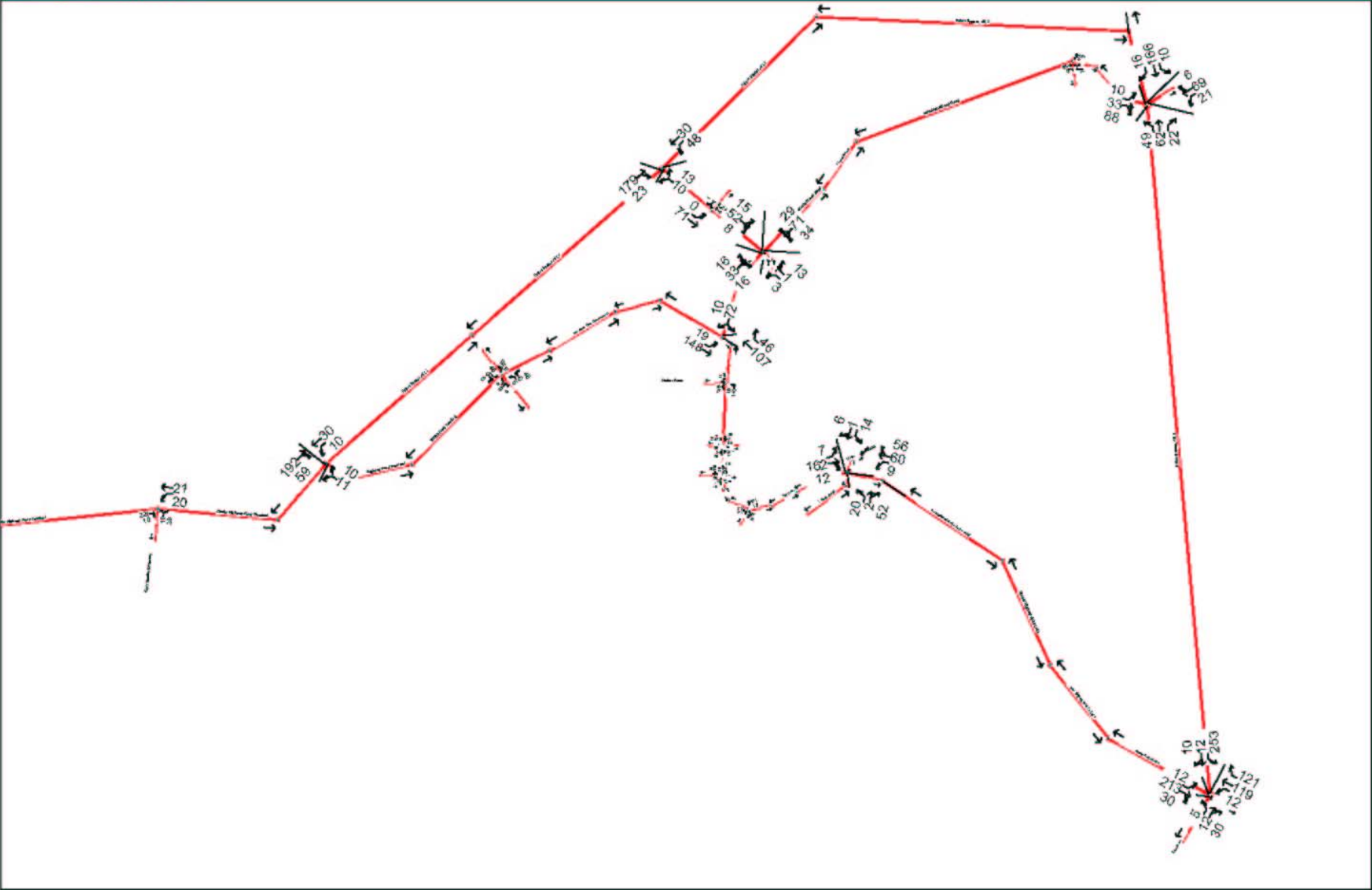
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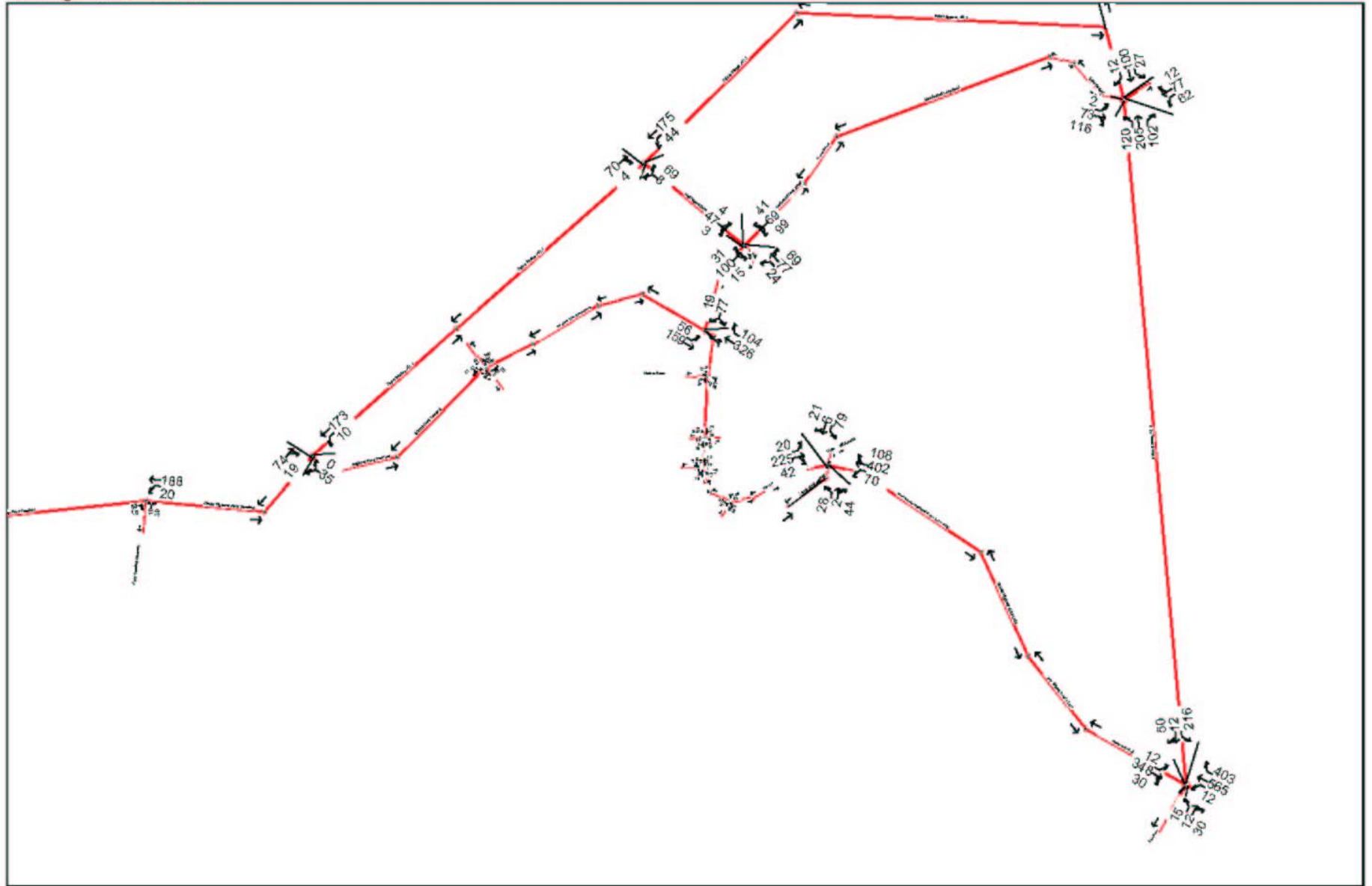
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+		↑	↑			+	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	167	17	127	68	62	30	98	88	15	60	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	22	186	19	141	76	69	33	109	98	17	67	27
Pedestrians		10			10			10				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		1			1			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	144			214			712	676	215	794	651	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	144			214			712	676	215	794	651	120
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			89			87	67	88	91	80	97
cM capacity (veh/h)	1426			1333			253	325	806	178	336	918
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	227	286	33	207	110							
Volume Left	22	141	33	0	17							
Volume Right	19	69	0	98	27							
cSH	1426	1333	253	453	343							
Volume to Capacity	0.02	0.11	0.13	0.46	0.32							
Queue Length (ft)	1	9	11	58	34							
Control Delay (s)	0.9	4.4	21.4	19.4	20.4							
Lane LOS	A	A	C	C	C							
Approach Delay (s)	0.9	4.4	19.7		20.4							
Approach LOS			C		C							
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			51.9%		ICU Level of Service				A			

Alternative 3 Peak Hour Turning Movements

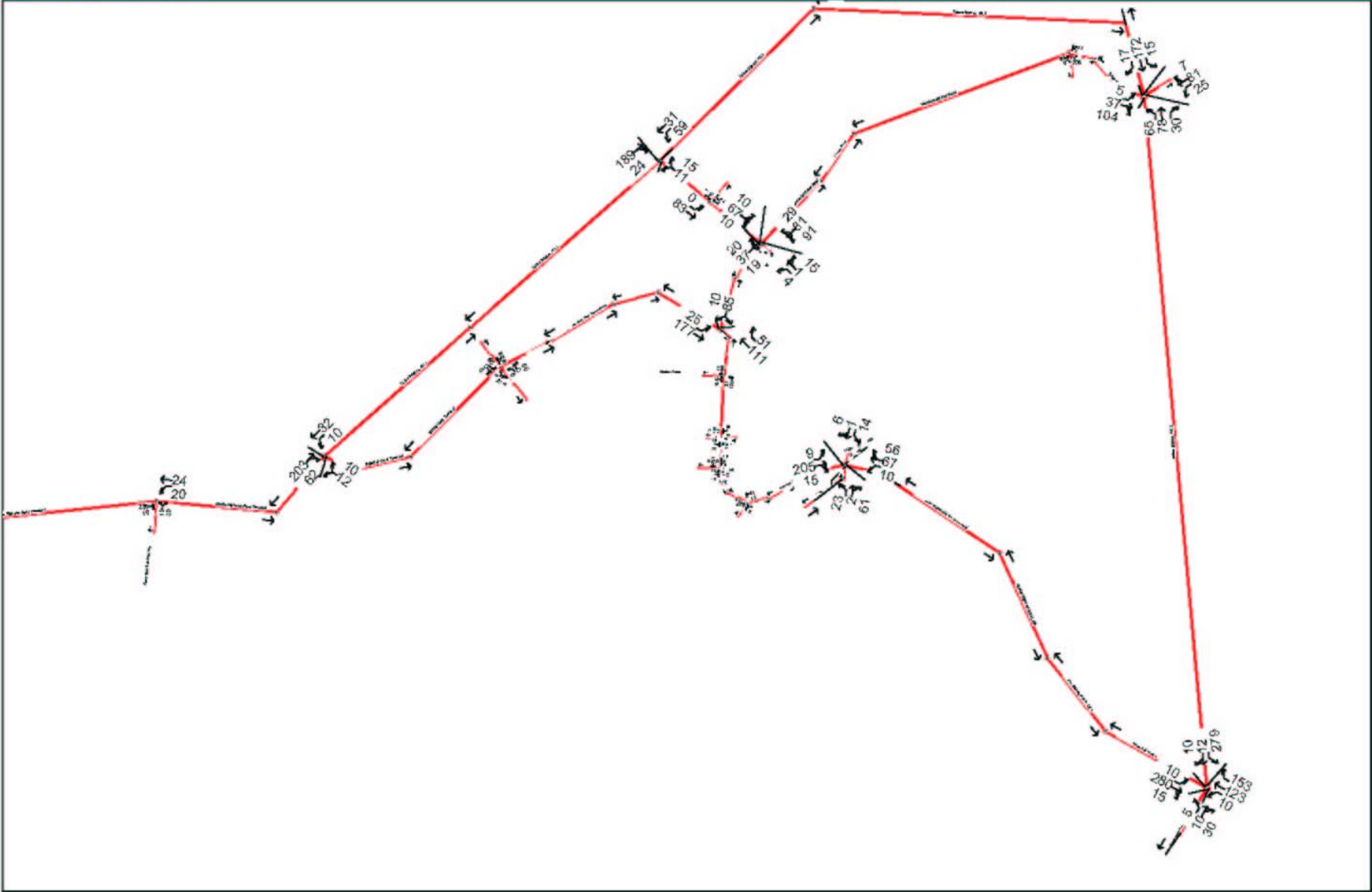
Alternative 3 Year 2009
Timing Plan: AM Peak



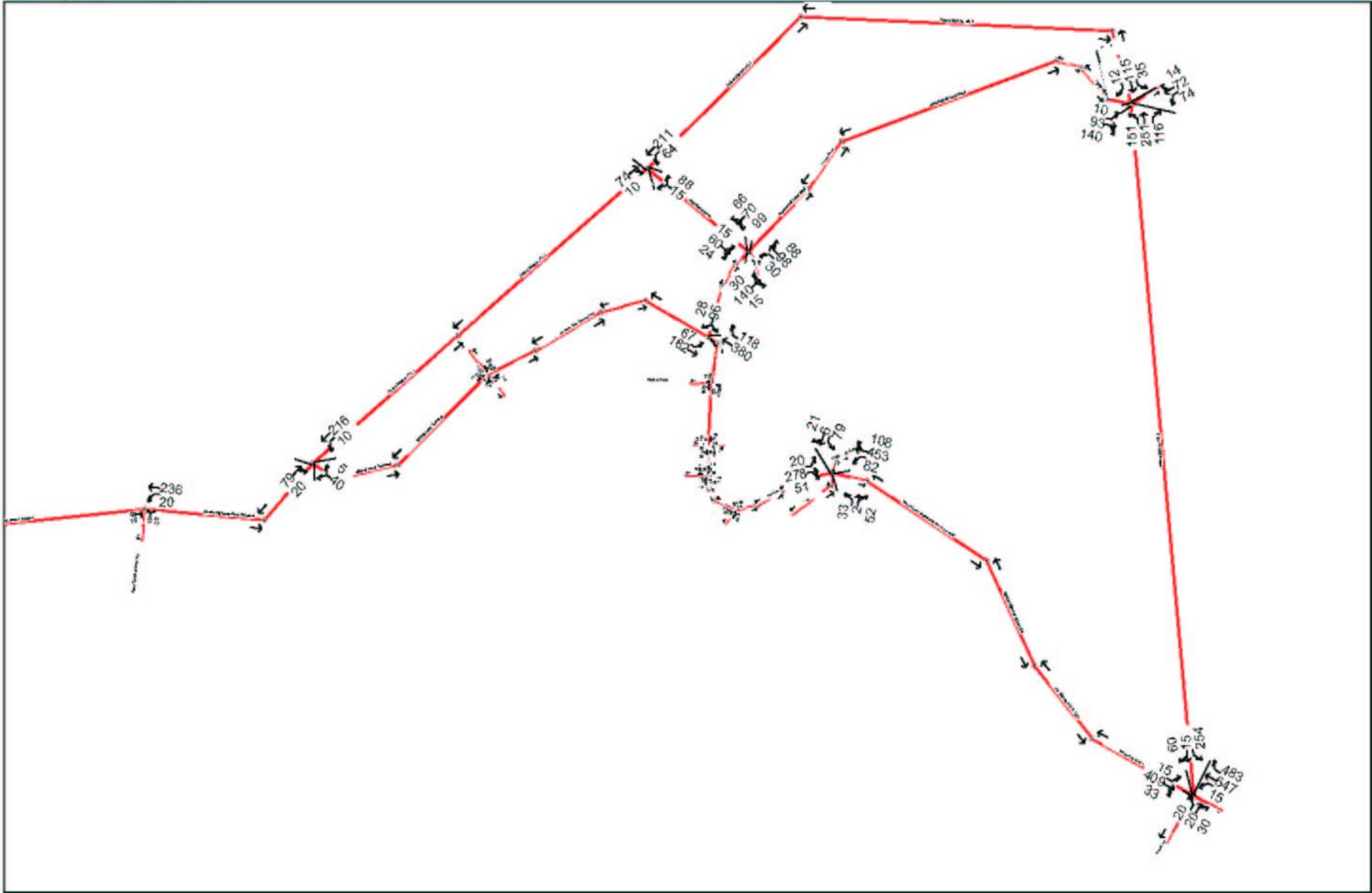
Alternative 3 Year 2009
Timing Plan: PM Peak



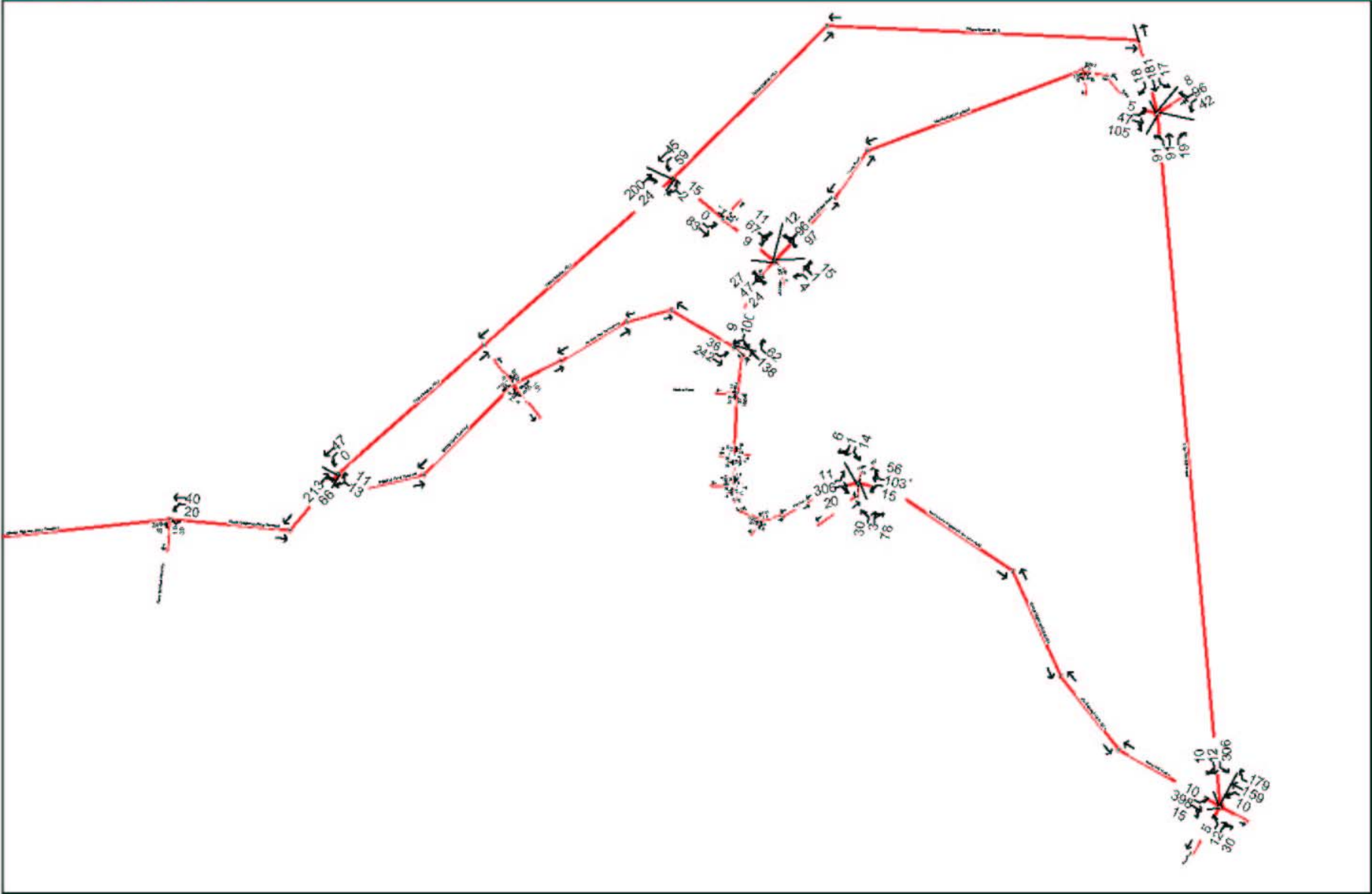
Alternative 3 Year 2019
Timing Plan: AM Peak



Alternative 3 Year 2019
Timing Plan: PM Peak



Alternative 3 Year 2029
Timing Plan: AM Peak



Alternative 3 Year 2029
Timing Plan: PM Peak

