TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Maiden/Dawn Terrace*
Agency/Co.	*J-U-B ENGINEERS, INC.*	Jurisdiction	*City of Wenatchee*
Date Performed	*9/16/2008*	Analysis Year	*2008 (Existing)*
Analysis Time Period	*PM Peak Hour*		

Project Description *Wenatchee Foothills Study*

East/West Street: *Maiden Lane* | North/South Street: *Dawn Terrace*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*95*	*235*			*265*	*5*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*103*	*255*	*0*	*0*	*288*	*5*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*5*		*195*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*211*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*						*LR*	
v (veh/h)	*103*						*216*	
C (m) (veh/h)	*1280*						*743*	
v/c	*0.08*						*0.29*	
95% queue length	*0.26*						*1.21*	
Control Delay (s/veh)	*8.1*						*11.8*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--				*11.8*		
Approach LOS	--	--				*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Western
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2008 (Existing)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Maiden Lane* | North/South Street: *Western*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	75	300			420	35
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	81	326	0	0	456	38
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	25		50			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	27	0	54	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	81					27		54
C (m) (veh/h)	1080					395		594
v/c	0.08					0.07		0.09
95% queue length	0.24					0.22		0.30
Control Delay (s/veh)	8.6					14.8		11.7
LOS	A					B		B
Approach Delay (s/veh)	--	--				12.7		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	5th/Surry
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2008 (Existing)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *5th*	North/South Street: *Surry*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	15	175			230	130
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	16	190	0	0	249	141
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				15		5
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	16	0	5
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	16						21	
C (m) (veh/h)	1180						538	
v/c	0.01						0.04	
95% queue length	0.04						0.12	
Control Delay (s/veh)	8.1						12.0	
LOS	A						B	
Approach Delay (s/veh)	--	--	12.0					
Approach LOS	--	--	B					

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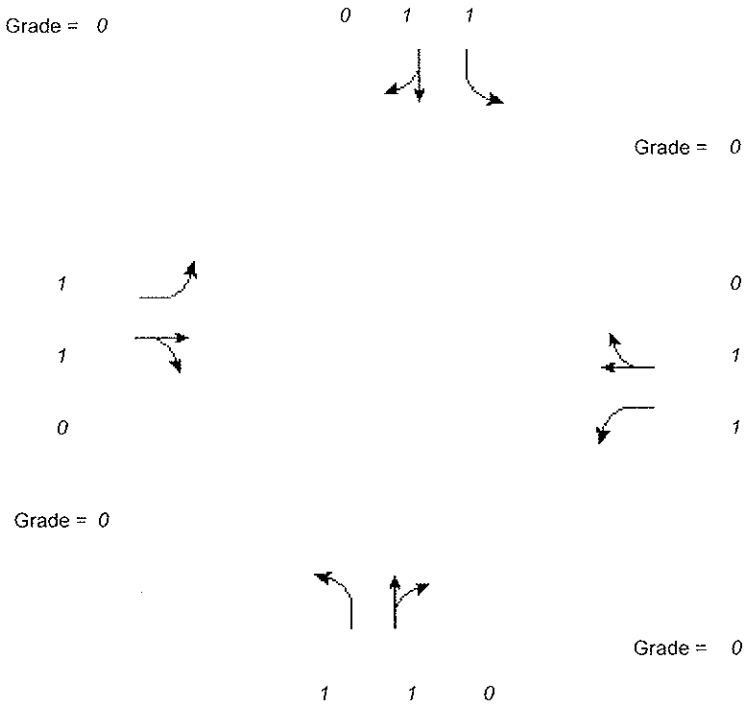
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*5th/Western*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2008 (Existing)*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	100	75	70	155	175	80	80	410	50	60	440	105
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of Effective Green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival Type	3	3		3	3		3	3		3	3	
Unit Extension	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	20
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0		0	0		0	0		0	0	

	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 20.0	G =	G =	G =	G = 30.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 60.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Adjusted Flow Rate	*109*	*158*		*168*	*277*		*87*	*500*		*65*	*570*	
Satflow Rate	*992*	*1763*		*1248*	*1810*		*601*	*1869*		*713*	*1854*	
Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Green Ratio	*0.33*	*0.33*		*0.33*	*0.33*		*0.50*	*0.50*		*0.50*	*0.50*	
Lane Group Capacity	*331*	*588*		*416*	*603*		*301*	*935*		*357*	*927*	
v/c Ratio	*0.33*	*0.27*		*0.40*	*0.46*		*0.29*	*0.53*		*0.18*	*0.61*	
Flow Ratio	*0.11*	*0.09*		*0.13*	*0.15*		*0.14*	*0.27*		*0.09*	*0.31*	
Critical Lane Group		*N*			*Y*			*N*			*Y*	
Sum Flow Ratios	*0.46*											
Lost Time/Cycle	*10.00*											
Critical v/c Ratio	*0.55*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Adjusted Flow Rate	*109*	*158*		*168*	*277*		*87*	*500*		*65*	*570*	
Lane Group Capacity	*331*	*588*		*416*	*603*		*301*	*935*		*357*	*927*	
v/c Ratio	*0.33*	*0.27*		*0.40*	*0.46*		*0.29*	*0.53*		*0.18*	*0.61*	
Green Ratio	*0.33*	*0.33*		*0.33*	*0.33*		*0.50*	*0.50*		*0.50*	*0.50*	
Uniform Delay d_1	*15.0*	*14.6*		*15.4*	*15.7*		*8.8*	*10.2*		*8.3*	*10.8*	
Delay Factor k	*0.50*	*0.50*		*0.50*	*0.50*		*0.50*	*0.50*		*0.50*	*0.50*	
Incremental Delay d_2	*2.6*	*1.1*		*2.9*	*2.5*		*2.4*	*2.2*		*1.1*	*3.0*	
PF Factor	*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Control Delay	*17.6*	*15.8*		*18.3*	*18.3*		*11.2*	*12.4*		*9.4*	*13.9*	
Lane Group LOS	*B*	*B*		*B*	*B*		*B*	*B*		*A*	*B*	
Approach Delay	*16.5*			*18.3*			*12.2*			*13.4*		
Approach LOS	*B*			*B*			*B*			*B*		
Intersection Delay	*14.6*			Intersection LOS						*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Cherry/Western
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2008 (Existing)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Cherry* | North/South Street: *Western*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		110	50	270	155	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	119	54	293	168	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				75		205
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	81	0	222
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		293	81		222			
C (m) (veh/h)		1416	247		906			
v/c		0.21	0.33		0.25			
95% queue length		0.78	1.37		0.96			
Control Delay (s/veh)		8.2	26.5		10.3			
LOS		A	D		B			
Approach Delay (s/veh)	--	--	14.6					
Approach LOS	--	--	B					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Crawford/Miller
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2008 (Existing)
Analysis Time Period	PM Peak Hour		

Project Description Wenatchee Foothills Study	
East/West Street: Crawford	North/South Street: Miller
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	30	15	235	50	40
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	32	16	255	54	43
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	20	20	5	20	30	185
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	21	21	5	21	32	201
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	5	255		254			47	
C (m) (veh/h)	1509	1572		705			279	
v/c	0.00	0.16		0.36			0.17	
95% queue length	0.01	0.58		1.64			0.60	
Control Delay (s/veh)	7.4	7.7		13.0			20.5	
LOS	A	A		B			C	
Approach Delay (s/veh)	--	--	13.0			20.5		
Approach LOS	--	--	B			C		

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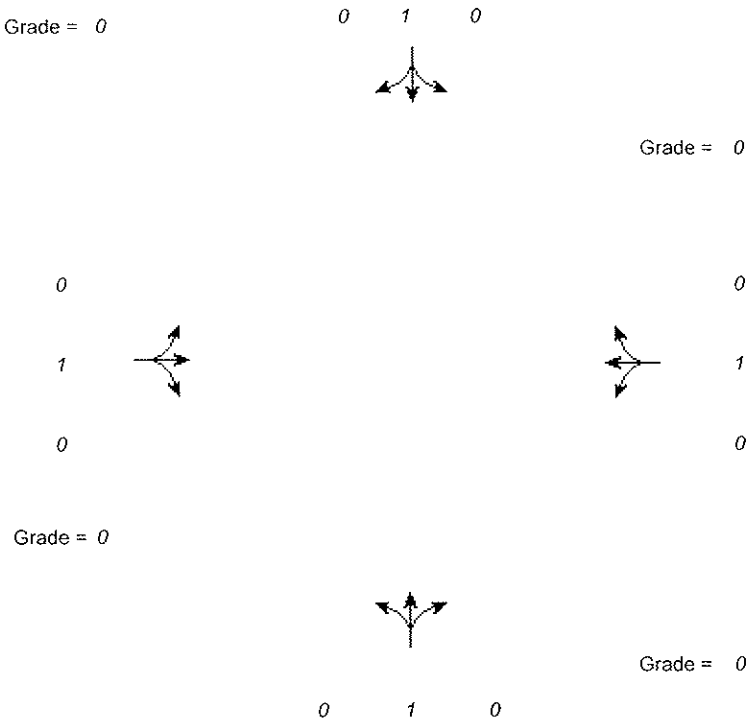
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Crawford/Mission*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2008 (Existing)*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	225	90	90	25	145	40	55	175	10	25	195	135
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	P	P	P	P	P	P	P	P	P	P	P	P
Startup Lost Time		2.0			2.0			2.0			2.0	
Extension of Effective Green		2.0			2.0			2.0			2.0	
Arrival Type		3			3			3			3	
Unit Extension		3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	20
Lane Width		12.0			12.0			12.0			12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0			0			0			0	

	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 30.0	G =	G =	G =	G = 25.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 65.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB	
Lane Group		*LTR*			*LTR*			*LTR*			*LTR*	
Adjusted Flow Rate		*441*			*228*			*261*			*364*	
Satflow Rate		*1329*			*1719*			*1634*			*1748*	
Lost Time		*2.0*			*2.0*			*2.0*			*2.0*	
Green Ratio		*0.46*			*0.46*			*0.38*			*0.38*	
Lane Group Capacity		*613*			*793*			*628*			*672*	
v/c Ratio		*0.72*			*0.29*			*0.42*			*0.54*	
Flow Ratio		*0.33*			*0.13*			*0.16*			*0.21*	
Critical Lane Group		*Y*			*N*			*N*			*Y*	
Sum Flow Ratios	*0.54*											
Lost Time/Cycle	*10.00*											
Critical v/c Ratio	*0.64*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB	
Lane Group		*LTR*			*LTR*			*LTR*			*LTR*	
Adjusted Flow Rate		*441*			*228*			*261*			*364*	
Lane Group Capacity		*613*			*793*			*628*			*672*	
v/c Ratio		*0.72*			*0.29*			*0.42*			*0.54*	
Green Ratio		*0.46*			*0.46*			*0.38*			*0.38*	
Uniform Delay d_1		*14.1*			*10.9*			*14.6*			*15.5*	
Delay Factor k		*0.50*			*0.50*			*0.50*			*0.50*	
Incremental Delay d_2		*7.1*			*0.9*			*2.0*			*3.1*	
PF Factor		*1.000*			*1.000*			*1.000*			*1.000*	
Control Delay		*21.2*			*11.8*			*16.7*			*18.7*	
Lane Group LOS		*C*			*B*			*B*			*B*	
Approach Delay	*21.2*			*11.8*			*16.7*			*18.7*		
Approach LOS	*C*			*B*			*B*			*B*		
Intersection Delay	*17.9*			Intersection LOS						*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Dawn Terrace
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Current Trend)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Maiden Lane* | North/South Street: *Dawn Terrace*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	265	540			295	20
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	288	586	0	0	320	21
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				80		280
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	86	0	304
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	288						390	
C (m) (veh/h)	1229						446	
v/c	0.23						0.87	
95% queue length	0.91						9.09	
Control Delay (s/veh)	8.8						47.9	
LOS	A						E	
Approach Delay (s/veh)	--	--	47.9					
Approach LOS	--	--	E					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Dawn Terrace
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Current Trend) Mitgated
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study - SB left turn lane*

East/West Street: *Maiden Lane* | North/South Street: *Dawn Terrace*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	265	540			295	20
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	288	586	0	0	320	21
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				80		280
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	86	0	304
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	288					86		304
C (m) (veh/h)	1229					191		716
v/c	0.23					0.45		0.42
95% queue length	0.91					2.12		2.13
Control Delay (s/veh)	8.8					38.4		13.7
LOS	A					E		B
Approach Delay (s/veh)	--	--				19.1		
Approach LOS	--	--				C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Western
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Current Trend)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Maiden Lane* | North/South Street: *Western*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	155	760			510	50
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	168	826	0	0	554	54
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	45		90			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	48	0	97	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	168					48		97
C (m) (veh/h)	980					187		517
v/c	0.17					0.26		0.19
95% queue length	0.62					0.98		0.68
Control Delay (s/veh)	9.4					30.8		13.6
LOS	A					D		B
Approach Delay (s/veh)	--	--				19.3		
Approach LOS	--	--				C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	5th/Surry
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Current Trend)
Analysis Time Period	PM Peak Hour		

Project Description	Wenatchee Foothills Study
East/West Street: 5th	North/South Street: Surry
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	20	285			365	255
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	21	309	0	0	396	277
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				130		10
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	141	0	10
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	21						151	
C (m) (veh/h)	927						320	
v/c	0.02						0.47	
95% queue length	0.07						2.41	
Control Delay (s/veh)	9.0						25.9	
LOS	A						D	
Approach Delay (s/veh)	--	--				25.9		
Approach LOS	--	--				D		

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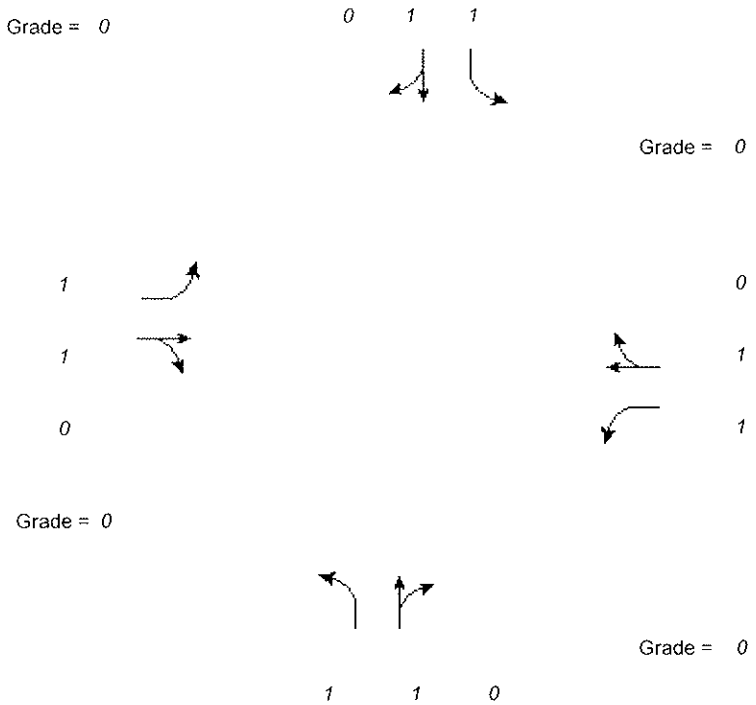
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*5th/Western*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Current Trend)*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	195	150	130	160	305	85	175	550	65	70	520	215
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of Effective Green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival Type	3	3		3	3		3	3		3	3	
Unit Extension	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0		0	0		0	0		0	0	

	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 6.0	G = 25.0	G =	G =	G = 6.2	G = 40.8	G =	G =
	Y = 4	Y = 5	Y =	Y =	Y = 4	Y = 5	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 96.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Adjusted Flow Rate	*212*	*304*		*174*	*424*		*190*	*669*		*76*	*799*	
Satflow Rate	*1805*	*1768*		*1805*	*1838*		*1805*	*1870*		*1805*	*1817*	
Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Green Ratio	*0.38*	*0.26*		*0.38*	*0.26*		*0.54*	*0.42*		*0.54*	*0.42*	
Lane Group Capacity	*196*	*460*		*290*	*479*		*196*	*795*		*224*	*772*	
v/c Ratio	*1.08*	*0.66*		*0.60*	*0.89*		*0.97*	*0.84*		*0.34*	*1.03*	
Flow Ratio	*0.06*	*0.17*		*0.06*	*0.23*		*0.06*	*0.36*		*0.04*	*0.44*	
Critical Lane Group	*Y*	*N*			*N*		*Y*	*N*			*N*	
Sum Flow Ratios	*0.94*											
Lost Time/Cycle	*10.00*											
Critical v/c Ratio	*1.05*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Adjusted Flow Rate	*212*	*304*		*174*	*424*		*190*	*669*		*76*	*799*	
Lane Group Capacity	*196*	*460*		*290*	*479*		*196*	*795*		*224*	*772*	
v/c Ratio	*1.08*	*0.66*		*0.60*	*0.89*		*0.97*	*0.84*		*0.34*	*1.03*	
Green Ratio	*0.38*	*0.26*		*0.38*	*0.26*		*0.54*	*0.42*		*0.54*	*0.42*	
Uniform Delay d_1	*33.2*	*31.7*		*26.0*	*34.1*		*21.0*	*24.7*		*16.7*	*27.6*	
Delay Factor k	*0.50*	*0.24*		*0.19*	*0.41*		*0.48*	*0.38*		*0.11*	*0.50*	
Incremental Delay d_2	*87.7*	*3.5*		*3.4*	*17.7*		*55.3*	*8.1*		*0.9*	*41.7*	
PF Factor	*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Control Delay	*120.9*	*35.2*		*29.5*	*51.8*		*76.2*	*32.8*		*17.6*	*69.3*	
Lane Group LOS	*F*	*D*		*C*	*D*		*E*	*C*		*B*	*E*	
Approach Delay	*70.4*			*45.3*			*42.4*			*64.9*		
Approach LOS	*E*			*D*			*D*			*E*		
Intersection Delay	*55.0*			Intersection LOS						*D*		

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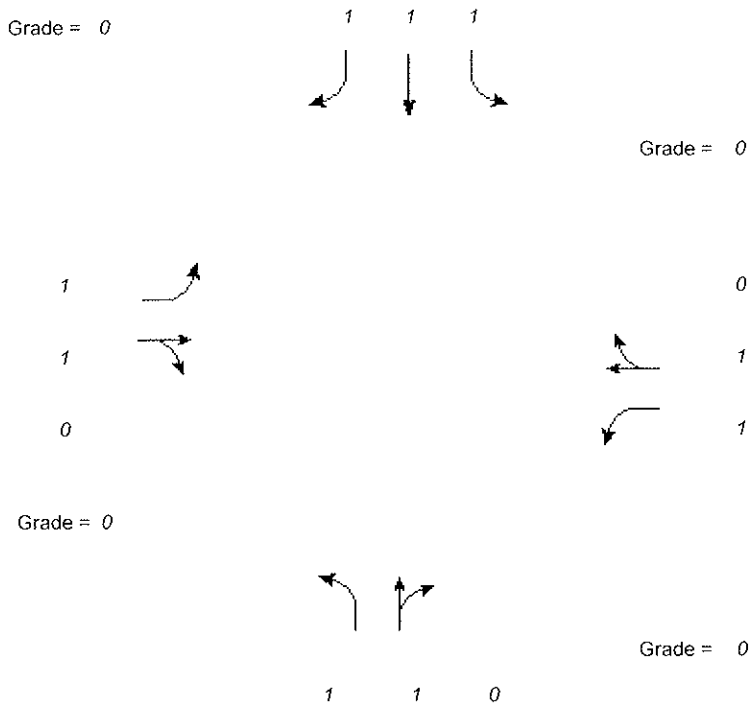
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*5th/Western*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Current Trend) Mit*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	195	150	130	160	305	85	175	550	65	70	520	215
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Extension of Effective Green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Arrival Type	3	3		3	3		3	3		3	3	3
Unit Extension	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0		0	0		0	0		0	0	0

	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 10.0	G = 25.0	G =	G =	G = 6.0	G = 36.0	G =	G =
	Y = 4	Y = 5	Y =	Y =	Y = 4	Y = 5	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 95.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*T*	*R*
Adjusted Flow Rate	*212*	*304*		*174*	*424*		*190*	*669*		*76*	*565*	*234*
Satflow Rate	*1805*	*1768*		*1805*	*1838*		*1805*	*1870*		*1805*	*1900*	*1615*
Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	*2.0*
Green Ratio	*0.42*	*0.26*		*0.42*	*0.26*		*0.49*	*0.38*		*0.49*	*0.38*	*0.38*
Lane Group Capacity	*277*	*465*		*371*	*484*		*241*	*709*		*194*	*720*	*612*
v/c Ratio	*0.77*	*0.65*		*0.47*	*0.88*		*0.79*	*0.94*		*0.39*	*0.78*	*0.38*
Flow Ratio	*0.11*	*0.17*		*0.10*	*0.23*		*0.06*	*0.36*		*0.04*	*0.30*	*0.14*
Critical Lane Group	*Y*	*N*			*Y*		*Y*	*Y*			*N*	*N*
Sum Flow Ratios	*0.76*											
Lost Time/Cycle	*20.00*											
Critical v/c Ratio	*0.96*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*T*	*R*
Adjusted Flow Rate	*212*	*304*		*174*	*424*		*190*	*669*		*76*	*565*	*234*
Lane Group Capacity	*277*	*465*		*371*	*484*		*241*	*709*		*194*	*720*	*612*
v/c Ratio	*0.77*	*0.65*		*0.47*	*0.88*		*0.79*	*0.94*		*0.39*	*0.78*	*0.38*
Green Ratio	*0.42*	*0.26*		*0.42*	*0.26*		*0.49*	*0.38*		*0.49*	*0.38*	*0.38*
Uniform Delay d_1	*21.2*	*31.1*		*18.9*	*33.5*		*18.5*	*28.5*		*19.5*	*26.1*	*21.4*
Delay Factor k	*0.32*	*0.23*		*0.11*	*0.40*		*0.33*	*0.46*		*0.11*	*0.33*	*0.11*
Incremental Delay d_2	*12.1*	*3.3*		*0.9*	*16.4*		*16.0*	*21.1*		*1.3*	*5.7*	*0.4*
PF Factor	*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	*1.000*
Control Delay	*33.2*	*34.4*		*19.8*	*49.9*		*34.4*	*49.7*		*20.8*	*31.8*	*21.8*
Lane Group LOS	*C*	*C*		*B*	*D*		*C*	*D*		*C*	*C*	*C*
Approach Delay	*33.9*			*41.2*			*46.3*			*28.2*		
Approach LOS	*C*			*D*			*D*			*C*		
Intersection Delay	*37.4*			Intersection LOS						*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Cherry/Western
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Current Trend)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Cherry* | North/South Street: *Western*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		170	90	485	290	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	184	97	527	315	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				140		365
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	152	0	396
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		527	152		396			
C (m) (veh/h)		1293	70		812			
v/c		0.41	2.17		0.49			
95% queue length		2.02	14.25		2.71			
Control Delay (s/veh)		9.7	666.0		13.6			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	194.5					
Approach LOS	--	--	F					

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Cherry/Western
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Current Trend) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Cherry* | North/South Street: *Western*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	140	0	365
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	170	90	485	290	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	TR		L	T
PHF			0.92	0.92	0.92		0.92	0.92
Flow Rate (veh/h)			152	396	281		527	315
% Heavy Vehicles			0	0	0		0	0
No. Lanes	0		2		1		2	
Geometry Group			1		3b		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns			1.0	0.0	0.0		1.0	0.0
Prop. Right-Turns			0.0	1.0	0.3		0.0	0.0
Prop. Heavy Vehicle			0.0	0.0	0.0		0.0	0.0
hLT-adj			0.2	0.2	0.2	0.2	0.5	0.5
hRT-adj			-0.6	-0.6	-0.6	-0.6	-0.7	-0.7
hHV-adj			1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed			0.2	-0.6	-0.2		0.5	0.0

Departure Headway and Service Time

hd, initial value (s)			3.20	3.20	3.20		3.20	3.20
x, initial			0.14	0.35	0.25		0.47	0.28
hd, final value (s)			6.67	5.86	6.68		7.11	6.60
x, final value			0.28	0.64	0.52		1.04	0.58
Move-up time, m (s)	2.0				2.0		2.3	
Service Time, t_s (s)			4.7	3.9	4.7		4.8	4.3

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)			402	609	528		527	546
Delay (s/veh)			12.26	18.83	16.73		77.33	17.93
LOS			B	C	C		F	C
Approach: Delay (s/veh)			17.01		16.73		55.11	
LOS			C		C		F	
Intersection Delay (s/veh)	36.16							
Intersection LOS	E							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Cherry/Western
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Current Trend) Miligated

Project ID *Wenatchee Foothills Study*

East/West Street: *Cherry* | North/South Street: *Western*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	140	0	365
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	170	90	485	290	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	T	R	L	T
PHF			0.92	0.92	0.92	1.00	0.92	0.92
Flow Rate (veh/h)			152	396	184	90	527	315
% Heavy Vehicles			0	0	0	0	0	0
No. Lanes	0		2		2		2	
Geometry Group			1		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns			1.0	0.0	0.0	0.0	1.0	0.0
Prop. Right-Turns			0.0	1.0	0.0	1.0	0.0	0.0
Prop. Heavy Vehicle			0.0	0.0	0.0	0.0	0.0	0.0
hLT-adj			0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj			-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj			1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed			0.2	-0.6	0.0	-0.7	0.5	0.0

Departure Headway and Service Time

hd, initial value (s)			3.20	3.20	3.20	3.20	3.20	3.20
x, initial			0.14	0.35	0.16	0.08	0.47	0.28
hd, final value (s)			6.55	5.74	7.40	6.68	7.08	6.57
x, final value			0.28	0.63	0.38	0.17	1.04	0.57
Move-up time, m (s)			2.0		2.3		2.3	
Service Time, t_s (s)			4.5	3.7	5.1	4.4	4.8	4.3

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)			402	622	434	340	527	547
Delay (s/veh)			12.03	18.07	14.52	10.71	75.93	17.77
LOS			B	C	B	B	F	C
Approach: Delay (s/veh)			16.39		13.27		54.17	
LOS			C		B		F	
Intersection Delay (s/veh)	34.99							
Intersection LOS	D							

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ROUNDABOUTS - UNSIGNALIZED INTERSECTIONS WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Cherry/Western*
Agency/Co.	*J-U-B ENGINEERS, Inc*	Jurisdiction	*City of Wenatchee*
Date Performed	*9/17/2008*	Analysis Year	*2028 (Current Trend) Mitigated*
Time Period	*PM Peak*		

Project Description *Wenatchee Foothills Study*

Volume Adjustments

		EB	WB	NB	SB
LT Traffic	Volume, veh/h	*0*	*140*	*0*	*485*
	PHF	*0.92*	*0.92*	*0.92*	*0.92*
	Flow rate, veh/h	*0*	*152*	*0*	*527*
TH Traffic	Volume, veh/h	*0*	*0*	*170*	*290*
	PHF	*0.92*	*0.92*	*0.92*	*0.92*
	Flow rate, veh/h	*0*	*0*	*184*	*315*
RT Traffic	Volume, veh/h	*0*	*365*	*90*	*0*
	PHF	*0.92*	*0.92*	*0.92*	*0.92*
	Flow rate, veh/h	*0*	*396*	*97*	*0*

Approach Flow Computation

Approach Flow (veh/h)	Va (veh/h)
V_{ae}	*0*
V_{aw}	*548*
V_{an}	*281*
V_{as}	*842*

Circulating Flow Computation

Approach Flow (veh/h)	Vc (veh/h)
V_{ce}	*994*
V_{cw}	*184*
V_{cn}	*527*
V_{cs}	*152*

Capacity Computation

		EB	WB	NB	SB
Capacity	Upper bound	*625*	*1199*	*913*	*1229*
	Lower bound	*485*	*992*	*736*	*1020*
v/c Ratio	Upper bound	*0.00*	*0.46*	*0.31*	*0.69*
	Lower bound	*0.00*	*0.55*	*0.38*	*0.83*

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Crawford/Miller
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Current Trend)
Analysis Time Period	PM Peak Hour		

Project Description	Wenatchee Foothills Study
East/West Street: Crawford	North/South Street: Miller
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	125	10	415	190	90
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	135	10	451	206	97
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	235
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	86	10	5	5	5	255
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	5	451		265			101	
C (m) (veh/h)	1269	1450		680			60	
v/c	0.00	0.31		0.39			1.68	
95% queue length	0.01	1.34		1.85			9.23	
Control Delay (s/veh)	7.8	8.6		13.6			481.6	
LOS	A	A		B			F	
Approach Delay (s/veh)	--	--	13.6			481.6		
Approach LOS	--	--	B			F		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, INC.
Date Performed	9/16/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Crawford/Miller
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Current Trend)-Mitigated

Project Description *Wenatchee Foothills Study*

East/West Street: *Crawford* | North/South Street: *Miller*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	125	10	415	190	90
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	135	10	451	206	97
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LTR			LT		R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	235
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	86	10	5	5	5	255
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L		TR		LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LT		LTR		L		TR
v (veh/h)	5	451		265		86		15
C (m) (veh/h)	1269	1450		687		61		155
v/c	0.00	0.31		0.39		1.41		0.10
95% queue length	0.01	1.34		1.82		7.45		0.32
Control Delay (s/veh)	7.8	8.6		13.5		370.6		30.7
LOS	A	A		B		F		D
Approach Delay (s/veh)	--	--	13.5			320.1		
Approach LOS	--	--	B			F		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Crawford/Miller
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Current Trend) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Crawford* | North/South Street: *Miller*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	235
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	2	125	10	415	190	90
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.92		0.92		0.92		0.92	
Flow Rate (veh/h)	101		265		147		754	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.9		0.0		0.0		0.6	
Prop. Right-Turns	0.0		1.0		0.1		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.6		-0.0		0.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.09		0.24		0.13		0.67	
hd, final value (s)	7.02		5.90		6.22		5.41	
x, final value	0.20		0.43		0.25		1.13	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	5.0		3.9		4.2		3.4	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	351		515		397		754	
Delay (s/veh)	11.73		13.35		11.33		98.95	
LOS	B		B		B		F	
Approach: Delay (s/veh)	11.73		13.35		11.33		98.95	
LOS	B		B		B		F	
Intersection Delay (s/veh)	63.92							
Intersection LOS	F							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Crawford/Miller
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Current Trend) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Crawford* | North/South Street: *Miller*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	235
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	2	125	10	415	190	90
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		L	TR
PHF	0.92		0.92		0.92		0.92	0.92
Flow Rate (veh/h)	101		265		147		451	303
% Heavy Vehicles	0		0		0		0	0
No. Lanes	1		1		1		2	
Geometry Group	2		2		4a		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.9		0.0		0.0		1.0	0.0
Prop. Right-Turns	0.0		1.0		0.1		0.0	0.3
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.6		-0.0		0.5	-0.2

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	3.20
x, initial	0.09		0.24		0.13		0.40	0.27
hd, final value (s)	6.72		5.63		6.12		6.38	5.64
x, final value	0.19		0.41		0.25		0.80	0.48
Move-up time, m (s)	2.0		2.0		2.0		2.3	
Service Time, t_s (s)	4.7		3.6		4.1		4.1	3.3

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	351		515		397		560	553
Delay (s/veh)	11.27		12.57		11.15		29.71	13.35
LOS	B		B		B		D	B
Approach: Delay (s/veh)	11.27		12.57		11.15		23.13	
LOS	B		B		B		C	
Intersection Delay (s/veh)	18.59							
Intersection LOS	C							

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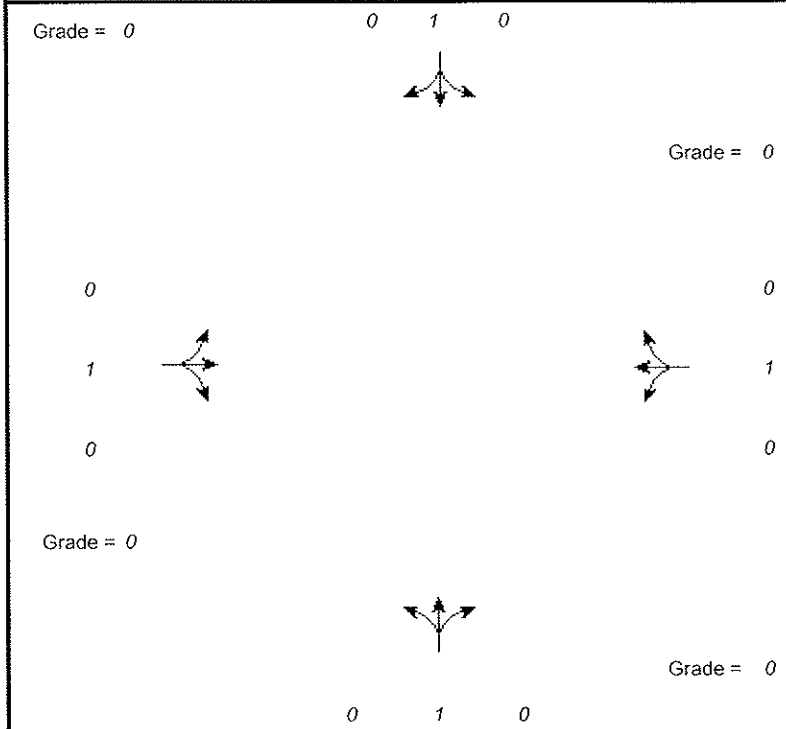
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Crawford/Mission*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Current Trends)*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	330	135	130	35	295	60	85	265	10	35	235	195
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time		2.0			2.0			2.0			2.0	
Extension of Effective Green		2.0			2.0			2.0			2.0	
Arrival Type		3			3			3			3	
Unit Extension		3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	20
Lane Width		12.0			12.0			12.0			12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0			0			0			0	

	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 40.0	G =	G =	G =	G = 25.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = *0.25*

Cycle Length C = *75.0*

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB	WB	NB	SB
Lane Group	*LTR*	*LTR*	*LTR*	*LTR*
Adjusted Flow Rate	*647*	*424*	*391*	*483*
Satflow Rate	*1091*	*1705*	*1269*	*1704*
Lost Time	*2.0*	*2.0*	*2.0*	*2.0*
Green Ratio	*0.53*	*0.53*	*0.33*	*0.33*
Lane Group Capacity	*582*	*909*	*423*	*568*
v/c Ratio	*1.11*	*0.47*	*0.92*	*0.85*
Flow Ratio	*0.59*	*0.25*	*0.31*	*0.28*
Critical Lane Group	*Y*	*N*	*Y*	*N*
Sum Flow Ratios	*0.90*			
Lost Time/Cycle	*10.00*			
Critical v/c Ratio	*1.04*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB	WB	NB	SB
Lane Group	*LTR*	*LTR*	*LTR*	*LTR*
Adjusted Flow Rate	*647*	*424*	*391*	*483*
Lane Group Capacity	*582*	*909*	*423*	*568*
v/c Ratio	*1.11*	*0.47*	*0.92*	*0.85*
Green Ratio	*0.53*	*0.53*	*0.33*	*0.33*
Uniform Delay d_1	*17.5*	*10.9*	*24.1*	*23.3*
Delay Factor k	*0.50*	*0.11*	*0.44*	*0.38*
Incremental Delay d_2	*71.8*	*0.4*	*26.0*	*11.8*
PF Factor	*1.000*	*1.000*	*1.000*	*1.000*
Control Delay	*89.3*	*11.3*	*50.1*	*35.0*
Lane Group LOS	*F*	*B*	*D*	*D*
Approach Delay	*89.3*	*11.3*	*50.1*	*35.0*
Approach LOS	*F*	*B*	*D*	*D*
Intersection Delay	*50.9*	Intersection LOS		*D*

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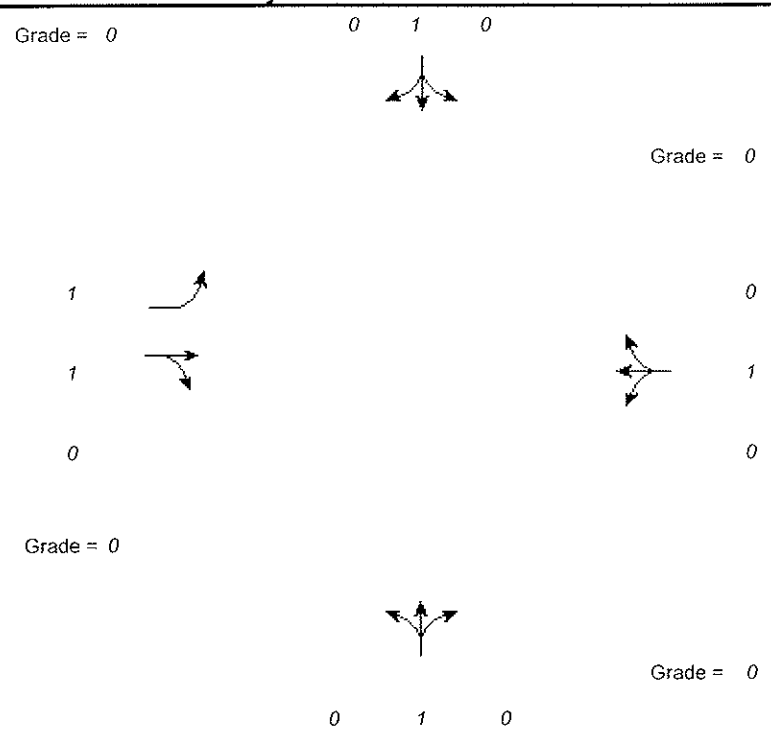
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Crawford/Mission*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Current Trend)Mit*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	330	135	130	35	295	60	85	265	10	35	235	195
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0			2.0			2.0			2.0	
Extension of Effective Green	2.0	2.0			2.0			2.0			2.0	
Arrival Type	3	3			3			3			3	
Unit Extension	3.0	3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	20
Lane Width	12.0	12.0			12.0			12.0			12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0			0			0			0	

	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 35.0	G =	G =	G =	G = 30.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 75.0			

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB				WB			NB			SB	
Lane Group	*L*	*TR*			*LTR*			*LTR*			*LTR*	
Adjusted Flow Rate	*359*	*288*			*424*			*391*			*483*	
Satflow Rate	*870*	*1760*			*1772*			*1419*			*1703*	
Lost Time	*2.0*	*2.0*			*2.0*			*2.0*			*2.0*	
Green Ratio	*0.47*	*0.47*			*0.47*			*0.40*			*0.40*	
Lane Group Capacity	*406*	*821*			*827*			*568*			*681*	
v/c Ratio	*0.88*	*0.35*			*0.51*			*0.69*			*0.71*	
Flow Ratio	*0.41*	*0.16*			*0.24*			*0.28*			*0.28*	
Critical Lane Group	*Y*	*N*			*N*			*N*			*Y*	
Sum Flow Ratios	*0.70*											
Lost Time/Cycle	*10.00*											
Critical v/c Ratio	*0.80*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB				WB			NB			SB	
Lane Group	*L*	*TR*			*LTR*			*LTR*			*LTR*	
Adjusted Flow Rate	*359*	*288*			*424*			*391*			*483*	
Lane Group Capacity	*406*	*821*			*827*			*568*			*681*	
v/c Ratio	*0.88*	*0.35*			*0.51*			*0.69*			*0.71*	
Green Ratio	*0.47*	*0.47*			*0.47*			*0.40*			*0.40*	
Uniform Delay d_1	*18.2*	*12.8*			*14.0*			*18.6*			*18.8*	
Delay Factor k	*0.41*	*0.11*			*0.12*			*0.26*			*0.27*	
Incremental Delay d_2	*20.0*	*0.3*			*0.5*			*3.5*			*3.4*	
PF Factor	*1.000*	*1.000*			*1.000*			*1.000*			*1.000*	
Control Delay	*38.2*	*13.0*			*14.6*			*22.1*			*22.3*	
Lane Group LOS	*D*	*B*			*B*			*C*			*C*	
Approach Delay	*27.0*			*14.6*			*22.1*			*22.3*		
Approach LOS	*C*			*B*			*C*			*C*		
Intersection Delay	*22.1*			Intersection LOS						*C*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Dawn Terrace
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Med-Low)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study -*

East/West Street: *Maiden Lane* | North/South Street: *Dawn Terrace*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	270	550			310	20
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	300	611	0	0	344	22
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				80		295
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	88	0	327
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	300						415	
C (m) (veh/h)	1204						428	
v/c	0.25						0.97	
95% queue length	0.99						11.69	
Control Delay (s/veh)	9.0						67.5	
LOS	A						F	
Approach Delay (s/veh)	--	--	67.5					
Approach LOS	--	--	F					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Dawn Terrace
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Med-Low) Mitigated
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study - w/ SB left turn*

East/West Street: *Maiden Lane* | North/South Street: *Dawn Terrace*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	270	550			310	20
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	293	597	0	0	336	21
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				80		295
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	86	0	320
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	293					86		320
C (m) (veh/h)	1213					185		702
v/c	0.24					0.46		0.46
95% queue length	0.95					2.21		2.39
Control Delay (s/veh)	8.9					40.3		14.4
LOS	A					E		B
Approach Delay (s/veh)	--	--				19.9		
Approach LOS	--	--				C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Maiden/Western
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Medium Low)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Maiden Lane* | North/South Street: *Western*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	155	775			535	50
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	168	842	0	0	581	54
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L	T				TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	45		95			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	48	0	103	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	168					48		103
C (m) (veh/h)	958					182		499
v/c	0.18					0.26		0.21
95% queue length	0.63					1.01		0.77
Control Delay (s/veh)	9.6					31.7		14.1
LOS	A					D		B
Approach Delay (s/veh)	--	--				19.7		
Approach LOS	--	--				C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	5th/Surry
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Medium Low)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *5th*	North/South Street: *Surry*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	20	285			365	255
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	21	309	0	0	396	277
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				130		10
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	141	0	10
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	21						151	
C (m) (veh/h)	927						320	
v/c	0.02						0.47	
95% queue length	0.07						2.41	
Control Delay (s/veh)	9.0						25.9	
LOS	A						D	
Approach Delay (s/veh)	--	--				25.9		
Approach LOS	--	--				D		

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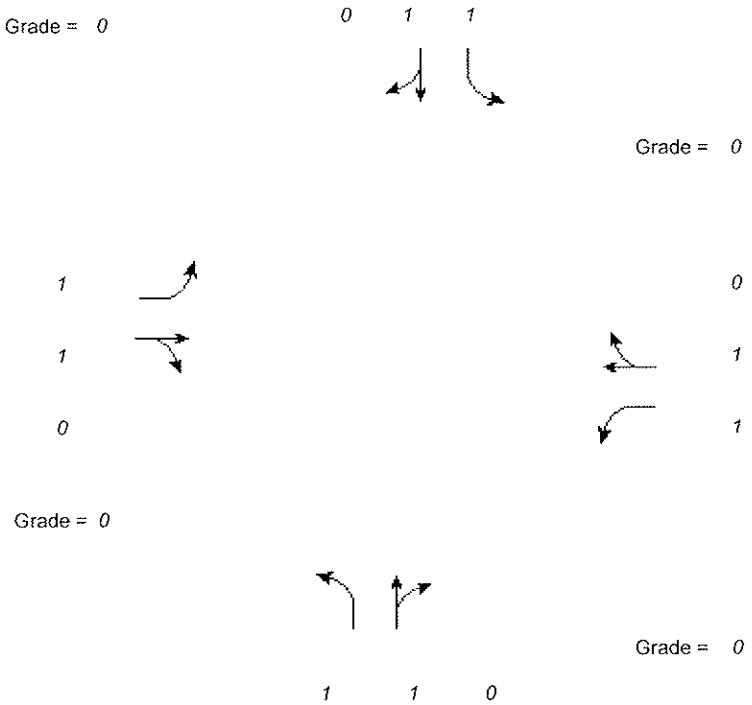
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*5th/Western*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Medium Low)*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	195	150	130	170	305	85	175	565	70	70	545	215
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Extension of Effective Green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Arrival Type	3	3		3	3		3	3		3	3	
Unit Extension	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0		0	0		0	0		0	0	

	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 6.0	G = 28.8	G =	G =	G = 6.9	G = 46.3	G =	G =
	Y = 4	Y = 5	Y =	Y =	Y = 4	Y = 5	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 106.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Adjusted Flow Rate	*212*	*304*		*185*	*424*		*190*	*690*		*76*	*826*	
Satflow Rate	*1805*	*1768*		*1805*	*1838*		*1805*	*1869*		*1805*	*1819*	
Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Green Ratio	*0.38*	*0.27*		*0.38*	*0.27*		*0.55*	*0.44*		*0.55*	*0.44*	
Lane Group Capacity	*194*	*480*		*289*	*499*		*189*	*816*		*220*	*795*	
v/c Ratio	*1.09*	*0.63*		*0.64*	*0.85*		*1.01*	*0.85*		*0.35*	*1.04*	
Flow Ratio	*0.06*	*0.17*		*0.06*	*0.23*		*0.06*	*0.37*		*0.04*	*0.45*	
Critical Lane Group	*Y*	*N*			*N*		*Y*	*N*			*N*	
Sum Flow Ratios	*0.99*											
Lost Time/Cycle	*10.00*											
Critical v/c Ratio	*1.10*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*TR*	
Adjusted Flow Rate	*212*	*304*		*185*	*424*		*190*	*690*		*76*	*826*	
Lane Group Capacity	*194*	*480*		*289*	*499*		*189*	*816*		*220*	*795*	
v/c Ratio	*1.09*	*0.63*		*0.64*	*0.85*		*1.01*	*0.85*		*0.35*	*1.04*	
Green Ratio	*0.38*	*0.27*		*0.38*	*0.27*		*0.55*	*0.44*		*0.55*	*0.44*	
Uniform Delay d_1	*37.3*	*34.0*		*30.5*	*36.6*		*22.8*	*26.7*		*18.5*	*29.9*	
Delay Factor k	*0.50*	*0.21*		*0.22*	*0.38*		*0.50*	*0.38*		*0.11*	*0.50*	
Incremental Delay d_2	*91.6*	*2.7*		*4.7*	*13.1*		*66.8*	*8.2*		*0.9*	*42.5*	
PF Factor	*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Control Delay	*128.8*	*36.7*		*35.2*	*49.6*		*89.7*	*34.9*		*19.4*	*72.3*	
Lane Group LOS	*F*	*D*		*D*	*D*		*F*	*C*		*B*	*E*	
Approach Delay	*74.5*			*45.2*			*46.7*			*67.9*		
Approach LOS	*E*			*D*			*D*			*E*		
Intersection Delay	*57.9*			Intersection LOS						*E*		

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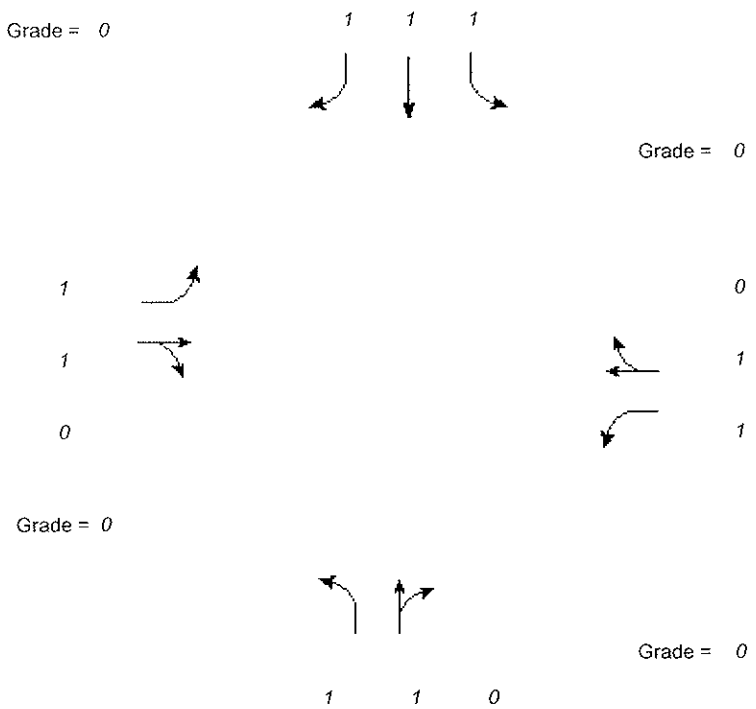
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*5th/Western*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Medium Low) Mitigated*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	195	150	130	170	305	85	175	565	70	70	545	215
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Extension of Effective Green	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Arrival Type	3	3		3	3		3	3		3	3	3
Unit Extension	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0		0	0		0	0		0	0	0

	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 10.0	G = 25.0	G =	G =	G = 6.0	G = 36.0	G =	G =
	Y = 4	Y = 5	Y =	Y =	Y = 4	Y = 5	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 95.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*T*	*R*
Adjusted Flow Rate	*212*	*304*		*185*	*424*		*190*	*690*		*76*	*592*	*234*
Satflow Rate	*1805*	*1768*		*1805*	*1838*		*1805*	*1869*		*1805*	*1900*	*1615*
Lost Time	*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	*2.0*
Green Ratio	*0.42*	*0.26*		*0.42*	*0.26*		*0.49*	*0.38*		*0.49*	*0.38*	*0.38*
Lane Group Capacity	*277*	*465*		*371*	*484*		*221*	*708*		*194*	*720*	*612*
v/c Ratio	*0.77*	*0.65*		*0.50*	*0.88*		*0.86*	*0.97*		*0.39*	*0.82*	*0.38*
Flow Ratio	*0.11*	*0.17*		*0.10*	*0.23*		*0.06*	*0.37*		*0.04*	*0.31*	*0.14*
Critical Lane Group	*Y*	*N*			*Y*		*Y*	*Y*			*N*	*N*
Sum Flow Ratios	*0.77*											
Lost Time/Cycle	*20.00*											
Critical v/c Ratio	*0.97*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group	*L*	*TR*		*L*	*TR*		*L*	*TR*		*L*	*T*	*R*
Adjusted Flow Rate	*212*	*304*		*185*	*424*		*190*	*690*		*76*	*592*	*234*
Lane Group Capacity	*277*	*465*		*371*	*484*		*221*	*708*		*194*	*720*	*612*
v/c Ratio	*0.77*	*0.65*		*0.50*	*0.88*		*0.86*	*0.97*		*0.39*	*0.82*	*0.38*
Green Ratio	*0.42*	*0.26*		*0.42*	*0.26*		*0.49*	*0.38*		*0.49*	*0.38*	*0.38*
Uniform Delay d_1	*21.2*	*31.1*		*19.0*	*33.5*		*19.2*	*29.0*		*20.1*	*26.6*	*21.4*
Delay Factor k	*0.32*	*0.23*		*0.11*	*0.40*		*0.39*	*0.48*		*0.11*	*0.36*	*0.11*
Incremental Delay d_2	*12.1*	*3.3*		*1.1*	*16.4*		*27.2*	*27.5*		*1.3*	*7.6*	*0.4*
PF Factor	*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	*1.000*
Control Delay	*33.2*	*34.4*		*20.1*	*49.9*		*46.5*	*56.5*		*21.4*	*34.2*	*21.8*
Lane Group LOS	*C*	*C*		*C*	*D*		*D*	*E*		*C*	*C*	*C*
Approach Delay	*33.9*			*40.8*			*54.4*			*29.9*		
Approach LOS	*C*			*D*			*D*			*C*		
Intersection Delay	*40.3*			Intersection LOS						*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Cherry/Western
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Med-Low)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Cherry*	North/South Street: *Western*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		190	100	485	325	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	206	108	527	353	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				160		365
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	173	0	396
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		527	173		396			
C (m) (veh/h)		1258	62		784			
v/c		0.42	2.79		0.51			
95% queue length		2.11	17.57		2.89			
Control Delay (s/veh)		9.9	950.8		14.2			
LOS		A	F		B			
Approach Delay (s/veh)	--	--	299.0					
Approach LOS	--	--	F					

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Cherry/Western
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Med-Low) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Cherry* | North/South Street: *Western*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	160	0	365
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	190	100	485	325	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	TR		L	T
PHF			0.92	0.92	0.92		0.92	0.92
Flow Rate (veh/h)			173	396	314		527	353
% Heavy Vehicles			0	0	0		0	0
No. Lanes	0		2		1		2	
Geometry Group			1		3b		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns			1.0	0.0	0.0		1.0	0.0
Prop. Right-Turns			0.0	1.0	0.3		0.0	0.0
Prop. Heavy Vehicle			0.0	0.0	0.0		0.0	0.0
hLT-adj			0.2	0.2	0.2	0.2	0.5	0.5
hRT-adj			-0.6	-0.6	-0.6	-0.6	-0.7	-0.7
hHV-adj			1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed			0.2	-0.6	-0.2		0.5	0.0

Departure Headway and Service Time

hd, initial value (s)			3.20	3.20	3.20		3.20	3.20
x, initial			0.15	0.35	0.28		0.47	0.31
hd, final value (s)			6.76	5.94	6.74		7.24	6.73
x, final value			0.32	0.65	0.59		1.06	0.66
Move-up time, m (s)	2.0				2.0		2.3	
Service Time, t_s (s)			4.8	3.9	4.7		4.9	4.4

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)			423	600	526		527	535
Delay (s/veh)			12.97	19.45	18.88		83.82	21.55
LOS			B	C	C		F	C
Approach: Delay (s/veh)			17.48		18.88		58.84	
LOS			C		C		F	
Intersection Delay (s/veh)	38.38							
Intersection LOS	E							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Cherry/Western
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Med-Low) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Cherry* | North/South Street: *Western*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	160	0	365
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	190	100	485	325	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	T	R	L	T
PHF			0.92	0.92	0.92	1.00	0.92	0.92
Flow Rate (veh/h)			173	396	206	100	527	353
% Heavy Vehicles			0	0	0	0	0	0
No. Lanes	0		2		2		2	
Geometry Group			1		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns			1.0	0.0	0.0	0.0	1.0	0.0
Prop. Right-Turns			0.0	1.0	0.0	1.0	0.0	0.0
Prop. Heavy Vehicle			0.0	0.0	0.0	0.0	0.0	0.0
hLT-adj			0.2	0.2	0.5	0.5	0.5	0.5
hRT-adj			-0.6	-0.6	-0.7	-0.7	-0.7	-0.7
hHV-adj			1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed			0.2	-0.6	0.0	-0.7	0.5	0.0

Departure Headway and Service Time

hd, initial value (s)			3.20	3.20	3.20	3.20	3.20	3.20
x, initial			0.15	0.35	0.18	0.09	0.47	0.31
hd, final value (s)			6.62	5.82	7.52	6.80	7.21	6.70
x, final value			0.32	0.64	0.43	0.19	1.06	0.66
Move-up time, m (s)	2.0				2.3		2.3	
Service Time, t_s (s)			4.6	3.8	5.2	4.5	4.9	4.4

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)			423	614	456	350	527	536
Delay (s/veh)			12.68	18.56	15.77	11.07	82.12	21.30
LOS			B	C	C	B	F	C
Approach: Delay (s/veh)			16.77		14.23		57.72	
LOS			C		B		F	
Intersection Delay (s/veh)	36.86							
Intersection LOS	E							

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ROUNDABOUTS - UNSIGNALIZED INTERSECTIONS WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Cherry/Western*
Agency/Co.	*J-U-B ENGINEERS, Inc*	Jurisdiction	*City of Wenatchee*
Date Performed	*9/17/2008*	Analysis Year	*2028 (Med Low) Mitigated*
Time Period	*PM Peak*		

Project Description *Wenatchee Foothills Study*

Volume Adjustments

		EB	WB	NB	SB
LT Traffic	Volume, veh/h	*0*	*160*	*0*	*485*
	PHF	*0.92*	*0.92*	*0.92*	*0.92*
	Flow rate, veh/h	*0*	*173*	*0*	*527*
TH Traffic	Volume, veh/h	*0*	*0*	*190*	*325*
	PHF	*0.92*	*0.92*	*0.92*	*0.92*
	Flow rate, veh/h	*0*	*0*	*206*	*353*
RT Traffic	Volume, veh/h	*0*	*365*	*100*	*0*
	PHF	*0.92*	*0.92*	*0.92*	*0.92*
	Flow rate, veh/h	*0*	*396*	*108*	*0*

Approach Flow Computation

Approach Flow (veh/h)	Va (veh/h)
V_{ae}	*0*
V_{aw}	*569*
V_{an}	*314*
V_{as}	*880*

Circulating Flow Computation

Approach Flow (veh/h)	Vc (veh/h)
V_{ce}	*1053*
V_{cw}	*206*
V_{cn}	*527*
V_{cs}	*173*

Capacity Computation

		EB	WB	NB	SB
Capacity	Upper bound	*595*	*1178*	*913*	*1209*
	Lower bound	*459*	*974*	*736*	*1002*
v/c Ratio	Upper bound	*0.00*	*0.48*	*0.34*	*0.73*
	Lower bound	*0.00*	*0.58*	*0.43*	*0.88*

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Crawford/Miller
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Med-Low)
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Crawford*	North/South Street: *Miller*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	125	10	450	190	90
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	135	10	489	206	97
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	250
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	86	10	5	5	5	271
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	5	489		281			101	
C (m) (veh/h)	1269	1450		660			50	
v/c	0.00	0.34		0.43			2.02	
95% queue length	0.01	1.51		2.13			10.12	
Control Delay (s/veh)	7.8	8.7		14.4			650.2	
LOS	A	A		B			F	
Approach Delay (s/veh)	--	--	14.4			650.2		
Approach LOS	--	--	B			F		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Crawford/Miller
Agency/Co.	J-U-B ENGINEERS, INC.	Jurisdiction	City of Wenatchee
Date Performed	9/16/2008	Analysis Year	2028 (Med-Low)-Mitigated
Analysis Time Period	PM Peak Hour		

Project Description *Wenatchee Foothills Study*

East/West Street: *Crawford* | North/South Street: *Miller*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	125	10	450	190	90
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	135	10	489	206	97
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	1
Configuration	LTR			LT		R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	250
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	86	10	5	5	5	271
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	1	0	0	1	0
Configuration	L		TR		LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LT		LTR		L		TR
v (veh/h)	5	489		281		86		15
C (m) (veh/h)	1269	1450		667		50		134
v/c	0.00	0.34		0.42		1.72		0.11
95% queue length	0.01	1.51		2.09		8.36		0.37
Control Delay (s/veh)	7.8	8.7		14.3		525.3		35.2
LOS	A	A		B		F		E
Approach Delay (s/veh)	--	--	14.3			452.5		
Approach LOS	--	--	B			F		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Crawford/Miller
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Med-Low) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Crawford* | North/South Street: *Miller*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	250
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	5	125	10	450	190	90
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.92		0.92		0.92		0.92	
Flow Rate (veh/h)	101		281		150		792	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.9		0.0		0.0		0.6	
Prop. Right-Turns	0.0		1.0		0.1		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.6		-0.0		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.09		0.25		0.13		0.70	
hd, final value (s)	7.08		5.91		6.30		5.49	
x, final value	0.20		0.46		0.26		1.21	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	5.1		3.9		4.3		3.5	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	351		531		400		792	
Delay (s/veh)	11.83		13.88		11.52		126.85	
LOS	B		B		B		F	
Approach: Delay (s/veh)	11.83		13.88		11.52		126.85	
LOS	B		B		B		F	
Intersection Delay (s/veh)	81.03							
Intersection LOS	F							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B ENGINEERS, Inc.
Date Performed	9/17/2008
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Crawford/Miller
Jurisdiction	City of Wenatchee
Analysis Year	2028 (Med-Low) Mitigated

Project ID *Wenatchee Foothills Study*

East/West Street: *Crawford* | North/South Street: *Miller*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	80	10	5	5	5	250
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	5	125	10	450	190	90
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		L	TR
PHF	0.92		0.92		0.92		0.92	0.92
Flow Rate (veh/h)	101		281		150		489	303
% Heavy Vehicles	0		0		0		0	0
No. Lanes	1		1		1		2	
Geometry Group	2		2		4a		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.9		0.0		0.0		1.0	0.0
Prop. Right-Turns	0.0		1.0		0.1		0.0	0.3
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	0.0
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.6		-0.0		0.5	-0.2

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	3.20
x, initial	0.09		0.25		0.13		0.43	0.27
hd, final value (s)	6.88		5.74		6.27		6.46	5.73
x, final value	0.19		0.45		0.26		0.88	0.48
Move-up time, m (s)	2.0		2.0		2.0		2.3	
Service Time, t_s (s)	4.9		3.7		4.3		4.2	3.4

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	351		531		400		554	553
Delay (s/veh)	11.51		13.31		11.47		39.22	13.65
LOS	B		B		B		E	B
Approach: Delay (s/veh)	11.51		13.31		11.47		29.44	
LOS	B		B		B		D	
Intersection Delay (s/veh)	22.61							
Intersection LOS	C							

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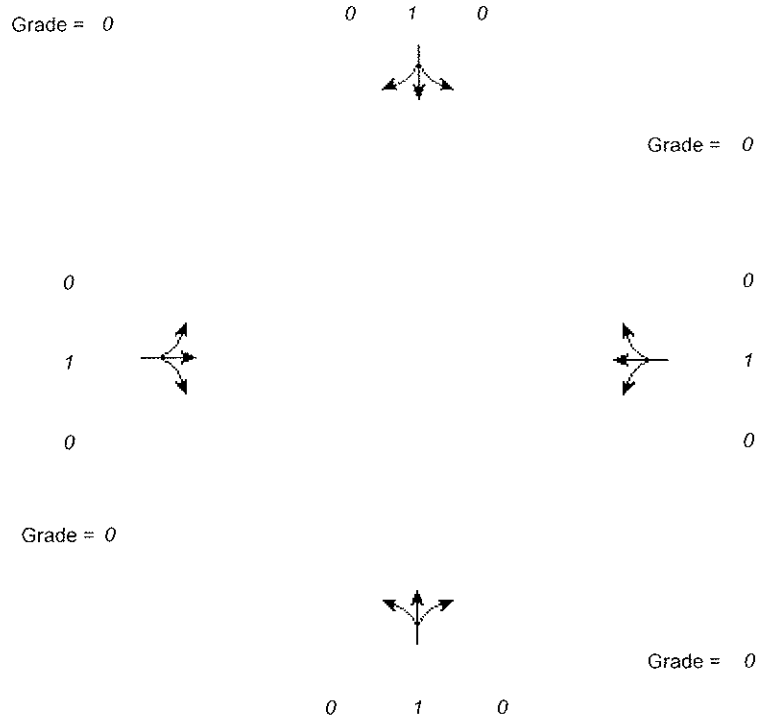
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Crawford/Mission*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Med Low)*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	330	135	155	45	215	60	95	305	15	35	295	195
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time		2.0			2.0			2.0			2.0	
Extension of Effective Green		2.0			2.0			2.0			2.0	
Arrival Type		3			3			3			3	
Unit Extension		3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	20
Lane Width		12.0			12.0			12.0			12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0			0			0			0	

	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 37.0	G =	G =	G =	G = 28.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 75.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group		LTR			LTR			LTR			LTR	
Adjusted Flow Rate		674			348			451			549	
Satflow Rate		1176			1614			1260			1723	
Lost Time		2.0			2.0			2.0			2.0	
Green Ratio		0.49			0.49			0.37			0.37	
Lane Group Capacity		580			796			470			643	
v/c Ratio		1.16			0.44			0.96			0.85	
Flow Ratio		0.57			0.22			0.36			0.32	
Critical Lane Group		Y			N			Y			N	
Sum Flow Ratios	0.93											
Lost Time/Cycle	10.00											
Critical v/c Ratio	1.07											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group		LTR			LTR			LTR			LTR	
Adjusted Flow Rate		674			348			451			549	
Lane Group Capacity		580			796			470			643	
v/c Ratio		1.16			0.44			0.96			0.85	
Green Ratio		0.49			0.49			0.37			0.37	
Uniform Delay d_1		19.0			12.3			22.9			21.6	
Delay Factor k		0.50			0.11			0.47			0.39	
Incremental Delay d_2		90.8			0.4			31.3			10.8	
PF Factor		1.000			1.000			1.000			1.000	
Control Delay		109.8			12.7			54.3			32.5	
Lane Group LOS		F			B			D			C	
Approach Delay	109.8			12.7			54.3			32.5		
Approach LOS	F			B			D			C		
Intersection Delay	59.7			Intersection LOS						E		

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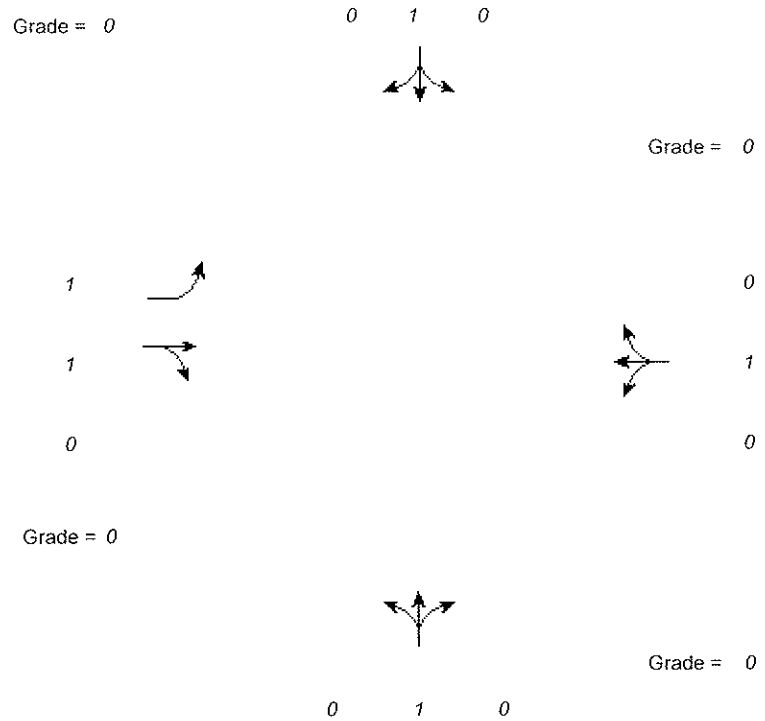
INPUT WORKSHEET

General Information		Site Information	
Analyst	*J. Baerlocher*	Intersection	*Crawford/Mission*
Agency or Co.	*J-U-B ENGINEERS, INC.*	Area Type	*All other areas*
Date Performed	*9/16/2008*	Jurisdiction	*City of Wenatchee*
Time Period	*PM Peak Hour*	Analysis Year	*2028 (Med Low)Mit*

Project Description *Wenatchee Foothills Study*

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	330	135	155	45	215	60	95	305	15	35	295	195
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time	2.0	2.0			2.0			2.0			2.0	
Extension of Effective Green	2.0	2.0			2.0			2.0			2.0	
Arrival Type	3	3			3			3			3	
Unit Extension	3.0	3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	0	0	0	0	0	0	20
Lane Width	12.0	12.0			12.0			12.0			12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour	0	0			0			0			0	

	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = 35.0	G =	G =	G =	G = 30.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 75.0		

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Wenatchee Foothills Study*

Capacity Analysis

	EB			WB			NB			SB		
Lane Group	*L*	*TR*			*LTR*			*LTR*			*LTR*	
Adjusted Flow Rate	*359*	*315*			*348*			*451*			*549*	
Satflow Rate	*983*	*1748*			*1698*			*1320*			*1723*	
Lost Time	*2.0*	*2.0*			*2.0*			*2.0*			*2.0*	
Green Ratio	*0.47*	*0.47*			*0.47*			*0.40*			*0.40*	
Lane Group Capacity	*459*	*816*			*792*			*528*			*689*	
v/c Ratio	*0.78*	*0.39*			*0.44*			*0.85*			*0.80*	
Flow Ratio	*0.37*	*0.18*			*0.20*			*0.34*			*0.32*	
Critical Lane Group	*Y*	*N*			*N*			*Y*			*N*	
Sum Flow Ratios	*0.71*											
Lost Time/Cycle	*10.00*											
Critical v/c Ratio	*0.82*											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group	*L*	*TR*			*LTR*			*LTR*			*LTR*	
Adjusted Flow Rate	*359*	*315*			*348*			*451*			*549*	
Lane Group Capacity	*459*	*816*			*792*			*528*			*689*	
v/c Ratio	*0.78*	*0.39*			*0.44*			*0.85*			*0.80*	
Green Ratio	*0.47*	*0.47*			*0.47*			*0.40*			*0.40*	
Uniform Delay d_1	*16.8*	*13.0*			*13.4*			*20.5*			*19.8*	
Delay Factor k	*0.33*	*0.11*			*0.11*			*0.39*			*0.34*	
Incremental Delay d_2	*8.5*	*0.3*			*0.4*			*12.9*			*6.5*	
PF Factor	*1.000*	*1.000*			*1.000*			*1.000*			*1.000*	
Control Delay	*25.3*	*13.3*			*13.8*			*33.4*			*26.3*	
Lane Group LOS	*C*	*B*			*B*			*C*			*C*	
Approach Delay	*19.7*			*13.8*			*33.4*			*26.3*		
Approach LOS	*B*			*B*			*C*			*C*		
Intersection Delay	*23.6*			Intersection LOS						*C*		

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