

HCM Signalized Intersection Capacity Analysis

1: Gage Blvd & Leslie Rd

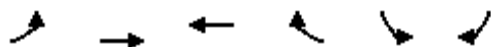
2028 No Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1782	1515	1693	3334		1693	3113		1676	3214	
Flt Permitted	0.19	1.00	1.00	0.11	1.00		0.12	1.00		0.20	1.00	
Satd. Flow (perm)	339	1782	1515	193	3334		223	3113		354	3214	
Volume (vph)	135	655	620	505	790	90	545	335	390	195	705	270
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	147	712	674	549	859	98	592	364	424	210	758	290
RTOR Reduction (vph)	0	0	142	0	7	0	0	177	0	0	33	0
Lane Group Flow (vph)	147	712	532	549	950	0	592	611	0	210	1015	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	39.0	32.0	32.0	57.0	45.0		53.0	36.0		39.0	27.0	
Effective Green, g (s)	43.0	34.0	34.0	59.0	47.0		55.0	38.0		43.0	29.0	
Actuated g/C Ratio	0.36	0.28	0.28	0.49	0.39		0.46	0.32		0.36	0.24	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	223	505	429	370	1306		384	986		281	777	
v/s Ratio Prot	0.05	0.40		c0.27	0.28		c0.30	0.20		0.09	0.32	
v/s Ratio Perm	0.19		0.35	c0.46			c0.41			0.18		
v/c Ratio	0.66	1.41	1.24	1.48	0.73		1.54	0.62		0.75	1.31	
Uniform Delay, d1	27.9	43.0	43.0	51.2	31.0		50.7	34.9		29.2	45.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.3	196.0	126.6	231.7	3.6		256.4	2.9		16.5	146.9	
Delay (s)	42.2	239.0	169.6	282.9	34.6		307.1	37.8		45.8	192.4	
Level of Service	D	F	F	F	C		F	D		D	F	
Approach Delay (s)		189.6			125.1			153.3			167.9	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM Average Control Delay			158.9			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.50									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			6.0			
Intersection Capacity Utilization			140.8%			ICU Level of Service				H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Gage Blvd & Steptoe St

2028 No Build



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑	↗	↘↘	↙
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1693	3386	3386	1498	3317	1530
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1693	3386	3386	1498	3317	1530
Volume (vph)	325	980	1355	580	475	290
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.96	0.96
Adj. Flow (vph)	349	1054	1473	630	495	302
RTOR Reduction (vph)	0	0	0	62	0	249
Lane Group Flow (vph)	349	1054	1473	568	495	53
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Turn Type	Prot			pm+ov		Perm
Protected Phases	1	6	2	8	8	
Permitted Phases				2		8
Actuated Green, G (s)	30.5	90.3	56.2	75.2	19.0	19.0
Effective Green, g (s)	31.0	93.0	59.0	80.0	21.0	21.0
Actuated g/C Ratio	0.26	0.78	0.49	0.67	0.18	0.18
Clearance Time (s)	3.5	5.7	5.8	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	437	2624	1665	1036	580	268
v/s Ratio Prot	c0.21	0.31	c0.44	0.10	c0.15	
v/s Ratio Perm				0.28		0.03
v/c Ratio	0.80	0.40	0.88	0.55	0.85	0.20
Uniform Delay, d1	41.6	4.4	27.4	10.5	48.0	42.3
Progression Factor	1.00	1.00	0.80	0.35	0.51	1.54
Incremental Delay, d2	9.2	0.5	4.8	0.2	8.3	0.1
Delay (s)	50.8	4.9	26.7	3.9	32.7	65.2
Level of Service	D	A	C	A	C	E
Approach Delay (s)		16.3	19.9		45.0	
Approach LOS		B	B		D	
Intersection Summary						
HCM Average Control Delay			23.4		HCM Level of Service	C
HCM Volume to Capacity ratio			0.85			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			82.8%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 3: Gage Blvd & Grandridge Blvd

2028 No Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙	↑↑		↙	↕			↗	↗
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95			1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95			0.98	1.00
Satd. Flow (prot)	1693	3386	1479	1692	3374		1608	1610			1739	1488
Flt Permitted	0.16	1.00	1.00	0.26	1.00		0.95	0.95			0.98	1.00
Satd. Flow (perm)	290	3386	1479	464	3374		1608	1610			1739	1488
Volume (vph)	55	730	750	15	945	20	1000	10	10	20	20	60
Peak-hour factor, 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
Adj. Flow (vph)	60	793	815	16	1027	22	1087	11	11	22	22	65
RTOR Reduction (vph)	0	0	413	0	1	0	0	1	0	0	0	39
Lane Group Flow (vph)	60	793	402	16	1048	0	564	544	0	0	44	26
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm		Perm	Perm			Split			Split		Perm
Protected Phases		6			2		4	4		3	3	
Permitted Phases	6		6	2								3
Actuated Green, G (s)	56.7	56.7	56.7	56.7	56.7		43.8	43.8			4.0	4.0
Effective Green, g (s)	59.2	59.2	59.2	59.2	59.2		45.8	45.8			6.0	6.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49		0.38	0.38			0.05	0.05
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	143	1670	730	229	1665		614	614			87	74
v/s Ratio Prot		0.23			c0.31		c0.35	0.34			c0.03	
v/s Ratio Perm	0.21		0.27	0.03								0.02
v/c Ratio	0.42	0.47	0.55	0.07	0.63		0.92	0.89			0.51	0.35
Uniform Delay, d1	19.4	20.1	21.1	16.0	22.3		35.3	34.7			55.6	55.1
Progression Factor	0.72	0.68	0.48	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.1	0.4	0.6	1.8		18.4	14.1			1.7	1.1
Delay (s)	14.6	13.7	10.6	16.5	24.2		53.8	48.8			57.2	56.2
Level of Service	B	B	B	B	C		D	D			E	E
Approach Delay (s)		12.2			24.0			51.3			56.6	
Approach LOS		B			C			D			E	
Intersection Summary												
HCM Average Control Delay			27.6				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)				9.0	
Intersection Capacity Utilization			79.8%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Grandridge Blvd & Columbia Center Blvd

2028 No Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘		↖↗		↖	↑↑↑	↘	↖	↑↑↑	↘
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00		0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.99		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1693	1507		3172		1644	4725	1471	1676	4818	1500
Flt Permitted	0.95	1.00	1.00		0.99		0.08	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	1608	1693	1507		3172		138	4725	1471	273	4818	1500
Volume (vph)	145	200	260	85	230	135	380	1175	65	145	1865	65
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	158	217	283	92	250	147	413	1277	71	154	1984	69
RTOR Reduction (vph)	0	0	82	0	40	0	0	0	22	0	0	26
Lane Group Flow (vph)	158	217	201	0	449	0	413	1277	49	154	1984	43
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Split		pm+ov	Split			D.P+P		pm+ov	D.P+P		pm+ov
Protected Phases	3	3	5	4	4		5	2	4	1	6	3
Permitted Phases			3				6		2	2		6
Actuated Green, G (s)	13.2	13.2	37.1		15.2		71.8	63.7	78.9	72.3	47.9	61.1
Effective Green, g (s)	15.0	15.0	41.0		17.0		76.0	65.4	82.4	76.0	50.0	65.0
Actuated g/C Ratio	0.12	0.12	0.34		0.14		0.63	0.55	0.69	0.63	0.42	0.54
Clearance Time (s)	4.8	4.8	5.1		4.8		5.1	4.7	4.8	5.0	5.1	4.8
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	201	212	553		449		414	2575	1010	297	2008	813
v/s Ratio Prot	0.10	c0.13	0.08		c0.14		c0.22	0.27	0.01	0.05	0.41	0.01
v/s Ratio Perm			0.05				c0.41		0.03	0.28		0.02
v/c Ratio	0.79	1.02	0.36		1.00		1.00	0.50	0.05	0.52	0.99	0.05
Uniform Delay, d1	50.9	52.5	29.7		51.5		43.0	17.0	6.1	10.8	34.7	13.0
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.8	68.1	0.1		41.9		43.2	0.7	0.0	0.6	17.5	0.0
Delay (s)	67.8	120.6	29.8		93.4		86.2	17.7	6.1	11.4	52.2	13.0
Level of Service	E	F	C		F		F	B	A	B	D	B
Approach Delay (s)		68.9			93.4			33.3			48.1	
Approach LOS		E			F			C			D	
Intersection Summary												
HCM Average Control Delay			50.0				HCM Level of Service				D	
HCM Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			98.6%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: Clearwater Ave & Columbia Center Blvd

2028 No Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗		↖	↖↗	↖↗	↖	↖↗↘		↖	↖↗	↖
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95		1.00	0.95	0.88	1.00	*0.60		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3130	3121		1676	3353	2640	1660	3084		1676	3353	1500
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3130	3121		1676	3353	2640	1660	3084		1676	3353	1500
Volume (vph)	885	410	115	140	575	255	150	935	140	210	1430	1040
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	941	436	122	152	625	277	163	1016	152	228	1554	1130
RTOR Reduction (vph)	0	21	0	0	0	202	0	9	0	0	0	326
Lane Group Flow (vph)	941	537	0	152	625	75	163	1159	0	228	1554	804
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot			Prot		custom
Protected Phases	1	6		5	2		3	8		7	4	4
Permitted Phases						2						4
Actuated Green, G (s)	28.0	34.4		12.9	19.6	19.6	8.3	38.2		14.0	43.3	43.3
Effective Green, g (s)	29.0	37.1		13.9	22.0	22.0	11.0	40.6		16.4	46.0	46.0
Actuated g/C Ratio	0.24	0.31		0.12	0.18	0.18	0.09	0.34		0.14	0.38	0.38
Clearance Time (s)	4.0	5.7		4.0	5.4	5.4	5.7	5.4		5.4	5.7	5.7
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	756	965		194	615	484	152	1043		229	1285	575
v/s Ratio Prot	c0.30	0.17		0.09	c0.19		c0.10	0.38		c0.14	0.46	c0.54
v/s Ratio Perm						0.03						
v/c Ratio	1.24	0.56		0.78	1.02	0.16	1.07	1.11		1.00	1.21	1.40
Uniform Delay, d1	45.5	34.6		51.6	49.0	41.2	54.5	39.7		51.8	37.0	37.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	121.1	2.3		17.1	40.4	0.7	93.6	63.5		57.8	101.7	189.9
Delay (s)	166.6	36.9		68.7	89.4	41.9	148.1	103.2		109.6	138.7	226.9
Level of Service	F	D		E	F	D	F	F		F	F	F
Approach Delay (s)		118.3			73.9			108.7			170.6	
Approach LOS		F			E			F			F	

Intersection Summary

HCM Average Control Delay	132.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
7: Clearwater Ave & Clodfelter Rd

2028 No Build

	→	↘	↙	←	↖	↗	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑		↖	↑↑	↖	↗	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Volume (veh/h)	505	45	935	825	50	755	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	549	49	1016	897	54	821	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume			598		3054	299	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			598		3054	299	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			0		0	0	
cM capacity (veh/h)			975		0	703	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	366	232	1016	448	448	54	821
Volume Left	0	0	1016	0	0	54	0
Volume Right	0	49	0	0	0	0	821
cSH	1700	1700	975	1700	1700	0	703
Volume to Capacity	0.22	0.14	1.04	0.26	0.26	Err	1.17
Queue Length 95th (ft)	0	0	557	0	0	Err	659
Control Delay (s)	0.0	0.0	60.9	0.0	0.0	Err	111.7
Lane LOS			F			F	F
Approach Delay (s)	0.0		32.4			Err	
Approach LOS						F	
Intersection Summary							
Average Delay			Err				
Intersection Capacity Utilization			84.3%	ICU Level of Service		E	
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

8: 10th Ave & Clodfelter Rd

2028 No Build



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL2	NEL	NER
Lane Configurations		↕			↕		↕				↕	
Sign Control		Stop			Stop		Stop				Stop	
Volume (vph)	65	95	30	90	270	105	120	625	50	15	575	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	103	33	98	293	114	130	679	54	16	625	87

Direction, Lane #	EB 1	WB 1	SB 1	NE 1
Volume Total (vph)	207	505	864	728
Volume Left (vph)	71	98	130	16
Volume Right (vph)	33	114	54	87
Hadj (s)	0.18	-0.06	0.08	0.02
Departure Headway (s)	9.7	8.4	8.5	8.4
Degree Utilization, x	0.56	1.17	2.04	1.71
Capacity (veh/h)	359	427	430	431
Control Delay (s)	24.4	127.8	496.3	349.5
Approach Delay (s)	24.4	127.8	496.3	349.5
Approach LOS	C	F	F	F

Intersection Summary			
Delay		326.8	
HCM Level of Service		F	
Intersection Capacity Utilization		131.2%	ICU Level of Service H
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis

9: Canyon St & Steptoe St

2028 No Build



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0		3.0	3.0	3.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.98	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1613		1676	3353	3277	
Flt Permitted	0.97		0.12	1.00	1.00	
Satd. Flow (perm)	1613		217	3353	3277	
Volume (vph)	85	70	165	860	900	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	76	179	935	978	174
RTOR Reduction (vph)	25	0	0	0	12	0
Lane Group Flow (vph)	143	0	179	935	1140	0
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	25.0		85.0	85.0	57.0	
Effective Green, g (s)	27.0		87.0	87.0	59.0	
Actuated g/C Ratio	0.22		0.72	0.72	0.49	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	363		461	2431	1611	
v/s Ratio Prot	c0.09		0.08	c0.28	c0.35	
v/s Ratio Perm			0.20			
v/c Ratio	0.39		0.39	0.38	0.71	
Uniform Delay, d1	39.5		11.9	6.3	23.8	
Progression Factor	1.00		0.79	0.87	0.32	
Incremental Delay, d2	3.2		2.0	0.4	1.9	
Delay (s)	42.7		11.3	5.9	9.4	
Level of Service	D		B	A	A	
Approach Delay (s)	42.7			6.7	9.4	
Approach LOS	D			A	A	

Intersection Summary

HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

10: Tapteal Dr & Steptoe St

2028 No Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	1765	1500	1676	1765	1500	1676	3288		1676	3299	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	1765	1500	1676	1765	1500	1676	3288		1676	3299	
Volume (vph)	180	130	225	90	130	65	245	610	90	25	745	90
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	196	141	245	98	141	71	266	663	98	27	793	96
RTOR Reduction (vph)	0	0	194	0	0	62	0	10	0	0	8	0
Lane Group Flow (vph)	196	141	51	98	141	9	266	751	0	27	881	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	20.0	23.0	23.0	11.0	14.0	14.0	26.0	62.0		4.0	40.0	
Effective Green, g (s)	22.0	25.0	25.0	13.0	16.0	16.0	28.0	64.0		6.0	42.0	
Actuated g/C Ratio	0.18	0.21	0.21	0.11	0.13	0.13	0.23	0.53		0.05	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	307	368	313	182	235	200	391	1754		84	1155	
v/s Ratio Prot	c0.12	0.08		0.06	c0.08		c0.16	0.23		0.02	c0.27	
v/s Ratio Perm			0.03			0.01						
v/c Ratio	0.64	0.38	0.16	0.54	0.60	0.05	0.68	0.43		0.32	0.76	
Uniform Delay, d1	45.3	40.9	38.9	50.7	49.0	45.4	41.9	16.9		55.0	34.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.49		1.00	1.00	
Incremental Delay, d2	9.8	3.0	1.1	11.0	10.8	0.4	8.7	0.7		9.8	4.8	
Delay (s)	55.1	43.9	40.0	61.6	59.8	45.8	40.6	9.0		64.9	39.4	
Level of Service	E	D	D	E	E	D	D	A		E	D	
Approach Delay (s)		46.0			57.2			17.2			40.1	
Approach LOS		D			E			B			D	
Intersection Summary												
HCM Average Control Delay			34.9			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			70.2%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

28_PM_NB_Center-Gage. OUT

Akcelik & Associates Pty Ltd - aaSIDRA 2.1.4.357

CH2MHILL
 CH2MHILL User ID: A0725
 Licence Type: Single Computer

Time and Date of Analysis 11:15 AM, Sep 11, 2006

Filename: C:\Documents and Settings\tnewkirk\My Documents\aaTraffic\Steptoe\28_PM_NB_Center-Gage. OUT

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:

aaTraffic SIDRA US Highway Capacity Manual (2000) Version

RUN INFORMATION

* Basic Parameters:
 Intersection Type: Roundabout
 Driving on the right-hand side of the road
 Input data specified in US units
 Default Values File No. 11
 Peak flow period (for performance): 15 minutes
 Unit time (for volumes): 60 minutes (Total Flow Period)
 Delay definition: Control delay
 Geometric delay included
 aaSIDRA Standard Delay and Queue models used
 Level of Service based on: Delay (HCM method)
 Queue definition: Back of queue, 95th Percentile

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor	
	LV	HV	LV	HV	LV	HV			
VEHICLES Demand flows in veh/hour as used by the program									
West: EB: Gage Blvd									
12	27	1	0	0	0	0	1.00	0.92	
11	0	0	266	5	0	0	1.00	0.92	
13	0	0	0	0	623	13	1.00	0.92	
South: NB: Center Pkwy									
32	651	7	0	0	0	0	1.00	0.92	
31	0	0	65	1	48	1	1.00	0.92	
East: WB: Gage Blvd									
22	38	1	0	0	0	0	1.00	0.92	
21	0	0	452	5	0	0	1.00	0.92	
23	0	0	0	0	54	1	1.00	0.92	

North: SB: Center Pkwy

28_PM_NB_Center-Gage. OUT

42 63 2 69 2 21 1 1.00 0.92

 Based on unit time = 60 minutes.
 Flow Scale and Peak Hour Factor effects included in flow values.

 Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table R.0 - ROUNDABOUT BASIC PARAMETERS

Cent Island Diam (ft)	Circ Width (ft)	Insc Diam. (ft)	No. of Circ. Lanes	No. of Entry Lanes	Av. Ent Lane Width (ft)	Circulating/Exiting Stream						
						Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor	

West: 96	EB: 18	Gage Blvd 132	1	1	13.00	174	2.6	174	0	N	0.979	

South: 96	NB: 18	Center Pkwy 132	1	2	13.00	364	2.2	364	0	N	0.971	

East: 96	WB: 30	Gage Blvd 156	2	2	13.00	750	1.0	750	0	N	0.898	

North: 96	SB: 30	Center Pkwy 156	2	1	13.00	1152	1.0	1152	0	N	0.898	

 Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table R.1 - ROUNDABOUT GAP ACCEPTANCE PARAMETERS

Turn	Lane No.	Lane Type	Circulating/Exiting Stream					Critical Gap		Follow-up Headway (s)
			Flow Rate (pcu/h)	Aver Speed (mph)	Aver Dist (ft)	In-Bnch Headway (s)	Prop Bunched	Hdwy (s)	Dist (ft)	

West: EB: Gage Blvd										
Left	1	Dominant	174	19.0	576.3	2.00	0.191	4.60	128.0	2.41
Thru	1	Dominant	174	19.0	576.3	2.00	0.191	4.60	128.0	2.41
Right	2	Continuous								

South: NB: Center Pkwy										
Left	1	Subdominant	364	22.1	320.0	2.00	0.358	4.32	139.9	2.34
	2	Dominant	364	22.1	320.0	2.00	0.358	3.70	120.0	2.01
Thru	2	Dominant	364	22.1	320.0	2.00	0.358	3.71	120.0	2.01
Right	2	Dominant	364	22.1	320.0	2.00	0.358	3.71	120.0	2.01

East: WB: Gage Blvd										
Left	1	Subdominant	750	16.3	115.0	1.06	0.385	3.52	84.4	2.40
Thru	1	Subdominant	750	16.3	115.0	1.06	0.385	3.52	84.3	2.40
	2	Dominant	750	16.3	115.0	1.06	0.385	3.10	74.3	2.12
Right	2	Dominant	750	16.3	115.0	1.06	0.385	3.10	74.3	2.12

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North: SB: Center Pkwy										
Left	1	Dominant	1152	19.0	86.8	1.03	0.521	3.25	90.2	2.34
Thru	1	Dominant	1152	19.0	86.8	1.03	0.521	3.25	90.2	2.34
Right	1	Dominant	1152	19.0	86.8	1.03	0.521	3.25	90.3	2.34

Environment Factor: 1.00
 Entry/Circulating Flow Adjustment: Medium

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

* Critical gap or follow-up headway set to MINIMUM value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table R.5 - ROUNDABOUT CAPACITY & LEVEL OF SERVICE - aaSIDRA & HCM MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA				HCM 2000 Lower				HCM 2000 Upper				
		Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	
West: EB: Gage Blvd														
12	L	28	116	0.241	13.1	B	94	0.298	13.2	B	113	0.248	12.9	B
11	T	271	1127	0.240	6.0	A	907	0.299	6.1	A	1095	0.247	5.9	A
13	R	636	-	-	NA	-	-	-	NA	-	-	-	NA	-
South: NB: Center Pkwy														
32	L	658	2036	0.323	14.0	B	1446	0.455	15.0	B	1770	0.372	14.2	B
31	TR	115	356	0.323	7.5	A	253	0.455	8.6	A	309	0.372	7.9	A
East: WB: Gage Blvd														
22	L	39	130	0.300	14.6	B	-	-	NA	-	-	-	NA	-
21	T	457	1522	0.300	7.5	A	-	-	NA	-	-	-	NA	-
23	R	55	183	0.301	8.5	A	-	-	NA	-	-	-	NA	-
North: SB: Center Pkwy														
42	LTR	158	706	0.224	11.7	B	-	-	NA	-	-	-	NA	-

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the HCM models are only applicable to single-lane roundabouts with circulating flows less than 1200 veh/h. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

28_PM_NB_Center-Gage. OUT

2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
Intersection ID:
Roundabout

Table R.6 - ROUNDABOUT ALTERNATIVE CAPACITY MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA		NAASRA 1986		Ger. Linear		Ger. GapAcc		
		Cap. (veh/h)	Deg. Satn x	Cap. (veh/h)	% Diff from aaSIDRA	Cap. (veh/h)	% Diff from aaSIDRA	Cap. (veh/h)	% Diff from aaSIDRA	
West: EB: Gage Blvd										
12 L	28	116	0.241	145	25.0	102	-12.1	102	-12.1	
11 T	271	1127	0.240	1403	24.5	987	-12.4	990	-12.2	
13 R	636	-	NA	-	NA	-	NA	-	NA	
South: NB: Center Pkwy										
32 L	658	2036	0.323	2205	8.3	-	NA	-	NA	
31 TR	115	356	0.323	385	8.1	-	NA	-	NA	
East: WB: Gage Blvd										
22 L	39	130	0.300	135	3.8	87	-33.1	140	7.7	
21 T	457	1522	0.300	1586	4.2	1017	-33.2	1635	7.4	
23 R	55	183	0.301	191	4.4	122	-33.3	197	7.7	
North: SB: Center Pkwy										
42 LTR	158	706	0.224	677	-4.1	852	20.7	676	-4.2	

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the NAASRA model is not applicable for circulating flows above 1800 veh/h in a single lane and the German models are not applicable for high values of circulating flow (actual values depend on number of lanes at roundabout) or for roundabout approaches with more than two entry lanes, or two entry lanes with a single circulating lane. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

Steptoe Street Extension
2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
Intersection ID:
Roundabout

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Demand Flow (veh/h)	Opposing Movement				Total Cap. (veh/h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
		HV (%)	Flow (veh/h)	HV (%)	Flow (pcu/h)					
West: EB: Gage Blvd										
12 L	28	3.6	174	2.6	174	116	0.85	252	100	0.241
11 T	271	1.8	174	2.6	174	1127	0.85	253	100	0.240
13 R	636	2.0	0			1900	0.98	193	100	0.335*
South: NB: Center Pkwy										
32 L	658	1.1	364	2.2	364	2036	0.85	163	100	0.323

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31 TR	115	1.7	364	2.2	364	356	0.85	163	100	0.323

East: WB: Gage Blvd										
22 L	39	2.6	750	1.0	750	130	0.85	183	100	0.300
21 T	457	1.1	750	1.0	750	1522	0.85	183	100	0.300
23 R	55	1.8	750	1.0	750	183	0.85	183	100	0.301

North: SB: Center Pkwy										
42 LTR	158	3.2	1152	1.0	1152	706	0.85	280	100	0.224

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.3 - INTERSECTION PARAMETERS

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s)	=	9.2
Largest average movement delay (s)	=	14.6
Largest back of queue, 95% (ft)	=	69
Performance Index	=	44.19
Degree of saturation (highest)	=	0.335
Practical Spare Capacity (lowest)	=	163 %
Effective intersection capacity, (veh/h)	=	7221
Total vehicle flow (veh/h)	=	2417
Total person flow (pers/h)	=	3626
Total vehicle delay (veh-h/h)	=	6.18
Total person delay (pers-h/h)	=	9.27
Total effective vehicle stops (veh/h)	=	1509
Total effective person stops (pers/h)	=	2263
Total vehicle travel (veh-mi/h)	=	1031.6
Total cost (\$/h)	=	844.33
Total fuel (gal/h)	=	37.9
Total CO2 (kg/h)	=	359.23

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue (ft)	Perf. Index	Aver. Speed (mph)

West: EB: Gage Blvd									
12 L	0.10	0.15	13.1	0.40	0.67	1.9	48	0.57	29.6
11 T	0.45	0.68	6.0	0.40	0.50	1.9	48	4.58	33.2
13 R	1.07	1.61	6.1		0.50	16.2#		9.45	34.5

South: NB: Center Pkwy									
32 L	2.57	3.85	14.0	0.57	0.73	2.7	69	14.04	29.2
31 TR	0.24	0.36	7.5	0.56	0.61	2.7	69	2.06	32.1

East: WB: Gage Blvd									

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22 L	0.16	0.24	14.6	0.63	0.86	1.8	45	0.87	29.0
21 T	0.95	1.42	7.5	0.62	0.63	1.9	47	8.29	32.1
23 R	0.13	0.19	8.5	0.61	0.69	1.9	47	1.02	31.6

North: SB: Center Pkwy									
42 LTR	0.52	0.77	11.7	0.65	0.81	1.2	31	3.30	30.4

# Largest density (passenger cars per km or mile) for any lane									

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (ft)	Perf. Index	Aver. Speed (mph)

West: EB: Gage Blvd									
935	0.335	1.63	2.44	6.3	0.13	0.50	256	14.60	33.9

South: NB: Center Pkwy									
773	0.323	2.80	4.21	13.1	0.57	0.71	69	16.10	29.5

East: WB: Gage Blvd									
551	0.301	1.23	1.85	8.1	0.62	0.65	47	10.18	31.8

North: SB: Center Pkwy									
158	0.224	0.52	0.77	11.7	0.65	0.81	31	3.30	30.4

ALL VEHICLES:									
2417	0.335	6.18	9.27	9.2	0.41	0.62	69	44.19	31.6

INTERSECTION (persons):									
3626	0.335		9.27	9.2	0.41	0.62		44.19	31.6

Queue values in this table are 95% back of queue (feet).

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Dem Flow (veh/h)	Cap (veh/h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue (ft)	Short Lane (ft)

West: EB: Gage Blvd									
1 LT	12, 11	299	1244	0.240	6.7	0.51	1.9	48	
2 R	13	636	1900	0.335	6.1	0.50	16.2#		

South: NB: Center Pkwy									
1 L	32	350	1082	0.323	14.2	0.74	2.6	66	

28_PM_NB_Center-Gage. OUT										
2 LTR	32, 31	423	1310	0.323	12.1	0.69	2.7	69		

East: WB: Gage Blvd										
1 LT	22, 21	251	837	0.300	8.8	0.69	1.8	45		
2 TR	21, 23	300	998	0.300	7.4	0.63	1.9	47		

North: SB: Center Pkwy										
1 LTR	42	158	706	0.224	11.7	0.81	1.2	31		

Density (passenger cars per km or mile)

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S. 8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h)				Min Cap (veh/h)	Tot Cap (veh/h)	Deg. Satn x	Lane Util %
		Lef	Thru	Rig	Tot				
West: EB: Gage Blvd									
1 LT	12, 11	28	271	0	299	150	1244	0.240	100
2 R	13	0	0	636	636	150	1900	0.335	100
South: NB: Center Pkwy									
1 L	32	350	0	0	350	150	1082	0.323	100
2 LTR	32, 31	308	66	49	423	150	1310	0.323	100
East: WB: Gage Blvd									
1 LT	22, 21	39	212	0	251	150	837	0.300	100
2 TR	21, 23	0	245	55	300	150	998	0.300	100
North: SB: Center Pkwy									
1 LTR	42	65	71	22	158	150	706	0.224	100

For roundabouts, the capacity value for continuous movements is obtained as the basic saturation flow without any adjustments. Saturation flow scale applies if specified.

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S. 12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total	Cost Total	HC Total	CO Total	NOX Total	CO2 Total

		gal /h	\$/h	28_PM_NB_Center-Gage. OUT kg/h	kg/h	kg/h	kg/h

West: EB: Gage Blvd							
12	L	0.5	10.88	0.007	0.24	0.009	4.5
11	T	4.1	88.78	0.058	1.87	0.078	39.0
13	R	9.4	199.93	0.131	4.18	0.178	89.0
		14.0	299.58	0.196	6.29	0.265	132.5

South: NB: Center Pkwy							
32	L	11.1	259.45	0.166	5.52	0.209	104.8
31	TR	1.8	38.73	0.026	0.84	0.034	16.6
		12.8	298.18	0.192	6.36	0.243	121.4

East: WB: Gage Blvd							
22	L	0.7	15.45	0.010	0.33	0.012	6.2
21	T	7.0	154.54	0.101	3.30	0.134	65.9
23	R	0.8	18.78	0.013	0.42	0.017	8.0
		8.5	188.77	0.124	4.05	0.163	80.2

North: SB: Center Pkwy							
42	LTR	2.7	57.80	0.038	1.32	0.051	25.1
		2.7	57.80	0.038	1.32	0.051	25.1

INTERSECTION:		37.9	844.33	0.550	18.02	0.722	359.2

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel (\$/US gal)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 lb)	=	1.4
Heavy vehicle mass (1000 lb)	=	11.0
Light vehicle idle fuel rate (US gal/h)	=	0.360
Heavy vehicle idle fuel rate (US gal/h)	=	0.530

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (ft)	Shrt Lane (ft)
	L	T	R	Tot			1st	2nd				

West: EB: Gage Blvd												
1	LT	28	271	299	2				0.240	6.7	48	

28_PM_NB_Center-Gage. OUT									
2 R		636	636	2	1900	0.335	6.1		
	28	271	636	935	2	0.335	6.3	48	

South: NB: Center Pkwy									
1 L		350		350	1	0.323	14.2	66	
2 LTR		308	66	49	423	1	0.323	12.1	69
		658	66	49	773	1	0.323	13.1	69

East: WB: Gage Bl vd									
1 LT		39	212		251	1	0.300	8.8	45
2 TR			245	55	300	1	0.300	7.4	47
		39	457	55	551	1	0.300	8.1	47

North: SB: Center Pkwy									
1 LTR		65	71	22	158	3	0.224	11.7	31
		65	71	22	158	3	0.224	11.7	31
=====									
ALL VEHICLES		Total Flow		% HV		Max X	Aver. Delay	Max Queue	
		2417		2		0.335	9.2	69	
=====									

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Bl vd
 Intersection ID:
 Roundabout

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh/h)	Total Cap. (veh/h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	Queue (ft)
West: EB: Gage Bl vd								
12	L	28	116	0.241	13.1	B	1.9	48
11	T	271	1127	0.240	6.0	A	1.9	48
13	R (Con)	636	1900	0.335*	6.1	B#	16.2#	
		935		0.335	6.3	A	1.9	48

South: NB: Center Pkwy								
32	L	658	2036	0.323	14.0	B	2.7	69
31	TR	115	356	0.323	7.5	A	2.7	69
		773		0.323	13.1	B	2.7	69

East: WB: Gage Bl vd								
22	L	39	130	0.300	14.6	B	1.8	45
21	T	457	1522	0.300	7.5	A	1.9	47
23	R	55	183	0.301	8.5	A	1.9	47

28_PM_NB_Center-Gage. OUT

	551		0.301	8.1	A	1.9	47
North: SB: Center Pkwy	158	706	0.224	11.7	B	1.2	31
42 LTR	158		0.224	11.7	B	1.2	31
ALL VEHICLES:	2417		0.335	9.2	A	2.7	69

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.

- # Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
- * Maximum v/c ratio, or critical green periods

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (ft)	Negn Speed (mph)	Negn Dist. (ft)	Appr. Dist. (ft)	Downstream Distance (ft)
West: EB: Gage Blvd						
	South	135.0	21.4	50.8	1800	403
	East	188.6	24.3	127.0	1800	411
	North	56.8	15.4	223.1	1800	549
South: NB: Center Pkwy						
	West	58.4	15.6	229.3	1800	554
	East	102.2	19.3	51.0	1800	397
	North	183.6	24.1	137.2	1800	410
East: WB: Gage Blvd						
	West	182.9	24.1	147.5	1800	413
	South	58.4	15.6	229.3	1800	554
	North	110.4	19.9	60.5	1800	398
North: SB: Center Pkwy						
	West	123.4	20.7	60.3	1800	403
	South	183.6	24.1	137.2	1800	412
	East	56.8	15.4	223.1	1800	550

Maximum Negotiation (Design) Speed = 50.0 mph
 Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

28_PM_NB_Center-Gage. OUT

Intersection ID:
Roundabout

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-Line		Delay Total dSL	Delay (seconds/veh)				Geom dig	Control dic	
			1st d1	2nd d2		Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di			
West: EB: Gage Blvd												
1	LT	12, 11	0.240	0.9	0.0	0.9	2.6	0.0	0.0	0.0	12.2	6.7
2	R	13	0.335			0.1					5.1	6.1
South: NB: Center Pkwy												
1	L	32	0.323	2.1	0.0	2.1	2.8	0.0	0.0	0.0	12.2	14.2
2	LTR	32, 31	0.323	1.6	0.0	1.6	2.9	0.0	0.0	0.0	12.2	12.1
East: WB: Gage Blvd												
1	LT	22, 21	0.300	2.5	0.0	2.5	3.9	0.0	0.0	0.0	12.2	8.8
2	TR	21, 23	0.300	2.0	0.0	2.0	3.9	0.0	0.0	0.0	5.3	7.4
North: SB: Center Pkwy												
1	LTR	42	0.224	3.5	0.0	3.5	3.7	0.2	0.0	0.2	8.3	11.7

dn is average stop-start delay for all vehicles queued and unqueued

Steptoe Street Extension
2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
Intersection ID:
Roundabout

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective		Stop Geom. hig	Rate Overall h	Prop. Queued pq	Queue Move-up Rate hqm
		he1	he2				
West: EB: Gage Blvd							
1	LT	0.240	0.24	0.00	0.28	0.51	0.400
2	R	0.335			0.50	0.50	0.00
South: NB: Center Pkwy							
1	L	0.323	0.44	0.00	0.30	0.74	0.580
2	LTR	0.323	0.40	0.00	0.29	0.69	0.558
East: WB: Gage Blvd							
1	LT	0.300	0.50	0.00	0.18	0.69	0.626
2	TR	0.300	0.45	0.00	0.18	0.63	0.614
North: SB: Center Pkwy							
1	LTR	0.224	0.62	0.00	0.20	0.81	0.652

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table D. 3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh)			Percentile (veh)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: Gage Blvd											
1 LT	0.240	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.9	2.2	0.03
2 R	0.335				10.1#						0.06#
South: NB: Center Pkwy											
1 L	0.323	0.0	0.8	0.0	0.8	1.5	1.9	2.1	2.6	3.0	0.04
2 LTR	0.323	0.0	0.9	0.0	0.9	1.6	1.9	2.2	2.7	3.2	0.04
East: WB: Gage Blvd											
1 LT	0.300	0.0	0.6	0.0	0.6	1.0	1.3	1.4	1.8	2.1	0.02
2 TR	0.300	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.9	2.2	0.03
North: SB: Center Pkwy											
1 LTR	0.224	0.0	0.4	0.0	0.4	0.7	0.9	1.0	1.2	1.4	0.02

Values printed in this table are back of queue (vehicles).

Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table D. 3B - LANE QUEUES (feet)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (feet)			Percentile (feet)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: Gage Blvd											
1 LT	0.240	0	15	0	15	28	34	39	48	55	0.03
2 R	0.335				6.2#						0.06#
South: NB: Center Pkwy											
1 L	0.323	0	21	0	21	38	47	53	66	76	0.04
2 LTR	0.323	0	22	0	22	40	49	56	69	80	0.04
East: WB: Gage Blvd											
1 LT	0.300	0	14	0	14	26	32	36	45	52	0.02
2 TR	0.300	0	15	0	15	28	34	38	47	54	0.03
North: SB: Center Pkwy											
1 LTR	0.224	0	10	0	10	18	22	25	31	36	0.02

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Values printed in this table are back of queue (feet).

Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

Steptoe Street Extension
 2028 PM Peak Hour_No Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table D.4 - MOVEMENT SPEEDS (mph)

Mov No.	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running	Overall

West: EB: Gage Blvd								
12	40.0	15.4	15.4	40.0			29.6	29.6
11	40.0	24.3	24.3	40.0			33.2	33.2
13	40.0	21.4	21.4	40.0			34.5	34.5

South: NB: Center Pkwy								
32	40.0	15.6	15.6	40.0			29.2	29.2
31	40.0	22.0	22.0	40.0			32.1	32.1

East: WB: Gage Blvd								
22	40.0	15.6	15.6	40.0			29.0	29.0
21	40.0	24.1	24.1	40.0			32.1	32.1
23	40.0	19.9	19.9	40.0			31.6	31.6

North: SB: Center Pkwy								
42	40.0	20.0	20.0	40.0			30.5	30.4

"Running Speed" is the average speed excluding stopped periods.

--- End of aaSIDRA Output ---

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HCM Signalized Intersection Capacity Analysis

1: Gage Blvd & Leslie Rd

2028 Build (Signal @ Clearwater/Step toe)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1782	1515	1693	3331		1693	3163		1676	3185	
Flt Permitted	0.12	1.00	1.00	0.12	1.00		0.16	1.00		0.54	1.00	
Satd. Flow (perm)	223	1782	1515	223	3331		285	3163		948	3185	
Volume (vph)	140	685	525	190	825	100	490	185	145	200	550	275
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	152	745	571	207	897	109	533	201	158	215	591	296
RTOR Reduction (vph)	0	0	153	0	10	0	0	107	0	0	70	0
Lane Group Flow (vph)	152	745	418	207	996	0	533	252	0	215	817	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	33.0	30.0	30.0	33.0	30.0		42.0	27.0		30.0	20.0	
Effective Green, g (s)	37.0	32.0	32.0	37.0	32.0		44.0	29.0		34.0	22.0	
Actuated g/C Ratio	0.41	0.36	0.36	0.41	0.36		0.49	0.32		0.38	0.24	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	173	634	539	173	1184		437	1019		455	779	
v/s Ratio Prot	0.05	0.42		c0.07	0.30		c0.26	0.08		0.06	0.26	
v/s Ratio Perm	0.31		0.28	c0.43			c0.34			0.12		
v/c Ratio	0.88	1.18	0.77	1.20	0.84		1.22	0.25		0.47	1.05	
Uniform Delay, d1	21.1	29.0	25.8	44.7	26.7		25.3	22.5		20.0	34.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	42.4	94.6	10.4	131.2	7.3		118.0	0.6		3.5	46.0	
Delay (s)	63.5	123.6	36.2	175.9	34.0		143.4	23.0		23.5	80.0	
Level of Service	E	F	D	F	C		F	C		C	E	
Approach Delay (s)		83.4			58.2			94.9			68.9	
Approach LOS		F			E			F			E	
Intersection Summary												
HCM Average Control Delay			75.7			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.20									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			116.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Gage Blvd & Steptoe ST

2028 Build (Signal @ Clearwater/Steptoe)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑		↙	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	3386	1500	1676	3386	1494	1676	3220		1710	3305	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1693	3386	1500	1676	3386	1494	1676	3220		1710	3305	
Volume (vph)	130	760	145	290	1040	340	140	640	230	115	1005	130
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.88	0.88	0.92	0.92	0.92	0.96	0.92	0.96
Adj. Flow (vph)	140	817	158	315	1182	386	152	696	250	120	1092	135
RTOR Reduction (vph)	0	0	119	0	0	181	0	37	0	0	10	0
Lane Group Flow (vph)	140	817	39	315	1182	205	152	909	0	120	1217	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	2%	2%	2%	0%	2%	0%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						
Actuated Green, G (s)	6.5	19.3	19.3	14.0	28.2	28.2	6.0	27.0		9.0	30.0	
Effective Green, g (s)	7.0	22.0	22.0	16.0	31.0	31.0	8.0	29.0		11.0	32.0	
Actuated g/C Ratio	0.08	0.24	0.24	0.18	0.34	0.34	0.09	0.32		0.12	0.36	
Clearance Time (s)	3.5	5.7	5.7	5.0	5.8	5.8	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	132	828	367	298	1166	515	149	1038		209	1175	
v/s Ratio Prot	0.08	0.24		c0.19	c0.35		c0.09	0.28		0.07	c0.37	
v/s Ratio Perm			0.03			0.14						
v/c Ratio	1.06	0.99	0.11	1.06	1.01	0.40	1.02	0.88		0.57	1.04	
Uniform Delay, d1	41.5	33.9	26.4	37.0	29.5	22.4	41.0	28.8		37.3	29.0	
Progression Factor	1.00	1.00	1.00	1.16	0.80	0.94	1.00	1.00		1.29	0.46	
Incremental Delay, d2	95.5	28.2	0.6	59.5	25.5	1.6	79.1	8.2		1.3	29.0	
Delay (s)	137.0	62.1	26.9	102.4	49.1	22.6	120.1	36.9		49.4	42.3	
Level of Service	F	E	C	F	D	C	F	D		D	D	
Approach Delay (s)		66.5			52.6			48.5			42.9	
Approach LOS		E			D			D			D	

Intersection Summary

HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

3: Gage Blvd & Grandridge Blvd

2028 Build (Signal @ Clearwater/Step toe)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑		↘	↕			↗	↗
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95			1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95			0.98	1.00
Satd. Flow (prot)	1692	3386	1480	1692	3373		1608	1610			1739	1490
Flt Permitted	0.20	1.00	1.00	0.30	1.00		0.95	0.95			0.98	1.00
Satd. Flow (perm)	354	3386	1480	536	3373		1608	1610			1739	1490
Volume (vph)	55	655	475	10	855	20	850	10	10	20	20	55
Peak-hour factor, 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
Adj. Flow (vph)	60	712	516	11	929	22	924	11	11	22	22	60
RTOR Reduction (vph)	0	0	265	0	2	0	0	1	0	0	0	50
Lane Group Flow (vph)	60	712	251	11	949	0	480	465	0	0	44	10
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm		Perm	Perm			Split			Split		Perm
Protected Phases		6			2		4	4		3	3	
Permitted Phases	6		6	2								3
Actuated Green, G (s)	41.2	41.2	41.2	41.2	41.2		28.9	28.9			4.4	4.4
Effective Green, g (s)	43.7	43.7	43.7	43.7	43.7		30.9	30.9			6.4	6.4
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49		0.34	0.34			0.07	0.07
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	172	1644	719	260	1638		552	553			124	106
v/s Ratio Prot		0.21			c0.28		c0.30	0.29			c0.03	
v/s Ratio Perm	0.17		0.17	0.02								0.01
v/c Ratio	0.35	0.43	0.35	0.04	0.58		0.87	0.84			0.35	0.09
Uniform Delay, d1	14.3	15.1	14.3	12.2	16.6		27.7	27.3			39.8	39.1
Progression Factor	0.48	0.44	0.32	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.0	0.1	0.3	1.5		13.3	10.6			0.6	0.1
Delay (s)	7.2	6.6	4.6	12.5	18.1		40.9	37.9			40.5	39.2
Level of Service	A	A	A	B	B		D	D			D	D
Approach Delay (s)		5.8			18.0			39.4			39.8	
Approach LOS		A			B			D			D	

Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 5: Grandridge Blvd & Columbia Center Blvd

2028 Build (Signal @ Clearwater/Step toe)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.95	1.00		0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.99		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1693	1503		3157		1644	4725	1471	1676	4818	1500
Flt Permitted	0.95	1.00	1.00		0.99		0.11	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	1608	1693	1503		3157		197	4725	1471	333	4818	1500
Volume (vph)	145	185	95	95	200	140	155	950	70	140	1360	65
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	158	201	103	103	217	152	168	1033	76	149	1447	69
RTOR Reduction (vph)	0	0	74	0	64	0	0	0	31	0	0	30
Lane Group Flow (vph)	158	201	29	0	408	0	168	1033	45	149	1447	39
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Split		pm+ov	Split			D.P+P		pm+ov	D.P+P		pm+ov
Protected Phases	3	3	5	4	4		5	2	4	1	6	3
Permitted Phases			3				6		2	2		6
Actuated Green, G (s)	12.5	12.5	20.6		13.1		41.1	34.4	47.5	41.6	33.0	45.5
Effective Green, g (s)	14.3	14.3	24.5		14.9		45.3	36.1	51.0	45.3	35.1	49.4
Actuated g/C Ratio	0.17	0.17	0.28		0.17		0.52	0.42	0.59	0.52	0.41	0.57
Clearance Time (s)	4.8	4.8	5.1		4.8		5.1	4.7	4.8	5.0	5.1	4.8
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	266	280	478		544		274	1972	867	317	1955	857
v/s Ratio Prot	0.10	c0.12	0.01		c0.13		0.07	c0.22	0.01	0.05	c0.30	0.01
v/s Ratio Perm			0.01				0.25		0.02	0.20		0.02
v/c Ratio	0.59	0.72	0.06		0.75		0.61	0.52	0.05	0.47	0.74	0.05
Uniform Delay, d1	33.4	34.2	22.6		34.0		27.2	18.8	7.5	11.7	21.8	8.2
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	7.1	0.0		5.1		2.8	1.0	0.0	0.4	2.6	0.0
Delay (s)	35.8	41.3	22.6		39.2		30.1	19.8	7.5	12.1	24.4	8.2
Level of Service	D	D	C		D		C	B	A	B	C	A
Approach Delay (s)		35.3			39.2			20.4			22.6	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			25.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			86.5				Sum of lost time (s)				9.0	
Intersection Capacity Utilization			73.9%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: Clearwater Ave & Columbia Center Blvd

2028 Build (Signal @ Clearwater/Step toe)































Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95		1.00	0.95	0.88	1.00	*0.60		1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3130	3087		1676	3353	2640	1660	3077		1676	3353	1500
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3130	3087		1676	3353	2640	1660	3077		1676	3353	1500
Volume (vph)	420	505	205	135	650	215	155	860	145	195	1180	540
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	447	537	218	147	707	234	168	935	158	212	1283	587
RTOR Reduction (vph)	0	48	0	0	0	182	0	14	0	0	0	188
Lane Group Flow (vph)	447	707	0	147	707	52	168	1079	0	212	1283	399
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot			Prot		custom
Protected Phases	1	6		5	2		3	8		7	4	4
Permitted Phases						2						4
Actuated Green, G (s)	12.0	22.3		7.0	17.6	17.6	7.3	30.2		9.7	32.3	32.3
Effective Green, g (s)	13.0	25.0		8.0	20.0	20.0	10.0	32.6		12.4	35.0	35.0
Actuated g/C Ratio	0.14	0.28		0.09	0.22	0.22	0.11	0.36		0.14	0.39	0.39
Clearance Time (s)	4.0	5.7		4.0	5.4	5.4	5.7	5.4		5.7	5.7	5.7
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	452	858		149	745	587	184	1115		231	1304	583
v/s Ratio Prot	c0.14	0.23		0.09	c0.21		0.10	0.35		c0.13	c0.38	0.27
v/s Ratio Perm						0.02						
v/c Ratio	0.99	0.82		0.99	0.95	0.09	0.91	0.97		0.92	0.98	0.68
Uniform Delay, d1	38.4	30.4		40.9	34.5	27.8	39.6	28.2		38.3	27.2	22.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.9	8.8		68.9	22.6	0.3	41.7	19.3		36.6	20.9	2.7
Delay (s)	77.3	39.2		109.9	57.1	28.1	81.3	47.5		74.9	48.1	25.5
Level of Service	E	D		F	E	C	F	D		E	D	C
Approach Delay (s)		53.4			58.0			52.0			44.5	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	50.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

7: Clearwater Ave & Steptoe ST

2028 Build (Signal @ Clearwater/Steptoe)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 		 
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	3231		1676	3353	1500	1710	3353	1530	1676	3294	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1676	3231		1676	3353	1500	1710	3353	1530	1676	3294	
Volume (vph)	160	300	40	465	525	285	20	740	390	315	1020	135
Peak-hour factor, 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
Adj. Flow (vph)	174	326	43	505	571	310	22	804	424	342	1109	147
RTOR Reduction (vph)	0	10	0	0	0	228	0	0	311	0	9	0
Lane Group Flow (vph)	174	359	0	505	571	82	22	804	113	342	1247	0
Heavy Vehicles (%)	2%	4%	4%	2%	2%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	11.4	12.5		23.0	24.1	24.1	5.8	24.5	24.5	19.0	37.7	
Effective Green, g (s)	13.4	14.5		25.0	26.1	26.1	7.8	26.5	26.5	21.0	39.7	
Actuated g/C Ratio	0.14	0.15		0.25	0.26	0.26	0.08	0.27	0.27	0.21	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	227	473		423	884	395	135	898	410	356	1321	
v/s Ratio Prot	0.10	c0.11		c0.30	0.17		0.01	0.24		c0.20	c0.38	
v/s Ratio Perm						0.05			0.07			
v/c Ratio	0.77	0.76		1.19	0.65	0.21	0.16	0.90	0.28	0.96	0.94	
Uniform Delay, d1	41.3	40.6		37.0	32.3	28.4	42.6	34.9	28.7	38.6	28.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.0	6.1		108.3	1.2	0.1	0.2	11.1	0.1	37.1	13.4	
Delay (s)	54.3	46.7		145.3	33.6	28.5	42.8	46.0	28.8	75.6	42.0	
Level of Service	D	D		F	C	C	D	D	C	E	D	
Approach Delay (s)		49.1			73.2			40.1			49.2	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM Average Control Delay			53.8				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			99.0				Sum of lost time (s)				9.0	
Intersection Capacity Utilization			90.6%				ICU Level of Service				E	
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: Canyon St & Steptoe ST

2028 Build (Signal @ Clearwater/Steptoe)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0		3.0	3.0	3.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.94		1.00	1.00	0.98	
Flt Protected	0.97		0.95	1.00	1.00	
Satd. Flow (prot)	1611		1676	3353	3277	
Flt Permitted	0.97		0.08	1.00	1.00	
Satd. Flow (perm)	1611		138	3353	3277	
Volume (vph)	110	95	225	1090	1160	205
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	103	245	1185	1261	223
RTOR Reduction (vph)	34	0	0	0	16	0
Lane Group Flow (vph)	189	0	245	1185	1468	0
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	15.0		65.0	65.0	46.0	
Effective Green, g (s)	17.0		67.0	67.0	48.0	
Actuated g/C Ratio	0.19		0.74	0.74	0.53	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	304		376	2496	1748	
v/s Ratio Prot	c0.12		c0.12	0.35	c0.45	
v/s Ratio Perm			0.37			
v/c Ratio	0.62		0.65	0.47	0.84	
Uniform Delay, d1	33.5		22.0	4.5	17.8	
Progression Factor	1.00		1.37	0.60	0.17	
Incremental Delay, d2	9.2		6.2	0.5	2.9	
Delay (s)	42.8		36.3	3.2	5.8	
Level of Service	D		D	A	A	
Approach Delay (s)	42.8			8.9	5.8	
Approach LOS	D			A	A	

Intersection Summary

HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

10: Tapteal Dr & Steptoe St

2028 Build (Signal @ Clearwater/Steptoe)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑	↗	↘	↑	↗	↘	↑↑		↘	↑↑	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1676	1765	1500	1676	1765	1500	1676	3290		1676	3308	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1676	1765	1500	1676	1765	1500	1676	3290		1676	3308	
Volume (vph)	185	135	230	120	135	85	250	830	120	35	1015	100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	201	147	250	130	147	92	272	902	130	37	1080	106
RTOR Reduction (vph)	0	0	203	0	0	77	0	13	0	0	8	0
Lane Group Flow (vph)	201	147	47	130	147	15	272	1020	0	37	1178	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	10.0	15.0	15.0	8.0	13.0	13.0	14.0	43.0		4.0	33.0	
Effective Green, g (s)	12.0	17.0	17.0	10.0	15.0	15.0	16.0	45.0		6.0	35.0	
Actuated g/C Ratio	0.13	0.19	0.19	0.11	0.17	0.17	0.18	0.50		0.07	0.39	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	223	333	283	186	294	250	298	1645		112	1286	
v/s Ratio Prot	c0.12	c0.08		c0.08	0.08		c0.16	0.31		0.02	c0.36	
v/s Ratio Perm			0.03			0.01						
v/c Ratio	0.90	0.44	0.17	0.70	0.50	0.06	0.91	0.62		0.33	0.92	
Uniform Delay, d1	38.4	32.3	30.6	38.5	34.1	31.6	36.3	16.3		40.1	26.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.70		1.00	1.00	
Incremental Delay, d2	39.2	4.2	1.3	19.6	6.0	0.5	31.2	1.6		7.7	11.7	
Delay (s)	77.6	36.5	31.8	58.2	40.1	32.0	58.9	13.0		47.8	37.8	
Level of Service	E	D	C	E	D	C	E	B		D	D	
Approach Delay (s)		48.4			44.4			22.5			38.1	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

28_PM_Build_Center-Gage.OUT

Akcelik & Associates Pty Ltd - aaSIDRA 2.1.4.357

CH2MHILL
 CH2MHILL User ID: A0725
 Licence Type: Single Computer

Time and Date of Analysis 11:17 AM, Sep 11, 2006

Filename: C:\Documents and Settings\tnewkirk\My Documents\aaTraffic\Steptoe\28_PM_Build_Center-Gage.OUT

Steptoe Street Extension
 2028 PM Peak Hour_Build_Center Pkwy & Gage Blvd
 Intersection ID:

aaTraffic SIDRA US Highway Capacity Manual (2000) Version

RUN INFORMATION

* Basic Parameters:
 Intersection Type: Roundabout
 Driving on the right-hand side of the road
 Input data specified in US units
 Default Values File No. 11
 Peak flow period (for performance): 15 minutes
 Unit time (for volumes): 60 minutes (Total Flow Period)
 Delay definition: Control delay
 Geometric delay included
 aaSIDRA Standard Delay and Queue models used
 Level of Service based on: Delay (HCM method)
 Queue definition: Back of queue, 95th Percentile

Steptoe Street Extension
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 Intersection ID:
 Roundabout

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor	
	LV	HV	LV	HV	LV	HV			
VEHICLES Demand flows in veh/hour as used by the program									
West: EB: Gage Blvd									
12	186	4	0	0	0	0	1.00	0.92	
11	0	0	197	4	0	0	1.00	0.92	
13	0	0	0	0	458	9	1.00	0.92	
South: NB: Center Pkwy									
32	517	5	0	0	0	0	1.00	0.92	
31	0	0	188	2	38	1	1.00	0.92	
East: WB: Gage Blvd									
22	32	1	0	0	0	0	1.00	0.92	
21	0	0	360	4	0	0	1.00	0.92	
23	0	0	0	0	226	2	1.00	0.92	

North: SB: Center Pkwy

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42 185 6 185 6 169 5 1.00 0.92

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Steptoe Street Extension
2028 PM Peak Hour_Build_Center Pkwy & Gage Blvd
Intersection ID:
Roundabout

Table R.0 - ROUNDABOUT BASIC PARAMETERS

Cent Island Diam (ft)	Circ Width (ft)	Insc Diam (ft)	No. of Circ Lanes	No. of Entry Lanes	Av. Ent Lane Width (ft)	Circulating/Exiting Stream						
						Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor	
West: EB: Gage Blvd												
96	18	132	1	1	13.00	413	2.8	413	0	N	0.919	
South: NB: Center Pkwy												
96	18	132	1	2	13.00	582	2.3	582	0	N	0.921	
East: WB: Gage Blvd												
96	30	156	2	2	13.00	902	1.2	902	0	N	0.851	
North: SB: Center Pkwy												
96	30	156	2	1	13.00	918	1.0	919	0	N	0.899	

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Intersection ID:
Roundabout

Table R.1 - ROUNDABOUT GAP ACCEPTANCE PARAMETERS

Turn	Lane No.	Lane Type	Circulating/Exiting Stream					Critical Gap		Follow-up Headway (s)
			Flow Rate (pcu/h)	Aver Speed (mph)	Aver Dist (ft)	In-Bnch Headway (s)	Prop Bunched	Hdwy (s)	Dist (ft)	
West: EB: Gage Blvd										
Left	1	Dominant	413	19.4	248.3	2.00	0.396	4.32	123.1	2.36
Thru	1	Dominant	413	19.4	248.3	2.00	0.396	4.32	123.1	2.36
Right	2	Continuous								
South: NB: Center Pkwy										
Left	1	Subdominant	582	18.5	168.1	2.00	0.512	4.10	111.2	2.29
	2	Dominant	582	18.5	168.1	2.00	0.512	3.44	93.3	1.92
Thru	2	Dominant	582	18.5	168.1	2.00	0.512	3.44	93.3	1.92
Right	2	Dominant	582	18.5	168.1	2.00	0.512	3.44	93.3	1.92
East: WB: Gage Blvd										
Left	1	Subdominant	902	17.4	101.6	1.25	0.502	3.40	86.6	2.38
Thru	1	Subdominant	902	17.4	101.6	1.25	0.502	3.40	86.5	2.38
	2	Dominant	902	17.4	101.6	1.25	0.502	2.95	75.1	2.06
Right	2	Dominant	902	17.4	101.6	1.25	0.502	2.95	75.1	2.06

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North: SB: Center Pkwy										
Left	1	Dominant	919	19.0	108.9	1.24	0.505	3.47	96.3	2.43
Thru	1	Dominant	919	19.0	108.9	1.24	0.505	3.47	96.3	2.43
Right	1	Dominant	919	19.0	108.9	1.24	0.505	3.46	96.3	2.43

Environment Factor: 1.00
 Entry/Circulating Flow Adjustment: Medium

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

* Critical gap or follow-up headway set to MINIMUM value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Steptoe Street Extension
 2028 PM Peak Hour_Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table R.5 - ROUNDABOUT CAPACITY & LEVEL OF SERVICE - aaSIDRA & HCM MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA				HCM 2000 Lower				HCM 2000 Upper				
		Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	
West: EB: Gage Blvd														
12	L	190	472	0.403	14.8	B	395	0.481	15.8	B	486	0.391	14.6	B
11	T	201	499	0.403	7.7	A	418	0.481	8.8	A	514	0.391	7.6	A
13	R	467	-	-	NA	-	-	-	NA	-	-	-	NA	-
South: NB: Center Pkwy														
32	L	522	1367	0.382	15.6	B	976	0.535	18.9	B	1215	0.430	16.5	B
31	TR	229	600	0.382	8.4	A	428	0.535	12.2	B	533	0.430	9.7	A
East: WB: Gage Blvd														
22	L	33	85	0.388	15.8	B	-	-	NA	-	-	-	NA	-
21	T	364	941	0.387	8.7	A	-	-	NA	-	-	-	NA	-
23	R	228	590	0.386	9.3	A	-	-	NA	-	-	-	NA	-
North: SB: Center Pkwy														
42	LTR	556	740	0.751	16.7	B	-	-	NA	-	-	-	NA	-

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the HCM models are only applicable to single-lane roundabouts with circulating flows less than 1200 veh/h. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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 Intersection ID:
 Roundabout

Table R.6 - ROUNDABOUT ALTERNATIVE CAPACITY MODELS

Mov No.	Dem Flow (veh /h)	aaSIDRA		NAASRA 1986		Ger. Linear		Ger. GapAcc		
		Cap. (veh /h)	Deg. Satn x	Cap. (veh /h)	% Diff from aaSIDRA	Cap. (veh /h)	% Diff from aaSIDRA	Cap. (veh /h)	% Diff from aaSIDRA	
West: EB: Gage Blvd										
12 L	190	472	0.403	599	26.9	443	-6.1	431	-8.7	
11 T	201	499	0.403	634	27.1	469	-6.0	456	-8.6	
13 R	467	-	NA	-	NA	-	NA	-	NA	
South: NB: Center Pkwy										
32 L	522	1367	0.382	1435	5.0	-	NA	-	NA	
31 TR	229	600	0.382	629	4.8	-	NA	-	NA	
East: WB: Gage Blvd										
22 L	33	85	0.388	89	4.7	60	-29.4	91	7.1	
21 T	364	941	0.387	978	3.9	665	-29.3	1001	6.4	
23 R	228	590	0.386	613	3.9	417	-29.3	627	6.3	
North: SB: Center Pkwy										
42 LTR	556	740	0.751	828	11.9	929	25.5	768	3.8	

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the NAASRA model is not applicable for circulating flows above 1800 veh/h in a single lane and the German models are not applicable for high values of circulating flow (actual values depend on number of lanes at roundabout) or for roundabout approaches with more than two entry lanes, or two entry lanes with a single circulating lane. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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 Intersection ID:
 Roundabout

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Demand Flow (veh/h)	Opposing Movement				Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
		HV (%)	Flow (veh/h)	HV (%)	Flow (pcu/h)					
West: EB: Gage Blvd										
12 L	190	2.1	413	2.8	413	472	0.85	111	100	0.403
11 T	201	2.0	413	2.8	413	499	0.85	111	100	0.403
13 R	467	1.9	0			1900	0.98	299	100	0.246
South: NB: Center Pkwy										
32 L	522	1.0	582	2.3	582	1367	0.85	123	100	0.382

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31 TR	229	1.3	582	2.3	582	600	0.85	123	100	0.382	

East: WB: Gage Blvd											
22 L	33	3.0	902	1.2	902	85	0.85	119	100	0.388	
21 T	364	1.1	902	1.2	902	941	0.85	120	100	0.387	
23 R	228	0.9	902	1.2	902	590	0.85	120	100	0.386	

North: SB: Center Pkwy											
42 LTR	556	3.1	918	1.0	919	740	0.85	13	100	0.751*	

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 Intersection ID:
 Roundabout

Table S.3 - INTERSECTION PARAMETERS

Intersection Level of Service	=	B
Worst movement Level of Service	=	B
Average intersection delay (s)	=	11.6
Largest average movement delay (s)	=	16.7
Largest back of queue, 95% (ft)	=	207
Performance Index	=	58.80
Degree of saturation (highest)	=	0.751
Practical Spare Capacity (lowest)	=	13 %
Effective intersection capacity, (veh/h)	=	3713
Total vehicle flow (veh/h)	=	2790
Total person flow (pers/h)	=	4185
Total vehicle delay (veh-h/h)	=	8.99
Total person delay (pers-h/h)	=	13.49
Total effective vehicle stops (veh/h)	=	2195
Total effective person stops (pers/h)	=	3292
Total vehicle travel (veh-mi/h)	=	1190.9
Total cost (\$/h)	=	1017.92
Total fuel (gal/h)	=	45.2
Total CO2 (kg/h)	=	428.34

Steptoe Street Extension
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 Intersection ID:
 Roundabout

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue (ft)	Perf. Index	Aver. Speed (mph)

West: EB: Gage Blvd									
12 L	0.78	1.17	14.8	0.71	0.78	3.7	94	4.30	28.8
11 T	0.43	0.65	7.7	0.71	0.66	3.7	94	3.88	31.8
13 R	0.79	1.18	6.1		0.50	11.9#		6.94	34.5

South: NB: Center Pkwy									
32 L	2.27	3.40	15.6	0.75	0.82	3.6	91	12.06	28.7
31 TR	0.53	0.80	8.4	0.75	0.70	3.6	91	4.46	31.4

East: WB: Gage Blvd									

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22 L	0.15	0.22	15.8	0.73	0.94	2.6	67	0.78	28.7
21 T	0.88	1.31	8.7	0.73	0.75	2.8	70	7.24	31.6
23 R	0.59	0.89	9.3	0.73	0.77	2.8	70	4.53	31.1

North: SB: Center Pkwy									
42 LTR	2.59	3.88	16.7	0.87	1.10	8.1	207	14.62	27.9

Largest density (passenger cars per km or mile) for any lane

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 Roundabout

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (ft)	Perf. Index	Aver. Speed (mph)
West: EB: Gage Blvd 858	0.403	1.99	2.99	8.4	0.32	0.60	187	15.11	32.4
South: NB: Center Pkwy 751	0.382	2.80	4.20	13.4	0.75	0.79	91	16.51	29.4
East: WB: Gage Blvd 625	0.388	1.61	2.42	9.3	0.73	0.77	70	12.56	31.3
North: SB: Center Pkwy 556	0.751	2.59	3.88	16.7	0.87	1.10	207	14.62	27.9
ALL VEHICLES: 2790	0.751	8.99	13.49	11.6	0.64	0.79	207	58.80	30.3
INTERSECTION (persons): 4185	0.751		13.49	11.6	0.64	0.79		58.80	30.3

Queue values in this table are 95% back of queue (feet).

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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Dem Flow (veh/h)	Cap (veh/h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue (ft)	Short Lane (ft)
West: EB: Gage Blvd 1 LT	12, 11	391	971	0.403	11.1	0.72	3.7	94	
2 R	13	467	1900	0.246	6.1	0.50	11.9#		
South: NB: Center Pkwy 1 L	32	332	869	0.382	15.9	0.84	3.3	84	

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2 LTR	32, 31	419	1098	0.382	11.4	0.74	3.6	91

East: WB: Gage Blvd								
1 LT	22, 21	281	728	0.387	9.7	0.79	2.6	67
2 TR	21, 23	344	888	0.387	8.9	0.75	2.8	70

North: SB: Center Pkwy								
1 LTR	42	556	740	0.752	16.7	1.10	8.1	207

Density (passenger cars per km or mile)

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 Intersection ID:
 Roundabout

Table S. 8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h)			Min Cap (veh/h)	Tot Cap (veh/h)	Deg. Satn x	Lane Util %	
		Lef	Thru	Rig					Tot
West: EB: Gage Blvd									
1 LT	12, 11	190	201	0	391	150	971	0.403	100
2 R	13	0	0	467	467	150	1900	0.246	100
South: NB: Center Pkwy									
1 L	32	332	0	0	332	150	869	0.382	100
2 LTR	32, 31	190	190	39	419	150	1098	0.382	100
East: WB: Gage Blvd									
1 LT	22, 21	33	248	0	281	150	728	0.387	100
2 TR	21, 23	0	116	228	344	150	888	0.387	100
North: SB: Center Pkwy									
1 LTR	42	191	191	174	556	150	740	0.752	100

For roundabouts, the capacity value for continuous movements is obtained as the basic saturation flow without any adjustments. Saturation flow scale applies if specified.

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Table S. 12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total	Cost Total	HC Total	CO Total	NOX Total	CO2 Total

		28_PM_Buid_Center-Gage. OUT					
		gal /h	\$/h	kg/h	kg/h	kg/h	kg/h

West: EB: Gage Blvd							
12	L	3.3	75.77	0.049	1.68	0.062	31.2
11	T	3.2	68.75	0.046	1.54	0.061	30.0
13	R	6.9	146.78	0.096	3.07	0.131	65.4
		13.4	291.31	0.191	6.28	0.254	126.6

South: NB: Center Pkwy							
32	L	8.9	209.27	0.134	4.47	0.168	84.0
31	TR	3.5	78.80	0.052	1.73	0.069	33.5
		12.4	288.08	0.186	6.20	0.237	117.6

East: WB: Gage Blvd							
22	L	0.6	13.23	0.008	0.28	0.011	5.3
21	T	5.6	124.95	0.082	2.72	0.109	53.2
23	R	3.6	78.88	0.053	1.78	0.069	33.6
		9.7	217.06	0.143	4.78	0.189	92.1

North: SB: Center Pkwy							
42	LTR	9.7	221.47	0.144	5.02	0.186	92.1
		9.7	221.47	0.144	5.02	0.186	92.1

INTERSECTION:		45.2	1017.92	0.664	22.29	0.866	428.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel (\$/US gal)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 lb)	=	1.4
Heavy vehicle mass (1000 lb)	=	11.0
Light vehicle idle fuel rate (US gal/h)	=	0.360
Heavy vehicle idle fuel rate (US gal/h)	=	0.530

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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 Intersection ID:
 Roundabout

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs)		Deg Sat x	Aver. Delay (sec)	Longest Queue (ft)	Shrt Lane (ft)
	L	T	R	Tot			1st	2nd				

West: EB: Gage Blvd												
1	LT	190	201	391	2				0.403	11.1	94	

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2 R		467	467	2	1900	0.246	6.1		
	190	201	467	858	2	0.403	8.4	94	

South: NB: Center Pkwy									
1 L		332		332	1	0.382	15.9	84	
2 LTR	190	190	39	419	1	0.382	11.4	91	
	522	190	39	751	1	0.382	13.4	91	

East: WB: Gage Blvd									
1 LT		33	248	281	1	0.387	9.7	67	
2 TR			116	228	344	1	0.387	8.9	70
	33	364	228	625	1	0.387	9.3	70	

North: SB: Center Pkwy									
1 LTR	191	191	174	556	3	0.752	16.7	207	
	191	191	174	556	3	0.752	16.7	207	
=====									
ALL VEHICLES				Total Flow	% HV	Max X	Aver. Delay	Max Queue	
				2790	2	0.751	11.6	207	
=====									

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Steptoe Street Extension
 2028 PM Peak Hour_Buid_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh/h)	Total Cap. (veh/h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	Queue (ft)
West: EB: Gage Blvd								
12	L	190	472	0.403	14.8	B	3.7	94
11	T	201	499	0.403	7.7	A	3.7	94
13	R (Con)	467	1900	0.246	6.1	B#	11.9#	
		858		0.403	8.4	A	3.7	94

South: NB: Center Pkwy								
32	L	522	1367	0.382	15.6	B	3.6	91
31	TR	229	600	0.382	8.4	A	3.6	91
		751		0.382	13.4	B	3.6	91

East: WB: Gage Blvd								
22	L	33	85	0.388	15.8	B	2.6	67
21	T	364	941	0.387	8.7	A	2.8	70
23	R	228	590	0.386	9.3	A	2.8	70

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	625		0.388	9.3	A	2.8	70
North: SB: Center Pkwy	556	740	0.751*	16.7	B	8.1	207
42 LTR	556		0.751	16.7	B	8.1	207
ALL VEHICLES:	2790		0.751	11.6	B	8.1	207

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.

- # Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
- * Maximum v/c ratio, or critical green periods

Steptoe Street Extension
 2028 PM Peak Hour_Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (ft)	Negn Speed (mph)	Negn Dist. (ft)	Appr. Dist. (ft)	Downstream Distance (ft)
West: EB: Gage Blvd						
	South	135.0	21.4	50.8	1800	403
	East	188.6	24.3	127.0	1800	411
	North	56.8	15.4	223.1	1800	549
South: NB: Center Pkwy						
	West	58.4	15.6	229.3	1800	554
	East	102.2	19.3	51.0	1800	397
	North	183.6	24.1	137.2	1800	410
East: WB: Gage Blvd						
	West	182.9	24.1	147.5	1800	413
	South	58.4	15.6	229.3	1800	554
	North	110.4	19.9	60.5	1800	398
North: SB: Center Pkwy						
	West	123.4	20.7	60.3	1800	403
	South	183.6	24.1	137.2	1800	412
	East	56.8	15.4	223.1	1800	550

Maximum Negotiation (Design) Speed = 50.0 mph
 Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Intersection ID:
Roundabout

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-Line		Delay Total dSL	Delay (seconds/veh)			Stopd (Idle) di	Geom dig	Control dic	
			1st d1	2nd d2		Acc. Dec. dn	Queuing Total dq	MvUp dqm				
West: EB: Gage Blvd												
1	LT	12, 11	0.403	2.6	0.0	2.6	4.0	0.0	0.0	0.0	12.2	11.1
2	R	13	0.246			0.0					5.1	6.1
South: NB: Center Pkwy												
1	L	32	0.382	3.7	0.0	3.7	3.7	0.1	0.0	0.1	12.2	15.9
2	LTR	32, 31	0.382	3.0	0.0	3.0	4.3	0.0	0.0	0.0	12.2	11.4
East: WB: Gage Blvd												
1	LT	22, 21	0.387	3.4	0.3	3.7	4.6	0.0	0.0	0.0	12.2	9.7
2	TR	21, 23	0.387	2.7	0.1	2.9	4.4	0.0	0.0	0.0	5.3	8.9
North: SB: Center Pkwy												
1	LTR	42	0.752	4.8	4.0	8.8	5.0	3.8	2.9	0.9	7.9	16.7

dn is average stop-start delay for all vehicles queued and unqueued

Steptoe Street Extension
2028 PM Peak Hour_Buid_Center Pkwy & Gage Blvd
Intersection ID:
Roundabout

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective		Stop Geom. hig	Rate Overall h	Prop. Queued pq	Queue Move-up Rate hqm
		he1	he2				
West: EB: Gage Blvd							
1	LT	0.403	0.55	0.00	0.17	0.72	0.706
2	R	0.246			0.50	0.50	0.00
South: NB: Center Pkwy							
1	L	0.382	0.66	0.00	0.17	0.84	0.757
2	LTR	0.382	0.60	0.00	0.14	0.74	0.749
East: WB: Gage Blvd							
1	LT	0.387	0.65	0.02	0.13	0.79	0.729
2	TR	0.387	0.60	0.01	0.14	0.75	0.726
North: SB: Center Pkwy							
1	LTR	0.752	0.87	0.16	0.07	1.10	0.868

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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 Intersecti on ID:
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Table D. 3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh)			Percentile (veh)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: Gage BI vd											
1 LT	0.403	0.0	1.2	0.0	1.2	2.1	2.6	3.0	3.7	4.3	0.05
2 R	0.246				7.4#						0.04#
South: NB: Center Pkwy											
1 L	0.382	0.0	1.1	0.0	1.1	1.9	2.4	2.7	3.3	3.9	0.05
2 LTR	0.382	0.0	1.2	0.0	1.2	2.1	2.6	2.9	3.6	4.2	0.05
East: WB: Gage BI vd											
1 LT	0.387	0.0	0.8	0.0	0.8	1.5	1.9	2.1	2.6	3.1	0.04
2 TR	0.387	0.0	0.9	0.0	0.9	1.6	2.0	2.2	2.8	3.2	0.04
North: SB: Center Pkwy											
1 LTR	0.752	0.7	1.9	0.8	2.7	4.6	5.7	6.5	8.1	9.4	0.11

Values printed in this table are back of queue (vehicles).

Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Table D. 3B - LANE QUEUES (feet)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (feet)			Percentile (feet)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: Gage BI vd											
1 LT	0.403	0	30	0	30	54	67	76	94	109	0.05
2 R	0.246				4.6#						0.04#
South: NB: Center Pkwy											
1 L	0.382	0	27	0	27	49	59	68	84	97	0.05
2 LTR	0.382	0	29	0	29	53	65	73	91	106	0.05
East: WB: Gage BI vd											
1 LT	0.387	1	21	1	21	39	48	54	67	77	0.04
2 TR	0.387	1	22	1	22	41	50	57	70	81	0.04
North: SB: Center Pkwy											
1 LTR	0.752	18	48	21	69	117	145	165	207	241	0.11

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Values printed in this table are back of queue (feet).
 # Continuous movements: Density (passenger cars per km or mile)
 instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

Steptoe Street Extension
 2028 PM Peak Hour_Build_Center Pkwy & Gage Blvd
 Intersection ID:
 Roundabout

Table D.4 - MOVEMENT SPEEDS (mph)

Mov No.	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running	Overall

West: EB: Gage Blvd								
12	40.0	15.4	15.4	40.0			28.8	28.8
11	40.0	24.3	24.3	40.0			31.8	31.8
13	40.0	21.4	21.4	40.0			34.5	34.5

South: NB: Center Pkwy								
32	40.0	15.6	15.6	40.0			28.7	28.7
31	40.0	23.3	23.3	40.0			31.4	31.4

East: WB: Gage Blvd								
22	40.0	15.6	15.6	40.0	11.2		28.7	28.7
21	40.0	24.1	24.1	40.0	11.4		31.6	31.6
23	40.0	19.9	19.9	40.0	11.9		31.1	31.1

North: SB: Center Pkwy								
42	40.0	20.1	20.1	40.0	11.1		28.3	27.9

"Running Speed" is the average speed excluding stopped periods.

--- End of aaSIDRA Output ---

C:\Documents and Settings\tnewkirk\My
 Documents\aaTraffic\Steptoe\28_PM_Build_Center-Gage.OUT
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CH2MHILL
 CH2MHILL User ID: A0725
 Licence Type: Single Computer

Time and Date of Analysis 4:52 PM, Aug 25, 2006

Filename: C:\Documents and Settings\tnewkirk\My Documents\aaTraffic\Steptoe\2028_PM_Clearwater-Steptoe. OUT

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:

aaTraffic SIDRA US Highway Capacity Manual (2000) Version

RUN INFORMATION

* Basic Parameters:
 Intersection Type: Roundabout
 Driving on the right-hand side of the road
 Input data specified in US units
 Default Values File No. 11
 Peak flow period (for performance): 15 minutes
 Unit time (for volumes): 60 minutes (Total Flow Period)
 Delay definition: Control delay
 Geometric delay included
 aaSIDRA Standard Delay and Queue models used
 Level of Service based on: Delay (HCM method)
 Queue definition: Back of queue, 95th Percentile

Geometric delay is less than 2 seconds for some movements. The negotiation speed may be too high or the approach and exit speeds may be too low for given geometric design (e.g. for a large roundabout). Check Tables D.0, D.1 and D.4 for geometric delay data including negotiation speeds. If necessary, specify appropriate values of approach and exit speeds (RIDES Approach Data screen), and negotiation radius or negotiation speed data (RIDES Extra Data - Geometric Delay data screen).

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor
	LV	HV	LV	HV	LV	HV		
VEHICLES Demand flows in veh/hour as used by the program								
West: EB: W. Clearwater Avenue								
12	167	7	0	0	0	0	1.00	0.92
11	0	0	313	13	0	0	1.00	0.92
13	0	0	0	0	42	2	1.00	0.92
South: NB: Clodfelder Road								
32	22	0	0	0	0	0	1.00	0.92

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31	0	0	804	0	0	0	1.00	0.92
33	0	0	0	0	424	0	1.00	0.92

East: WB: W. Clearwater Avenue								
22	495	10	0	0	0	0	1.00	0.92
21	0	0	559	11	0	0	1.00	0.92
23	0	0	0	0	304	6	1.00	0.92

North: SB: Steptoe Street Ext.								
42	336	7	0	0	0	0	1.00	0.92
41	0	0	1087	22	0	0	1.00	0.92
43	0	0	0	0	144	3	1.00	0.92

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Steptoe Street Extension
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Intersection ID:
Roundabout

Table R.0 - ROUNDABOUT BASIC PARAMETERS

Cent Island Diam (ft)	Circ Width (ft)	Insc Diam (ft)	No. of Circ Lanes	No. of Entry Lanes	Av. Ent Lane Width (ft)	Circulating/Exiting Stream					
						Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor

West: EB: W. Clearwater Avenue											
115	30	175	2	2	13.00	1714	2.0	1714	0	Y	0.658

South: NB: Clodfelter Road											
115	30	175	2	2	13.00	785	3.3	785	0	Y	0.862

East: WB: W. Clearwater Avenue											
115	30	175	2	2	13.00	1000	0.7	1000	0	N	0.793

North: SB: Steptoe Street Ext.											
115	30	175	2	2	13.00	1098	2.0	1098	0	N	0.707

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Intersection ID:
Roundabout

Table R.1 - ROUNDABOUT GAP ACCEPTANCE PARAMETERS

Turn	Lane No.	Lane Type	Circulating/Exiting Stream					Critical Gap		Follow-up Headway (s)
			Flow Rate (pcu/h)	Aver Speed (mph)	Aver Dist (ft)	In-Bnch Headway (s)	Prop Bunched	Hdwy (s)	Dist (ft)	

West: EB: W. Clearwater Avenue										
Left	1	Subdominant	1714	21.2	65.2	1.32	0.787	2.86	88.8	2.14
Thru	1	Subdominant	1714	21.2	65.2	1.32	0.787	2.86	88.8	2.14
	2	Dominant	1714	21.2	65.2	1.32	0.787	2.26	70.1	1.69
Right	2	Dominant	1714	21.2	65.2	1.32	0.787	2.26	70.2	1.69

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South: NB: Clodfel ter Road										
Left	1	Subdomi nant	785	20.1	135.3	1.41	0.495	3.44	101.5	2.36
Thru	1	Subdomi nant	785	20.1	135.3	1.41	0.495	3.44	101.5	2.36
	2	Domi nant	785	20.1	135.3	1.41	0.495	2.97	87.6	2.04
Ri ght	2	Domi nant	785	20.1	135.3	1.41	0.495	2.97	87.6	2.04
East: WB: W. Clearwater Avenue										
Left	1	Subdomi nant	1000	23.4	123.4	1.39	0.581	3.27	112.2	2.32
Thru	1	Subdomi nant	1000	23.4	123.4	1.39	0.581	3.27	112.2	2.32
	2	Domi nant	1000	23.4	123.4	1.39	0.581	2.77	94.8	1.96
Ri ght	2	Domi nant	1000	23.4	123.4	1.39	0.581	2.77	94.8	1.96
North: SB: Steptoe Street Ext.										
Left	1	Subdomi nant	1098	21.0	101.0	1.12	0.534	3.21	98.7	2.30
Thru	1	Subdomi nant	1098	21.0	101.0	1.12	0.534	3.21	98.7	2.30
	2	Domi nant	1098	21.0	101.0	1.12	0.534	2.68	82.6	1.92
Ri ght	2	Domi nant	1098	21.0	101.0	1.12	0.534	2.68	82.6	1.92

Environment Factor: 1.00
 Entry/Ci rcul ating Flow Adjustment: Medi um

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The 0-D Factor (Table R.0) allows for priority sharing and priority emphasis.

Dist (Di stance): Spacing, i.e. distance between the front ends of two successive vehi cles across all lanes in the ci rcul ating or exi ting stream

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersecti on ID:
 Roundabout

Table R.5 - ROUNDABOUT CAPACITY & LEVEL OF SERVICE - aaSIDRA & HCM MODELS

Mov No.	Dem Flow (veh /h)	aaSIDRA				HCM 2000 Lower				HCM 2000 Upper							
		Cap. (veh /h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh /h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh /h)	Deg. Satn x	Av. Del ay (sec)	LOS				
West: EB: W. Clearwater Avenue																	
12	L	174	271	0.642	23.6	C	-	-	-	NA	-	-	-	NA	-	-	-
11	T	326	507	0.643	15.0	B	-	-	-	NA	-	-	-	NA	-	-	-
13	R	44	68	0.647	15.7	B	-	-	-	NA	-	-	-	NA	-	-	-
South: NB: Clodfel ter Road																	
32	L	22	31	0.710	12.9	B	-	-	-	NA	-	-	-	NA	-	-	-
31	T	804	1118	0.719	6.9	A	-	-	-	NA	-	-	-	NA	-	-	-
33	R	424	590	0.719	7.2	A	-	-	-	NA	-	-	-	NA	-	-	-
East: WB: W. Clearwater Avenue																	
22	L	505	533	0.947	29.9	C	-	-	-	NA	-	-	-	NA	-	-	-
21	T	570	602	0.947	21.7	C	-	-	-	NA	-	-	-	NA	-	-	-
23	R	310	327	0.948	22.4	C	-	-	-	NA	-	-	-	NA	-	-	-
North: SB: Steptoe Street Ext.																	

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42 L	343	286	1.199	109.6	F	-	-	-	-	NA	-	-	-	-	NA	-	-	-	-
41 T	1109	924	1.200	102.3	F	-	-	-	-	NA	-	-	-	-	NA	-	-	-	-
43 R	147	122	1.205	102.7	F	-	-	-	-	NA	-	-	-	-	NA	-	-	-	-

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the HCM models are only applicable to single-lane roundabouts with circulating flows less than 1200 veh/h. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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 Intersection ID:
 Roundabout

Table R.6 - ROUNDABOUT ALTERNATIVE CAPACITY MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA		NAASRA 1986		Ger. Linear		Ger. GapAcc		
		Cap. (veh/h)	Deg. Satn x	Cap. (veh/h)	% Diff from aaSIDRA	Cap. (veh/h)	% Diff from aaSIDRA	Cap. (veh/h)	% Diff from aaSIDRA	
West: EB: W. Clearwater Avenue										
12 L	174	271	0.642	247	-8.9	240	-11.4	197	-27.3	
11 T	326	507	0.643	463	-8.7	450	-11.2	368	-27.4	
13 R	44	68	0.647	63	-7.4	61	-10.3	50	-26.5	
South: NB: Clodfelter Road										
32 L	22	31	0.710	32	3.2	18	-41.9	23	-25.8	
31 T	804	1118	0.719	1175	5.1	658	-41.1	859	-23.2	
33 R	424	590	0.719	620	5.1	347	-41.2	453	-23.2	
East: WB: W. Clearwater Avenue										
22 L	505	533	0.947	563	5.6	348	-34.7	389	-27.0	
21 T	570	602	0.947	635	5.5	393	-34.7	439	-27.1	
23 R	310	327	0.948	346	5.8	214	-34.6	239	-26.9	
North: SB: Steptoe Street Ext.										
42 L	343	286	1.199	304	6.3	214	-25.2	264	-7.7	
41 T	1109	924	1.200	984	6.5	693	-25.0	854	-7.6	
43 R	147	122	1.205	130	6.6	92	-24.6	113	-7.4	

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 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Demand Flow (veh/h)	HV (%)	Opposing Movement		Total Cap. (veh/h)	Prac. Deg. Satn xp (%)	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
			Flow (veh/h)	HV (%)					

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West: EB: W. Clearwater Avenue										
12 L	174	4.0	1714	2.0	1714	271	0.85	32	100	0.642
11 T	326	4.0	1714	2.0	1714	507	0.85	32	100	0.643
13 R	44	4.5	1714	2.0	1714	68	0.85	31	100	0.647
South: NB: Clodfel ter Road										
32 L	22	0.0	785	3.3	785	31	0.85	20	100	0.710
31 T	804	0.0	785	3.3	785	1118	0.85	18	100	0.719
33 R	424	0.0	785	3.3	785	590	0.85	18	100	0.719
East: WB: W. Clearwater Avenue										
22 L	505	2.0	1000	0.7	1000	533	0.85	-10	100	0.947
21 T	570	1.9	1000	0.7	1000	602	0.85	-10	100	0.947
23 R	310	1.9	1000	0.7	1000	327	0.85	-10	100	0.948
North: SB: Steptoe Street Ext.										
42 L	343	2.0	1098	2.0	1098	286	0.85	-29	100	1.199
41 T	1109	2.0	1098	2.0	1098	924	0.85	-29	100	1.200
43 R	147	2.0	1098	2.0	1098	122	0.85	-29	100	1.205*

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 Intersection ID:
 Roundabout

Table S.3 - INTERSECTION PARAMETERS

Intersection Level of Service	=	D
Worst movement Level of Service	=	F
Average intersection delay (s)	=	45.9
Largest average movement delay (s)	=	109.6
Largest back of queue, 95% (ft)	=	1573
Performance Index	=	259.76
Degree of saturation (highest)	=	1.205
Practical Spare Capacity (lowest)	=	-29 %
Effective intersection capacity, (veh/h)	=	3965
Total vehicle flow (veh/h)	=	4778
Total person flow (pers/h)	=	7167
Total vehicle delay (veh-h/h)	=	60.86
Total person delay (pers-h/h)	=	91.28
Total effective vehicle stops (veh/h)	=	10614
Total effective person stops (pers/h)	=	15921
Total vehicle travel (veh-mi/h)	=	1818.7
Total cost (\$/h)	=	3408.26
Total fuel (gal/h)	=	86.0
Total CO2 (kg/h)	=	814.37

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (veh)	Perf. Index	Aver. Speed (mph)

2028_PM_Clearwater-Steptoe. OUT

West: EB: W. Clearwater Avenue										
12 L	1.14	1.71	23.6	0.96	1.19	5.8	148	6.60	17.9	
11 T	1.36	2.04	15.0	0.99	1.22	6.9	177	10.80	19.5	
13 R	0.19	0.29	15.7	1.00	1.23	6.9	177	1.46	19.3	

South: NB: Clodfelter Road										
32 L	0.08	0.12	12.9	0.88	1.13	8.1	201	0.68	20.5	
31 T	1.53	2.30	6.9	0.88	1.06	8.6	216	21.95	22.2	
33 R	0.85	1.27	7.2	0.88	1.08	8.6	216	11.47	22.0	

East: WB: W. Clearwater Avenue										
22 L	4.20	6.30	29.9	1.00	1.72	17.7	449	22.51	16.6	
21 T	3.44	5.16	21.7	1.00	1.75	20.0	509	22.87	17.8	
23 R	1.93	2.89	22.4	1.00	1.75	20.0	509	12.44	17.6	

North: SB: Steptoe Street Ext.										
42 L	10.44	15.66	109.6	1.00	3.63	50.0	1271	32.61	8.8	
41 T	31.50	47.25	102.3	1.00	3.94	61.9	1573	102.66	8.6	
43 R	4.19	6.29	102.7	1.00	4.08	61.9	1573	13.70	8.6	

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (ft)	Perf. Index	Aver. Speed (mph)	

West: EB: W. Clearwater Avenue										
544	0.647	2.69	4.04	17.8	0.98	1.21	177	18.87	18.9	

South: NB: Clodfelter Road										
1250	0.719	2.46	3.69	7.1	0.88	1.07	216	34.11	22.1	

East: WB: W. Clearwater Avenue										
1385	0.948	9.57	14.35	24.9	1.00	1.74	509	57.82	17.3	

North: SB: Steptoe Street Ext.										
1599	1.205	46.13	69.20	103.9	1.00	3.88	1573	148.96	8.6	

ALL VEHICLES:										
4778	1.205	60.86	91.28	45.9	0.97	2.22	1573	259.76	13.6	

INTERSECTION (persons):										
7167	1.205		91.28	45.9	0.97	2.22		259.76	13.6	

Queue values in this table are 95% back of queue (feet).

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.7 - LANE PERFORMANCE

2028_PM_Clearwater-Steptoe. OUT

Lane No.	Mov No.	Dem Flow (veh/h)	Cap (veh/h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue (ft)	Short Lane (ft)

West: EB: W. Clearwater Avenue									
1	LT	12, 11	225	350	0.643	22.3	1.18	5.8	148
2	TR	11, 13	319	497	0.643	14.7	1.23	6.9	177

South: NB: Clodfel ter Road									
1	LT	32, 31	563	783	0.719	7.5	1.07	8.1	201
2	TR	31, 33	687	956	0.719	6.7	1.07	8.6	216

East: WB: W. Clearwater Avenue									
1	LT	22, 21	611	645	0.947	29.0	1.72	17.7	449
2	TR	21, 23	774	817	0.947	21.6	1.75	20.0	509

North: SB: Steptoe Street Ext.									
1	LT	42, 41	697	580	1.201	106.7	3.63	50.0	1271
2	TR	41, 43	902	751	1.201	101.7	4.08	61.9	1573

Step toe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h)			Deg. Satn x	Lane Util %				
		Left	Thru	Right						

West: EB: W. Clearwater Avenue										
1	LT	12, 11	174	51	0	225	150	350	0.643	100
2	TR	11, 13	0	275	44	319	150	497	0.643	100

South: NB: Clodfel ter Road										
1	LT	32, 31	22	541	0	563	150	783	0.719	100
2	TR	31, 33	0	263	424	687	150	956	0.719	100

East: WB: W. Clearwater Avenue										
1	LT	22, 21	505	106	0	611	150	645	0.947	100
2	TR	21, 23	0	464	310	774	150	817	0.947	100

North: SB: Steptoe Street Ext.										

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1 LT	42,	343	354	0	697	150	580	1.201	100
	41								
2 TR	41,	0	755	147	902	150	751	1.201	100
	43								

For roundabouts, the capacity value for continuous movements is obtained as the basic saturation flow without any adjustments. Saturation flow scale applies if specified.

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total gal/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: EB: W. Clearwater Avenue						
12 L	2.9	101.36	0.044	1.05	0.035	27.4
11 T	4.8	158.41	0.073	1.92	0.062	45.6
13 R	0.6	21.56	0.010	0.25	0.008	6.1
	8.4	281.33	0.127	3.22	0.105	79.2
South: NB: Clodfelter Road						
32 L	0.3	11.15	0.005	0.12	0.004	3.0
31 T	10.2	342.63	0.157	3.94	0.132	96.7
33 R	5.4	181.34	0.082	2.03	0.069	50.8
	15.9	535.12	0.244	6.09	0.205	150.5
East: WB: W. Clearwater Avenue						
22 L	8.6	318.03	0.137	3.25	0.105	81.4
21 T	8.7	305.24	0.138	3.59	0.113	82.2
23 R	4.7	167.16	0.075	1.90	0.061	44.6
	22.0	790.43	0.350	8.74	0.279	208.2
North: SB: Steptoe Street Ext.						
42 L	8.9	409.19	0.161	3.17	0.098	84.5
41 T	27.2	1228.75	0.498	10.51	0.315	257.7
43 R	3.6	163.44	0.066	1.40	0.042	34.2
	39.8	1801.38	0.725	15.07	0.455	376.5
INTERSECTION:	86.0	3408.26	1.446	33.12	1.044	814.4

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel (\$/US gal)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	27.00
Time value factor	=	0.60

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Average occupancy (persons/veh)	= 1.5
Light vehicle mass (1000 lb)	= 1.4
Heavy vehicle mass (1000 lb)	= 11.0
Light vehicle idle fuel rate (US gal/h)	= 0.360
Heavy vehicle idle fuel rate (US gal/h)	= 0.530

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (ft)	Shrt Lane (ft)
	L	T	R	Tot							
West: EB: W. Clearwater Avenue											
1 LT	174	51		225	4			0.643	22.3	148	
2 TR		275	44	319	4			0.643	14.7	177	
	174	326	44	544	4			0.643	17.8	177	
South: NB: Clodfel ter Road											
1 LT	22	541		563	0			0.719	7.5	201	
2 TR		263	424	687	0			0.719	6.7	216	
	22	804	424	1250	0			0.719	7.1	216	
East: WB: W. Clearwater Avenue											
1 LT	505	106		611	2			0.947	29.0	449	
2 TR		464	310	774	2			0.947	21.6	509	
	505	570	310	1385	2			0.947	24.9	509	
North: SB: Steptoe Street Ext.											
1 LT	343	354		697	2			1.201	106.7	1271	
2 TR		755	147	902	2			1.201	101.7	1573	
	343	1109	147	1599	2			1.201	103.9	1573	
=====											
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				4778	2			1.205	45.9	1573	
=====											

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

2028_PM_Clearwater-Steptoe. OUT

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh/h)	Total Cap. (veh/h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(ft)
West: EB: W. Clearwater Avenue								
12	L	174	271	0.642	23.6	C	5.8	148
11	T	326	507	0.643	15.0	B	6.9	177
13	R	44	68	0.647	15.7	B	6.9	177
		544		0.647	17.8	B	6.9	177
South: NB: Clodfelder Road								
32	L	22	31	0.710	12.9	B	8.1	201
31	T	804	1118	0.719	6.9	A	8.6	216
33	R	424	590	0.719	7.2	A	8.6	216
		1250		0.719	7.1	A	8.6	216
East: WB: W. Clearwater Avenue								
22	L	505	533	0.947	29.9	C	17.7	449
21	T	570	602	0.947	21.7	C	20.0	509
23	R	310	327	0.948	22.4	C	20.0	509
		1385		0.948	24.9	C	20.0	509
North: SB: Steptoe Street Ext.								
42	L	343	286	1.199	109.6	F	50.0	1271
41	T	1109	924	1.200	102.3	F	61.9	1573
43	R	147	122	1.205*	102.7	F	61.9	1573
		1599		1.205	103.9	F	61.9	1573
ALL VEHICLES:		4778		1.205	45.9	D	61.9	1573

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (ft)	Negn Speed (mph)	Negn Dist. (ft)	Appr. Dist. (ft)	Downstream Distance (ft)
West: EB: W. Clearwater Avenue						
	South	133.3	21.3	67.7	1800	165
	East	219.5	25.0	166.5	1800	167
	North	69.5	16.7	272.9	1800	368

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South: NB: Clodfel ter Road

West	69.5	16.7	272.9	1800	367
East	133.3	21.3	67.7	1800	163
North	219.5	25.0	166.5	1800	167

East: WB: W. Clearwater Avenue

West	219.5	25.0	166.5	1800	167
South	69.5	16.7	272.9	1800	368
North	133.3	21.3	67.7	1800	164

North: SB: Steptoe Street Ext.

West	133.3	21.3	67.7	1800	164
South	219.5	25.0	166.5	1800	167
East	69.5	16.7	272.9	1800	368

Maximum Negoti ati on (Desi gn) Speed = 50.0 mph
Downstream Di stance cal cul ated by aaSI DRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negoti ati on di stance). Accelerati on di stance is weighted for light and heavy vehi cles. The same di stance applies for both stopped and unstopped vehi cles.

Steptoe Street Extension
2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
Intersecti on ID:
Roundabout

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Del ay			Del ay (seconds/veh)					Geom di g	Control di c
			1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queui ng Total dq	MvUp dqm	Stopd (I dle) di			
West: EB: W. Clearwater Avenue												
1	LT	12, 11	0.643	9.8	8.2	18.0	5.2	12.8	2.4	10.4	5.6	22.3
											0.0	
2	TR	11, 13	0.643	7.7	6.8	14.5	6.6	7.9	2.5	5.4	0.0	14.7
											1.2	
South: NB: Clodfel ter Road												
1	LT	32, 31	0.719	4.1	3.2	7.3	5.9	1.4	1.4	0.0	5.6	7.5
											0.0	
2	TR	31, 33	0.719	3.4	2.6	6.0	5.6	0.4	0.4	0.0	0.0	6.7
											1.2	
East: WB: W. Clearwater Avenue												
1	LT	22, 21	0.947	5.8	18.5	24.3	5.4	19.0	7.9	11.1	5.6	29.0
											0.0	
2	TR	21, 23	0.947	4.8	16.4	21.1	6.5	14.7	8.0	6.7	0.0	21.6
											1.2	
North: SB: Steptoe Street Ext.												
1	LT	42, 41	1.201	5.0	98.9	103.9	5.9	98.0	29.3	68.7	5.6	106.7
											0.0	
2	TR	41, 43	1.201	4.2	97.3	101.5	6.6	94.9	33.3	61.5	0.0	101.7
											1.2	

dn is average stop-start delay for all vehi cles queued and unqueued

2028_PM_Clearwater-Steptoe.OUT

Geometric delay is less than 2 seconds for some movements. The negotiation speed may be too high or the approach and exit speeds may be too low for given geometric design (e.g. for a large roundabout). Check Tables D.0, D.1 and D.4 for geometric delay data including negotiation speeds. If necessary, specify appropriate values of approach and exit speeds (RIDES Approach Data screen), and negotiation radius or negotiation speed data (RIDES Extra Data - Geometric Delay data screen).

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table D.2 - LANE STOPS

Lane No.	Deg. Sat'n x	Effective Stop		Geom. High	Rate Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: EB: W. Clearwater Avenue							
1 LT	0.643	0.96	0.21	0.02	1.18	0.956	0.45
2 TR	0.643	1.00	0.23	0.00	1.23	1.000	0.45
South: NB: Clodfel ter Road							
1 LT	0.719	0.88	0.18	0.00	1.07	0.884	0.34
2 TR	0.719	0.88	0.17	0.01	1.07	0.884	0.31
East: WB: W. Clearwater Avenue							
1 LT	0.947	1.00	0.72	0.00	1.72	1.000	1.42
2 TR	0.947	1.00	0.75	0.00	1.75	1.000	1.39
North: SB: Steptoe Street Ext.							
1 LT	1.201	1.00	2.63	0.00	3.63	1.000	5.39
2 TR	1.201	1.00	3.08	0.00	4.08	1.000	5.92

high is the average value for all movements in a shared lane
 hqm is average queue move-up rate for all vehicles queued and unqueued

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Sat'n x	Ovrfl. Queue No	Average (veh)			Percentile (veh)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: W. Clearwater Avenue											
1 LT	0.643	0.5	1.5	0.4	1.9	3.3	4.1	4.6	5.8	6.7	0.08
2 TR	0.643	0.6	1.8	0.5	2.3	3.9	4.8	5.5	6.9	8.0	0.10
South: NB: Clodfel ter Road											
1 LT	0.719	0.6	2.0	0.7	2.7	4.6	5.6	6.4	8.1	9.4	0.11
2 TR	0.719	0.6	2.1	0.7	2.9	4.9	6.0	6.9	8.6	10.1	0.12

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East: WB: W. Clearwater Avenue												
1	LT	0.947	2.9	2.8	3.4	6.3	9.5	12.0	13.9	17.7	20.8	0.25
2	TR	0.947	3.3	3.2	4.0	7.2	10.7	13.6	15.7	20.0	23.6	0.28
North: SB: Steptoe Street Ext.												
1	LT	1.201	15.8	3.4	16.1	19.5	24.6	32.4	38.3	50.0	59.8	0.71
2	TR	1.201	20.2	3.8	20.6	24.4	30.1	39.9	47.3	61.9	74.1	0.87

Values printed in this table are back of queue (vehicles).

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table D.3B - LANE QUEUES (feet)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (feet)			Percentile (feet)					Queue Stor. Ratio	
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%		
West: EB: W. Clearwater Avenue												
1	LT	0.643	12	40	9	49	85	105	119	148	173	0.08
2	TR	0.643	14	47	12	59	101	125	142	177	207	0.10
South: NB: Clodfel ter Road												
1	LT	0.719	14	50	18	67	114	141	161	201	235	0.11
2	TR	0.719	14	54	19	72	122	151	172	216	252	0.12
East: WB: W. Clearwater Avenue												
1	LT	0.947	75	72	87	159	242	306	354	449	529	0.25
2	TR	0.947	83	80	102	183	271	344	399	509	600	0.28
North: SB: Steptoe Street Ext.												
1	LT	1.201	402	86	410	496	626	824	973	1271	1519	0.71
2	TR	1.201	512	97	524	621	766	1014	1200	1573	1883	0.87

Values printed in this table are back of queue (feet).

Steptoe Street Extension
 2028 PM Peak Hour - W. Clearwater Avenue & Steptoe Street Ext.
 Intersection ID:
 Roundabout

Table D.4 - MOVEMENT SPEEDS (mph)

Mov No.	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Runni ng	Overall
West: EB: W. Clearwater Avenue								
12	25.0	16.7	16.7	25.0	10.1		20.5	17.9
11	25.0	25.0	25.0	25.0	10.9		21.4	19.5
13	25.0	21.3	21.3	25.0	11.1		21.2	19.3
South: NB: Clodfel ter Road								

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32	25.0	16.7	16.7	25.0	11.8	20.8	20.5
31	25.0	25.0	25.0	25.0	12.1	22.2	22.2
33	25.0	21.3	21.3	25.0	12.6	22.0	22.0

 East: WB: W. Clearwater Avenue

22	25.0	16.7	16.7	25.0	11.2	19.0	16.6
21	25.0	25.0	25.0	25.0	11.8	19.6	17.8
23	25.0	21.3	21.3	25.0	12.0	19.5	17.6

 North: SB: Steptoe Street Ext.

42	25.0	16.7	16.7	25.0	10.6	14.9	8.8
41	25.0	25.0	25.0	25.0	11.2	14.5	8.6
43	25.0	21.3	21.3	25.0	11.4	14.2	8.6

"Running Speed" is the average speed excluding stopped periods.

--- End of aaSIDRA Output ---

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Steptoe Street Extension
 2028 PM Peak Hour - Cl odfel ter Road & W. 10th Avenue
 Intersection ID:

aaTraffic SIDRA US Highway Capacity Manual (2000) Version

RUN INFORMATION

* Basic Parameters:
 Intersection Type: Roundabout
 Driving on the right-hand side of the road
 Input data specified in US units
 Default Values File No. 11
 Peak flow period (for performance): 15 minutes
 Unit time (for volumes): 60 minutes (Total Flow Period)
 Delay definition: Control delay
 Geometric delay included
 aaSIDRA Standard Delay and Queue models used
 Level of Service based on: Delay (HCM method)
 Queue definition: Back of queue, 95th Percentile

Geometric delay is less than 2 seconds for some movements. The negotiation speed may be too high or the approach and exit speeds may be too low for given geometric design (e.g. for a large roundabout). Check Tables D.0, D.1 and D.4 for geometric delay data including negotiation speeds. If necessary, specify appropriate values of approach and exit speeds (RIDES Approach Data screen), and negotiation radius or negotiation speed data (RIDES Extra Data - Geometric Delay data screen).

Steptoe Street Extension
 2028 PM Peak Hour - Cl odfel ter Road & W. 10th Avenue
 Intersection ID:
 Roundabout

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor	
	LV	HV	LV	HV	LV	HV			
VEHICLES Demand flows in veh/hour as used by the program									
West: EB: W. 10th Avenue									
12	215	29	0	0	0	0	1.00	0.92	
11	0	0	77	10	0	0	1.00	0.92	
13	0	0	0	0	29	4	1.00	0.92	
South: NB: Cl odfel ter Road									
32	21	1	0	0	0	0	1.00	0.92	

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31	0	0	620	33	0	0	1.00	0.92
33	0	0	0	0	52	3	1.00	0.92

East: WB: W. 10th Avenue								
22	43	1	0	0	0	0	1.00	0.92
21	0	0	176	4	0	0	1.00	0.92
23	0	0	0	0	293	6	1.00	0.92

NorthEast: SB: Ci odfel ter Road								
62	1182	62	0	0	0	0	1.00	0.92
61	0	0	341	18	0	0	1.00	0.92

Based on unit t ime = 60 mi nutes.
Flow Scale and Peak Hour Factor effects i ncl uded i n fl ow val ues.

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Table R.0 - ROUNDABOUT BASIC PARAMETERS

Cent Isl and Di am (ft)	Circ Wi dth (ft)	Insc Di am. (ft)	No. of Circ. Lanes	No. of Entry Lanes	Av. Ent Lane Wi dth (ft)	Ci rcul ati ng/Exi ti ng Stream					
						Fl ow (veh/h)	%HV	Adj ust. Fl ow (pcu/h)	%Exi t Incl .	Cap. Constr. Effect	O-D Factor

West: EB: W. 10th Avenue											
115	30	175	2	2	13.00	1288	4.9	1292	0	N	0.865

South: NB: Ci odfel ter Road											
115	30	175	2	2	13.00	685	8.4	708	0	N	0.937

East: WB: W. 10th Avenue											
115	30	175	2	1	13.00	918	6.9	936	0	N	0.878
Excl usi ve Sl ip lane (exi ti ng fl ow):						897	6.9	915	0	N	0.883

NorthEast: SB: Ci odfel ter Road											
115	30	175	2	2	13.00	245	2.3	245	0	N	0.964

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Table R.1 - ROUNDABOUT GAP ACCEPTANCE PARAMETERS

Turn	Lane No.	Lane Type	Ci rcul ati ng/Exi ti ng Stream				Cri ti cal Gap			
			Fl ow Rate (pcu/h)	Aver Speed (mph)	Aver Dist (ft)	In-Bnch Headway (s)	Prop Bunched	Hdwy (s)	Dist (ft)	Fol l -up Headway (s)

West: EB: W. 10th Avenue										
Left	1	Domi nant	1292	16.7	68.1	1.18	0.618	2.71	66.2	1.98
Thru	2	Subdomi nant	1292	16.7	68.1	1.18	0.618	3.36	82.1	2.45
Ri ght	2	Subdomi nant	1292	16.7	68.1	1.18	0.618	3.38	82.6	2.47

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South: NB: Ci odfel ter Road										
Left	1	Subdomi nant	708	17.7	132.1	1.25	0.417	3.51	91.2	2.38
Thru	1	Subdomi nant	708	17.7	132.1	1.25	0.417	3.51	91.4	2.38
	2	Domi nant	708	17.7	132.1	1.25	0.417	3.06	79.5	2.08
Right	2	Domi nant	708	17.7	132.1	1.25	0.417	3.07	79.7	2.08

East: WB: W. 10th Avenue										
Left	1	Domi nant	936	22.6	127.3	1.29	0.526	3.35	111.0	2.35
Thru	1	Domi nant	936	22.6	127.3	1.29	0.526	3.35	111.0	2.35
Right	2	Excl. Slip	915E	22.7	131.2	1.32	0.525	3.35	111.7	2.35

NorthEast: SB: Ci odfel ter Road										
Left	1	Subdomi nant	245	22.8	491.7	2.00	0.257	3.91	130.6	2.43
	2	Domi nant	245	22.8	491.7	2.00	0.257	3.49	116.7	2.18
Thru	2	Domi nant	245	22.8	491.7	2.00	0.257	3.49	116.7	2.18

Environment Factor: 1.00
 Entry/Ci rcul ating Flow Adjustment: Medi um

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

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Table R.5 - ROUNDABOUT CAPACITY & LEVEL OF SERVICE - aaSIDRA & HCM MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA				HCM 2000 Lower				HCM 2000 Upper							
		Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Del ay (sec)	LOS				
West: EB: W. 10th Avenue																	
12	L	244	780	0.313	8.7	A	-	-	-	NA	-	-	-	NA	-	-	-
11	T	87	407	0.214	5.0	A	-	-	-	NA	-	-	-	NA	-	-	-
13	R	33	154	0.214	6.2	A	-	-	-	NA	-	-	-	NA	-	-	-
South: NB: Ci odfel ter Road																	
32	L	22	59	0.373	8.3	A	-	-	-	NA	-	-	-	NA	-	-	-
31	T	653	1764	0.370	2.4	A	-	-	-	NA	-	-	-	NA	-	-	-
33	R	55	149	0.369	3.3	A	-	-	-	NA	-	-	-	NA	-	-	-
East: WB: W. 10th Avenue																	
22	L	44	146	0.301	9.0	A	-	-	-	NA	-	-	-	NA	-	-	-
21	T	180	596	0.302	3.4	A	-	-	-	NA	-	-	-	NA	-	-	-
23	R	299	-	-	NA	-	-	-	NA	-	-	-	-	NA	-	-	-
NorthEast: SB: Ci odfel ter Road																	
62	L	1244	1959	0.635	7.0	A	-	-	-	NA	-	-	-	NA	-	-	-
61	T	359	-	-	NA	-	-	-	NA	-	-	-	-	NA	-	-	-

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the HCM models are only applicable to single-lane roundabouts with circulating flows less than 1200 veh/h. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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Table R.6 - ROUNDABOUT ALTERNATIVE CAPACITY MODELS

Mov No.	Dem Flow (veh /h)	aaSIDRA		NAASRA 1986		Ger. Linear		Ger. GapAcc		
		Cap. (veh /h)	Deg. Satn x	Cap. (veh /h)	% Diff from aaSIDRA	Cap. (veh /h)	% Diff from aaSIDRA	Cap. (veh /h)	% Diff from aaSIDRA	
West: EB: W. 10th Avenue										
12 L	244	780	0.313	520	-33.3	407	-47.8	345	-55.8	
11 T	87	407	0.214	378	-7.1	296	-27.3	251	-38.3	
13 R	33	154	0.214	144	-6.5	112	-27.3	95	-38.3	
South: NB: Clodfel ter Road										
32 L	22	59	0.373	59	0.0	32	-45.8	42	-28.8	
31 T	653	1764	0.370	1762	-0.1	948	-46.3	1248	-29.3	
33 R	55	149	0.369	148	-0.7	80	-46.3	105	-29.5	
East: WB: W. 10th Avenue										
22 L	44	146	0.301	160	9.6	148	1.4	112	-23.3	
21 T	180	596	0.302	655	9.9	605	1.5	456	-23.5	
23 R	299	-	NA	-	NA	-	NA	-	NA	
NorthEast: SB: Clodfel ter Road										
62 L	1244	1959	0.635	2267	15.7	973	-50.3	1602	-18.2	
61 T	359	-	NA	-	NA	-	NA	-	NA	

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the NAASRA model is not applicable for circulating flows above 1800 veh/h in a single lane and the German models are not applicable for high values of circulating flow (actual values depend on number of lanes at roundabout) or for roundabout approaches with more than two entry lanes, or two entry lanes with a single circulating lane. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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Table S. 2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Demand		Opposing Movement		Movement Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
	Flow (veh/h)	HV (%)	Flow (veh/h)	HV (%)						
West: EB: W. 10th Avenue										
12 L	244	11.9	1288	4.9	1292	780	0.85	172	100	0.313
11 T	87	11.5	1288	4.9	1292	407	0.85	298	100	0.214
13 R	33	12.1	1288	4.9	1292	154	0.85	297	100	0.214
South: NB: Cl odfel ter Road										
32 L	22	4.5	685	8.4	708	59	0.85	128	100	0.373
31 T	653	5.1	685	8.4	708	1764	0.85	130	100	0.370
33 R	55	5.5	685	8.4	708	149	0.85	130	100	0.369
East: WB: W. 10th Avenue										
22 L	44	2.3	918	6.9	936	146	0.85	182	100	0.301
21 T	180	2.2	918	6.9	936	596	0.85	181	100	0.302
23 R	299	2.0	897	6.9	915	754	0.85	114	100	0.397
NorthEast: SB: Cl odfel ter Road										
62 L	1244	5.0	245	2.3	245	1959	0.85	34	100	0.635*
61 T	359	5.0	245	2.3	245	565	0.98	54	100	0.635*

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Table S. 3 - INTERSECTION PARAMETERS

Intersection Level of Service	=	A
Worst movement Level of Service	=	E
Average intersection delay (s)	=	5.0
Largest average movement delay (s)	=	9.0
Largest back of queue, 95% (ft)	=	175
Performance Index	=	71.47
Degree of saturation (highest)	=	0.635
Practical Spare Capacity (lowest)	=	34 %
Effective intersection capacity, (veh/h)	=	5068
Total vehicle flow (veh/h)	=	3220
Total person flow (pers/h)	=	4830
Total vehicle delay (veh-h/h)	=	4.45
Total person delay (pers-h/h)	=	6.68
Total effective vehicle stops (veh/h)	=	1729
Total effective person stops (pers/h)	=	2594
Total vehicle travel (veh-mi/h)	=	1247.9
Total cost (\$/h)	=	1407.49
Total fuel (gal/h)	=	45.1
Total CO2 (kg/h)	=	427.53

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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue (ft)	Perf. Index	Aver. Speed (mph)
West: EB: W. 10th Avenue									
12 L	0.59	0.88	8.7	0.74	0.86	2.0	55	6.30	21.7
11 T	0.12	0.18	5.0	0.71	0.71	1.2	33	2.03	22.9
13 R	0.06	0.09	6.2	0.71	0.76	1.2	33	0.79	22.4
South: NB: Cl odfel ter Road									
32 L	0.05	0.08	8.3	0.63	0.78	2.3	60	0.56	21.8
31 T	0.43	0.64	2.4	0.62	0.35	2.4	63	12.73	23.2
33 R	0.05	0.08	3.3	0.61	0.46	2.4	63	1.11	22.9
East: WB: W. 10th Avenue									
22 L	0.11	0.17	9.0	0.69	0.84	1.9	48	1.16	21.7
21 T	0.17	0.26	3.4	0.69	0.51	1.9	48	3.84	23.0
23 R	0.44	0.66	5.3	0.72	0.75	2.7	69	7.00	22.6
NorthEast: SB: Cl odfel ter Road									
62 L	2.41	3.62	7.0	0.63	0.65	6.8	175	30.61	21.8
61 T	0.02	0.04	0.2		0.00	35.7#		5.34	24.9

Largest density (passenger cars per km or mile) for any lane

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 Roundabout

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (ft)	Perf. Index	Aver. Speed (mph)
West: EB: W. 10th Avenue									
364	0.313	0.77	1.15	7.6	0.73	0.82	55	9.13	22.0
South: NB: Cl odfel ter Road									
730	0.373	0.53	0.80	2.6	0.62	0.37	63	14.41	23.1
East: WB: W. 10th Avenue									
523	0.397	0.72	1.08	4.9	0.71	0.67	69	11.99	22.7
NorthEast: SB: Cl odfel ter Road									
1603	0.635	2.44	3.66	5.5	0.49	0.50	576	35.95	22.4
ALL VEHICLES:									
3220	0.635	4.45	6.68	5.0	0.58	0.54	175	71.47	22.6
INTERSECTION (persons):									
4830	0.635		6.68	5.0	0.58	0.54		71.47	22.6

Queue values in this table are 95% back of queue (feet).

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Roundabout

Table S. 7 - LANE PERFORMANCE

Lane No.	Mov No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Del ay (sec)	Eff. Stop Rate	Q u e u e 95% Back (vehs)	Q u e u e (ft)	Short Lane (ft)
West: EB: W. 10th Avenue									
1 L	12	244	780	0.313	8.7	0.86	2.0	55	
2 TR	11, 13	120	561	0.214	5.3	0.72	1.2	33	
South: NB: Clodfel ter Road									
1 LT	32, 31	331	894	0.370	3.0	0.42	2.3	60	
2 TR	31, 33	399	1078	0.370	2.3	0.33	2.4	63	
East: WB: W. 10th Avenue									
1 LT	22, 21	224	742	0.302	4.5	0.57	1.9	48	
2 R	23	299	754	0.396	5.3	0.75	2.7	69	
NorthEast: SB: Clodfel ter Road									
1 L	62	750	1180	0.635	7.2	0.66	6.8	175	
2 LT	62, 61	853	1344	0.635	3.3	0.00	35.7#		

Densi ty (passenger cars per km or mile)

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Table S. 8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h)				Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
		Lef	Thru	Rig	Tot				
West: EB: W. 10th Avenue									
1 L	12	244	0	0	244	150	780	0.313	100
2 TR	11, 13	0	87	33	120	120	561	0.214	100
South: NB: Clodfel ter Road									
1 LT	32, 31	22	309	0	331	150	894	0.370	100
2 TR	31, 33	0	344	55	399	150	1078	0.370	100
East: WB: W. 10th Avenue									
1 LT	22, 21	44	180	0	224	150	742	0.302	100
2 R	23	0	0	299	299	150	754	0.396	100

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NorthEast: SB: Cio dfe lter Road									
1 L	62	750	0	0	750	150	1180	0.635	100
2 LT	62,	494	359	0	853	150	1344	0.635	100
	61								

For roundabouts, the capacity value for continuous movements is obtained as the basic saturation flow without any adjustments. Saturation flow scale applies if specified.

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Table S. 12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total gal/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: EB: W. 10th Avenue						
12 L	4.0	114.96	0.053	1.49	0.049	38.5
11 T	1.3	36.33	0.017	0.47	0.016	12.5
13 R	0.5	14.05	0.007	0.18	0.006	4.8
	5.9	165.34	0.077	2.14	0.071	55.8
South: NB: Cio dfe lter Road						
32 L	0.3	10.54	0.005	0.12	0.004	3.1
31 T	8.6	265.61	0.121	2.97	0.104	81.6
33 R	0.7	22.74	0.010	0.26	0.009	7.0
	9.7	298.90	0.136	3.35	0.117	91.7
East: WB: W. 10th Avenue						
22 L	0.6	21.12	0.009	0.23	0.008	6.0
21 T	2.3	73.96	0.033	0.81	0.028	21.6
23 R	3.8	124.77	0.056	1.39	0.048	36.3
	6.7	219.85	0.099	2.43	0.084	63.9
NorthEast: SB: Cio dfe lter Road						
62 L	18.5	587.80	0.263	6.60	0.225	175.6
61 T	4.3	135.60	0.056	0.98	0.042	40.4
	22.8	723.39	0.319	7.58	0.267	216.1
INTERSECTION:	45.1	1407.49	0.631	15.50	0.539	427.5

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel (\$/US gal)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	27.00
Time value factor	=	0.60

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Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 lb)	=	1.4
Heavy vehicle mass (1000 lb)	=	11.0
Light vehicle idle fuel rate (US gal/h)	=	0.360
Heavy vehicle idle fuel rate (US gal/h)	=	0.530

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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 Roundabout

Table S. 14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (ft)	Shrt Lane (ft)
	L	T	R	Tot							
West: EB: W. 10th Avenue											
1 L	244			244	12			0.313	8.7	55	
2 TR		87	33	120	12			0.214	5.3	33	
	244	87	33	364	12			0.313	7.6	55	
South: NB: Cl odfel ter Road											
1 LT	22	309		331	5			0.370	3.0	60	
2 TR		344	55	399	5			0.370	2.3	63	
	22	653	55	730	5			0.370	2.6	63	
East: WB: W. 10th Avenue											
1 LT	44	180		224	2			0.302	4.5	48	
2 R			299	299	2			0.396	5.3	69	
	44	180	299	523	2			0.396	4.9	69	
NorthEast: SB: Cl odfel ter Road											
1 L	750			750	5			0.635	7.2	175	
2 LT	494	359		853	5	1900		0.635	3.3		
	1244	359	0	1603	5			0.635	5.1	175	
=====											
ALL VEHI CLES				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				3220	5			0.635	5.0	175	
=====											

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

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Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(ft)
West: EB: W. 10th Avenue								
12	L	244	780	0.313	8.7	A	2.0	55
11	T	87	407	0.214	5.0	A	1.2	33
13	R	33	154	0.214	6.2	A	1.2	33
		364		0.313	7.6	A	2.0	55
South: NB: Cl odfel ter Road								
32	L	22	59	0.373	8.3	A	2.3	60
31	T	653	1764	0.370	2.4	A	2.4	63
33	R	55	149	0.369	3.3	A	2.4	63
		730		0.373	2.6	A	2.4	63
East: WB: W. 10th Avenue								
22	L	44	146	0.301	9.0	A	1.9	48
21	T	180	596	0.302	3.4	A	1.9	48
23	R	299	754	0.397	5.3	A	2.7	69
		523		0.397	4.9	A	2.7	69
NorthEast: SB: Cl odfel ter Road								
62	L	1244	1959	0.635*	7.0	A	6.8	175
61	T (Con)	359	565	0.635*	0.2	E#	35.7#	
		1603		0.635	5.5	A	6.8	175
ALL VEHICLES:		3220		0.635	5.0	A	6.8	175

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.

Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.

* Maximum v/c ratio, or critical green periods

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 Roundabout

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (ft)	Negn Speed (mph)	Negn Di st. (ft)	Appr. Di st. (ft)	Downstream Di stance (ft)
West: EB: W. 10th Avenue						
	South	133.3	21.3	67.7	1800	168
	East	219.5	25.0	166.5	1800	169
	NorthEast	69.5	16.7	218.3	1800	315

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South: NB: Ci odfel ter Road						
	West	69.5	16.7	272.9	1800	368
	East	133.3	21.3	67.7	1800	165
	NorthEast	219.5	25.0	124.9	1800	157

East: WB: W. 10th Avenue						
	West	219.5	25.0	166.5	1800	167
	South	69.5	16.7	272.9	1800	368
	NorthEast	127.9	21.0	34.2	1800	164

NorthEast: SB: Ci odfel ter Road						
	West	219.5	25.0	124.9	1800	156
	South	69.5	16.7	218.3	1800	345
	East	69.5	16.7	327.5	1800	345

Maximum Negoti ati on (Desi gn) Speed = 50.0 mph
 Downstream Di stance cal cul ated by aaSI DRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negoti ati on di stance). Accelerati on di stance is weighted for light and heavy vehi cles. The same di stance applies for both stopped and unstopped vehi cles.

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Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Del ay (seconds/veh)									
			Stop-l ine		Del ay	Acc. Dec. dn	Queui ng Total dq	MvUp dqm	Stopd (I dle) di	Geom dig	Control dic	
			1st d1	2nd d2	Total dSL							

West: EB: W. 10th Avenue												
1	L	12	0.313	3.8	0.0	3.8	3.7	0.0	0.0	0.0	4.9	8.7
2	TR	11, 13	0.214	5.0	0.0	5.0	4.7	0.3	0.0	0.3	0.0	5.3
											1.3	

South: NB: Ci odfel ter Road												
1	LT	32, 31	0.370	2.6	0.0	2.7	4.2	0.0	0.0	0.0	5.6	3.0
											0.0	
2	TR	31, 33	0.370	2.1	0.0	2.1	4.1	0.0	0.0	0.0	0.0	2.3
											1.2	

East: WB: W. 10th Avenue												
1	LT	22, 21	0.302	3.4	0.0	3.4	4.4	0.0	0.0	0.0	5.6	4.5
											0.0	
2	R	23	0.396	3.6	0.3	3.9	4.3	0.0	0.0	0.0	1.3	5.3

NorthEast: SB: Ci odfel ter Road												
1	L	62	0.635	1.7	0.2	1.9	3.2	0.0	0.0	0.0	5.3	7.2
2	LT	62, 61	0.635	0.2	0.0	0.2	0.0	0.0	0.0	0.0	5.3	3.3
											0.0	

dn is average stop-start delay for all vehi cles queued and unqueued

Geometric delay is less than 2 seconds for some movements. The negoti ati on speed may be too high or the approach and exit speeds may be too low for

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given geometric design (e.g. for a large roundabout). Check Tables D.0, D.1 and D.4 for geometric delay data including negotiation speeds. If necessary, specify appropriate values of approach and exit speeds (RIDES Approach Data screen), and negotiation radius or negotiation speed data (RIDES Extra Data - Geometric Delay data screen).

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Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop		Geom. Overall	Rate	Prop. Queued	Queue Move-up Rate
		he1	he2	hi g	h	pq	hqm
West: EB: W. 10th Avenue							
1 L	0.313	0.74	0.00	0.13	0.86	0.737	0.00
2 TR	0.214	0.71	0.00	0.01	0.72	0.711	0.00
South: NB: Clodfel ter Road							
1 LT	0.370	0.41	0.00	0.01	0.42	0.629	0.00
2 TR	0.370	0.32	0.00	0.01	0.33	0.614	0.00
East: WB: W. 10th Avenue							
1 LT	0.302	0.54	0.00	0.03	0.57	0.692	0.00
2 R	0.396	0.67	0.03	0.05	0.75	0.721	0.06
NorthEast: SB: Clodfel ter Road							
1 L	0.635	0.47	0.01	0.18	0.66	0.639	0.01
2 LT	0.635	0.25	0.00	0.11	0.36	0.000	0.00

hi g is the average value for all movements in a shared lane
 hqm is average queue move-up rate for all vehicles queued and unqueued

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Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh)			Percentile (veh)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: W. 10th Avenue											
1 L	0.313	0.0	0.6	0.0	0.6	1.2	1.4	1.6	2.0	2.3	0.03
2 TR	0.214	0.0	0.4	0.0	0.4	0.7	0.9	1.0	1.2	1.4	0.02
South: NB: Clodfel ter Road											
1 LT	0.370	0.0	0.7	0.0	0.7	1.4	1.6	1.9	2.3	2.7	0.03
2 TR	0.370	0.0	0.8	0.0	0.8	1.4	1.7	2.0	2.4	2.8	0.03
East: WB: W. 10th Avenue											
1 LT	0.302	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.9	2.2	0.03

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2 R	0.396	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.2	0.04

NorthEast: SB: Clodfel ter Road											
1 L	0.635	0.0	2.1	0.1	2.2	3.9	4.7	5.4	6.8	7.9	0.10
2 LT	0.635	0.0	22.2	0.0	22.2	22.2	22.2	22.2	22.2	22.2	0.13

Values printed in this table are back of queue (vehicles).

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Table D.3B - LANE QUEUES (feet)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (feet)			Percentile (feet)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	

West: EB: W. 10th Avenue											
1 L	0.313	0	17	0	17	32	39	44	55	64	0.03
2 TR	0.214	0	10	0	10	19	23	26	33	38	0.02

South: NB: Clodfel ter Road											
1 LT	0.370	0	19	0	19	35	43	49	60	70	0.03
2 TR	0.370	0	20	0	20	37	45	51	63	73	0.03

East: WB: W. 10th Avenue											
1 LT	0.302	0	15	0	15	28	34	39	48	56	0.03
2 R	0.396	1	21	1	22	40	49	56	69	80	0.04

NorthEast: SB: Clodfel ter Road											
1 L	0.635	1	56	2	58	100	123	141	175	204	0.10
2 LT	0.635	0	576	0	576	576	576	576	576	576	0.13

Values printed in this table are back of queue (feet).

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Table D.4 - MOVEMENT SPEEDS (mph)

Mov No.	App. Speeds		Exi t Speeds		Queue Move-up		Av. Secti on Spd	
	Crui se	Negn	Negn	Crui se	1st Grn	2nd Grn	Runni ng	Overal l

West: EB: W. 10th Avenue								
12	25.0	16.7	16.7	25.0			21.8	21.7
11	25.0	25.0	25.0	25.0			23.0	22.9
13	25.0	21.3	21.3	25.0			22.7	22.4

South: NB: Clodfel ter Road								
32	25.0	16.7	16.7	25.0	12.3		21.8	21.8
31	25.0	25.0	25.0	25.0	12.6		23.2	23.2

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33	25.0	21.3	21.3	25.0		22.9	22.9

East: WB: W. 10th Avenue							
22	25.0	16.7	16.7	25.0		21.7	21.7
21	25.0	25.0	25.0	25.0		23.0	23.0
23	25.0	21.0	21.0	25.0	11.3	22.6	22.6

NorthEast: SB: Clodfel ter Road							
62	25.0	16.7	16.7	25.0	19.0	21.8	21.8
61	25.0	25.0	25.0	25.0		24.9	24.9

"Running Speed" is the average speed excluding stopped periods.

--- End of aaSIDRA Output ---

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Documents\aaTraffi c\Steptoe\2028_PM_Clodfel ter-W10th. OUT
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41	0	0	1181	24	0	0	1.00	0.95	
43	0	0	0	0	217	4	1.00	0.95	

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

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Table R.0 - ROUNDABOUT BASIC PARAMETERS

Cent Island Diam (ft)	Circ Width (ft)	Insc Diam. (ft)	No. of Circ. Lanes	No. of Entry Lanes	Av. Ent Lane Width (ft)	Circulating/Exiting Stream						
						Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor	
West: EB: Center Parkway												
115	30	175	2	2	13.00	1390	2.0	1390	0	N	0.681	
South: NB: Steptoe Street Ext.												
115	30	175	1	2	13.00	319	2.0	319	0	N	0.955	
East: WB: Center Parkway												
115	30	175	2	1	13.00	1310	2.0	1310	0	N	0.791	
North: SB: Steptoe Street Ext.												
115	30	175	1	2	13.00	533	2.0	533	0	N	0.944	

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Table R.1 - ROUNDABOUT GAP ACCEPTANCE PARAMETERS

Turn	Lane No.	Lane Type	Circulating/Exiting Stream						Critical Gap		Follow-up Headway (s)
			Flow Rate (pcu/h)	Aver Speed (mph)	Aver Dist (ft)	In-Bch Headway (s)	Prop Bunched	Hdwy (s)	Dist (ft)		
West: EB: Center Parkway											
Left	1	Subdominant	1390	23.9	90.7	1.07	0.609	3.00	105.3	2.21	
Thru	1	Subdominant	1390	23.9	90.7	1.07	0.609	3.01	105.3	2.21	
Right	2	Dominant	1390	23.9	90.7	1.07	0.609	2.46	86.2	1.81	
South: NB: Steptoe Street Ext.											
Left	1	Subdominant	319	18.0	298.7	2.00	0.322	4.20	111.1	2.25	
Thru	1	Subdominant	319	18.0	298.7	2.00	0.322	4.20	111.1	2.25	
	2	Dominant	319	18.0	298.7	2.00	0.322	3.47	91.8	1.86	
Right	2	Dominant	319	18.0	298.7	2.00	0.322	3.47	91.8	1.86	
East: WB: Center Parkway											
Left	1	Dominant	1310	21.9	88.2	1.15	0.612	3.02	97.1	2.21	
Thru	1	Dominant	1310	21.9	88.2	1.15	0.612	3.02	97.1	2.21	
Right	1	Dominant	1310	21.9	88.2	1.15	0.612	3.02	97.1	2.21	

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North: SB: Steptoe Street Ext.

Left	1	Subdominant	533	18.6	184.6	2.00	0.480	3.97	108.3	2.20
Thru	1	Subdominant	533	18.6	184.6	2.00	0.480	3.97	108.3	2.20
	2	Dominant	533	18.6	184.6	2.00	0.480	3.21	87.6	1.78
Right	2	Dominant	533	18.6	184.6	2.00	0.480	3.21	87.6	1.78

Environment Factor: 1.00
 Entry/Circulating Flow Adjustment: Medium

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

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Table R.5 - ROUNDABOUT CAPACITY & LEVEL OF SERVICE - aaSIDRA & HCM MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA				HCM 2000 Lower				HCM 2000 Upper				
		Cap. (veh/h)	Deg. Satn x	Av. Delay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Delay (sec)	LOS	Cap. (veh/h)	Deg. Satn x	Av. Delay (sec)	LOS	
West: EB: Center Parkway														
12	L	173	387	0.447	11.3	B	-	-	-	NA	-	-	-	-
11	T	53	119	0.445	9.4	A	-	-	-	NA	-	-	-	-
13	R	253	683	0.370	8.7	A	-	-	-	NA	-	-	-	-
South: NB: Steptoe Street Ext.														
32	L	315	655	0.481	7.6	A	444	0.709	10.8	B	540	0.583	8.3	A
31	T	821	1708	0.481	5.4	A	1157	0.710	9.0	A	1408	0.583	6.5	A
33	R	121	252	0.480	6.5	A	171	0.708	10.1	B	207	0.585	7.7	A
East: WB: Center Parkway														
22	LTR	295	603	0.489	8.1	A	-	-	-	NA	-	-	-	-
North: SB: Steptoe Street Ext.														
42	L	93	139	0.669	12.2	B	90	1.033	51.7	D	111	0.838	18.3	B
41	T	1205	1803	0.668	9.5	A	1163	1.036	49.9	D	1442	0.836	16.4	B
43	R	221	331	0.668	9.8	A	213	1.038	51.0	D	265	0.834	17.6	B

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the HCM models are only applicable to single-lane roundabouts with circulating flows less than 1200 veh/h. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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Table R.6 - ROUNDABOUT ALTERNATIVE CAPACITY MODELS

Mov No.	Dem Flow (veh/h)	aaSIDRA		NAASRA 1986		Ger. Linear		Ger. GapAcc	
		Cap. (veh/h)	Deg. Satn x	Cap. (veh/h)	% Diff from aaSIDRA	Cap. (veh/h)	% Diff from aaSIDRA	Cap. (veh/h)	% Diff from aaSIDRA
West: EB: Center Parkway									
12 L	173	387	0.447	422	9.0	461	19.1	730	88.6
11 T	53	119	0.445	129	8.4	141	18.5	224	88.2
13 R	253	683	0.370	551	-19.3	603	-11.7	953	39.5
South: NB: Steptoe Street Ext.									
32 L	315	655	0.481	678	3.5	-	NA	-	NA
31 T	821	1708	0.481	1768	3.5	-	NA	-	NA
33 R	121	252	0.480	261	3.6	-	NA	-	NA
East: WB: Center Parkway									
22 LTR	295	603	0.489	591	-2.0	1014	68.2	881	46.1
North: SB: Steptoe Street Ext.									
42 L	93	139	0.669	133	-4.3	-	NA	-	NA
41 T	1205	1803	0.668	1727	-4.2	-	NA	-	NA
43 R	221	331	0.668	317	-4.2	-	NA	-	NA

NA Values for this roundabout capacity model have not been calculated because the model was not applicable for the given roundabout conditions. Note that the NAASRA model is not applicable for circulating flows above 1800 veh/h in a single lane and the German models are not applicable for high values of circulating flow (actual values depend on number of lanes at roundabout) or for roundabout approaches with more than two entry lanes, or two entry lanes with a single circulating lane. Also note that results are not calculated for any of the models for slip lane or continuous movements. See the aaSIDRA Traffic Model Reference Guide for roundabout limits.

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Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Demand Flow (veh/h)	Opposing Movement				Total Cap. (veh/h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
		HV (%)	Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)					
West: EB: Center Parkway										
12 L	173	1.7	1390	2.0	1390	387	0.85	90	100	0.447
11 T	53	1.9	1390	2.0	1390	119	0.85	91	100	0.445
13 R	253	2.0	1390	2.0	1390	683	0.85	129	100	0.370

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South: NB: Steptoe Street Ext.										
32 L	315	1.9	319	2.0	319	655	0.85	77	100	0.481
31 T	821	1.9	319	2.0	319	1708	0.85	77	100	0.481
33 R	121	1.7	319	2.0	319	252	0.85	77	100	0.480

East: WB: Center Parkway										
22 LTR	295	2.0	1310	2.0	1310	603	0.85	74	100	0.489

North: SB: Steptoe Street Ext.										
42 L	93	2.2	533	2.0	533	139	0.85	27	100	0.669*
41 T	1205	2.0	533	2.0	533	1803	0.85	27	100	0.668
43 R	221	1.8	533	2.0	533	331	0.85	27	100	0.668

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Table S.3 - INTERSECTION PARAMETERS

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s)	=	8.3
Largest average movement delay (s)	=	12.2
Largest back of queue, 95% (ft)	=	244
Performance Index	=	74.88
Degree of saturation (highest)	=	0.669
Practical Spare Capacity (lowest)	=	27 %
Effective intersection capacity, (veh/h)	=	5306
Total vehicle flow (veh/h)	=	3550
Total person flow (pers/h)	=	5325
Total vehicle delay (veh-h/h)	=	8.16
Total person delay (pers-h/h)	=	12.24
Total effective vehicle stops (veh/h)	=	2747
Total effective person stops (pers/h)	=	4121
Total vehicle travel (veh-mi/h)	=	1347.4
Total cost (\$/h)	=	1236.86
Total fuel (gal/h)	=	44.7
Total CO2 (kg/h)	=	423.47

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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue (ft)	Perf. Index	Aver. Speed (mph)
West: EB: Center Parkway									
12 L	0.54	0.81	11.3	0.84	0.98	3.2	80	5.11	21.0
11 T	0.14	0.21	9.4	0.84	0.94	3.2	80	1.15	31.0
13 R	0.61	0.92	8.7	0.84	0.80	2.8	70	4.98	30.6

South: NB: Steptoe Street Ext.									
32 L	0.66	1.00	7.6	0.65	0.67	4.6	118	7.87	21.7

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31 T	1.23	1.85	5.4	0.63	0.51	4.9	125	13.21	32.1
33 R	0.22	0.33	6.5	0.62	0.58	4.9	125	2.01	31.6

East: WB: Center Parkway									
22 LTR	0.67	1.00	8.1	0.82	0.94	3.6	92	7.90	21.8

North: SB: Steptoe Street Ext.									
42 L	0.32	0.47	12.2	0.88	1.00	9.1	232	2.79	20.7
41 T	3.17	4.75	9.5	0.86	0.88	9.6	244	25.33	30.7
43 R	0.60	0.90	9.8	0.85	0.85	9.6	244	4.53	30.6

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Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (ft)	Perf. Index	Aver. Speed (mph)

West: EB: Center Parkway									
479	0.447	1.29	1.94	9.7	0.84	0.88	80	11.23	26.1

South: NB: Steptoe Street Ext.									
1257	0.481	2.12	3.17	6.1	0.63	0.56	125	23.09	28.4

East: WB: Center Parkway									
295	0.489	0.67	1.00	8.1	0.82	0.94	92	7.90	21.8

North: SB: Steptoe Street Ext.									
1519	0.669	4.08	6.13	9.7	0.86	0.88	244	32.66	29.7

ALL VEHICLES:									
3550	0.669	8.16	12.24	8.3	0.77	0.77	244	74.88	27.9

INTERSECTION (persons):									
5325	0.669		12.24	8.3	0.77	0.77		74.88	27.9

Queue values in this table are 95% back of queue (feet).

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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Dem Flow (veh/h)	Cap (veh/h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue (ft)	Short Lane (ft)

West: EB: Center Parkway									
1 LT	12	226	506	0.446	10.8	0.97	3.2	80	
	11								
2 R	13	253	683	0.371	8.7	0.80	2.8	70	

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South: NB: Steptoe Street Ext.									
1	LT	32,	556	1157	0.481	6.8	0.62	4.6	118
		31							
2	TR	31,	701	1457	0.481	5.5	0.51	4.9	125
		33							

East: WB: Center Parkway									
1	LTR	22	295	603	0.489	8.1	0.94	3.6	92

North: SB: Steptoe Street Ext.									
1	LT	42,	656	981	0.669	10.7	0.94	9.1	232
		41							
2	TR	41,	863	1291	0.669	8.9	0.84	9.6	244
		43							

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Table S. 8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h)				Min Cap (veh/h)	Tot Cap (veh/h)	Deg. Satn x	Lane Util %	
		Lef	Thru	Rig	Tot					
West: EB: Center Parkway										
1	LT	12,	173	53	0	226	150	506	0.446	100
		11								
2	R	13	0	0	253	253	150	683	0.371	100

South: NB: Steptoe Street Ext.										
1	LT	32,	315	241	0	556	150	1157	0.481	100
		31								
2	TR	31,	0	580	121	701	150	1457	0.481	100
		33								

East: WB: Center Parkway										
1	LTR	22	93	125	77	295	150	603	0.489	100

North: SB: Steptoe Street Ext.										
1	LT	42,	93	563	0	656	150	981	0.669	100
		41								
2	TR	41,	0	642	221	863	150	1291	0.669	100
		43								

For roundabouts, the capacity value for continuous movements is obtained as the basic saturation flow without any adjustments. Saturation flow scale applies if specified.

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Table S. 12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total gal/h	Cost Total \$/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: EB: Center Parkway						
12 L	2.5	85.73	0.038	0.93	0.031	24.0
11 T	0.6	16.35	0.009	0.21	0.011	6.1
13 R	3.1	78.92	0.044	1.01	0.052	29.3
	6.3	181.00	0.091	2.15	0.094	59.4
South: NB: Steptoe Street Ext.						
32 L	4.5	150.75	0.067	1.60	0.055	42.7
31 T	9.6	244.70	0.134	2.85	0.157	91.4
33 R	1.4	36.59	0.020	0.43	0.024	13.6
	15.6	432.04	0.220	4.89	0.235	147.6
East: WB: Center Parkway						
22 LTR	4.0	131.94	0.060	1.48	0.050	37.9
	4.0	131.94	0.060	1.48	0.050	37.9
North: SB: Steptoe Street Ext.						
42 L	1.4	46.80	0.021	0.52	0.017	13.1
41 T	14.8	376.03	0.210	4.98	0.246	139.8
43 R	2.7	69.05	0.038	0.89	0.045	25.6
	18.8	491.88	0.269	6.38	0.309	178.5
INTERSECTION:	44.7	1236.86	0.640	14.90	0.688	423.5

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel (\$/US gal)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 lb)	=	1.4
Heavy vehicle mass (1000 lb)	=	11.0
Light vehicle idle fuel rate (US gal/h)	=	0.360
Heavy vehicle idle fuel rate (US gal/h)	=	0.530

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Table S. 14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane	Demand Flow (veh/h)	Adj. Eff Grn	Deg	Aver. Longest Shrt
------	---------------------	--------------	-----	--------------------

No.	2028_PM_Center-Steptoe. OUT				%HV	Basic Satf.	(secs)		Sat x	Del ay (sec)	Queue (ft)	Lane (ft)
	L	T	R	Tot			1st	2nd				
West: EB: Center Parkway												
1 LT	173	53		226	2			0.446	10.8	80		
2 R			253	253	2			0.371	8.7	70		
	173	53	253	479	2			0.446	9.7	80		
South: NB: Steptoe Street Ext.												
1 LT	315	241		556	2			0.481	6.8	118		
2 TR		580	121	701	2			0.481	5.5	125		
	315	821	121	1257	2			0.481	6.1	125		
East: WB: Center Parkway												
1 LTR	93	125	77	295	2			0.489	8.1	92		
	93	125	77	295	2			0.489	8.1	92		
North: SB: Steptoe Street Ext.												
1 LT	93	563		656	2			0.669	10.7	232		
2 TR		642	221	863	2			0.669	8.9	244		
	93	1205	221	1519	2			0.669	9.7	244		
ALL VEHICLES				Total Flow	% HV			Max X	Aver. Del ay	Max Queue		
				3550	2			0.669	8.3	244		

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

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Table S. 15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Total Flow (veh/h)	Total Cap. (veh/h)	Deg. of Satn (v/c)	Aver. Del ay (sec)	LOS	Longest Queue 95% Back (vehs)	Queue (ft)
West: EB: Center Parkway								
12	L	173	387	0.447	11.3	B	3.2	80
11	T	53	119	0.445	9.4	A	3.2	80
13	R	253	683	0.370	8.7	A	2.8	70
		479		0.447	9.7	A	3.2	80
South: NB: Steptoe Street Ext.								
32	L	315	655	0.481	7.6	A	4.6	118
31	T	821	1708	0.481	5.4	A	4.9	125
33	R	121	252	0.480	6.5	A	4.9	125

		2028_PM_Center-Steptoe. OUT					
1257			0.481	6.1	A	4.9	125

East: WB: Center Parkway							
22 LTR	295	603	0.489	8.1	A	3.6	92

295			0.489	8.1	A	3.6	92

North: SB: Steptoe Street Ext.							
42 L	93	139	0.669*	12.2	B	9.1	232
41 T	1205	1803	0.668	9.5	A	9.6	244
43 R	221	331	0.668	9.8	A	9.6	244

1519			0.669	9.7	A	9.6	244

ALL VEHICLES:	3550		0.669	8.3	A	9.6	244

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.

For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

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Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (ft)	Negn Speed (mph)	Negn Di st. (ft)	Appr. Di st. (ft)	Downstream Di stance (ft)

West: EB: Center Parkway						
	South	133.3	21.3	67.7	1800	164
	East	219.5	25.0	166.5	1800	167
	North	69.5	16.7	272.9	1800	368

South: NB: Steptoe Street Ext.						
	West	69.5	16.7	272.9	1800	368
	East	133.3	21.3	67.7	1800	164
	North	219.5	25.0	166.5	1800	167

East: WB: Center Parkway						
	West	219.5	25.0	166.5	1800	167
	South	69.5	16.7	272.9	1800	368
	North	146.3	22.1	67.6	1800	163

North: SB: Steptoe Street Ext.						
	West	133.3	21.3	67.7	1800	164
	South	219.5	25.0	166.5	1800	167
	East	69.5	16.7	272.9	1800	368

Maximum Negotiation (Design) Speed = 50.0 mph
 Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-Line		Total Delay dSL	Delay (seconds/veh)				Geom dig	Control dic	
			1st d1	2nd d2		Acc. Dec. dn	Queueing Total dq	MVUp dqm	Stopd (Idle) di			
West: EB: Center Parkway												
1	LT	12, 0.446	4.6	1.1	5.7	4.6	1.1	0.5	0.6	5.6	10.8	
		11								3.8		
2	R	13, 0.371	3.4	0.3	3.7	5.1	0.0	0.0	0.0	5.0	8.7	
South: NB: Steptoe Street Ext.												
1	LT	32, 0.481	2.0	0.0	2.0	3.8	0.0	0.0	0.0	5.6	6.8	
		31								3.8		
2	TR	31, 0.481	1.5	0.0	1.5	4.1	0.0	0.0	0.0	3.8	5.5	
		33								5.0		
East: WB: Center Parkway												
1	LTR	22, 0.489	4.7	1.4	6.1	5.0	1.1	0.6	0.5	2.0	8.1	
North: SB: Steptoe Street Ext.												
1	LT	42, 0.669	4.2	2.5	6.6	5.7	0.9	0.8	0.1	5.6	10.7	
		41								3.8		
2	TR	41, 0.669	3.2	1.6	4.8	5.6	0.0	0.0	0.0	3.8	8.9	
		43								5.0		

dn is average stop-start delay for all vehicles queued and unqueued

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Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective		Stop Geom. High	Rate Overall h	Prop. Queued pq	Queue Move-up Rate hqm
		he1	he2				
West: EB: Center Parkway							
1	LT	0.446	0.84	0.05	0.08	0.97	0.842
2	R	0.371	0.72	0.01	0.07	0.80	0.841
South: NB: Steptoe Street Ext.							
1	LT	0.481	0.46	0.00	0.16	0.62	0.650
2	TR	0.481	0.37	0.00	0.14	0.51	0.619
East: WB: Center Parkway							
1	LTR	0.489	0.82	0.08	0.04	0.94	0.818
North: SB: Steptoe Street Ext.							

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1 LT	0.669	0.78	0.11	0.05	0.94	0.877	0.24
2 TR	0.669	0.70	0.08	0.06	0.84	0.852	0.17

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh)			Percentile (veh)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: Center Parkway											
1 LT	0.446	0.1	0.9	0.1	1.0	1.8	2.3	2.6	3.2	3.7	0.04
2 R	0.371	0.0	0.9	0.0	0.9	1.6	2.0	2.2	2.8	3.2	0.04
South: NB: Steptoe Street Ext.											
1 LT	0.481	0.0	1.5	0.0	1.5	2.7	3.3	3.7	4.6	5.4	0.07
2 TR	0.481	0.0	1.6	0.0	1.6	2.9	3.5	4.0	4.9	5.7	0.07
East: WB: Center Parkway											
1 LTR	0.489	0.1	1.0	0.1	1.2	2.1	2.6	2.9	3.6	4.2	0.05
North: SB: Steptoe Street Ext.											
1 LT	0.669	0.5	2.3	0.8	3.1	5.1	6.4	7.3	9.1	10.7	0.13
2 TR	0.669	0.4	2.5	0.7	3.2	5.4	6.7	7.7	9.6	11.2	0.14

Values printed in this table are back of queue (vehicles).

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Table D.3B - LANE QUEUES (feet)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (feet)			Percentile (feet)					Queue Stor. Ratio
			Nb1	Nb2	Nb	70%	85%	90%	95%	98%	
West: EB: Center Parkway											
1 LT	0.446	2	24	2	26	47	57	65	80	93	0.04
2 R	0.371	1	22	1	23	41	50	57	70	82	0.04
South: NB: Steptoe Street Ext.											
1 LT	0.481	0	38	0	38	68	84	95	118	137	0.07
2 TR	0.481	0	41	0	41	72	89	101	125	146	0.07
East: WB: Center Parkway											
1 LTR	0.489	4	26	3	30	53	65	74	92	107	0.05
North: SB: Steptoe Street Ext.											

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1	LT	0.669	13	59	19	78	131	162	185	232	271	0.13
2	TR	0.669	11	65	18	82	137	170	195	244	285	0.14

Values printed in this table are back of queue (feet).

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Table D.4 - MOVEMENT SPEEDS (mph)

Mov No.	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running	Overall
West: EB: Center Parkway								
12	25.0	16.7	16.7	25.0	10.1		21.2	21.0
11	40.0	25.0	25.0	25.0	10.1		31.0	31.0
13	40.0	21.3	21.3	25.0	10.9		30.6	30.6
South: NB: Steptoe Street Ext.								
32	25.0	16.7	16.7	25.0			21.7	21.7
31	40.0	25.0	25.0	25.0			32.1	32.1
33	40.0	21.3	21.3	25.0			31.6	31.6
East: WB: Center Parkway								
22	25.0	21.6	21.6	25.0	10.3		22.0	21.8
North: SB: Steptoe Street Ext.								
42	25.0	16.7	16.7	25.0	14.5		20.9	20.7
41	40.0	25.0	25.0	25.0	15.2		30.7	30.7
43	40.0	21.3	21.3	25.0	15.9		30.6	30.6

"Running Speed" is the average speed excluding stopped periods.

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