





















Lanes, Volumes, Timings
1: E Pleasant St & Triangle St

AM Peak

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	161	172	15	32	261	102	29	57	109	22	381	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	50		0	0		200	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		916			949			1047			1290	
Travel Time (s)		25.0			25.9			28.6			35.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	175	203	0	35	395	0	0	94	118	0	466	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.5	31.5		16.5	31.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	16.5	31.5		16.5	31.5		24.0	24.0	24.0	24.0	24.0	
Total Split (%)	18.3%	35.0%		18.3%	35.0%		26.7%	26.7%	26.7%	26.7%	26.7%	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5	6.5		6.5	
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Max		None	Max		None	None	None	None	None	
v/c Ratio	0.43	0.29		0.07	0.74			0.60	0.26		1.26	
Control Delay	23.3	24.4		14.3	37.1			51.6	3.2		168.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	23.3	24.4		14.3	37.1			51.6	3.2		168.7	
Queue Length 50th (ft)	57	91		11	195			50	0		~347	
Queue Length 95th (ft)	99	154		27	#333			#121	18		#538	
Internal Link Dist (ft)		836			869			967			1210	
Turn Bay Length (ft)	120			50					200			
Base Capacity (vph)	407	691		538	536			156	458		371	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.43	0.29		0.07	0.74			0.60	0.26		1.26	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	86.4
Natural Cycle:	90
Control Type:	Semi Act-Uncoord

Lanes, Volumes, Timings
 1: E Pleasant St & Triangle St

AM Peak

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	14.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	20%
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lanes, Volumes, Timings

1: E Pleasant St & Triangle St

AM Peak

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.




















Splits and Phases: 1: E Pleasant St & Triangle St

↑ ø2	↙ ø1	↘ ø4	🚶 ø9
31.5 s	16.5 s	24 s	18 s
↓ ø6	↑ ø5	↙ ø8	
31.5 s	16.5 s	24 s	

HCM Signalized Intersection Capacity Analysis

1: E Pleasant St & Triangle St

AM Peak





















												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	161	172	15	32	261	102	29	57	109	22	381	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5			6.5	6.5		6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Fr _t	1.00	0.99		1.00	0.96			1.00	0.85		0.99	
Fl _t Protected	0.95	1.00		0.95	1.00			0.98	1.00		1.00	
Satd. Flow (prot)	1770	1841		1770	1784			1832	1583		1843	
Fl _t Permitted	0.33	1.00		0.61	1.00			0.41	1.00		0.98	
Satd. Flow (perm)	621	1841		1136	1784			767	1583		1807	
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)	175	187	16	35	284	111	32	62	118	24	414	28
RTOR Reduction (vph)	0	3	0	0	16	0	0	0	95	0	2	0
Lane Group Flow (vph)	175	200	0	35	379	0	0	94	23	0	464	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	44.6	32.3		31.0	25.2			17.6	17.6		17.6	
Effective Green, g (s)	44.6	32.3		31.0	25.2			17.6	17.6		17.6	
Actuated g/C Ratio	0.50	0.36		0.34	0.28			0.20	0.20		0.20	
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5	6.5		6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	472	660		432	499			149	309		353	
v/s Ratio Prot	c0.05	0.11		0.01	c0.21							
v/s Ratio Perm	0.13			0.02				0.12	0.01		c0.26	
v/c Ratio	0.37	0.30		0.08	0.76			0.63	0.07		1.31	
Uniform Delay, d ₁	22.0	20.8		20.5	29.6			33.2	29.6		36.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d ₂	0.5	1.2		0.1	10.4			8.4	0.1		159.8	
Delay (s)	22.5	21.9		20.6	40.0			41.6	29.7		196.0	
Level of Service	C	C		C	D			D	C		F	
Approach Delay (s)		22.2			38.5			35.0			196.0	
Approach LOS		C			D			C			F	

Intersection Summary

HCM 2000 Control Delay	83.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	23.5
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
1: E Pleasant St & Triangle St

PM Peak

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	147	256	31	30	207	50	56	242	186	26	216	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	50		0	0		200	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		916			949			1049			1290	
Travel Time (s)		25.0			25.9			28.6			35.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	160	312	0	33	279	0	0	324	202	0	320	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	25.0		10.0	25.0		15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.5	31.5		16.5	31.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	16.5	31.5		16.5	31.5		24.0	24.0	24.0	24.0	24.0	
Total Split (%)	18.3%	35.0%		18.3%	35.0%		26.7%	26.7%	26.7%	26.7%	26.7%	
Yellow Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5	6.5		6.5	
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	None	Max		None	Max		None	None	None	None	None	
v/c Ratio	0.32	0.45		0.07	0.52			1.31	0.42		1.47	
Control Delay	18.2	26.7		14.6	29.8			199.3	7.7		263.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	18.2	26.7		14.6	29.8			199.3	7.7		263.6	
Queue Length 50th (ft)	52	150		10	128			~247	0		~255	
Queue Length 95th (ft)	91	237		26	208			#409	56		#420	
Internal Link Dist (ft)		836			869			969			1210	
Turn Bay Length (ft)	120			50					200			
Base Capacity (vph)	501	690		447	536			247	483		218	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.32	0.45		0.07	0.52			1.31	0.42		1.47	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 86.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord

Lanes, Volumes, Timings
 1: E Pleasant St & Triangle St

PM Peak

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	14.0
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	20%
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lanes, Volumes, Timings

1: E Pleasant St & Triangle St

PM Peak

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.




















Splits and Phases: 1: E Pleasant St & Triangle St

↑ ø2	↙ ø1	↘ ø4	🚶 ø9
31.5 s	16.5 s	24 s	18 s
↓ ø6	↑ ø5	↙ ø8	
31.5 s	16.5 s	24 s	

HCM Signalized Intersection Capacity Analysis

1: E Pleasant St & Triangle St

PM Peak

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	
Lane Configurations													
Volume (vph)	147	256	31	30	207	50	56	242	186	26	216	52	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.5	6.5		6.5	6.5			6.5	6.5		6.5		
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00		
Fr _t	1.00	0.98		1.00	0.97			1.00	0.85		0.98		
Fl _t Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00		
Satd. Flow (prot)	1770	1832		1770	1809			1845	1583		1810		
Fl _t Permitted	0.49	1.00		0.44	1.00			0.65	1.00		0.56		
Satd. Flow (perm)	910	1832		827	1809			1209	1583		1027		
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)	160	278	34	33	225	54	61	263	202	28	235	57	
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	162	0	9	0	
Lane Group Flow (vph)	160	308	0	33	270	0	0	324	40	0	311	0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA		
Protected Phases	5	2		1	6			4			8		
Permitted Phases	2			6			4		4	8			
Actuated Green, G (s)	44.6	32.3		31.0	25.2			17.6	17.6		17.6		
Effective Green, g (s)	44.6	32.3		31.0	25.2			17.6	17.6		17.6		
Actuated g/C Ratio	0.50	0.36		0.34	0.28			0.20	0.20		0.20		
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5	6.5		6.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	574	657		345	506			236	309		200		
v/s Ratio Prot	c0.04	c0.17		0.01	0.15								
v/s Ratio Perm	0.10			0.03				0.27	0.02		c0.30		
v/c Ratio	0.28	0.47		0.10	0.53			1.37	0.13		1.56		
Uniform Delay, d ₁	16.8	22.2		23.9	27.4			36.2	29.9		36.2		
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d ₂	0.3	2.4		0.1	4.0			192.3	0.2		273.2		
Delay (s)	17.0	24.6		24.0	31.4			228.5	30.1		309.4		
Level of Service	B	C		C	C			F	C		F		
Approach Delay (s)		22.1			30.6			152.3			309.4		
Approach LOS		C			C			F			F		
Intersection Summary													
HCM 2000 Control Delay			122.1									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	23.5
Intersection Capacity Utilization			82.1%									ICU Level of Service	E
Analysis Period (min)			15										
c	Critical Lane Group												

MOVEMENT SUMMARY

 Site: E Pleasant St at Triangle St

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: East Pleasant St											
3a	L1	175	2.0	0.396	8.2	LOS A	1.9	48.7	0.35	0.23	26.3
8	T1	187	2.0	0.396	8.2	LOS A	1.9	48.7	0.35	0.23	26.4
18b	R3	16	2.0	0.396	8.2	LOS A	1.9	48.7	0.35	0.23	25.7
Approach		378	2.0	0.396	8.2	LOS A	1.9	48.7	0.35	0.23	26.3
SouthEast: Triangle St											
3bx	L3	24	2.0	0.638	16.4	LOS C	4.3	110.0	0.71	0.78	29.3
8x	T1	414	2.0	0.638	16.4	LOS C	4.3	110.0	0.71	0.78	29.2
18ax	R1	28	2.0	0.638	16.4	LOS C	4.3	110.0	0.71	0.78	29.0
Approach		466	2.0	0.638	16.4	LOS C	4.3	110.0	0.71	0.78	29.2
North: East Pleasant St											
7a	L1	35	2.0	0.733	24.8	LOS C	5.2	132.6	0.82	0.96	26.0
4	T1	284	2.0	0.733	24.8	LOS C	5.2	132.6	0.82	0.96	26.3
14b	R3	111	2.0	0.733	24.8	LOS C	5.2	132.6	0.82	0.96	25.6
Approach		429	2.0	0.733	24.8	LOS C	5.2	132.6	0.82	0.96	26.1
NorthWest: Triangle St											
7bx	L3	32	2.0	0.275	7.8	LOS A	1.1	27.3	0.48	0.43	32.8
4x	T1	62	2.0	0.275	7.8	LOS A	1.1	27.3	0.48	0.43	32.6
14ax	R1	118	2.0	0.275	7.8	LOS A	1.1	27.3	0.48	0.43	32.4
Approach		212	2.0	0.275	7.8	LOS A	1.1	27.3	0.48	0.43	32.6
All Vehicles		1486	2.0	0.733	15.5	LOS C	5.2	132.6	0.62	0.64	27.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: E Pleasant St at Triangle St

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: East Pleasant St											
3a	L1	160	2.0	0.622	15.3	LOS C	4.2	105.8	0.68	0.74	24.4
8	T1	278	2.0	0.622	15.3	LOS C	4.2	105.8	0.68	0.74	24.4
18b	R3	34	2.0	0.622	15.3	LOS C	4.2	105.8	0.68	0.74	23.8
Approach		472	2.0	0.622	15.3	LOS C	4.2	105.8	0.68	0.74	24.4
SouthEast: Triangle St											
3bx	L3	28	2.0	0.486	13.0	LOS B	2.4	61.4	0.65	0.69	30.6
8x	T1	235	2.0	0.486	13.0	LOS B	2.4	61.4	0.65	0.69	30.5
18ax	R1	57	2.0	0.486	13.0	LOS B	2.4	61.4	0.65	0.69	30.3
Approach		320	2.0	0.486	13.0	LOS B	2.4	61.4	0.65	0.69	30.4
North: East Pleasant St											
7a	L1	33	2.0	0.440	11.2	LOS B	2.1	52.4	0.60	0.62	30.9
4	T1	225	2.0	0.440	11.2	LOS B	2.1	52.4	0.60	0.62	31.2
14b	R3	54	2.0	0.440	11.2	LOS B	2.1	52.4	0.60	0.62	30.3
Approach		312	2.0	0.440	11.2	LOS B	2.1	52.4	0.60	0.62	31.0
NorthWest: Triangle St											
7bx	L3	61	2.0	0.646	15.3	LOS C	4.7	119.5	0.67	0.66	29.6
4x	T1	263	2.0	0.646	15.3	LOS C	4.7	119.5	0.67	0.66	29.5
14ax	R1	202	2.0	0.646	15.3	LOS C	4.7	119.5	0.67	0.66	29.3
Approach		526	2.0	0.646	15.3	LOS C	4.7	119.5	0.67	0.66	29.4
All Vehicles		1629	2.0	0.646	14.1	LOS B	4.7	119.5	0.65	0.68	28.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.