

Appendix A

Intersection Turning Movement Counts

Intersection Turning Movement Count

Intersection of E Brady Street & N Farwell Avenue & N Cambridge Avenue

Wednesday, February 15th, 2023

PM Peak Period

Selected Peak Hour for Analysis: 5:00-6:00 PM

Time	N Farwell Avenue (NE Leg)				E Brady Street (SE Leg)				E Brady Street (W Leg)				N Cambridge Ave (N Leg)			
	SB Right	SB Thru	SB Left	SB UTrn	WB Right	WB Thru	WB Left	WB Utrn	NB Right	NB Thru	NB Left	NB UTrn	EB Right	EB Thru	EB Left	EB UTrn
15:30	3	36	92	2	13	12	20	0	25	37	13	0	15	32	4	0
15:45	1	23	85	2	8	8	19	0	25	27	23	0	23	22	1	0
16:00	3	36	106	0	7	16	29	0	25	24	26	0	21	28	3	0
16:15	1	23	87	10	8	22	23	0	20	29	23	0	16	27	3	0
16:30	0	27	104	5	10	16	30	0	15	32	25	0	16	22	8	0
16:45	1	34	101	6	9	21	23	0	36	25	20	0	22	35	4	0
17:00	0	37	112	3	9	18	22	0	18	33	39	0	24	34	2	0
17:15	1	38	122	4	12	19	17	0	28	31	21	0	18	29	6	0
17:30	1	31	119	8	11	22	29	0	24	26	21	0	20	38	5	0
17:45	2	29	103	8	13	34	23	0	26	33	19	0	17	37	2	0
18:00	2	47	93	1	7	10	22	0	18	25	24	0	18	26	4	0
18:15	1	28	88	10	11	20	15	0	27	18	18	0	18	28	0	0

Peak Hour	N Farwell Avenue (NE Leg)				E Brady Street (SE Leg)				E Brady Street (W Leg)				N Cambridge Ave (N Leg)			
Time	SB Right	SB Thru	SB Left	SB UTrn	WB Right	WB Thru	WB Left	WB Utrn	NB Right	NB Thru	NB Left	NB UTrn	EB Right	EB Thru	EB Left	EB UTrn
5:00 - 6:00	4	135	456	23	45	93	91	0	96	123	100	0	79	138	15	0
Truck %	1.46%				0.00%				1.88%				2.16%			
	Farwell from North				Brady from East				Brady from West				Cambridge form North			

Intersection Turning Movement Count - Bicycles and Pedestrians

Intersection of E Brady Street & N Farwell Avenue & N Cambridge Avenue

Wednesday, February 15th, 2023

PM Peak Period

Selected Peak Hour for Analysis: 5:00-6:00 PM

Time	Cambridge (N)			Farwell (NW)			Brady (SE)			Farwell (SE)			E Brady (W)		
	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina
15:30	0	8	2	1	7	0	0	4	0	0	16	0	0	10	2
15:45	2	4	2	4	6	0	1	4	0	0	6	4	0	4	1
16:00	0	32	1	0	32	0	0	6	0	0	9	1	0	10	0
16:15	0	11	4	0	8	0	0	2	0	0	14	2	0	6	1
16:30	1	12	1	0	12	0	0	10	0	0	13	6	0	1	5
16:45	0	14	0	0	21	0	0	11	0	0	21	0	0	14	0
17:00	0	6	2	0	4	0	0	12	0	0	16	2	0	7	4
17:15	1	17	0	0	18	0	1	11	0	0	15	3	2	19	0
17:30	2	10	0	1	15	0	1	10	0	0	24	2	1	20	1
17:45	2	10	0	0	14	0	1	4	0	0	24	1	2	11	0
18:00	1	10	0	1	5	0	0	5	0	0	20	1	0	10	1
18:15	0	6	0	0	3	0	0	5	0	0	21	0	0	7	0

Peak Hour	Cambridge (N)			Farwell (NW)			Brady (SE)			Farwell (SE)			E Brady (W)		
Time	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina	Bikes	Peds	Illegal Ped Xina
	Bikes	Illegal		Bikes		Illegal	Bikes		Illegal	Bikes		Illegal	Bikes		Illegal
5:00 - 6:00	5	43	2	1	51	0	3	37	0	0	79	8	5	57	5

Appendix B

ITE Trip Generation Tables

Land Use: 310

Hotel

Description

A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room. All suites hotel (Land Use 311), business hotel (Land Use 312), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Twenty-five studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 82 percent.

Some properties in this land use provide guest transportation services (e.g., airport shuttle, limousine service, golf course shuttle service) which may have an impact on the overall trip generation rates.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, District of Columbia, Florida, Georgia, Indiana, Minnesota, New York, Ontario (CAN), Pennsylvania, South Dakota, Texas, Vermont, Virginia, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Trip generation at a hotel may be related to the presence of supporting facilities such as convention facilities, restaurants, meeting/banquet space, and retail facilities. Future data submissions should specify the presence of these amenities. Reporting the level of activity at the supporting facilities such as full, empty, partially active, number of people attending a meeting/banquet during observation may also be useful in further analysis of this land use.

Source Numbers

170, 260, 262, 277, 280, 301, 306, 357, 422, 507, 577, 728, 867, 872, 925, 951, 1009, 1021, 1026, 1046

Hotel (310)

Vehicle Trip Ends vs: Rooms

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: Dense Multi-Use Urban

Number of Studies: 3

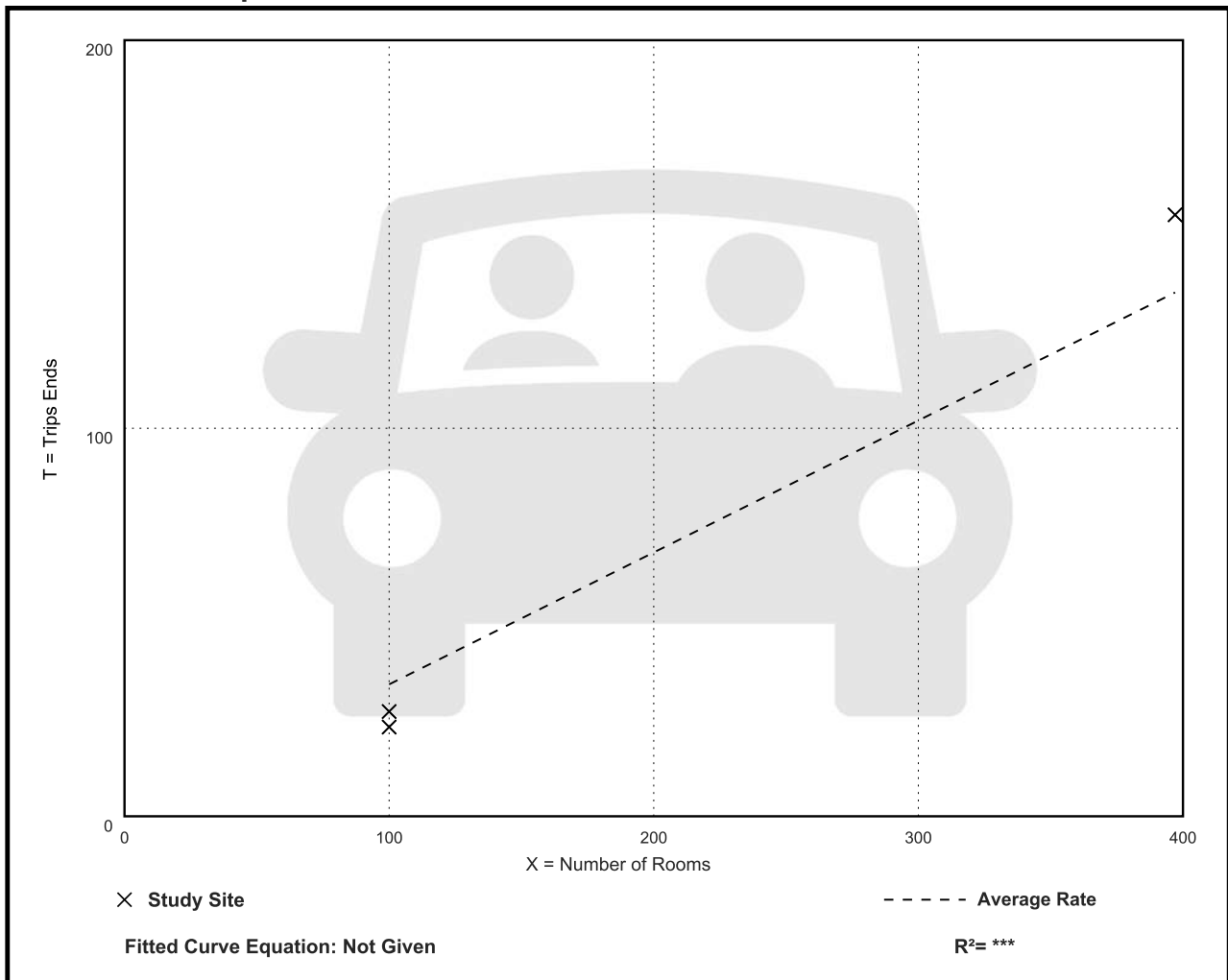
Avg. Num. of Rooms: 199

Directional Distribution: 30% entering, 70% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.34	0.23 - 0.39	0.08

Data Plot and Equation



Hotel (310)

Vehicle Trip Ends vs: Rooms
On a: Weekday

Setting/Location: Center City Core

Number of Studies: 1

Avg. Num. of Rooms: 136

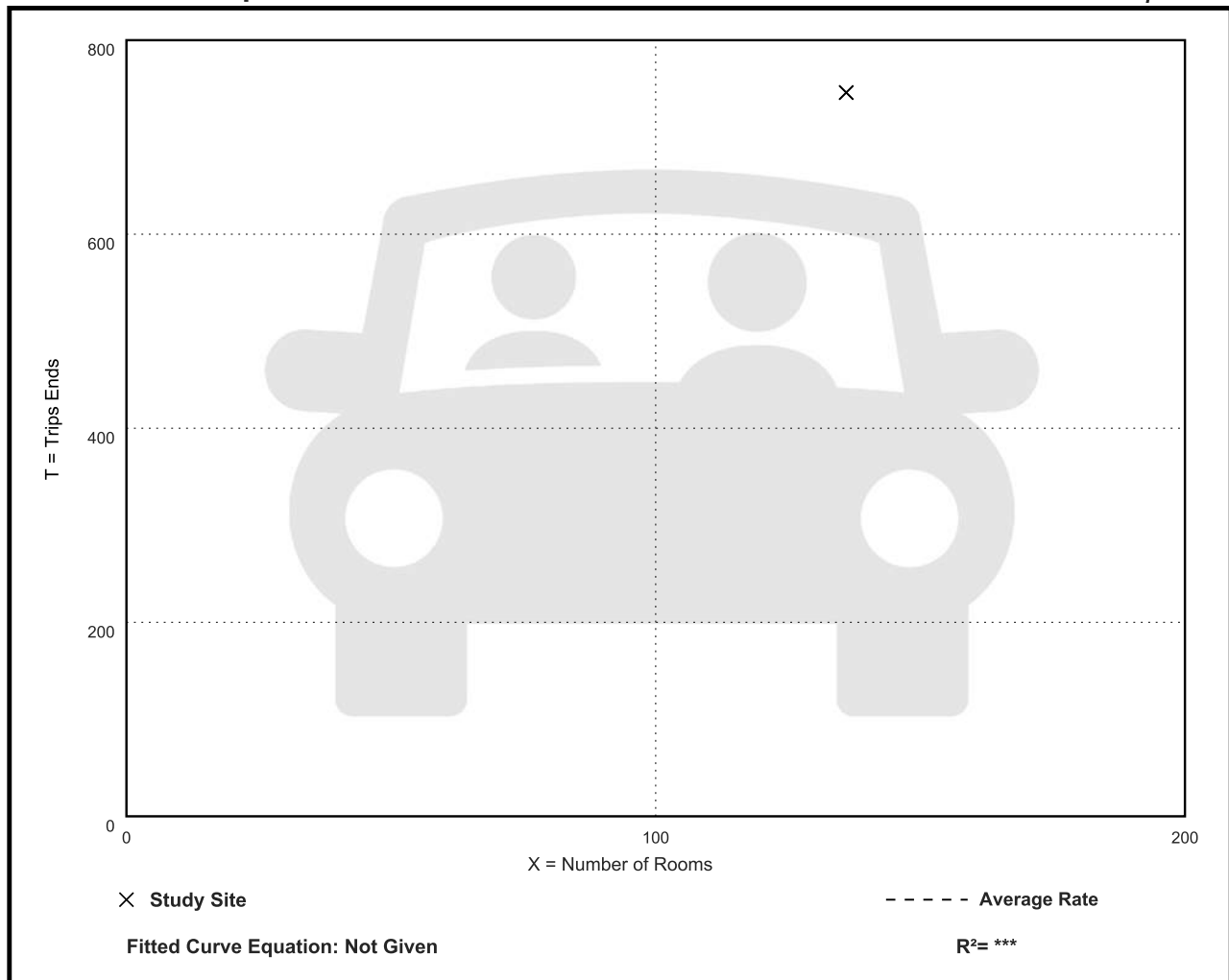
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
5.49	5.49 - 5.49	***

Data Plot and Equation

Caution – Small Sample Size



Land Use: 931

Fine Dining Restaurant

Description

A fine dining restaurant is a full-service eating establishment with a typical duration of stay of at least 1 hour. A fine dining restaurant generally does not serve breakfast; some do not serve lunch; all serve dinner. This type of restaurant often requests and sometimes requires a reservation and is generally not part of a chain. A patron commonly waits to be seated, is served by wait staff, orders from a menu and pays after the meal. Some of the study sites have lounge or bar facilities (serving alcoholic beverages), but meal service is the primary draw to the restaurant. Fast casual restaurant (Land Use 930) and high-turnover (sit-down) restaurant (Land Use 932) are related uses.

Additional Data

If the fine dining restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

The sites were surveyed in the 1980s, the 1990s, and the 2010s in Alberta (CAN), California, Colorado, Florida, Indiana, Kentucky, New Jersey, and Utah.

Source Numbers

126, 260, 291, 301, 338, 339, 368, 437, 440, 976, 1053

Fine Dining Restaurant (931)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 10

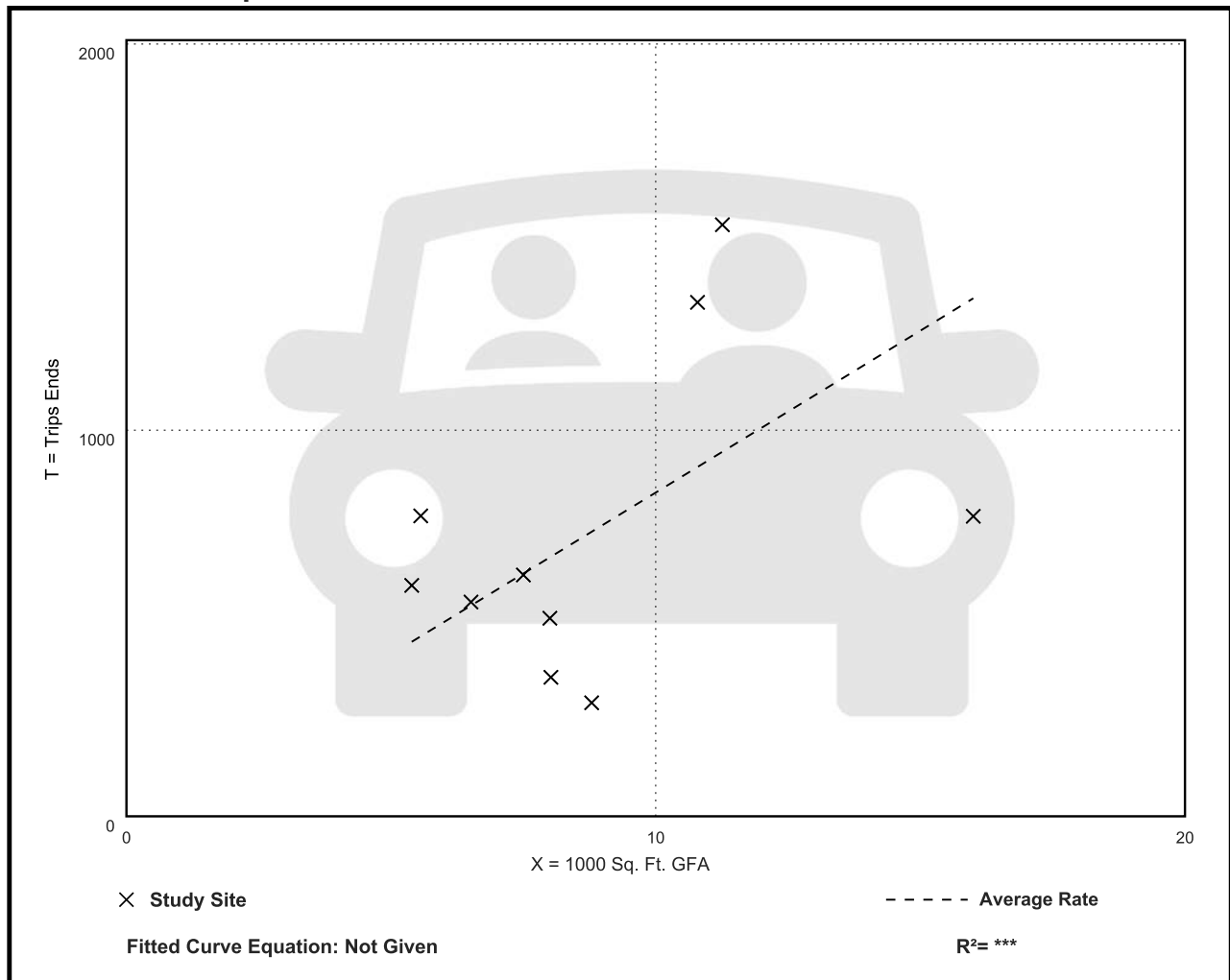
Avg. 1000 Sq. Ft. GFA: 9

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
83.84	33.45 - 139.93	40.01

Data Plot and Equation



Fine Dining Restaurant (931)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 19

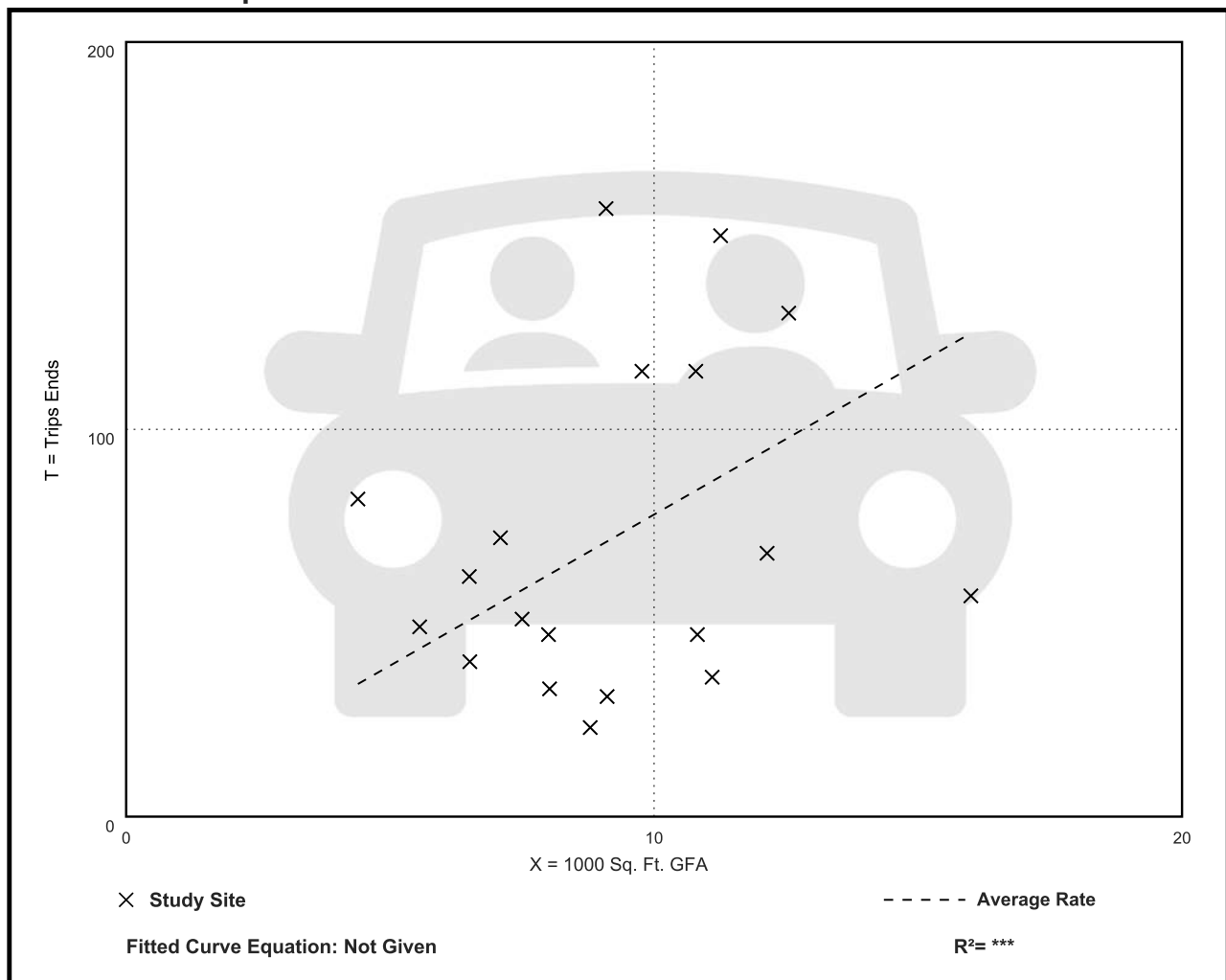
Avg. 1000 Sq. Ft. GFA: 9

Directional Distribution: 67% entering, 33% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
7.80	2.62 - 18.68	4.49

Data Plot and Equation



Land Use: 932

High-Turnover (Sit-Down) Restaurant

Description

This land use consists of sit-down, full-service eating establishments with a typical duration of stay of 60 minutes or less. This type of restaurant is usually moderately priced, frequently belongs to a restaurant chain, and is commonly referred to as casual dining. Generally, these restaurants serve lunch and dinner; they may also be open for breakfast and are sometimes open 24 hours a day. These restaurants typically do not accept reservations. A patron commonly waits to be seated, is served by wait staff, orders from a menu, and pays after the meal.

Some facilities offer carry-out for a small proportion of its customers. Some facilities within this land use may also contain a bar area for serving food and alcoholic drinks.

Fast casual restaurant (Land Use 930), fine dining restaurant (Land Use 931), fast-food restaurant without drive-through window (Land Use 933), and fast-food restaurant with drive-through window (Land Use 934) are related uses.

Additional Data

Users should exercise caution when applying statistics during the AM peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the AM peak hour of the adjacent street traffic were removed from the database.

If the restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Florida, Georgia, Indiana, Kentucky, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Vermont, and Wisconsin.

Source Numbers

126, 269, 275, 280, 300, 301, 305, 338, 340, 341, 358, 384, 424, 432, 437, 438, 444, 507, 555, 577, 589, 617, 618, 728, 868, 884, 885, 903, 927, 939, 944, 961, 962, 977, 1048

High-Turnover (Sit-Down) Restaurant (932)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 50

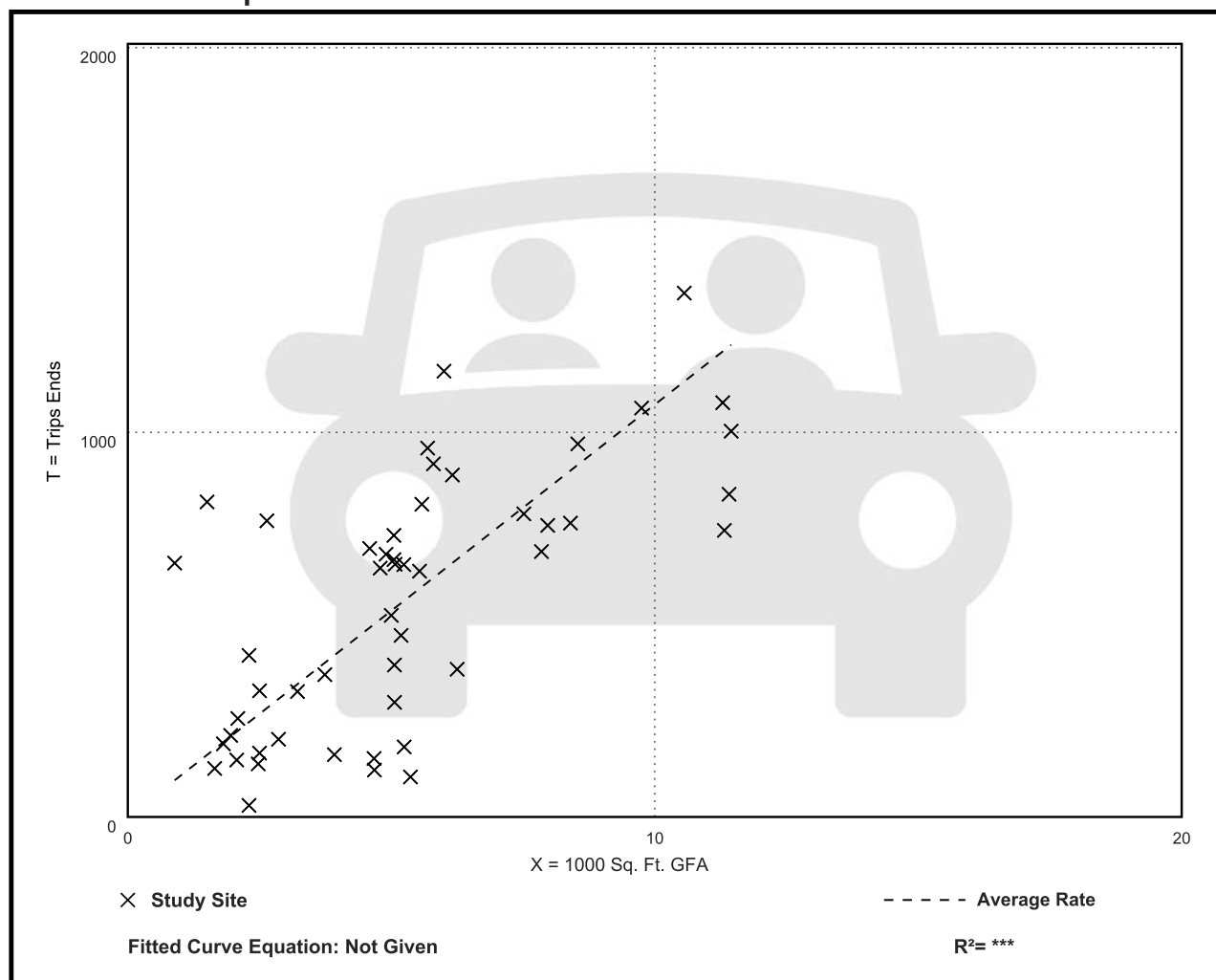
Avg. 1000 Sq. Ft. GFA: 5

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
107.20	13.04 - 742.41	66.72

Data Plot and Equation



High-Turnover (Sit-Down) Restaurant (932)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 104

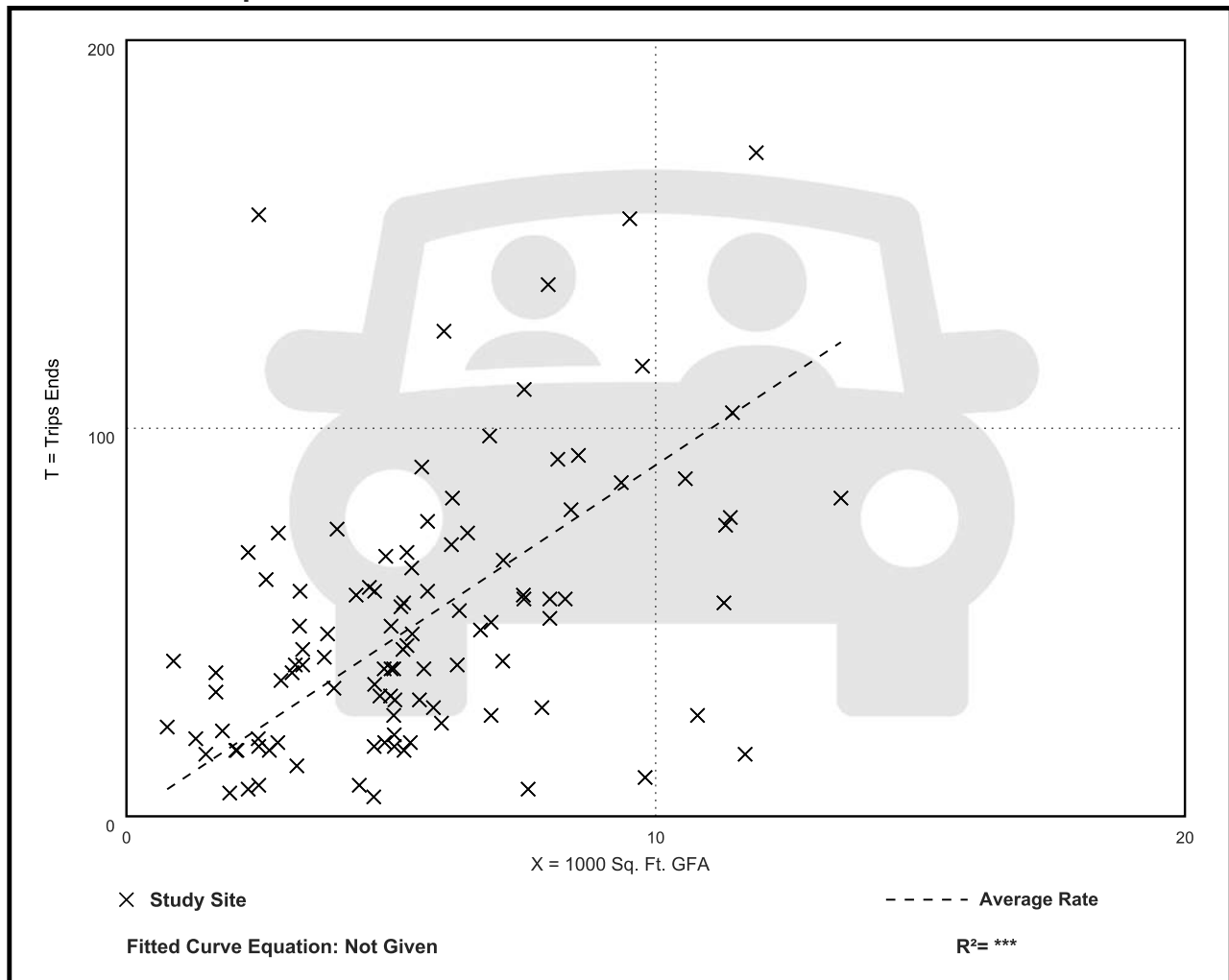
Avg. 1000 Sq. Ft. GFA: 6

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.05	0.92 - 62.00	6.18

Data Plot and Equation



Appendix C

Year 2023 Background Traffic Analysis with Existing Geometrics – Synchro Report

Brady-Farwell Hotel Traffic Study
1098:

2023 PM Background
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	100	125	95	90	95	45	15	140	80	25	455	135
Future Volume (vph)	100	125	95	90	95	45	15	140	80	25	455	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95			0.95	1.00
Frt		1.00	0.85		1.00	0.85	0.87	0.85			1.00	0.85
Flt Protected		0.98	1.00		0.98	1.00	0.99	1.00			1.00	1.00
Satd. Flow (prot)		1822	1583		1818	1583	1608	1504			3530	1583
Flt Permitted		0.66	1.00		0.73	1.00	0.99	1.00			1.00	1.00
Satd. Flow (perm)		1236	1583		1364	1583	1608	1504			3530	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	128	97	92	97	46	15	143	82	26	464	138
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	230	97	0	189	46	121	119	0	0	490	143
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	Perm		Split	NA	Perm
Protected Phases	3	8			4		2			6	6	
Permitted Phases	8		8	4		4		2				6
Actuated Green, G (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Effective Green, g (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Actuated g/C Ratio		0.37	0.37		0.26	0.26	0.20	0.20			0.23	0.23
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lane Grp Cap (vph)		498	580		348	404	321	300			823	369
v/s Ratio Prot		c0.04					0.08				c0.14	
v/s Ratio Perm		0.13	0.06		c0.14	0.03		c0.08				0.09
v/c Ratio		0.46	0.17		0.54	0.11	0.38	0.40			0.60	0.39
Uniform Delay, d1		21.7	19.2		29.0	25.7	31.1	31.3			30.7	29.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		3.1	0.6		6.0	0.6	3.4	3.9			3.2	3.1
Delay (s)		24.8	19.9		34.9	26.3	34.5	35.2			33.9	32.1
Level of Service		C	B		C	C	C	D			C	C
Approach Delay (s)		23.3			33.2		34.8				33.5	
Approach LOS		C			C		C				C	
Intersection Summary												
HCM 2000 Control Delay			31.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			21.0		
Intersection Capacity Utilization			99.2%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												



Movement	SWR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	5
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Brady-Farwell Hotel Traffic Study
1098:

2023 PM Background
Lanes, Volumes, Timings

												
Lane Group	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	100	125	95	90	95	45	15	140	80	25	455	135
Future Volume (vph)	100	125	95	90	95	45	15	140	80	25	455	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			115	0		125	0	60		0		90
Storage Lanes			1	0		1	1	1		0		1
Taper Length (ft)				25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00
Frt			0.850			0.850	0.869	0.850				0.850
Flt Protected		0.978			0.976		0.994				0.997	
Satd. Flow (prot)	0	1822	1583	0	1818	1583	1609	1504	0	0	3529	1583
Flt Permitted		0.664			0.732		0.994				0.997	
Satd. Flow (perm)	0	1237	1583	0	1364	1583	1609	1504	0	0	3529	1583
Right Turn on Red			No						No			
Satd. Flow (RTOR)												
Link Speed (mph)		25			25		25				30	
Link Distance (ft)		580			397		558				685	
Travel Time (s)		15.8			10.8		15.2				15.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	128	97	92	97	46	15	143	82	26	464	138
Shared Lane Traffic (%)								74%				
Lane Group Flow (vph)	0	230	97	0	189	46	121	119	0	0	490	143
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	Perm		Split	NA	Perm
Protected Phases	3	8			4		2			6	6	
Permitted Phases	8		8	4		4		2				6
Minimum Split (s)	10.0	39.0	39.0	29.0	29.0	29.0	24.0	24.0		27.0	27.0	27.0
Total Split (s)	10.0	39.0	39.0	29.0	29.0	29.0	24.0	24.0		27.0	27.0	27.0
Total Split (%)	11.1%	43.3%	43.3%	32.2%	32.2%	32.2%	26.7%	26.7%		30.0%	30.0%	30.0%
Maximum Green (s)	7.0	33.0	33.0	23.0	23.0	23.0	18.0	18.0		21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	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	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Walk Time (s)		20.0	20.0				9.0	9.0		11.0	11.0	11.0
Flash Dont Walk (s)		13.0	13.0				9.0	9.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0				0	0		0	0	0
Act Effect Green (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Actuated g/C Ratio		0.37	0.37		0.26	0.26	0.20	0.20			0.23	0.23
v/c Ratio		0.48	0.17		0.54	0.11	0.38	0.40			0.60	0.39
Control Delay		25.3	20.3		35.8	26.7	35.2	35.9			34.2	32.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay		25.3	20.3		35.8	26.7	35.2	35.9			34.2	32.8
LOS		C	C		D	C	D	D			C	C
Approach Delay		23.8			34.0		35.5				33.9	
Approach LOS		C			C		D				C	
Queue Length 50th (ft)		93	37		93	20	60	62			131	69
Queue Length 95th (ft)		153	71		162	48	112	116			183	124



Lane Group	SWR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.98
Adj. Flow (vph)	5
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

												
Lane Group	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Internal Link Dist (ft)		500			317		478				605	
Turn Bay Length (ft)			115			125		60				90
Base Capacity (vph)		479	580		348	404	321	300			823	369
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.48	0.17		0.54	0.11	0.38	0.40			0.60	0.39

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 31 (34%), Referenced to phase 2:SBL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 31.9

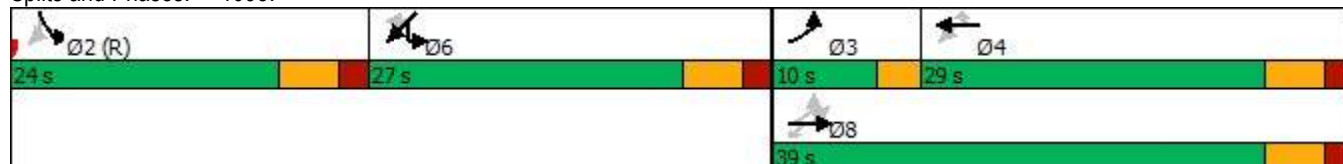
Intersection LOS: C

Intersection Capacity Utilization 99.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1098:





Lane Group	SWR2
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	

Appendix D

Year 2023 Build Traffic Analysis with Existing Geometrics – Synchro Report

Brady-Farwell Hotel Traffic Study
1098: N Farwell Ave & E Brady St & N Cambridge Ave

2023 PM Build
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	110	135	95	90	95	45	35	160	95	25	455	135
Future Volume (vph)	110	135	95	90	95	45	35	160	95	25	455	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95			0.95	1.00
Frt		1.00	0.85		1.00	0.85	0.89	0.85			1.00	0.85
Flt Protected		0.98	1.00		0.98	1.00	0.99	1.00			1.00	1.00
Satd. Flow (prot)		1822	1583		1818	1583	1631	1504			3530	1583
Flt Permitted		0.64	1.00		0.72	1.00	0.99	1.00			1.00	1.00
Satd. Flow (perm)		1188	1583		1346	1583	1631	1504			3530	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	138	97	92	97	46	36	163	97	26	464	138
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	250	97	0	189	46	150	146	0	0	490	143
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	Perm		Split	NA	Perm
Protected Phases	3	8			4		2			6	6	
Permitted Phases	8		8	4		4		2				6
Actuated Green, G (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Effective Green, g (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Actuated g/C Ratio		0.37	0.37		0.26	0.26	0.20	0.20			0.23	0.23
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lane Grp Cap (vph)		484	580		343	404	326	300			823	369
v/s Ratio Prot		c0.04					0.09				c0.14	
v/s Ratio Perm		c0.15	0.06		0.14	0.03		c0.10				0.09
v/c Ratio		0.52	0.17		0.55	0.11	0.46	0.49			0.60	0.39
Uniform Delay, d1		22.3	19.2		29.0	25.7	31.7	31.9			30.7	29.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		3.9	0.6		6.2	0.6	4.6	5.6			3.2	3.1
Delay (s)		26.2	19.9		35.3	26.3	36.3	37.5			33.9	32.1
Level of Service		C	B		D	C	D	D			C	C
Approach Delay (s)		24.4			33.5		36.9				33.5	
Approach LOS		C			C		D				C	
Intersection Summary												
HCM 2000 Control Delay			32.1									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			90.0								21.0	
Intersection Capacity Utilization			99.2%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												



Movement	SWR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	5
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Brady-Farwell Hotel Traffic Study
1098: N Farwell Ave & E Brady St & N Cambridge Ave

2023 PM Build
Lanes, Volumes, Timings

												
Lane Group	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	110	135	95	90	95	45	35	160	95	25	455	135
Future Volume (vph)	110	135	95	90	95	45	35	160	95	25	455	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			115	0		125	0	60		0		90
Storage Lanes			1	0		1	1	1		0		1
Taper Length (ft)				25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00
Frt			0.850			0.850	0.886	0.850				0.850
Flt Protected		0.978			0.976		0.988				0.997	
Satd. Flow (prot)	0	1822	1583	0	1818	1583	1631	1504	0	0	3529	1583
Flt Permitted		0.638			0.723		0.988				0.997	
Satd. Flow (perm)	0	1188	1583	0	1347	1583	1631	1504	0	0	3529	1583
Right Turn on Red			No						No			
Satd. Flow (RTOR)												
Link Speed (mph)		25			25		25				30	
Link Distance (ft)		580			397		558				685	
Travel Time (s)		15.8			10.8		15.2				15.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	138	97	92	97	46	36	163	97	26	464	138
Shared Lane Traffic (%)								70%				
Lane Group Flow (vph)	0	250	97	0	189	46	150	146	0	0	490	143
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	Perm		Split	NA	Perm
Protected Phases	3	8			4		2			6	6	
Permitted Phases	8		8	4		4		2				6
Minimum Split (s)	10.0	39.0	39.0	29.0	29.0	29.0	24.0	24.0		27.0	27.0	27.0
Total Split (s)	10.0	39.0	39.0	29.0	29.0	29.0	24.0	24.0		27.0	27.0	27.0
Total Split (%)	11.1%	43.3%	43.3%	32.2%	32.2%	32.2%	26.7%	26.7%		30.0%	30.0%	30.0%
Maximum Green (s)	7.0	33.0	33.0	23.0	23.0	23.0	18.0	18.0		21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	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	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Walk Time (s)		20.0	20.0				9.0	9.0		11.0	11.0	11.0
Flash Dont Walk (s)		13.0	13.0				9.0	9.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0				0	0		0	0	0
Act Effct Green (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Actuated g/C Ratio		0.37	0.37		0.26	0.26	0.20	0.20			0.23	0.23
v/c Ratio		0.54	0.17		0.55	0.11	0.46	0.49			0.60	0.39
Control Delay		26.9	20.3		36.1	26.7	37.0	38.2			34.2	32.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay		26.9	20.3		36.1	26.7	37.0	38.2			34.2	32.8
LOS		C	C		D	C	D	D			C	C
Approach Delay		25.0			34.2		37.6				33.9	
Approach LOS		C			C		D				C	
Queue Length 50th (ft)		103	37		93	20	76	77			131	69
Queue Length 95th (ft)		166	71		163	48	135	141			183	124



Lane Group	SWR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.98
Adj. Flow (vph)	5
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Brady-Farwell Hotel Traffic Study
1098: N Farwell Ave & E Brady St & N Cambridge Ave

2023 PM Build
Lanes, Volumes, Timings

												
Lane Group	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Internal Link Dist (ft)		500			317		478				605	
Turn Bay Length (ft)			115			125		60				90
Base Capacity (vph)		463	580		344	404	326	300			823	369
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.54	0.17		0.55	0.11	0.46	0.49			0.60	0.39

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 31 (34%), Referenced to phase 2:SBL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 32.6

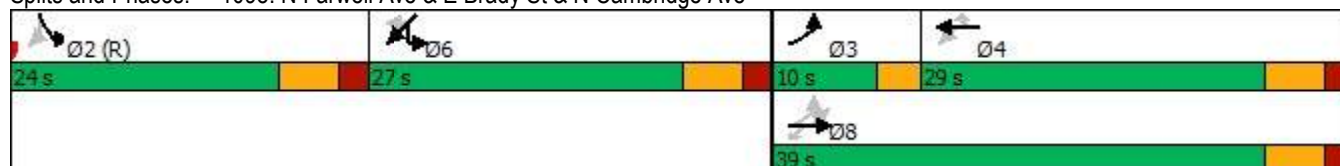
Intersection LOS: C

Intersection Capacity Utilization 99.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1098: N Farwell Ave & E Brady St & N Cambridge Ave





Lane Group	SWR2
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	

Appendix E

Year 2023 Build Sensitivity Traffic Analysis with Existing Geometrics – Synchro Report

Brady-Farwell Hotel Traffic Study
1098: N Farwell Ave & E Brady St & N Cambridge Ave

2023 PM Build-Sensitivity
HCM Signalized Intersection Capacity Analysis

												
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	110	135	95	90	95	45	35	160	95	45	475	150
Future Volume (vph)	110	135	95	90	95	45	35	160	95	45	475	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95			0.95	1.00
Frt		1.00	0.85		1.00	0.85	0.89	0.85			1.00	0.85
Flt Protected		0.98	1.00		0.98	1.00	0.99	1.00			1.00	1.00
Satd. Flow (prot)		1822	1583		1818	1583	1631	1504			3524	1583
Flt Permitted		0.64	1.00		0.72	1.00	0.99	1.00			1.00	1.00
Satd. Flow (perm)		1188	1583		1346	1583	1631	1504			3524	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	138	97	92	97	46	36	163	97	46	485	153
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	250	97	0	189	46	150	146	0	0	531	158
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	Perm		Split	NA	Perm
Protected Phases	3	8			4		2			6	6	
Permitted Phases	8		8	4		4		2				6
Actuated Green, G (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Effective Green, g (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Actuated g/C Ratio		0.37	0.37		0.26	0.26	0.20	0.20			0.23	0.23
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lane Grp Cap (vph)		484	580		343	404	326	300			822	369
v/s Ratio Prot		c0.04					0.09				c0.15	
v/s Ratio Perm		c0.15	0.06		0.14	0.03		c0.10				0.10
v/c Ratio		0.52	0.17		0.55	0.11	0.46	0.49			0.65	0.43
Uniform Delay, d1		22.3	19.2		29.0	25.7	31.7	31.9			31.1	29.4
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		3.9	0.6		6.2	0.6	4.6	5.6			3.9	3.6
Delay (s)		26.2	19.9		35.3	26.3	36.3	37.5			35.0	33.0
Level of Service		C	B		D	C	D	D			D	C
Approach Delay (s)		24.4			33.5		36.9				34.6	
Approach LOS		C			C		D				C	
Intersection Summary												
HCM 2000 Control Delay			32.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			90.0								21.0	
Intersection Capacity Utilization			99.2%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												



Movement	SWR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	5
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Brady-Farwell Hotel Traffic Study
1098: N Farwell Ave & E Brady St & N Cambridge Ave

2023 PM Build-Sensitivity
Lanes, Volumes, Timings

												
Lane Group	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	110	135	95	90	95	45	35	160	95	45	475	150
Future Volume (vph)	110	135	95	90	95	45	35	160	95	45	475	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			115	0		125	0	60		0		90
Storage Lanes			1	0		1	1	1		0		1
Taper Length (ft)				25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00
Frt			0.850			0.850	0.886	0.850				0.850
Flt Protected		0.978			0.976		0.988				0.996	
Satd. Flow (prot)	0	1822	1583	0	1818	1583	1631	1504	0	0	3525	1583
Flt Permitted		0.638			0.723		0.988				0.996	
Satd. Flow (perm)	0	1188	1583	0	1347	1583	1631	1504	0	0	3525	1583
Right Turn on Red			No						No			
Satd. Flow (RTOR)												
Link Speed (mph)		25			25		25				30	
Link Distance (ft)		580			397		558				685	
Travel Time (s)		15.8			10.8		15.2				15.6	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	138	97	92	97	46	36	163	97	46	485	153
Shared Lane Traffic (%)								70%				
Lane Group Flow (vph)	0	250	97	0	189	46	150	146	0	0	531	158
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	Perm		Split	NA	Perm
Protected Phases	3	8			4		2			6	6	
Permitted Phases	8		8	4		4		2				6
Minimum Split (s)	10.0	39.0	39.0	29.0	29.0	29.0	24.0	24.0		27.0	27.0	27.0
Total Split (s)	10.0	39.0	39.0	29.0	29.0	29.0	24.0	24.0		27.0	27.0	27.0
Total Split (%)	11.1%	43.3%	43.3%	32.2%	32.2%	32.2%	26.7%	26.7%		30.0%	30.0%	30.0%
Maximum Green (s)	7.0	33.0	33.0	23.0	23.0	23.0	18.0	18.0		21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	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	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Walk Time (s)		20.0	20.0				9.0	9.0		11.0	11.0	11.0
Flash Dont Walk (s)		13.0	13.0				9.0	9.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0				0	0		0	0	0
Act Effct Green (s)		33.0	33.0		23.0	23.0	18.0	18.0			21.0	21.0
Actuated g/C Ratio		0.37	0.37		0.26	0.26	0.20	0.20			0.23	0.23
v/c Ratio		0.54	0.17		0.55	0.11	0.46	0.49			0.65	0.43
Control Delay		26.9	20.3		36.1	26.7	37.0	38.2			35.4	33.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay		26.9	20.3		36.1	26.7	37.0	38.2			35.4	33.7
LOS		C	C		D	C	D	D			D	C
Approach Delay		25.0			34.2		37.6				35.0	
Approach LOS		C			C		D				D	
Queue Length 50th (ft)		103	37		93	20	76	77			144	77
Queue Length 95th (ft)		166	71		163	48	135	141			198	136



Lane Group	SWR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.98
Adj. Flow (vph)	5
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	

Brady-Farwell Hotel Traffic Study
1098: N Farwell Ave & E Brady St & N Cambridge Ave

2023 PM Build-Sensitivity
Lanes, Volumes, Timings

												
Lane Group	EBL2	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	SWL	SWT	SWR
Internal Link Dist (ft)		500			317		478				605	
Turn Bay Length (ft)			115			125		60				90
Base Capacity (vph)		463	580		344	404	326	300			822	369
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.54	0.17		0.55	0.11	0.46	0.49			0.65	0.43

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 31 (34%), Referenced to phase 2:SBL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 33.2

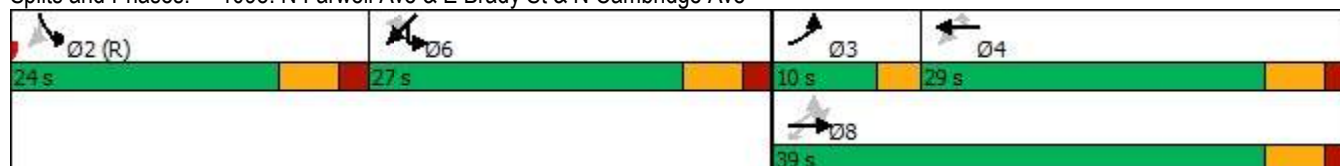
Intersection LOS: C

Intersection Capacity Utilization 99.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1098: N Farwell Ave & E Brady St & N Cambridge Ave





Lane Group	SWR2
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	