

March 1, 2023

Brian LaPlante, Esq.
LaPlante Sowa Goldman
78 Kenwood Street
Cranston, RI 02907

Re: **Response to Peer Review Comments**
Comstock Commons
Cranston, RI
(Pare Project No. 22028.01)

Dear Mr. LaPlante:

We are in receipt of a peer review of the traffic study for the Comstock Commons traffic impact assessment dated December 8, 2022, prepared by Fuss & O'Neill, Inc. The comments and Pare's responses are listed below.

Comment:	Response:
A total of 16 parking spaces are provided on site for the self-storage facility, which is inconsistent with the anticipated number of peak hour trips. The proponent should justify the number of parking spaces by using the Institution of Transportation Engineers (ITE) Parking Generation Manual.	The self-storage facility has been removed from the proposed development plan.
The proponent should install a sidewalk along the site frontage on Comstock Parkway. A new sidewalk would fill a gap in the existing sidewalk network and improve site access for pedestrians. The feasibility of installing a painted pedestrian crosswalk to the existing crosswalk on the west side of Comstock Parkway should also be explored.	A sidewalk along Comstock Parkway has been added to the plans. Due to the proximity of the site to Plainfield Pike, we believe this may not be the ideal location for a pedestrian crossing and believe the location of any mid-block crossing across Comstock Parkway be completed only after more thorough study. Therefore, this has not been added to the plans.
The material adjacent to the coffee shop and retail buildings on site is not clearly called out on the site plan. In addition, some accessible path to this space from the sidewalk along the street.	Material callouts have been added to the plans as well as an accessible path from the building to the proposed sidewalk along Comstock Parkway.

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Comment:	Response:
The study includes an analysis of crash history over a three-year period (2017-2019). It is recommended that the proponent expand the analysis to include the most recent two years of available crash data, 2020 and 2021 as well.	Data from 2020 and 2021 were not included due to the traffic pattern disruptions due to the pandemic. However, we did request, receive, and summarize the additional data, which is attached. Table 1 below includes data from 2017 through 2021. In general, crash patterns did not change with the additional data.
The site plan indicates the proposed coffee shop is 3,000 square feet, but trip generation appears to be calculated for a coffee shop of 2,800 square feet. The proponent should clarify this inconsistency.	Since the last submission, the building plan has been revised. The size of the coffee shop has been revised now to 3,924 square feet, with a basement storage area of 1,335 square feet. The basement area will be used for longer-term storage for both existing Latte Love locations and potential future locations. The adjacent strip retail space will be 5,888 square feet. 1,472 square feet of this space will be occupied by Latte Love as a business operations center. Tenants for the remaining space have not been identified yet. A revised trip generation table is shown in Table 2, and revised trip generation worksheets are attached.
The Traffic Impact Analysis makes no reference to the existing Latte Love café, located across the street at 11 Comstock Parkway. Collecting existing trip generation data at this location, or alternatively, examining available customer data would be beneficial to confirm the accuracy of the trip generation estimates.	The existing location is in a strip plaza that is shared with other businesses; therefore, it is difficult to accurately gather existing trip data for the current location. However, based on transaction data provided by Latte Love, they generally average approximately 40 transactions per hour during the morning peak, and about 25 transactions per hour during the afternoon peak, which is significantly less than the trip generation estimates using the ITE manual.

Comment:	Response:
<p>It is unclear when reviewing the Trip Generation Handbook how the proponent determined a value of 50% pass by trips for the proposed development. The method of determining the percentage of pass-by trips from the Trip Generation Handbook should be further explained.</p>	<p>Pass-by trip information was taken from information provided on the ite.org website. Included in this information is pass-by trips information for Land Use Codes (LUCs) 938 (Coffee Shop with Drive-Through and No Indoor Seating) and 934 (Fast-Food with Drive-Through). LUC 938 indicates a 90% pass-by rate, but as this shop will have dining space, a lower pass-by rate would be expected at this location. LUC 934 indicates a pass-by rate of between 50-55%. Pare used the 50% pass-by rate as a conservatively low rate. We expect the actual rate to be higher, especially during the morning peak hour. It should also be noted that the retail component of the development will also likely have some pass-by trips, but since there are no identified tenants yet, Pare conservatively did not include pass-by trips for that use.</p>
<p>Further clarification should be provided regarding Figure 4 – Site Generated New Traffic Volumes. Although the figure appears to represent the new vehicle trips, the distribution at the site driveway appears to be representative of pass-by traffic, as the majority of traffic is entering from the south and exiting to the north during the morning peak hour, and vice versa during the afternoon peak hour. New trips typically follow the pattern of arriving and returning in the same direction.</p>	<p>The traffic volume figures been revised to accurately reflect the new trips and pass-by trips. New trips were distributed 57% oriented to/from the south and 43% to/from the north. Revised build condition capacity analyses have been performed to reflect the revised trip generation and distribution. These results can be found in Table 3 and revised volume figures and capacity analysis worksheets are attached.</p>
<p>The proponent should clarify why the proposed conditions were analyzed with one site driveway instead of the two that are proposed on the site plan.</p>	<p>For analysis purposes, the driveways were combined to present a more conservative analysis of driveway operation. For the revised analyses, the “single” driveway was assumed to have one left turn lane and one right turn lane for exiting traffic.</p>

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Table 1: Crash Data Summary 2017-2021

Roadway/ Intersection	Total Crashes	Non- Fatal Injuries	Fatalities	Rear End	Side- swipe	Head On	Single Vehicle	Angle	Ped/ Bike
Comstock Parkway	22	3	0	13	0	1	4	4	0
Plainfield Pike at Comstock Parkway	34	7	0	20	3	3	2	6	0
Scituate Avenue at Comstock Parkway	25	7	0	13	4	0	2	5	1

Table 2: Trip Generation Summary

		Number of New Trips (Number of Pass-By Trips)	
		AM Peak	PM Peak
LUC 937: Coffee/Donut Shop with Drive-Through Window (3,924 SF GFA)	Entering	86 (86)	39 (38)
	Exiting	83 (83)	38 (38)
	Total	169 (169)	77 (76)
LUC 822: Strip Retail Plaza (5,888 SF GFA)	Entering	12 (0)	27 (0)
	Exiting	8 (0)	26 (0)
	Total	20 (0)	53 (0)
LUC 822: Strip Retail Plaza (5,888 SF GFA)	Entering	1 (0)	1 (0)
	Exiting	1 (0)	1 (0)
	Total	2 (0)	2 (0)
TOTAL SITE	Entering	99 (86)	67 (38)
	Exiting	92 (83)	65 (38)
	Total	191 (169)	132 (76)

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Table 3: Revised Build Condition LOS Summary

Intersection	Movement		Morning Peak Hour		Afternoon Peak Hour	
			LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²
Plainfield Pike at Comstock Parkway	NB	T,L	D (44.5)	#135	E (57.8)	#147
		R	B (10.8)	147	A (9.8)	78
		App	B (17.2)	-	C (20.6)	-
	SB	L,T,R	C (23.9)	17	C (33.9)	98
		EB	L	A (7.7)	3	A (8.4)
	T,R		C (33.1)	#469	D (41.1)	#386
	App		C (33.0)	-	D (40.3)	-
	WB	L	B (12.8)	195	C (31.6)	#451
		T,R	A (6.0)	126	A (7.5)	197
		App	B (10.0)	-	C (21.6)	-
	Intersection		B (18.6)	-	C (25.6)	-
Scituate Avenue at Comstock Parkway	NB	L,T,R	D (37.3)	#181	B (18.5)	79
	SB	L,T	D (50.9)	#143	D (35.9)	#226
		R	A (8.0)	53	A (6.9)	70
		App	C (24.5)	-	B (17.2)	-
	EB	L	C (30.7)	#466	B (13.1)	80
		T,R	A (5.4)	80	A (5.6)	43
		App	C (23.0)	-	B (10.4)	-
	WB	L	C (24.5)	20	B (14.7)	34
		T,R	C (29.7)	170	C (24.3)	204
		App	C (29.5)	-	C (23.3)	-
	Intersection		C (26.1)	-	B (17.2)	-
Site Driveways at Comstock Parkway	SB	L	A (9.6)	8	A (9.0)	5
	WB	L	F (75.5)	100	F (60.0)	60
		R	B (14.9)	18	B (13.0)	8

1. Delay shown in seconds per vehicle.

2. Queue Length shown in feet, assuming 25 feet per vehicle at unsignalized intersections.

- 95th percentile volume exceeds capacity, queue shown is after 2 consecutive 95th percentile cycles.

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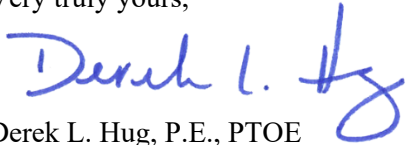
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In conclusion, Pare has revised the trip generation to accurately reflect the revised square footages of the land uses and eliminate the self-storage use. In addition, the trip generation was revised to consistently utilize the commuter peak hours (7-9, 4-6) between both uses. The trips were re-distributed and build condition analyses were updated. The result of these revision indicates the two signalized intersection still operate at LOS C or better during both peak hours. Left turns out of the site are shown to have a more significant delay, but the v/c ratios are all less than 1.0, indicating there is enough capacity to meet the demand. We believe these analyses provide a conservatively pessimistic view of the delays expected, as we believe the pass-by rate will likely be higher than 50 percent, given the use and location.

A final benefit to the elimination of the separate storage use building is that the revised site layout will allow for a longer available queue length for the coffee shop's drive through.

If you have any further questions, feel free to contact me.

Very truly yours,

A handwritten signature in blue ink that reads 'Derek L. Hug'.

Derek L. Hug, P.E., PTOE
Managing Engineer

Enclosures: Additional Crash Data Summary
 Revised Trip Generation Worksheets
 Revised Traffic Volume Figures
 Build Condition Capacity Analysis Worksheets

DLH/

Latte Love Coffee House, LLC
Foster, RI
Crash Data Summary
22028.01
9-Jan-23



Crash Ref. No.	Report No.	Date	Time	On Street	Intersecting Street	Directions of Travel	No. of Vehicles	Injuries	Fatalities	Weather Condition	Road Condition	Lighting	Crash Type	Notes
1	20-4234-AC	01/18/2020	7:14 PM	213 Comstock Pkwy	1145 Scituate Ave	SB/SB	2	0	0	Snow	Snow	Dark-Lighted	Rear End--Front to Rear	2nd Driver left scene
2	20-7394-AC	01/30/2020	11:45 AM	2184 Plainfield Pike	11 Comstock Pkwy	SB	2	0	0	Clear	Dry	Daylight	Rear End--Front to Rear	
3	20-18805-AC	03/17/2020	3:14 PM	41 Comstock Pkwy		NB/SB	2	0	0	Clear	Wet	Daylight	Rear End--Front to Rear	
4	20-29403-AC	05/31/2020	11:59 AM	110 Comstock Pkwy	11 Amflex Dr	NB/NB	2	0	0	Clear	Dry	Daylight	Rear End--Front to Rear	Hit and Run--2nd Driver left scene
5	20-36359-AC	07/14/2020	6:27 AM	2184 Plainfield Pike	11 Comstock Pkwy	NB/NB	2	0	0	Clear	Dry	Daylight	Sideswipe--Same Direction	
6	20-44330-AC	08/20/2020	5:00 AM	2184 Plainfield Pike	11 Comstock Pkwy	EB	1	0	0	Clear	Dry	Dark-Lighted	Driver hit deer	
7	20-59894-AC	10/29/2020	1:36 PM	110 Comstock Pkwy	11 Amflex Dr	SB	1	0	0	Rain	Wet	Daylight	Other--Tail gate openedon truck in front of driver and a tire flew out and driver drove into tire	
8	20-60647-AC	11/02/2020	8:42 AM	1145 Scituate Ave	213 Comstock Pkwy	EB/EB	3	1	0	Clear	Dry	Daylight	Rear End--Front to Rear--Chain reaction	
9	20-63651-AC	11/16/2020	3:29 PM	213 Comstock Pkwy	1145 Scituate Ave	WB/NB	2	0	0	Clear	Dry	Daylight	Angle-Front to Side includes Broadside	
10	20-66076-AC	11/29/2020	3:32 PM	213 Comstock Pkwy	1145 Scituate Ave	NB/NB	2	1	0	Clear	Dry	Daylight	Driver struck juvenile cyclist as it tried to pass cyclist--juvenile possible head injury	
11	21-4959-AC	01/26/2021	5:12 PM	201 Comstock Pkwy	15 W. Industr. Dr	NB/NB	2	0	0	Snow	Snow	Dark-Lighted	Rear End-Front to Rear	
12	21-9665-AC	02/19/2021	7:04 PM	11 Comstock Pkwy		SB/SB	2	0	0	Snow	Snow	Dark-Lighted	Rear End-Front to Rear	
13	21-35276-AC	06/29/2021	3:02 PM	41 Comstock Pkwy		SB/SB	2	0	0	Clear	Dry	Daylight	Rear End-Front to Rear	
14	21-50290-AC	09/13/2021	6:00 PM	11 Comstock Pkwy	2194 Plainfield Pike	EB/EB	2	0	0	Clear	Dry	Daylight	Rear End-Front to Rear	
15	21-51901-AC	09/21/2021	2:51 PM	1145 Scituate Ave	213 Comstock Pkwy	WB/WB	2	0	0	Clear	Dry	Daylight	Rear End-Front to Rear	
16	21-59821-AC	10/30/2021	12:50 PM	11 Comstock Pkwy	2184 Plainfield Pike	NB/NB	2	0	0	Rain	Wet	Daylight	Rear End-Front to Rear	
17	21-61481-AC	11/08/2021	2:05 AM	2184 Plainfield Pike	11 Comstock Pkwy	SB	1	0	0	Clear	Dry	Dark-Lighted	Driver making left hand turn and struck stone wall in intersection	
18	21-64783-AC	11/24/2021	7:45 AM	193 Comstock Pkwy		NB/WB	2	0	0	Clear	Dry	Daylight	Rear End-Front to Rear	
19	21-65263-AC	11/27/2021	12:45 PM	145 Scituate Ave	213 Comstock Pkwy	EB	2	0	0	Clear	Dry	Daylight	Angle-Front to Side Same Direction	
20	21-65508-AC	11/29/2021	8:24 AM	2184 Plainfield Pike	11 Comstock Pkwy	EB/EB	2	0	0	Clear	Dry	Daylight	Angle-Front to Side Same Direction	
21	21-65957-AC	12/01/2021	12:01 PM	1145 Scituate Ave	213 Comstock Pkwy	WB/WB	2	0	0	Clear	Dry	Daylight	Rear End-Front to Rear	
22	21-66450-AC	12/03/2021	4:30 PM	1145 Scituate Ave	213 Comstock Pkwy	SB/NB	2	0	0	Clear	Dry	Dark-Lighted	Sideswipe--Driver #1 sited with DUI	
23	21-66473-AC	12/03/2021	7:08 PM	1145 Scituate Ave	213 Comstock Pkwy	NB/EB	2	0	0	Clear	Dry	Dark-Lighted	Sideswipe-Same Direction	
24	21-67053-AC	12/06/2021	6:05 PM	11 Amflex Drive	110 Comstock Pkwy	Unkown	1	0	0	Rain	Wet	Dark-Lighted	Vehicle hit right front bumper of this vehicle. Didn't know until driver got home and saw car	
25	21-67732-AC	12/10/2021	3:26 PM	1145 Scituate Ave	213 Comstock Pkwy	EB/EB	2	0	0	Clear	Dry	Daylight	Rear End-Front to Rear	
26	21-68043-AC	12/12/2021	5:56 PM	11 Comstock Pkwy	2184 Plainfield Pike	SB/NB	2	1	0	Clear	Dry	Dark-Lighted	Head On - Front to Front	
27	21-70187-AC	12/24/2021	9:02 AM	110 Comstock Pkwy	11 Amflex Dr	WB	1	0	0	Snow	Snow	Daylight	Vehicle slid across street with slippery conditions and hit a curb	

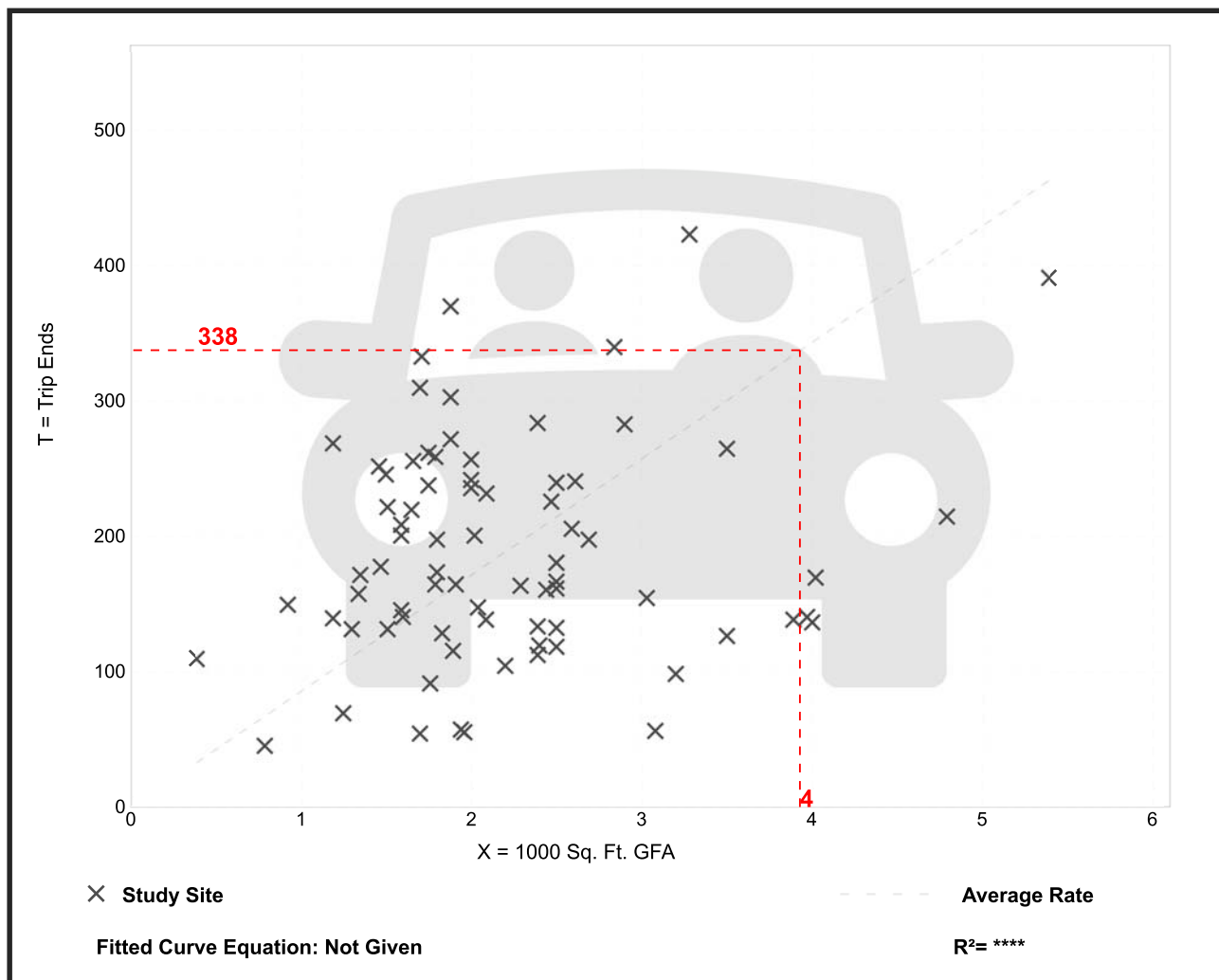
Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 78
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
85.88	18.51 - 282.05	44.92

Data Plot and Equation



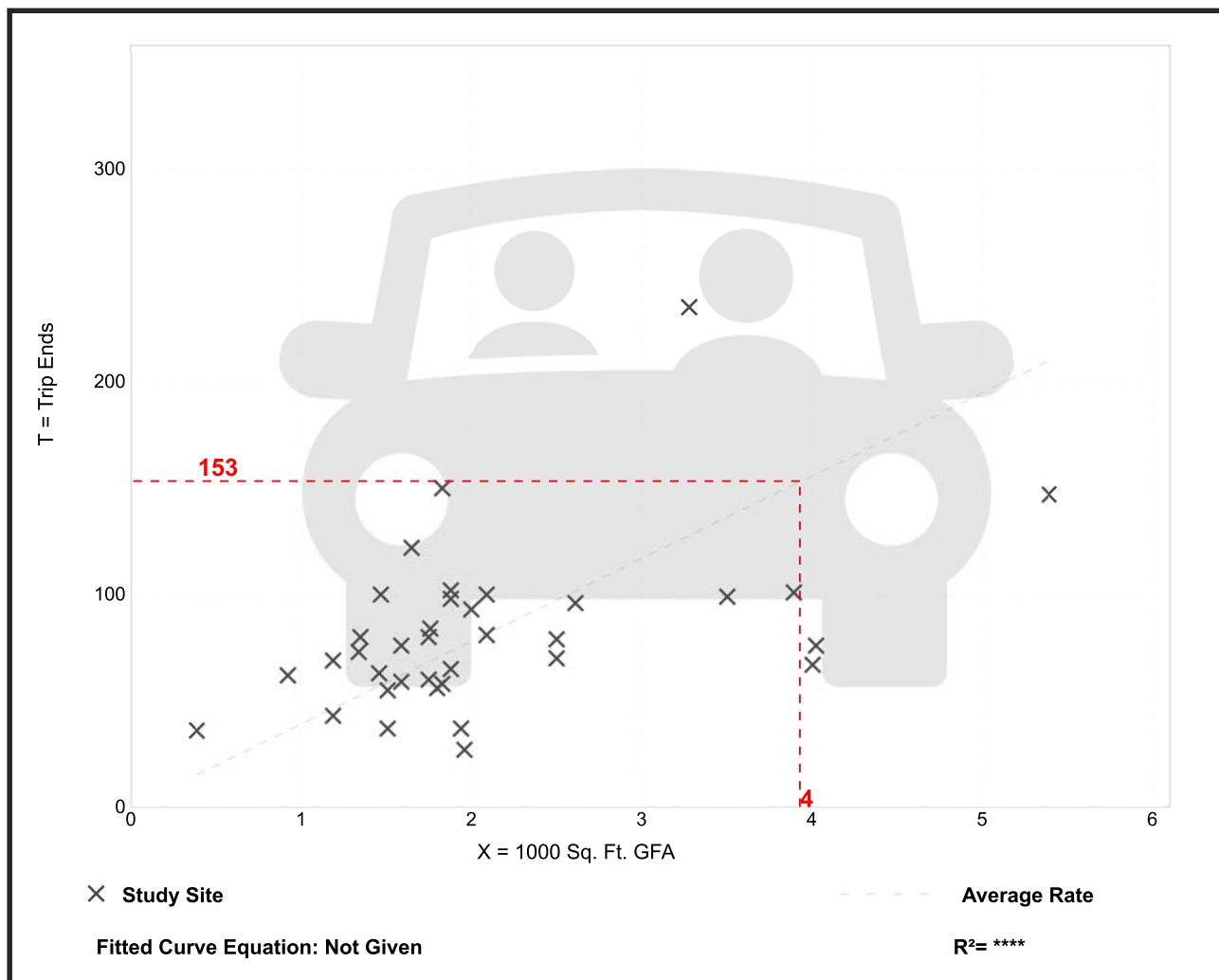
Coffee/Donut Shop with Drive-Through Window (937)

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: 36
 Avg. 1000 Sq. Ft. GFA: 2
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
38.99	13.78 - 92.31	17.79

Data Plot and Equation



Strip Retail Plaza (<40k) (822)

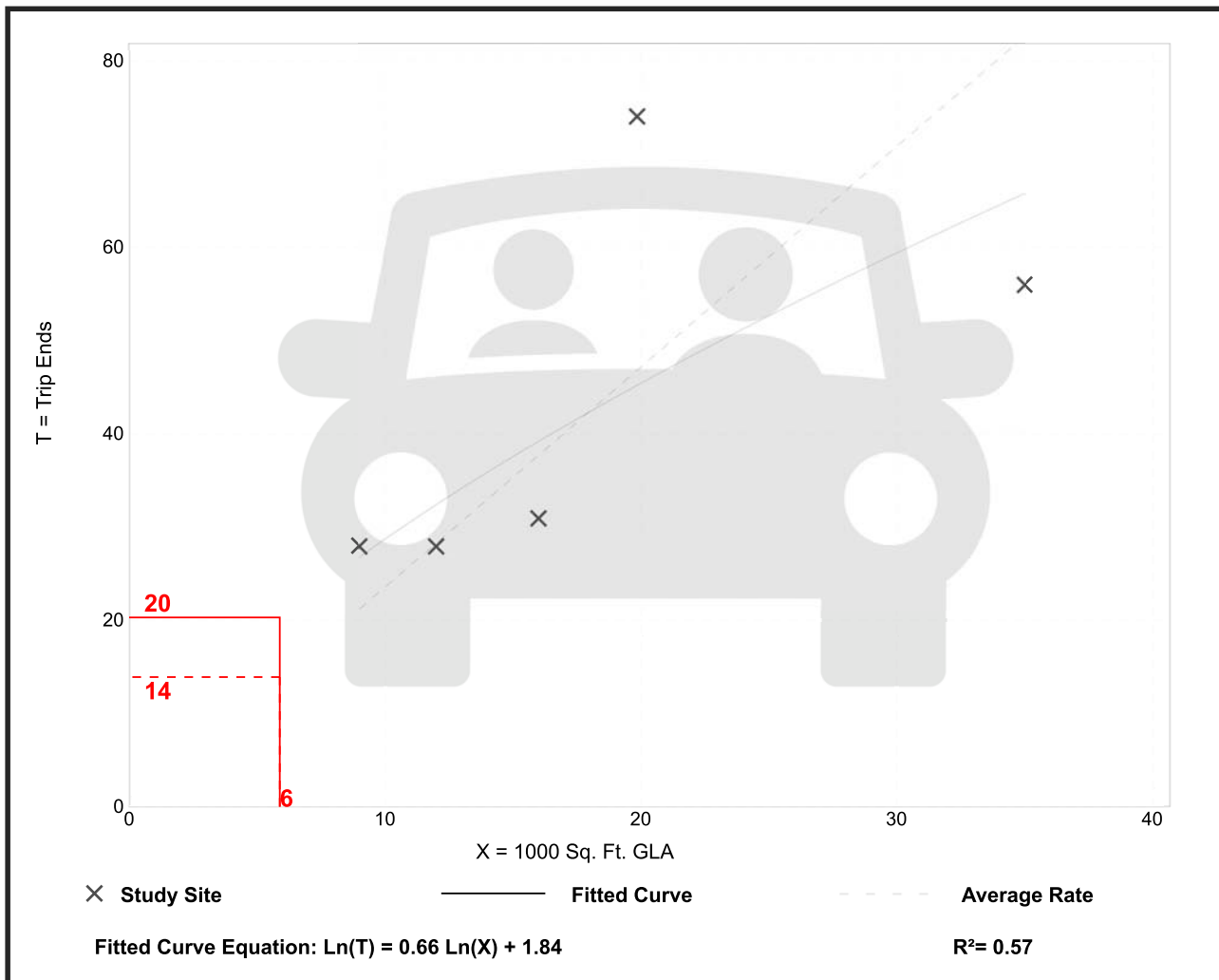
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 5
 Avg. 1000 Sq. Ft. GLA: 18
 Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
2.36	1.60 - 3.73	0.94

Data Plot and Equation

Caution – Small Sample Size



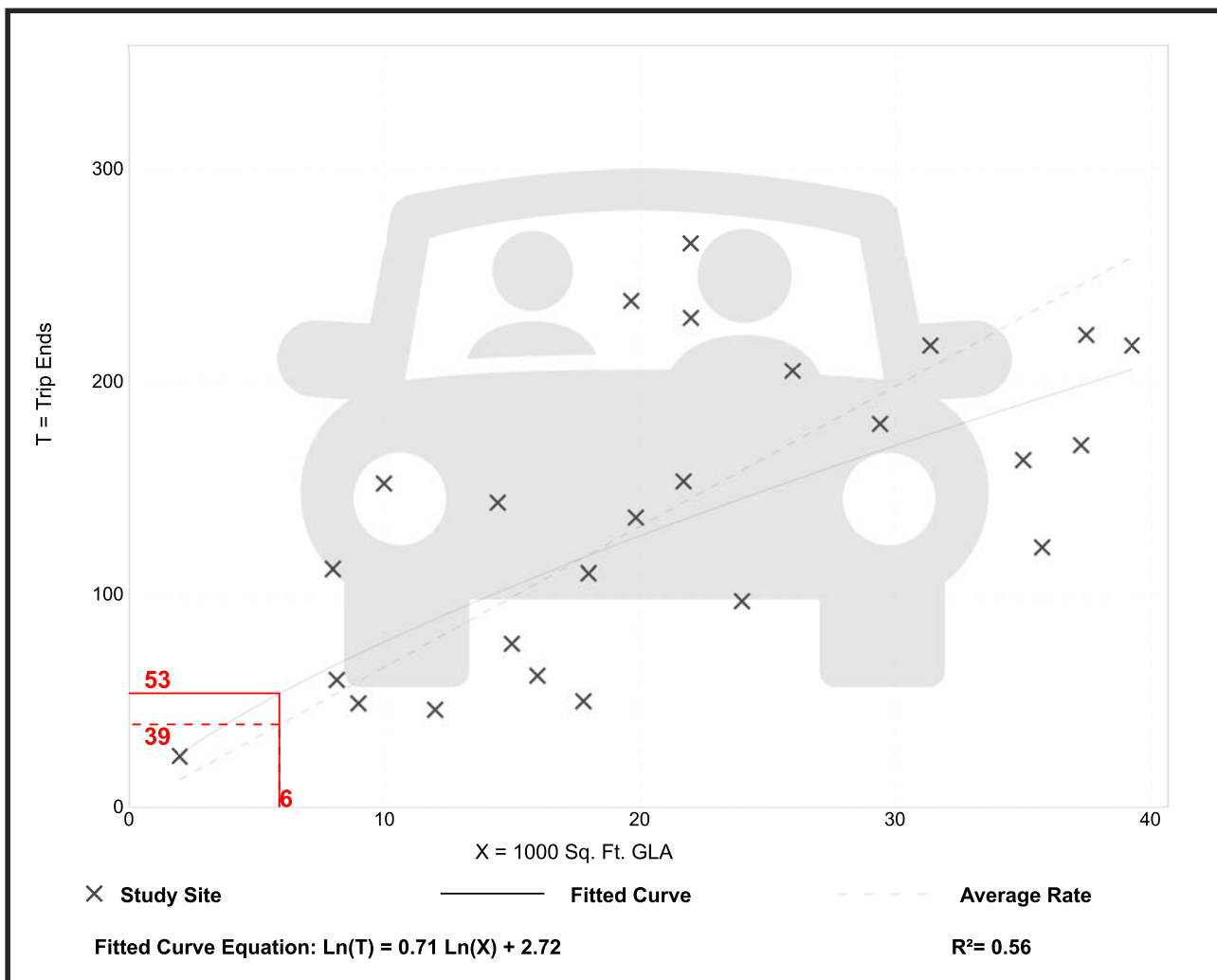
Strip Retail Plaza (<40k) (822)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 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: 25
 Avg. 1000 Sq. Ft. GLA: 21
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.59	2.81 - 15.20	2.94

Data Plot and Equation



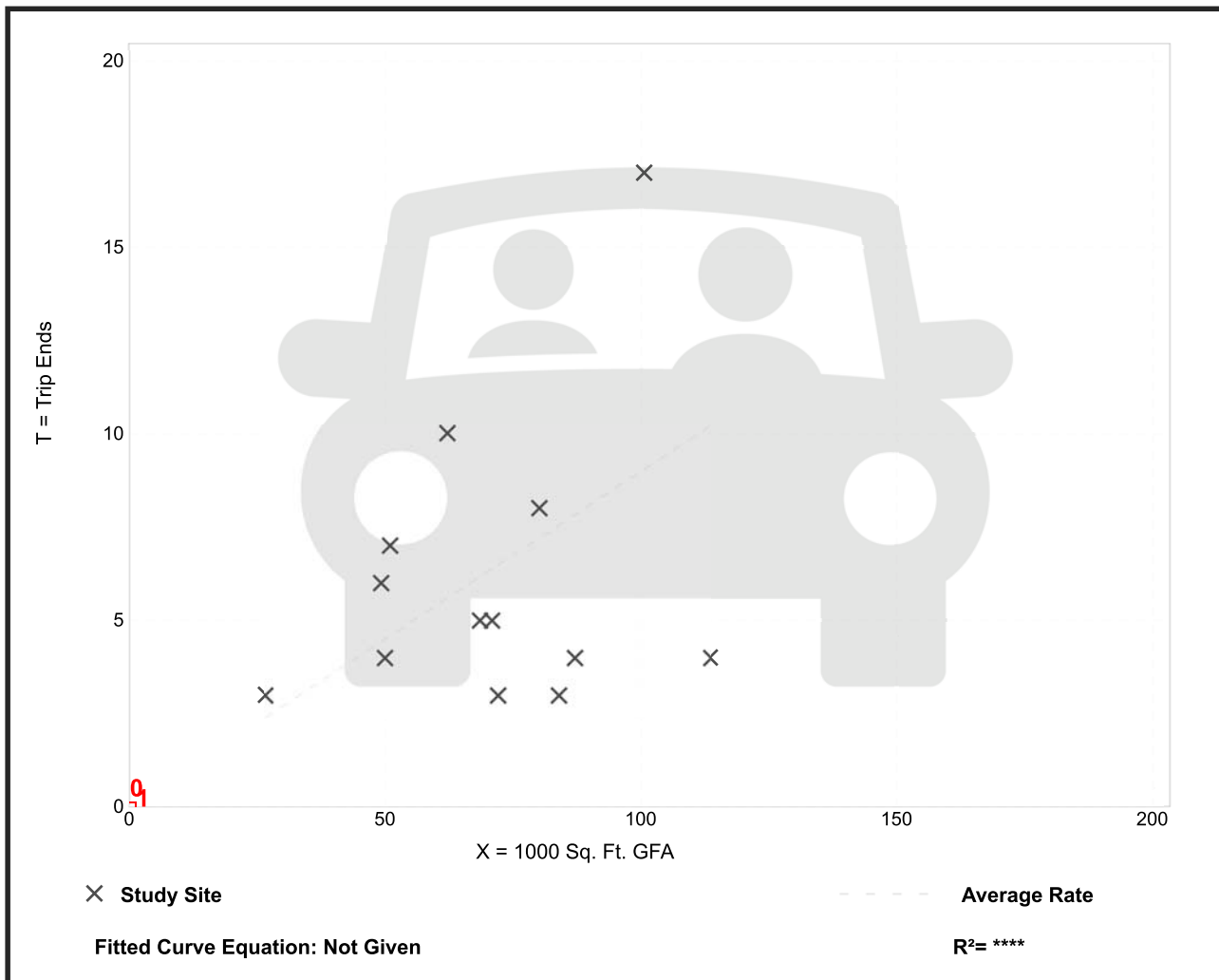
Mini-Warehouse (151)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 13
 Avg. 1000 Sq. Ft. GFA: 70
 Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.09	0.04 - 0.17	0.05

Data Plot and Equation



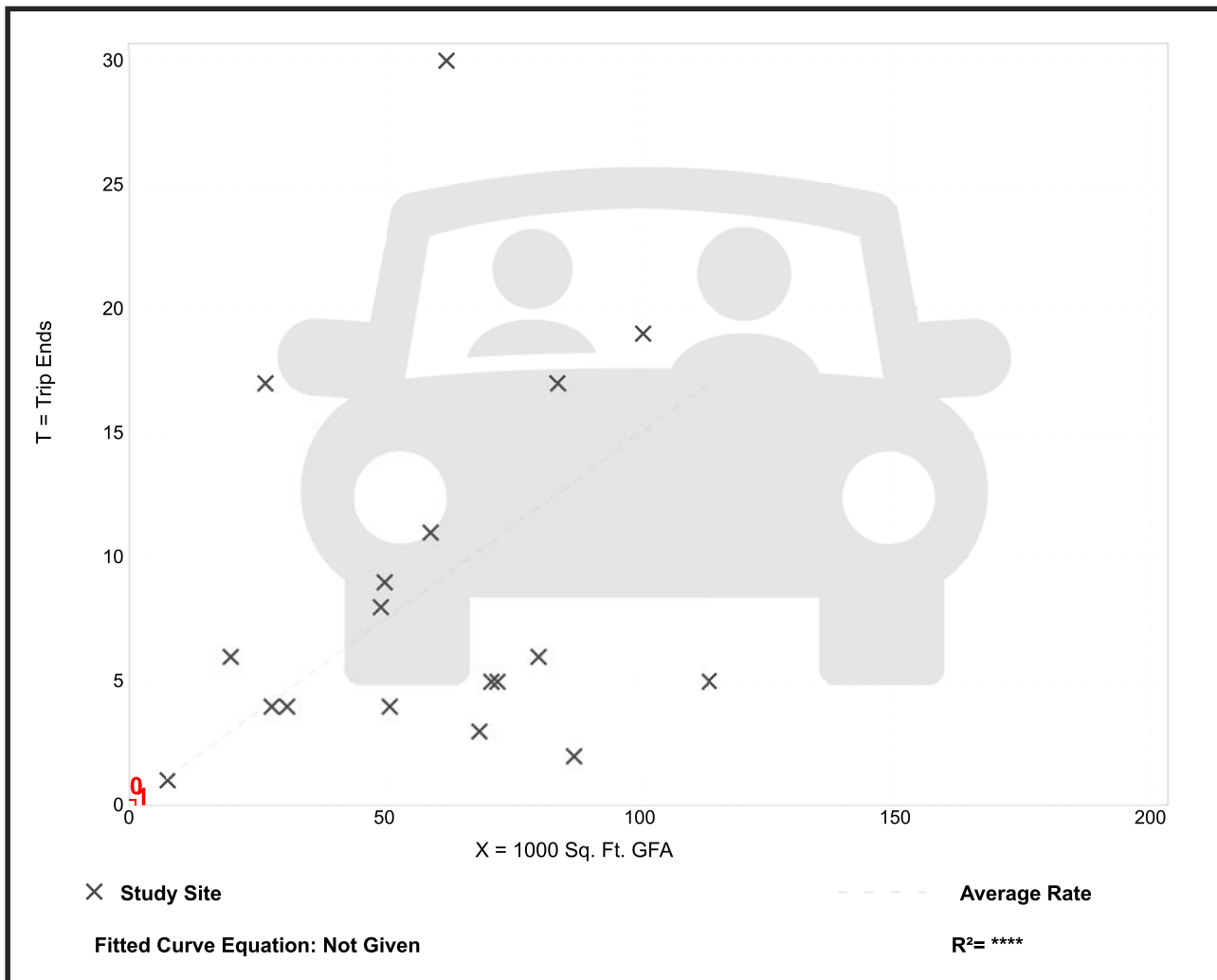
Mini-Warehouse (151)

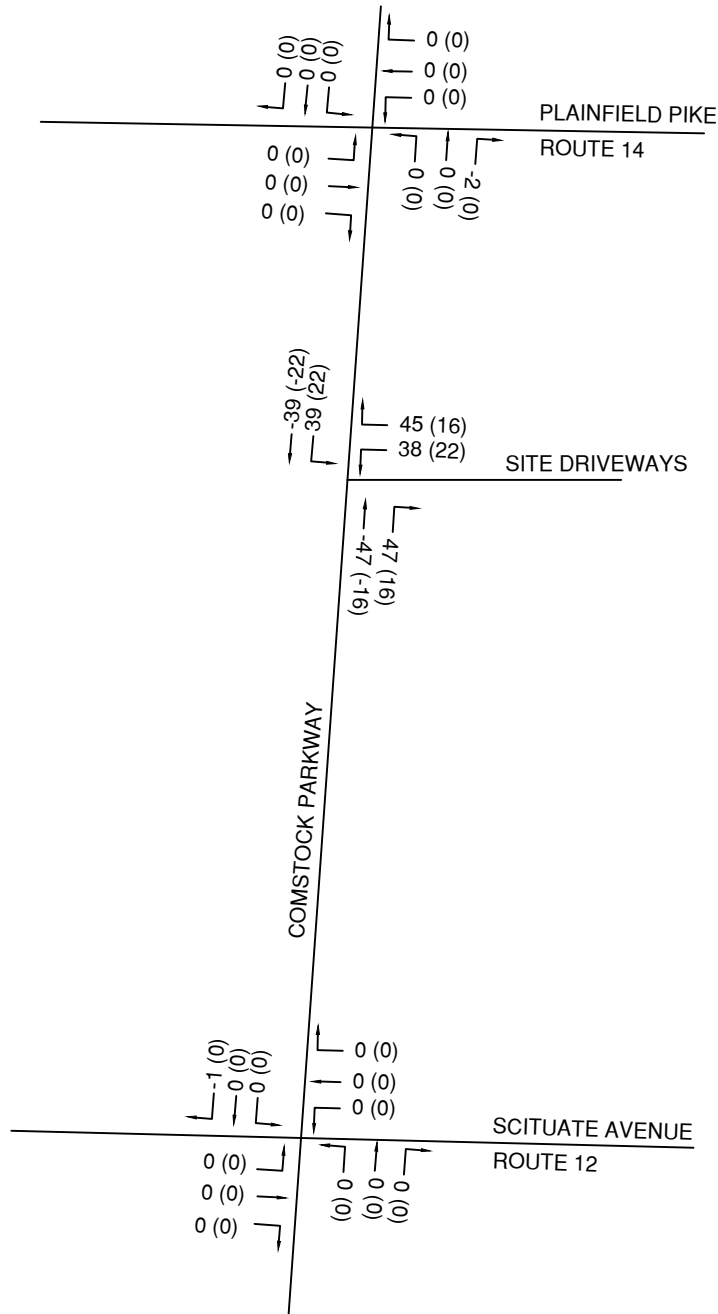
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 18
 Avg. 1000 Sq. Ft. GFA: 59
 Directional Distribution: 47% entering, 53% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.02 - 0.64	0.14

Data Plot and Equation





WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES
(WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES)

Project No. 22028.00

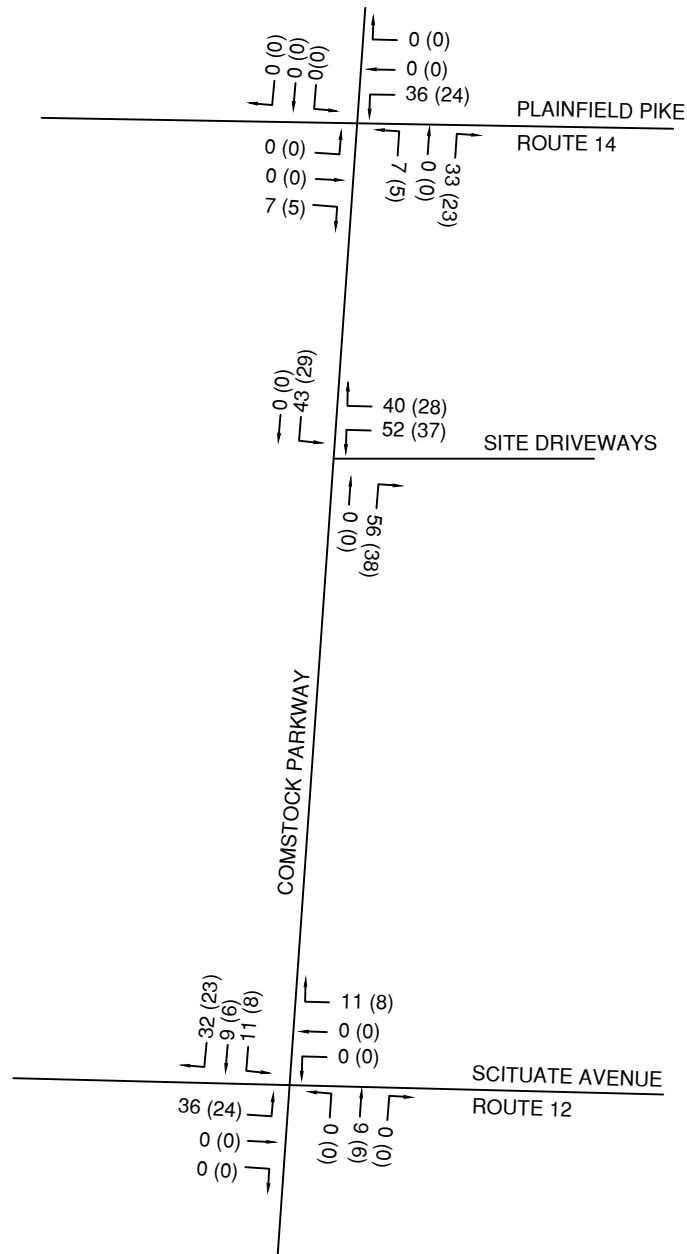
Date: March 2023



PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100

Figure 5
Site Generated Pass-By Traffic Volumes

Comstock Commons
Cranston, Rhode Island



WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES
(WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES)

Project No. 22028.00

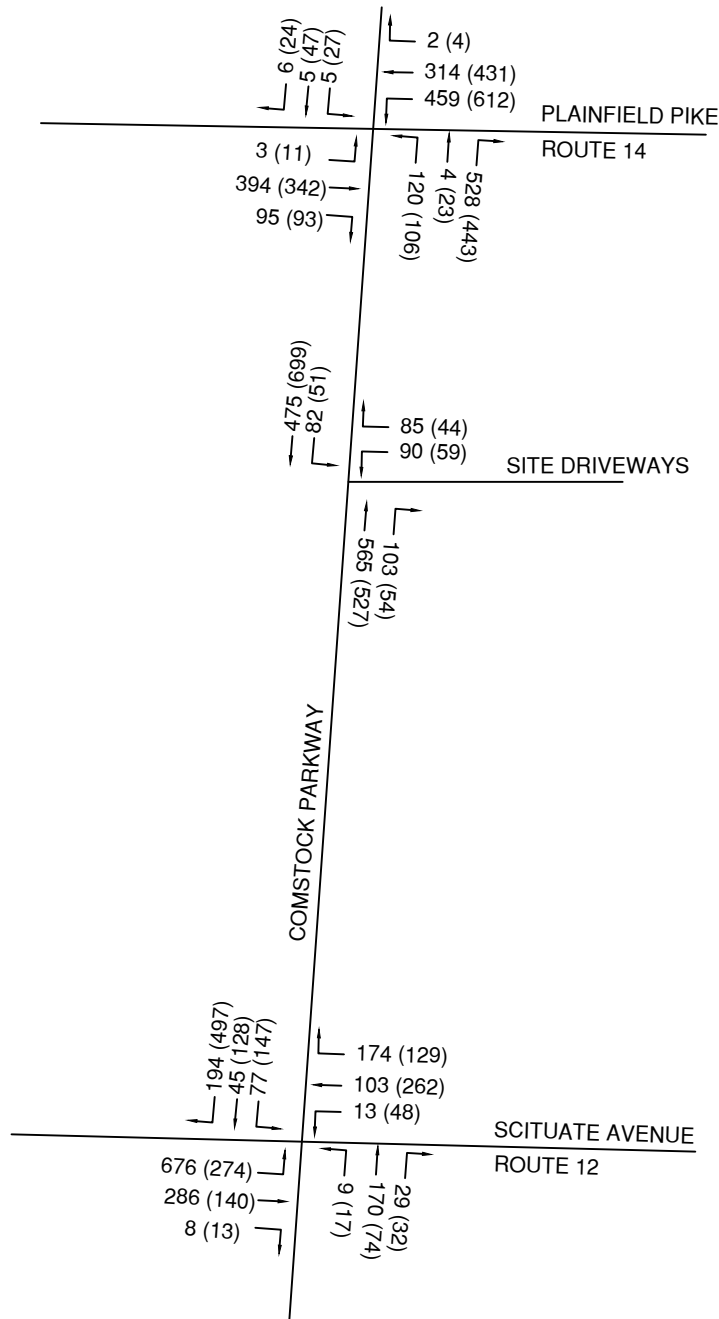
Date: March 2023



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401-334-4100

Figure 6
Site Generated New Traffic Volumes

Comstock Commons
Cranston, Rhode Island



WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES
(WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES)



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Project No. 22028.00

Date: March 2023

Figure 7
Future (2027) Build Peak Hour Traffic Volumes





















Comstock Commons
Cranston, Rhode Island

Lanes, Volumes, Timings

Build Condition

3: Comstock Parkway/CVS Drive & Plainfield Pike (Route 14)

AM Peak













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	394	95	459	314	2	120	4	528	5	5	6
Future Volume (vph)	3	394	95	459	314	2	120	4	528	5	5	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	117		0	470		0	0		230	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.971			0.999				0.850		0.949	
Flt Protected	0.950			0.950				0.954			0.985	
Satd. Flow (prot)	1805	1737	0	1736	1758	0	0	1813	1615	0	1740	0
Flt Permitted	0.566			0.242				0.711			0.877	
Satd. Flow (perm)	1075	1737	0	442	1758	0	0	1351	1615	0	1549	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			1				477		11	
Link Speed (mph)		30			30				30		30	
Link Distance (ft)		533			520				594		116	
Travel Time (s)		12.1			11.8				13.5		2.6	
Peak Hour Factor	0.93	0.93	0.93	0.98	0.98	0.98	0.92	0.92	0.92	0.54	0.54	0.54
Heavy Vehicles (%)	0%	7%	3%	4%	8%	0%	0%	0%	0%	3%	0%	3%
Adj. Flow (vph)	3	424	102	468	320	2	130	4	574	9	9	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	526	0	468	322	0	0	134	574	0	29	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Over	Perm	NA	
Protected Phases	5	2		1	6			3	1		7	
Permitted Phases	2			6			3			7		
Detector Phase	5	2		1	6		3	3	1	7	7	
Switch Phase												
Minimum Initial (s)	4.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	8.5	33.5		10.5	11.5		11.0	11.0	10.5	11.0	11.0	
Total Split (s)	14.5	35.5		34.5	55.5		20.0	20.0	34.5	20.0	20.0	
Total Split (%)	16.1%	39.4%		38.3%	61.7%		22.2%	22.2%	38.3%	22.2%	22.2%	
Maximum Green (s)	10.0	30.0		30.0	50.0		15.0	15.0	30.0	15.0	15.0	
Yellow Time (s)	3.5	4.5		3.5	4.5		3.0	3.0	3.5	3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	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)	4.5	5.5		4.5	5.5			5.0	4.5		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	2.7	2.9		2.7	2.9		2.4	2.4	2.7	2.4	2.4	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		5.0					5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		23.0					10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)		0					0	0		0	0	
Act Effect Green (s)	34.0	27.0		53.1	52.6			11.8	20.0		11.6	
Actuated g/C Ratio	0.48	0.38		0.75	0.74			0.17	0.28		0.16	
v/c Ratio	0.01	0.79		0.67	0.25			0.60	0.72		0.11	
Control Delay	7.7	33.1		12.8	6.0			44.5	10.8		23.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	

Lanes, Volumes, Timings

Build Condition

3: Comstock Parkway/CVS Drive & Plainfield Pike (Route 14)

AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	7.7	33.1		12.8	6.0			44.5	10.8		23.9	
LOS	A	C		B	A			D	B		C	
Approach Delay		33.0			10.0			17.2			23.9	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)	0	214		80	46			62	37		8	
Queue Length 95th (ft)	3	#469		195	126			#135	147		17	
Internal Link Dist (ft)		453			440			514			36	
Turn Bay Length (ft)	117			470					230			
Base Capacity (vph)	709	829		943	1334			320	1016		375	
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	0.00	0.63		0.50	0.24			0.42	0.56		0.08	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 71

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 18.6

Intersection LOS: B

Intersection Capacity Utilization 78.0%







ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.









Splits and Phases: 3: Comstock Parkway/CVS Drive & Plainfield Pike (Route 14)

		
Ø1	Ø2	Ø3
34.5 s	35.5 s	20 s
		
Ø5	Ø6	Ø7
14.5 s	55.5 s	20 s

Lanes, Volumes, Timings
6: Comstock Parkway & Scituate Avenue (Route 12)

Build Condition













AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	676	286	8	13	103	174	9	170	29	77	45	194
Future Volume (vph)	676	286	8	13	103	174	9	170	29	77	45	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	89		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.906			0.981				0.850
Flt Protected	0.950			0.950				0.998			0.969	
Satd. Flow (prot)	1787	1892	0	1671	1688	0	0	1850	0	0	1787	1538
Flt Permitted	0.310			0.568				0.985			0.507	
Satd. Flow (perm)	583	1892	0	999	1688	0	0	1826	0	0	935	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			101			9				200
Link Speed (mph)		30			30			30				30
Link Distance (ft)		589			651			181			2354	
Travel Time (s)		13.4			14.8			4.1			53.5	
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.86	0.86	0.86	0.97	0.97	0.97
Heavy Vehicles (%)	1%	0%	0%	8%	2%	2%	13%	0%	0%	3%	3%	5%
Adj. Flow (vph)	727	308	9	14	113	191	10	198	34	79	46	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	727	317	0	14	304	0	0	242	0	0	125	200
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	1			2			8			4	
Permitted Phases	2	2		2			8			4		4
Detector Phase	1	1		2	2		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	12.0	12.0		12.0	12.0		20.0	20.0		20.0	20.0	20.0
Total Split (s)	35.0	35.0		25.0	25.0		20.0	20.0		20.0	20.0	20.0
Total Split (%)	43.8%	43.8%		31.3%	31.3%		25.0%	25.0%		25.0%	25.0%	25.0%
Maximum Green (s)	30.0	30.0		20.0	20.0		15.0	15.0		15.0	15.0	15.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.7	2.7		2.7	2.7		2.7	2.7		2.7	2.7	2.7
Recall Mode	Min	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	40.5	45.7		13.6	13.6			13.6			13.6	13.6
Actuated g/C Ratio	0.58	0.66		0.20	0.20			0.20			0.20	0.20
v/c Ratio	0.90	0.26		0.07	0.74			0.67			0.69	0.43
Control Delay	30.7	5.4		24.5	29.7			37.3			50.9	8.0
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	30.7	5.4		24.5	29.7			37.3			50.9	8.0
LOS	C	A		C	C			D			D	A
Approach Delay		23.0			29.5			37.3			24.5	

Lanes, Volumes, Timings

6: Comstock Parkway & Scituate Avenue (Route 12)

Build Condition
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	C			C			D			C		
Queue Length 50th (ft)	229	50		5	88			99			53	0
Queue Length 95th (ft)	#466	80		20	170			#181			#143	53
Internal Link Dist (ft)	509			571			101			2274		
Turn Bay Length (ft)	300				89							150
Base Capacity (vph)	893	1232		296	572			413			208	498
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	0.81	0.26		0.05	0.53			0.59			0.60	0.40

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 69.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 26.1

Intersection LOS: C

Intersection Capacity Utilization 88.0%

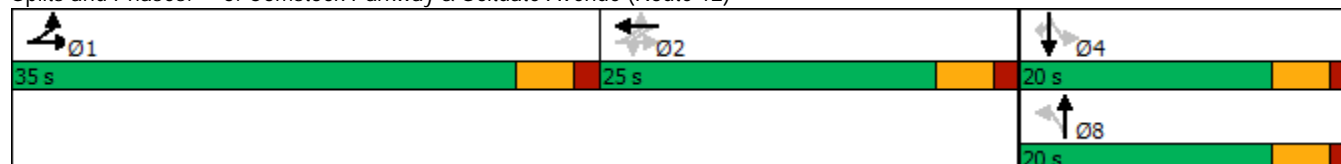
ICU Level of Service E

Analysis Period (min) 15

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





Queue shown is maximum after two cycles.

Splits and Phases: 6: Comstock Parkway & Scituate Avenue (Route 12)



HCM 6th TWSC
9: Comstock Parkway & Site Driveway

Build Condition
AM Peak









Intersection							
Int Delay, s/veh	6.3						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	90	85	565	103	82	475	
Future Vol, veh/h	90	85	565	103	82	475	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	0	-	-	-	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	98	92	614	112	89	516	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	1364	670	0	0	726	0	
Stage 1	670	-	-	-	-	-	
Stage 2	694	-	-	-	-	-	
Critical Hdwy	6.42	6.22	-	-	4.12	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	-	
Follow-up Hdwy	3.518	3.318	-	-	2.218	-	
Pot Cap-1 Maneuver	163	457	-	-	877	-	
Stage 1	509	-	-	-	-	-	
Stage 2	496	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	140	457	-	-	877	-	
Mov Cap-2 Maneuver	140	-	-	-	-	-	
Stage 1	509	-	-	-	-	-	
Stage 2	426	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	46.1	0		1.4			
HCM LOS	E						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	140	457	877	-
HCM Lane V/C Ratio		-	-	0.699	0.202	0.102	-
HCM Control Delay (s)		-	-	75.5	14.9	9.6	0
HCM Lane LOS		-	-	F	B	A	A
HCM 95th %tile Q(veh)		-	-	4	0.7	0.3	-

Lanes, Volumes, Timings

Build Condition

3: Comstock Parkway/CVS Drive & Plainfield Pike (Route 14)

PM Peak













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	342	93	612	431	4	106	23	443	27	47	24
Future Volume (vph)	11	342	93	612	431	4	106	23	443	27	47	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	117		0	470		0	0		230	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.968			0.999				0.850		0.967	
Flt Protected	0.950			0.950				0.960			0.986	
Satd. Flow (prot)	1805	1776	0	1736	1759	0	0	1824	1615	0	1784	0
Flt Permitted	0.497			0.216				0.693			0.843	
Satd. Flow (perm)	944	1776	0	395	1759	0	0	1317	1615	0	1525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			1				459		16	
Link Speed (mph)		30			30				30		30	
Link Distance (ft)		533			520				594		116	
Travel Time (s)		12.1			11.8				13.5		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.78	0.78	0.78	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	2%	4%	8%	0%	0%	0%	0%	3%	0%	3%
Adj. Flow (vph)	12	372	101	651	459	4	136	29	568	30	52	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	473	0	651	463	0	0	165	568	0	109	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Over	Perm	NA	
Protected Phases	5	2		1	6			3	1		7	
Permitted Phases	2			6			3			7		
Detector Phase	5	2		1	6		3	3	1	7	7	
Switch Phase												
Minimum Initial (s)	4.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	8.5	11.5		10.5	11.5		11.0	11.0	10.5	11.0	11.0	
Total Split (s)	14.5	35.5		34.5	55.5		20.0	20.0	34.5	20.0	20.0	
Total Split (%)	16.1%	39.4%		38.3%	61.7%		22.2%	22.2%	38.3%	22.2%	22.2%	
Maximum Green (s)	10.0	30.0		30.0	50.0		15.0	15.0	30.0	15.0	15.0	
Yellow Time (s)	3.5	4.5		3.5	4.5		3.0	3.0	3.5	3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	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)	4.5	5.5		4.5	5.5			5.0	4.5		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	2.7	2.9		2.7	2.9		2.4	2.4	2.7	2.4	2.4	
Recall Mode	None	Min		None	Min		None	None	None	None	None	
Walk Time (s)		5.0					5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		23.0					10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)		0					0	0		0	0	
Act Effect Green (s)	31.5	24.9		57.4	54.5			13.3	26.8		13.3	
Actuated g/C Ratio	0.39	0.31		0.71	0.68			0.17	0.33		0.17	
v/c Ratio	0.03	0.84		0.90	0.39			0.76	0.67		0.41	
Control Delay	8.4	41.1		31.6	7.5			57.9	9.8		33.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	

Lanes, Volumes, Timings

Build Condition

3: Comstock Parkway/CVS Drive & Plainfield Pike (Route 14)

PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	8.4	41.1		31.6	7.5			57.9	9.8		33.9	
LOS	A	D		C	A			E	A		C	
Approach Delay		40.3			21.6			20.6			33.9	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	2	233		230	85			88	42		46	
Queue Length 95th (ft)	7	#386		#451	197			#147	78		98	
Internal Link Dist (ft)		453			440			514			36	
Turn Bay Length (ft)	117			470					230			
Base Capacity (vph)	535	692		796	1269			253	903		305	
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	0.02	0.68		0.82	0.36			0.65	0.63		0.36	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 80.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 25.6

Intersection LOS: C

Intersection Capacity Utilization 83.8%







ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Comstock Parkway/CVS Drive & Plainfield Pike (Route 14)




















		
Ø1	Ø2	Ø3
34.5 s	35.5 s	20 s
		
Ø5	Ø6	Ø7
14.5 s	55.5 s	20 s

Lanes, Volumes, Timings

6: Comstock Parkway & Scituate Avenue (Route 12)













Build Condition

PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	274	140	13	48	262	129	17	74	32	147	128	497
Future Volume (vph)	274	140	13	48	262	129	17	74	32	147	128	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	89		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.950			0.965				0.850
Flt Protected	0.950			0.950				0.993			0.974	
Satd. Flow (prot)	1805	1858	0	1805	1781	0	0	1821	0	0	1851	1615
Flt Permitted	0.302			0.653				0.927			0.797	
Satd. Flow (perm)	574	1858	0	1241	1781	0	0	1700	0	0	1514	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			44			25				512
Link Speed (mph)		30			30			30				30
Link Distance (ft)		589			651			181			2354	
Travel Time (s)		13.4			14.8			4.1			53.5	
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.86	0.86	0.86	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	295	151	14	53	288	142	20	86	37	152	132	512
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	165	0	53	430	0	0	143	0	0	284	512
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	1			2			8			4	
Permitted Phases	2	2		2			8			4		4
Detector Phase	1	1		2	2		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	12.0	12.0		12.0	12.0		20.0	20.0		20.0	20.0	20.0
Total Split (s)	15.0	15.0		30.0	30.0		20.0	20.0		20.0	20.0	20.0
Total Split (%)	23.1%	23.1%		46.2%	46.2%		30.8%	30.8%		30.8%	30.8%	30.8%
Maximum Green (s)	10.0	10.0		25.0	25.0		15.0	15.0		15.0	15.0	15.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.7	2.7		2.7	2.7		2.7	2.7		2.7	2.7	2.7
Recall Mode	Min	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	26.3	31.4		17.1	17.1			14.1			14.1	14.1
Actuated g/C Ratio	0.47	0.56		0.31	0.31			0.25			0.25	0.25
v/c Ratio	0.62	0.16		0.14	0.75			0.32			0.74	0.65
Control Delay	13.1	5.6		14.7	24.3			18.5			35.9	6.9
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	13.1	5.6		14.7	24.3			18.5			35.9	6.9
LOS	B	A		B	C			B			D	A
Approach Delay		10.4			23.3			18.5			17.2	

Lanes, Volumes, Timings
6: Comstock Parkway & Scituate Avenue (Route 12)

Build Condition
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B			C			B			B		
Queue Length 50th (ft)	47	22		13	118			32			88	0
Queue Length 95th (ft)	80	43		34	204			79			#226	70
Internal Link Dist (ft)	509			571			101			2274		
Turn Bay Length (ft)	300				89							150
Base Capacity (vph)	507	1008		570	842			486			417	815
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	0.58	0.16		0.09	0.51			0.29			0.68	0.63

Intersection Summary

Area Type: Other

Cycle Length: 65

Actuated Cycle Length: 55.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 71.7%





ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.





Splits and Phases: 6: Comstock Parkway & Scituate Avenue (Route 12)

		
Ø1	Ø2	Ø4
15 s	30 s	20 s
		
		Ø8
		20 s

HCM 6th TWSC

9: Comstock Parkway & Site Driveway

Build Condition
PM Peak

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	59	44	527	54	51	699
Future Vol, veh/h	59	44	527	54	51	699
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	48	573	59	55	760
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1473	603	0	0	632	0
Stage 1	603	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	140	499	-	-	951	-
Stage 1	546	-	-	-	-	-
Stage 2	410	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	126	499	-	-	951	-
Mov Cap-2 Maneuver	126	-	-	-	-	-
Stage 1	546	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	39.9	0	0.6			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 126 499	951	-		
HCM Lane V/C Ratio	-	- 0.509 0.096	0.058	-		
HCM Control Delay (s)	-	- 60 13	9	0		
HCM Lane LOS	-	- F B	A	A		
HCM 95th %tile Q(veh)	-	- 2.4 0.3	0.2	-		