Appendix A: Traffic Data

- City of Kimberly Traffic Data Summary: 2009 & 2029 Peak Hour Volumes & ADT
- Highway 30 / Main Street Two-Way Stop Control Summary:
  2009 & 2029 AM Peak Hour and LOS
- Center / Main Street Two-Way Stop Control Summary:
  2009 & 2029 AM Peak Hour, LOS and Future Modified Scenario
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  2009 & 2029 AM Peak Hour and LOS

Appendix A:
Traffic Data

City of Kimberly Traffic Data Summary: 2009 & 2029 Peak Hour Volumes & ADT

CITY OF KIMBERLY TRAFFIC DATA SUMMARY

Annual Traffic Growth Rate: 2.00%

HCM "K" Factor for Pk Hr Volumes: 0.08 (used to convert Pk-Hr Volumes to ADT volumes)

Intersection Location	Intersection Leg	Traffic Direction	2005 Pk-Hr AM	2009 Pk-Hr AM (4-Yrs Growth)	2009 ADT (4-Yrs Growth)	2029 Pk-Hr AM (24-Yrs Growth)	2029 ADT (24-Yrs Growth)	2009 LEG ADT (4-Yrs Growth)	2029 LEG ADT (24-Yrs Growth)
Highway 30 / Main Street	SOUTH LEG-HIGHWAY 30	NB-Left	10	10	125	15	190	2005	3005
		NB-Thru	90	95	1190	145	1815		
	SOUTH LEG-MAIN	NE-Left	215	235	2940	345	4315	3695	5440
		NE-Right	5	5	65	10	125		
	NORTH LEG	SB-Thru	50	55	690	80	1000	4570	6815
		SB-Right	200	215	2690	320	4000		
Center Street / Main Street	WEST LEG	EB-Left	45	50	625	70	875	5880	8565
		EB-Thru	50	55	690	80	1000		
		EB-Right	75	80	1000	120	1500		
	EAST LEG	WB-Left	20	20	250	30	375	3195	4695
		WB- Thru	100	110	1375	160	2000		
		WB-Right	40	45	565	65	815		
	SOUTH LEG	NB-Left	100	110	1375	160	2000	5940	8815
		NB-Thru	130	140	1750	210	2625		
		NB-Right	15	15	190	25	315		
	NORTH LEG	SB-Left	10	10	125	15	190	5255	7695
		SB-Thru	100	110	1375	160	2000		
		SB-Right	60	65	815	95	1190		
Center Street / Emerald Street	WEST LEG	EB-Thru	120	130	1625	195	2440	5940	8885
		EB-Right	65	70	875	105	1315		
	EAST LEG	WB-Left	20	20	250	30	375	4755	7070
		WB-Thru	170	185	2315	275	3440		
	SOUTH LEG	NB-Left	85	90	1125	135	1690	2815	4195
		NB-Right	40	45	565	65	815		

South Leg=	NB-Thru	NB-Right	NB-Left	SB-Thru	EB-Right	WB-Left
North Leg=	NB-Thru	SB-Thru	SB-Right	SB-Left	EB-Left	WB-Right
West Leg=	NB-Left	SB-Right	EB-Thru	EB-Right	EB-Left	WB-Thru
East Leg=	NB-Right	SB-Left	EB-Thru	WB-Thru	WB-Right	WB-Left

Highway 30 / Main Street
Two-Way Stop Control Summary:
2009 & 2029 AM Peak Hour and LOS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	US 30/Main Street
Agency/Co.	J-U-B ENGINEERS, Inc	Jurisdiction	City of Kimberly
Date Performed	4/22/2009	Analysis Year	2009 (Existing)
Analysis Time Period	AM Peak		

Project Description *City of Kimberly Transportation Plan*

East/West Street: *US 30* | North/South Street: *Main Street*

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)	10	95			55	215
Peak-Hour Factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	11	109	0	0	63	247
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	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	235		5			
Peak-Hour Factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	270	0	5	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	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	11						275	
C (m) (veh/h)	1262						677	
v/c	0.01						0.41	
95% queue length	0.03						1.97	
Control Delay (s/veh)	7.9						13.9	
LOS	A						B	
Approach Delay (s/veh)	--	--				13.9		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	US 30/Main Street
Agency/Co.	J-U-B ENGINEERS, Inc	Jurisdiction	City of Kimberly
Date Performed	4/22/2009	Analysis Year	2029 (Future)
Analysis Time Period	AM Peak		

Project Description *City of Kimberly Transportation Plan*

East/West Street: *US 30* | North/South Street: *Main Street*

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)	15	145			80	320
Peak-Hour Factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	17	166	0	0	91	367
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	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	345		10			
Peak-Hour Factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	396	0	11	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	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	17						407	
C (m) (veh/h)	1114						549	
v/c	0.02						0.74	
95% queue length	0.05						6.34	
Control Delay (s/veh)	8.3						28.0	
LOS	A						D	
Approach Delay (s/veh)	--	--	28.0					
Approach LOS	--	--	D					

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Center / Main Street
Two-Way Stop Control Summary:
2009 & 2029 AM Peak Hour, LOS and
Future Modified Scenario

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B Engineers
Date Performed	4/22/2009
Analysis Time Period	AM Peak

Site Information

Intersection	Center Street/Main Street
Jurisdiction	City of Kimberly
Analysis Year	2009 (Existing)

Project ID *City of Kimberly Transporation Plan*

East/West Street: *Center Street* | North/South Street: *Main Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	50	55	80	20	110	45
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	110	140	15	10	110	65
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.80		0.80		0.80		0.80	
Flow Rate (veh/h)	229		217		329		230	
% 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	0.3		0.1		0.4		0.1	
Prop. Right-Turns	0.4		0.3		0.1		0.4	
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	-0.2		-0.1		0.1		-0.2	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.20		0.19		0.29		0.20	
hd, final value (s)	5.78		5.87		5.73		5.68	
x, final value	0.37		0.35		0.52		0.36	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, l_s (s)	3.8		3.9		3.7		3.7	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	479		467		579		480	
Delay (s/veh)	12.10		12.06		14.84		11.87	
LOS	B		B		B		B	
Approach: Delay (s/veh)	12.10		12.06		14.84		11.87	
LOS	B		B		B		B	
Intersection Delay (s/veh)	12.94							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	J. Baerlocher
Agency/Co.	J-U-B Engineers
Date Performed	4/22/2009
Analysis Time Period	AM Peak

Site Information

Intersection	Center Street/Main Street
Jurisdiction	City of Kimberly
Analysis Year	2029 (Future)

Project ID City of Kimberly Transporation Plan

East/West Street: Center Street

North/South Street: Main Street

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	70	80	120	30	160	65
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	160	210	25	15	160	95
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.80		0.80		0.80		0.80	
Flow Rate (veh/h)	335		317		492		335	
% 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	0.3		0.1		0.4		0.1	
Prop. Right-Turns	0.4		0.3		0.1		0.4	
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	-0.2		-0.1		0.0		-0.2	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.30		0.28		0.44		0.30	
hd, final value (s)	8.41		8.56		8.16		8.37	
x, final value	0.78		0.75		1.12		0.78	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	6.4		6.6		6.2		6.4	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	413		404		492		414	
Delay (s/veh)	35.61		33.45		106.09		35.14	
LOS	E		D		F		E	
Approach: Delay (s/veh)	35.61		33.45		106.09		35.14	
LOS	E		D		F		E	
Intersection Delay (s/veh)	58.49							
Intersection LOS	F							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Center Street/Main Street
Agency/Co.	J-U-B Engineers	Jurisdiction	City of Kimberly
Date Performed	4/22/2009	Analysis Year	2029 (Future) - modified
Analysis Time Period	AM Peak		

Project ID *City of Kimberly Transporation Plan*

East/West Street: *Center Street* | North/South Street: *Main Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	70	80	120	30	160	65
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	160	210	25	15	160	95
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	TR		TR		TR		TR	
PHF	0.80		0.80		0.80		0.80	
Flow Rate (veh/h)	248		280		293		317	
% 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	0.0		0.0		0.0		0.0	
Prop. Right-Turns	0.6		0.3		0.1		0.4	
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	-0.4		-0.2		-0.1		-0.2	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.22		0.25		0.26		0.28	
hd, final value (s)	6.11		6.20		6.21		6.01	
x, final value	0.42		0.48		0.51		0.53	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	4.1		4.2		4.2		4.0	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	498		522		528		548	
Delay (s/veh)	13.47		14.85		15.37		15.56	
LOS	B		B		C		C	
Approach: Delay (s/veh)	13.47		14.85		15.37		15.56	
LOS	B		B		C		C	
Intersection Delay (s/veh)	14.88							
Intersection LOS	B							

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Center / Emerald Street
Two-Way Stop Control Summary:
2009 & 2029 AM Peak Hour and LOS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Center Street/Emerald Street
Agency/Co.	J-U-B ENGINEERS, Inc	Jurisdiction	City of Kimberly
Date Performed	4/22/2009	Analysis Year	2009 (Existing)
Analysis Time Period	AM Peak		

Project Description *City of Kimberly Transportation Plan*

East/West Street: *Center Street* | North/South Street: *Emerald Street*

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)		130	70	20	185	
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.71	0.71	0.71
Hourly Flow Rate, HFR (veh/h)	0	183	98	28	260	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	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	90		45			
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.71	0.71	0.71
Hourly Flow Rate, HFR (veh/h)	126	0	63	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	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)		28		189				
C (m) (veh/h)		1293		565				
v/c		0.02		0.33				
95% queue length		0.07		1.46				
Control Delay (s/veh)		7.8		14.5				
LOS		A		B				
Approach Delay (s/veh)	--	--	14.5					
Approach LOS	--	--	B					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	J. Baerlocher	Intersection	Center Street/Emerald Street
Agency/Co.	J-U-B ENGINEERS, Inc	Jurisdiction	City of Kimberly
Date Performed	4/22/2009	Analysis Year	2029 (Future)
Analysis Time Period	AM Peak		

Project Description *City of Kimberly Transportation Plan*

East/West Street: *Center Street* | North/South Street: *Emerald Street*

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)		195	105	30	275	
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.71	0.71	0.71
Hourly Flow Rate, HFR (veh/h)	0	274	147	42	387	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	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	135		65			
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.71	0.71	0.71
Hourly Flow Rate, HFR (veh/h)	190	0	91	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	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)		42		281				
C (m) (veh/h)		1149		403				
v/c		0.04		0.70				
95% queue length		0.11		5.16				
Control Delay (s/veh)		8.3		32.1				
LOS		A		D				
Approach Delay (s/veh)	--	--	32.1					
Approach LOS	--	--	D					

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