Vanasse & Associates, Inc.
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810
Office 978-474-8800
Fax 978-688-6508

Ref: 7413

December 21, 2018

Ms. Rachna D. Balakrishna
Mason & Murphy, Inc.
1299 Beacon Street
Brookline, MA 02446

Re: Responses to Comments
1299 Beacon Street
Brookline, Massachusetts

Dear Rachna:

Vanasse & Associates, Inc. (VAI) is in receipt of comments from Mr. James D. Fitzgerald (11/27/18) and Mr. Todd Kirrane (11/27/18) and have provided supplemental information. This information is provided below.

James D. Fitzgerald P.E., November 27, 2018 Comments

Comment 1: The comment generally requests updated trip generation information with updated operational analysis and No-Build/Build comparison chart.

Response: VAI has updated trip generation trip estimates utilizing a more conservative approach to the retail trips with a 38% mode split adjustment. The updated trip generation is provided in Table 1. The morning trip estimates are very similar to the original traffic study, but the weekday evening peak hour and the Saturday midday peak hour estimates have increased and therefore the level of service analysis was updated. Tables 2 and 3 summarize the 2025 No-Build and Build analysis. As shown in the tables, even with the more conservative analysis, no change in operation conditions or level of service will result from the project. This is the same result as previously reported.

Table 1
TRIP-GENERATION SUMMARY (UPDATE)

	Residential Trips[a]	Residential Transit Reduction[b]	Retail[c] 7,125 sf	Retail[c] Transit Reduction[d]	Restaurant[f] 3,500 sf	Restaurant[f] Transit Reduction[e]	**Total New Trips**
Weekday Morning Peak Hour:							
Entering	6	-4	11	-4	2	-1	**10**
Exiting	10	-7	7	-3	1	0	**8**
Total	16	-11	18	-7	3	-1	**18**
Weekday Evening Peak Hour:							
Entering	12	-8	26	-10	18	-7	**31**
Exiting	9	-6	26	-10	9	-3	**25**
Total	21	-14	52	-20	27	-10	**56**
Saturday Midday Peak Hour:							
Entering	16	-11	35	-13	22	-8	**41**
Exiting	10	-6	34	-13	16	-6	**35**
Total	26	-17	69	-26	38	-14	**76**

Source: *Institute of Transportation Engineers – Trip Generation 10th Edition*.
[a]Based on ITE trip generation rates for LUC 252 applied to 80 apartments.
[b]Based on 65% percent transit usage for residential use.
[c]Based on ITE LUC 820 applied to 7,125 sf retail space – selected points.
[d]Based on 38% percent transit usage for retail use.
[e]Based on ITE trip generation rates for LUC 931 applied to 3,500 sf quality restaurant space.
[f]Based on 38% percent transit usage for restaurant use.

Table 2
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND QUEUE SUMMARY

Signalized Intersection/ Peak Hour	2025 No-Build				2025 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C[a]	Delay[b]	LOS[c]	Queue[d]
Beacon Street at Harvard Street								
Weekday Evening:	0.46	13.2	B	134/213	0.47	13.3	B	134/213
Beacon Street EB TH	0.32	12.4	B	56/120	0.34	12.8	B	60/129
Beacon Street EB RT	0.61	9.9	B	86/178	0.62	10.1	B	82/148
Beacon Street WB TH	0.20	7.1	A	15/45	0.20	7.4	A	15/38
Beacon Street WB RT	0.71	31.1	C	154/192	0.70	31.0	C	154/192
Harvard Street NB TH/RT	0.71	31.2	C	167/205	0.71	31.2	C	168/206
Harvard Street SB TH/RT	**0.65**	**18.2**	**B**	--	**0.65**	**18.2**	**B**	--
Overall								
Saturday Midday								
Beacon Street EB TH	0.43	12.9	B	119/191	0.43	12.9	B	119/191
Beacon Street EB RT	0.43	14.3	B	81/170	0.45	14.7	B	87/183
Beacon Street WB TH	0.51	9.1	A	87/96	0.52	9.1	A	73/115
Beacon Street WB RT	0.44	9.6	B	30/57	0.44	9.6	A	35/68
Harvard Street NB TH/RT	0.73	31.6	C	163/202	0.73	31.6	C	163/202
Harvard Street SB TH/RT	0.62	28.7	C	144/178	0.62	28.8	C	145/180
Overall	**0.59**	**17.7**	**B**	--	**0.59**	**17.7**	**B**	--
Beacon Street at Pleasant Street								
Weekday Evening								
Beacon Street EB TH	0.45	4.0	A	33/167	0.43	4.1	A	33/274
Beacon Street WB TH/RT	0.50	9.3	A	148/251	0.51	9.4	A	151/255
Pleasant Street SB LT	0.29	31.0	C	42/75	0.29	31.0	C	42/75
Pleasant Street SB RT	0.78	52.0	D	82/135	0.78	52.0	D	82/135
Overall	**0.57**	**11.0**	**B**	--	**0.57**	**11.1**	**B**	--
Saturday Midday								
Beacon Street EB TH	0.43	3.9	A	38/42	0.43	4.0	A	35/42
Beacon Street WB TH/RT	0.47	8.9	A	135/231	0.48	8.9	A	138/236
Pleasant Street SB LT	0.42	32.6	C	63/104	0.42	32.6	C	63/104
Pleasant Street SB RT	0.77	51.4	D	80/132	0.77	51.4	D	80/132
Overall	**0.54**	**11.3**	**B**	--	**0.54**	**11.3**	**B**	--
Beacon Street at Charles Street								
Weekday Evening								
Beacon Street EB LT	0.65	59.4	E	64/121	0.65	59.3	E	64/121
Beacon Street EB TH/RT	0.32	1.8	A	28/33	0.32	1.8	A	28/33
Beacon Street WB TH	0.42	8.5	A	135/174	0.52	9.6	A	183/234
Charles Street NB LT/RT	0.24	38.3	D	19/78	0.33	40.2	D	29/94
Overall	**0.44**	**10.8**	**B**	--	**0.53**	**11.5**	**B**	--
Saturday Midday								
Beacon Street EB LT	0.78	63.1	E	88/188	0.78	63.1	E	88/188
Beacon Street EB TH/RT	0.30	2.3	A	36/42	0.30	2.3	A	36/42
Beacon Street WB TH	0.37	8.8	A	111/146	0.51	10.2	B	170/218
Charles Street NB LT/RT	0.29	38.1	D	18/79	0.41	40.4	D	38/107
Overall	**0.43**	**13.1**	**B**	--	**0.55**	**13.7**	**B**	--

[a]Volume-to-capacity.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Queue length in feet.

Table 3
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND QUEUE SUMMARY

Signalized Intersection/ Peak Hour	2025 No-Build				2025 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C[a]	Delay[b]	LOS[c]	Queue[d]
Harvard Street at Longwood Avenue								
Weekday Evening								
Longwood Avenue LT/RT	221	>50.0	F	251	221	>50.0	F	272
Saturday Midday								
Longwood Avenue LT/RT	227	>50.0	F	229	227	>50.0	F	256
Harvard Street at Stearns Road								
Weekday Evening								
Stearns Road WB LT/TH/RT	279	>50.0	F	336	279	>50.0	F	339
Saturday Midday								
Stearns Road WB LT/TH/RT	197	34.1	D	100	197	34.3	D	101
Sewall Avenue at Longwood Avenue								
Weekday Evening								
Sewall Avenue NB LT/TH/RT	322	>50.0	F	240	325	>50.0	F	281
Saturday Midday								
Sewall Avenue NB LT/TH/RT	118	21.8	C	43	122	24.8	C	51
Sewall Avenue at Site Drive								
Weekday Evening								
Site Drive SB LT	18	11.4	B	3	25	12.0	B	4
Saturday Midday								
Site Drive SB LT	25	10.6	B	3	35	11.3	B	5
Charles Street at Sewall Avenue								
Weekday Evening								
Sewall Avenue EB LT	98	4.5	A	7	117	4.8	A	8
Saturday Midday								
Sewall Avenue EB LT	122	4.5	A	7	148	4.7	A	9
St. Paul Street at Sewall Avenue								
Weekday Evening								
Sewall Avenue EB LT/TH/RT	76	28.8	D	38	82	30.4	D	44
Sewall Avenue WB LT/TH/RT	78	32.6	D	45	79	34.5	D	48
Saturday Midday								
Sewall Avenue EB LT/TH/RT	96	15.8	C	23	105	16.4	C	26
Sewall Avenue WB LT/TH/RT	36	14.0	B	7	37	14.5	B	8

[a]Vehicle Volume
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Queue length in feet.

Comment 2: Vehicle templates should be revised to see if it is feasible to maintain on-street parking.

Response: The attached figure depicts the revised truck template with on-street parking added. As shown, three on-street spaces can be maintained.

<u>Todd Kirrane – November 27, 2018 Comments</u>

Comment 1: ***"The development should be responsible for fully funding construction of the attached safety improvements at the intersection of Sewall and Longwood."***

Response: The Sewall Avenue./Longwood Avenue plan is attached. The project proponent will consider designing and implementing this plan as part of the overall mitigation plan.

Comment 2: ***"…if the ZBA takes the recommendation of the Peer Review consultant and votes to remove parking to meet AASHTO sight lines we would recommend that an equal amount of spaces be made available in the garage for use by the general public. If the garage capacity or operations are unable to meet this shared parking usage model to offset the parking loss then we request that the ZBA approve mitigation of improvements for pedestrians and cyclists to affect mode shift to make up the difference including bicycle facilities on Sewall Avenue and Charles Street between Harvard Street and Beacon Street."***

Response: The project proponent will commit to a comprehensive TDM Plan promoting alternate modes of transportation. In addition, the project proponent is considering the pedestrian improvements at the Sewall Avenue/Longwood Avenue intersection as part of the overall project mitigation.

Comment 3: ***"The proposed TDM should be required to comply with the Town's Transportation Access Plan Guidelines and, among other things***

a. include transit screens in the lobby (an example is in our Public Library and operated via https://transitscreen/com/)

b. extend to employees of the building as well as employees of the retail tenants

c. commit to the required minimum of 30% subsidy for MBTA/BLUE Bike subsidies

d. meet the requirement for EV Charging stations which is "either one parking space or 2% of parking spaces (whichever is greater) be installed with electric vehicle charging stations and that an additional 15% of parking spaces have conduit to accommodate the installation of electric vehicle charging stations in the future."."

Response: The above recommendations will be incorporated into the TDM Plan.

If you should have any questions or require additional information, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

F. Giles Ham, P.E.
Managing Principal

FGH/mef

APPENDIX

TRIP-GENERATION – DOCUMENTATION
NETWORKS - UPDATE
CAPACITY ANALYSIS
TRUCK TEMPLATE PLAN - PARKING
SEWALL AVENUE/LONGWOOD AVENUE PLAN

TRIP-GENERATION - DOCUMENTATION

AM Reference

Graph Look Up

Query | Filter

DATA SOURCE:
ITE-TGM 10th Edition

SEARCH BY LAND USE CODE:
820

LAND USE CATEGORY:
(800-899) Retail

LAND USE :
820 - Shopping Center

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

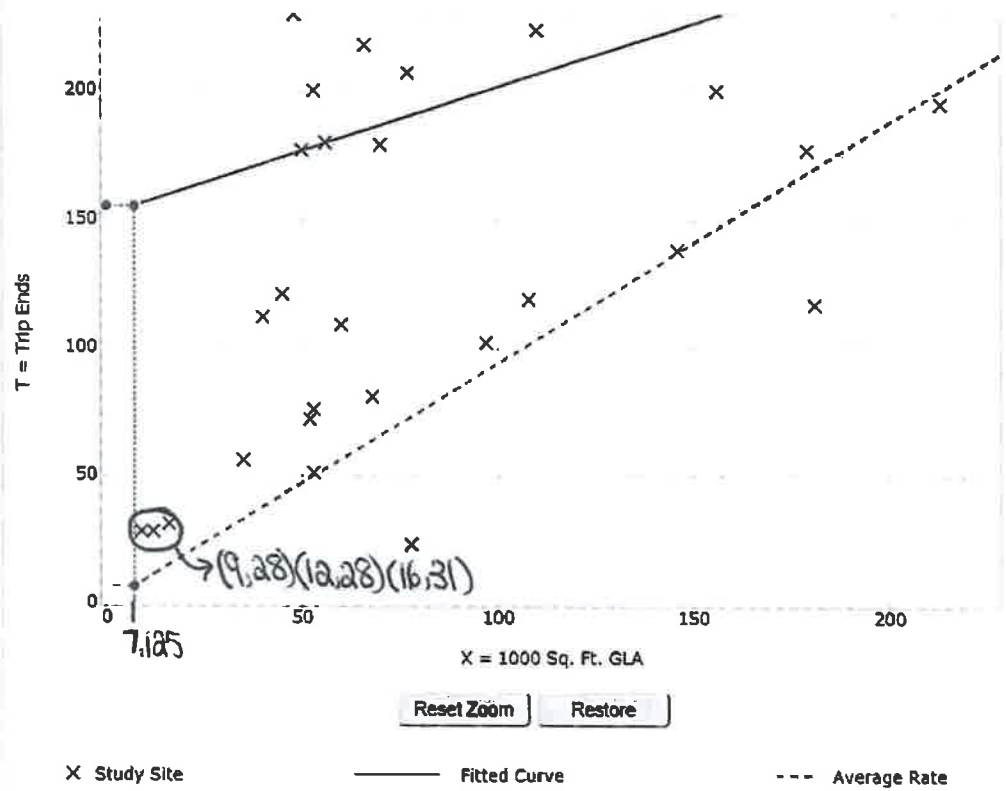
TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
7.13 Calculate

Data Plot and Equation



DATA STATISTICS

1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
84

Avg. 1000 Sq. Ft. GLA:
351

Average Rate:
0.94

Range of Rates:
0.18 - 23.74

Standard Deviation:
0.87

Fitted Curve Equation:
T = 0.50(X) + 151.78

R^2:
0.50

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 7 (Total), 4 (Entry), 3 (Exit)
Fitted Curve: 155 (Total), 96 (Entry), 59 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

3.11 2.33 1.93 Avc rate = 2.46

PM Reference

Graph Look Up

Query | Filter

DATA SOURCE:
ITE-TGM 10th Edition

SEARCH BY LAND USE CODE:
820

LAND USE CATEGORY:
(800-899) Retail

LAND USE :
820 - Shopping Center

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

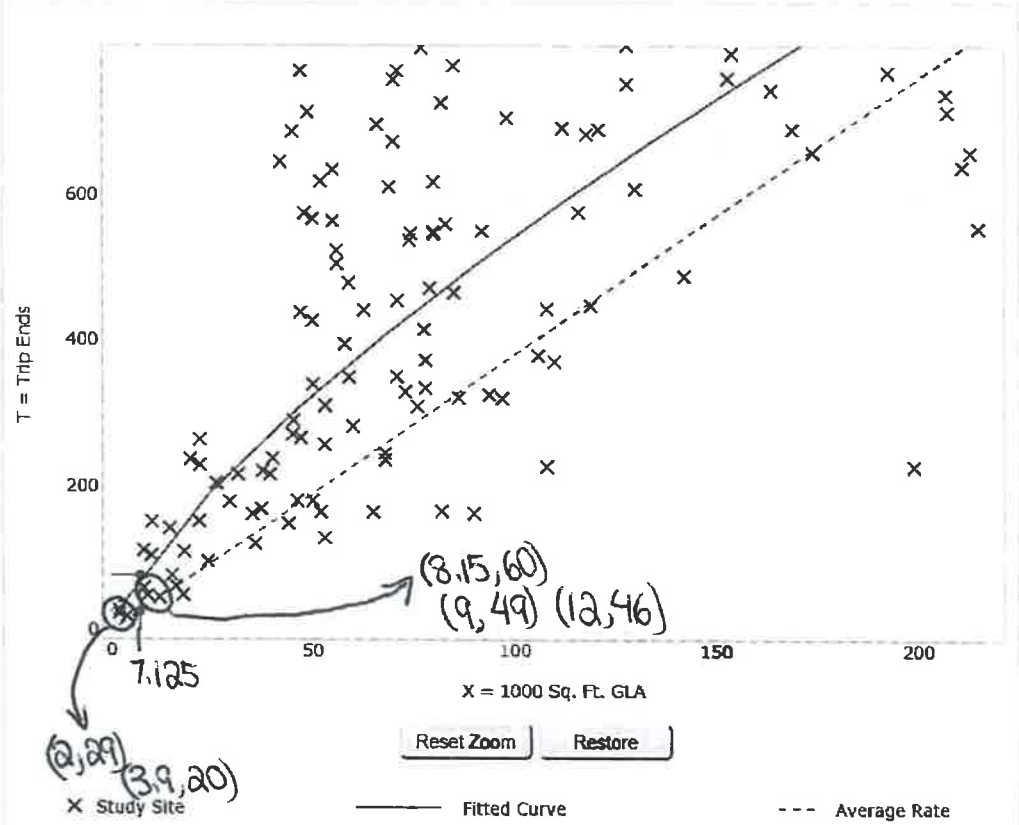
TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
7.13 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
261

Avg. 1000 Sq. Ft. GLA:
327

Average Rate:
3.81

Range of Rates:
0.74 - 18.69

Standard Deviation:
2.04

Fitted Curve Equation:
Ln(T) = 0.74 Ln(X) + 2.89

R^2:
0.82

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 27 (Total), 13 (Entry), 14 (Exit)
Fitted Curve: 77 (Total), 37 (Entry), 40 (Exit)

14.5
5.12

7.36
5.44
3.83

AVE - 7.25
rate

Saturday Reference

Graph Look Up

Query | Filter

DATA SOURCE:
ITE-TGM 10th Edition

SEARCH BY LAND USE CODE:
820

LAND USE CATEGORY:
(800-899) Retail

LAND USE :
820 - Shopping Center

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

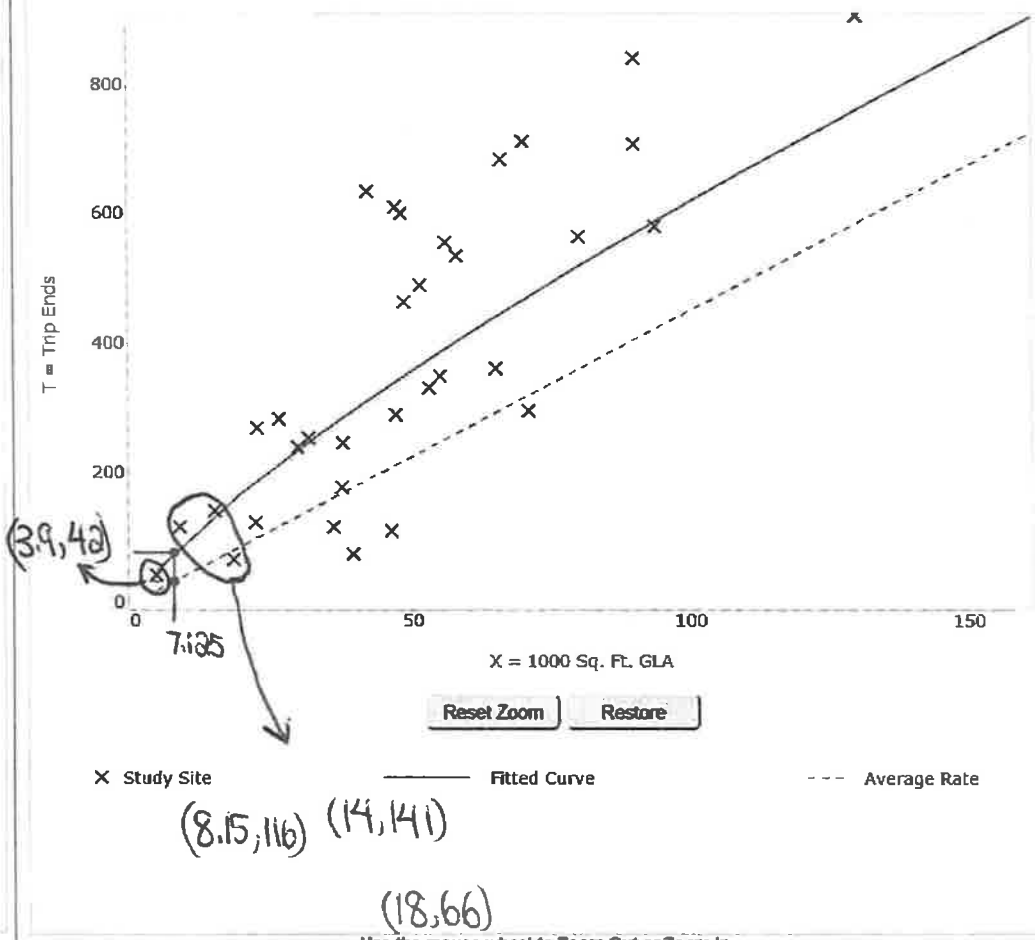
TIME PERIOD:
Saturday, Peak Hour of Generator

SETTING/LOCATION:
General Urban/Suburban

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
7.13 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
119

Avg. 1000 Sq. Ft. GLA:
416

Average Rate:
4.50

Range of Rates:
1.42 - 15.10

Standard Deviation:
1.88

Fitted Curve Equation:
Ln(T) = 0.79 Ln(X) + 2.79

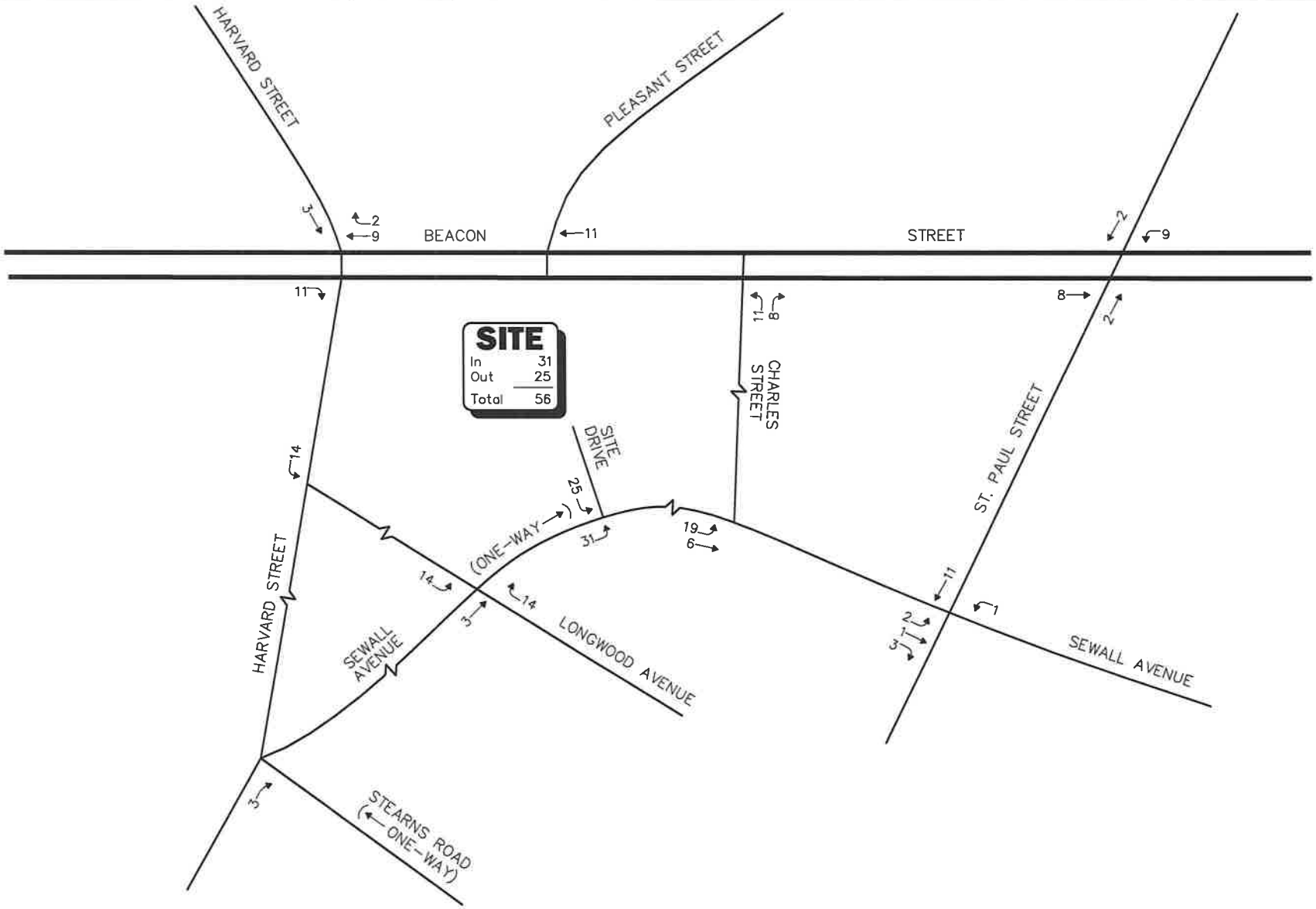
R^2:
0.87

Directional Distribution:
52% entering, 48% exiting

Calculated Trip Ends:
Average Rate: 32 (Total), 17 (Entry), 15 (Exit)
Fitted Curve: 77 (Total), 40 (Entry), 37 (Exit)

10.76 10.07 Ave. 9.68
14.23 3.66 rate

NETWORKS - UPDATE



Not To Scale

Figure 1

Site Generated (Revised)
Weekday Evening
Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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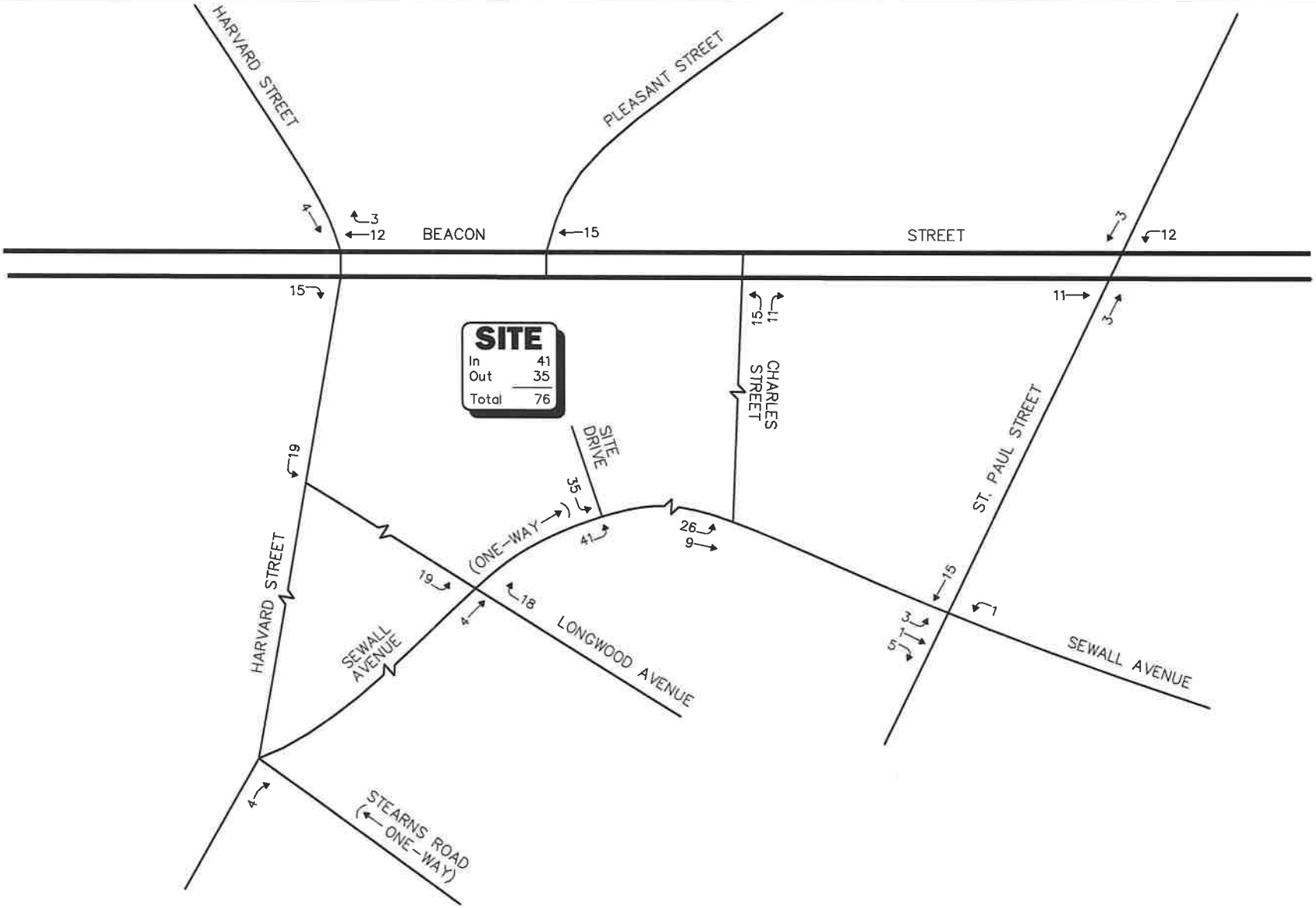

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 2

Site Generated (Revised)
Saturday Midday
Peak Hour Traffic Volumes

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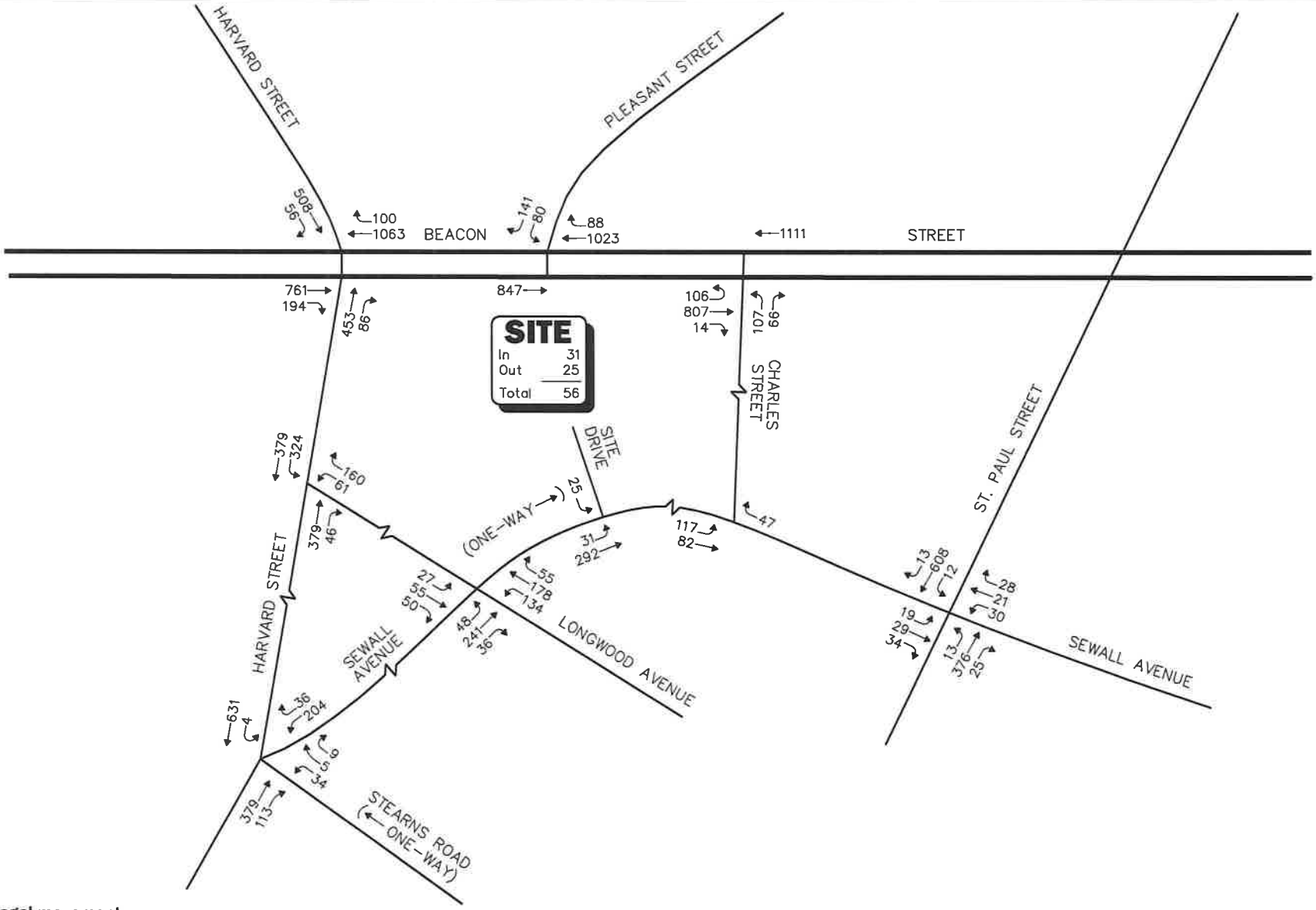

* Illegal movement.

Not To Scale

Figure 3

2025 Build (Revised)
Weekday Evening
Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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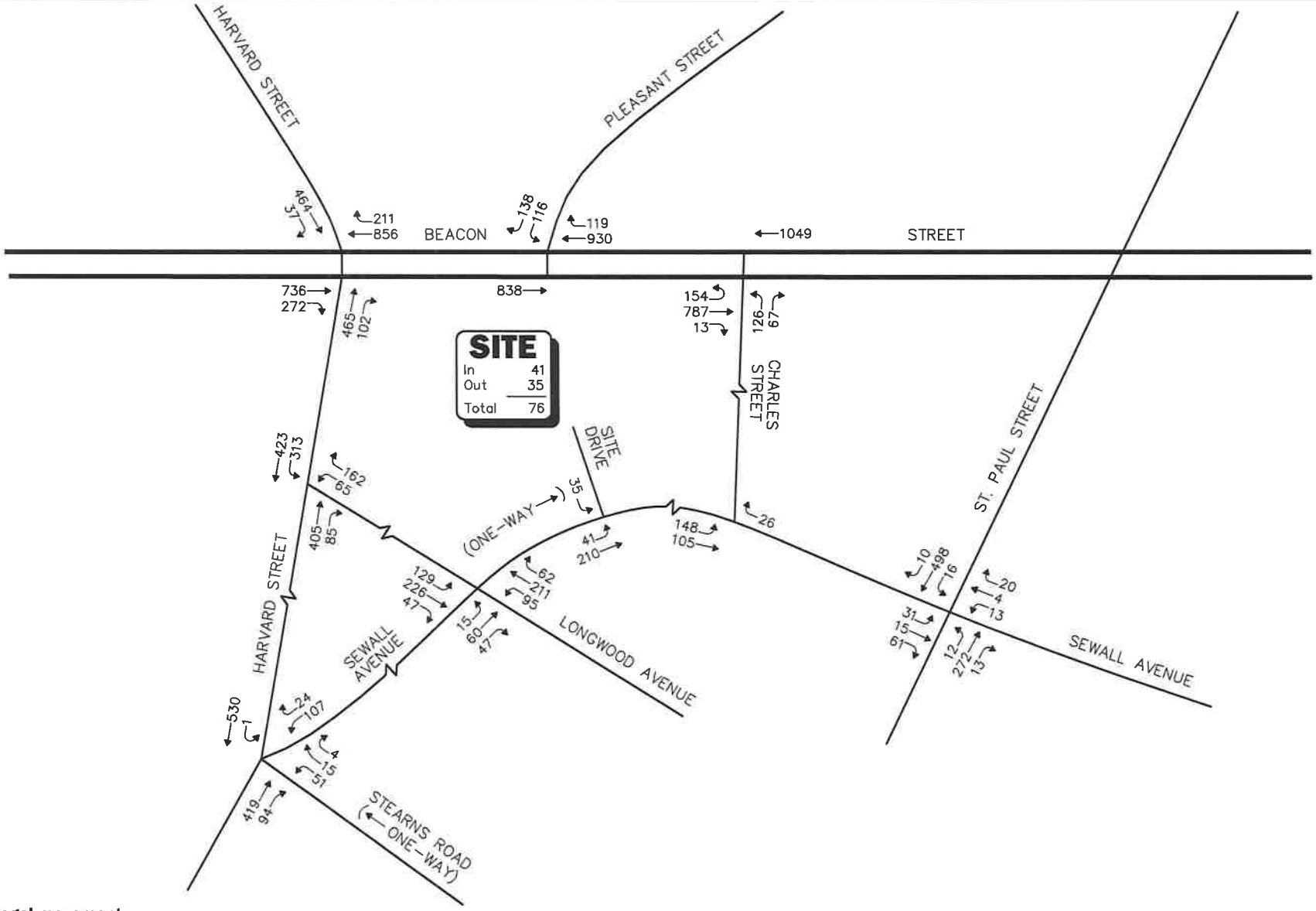

*Illegal movement.

Not To Scale

Figure 4

2025 Build (Revised)
Saturday Midday
Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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CAPACITY ANALYSIS

Beacon Street at Harvard Street
Beacon Street at Pleasant Street
Beacon Street at Charles Street
Harvard Street at Longwood Avenue
Harvard Street at Stearns Road
Longwood Avenue at Sewall Avenue
Sewall Avenue at Site Drive
Sewall Avenue at Charles Street
Sewall Avenue at St. Paul Street

Beacon Street at Harvard Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	761	183	0	1055	98	0	453	86	0	505	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Lane Util. Factor		0.95	1.00		0.95	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.79		1.00	0.65		0.93			0.96	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			0.98	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		3249	1151		3217	936		2788			2995	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		3249	1151		3217	936		2788			2995	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	827	199	0	1077	100	0	472	90	0	549	61
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	827	199	0	1077	100	0	562	0	0	610	0
Confl. Peds. (#/hr)			357			450			741			467
Confl. Bikes (#/hr)			17			134			87			48
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	4%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	10	10
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		6			2			8			4	
Permitted Phases			6			2						
Actuated Green, G (s)		49.3	49.3		49.3	49.3		25.7			25.7	
Effective Green, g (s)		49.3	49.3		49.3	49.3		25.7			25.7	
Actuated g/C Ratio		0.55	0.55		0.55	0.55		0.29			0.29	
Clearance Time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0		2.0			2.0	
Lane Grp Cap (vph)		1779	630		1762	512		796			855	
v/s Ratio Prot		0.25			c0.33			0.20			c0.20	
v/s Ratio Perm			0.17			0.11						
v/c Ratio		0.46	0.32		0.61	0.20		0.71			0.71	
Uniform Delay, d1		12.3	11.1		13.8	10.3		28.8			28.8	
Progression Factor		1.00	1.00		0.61	0.62		1.00			1.00	
Incremental Delay, d2		0.9	1.3		1.4	0.7		2.3			2.4	
Delay (s)		13.2	12.4		9.9	7.1		31.1			31.2	
Level of Service		B	B		A	A		C			C	
Approach Delay (s)		13.1			9.6			31.1			31.2	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	761	194	0	1063	100	0	453	86	0	508	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Lane Util. Factor		0.95	1.00		0.95	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.79		1.00	0.65		0.93			0.96	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			0.99	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		3249	1150		3217	936		2788			2995	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		3249	1150		3217	936		2788			2995	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	827	211	0	1085	102	0	472	90	0	552	61
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	827	211	0	1085	102	0	562	0	0	613	0
Confl. Peds. (#/hr)			357			450			741			467
Confl. Bikes (#/hr)			17			134			87			48
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	4%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	10	10
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		6			2			8			4	
Permitted Phases			6			2						
Actuated Green, G (s)		49.2	49.2		49.2	49.2		25.8			25.8	
Effective Green, g (s)		49.2	49.2		49.2	49.2		25.8			25.8	
Actuated g/C Ratio		0.55	0.55		0.55	0.55		0.29			0.29	
Clearance Time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0		2.0			2.0	
Lane Grp Cap (vph)		1776	628		1758	511		799			858	
v/s Ratio Prot		0.25			c0.34			0.20			c0.20	
v/s Ratio Perm			0.18			0.11						
v/c Ratio		0.47	0.34		0.62	0.20		0.70			0.71	
Uniform Delay, d1		12.4	11.3		14.0	10.4		28.7			28.8	
Progression Factor		1.00	1.00		0.62	0.64		1.00			1.00	
Incremental Delay, d2		0.9	1.4		1.4	0.8		2.3			2.4	
Delay (s)		13.3	12.8		10.1	7.4		31.0			31.2	
Level of Service		B	B		B	A		C			C	
Approach Delay (s)		13.2			9.9			31.0			31.2	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	827	211	1085	102	562	613
v/c Ratio	**0.47**	**0.36**	**0.62**	**0.20**	**0.70**	**0.72**
Control Delay	13.9	14.4	10.6	8.2	33.8	33.8
Queue Delay	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**
Total Delay	13.9	14.4	10.7	8.2	33.8	33.8
Queue Length 50th (ft)	**134**	**60**	**82**	**15**	**154**	**168**
Queue Length 95th (ft)	213	129	148	m38	192	206
Internal Link Dist (ft)	**434**		**199**		**228**	**124**
Turn Bay Length (ft)		100		80		
Base Capacity (vph)	**1777**	**589**	**1759**	**506**	**1116**	**1198**
Starvation Cap Reductn	0	0	128	0	0	0
Spillback Cap Reductn	**93**	**0**	**0**	**0**	**0**	**0**
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	**0.49**	**0.36**	**0.67**	**0.20**	**0.50**	**0.51**

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	736	257	0	844	209	0	465	102	0	460	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Lane Util. Factor		0.95	1.00		0.95	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.79		1.00	0.65		0.92			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.97			0.99	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		3249	1138		3249	945		2823			3035	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		3249	1138		3249	945		2823			3035	
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	759	265	0	908	225	0	484	106	0	500	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	759	265	0	908	225	0	590	0	0	540	0
Confl. Peds. (#/hr)			357			450			741			467
Confl. Bikes (#/hr)			17			134			87			48
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	10	10
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		6			2			8			4	
Permitted Phases			6			2						
Actuated Green, G (s)		49.1	49.1		49.1	49.1		25.9			25.9	
Effective Green, g (s)		49.1	49.1		49.1	49.1		25.9			25.9	
Actuated g/C Ratio		0.55	0.55		0.55	0.55		0.29			0.29	
Clearance Time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0		2.0			2.0	
Lane Grp Cap (vph)		1772	620		1772	515		812			873	
v/s Ratio Prot		0.23			c0.28			c0.21			0.18	
v/s Ratio Perm			0.23			0.24						
v/c Ratio		0.43	0.43		0.51	0.44		0.73			0.62	
Uniform Delay, d1		12.1	12.1		12.9	12.2		28.9			27.8	
Progression Factor		1.00	1.00		0.63	0.59		1.00			1.00	
Incremental Delay, d2		0.8	2.1		0.9	2.4		2.8			0.9	
Delay (s)		12.9	14.3		9.1	9.6		31.6			28.7	
Level of Service		B	B		A	A		C			C	
Approach Delay (s)		13.2			9.2			31.6			28.7	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	736	272	0	856	211	0	465	102	0	464	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Lane Util. Factor		0.95	1.00		0.95	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.79		1.00	0.65		0.92			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.97			0.99	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		3249	1138		3249	945		2823			3036	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		3249	1138		3249	945		2823			3036	
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	759	280	0	920	227	0	484	106	0	504	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	759	280	0	920	227	0	590	0	0	544	0
Confl. Peds. (#/hr)			357			450			741			467
Confl. Bikes (#/hr)			17			134			87			48
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	10	10
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		6			2			8			4	
Permitted Phases			6			2						
Actuated Green, G (s)		49.1	49.1		49.1	49.1		25.9			25.9	
Effective Green, g (s)		49.1	49.1		49.1	49.1		25.9			25.9	
Actuated g/C Ratio		0.55	0.55		0.55	0.55		0.29			0.29	
Clearance Time (s)		7.0	7.0		7.0	7.0		8.0			8.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0		2.0			2.0	
Lane Grp Cap (vph)		1772	620		1772	515		812			873	
v/s Ratio Prot		0.23			c0.28			c0.21			0.18	
v/s Ratio Perm			0.25			0.24						
v/c Ratio		0.43	0.45		0.52	0.44		0.73			0.62	
Uniform Delay, d1		12.1	12.3		13.0	12.2		28.9			27.8	
Progression Factor		1.00	1.00		0.63	0.59		1.00			1.00	
Incremental Delay, d2		0.8	2.4		1.0	2.4		2.8			1.0	
Delay (s)		12.9	14.7		9.1	9.6		31.6			28.8	
Level of Service		B	B		A	A		C			C	
Approach Delay (s)		13.4			9.2			31.6			28.8	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	759	280	920	227	590	544
v/c Ratio	**0.43**	**0.48**	**0.52**	**0.45**	**0.73**	**0.62**
Control Delay	13.5	16.9	9.5	10.6	34.4	31.0
Queue Delay	**0.0**	**0.0**	**0.2**	**0.4**	**0.0**	**0.0**
Total Delay	13.5	16.9	9.7	11.0	34.4	31.0
Queue Length 50th (ft)	**119**	**87**	**73**	**35**	**163**	**145**
Queue Length 95th (ft)	191	183	115	68	202	180
Internal Link Dist (ft)	**434**		**199**		**228**	**124**
Turn Bay Length (ft)		100		80		
Base Capacity (vph)	**1773**	**581**	**1773**	**510**	**1130**	**1214**
Starvation Cap Reductn	0	0	271	67	0	0
Spillback Cap Reductn	**62**	**0**	**0**	**0**	**0**	**0**
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	**0.44**	**0.48**	**0.61**	**0.51**	**0.52**	**0.45**

Intersection Summary

Beacon Street at Pleasant Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	847	1012	0	80	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)		6.0	6.0		8.0	8.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.73
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3046	3249		1486	973
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3046	3249		1486	973
Peak-hour factor, PHF	0.96	0.96	0.97	0.97	0.92	0.92
Adj. Flow (vph)	0	882	1043	0	87	153
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	882	1043	0	87	153
Confl. Peds. (#/hr)					6	168
Confl. Bikes (#/hr)						19
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Parking (#/hr)		5				
Turn Type		NA	NA		Prot	Perm
Protected Phases		6	2		4	
Permitted Phases						4
Actuated Green, G (s)		57.8	57.8		18.2	18.2
Effective Green, g (s)		57.8	57.8		18.2	18.2
Actuated g/C Ratio		0.64	0.64		0.20	0.20
Clearance Time (s)		6.0	6.0		8.0	8.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1956	2086		300	196
v/s Ratio Prot		0.29	c0.32		0.06	
v/s Ratio Perm						c0.16
v/c Ratio		0.45	0.50		0.29	0.78
Uniform Delay, d1		8.1	8.5		30.4	34.0
Progression Factor		0.40	1.00		1.00	1.00
Incremental Delay, d2		0.7	0.9		0.5	18.0
Delay (s)		4.0	9.3		31.0	52.0
Level of Service		A	A		C	D
Approach Delay (s)		4.0	9.3		44.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	847	1023	0	80	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)		6.0	6.0		8.0	8.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.73
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3046	3249		1486	973
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3046	3249		1486	973
Peak-hour factor, PHF	0.96	0.96	0.97	0.97	0.92	0.92
Adj. Flow (vph)	0	882	1055	0	87	153
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	882	1055	0	87	153
Confl. Peds. (#/hr)					6	168
Confl. Bikes (#/hr)						19
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Parking (#/hr)		5				
Turn Type		NA	NA		Prot	Perm
Protected Phases		6	2		4	
Permitted Phases						4
Actuated Green, G (s)		57.8	57.8		18.2	18.2
Effective Green, g (s)		57.8	57.8		18.2	18.2
Actuated g/C Ratio		0.64	0.64		0.20	0.20
Clearance Time (s)		6.0	6.0		8.0	8.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1956	2086		300	196
v/s Ratio Prot		0.29	c0.32		0.06	
v/s Ratio Perm						c0.16
v/c Ratio		0.45	0.51		0.29	0.78
Uniform Delay, d1		8.1	8.5		30.4	34.0
Progression Factor		0.43	1.00		1.00	1.00
Incremental Delay, d2		0.7	0.9		0.5	18.0
Delay (s)		4.1	9.4		31.0	52.0
Level of Service		A	A		C	D
Approach Delay (s)		4.1	9.4		44.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	882	1055	87	153
v/c Ratio	**0.45**	**0.51**	**0.29**	**0.73**
Control Delay	4.6	10.6	30.7	51.9
Queue Delay	**0.1**	**0.0**	**0.0**	**0.0**
Total Delay	4.7	10.6	30.7	51.9
Queue Length 50th (ft)	**33**	**151**	**42**	**82**
Queue Length 95th (ft)	274	255	75	135
Internal Link Dist (ft)	**199**	**133**	**80**	
Turn Bay Length (ft)				
Base Capacity (vph)	**1977**	**2109**	**390**	**273**
Starvation Cap Reductn	184	0	0	0
Spillback Cap Reductn	**0**	**50**	**0**	**0**
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	**0.49**	**0.51**	**0.22**	**0.56**

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Volume (vph)	0	838	915	0	116	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)		6.0	6.0		8.0	8.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.73
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3046	3249		1516	985
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3046	3249		1516	985
Peak-hour factor, PHF	0.98	0.98	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	855	995	0	126	150
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	855	995	0	126	150
Confl. Peds. (#/hr)					6	168
Confl. Bikes (#/hr)						19
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)		5				
Turn Type		NA	NA		Prot	Perm
Protected Phases		6	2		4	
Permitted Phases						4
Actuated Green, G (s)		58.2	58.2		17.8	17.8
Effective Green, g (s)		58.2	58.2		17.8	17.8
Actuated g/C Ratio		0.65	0.65		0.20	0.20
Clearance Time (s)		6.0	6.0		8.0	8.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1969	2101		299	194
v/s Ratio Prot		0.28	c0.31		0.08	
v/s Ratio Perm						c0.15
v/c Ratio		0.43	0.47		0.42	0.77
Uniform Delay, d1		7.8	8.1		31.6	34.2
Progression Factor		0.42	1.00		1.00	1.00
Incremental Delay, d2		0.6	0.8		1.0	17.3
Delay (s)		3.9	8.9		32.6	51.4
Level of Service		A	A		C	D
Approach Delay (s)		3.9	8.9		42.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	838	930	0	116	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	10	10
Total Lost time (s)		6.0	6.0		8.0	8.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	0.73
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3046	3249		1516	985
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3046	3249		1516	985
Peak-hour factor, PHF	0.98	0.98	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	855	1011	0	126	150
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	855	1011	0	126	150
Confl. Peds. (#/hr)					6	168
Confl. Bikes (#/hr)						19
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Parking (#/hr)		5				
Turn Type		NA	NA		Prot	Perm
Protected Phases		6	2		4	
Permitted Phases						4
Actuated Green, G (s)		58.2	58.2		17.8	17.8
Effective Green, g (s)		58.2	58.2		17.8	17.8
Actuated g/C Ratio		0.65	0.65		0.20	0.20
Clearance Time (s)		6.0	6.0		8.0	8.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1969	2101		299	194
v/s Ratio Prot		0.28	c0.31		0.08	
v/s Ratio Perm						c0.15
v/c Ratio		0.43	0.48		0.42	0.77
Uniform Delay, d1		7.8	8.2		31.6	34.2
Progression Factor		0.43	1.00		1.00	1.00
Incremental Delay, d2		0.6	0.8		1.0	17.3
Delay (s)		4.0	8.9		32.6	51.4
Level of Service		A	A		C	D
Approach Delay (s)		4.0	8.9		42.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	855	1011	126	150
v/c Ratio	**0.43**	**0.48**	**0.42**	**0.71**
Control Delay	4.4	10.1	34.3	51.4
Queue Delay	**0.1**	**0.0**	**0.0**	**0.0**
Total Delay	4.5	10.1	34.3	51.4
Queue Length 50th (ft)	**35**	**138**	**63**	**80**
Queue Length 95th (ft)	42	236	104	132
Internal Link Dist (ft)	**199**	**133**	**80**	
Turn Bay Length (ft)				
Base Capacity (vph)	**1987**	**2120**	**396**	**277**
Starvation Cap Reductn	203	0	0	0
Spillback Cap Reductn	**0**	**0**	**0**	**0**
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	**0.48**	**0.48**	**0.32**	**0.54**

Intersection Summary

Beacon Street at Charles Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	807	14	0	898	0	96	0	58	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	12	12	12	12	14	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			1.00			0.95				
Flt Protected	0.95	1.00			1.00			0.97				
Satd. Flow (prot)	1685	3481			3610			1866				
Flt Permitted	0.95	1.00			1.00			0.97				
Satd. Flow (perm)	1685	3481			3610			1866				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	114	868	15	0	966	0	107	0	64	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	117	0	0	0	0
Lane Group Flow (vph)	114	882	0	0	966	0	0	54	0	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	1	6			2		8	8				
Permitted Phases												
Actuated Green, G (s)	6.4	68.0			54.6			8.0				
Effective Green, g (s)	9.4	71.0			57.6			11.0				
Actuated g/C Ratio	0.10	0.79			0.64			0.12				
Clearance Time (s)	7.0	7.0			7.0			7.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	175	2746			2310			228				
v/s Ratio Prot	c0.07	0.25			c0.27			c0.03				
v/s Ratio Perm												
v/c Ratio	0.65	0.32			0.42			0.24				
Uniform Delay, d1	38.7	2.7			8.0			35.7				
Progression Factor	1.32	0.55			1.00			1.00				
Incremental Delay, d2	8.2	0.3			0.6			2.4				
Delay (s)	59.4	1.8			8.5			38.3				
Level of Service	E	A			A			D				
Approach Delay (s)		8.4			8.5			38.3			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	807	14	0	1111	0	107	0	66	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	12	12	12	12	14	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			1.00			0.95				
Flt Protected	0.95	1.00			1.00			0.97				
Satd. Flow (prot)	1685	3481			3610			1865				
Flt Permitted	0.95	1.00			1.00			0.97				
Satd. Flow (perm)	1685	3481			3610			1865				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	114	868	15	0	1195	0	119	0	73	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	117	0	0	0	0
Lane Group Flow (vph)	114	882	0	0	1195	0	0	75	0	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	1	6			2		8	8				
Permitted Phases												
Actuated Green, G (s)	6.4	68.0			54.6			8.0				
Effective Green, g (s)	9.4	71.0			57.6			11.0				
Actuated g/C Ratio	0.10	0.79			0.64			0.12				
Clearance Time (s)	7.0	7.0			7.0			7.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	175	2746			2310			227				
v/s Ratio Prot	c0.07	0.25			c0.33			c0.04				
v/s Ratio Perm												
v/c Ratio	0.65	0.32			0.52			0.33				
Uniform Delay, d1	38.7	2.7			8.7			36.1				
Progression Factor	1.32	0.55			1.00			1.01				
Incremental Delay, d2	8.2	0.3			0.8			3.9				
Delay (s)	59.3	1.8			9.6			40.2				
Level of Service	E	A			A			D				
Approach Delay (s)		8.4			9.6			40.2			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	NBT
Lane Group Flow (vph)	114	883	1195	192
v/c Ratio	**0.57**	**0.32**	**0.51**	**0.56**
Control Delay	61.0	1.8	9.6	20.0
Queue Delay	**0.0**	**0.2**	**0.0**	**0.0**
Total Delay	61.0	1.9	9.6	20.0
Queue Length 50th (ft)	**64**	**28**	**183**	**29**
Queue Length 95th (ft)	121	33	234	94
Internal Link Dist (ft)		**215**	**825**	**140**
Turn Bay Length (ft)				
Base Capacity (vph)	**205**	**2745**	**2366**	**344**
Starvation Cap Reductn	0	859	0	0
Spillback Cap Reductn	**0**	**0**	**0**	**0**
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	**0.56**	**0.47**	**0.51**	**0.56**

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	787	13	0	769	0	111	0	56	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	12	12	12	12	14	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			1.00			0.95				
Flt Protected	0.95	1.00			1.00			0.97				
Satd. Flow (prot)	1685	3481			3610			1873				
Flt Permitted	0.95	1.00			1.00			0.97				
Satd. Flow (perm)	1685	3481			3610			1873				
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	811	13	0	836	0	121	0	61	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	117	0	0	0	0
Lane Group Flow (vph)	159	823	0	0	836	0	0	65	0	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	1	6			2		8	8				
Permitted Phases												
Actuated Green, G (s)	8.0	68.0			53.0			8.0				
Effective Green, g (s)	11.0	71.0			56.0			11.0				
Actuated g/C Ratio	0.12	0.79			0.62			0.12				
Clearance Time (s)	7.0	7.0			7.0			7.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	205	2746			2246			228				
v/s Ratio Prot	c0.09	0.24			c0.23			c0.03				
v/s Ratio Perm												
v/c Ratio	0.78	0.30			0.37			0.29				
Uniform Delay, d1	38.3	2.6			8.4			35.9				
Progression Factor	1.23	0.76			1.00			0.97				
Incremental Delay, d2	16.2	0.3			0.5			3.1				
Delay (s)	63.1	2.3			8.8			38.1				
Level of Service	E	A			A			D				
Approach Delay (s)		12.1			8.8			38.1			0.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	787	13	0	1049	0	126	0	67	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	12	12	12	12	12	14	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0			4.0				
Lane Util. Factor	1.00	0.95			0.95			1.00				
Frt	1.00	1.00			1.00			0.95				
Flt Protected	0.95	1.00			1.00			0.97				
Satd. Flow (prot)	1685	3481			3610			1871				
Flt Permitted	0.95	1.00			1.00			0.97				
Satd. Flow (perm)	1685	3481			3610			1871				
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	811	13	0	1140	0	137	0	73	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	117	0	0	0	0
Lane Group Flow (vph)	159	823	0	0	1140	0	0	93	0	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA			NA		Split	NA				
Protected Phases	1	6			2		8	8				
Permitted Phases												
Actuated Green, G (s)	8.0	68.0			53.0			8.0				
Effective Green, g (s)	11.0	71.0			56.0			11.0				
Actuated g/C Ratio	0.12	0.79			0.62			0.12				
Clearance Time (s)	7.0	7.0			7.0			7.0				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	205	2746			2246			228				
v/s Ratio Prot	c0.09	0.24			c0.32			c0.05				
v/s Ratio Perm												
v/c Ratio	0.78	0.30			0.51			0.41				
Uniform Delay, d1	38.3	2.6			9.4			36.5				
Progression Factor	1.23	0.76			1.00			0.96				
Incremental Delay, d2	16.2	0.3			0.8			5.4				
Delay (s)	63.1	2.3			10.2			40.4				
Level of Service	E	A			B			D				
Approach Delay (s)		12.1			10.2			40.4			0.0	
Approach LOS		B			B			D			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

8: Charles Street & Beacon Street

Lane Group	EBL	EBT	WBT	NBT
Lane Group Flow (vph)	159	824	1140	210
v/c Ratio	**0.78**	**0.30**	**0.51**	**0.61**
Control Delay	71.9	2.3	10.4	22.9
Queue Delay	**0.0**	**0.2**	**0.0**	**0.0**
Total Delay	71.9	2.4	10.4	22.9
Queue Length 50th (ft)	**88**	**36**	**170**	**38**
Queue Length 95th (ft)	#188	42	218	107
Internal Link Dist (ft)		**215**	**825**	**140**
Turn Bay Length (ft)				
Base Capacity (vph)	**205**	**2748**	**2246**	**345**
Starvation Cap Reductn	0	946	0	0
Spillback Cap Reductn	**0**	**0**	**0**	**0**
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	**0.78**	**0.46**	**0.51**	**0.61**

Intersection Summary

 # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Harvard Street at Longwood Avenue

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	61	160	379	46	310	379
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.97	0.97	0.92	0.92
Hourly flow rate (vph)	65	170	391	47	337	412
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						258
pX, platoon unblocked	0.87					
vC, conflicting volume	1500	414			438	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1500	414			438	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	22	73			70	
cM capacity (veh/h)	83	640			1132	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	235	438	337	412
Volume Left	65	0	337	0
Volume Right	170	47	0	0
cSH	224	1700	1132	1700
Volume to Capacity	1.05	0.26	0.30	0.24
Queue Length 95th (ft)	253	0	31	0
Control Delay (s)	120.4	0.0	9.5	0.0
Lane LOS	F		A	
Approach Delay (s)	120.4	0.0	4.3	
Approach LOS	F			

Intersection Summary			
Average Delay	22.2		
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	61	160	379	46	324	379
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.97	0.97	0.92	0.92
Hourly flow rate (vph)	65	170	391	47	352	412
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						258
pX, platoon unblocked	0.87					
vC, conflicting volume	1531	414			438	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1535	414			438	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	16	73			69	
cM capacity (veh/h)	77	640			1132	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	235	438	352	412
Volume Left	65	0	352	0
Volume Right	170	47	0	0
cSH	213	1700	1132	1700
Volume to Capacity	1.11	0.26	0.31	0.24
Queue Length 95th (ft)	272	0	33	0
Control Delay (s)	140.5	0.0	9.6	0.0
Lane LOS	F		A	
Approach Delay (s)	140.5	0.0	4.4	
Approach LOS	F			

Intersection Summary			
Average Delay	25.3		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	65	162	405	85	294	423
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.93	0.93	0.95	0.95
Hourly flow rate (vph)	67	167	435	91	309	445
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						258
pX, platoon unblocked	0.88					
vC, conflicting volume	1545	481			527	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1552	481			527	
tC, single (s)	*6.0	*6.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	28	72			71	
cM capacity (veh/h)	93	604			1050	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	234	527	309	445
Volume Left	67	0	309	0
Volume Right	167	91	0	0
cSH	235	1700	1050	1700
Volume to Capacity	1.00	0.31	0.29	0.26
Queue Length 95th (ft)	233	0	31	0
Control Delay (s)	102.2	0.0	9.9	0.0
Lane LOS	F		A	
Approach Delay (s)	102.2	0.0	4.0	
Approach LOS	F			

Intersection Summary			
Average Delay	17.8		
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	65	162	405	85	313	423
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.93	0.93	0.95	0.95
Hourly flow rate (vph)	67	167	435	91	329	445
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						258
pX, platoon unblocked	0.88					
vC, conflicting volume	1585	481			527	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1597	481			527	
tC, single (s)	*6.0	*6.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	22	72			69	
cM capacity (veh/h)	86	604			1050	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	234	527	329	445
Volume Left	67	0	329	0
Volume Right	167	91	0	0
cSH	221	1700	1050	1700
Volume to Capacity	1.06	0.31	0.31	0.26
Queue Length 95th (ft)	256	0	34	0
Control Delay (s)	124.2	0.0	10.0	0.0
Lane LOS	F		A	
Approach Delay (s)	124.2	0.0	4.2	
Approach LOS	F			

Intersection Summary			
Average Delay	21.1		
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

Harvard Street at Stearns Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	238	41	379	110	4	631
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	259	45	412	120	4	664
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						561
pX, platoon unblocked	0.87					
vC, conflicting volume	1144	472			532	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	472			532	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	93			100	
cM capacity (veh/h)	208	596			1046	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	259	45	532	668
Volume Left	259	0	0	4
Volume Right	0	45	120	0
cSH	208	596	1700	1046
Volume to Capacity	1.24	0.07	0.31	0.00
Queue Length 95th (ft)	338	6	0	0
Control Delay (s)	190.0	11.5	0.0	0.1
Lane LOS	F	B		A
Approach Delay (s)	163.7		0.0	0.1
Approach LOS	F			

Intersection Summary			
Average Delay	33.1		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	238	41	379	113	4	631
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	259	45	412	123	4	664
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						561
pX, platoon unblocked	0.87					
vC, conflicting volume	1146	473			535	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1095	473			535	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	93			100	
cM capacity (veh/h)	208	595			1043	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	259	45	535	668
Volume Left	259	0	0	4
Volume Right	0	45	123	0
cSH	208	595	1700	1043
Volume to Capacity	1.25	0.07	0.31	0.00
Queue Length 95th (ft)	339	6	0	0
Control Delay (s)	190.8	11.5	0.0	0.1
Lane LOS	F	B		A
Approach Delay (s)	164.4		0.0	0.1
Approach LOS	F			

Intersection Summary			
Average Delay	33.2		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	158	39	419	90	1	530
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.96	0.96
Hourly flow rate (vph)	172	42	455	98	1	552
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						561
pX, platoon unblocked	0.88					
vC, conflicting volume	1059	504			553	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	999	504			553	
tC, single (s)	*6.0	*6.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	36	93			100	
cM capacity (veh/h)	268	588			1027	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	172	42	553	553
Volume Left	172	0	0	1
Volume Right	0	42	98	0
cSH	268	588	1700	1027
Volume to Capacity	0.64	0.07	0.33	0.00
Queue Length 95th (ft)	100	6	0	0
Control Delay (s)	39.7	11.6	0.0	0.0
Lane LOS	E	B		A
Approach Delay (s)	34.1		0.0	0.0
Approach LOS	D			

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	158	39	419	94	1	530
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.96	0.96
Hourly flow rate (vph)	172	42	455	102	1	552
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						561
pX, platoon unblocked	0.88					
vC, conflicting volume	1061	507			558	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1002	507			558	
tC, single (s)	*6.0	*6.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	36	93			100	
cM capacity (veh/h)	267	586			1023	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	172	42	558	553
Volume Left	172	0	0	1
Volume Right	0	42	102	0
cSH	267	586	1700	1023
Volume to Capacity	0.64	0.07	0.33	0.00
Queue Length 95th (ft)	101	6	0	0
Control Delay (s)	39.9	11.6	0.0	0.0
Lane LOS	E	B		A
Approach Delay (s)	34.3		0.0	0.0
Approach LOS	D			

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Longwood Avenue at Sewall Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	13	55	50	134	178	41	48	238	36	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	59	53	146	193	45	52	259	39	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	238			112			620	642	85	762	646	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238			112			620	642	85	762	646	216
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			90			86	27	96	100	100	100
cM capacity (veh/h)	1341			1491			370	353	979	116	351	829

Direction, Lane #	EB 1	EB 2	WB 1	NE 1
Volume Total	14	112	384	350
Volume Left	14	0	146	52
Volume Right	0	53	45	39
cSH	1341	1700	1491	383
Volume to Capacity	0.01	0.07	0.10	0.91
Queue Length 95th (ft)	1	0	8	240
Control Delay (s)	7.7	0.0	3.5	60.3
Lane LOS	A		A	F
Approach Delay (s)	0.8		3.5	60.3
Approach LOS				F

Intersection Summary			
Average Delay	26.2		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	27	55	50	134	178	55	48	241	36	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	59	53	146	193	60	52	262	39	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	253			112			657	687	85	801	684	223
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			112			657	687	85	801	684	223
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			90			85	20	96	100	100	100
cM capacity (veh/h)	1324			1491			347	329	979	92	330	821

Direction, Lane #	EB 1	EB 2	WB 1	NE 1
Volume Total	29	112	399	353
Volume Left	29	0	146	52
Volume Right	0	53	60	39
cSH	1324	1700	1491	358
Volume to Capacity	0.02	0.07	0.10	0.99
Queue Length 95th (ft)	2	0	8	281
Control Delay (s)	7.8	0.0	3.4	79.3
Lane LOS	A		A	F
Approach Delay (s)	1.6		3.4	79.3
Approach LOS				F

Intersection Summary			
Average Delay	33.1		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	110	226	47	95	211	44	15	56	47	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	117	240	50	103	229	48	16	61	51	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	277			290			959	983	265	1016	984	253
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277			290			959	983	265	1016	984	253
tC, single (s)	4.1			4.1			*6.0	*6.0	*6.0	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			92			94	75	94	100	100	100
cM capacity (veh/h)	1297			1283			280	240	790	145	209	790

Direction, Lane #	EB 1	EB 2	WB 1	NE 1
Volume Total	117	290	380	128
Volume Left	117	0	103	16
Volume Right	0	50	48	51
cSH	1297	1700	1283	341
Volume to Capacity	0.09	0.17	0.08	0.38
Queue Length 95th (ft)	7	0	7	43
Control Delay (s)	8.0	0.0	2.7	21.8
Lane LOS	A		A	C
Approach Delay (s)	2.3		2.7	21.8
Approach LOS				C

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	129	226	47	95	211	62	15	60	47	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	137	240	50	103	229	67	16	65	51	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	297			290			1009	1043	265	1068	1034	263
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	297			290			1009	1043	265	1068	1034	263
tC, single (s)	4.1			4.1			*6.0	*6.0	*6.0	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			92			94	70	94	100	100	100
cM capacity (veh/h)	1276			1283			259	219	790	126	192	780

Direction, Lane #	EB 1	EB 2	WB 1	NE 1
Volume Total	137	290	400	133
Volume Left	137	0	103	16
Volume Right	0	50	67	51
cSH	1276	1700	1283	312
Volume to Capacity	0.11	0.17	0.08	0.43
Queue Length 95th (ft)	9	0	7	51
Control Delay (s)	8.2	0.0	2.7	24.8
Lane LOS	A		A	C
Approach Delay (s)	2.6		2.7	24.8
Approach LOS				C

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Sewall Avenue at Site Drive

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Volume (veh/h)	0	0	18	0	17	275
Sign Control	Stop		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	20	0	18	299
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	196	186	336	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	186	336	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	97	100	99	
cM capacity (veh/h)	741	704	581	1091	1636	

Direction, Lane #	SE 1	NE 1
Volume Total	20	317
Volume Left	0	18
Volume Right	0	299
cSH	581	1636
Volume to Capacity	0.03	0.01
Queue Length 95th (ft)	3	1
Control Delay (s)	11.4	0.5
Lane LOS	B	A
Approach Delay (s)	11.4	0.5
Approach LOS	B	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Volume (veh/h)	0	0	25	0	31	292
Sign Control	Stop		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	0	34	317
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	240	226	385	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	240	226	385	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	95	100	98	
cM capacity (veh/h)	680	663	541	1091	1636	

Direction, Lane #	SE 1	NE 1
Volume Total	27	351
Volume Left	0	34
Volume Right	0	317
cSH	541	1636
Volume to Capacity	0.05	0.02
Queue Length 95th (ft)	4	2
Control Delay (s)	12.0	0.9
Lane LOS	B	A
Approach Delay (s)	12.0	0.9
Approach LOS	B	

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Volume (veh/h)	0	0	25	0	21	188
Sign Control	Stop		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	27	0	23	204
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	161	148	250	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161	148	250	0	0	
tC, single (s)	7.1	6.5	*6.0	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	96	100	99	
cM capacity (veh/h)	775	737	670	1091	1636	

Direction, Lane #	SE 1	NE 1
Volume Total	27	227
Volume Left	0	23
Volume Right	0	204
cSH	670	1636
Volume to Capacity	0.04	0.01
Queue Length 95th (ft)	3	1
Control Delay (s)	10.6	0.8
Lane LOS	B	A
Approach Delay (s)	10.6	0.8
Approach LOS	B	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Volume (veh/h)	0	0	35	0	41	210
Sign Control	Stop		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	38	0	45	228
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	222	203	317	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	222	203	317	0	0	
tC, single (s)	7.1	6.5	*6.0	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	94	100	97	
cM capacity (veh/h)	688	678	612	1091	1636	

Direction, Lane #	SE 1	NE 1
Volume Total	38	273
Volume Left	0	45
Volume Right	0	228
cSH	612	1636
Volume to Capacity	0.06	0.03
Queue Length 95th (ft)	5	2
Control Delay (s)	11.3	1.4
Lane LOS	B	A
Approach Delay (s)	11.3	1.4
Approach LOS	B	

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Sewall Avenue at Charles Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	98	76	0	47	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.74	0.74	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	103	0	51	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	51				368	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	51				368	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				100	100
cM capacity (veh/h)	1562				582	1091

Direction, Lane #	EB 1	WB 1
Volume Total	235	51
Volume Left	132	0
Volume Right	0	51
cSH	1562	1700
Volume to Capacity	0.08	0.03
Queue Length 95th (ft)	7	0
Control Delay (s)	4.5	0.0
Lane LOS	A	
Approach Delay (s)	4.5	0.0
Approach LOS		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	117	82	0	47	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.74	0.74	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	111	0	51	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	51				427	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	51				427	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				100	100
cM capacity (veh/h)	1562				529	1091

Direction, Lane #	EB 1	WB 1
Volume Total	269	51
Volume Left	158	0
Volume Right	0	51
cSH	1562	1700
Volume to Capacity	0.10	0.03
Queue Length 95th (ft)	8	0
Control Delay (s)	4.8	0.0
Lane LOS	A	
Approach Delay (s)	4.8	0.0
Approach LOS		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	122	96	0	26	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	136	107	0	28	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	28				378	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28				378	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				100	100
cM capacity (veh/h)	1598				575	1091

Direction, Lane #	EB 1	WB 1
Volume Total	242	28
Volume Left	136	0
Volume Right	0	28
cSH	1598	1700
Volume to Capacity	0.08	0.02
Queue Length 95th (ft)	7	0
Control Delay (s)	4.5	0.0
Lane LOS	A	
Approach Delay (s)	4.5	0.0
Approach LOS		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	148	105	0	26	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	164	117	0	28	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	28				446	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28				446	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				100	100
cM capacity (veh/h)	1598				515	1091

Direction, Lane #	EB 1	WB 1
Volume Total	281	28
Volume Left	164	0
Volume Right	0	28
cSH	1598	1700
Volume to Capacity	0.10	0.02
Queue Length 95th (ft)	9	0
Control Delay (s)	4.7	0.0
Lane LOS	A	
Approach Delay (s)	4.7	0.0
Approach LOS		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Sewall Avenue at St. Paul Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	28	31	29	21	28	13	376	25	12	597	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	18	30	34	32	23	30	14	409	27	13	649	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1174	1146	656	1182	1140	422	663			436		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1174	1146	656	1182	1140	422	663			436		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	84	93	77	88	95	98			99		
cM capacity (veh/h)	145	196	469	135	197	636	935			1135		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	83	85	450	676
Volume Left	18	32	14	13
Volume Right	34	30	27	14
cSH	233	213	935	1135
Volume to Capacity	0.36	0.40	0.02	0.01
Queue Length 95th (ft)	38	45	1	1
Control Delay (s)	28.8	32.6	0.5	0.3
Lane LOS	D	D	A	A
Approach Delay (s)	28.8	32.6	0.5	0.3
Approach LOS	D	D		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	29	34	30	21	28	13	376	25	12	608	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	21	32	37	33	23	30	14	409	27	13	661	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1186	1158	668	1197	1152	422	675			436		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1186	1158	668	1197	1152	422	675			436		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	84	92	75	88	95	98			99		
cM capacity (veh/h)	142	192	462	129	194	636	926			1135		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	89	86	450	688
Volume Left	21	33	14	13
Volume Right	37	30	27	14
cSH	229	206	926	1135
Volume to Capacity	0.39	0.42	0.02	0.01
Queue Length 95th (ft)	44	48	1	1
Control Delay (s)	30.4	34.5	0.5	0.3
Lane LOS	D	D	A	A
Approach Delay (s)	30.4	34.5	0.5	0.3
Approach LOS	D	D		

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	12	56	12	4	20	12	272	13	16	483	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Hourly flow rate (vph)	30	13	61	13	4	22	13	296	14	17	503	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	894	878	508	938	876	303	514			310		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	894	878	508	938	876	303	514			310		
tC, single (s)	*6.0	*6.0	*6.0	*6.0	*6.0	*6.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	96	90	95	99	97	99			99		
cM capacity (veh/h)	327	318	585	280	319	754	1062			1262		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	104	39	323	530
Volume Left	30	13	13	17
Volume Right	61	22	14	10
cSH	438	439	1062	1262
Volume to Capacity	0.24	0.09	0.01	0.01
Queue Length 95th (ft)	23	7	1	1
Control Delay (s)	15.8	14.0	0.5	0.4
Lane LOS	C	B	A	A
Approach Delay (s)	15.8	14.0	0.5	0.4
Approach LOS	C	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

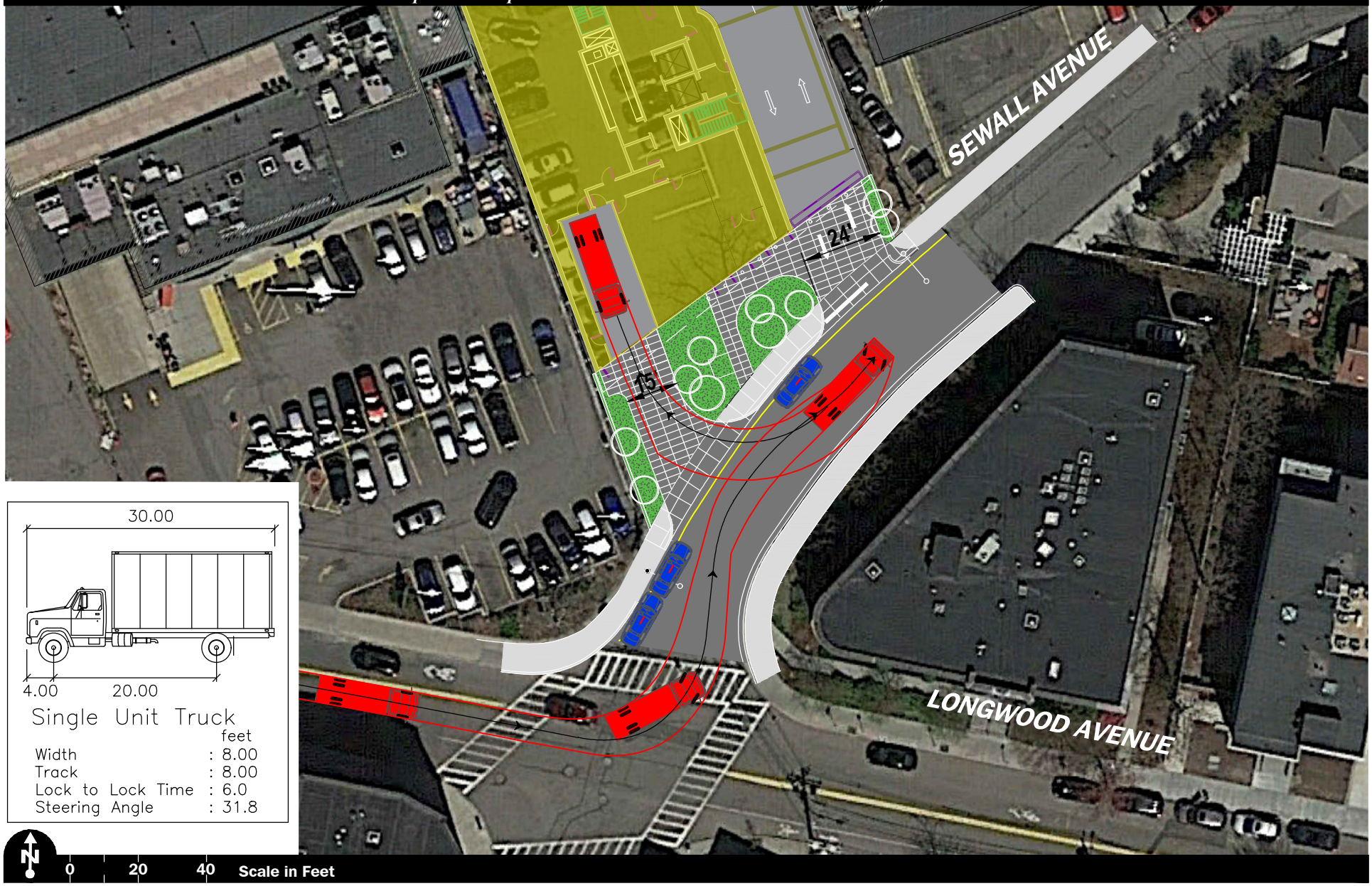
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	13	61	13	4	20	12	272	13	16	498	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Hourly flow rate (vph)	34	14	66	14	4	22	13	296	14	17	519	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	910	893	524	959	891	303	529			310		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	910	893	524	959	891	303	529			310		
tC, single (s)	*6.0	*6.0	*6.0	*6.0	*6.0	*6.0	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	95	88	95	99	97	99			99		
cM capacity (veh/h)	320	312	574	268	313	754	1048			1262		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	114	40	323	546
Volume Left	34	14	13	17
Volume Right	66	22	14	10
cSH	429	421	1048	1262
Volume to Capacity	0.27	0.10	0.01	0.01
Queue Length 95th (ft)	26	8	1	1
Control Delay (s)	16.4	14.5	0.5	0.4
Lane LOS	C	B	A	A
Approach Delay (s)	16.4	14.5	0.5	0.4
Approach LOS	C	B		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

TRUCK TEMPLATE PLAN - PARKING



Vanasse & Associates, Inc.
Transportation Engineers & Planners

Loading Zone Entry / Exit of truck

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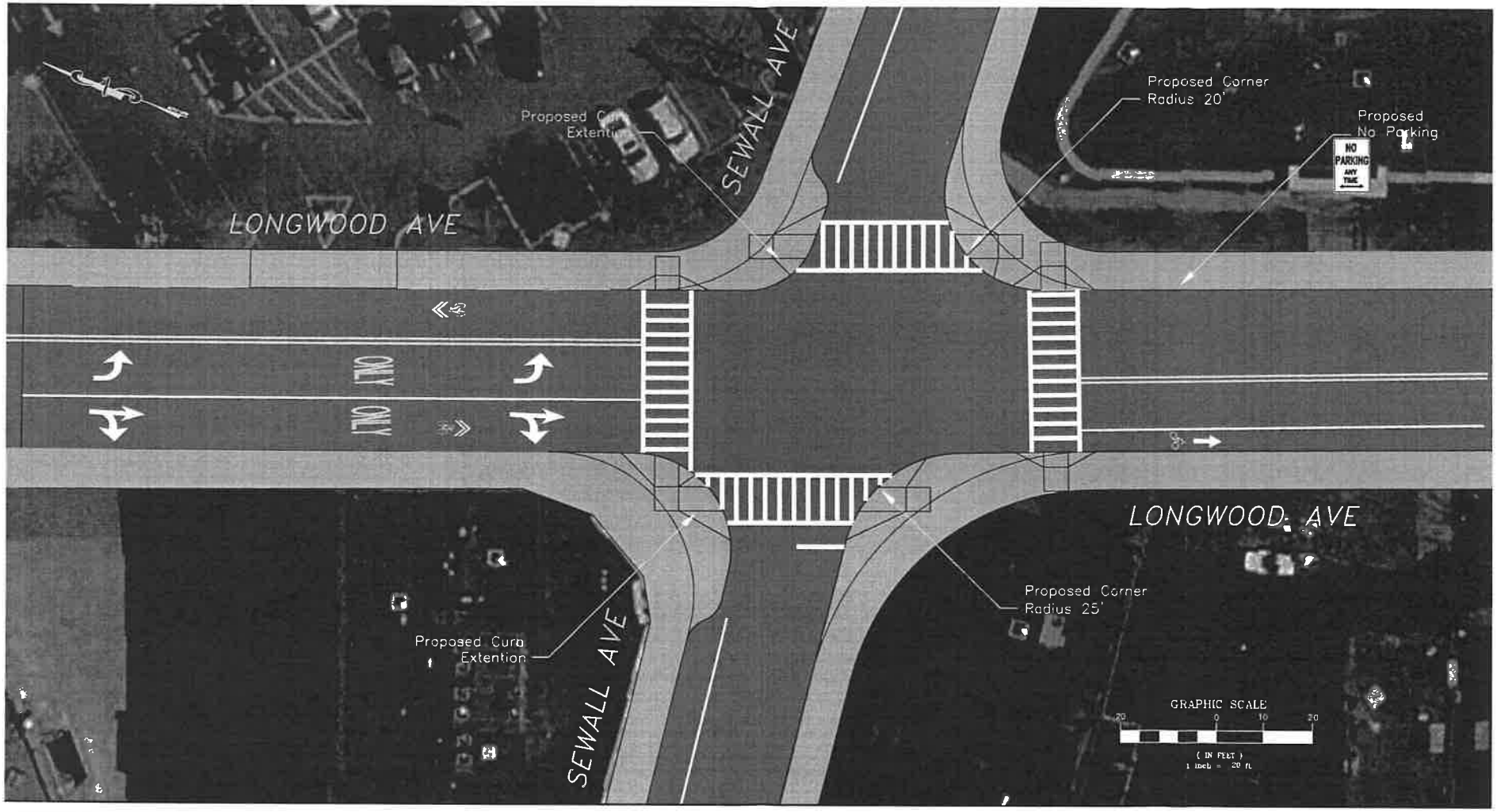
SEWALL AVENUE/LONGWOOD AVENUE PLAN

Longwood Avenue at Sewall Avenue
Brookline, Massachusetts



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Longwood Avenue at Sewall Avenue
Proposed Intersection Improvements