

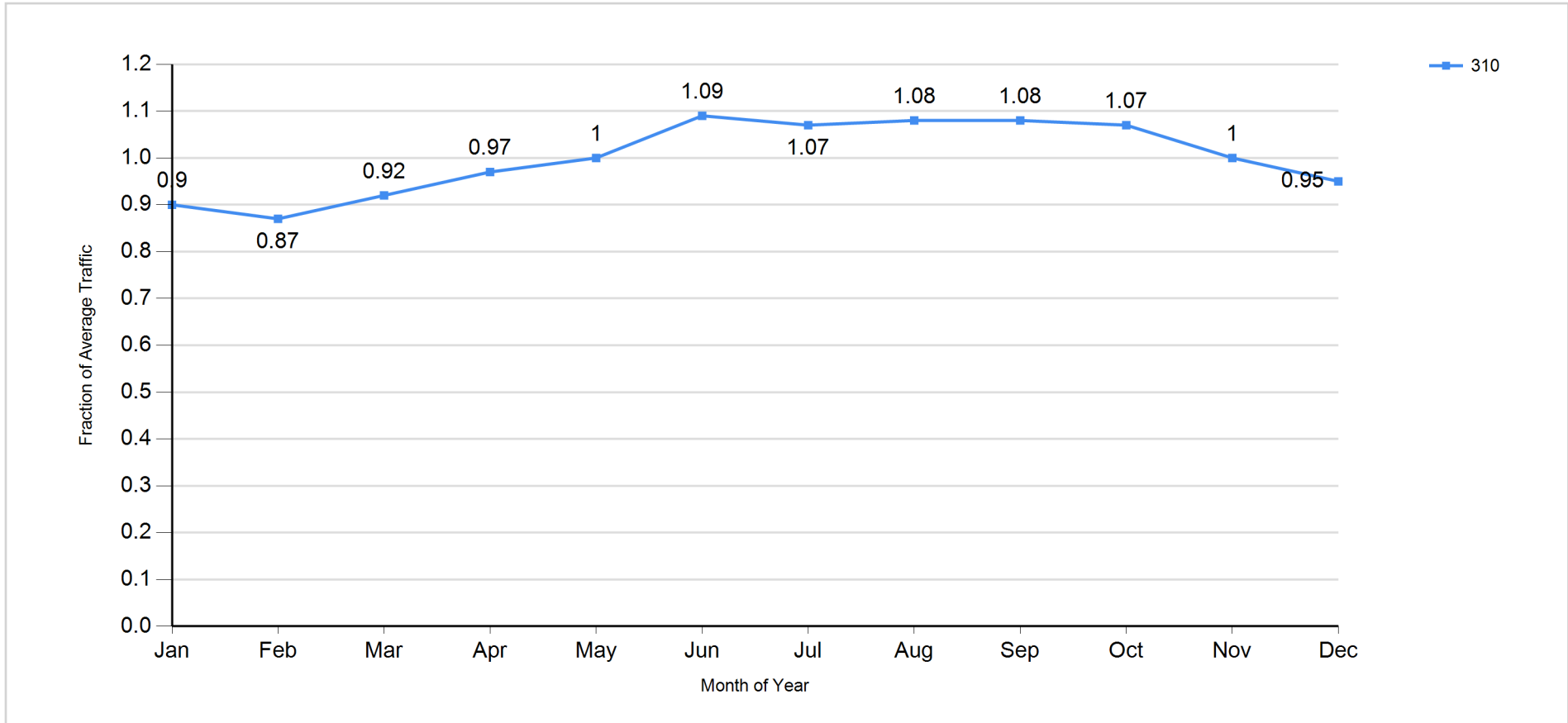
Transportation Attachments

- › T-1: MassDOT Seasonal Traffic Data
- › T-2: Traffic Volume Networks
- › T-3: Blackstone Logistics Center Traffic Data
- › T-4: Background Project Traffic Volumes
- › T-5: Trip Generation Calculations
- › T-6: Empirical Traffic Data
- › T-7: Truck Trip Distribution and Trip Assignment
- › T-8: Operations Analysis

T-1: MassDOT Seasonal Traffic Data

Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2021 - 12/31/2021
Criteria: Location ID = 310, From 1/1/1900 To 12/31/2049 12:00:00 AM



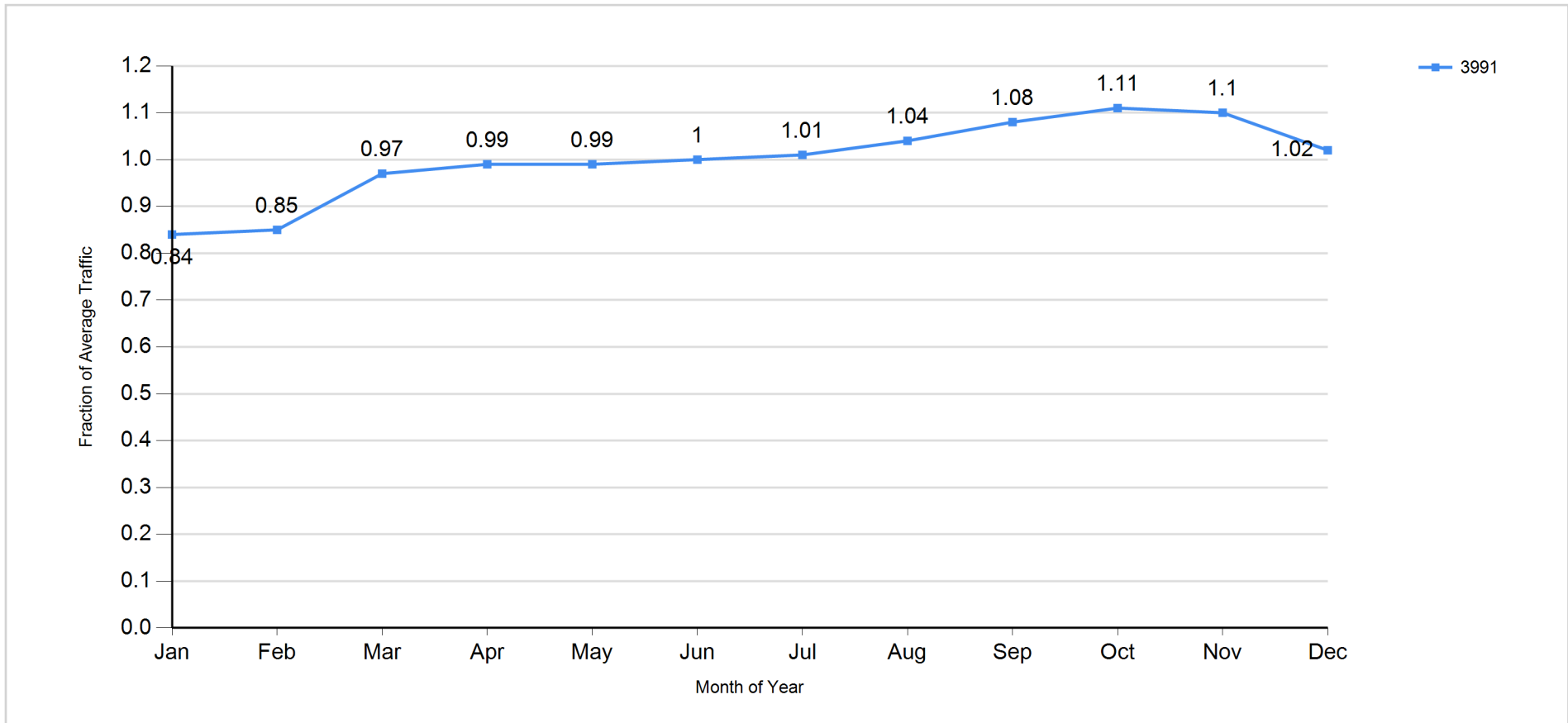
Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2021 - 12/31/2021
Criteria: Location ID = 310, From 1/1/1900 To 12/31/2049 12:00:00 AM

Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
UR2	310	1	0.896	0.874	0.919	0.966	0.995	1.087	1.072	1.076	1.080	1.067	0.998	0.950
	Average of Weighted Factors		0.896	0.874	0.919	0.966	0.995	1.087	1.072	1.076	1.080	1.067	0.998	0.950

Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2021 - 12/31/2021
Criteria: Location ID = 3991, From 1/1/1900 To 12/31/2049 12:00:00 AM

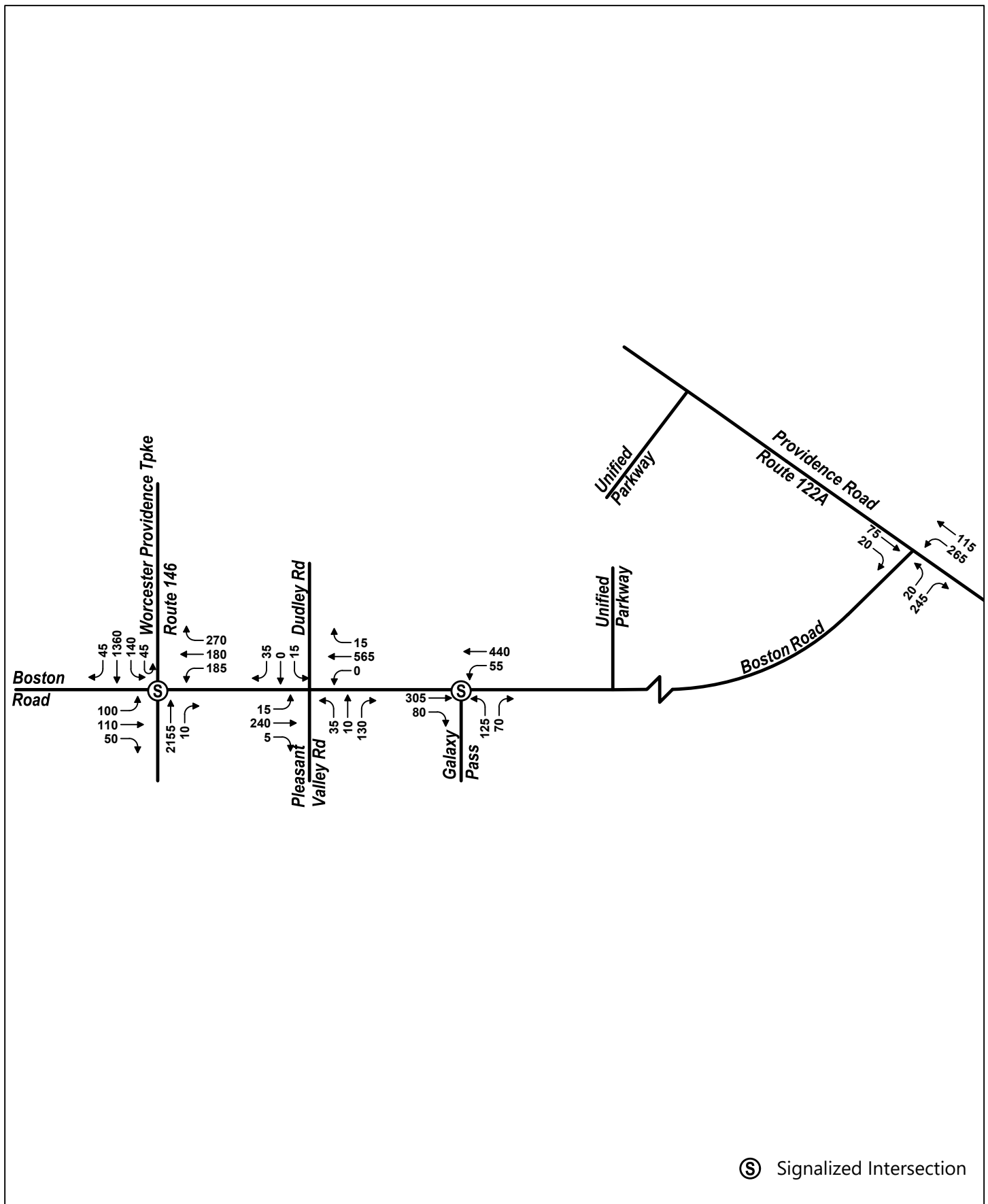


Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2021 - 12/31/2021
 Criteria: Location ID = 3991, From 1/1/1900 To 12/31/2049 12:00:00 AM

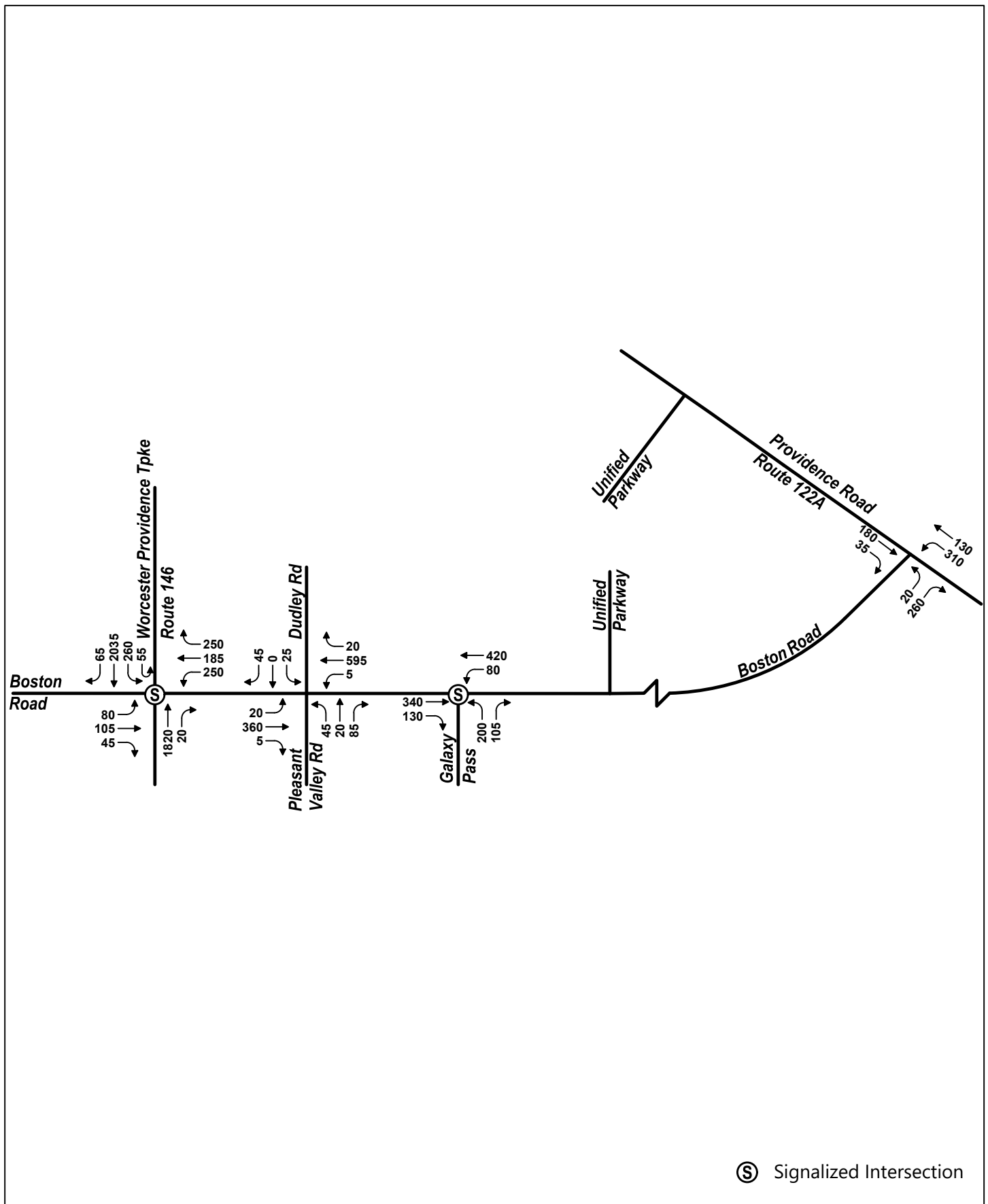
Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
U3	3991	1	0.844	0.850	0.967	0.985	0.987	0.996	1.009	1.040	1.076	1.111	1.100	1.022
	Average of Weighted Factors		0.844	0.850	0.967	0.985	0.987	0.996	1.009	1.040	1.076	1.111	1.100	1.022

T-2: Traffic Volume Networks



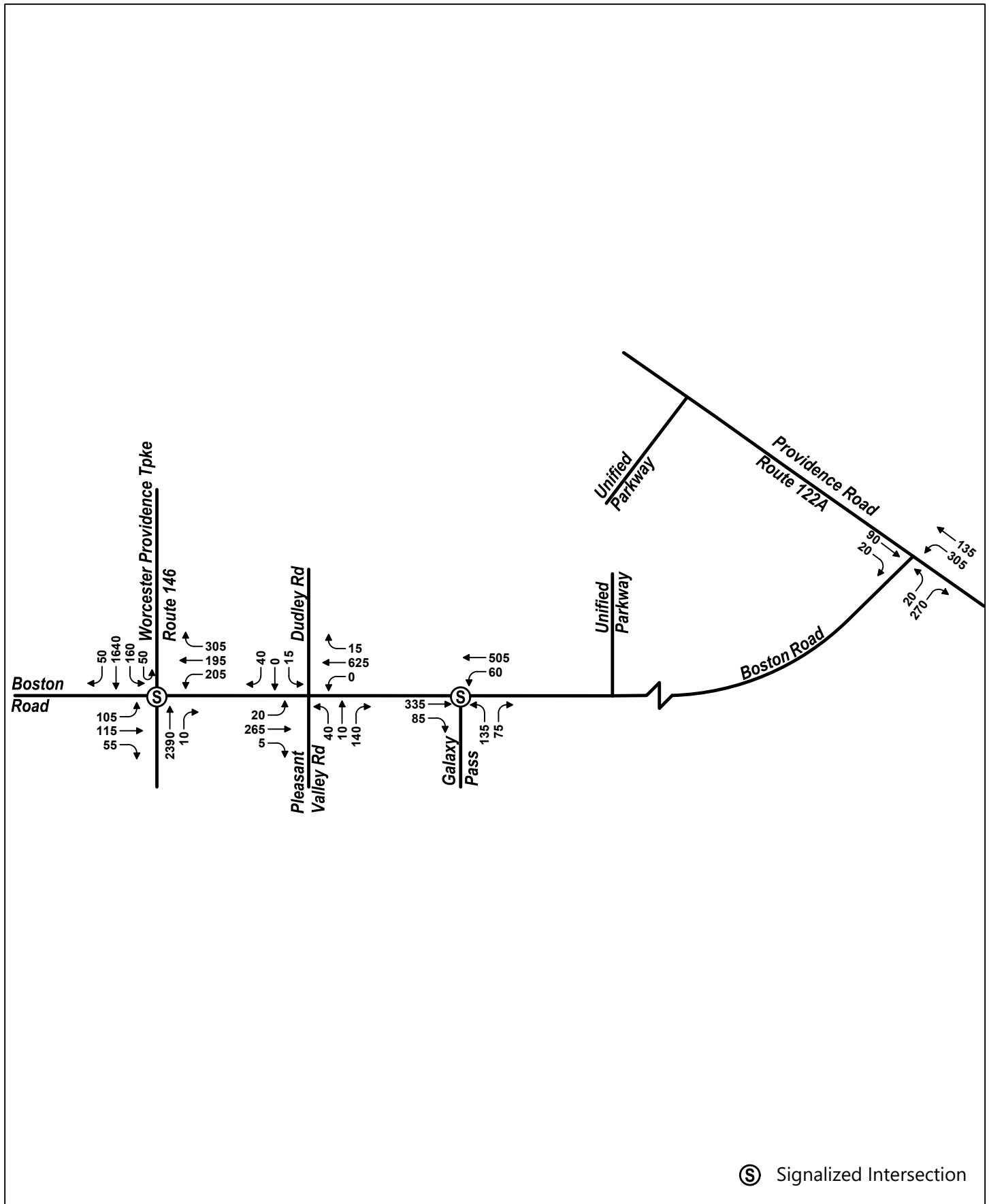
2022 Existing Weekday
Morning Traffic Volumes
UN1F1ED Sutton
Sutton, Massachusetts

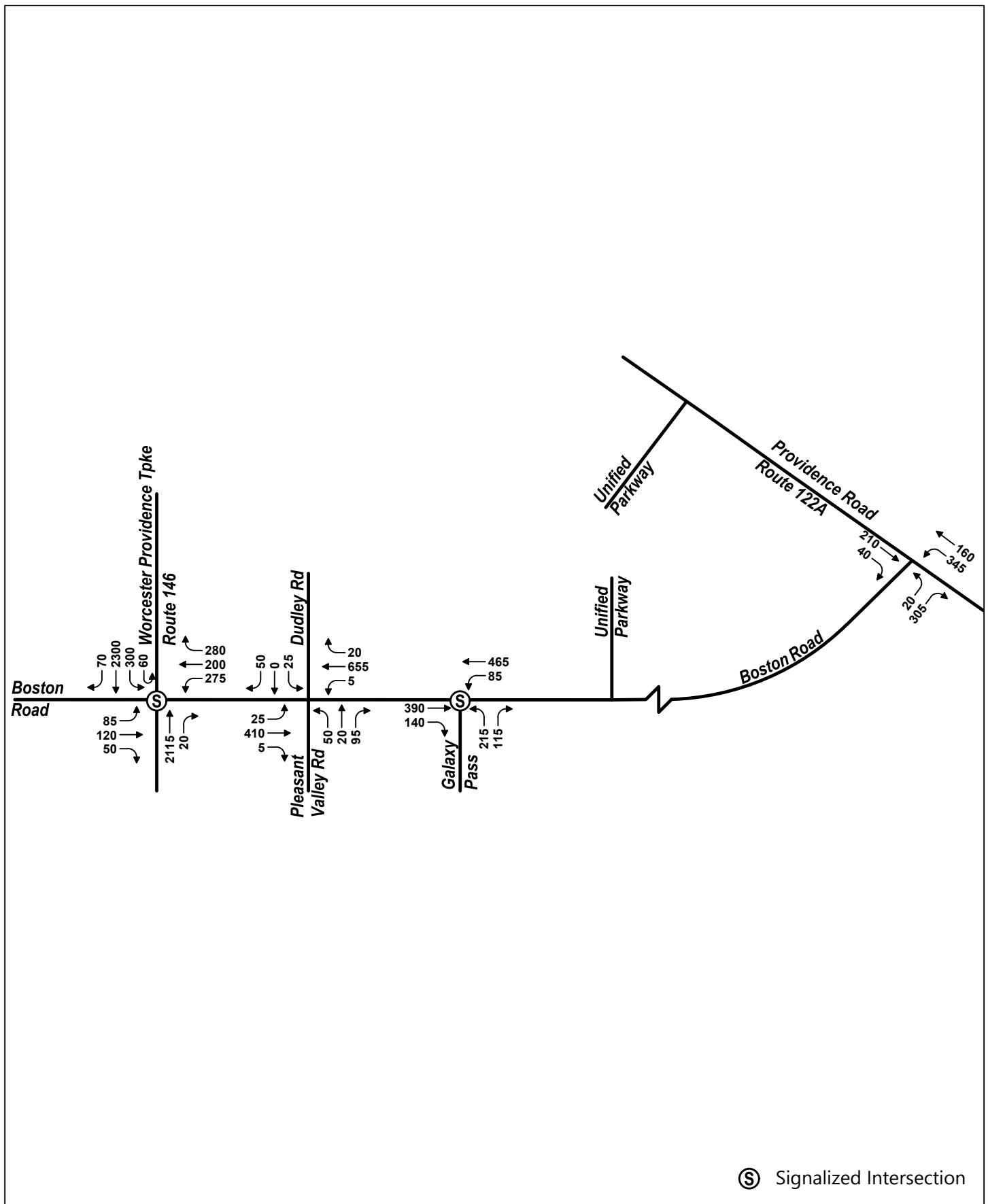
Figure T1



2022 Existing Weekday
Evening Traffic Volumes
UN1F1ED Sutton
Sutton, Massachusetts

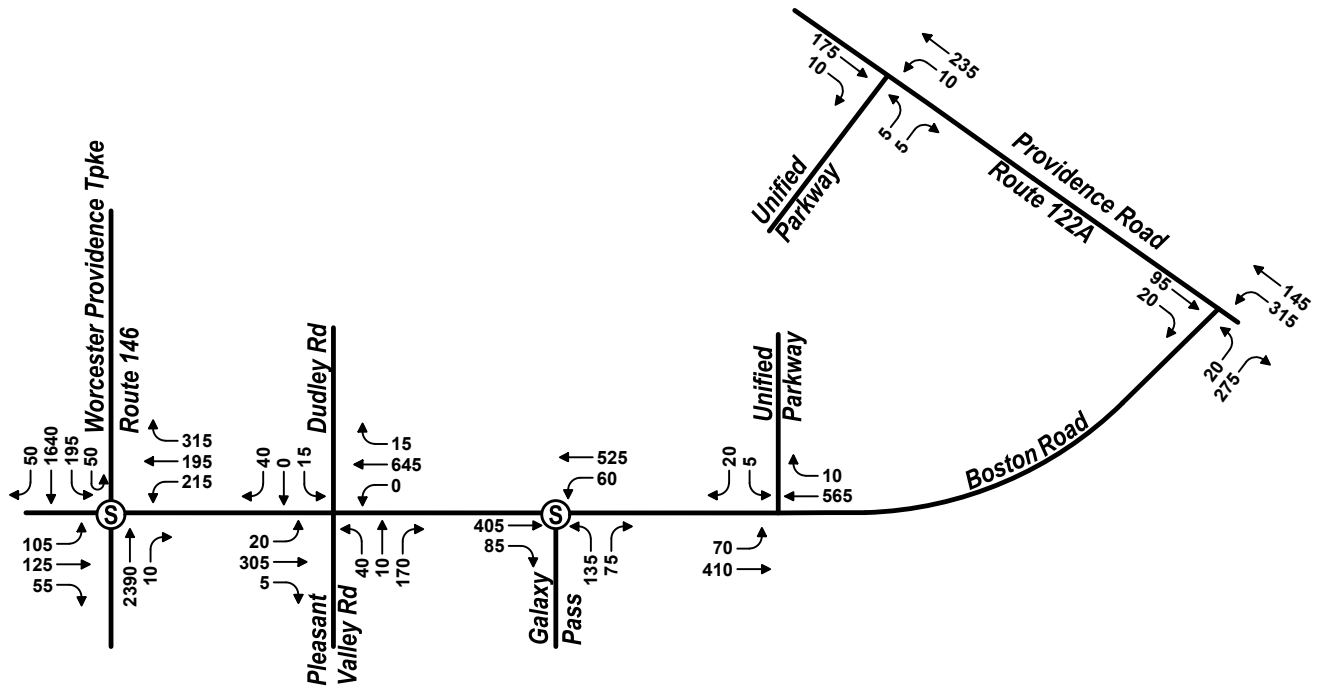
Figure T2





2028 No-Build Weekday
Evening Traffic Volumes
UN1F1ED Sutton
Sutton, Massachusetts

Figure T4

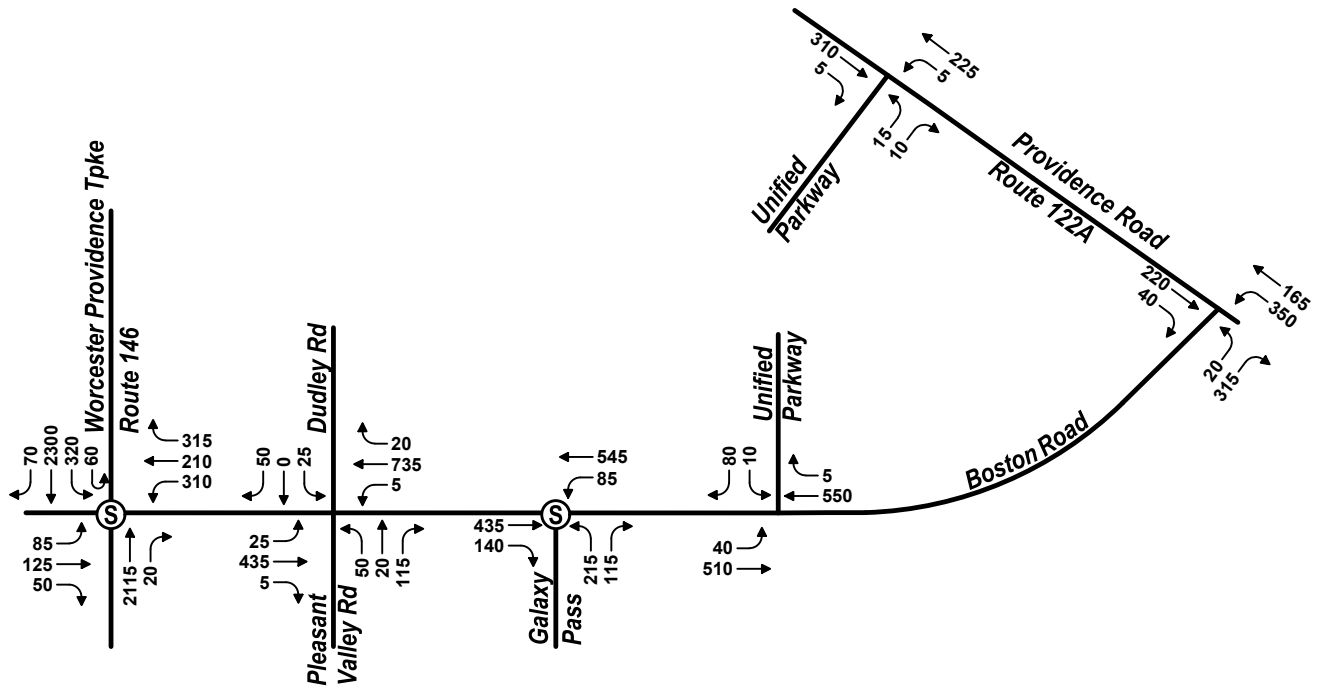


Ⓢ Signalized Intersection



Weekday Morning Peak Hour
2028 Build Traffic Volumes
UN1F1ED Sutton
Sutton, Massachusetts

Figure T5



Ⓢ Signalized Intersection



Weekday Evening Peak Hour
2028 Build Traffic Volumes
UN1F1ED Sutton
Sutton, Massachusetts

Figure T6

T-3: Blackstone Logistics Center Traffic Data

Station #	Location	ATR Volume by Year											
		2001	2004	2008	2011	2012	2013	2014	2015	2016	2017	2018	2019
3194	Whitins Road, Sutton east of Hough Road					4664			4678			4467	
3204	N Main St, Uxbridge south of Hartford Ave			13029	11332						11148		
3207	Lackey Dam Road, Sutton at Douglas TL						9651			12030			10537
236921	Main Street, Northbridge west of Hill St	10095			12022							11326	
255101	North Street, Douglas south of Gilboa Street		7551					8312					

Annual Growth Summary

Station 3194: -0.72% from 2012 to 2018 and -1.53% from 2015 to 2018

Station 3204: +1.72% from 2008 to 2017 and -0.27% from 2011 to 2017

Station 3207: +1.47% from 2013 to 2019 and -4.32% from 2016 to 2019

Station 236921: +0.68% from 2001 to 2018 and -0.85% from 2011 to 2018

Station 255101: +0.96% from 2004 to 2014

T-4: Background Project Traffic Volumes

15 - 17 Rice Road Millbury, MA

Proposed Residential Development
15-17 Rice Road, Millbury, MA

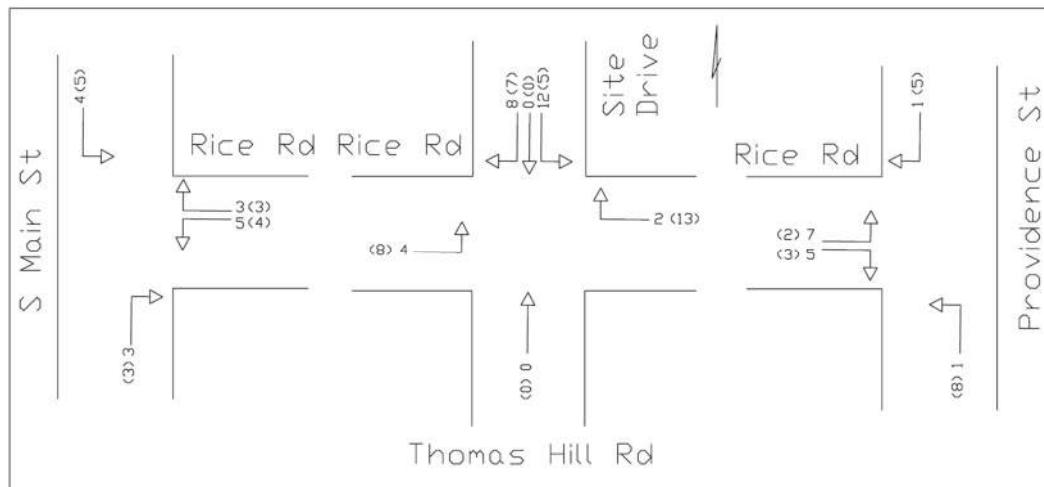
PM peak traffic periods were evaluated for all three intersections.

Trip Distribution and Assignment

Because such factors as population density, land use, availability of major highways in the area, and other demographics that make up the traffic patterns within a community, the directional distribution of the projected site-generated trips to and from the proposed multifamily residential development site was based on the existing traffic patterns within the immediate vicinity of the site and based on the knowledge of local traffic patterns. The turning movement traffic counts for the intersection of Rice Road with South Main Street, Thomas Hill Road, and Providence Street are good indicators of the traffic patterns in this area.

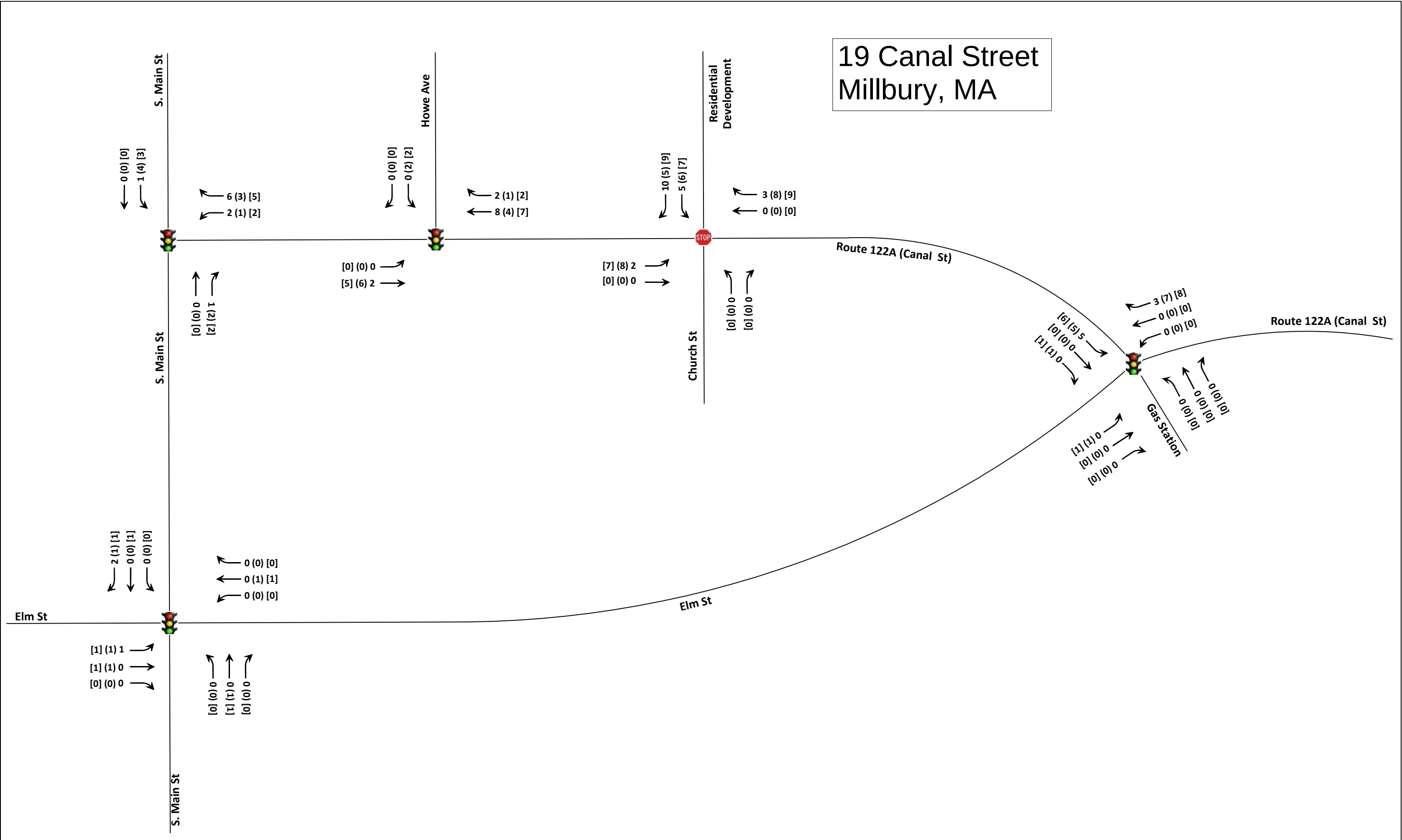
Using this information, the projected new site-generated trips from Table 2 are proportionally assigned to each approach of these intersections. As shown in Table 2 above and Figure 4 below, during AM peak period, a sum of six vehicles would be arriving at the proposed development site and 20 vehicles would be departing from the site in both directions along Rice Road via the proposed site driveway. During PM peak period, a total of 21 vehicles are expected to arrive at and 12 vehicles would depart from the proposed site via the proposed site driveway. Finally, a total of 190 vehicles will be arriving at and 91 vehicles will be departing from the proposed site during a 24-hour period on an average day.

Figure 4
Trip Generation and Distribution



¹ Trip Generation, 10th Edition, Institute of Transportation Engineers; Washington,

19 Canal Street Millbury, MA



Fisherville Terrace Grafton, MA

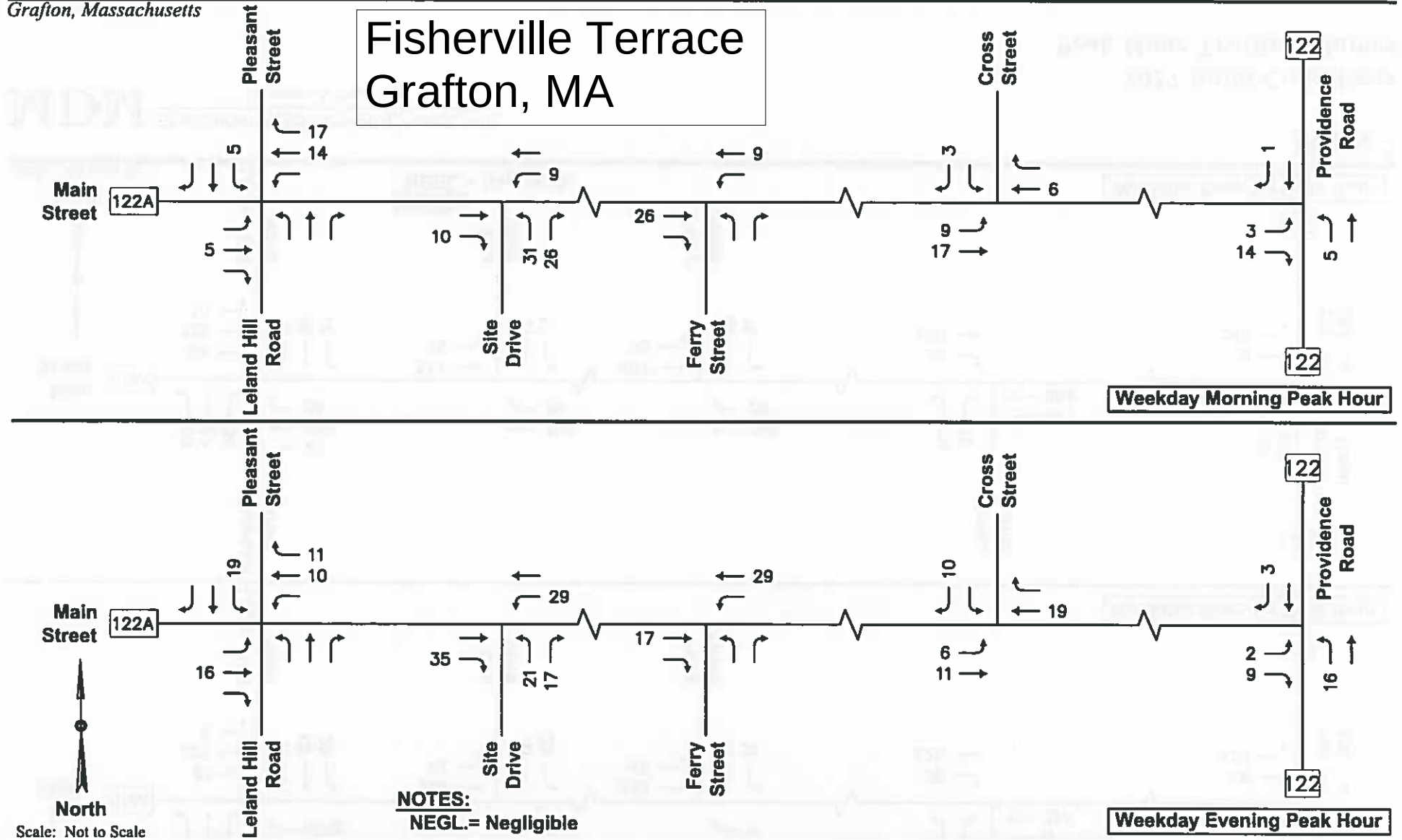
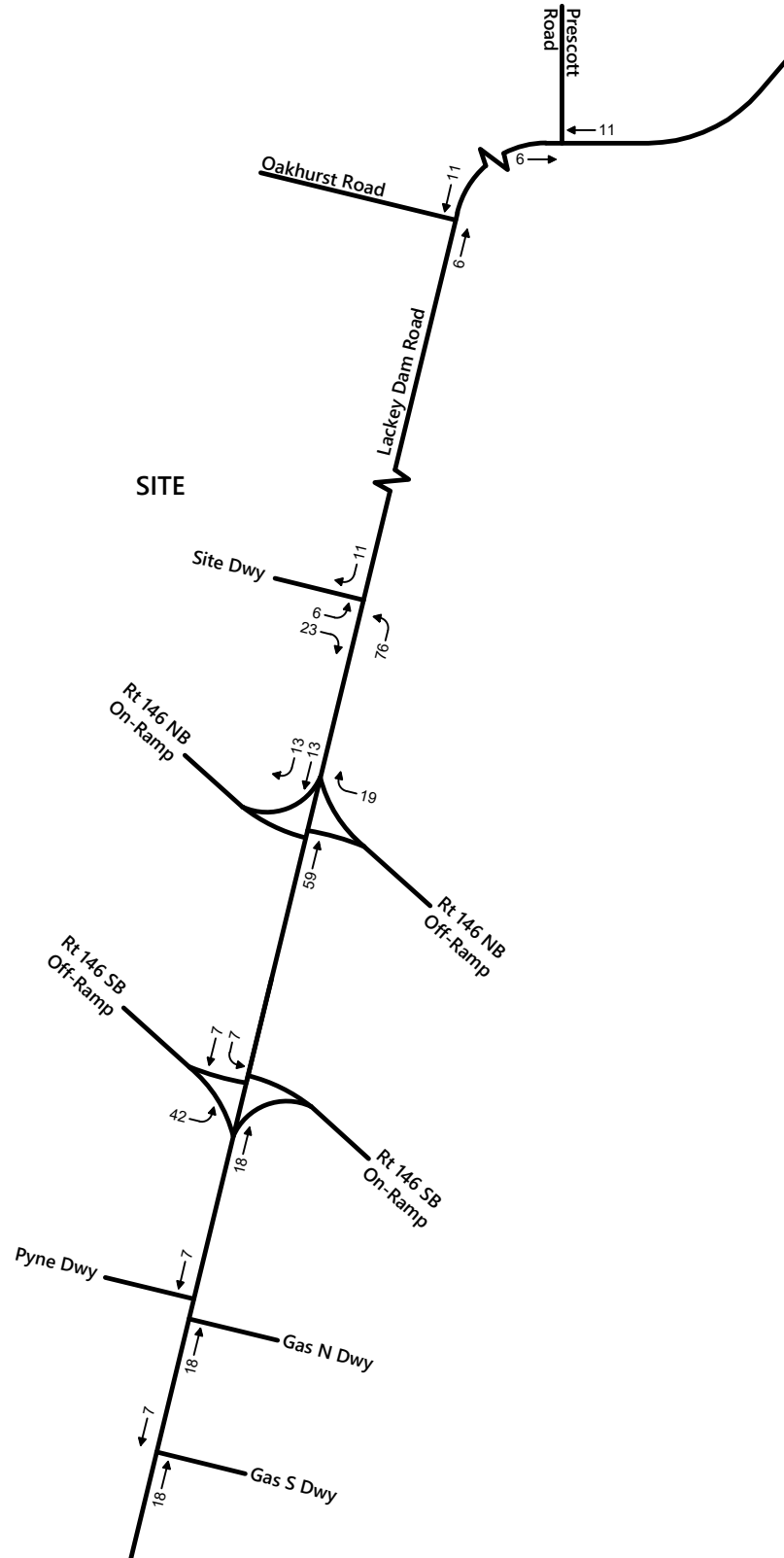


Figure 6

Weekday Peak Hour Trip Tracings
(100-Unit Housing Development)

All fractional numbers rounded up, resulting in minor volume discrepancies between intersections.



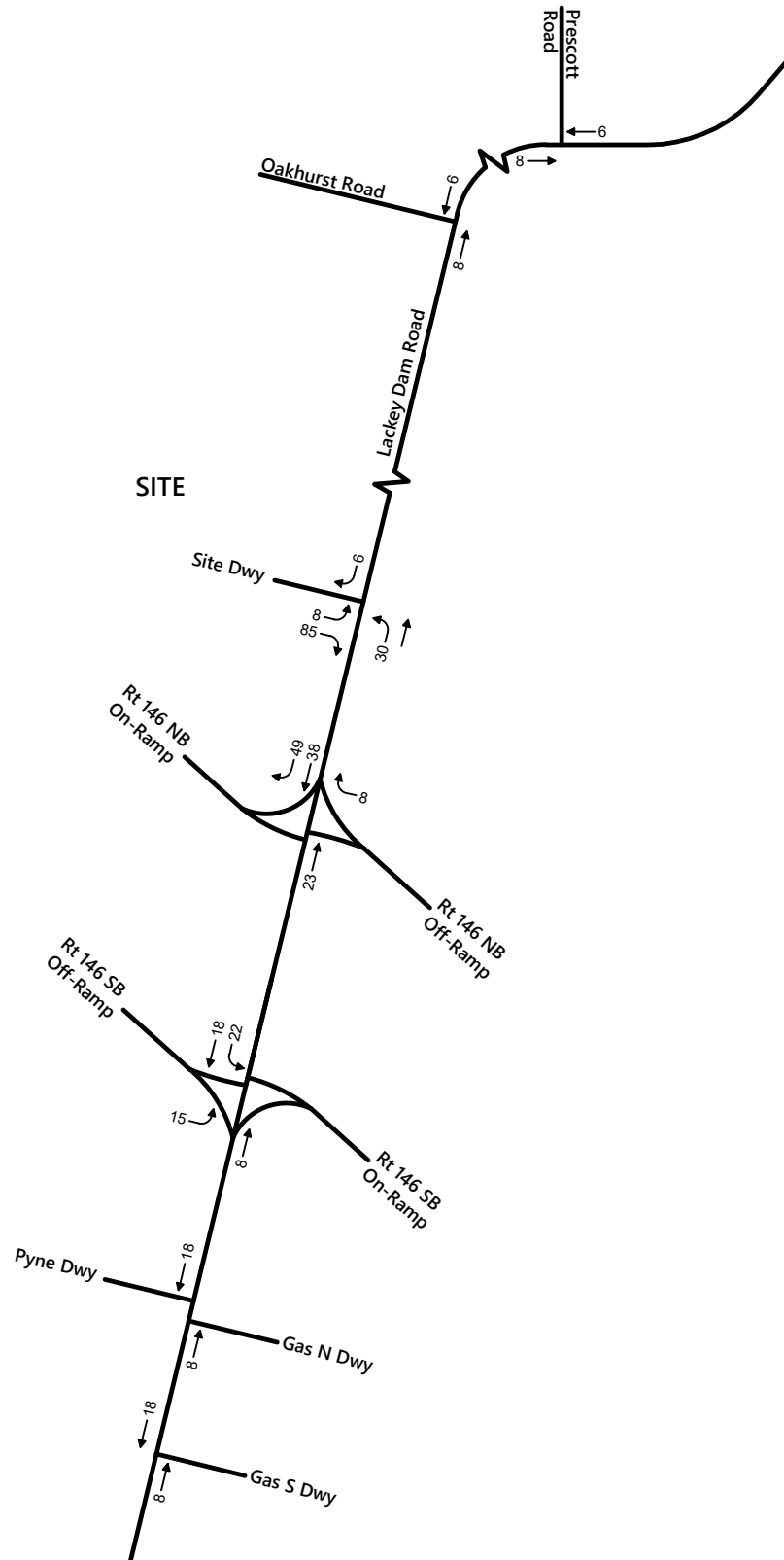
Not to Scale



Figure 7

Site-Generated Traffic Volumes
Weekday Morning Peak Hour
Blackstone Logistics Center
Sutton, Douglas, and Uxbridge, Massachusetts

All fractional numbers rounded up, resulting in minor volume discrepancies between intersections.



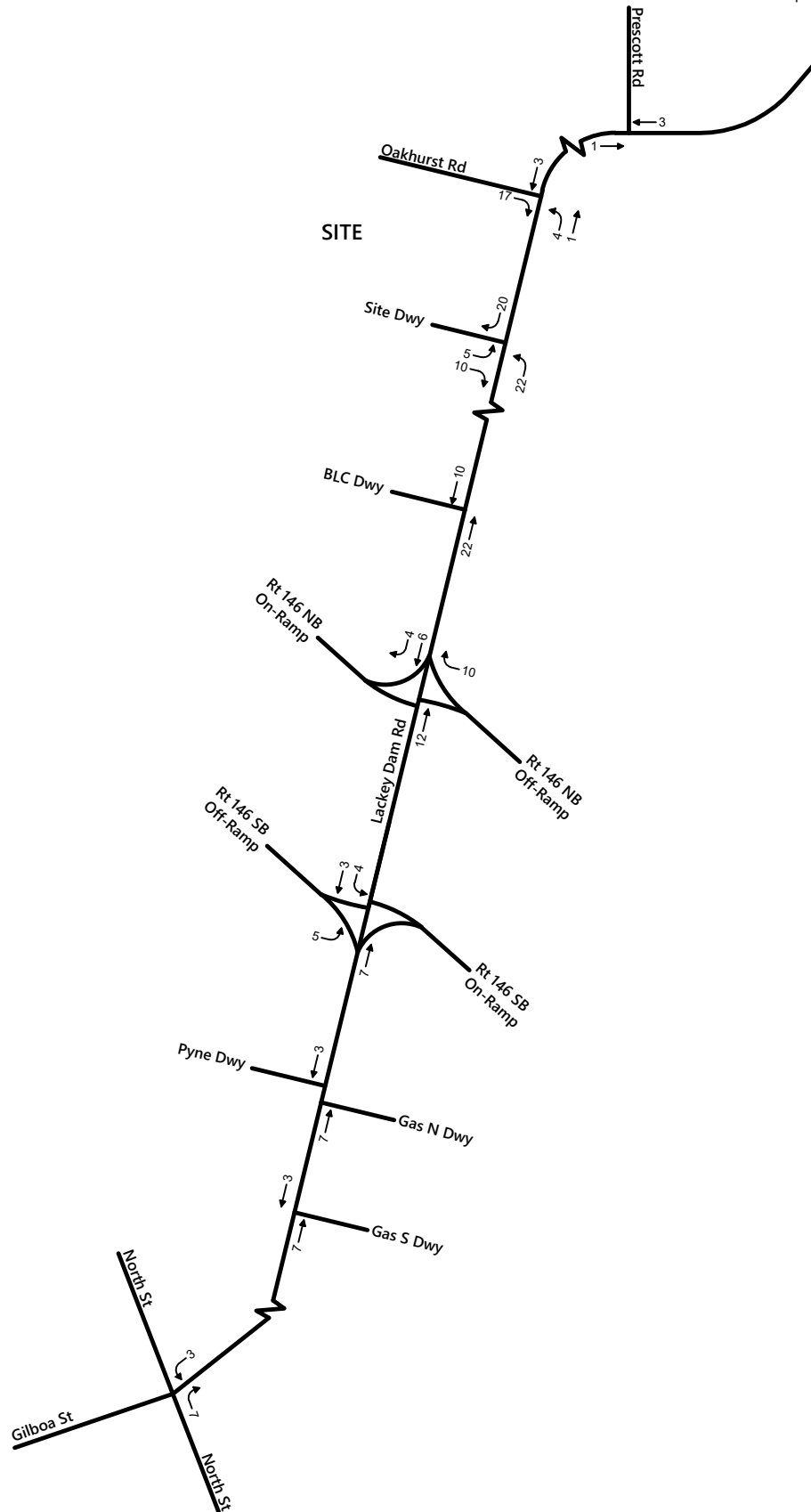
Not to Scale



Figure 8

Site-Generated Traffic Volumes
Weekday Evening Peak Hour
Blackstone Logistics Center
Sutton, Douglas, and Uxbridge, Massachusetts

All fractional numbers rounded up, resulting in minor volume discrepancies between intersections.



Not to Scale

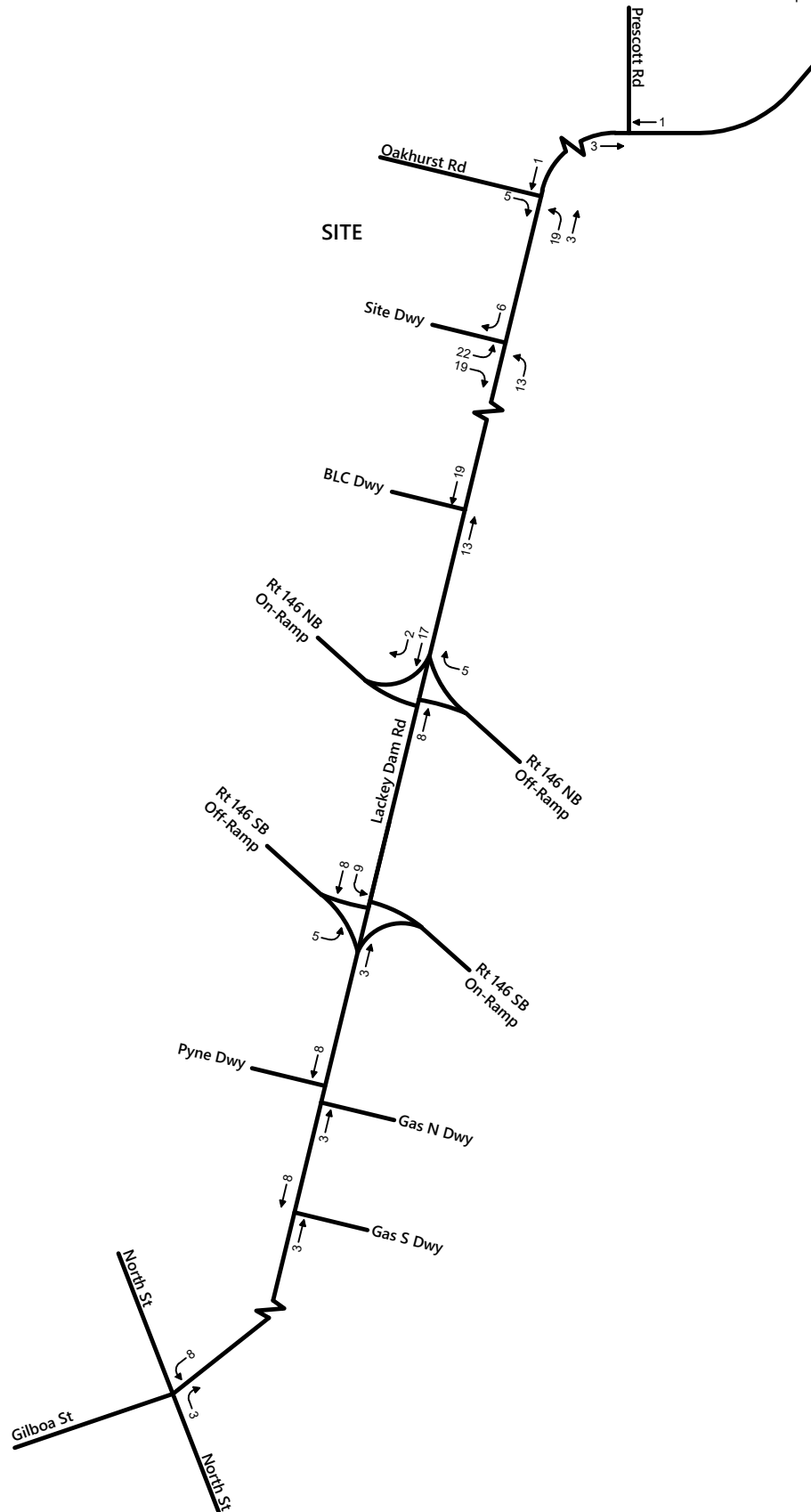


Figure 7

Site-Generated Traffic Volumes
Weekday Morning Peak Hour
Lackey Dam Road Logistics Center
Sutton and Uxbridge, MA

5/12/2022

All fractional numbers rounded up, resulting in minor volume discrepancies between intersections.



Not to Scale



Figure 8

Site-Generated Traffic Volumes
Weekday Evening Peak Hour
Lackey Dam Road Logistics Center
Sutton and Uxbridge, MA

5/12/2022

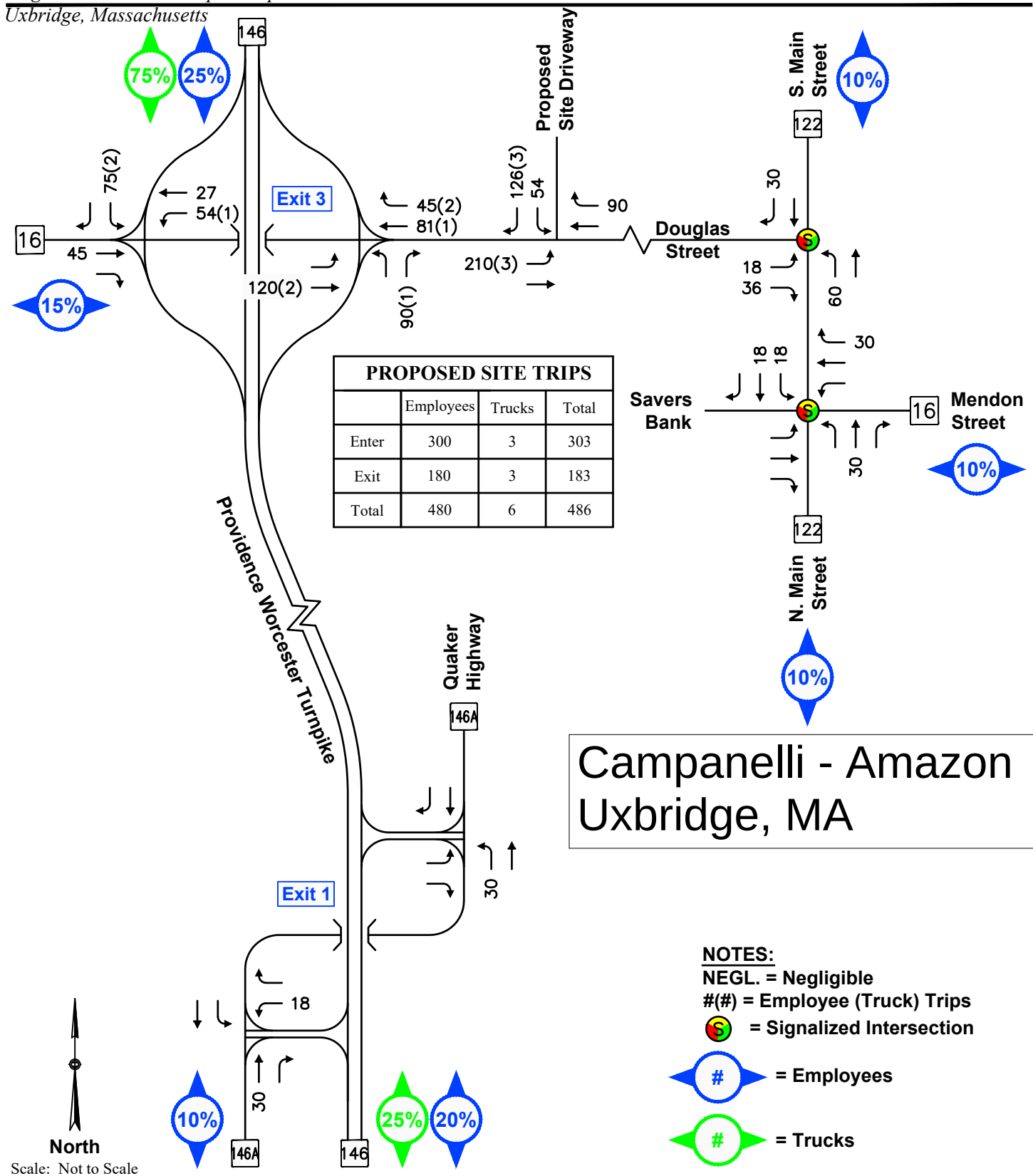


Figure 2

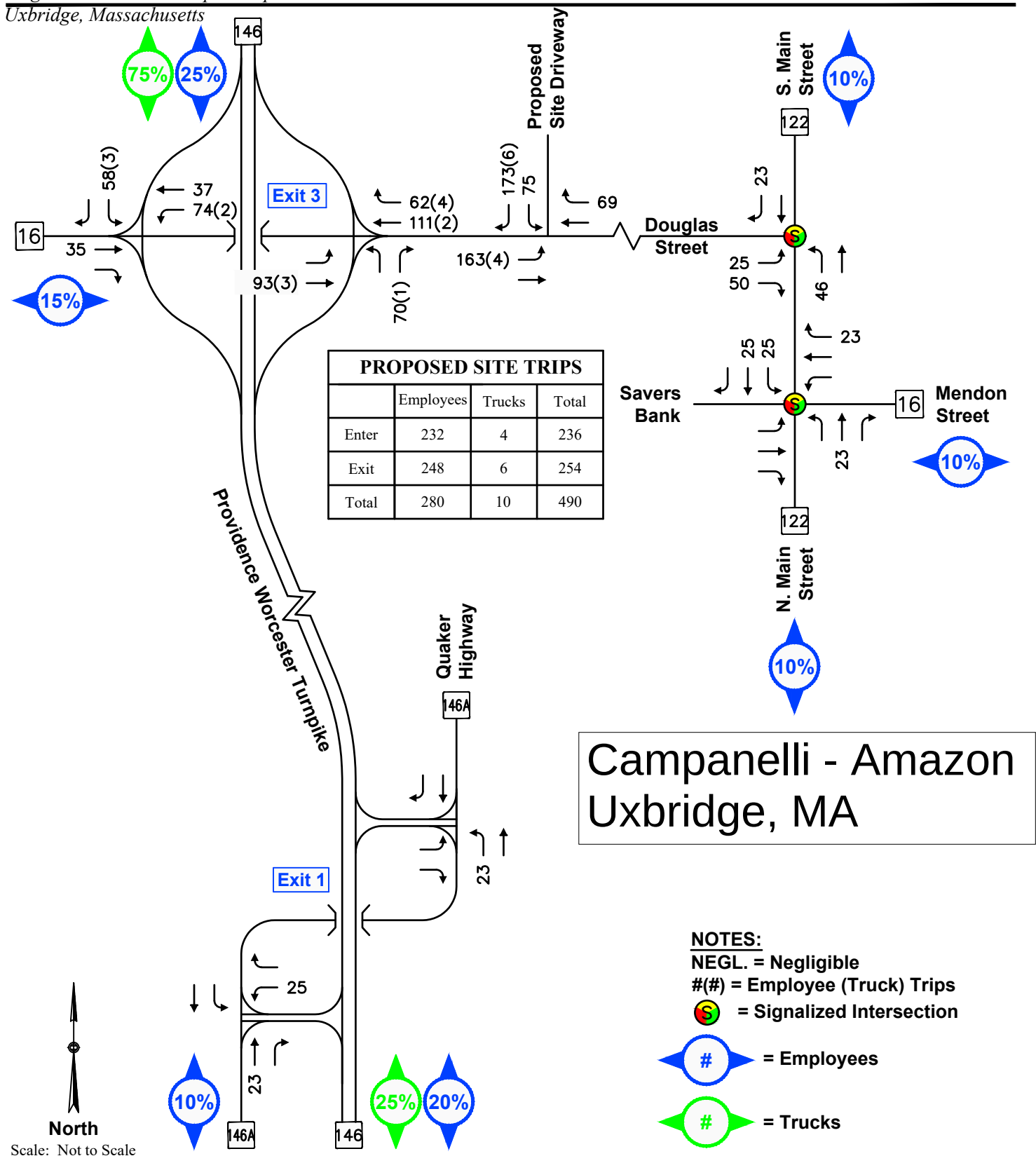
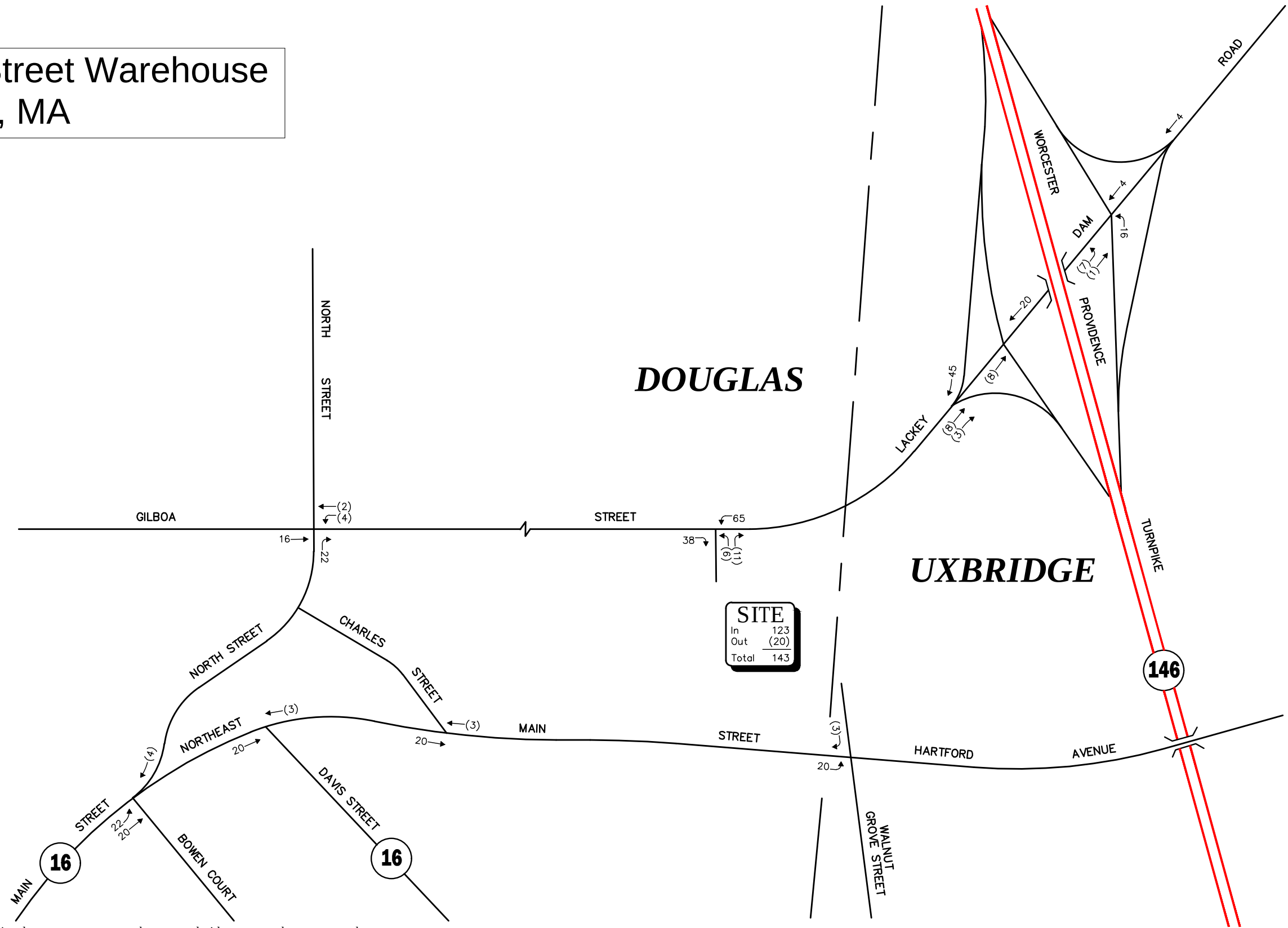


Figure 3

Site Generated Trips
Weekday Evening Peak Hour Volumes
(Empirical)

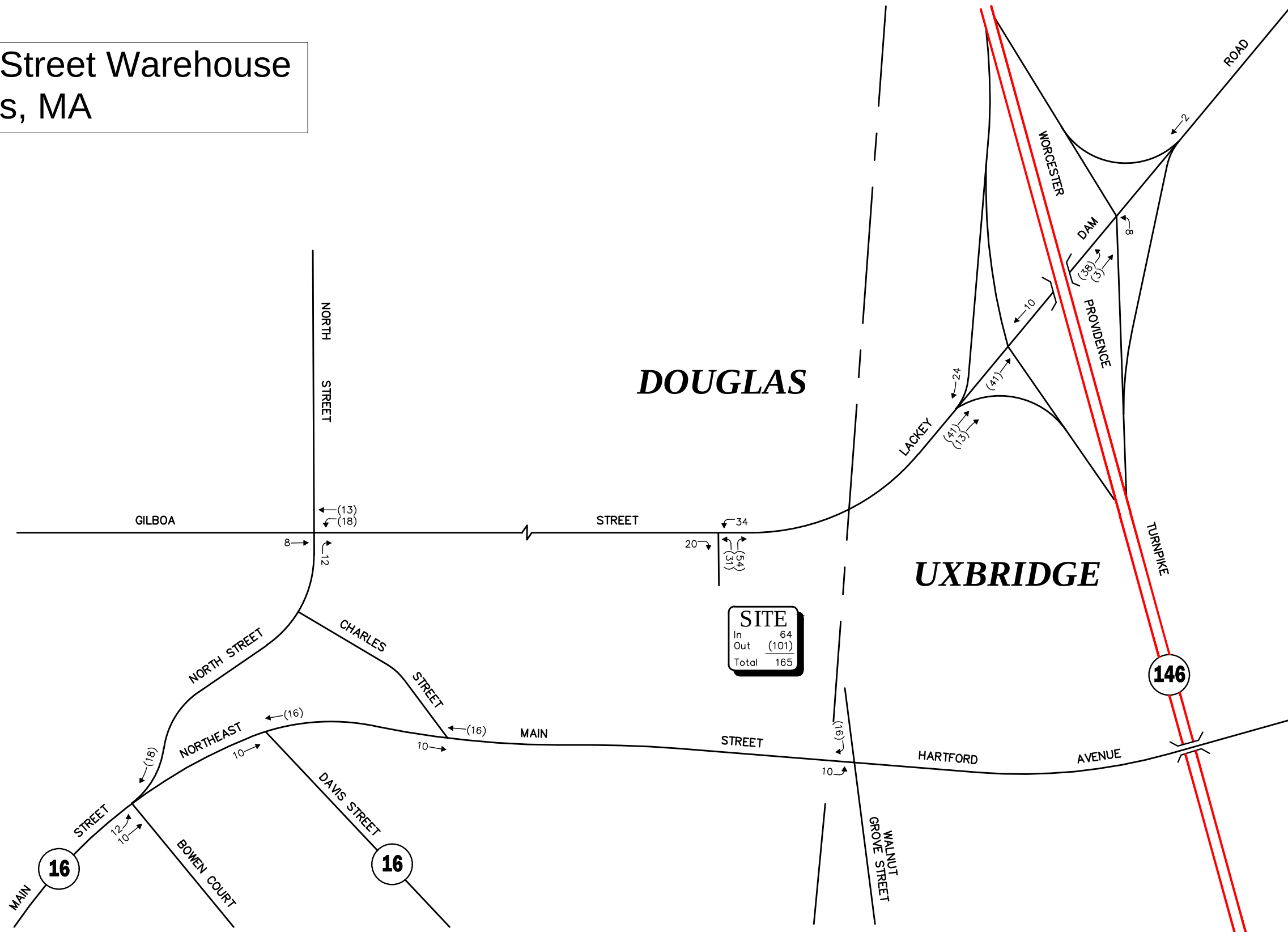
Gilboa Street Warehouse
Douglas, MA



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.
Not To Scale



Figure 9
Project-Generated
Weekday Morning
Passenger Car Trips
Peak-Hour Traffic Volumes



Not To Scale

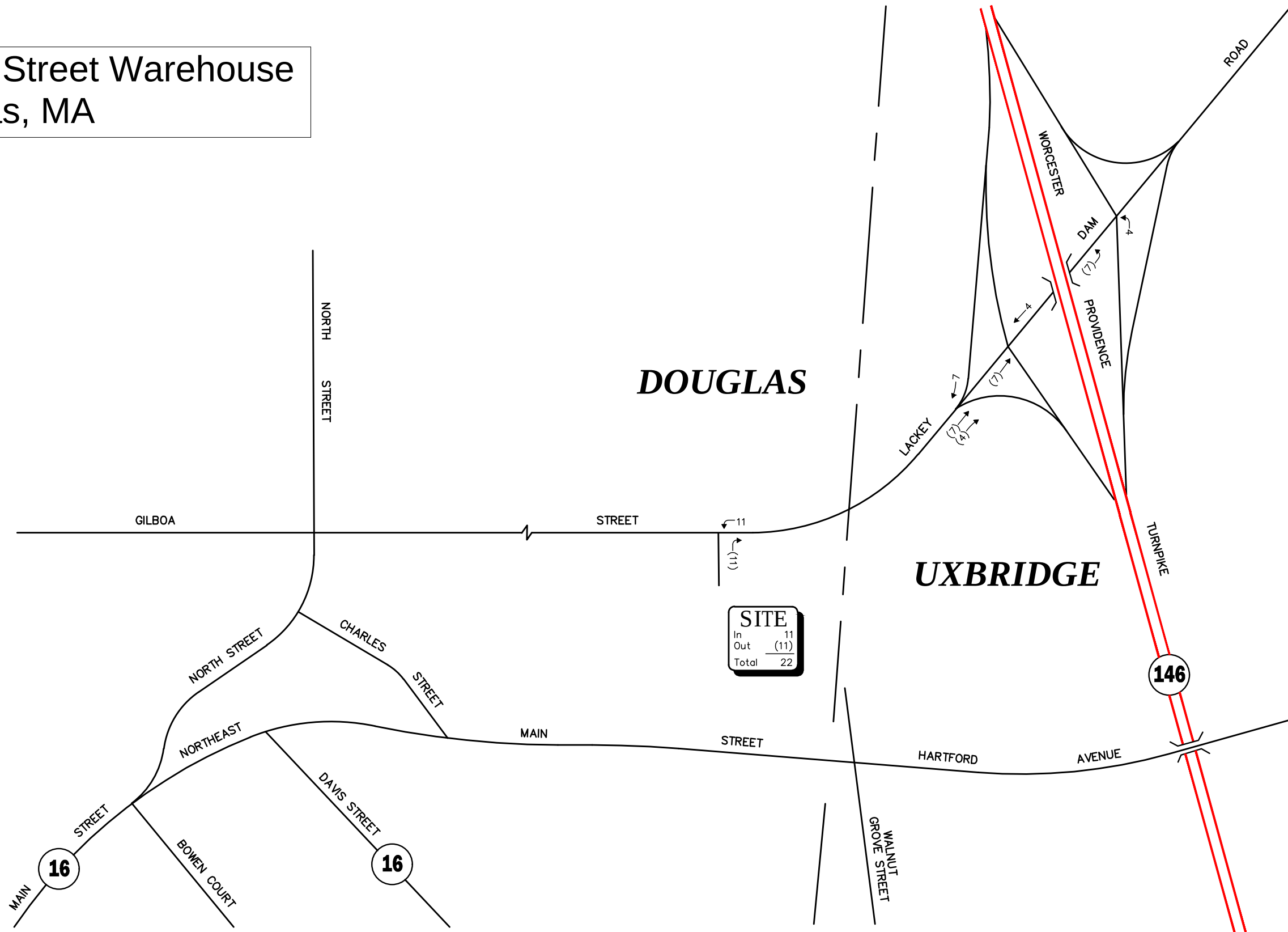


W Vanasse &
Associates inc

Figure 10

Project-Generated Weekday Evening Passenger Car Trips Peak-Hour Traffic Volumes

Gilboa Street Warehouse Douglas, MA



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.
Not To Scale

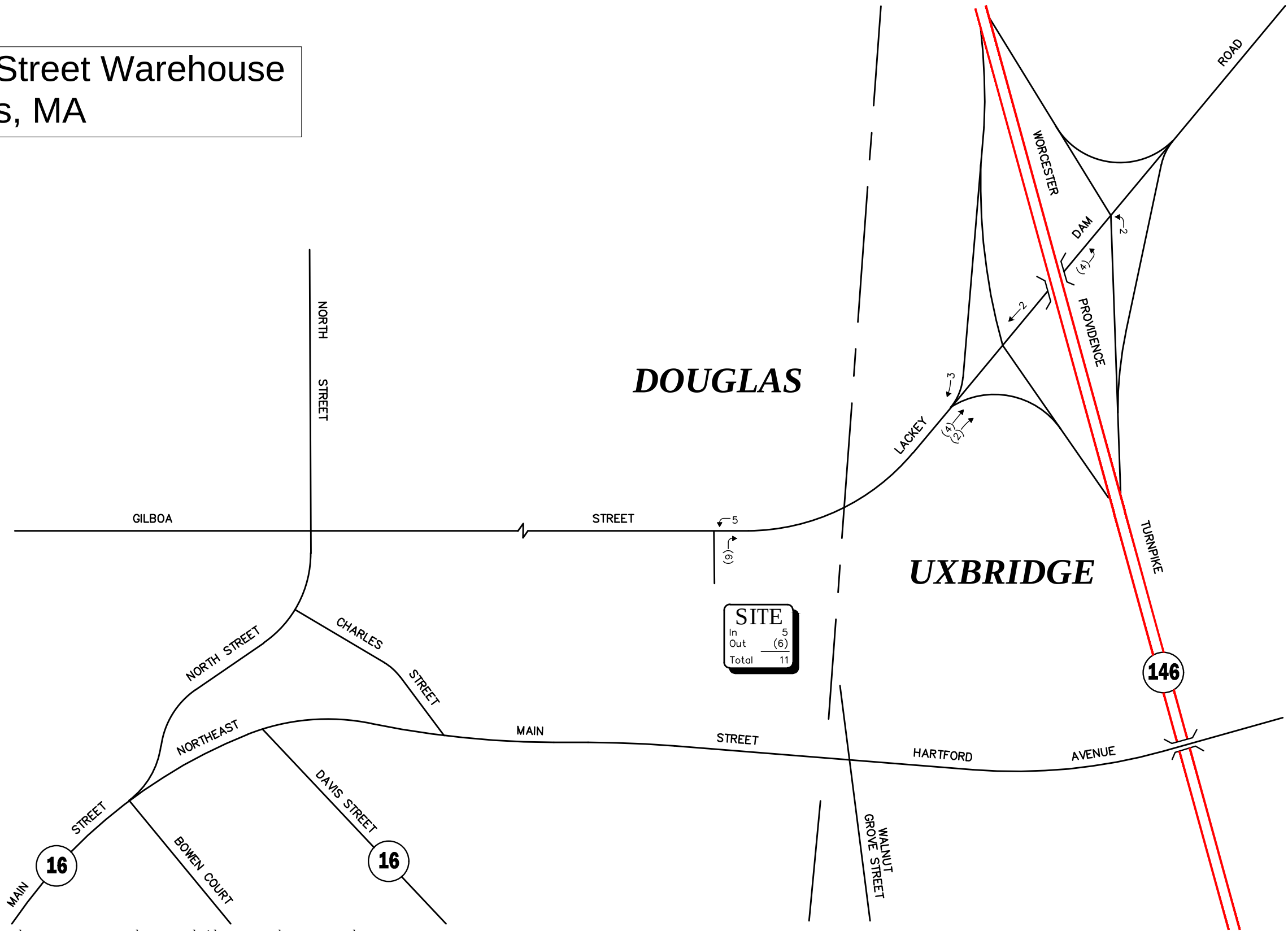


Vanasse &
Associates inc

Figure 11

Project-Generated Weekday Morning Truck Trips Peak-Hour Traffic Volumes

Gilboa Street Warehouse
Douglas, MA



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale



Vanasse &
Associates inc

Figure 12

Project-Generated
Weekday Evening
Truck Trips
Peak-Hour Traffic Volumes

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Douglas Street
NB: Main Driveway
Uxbridge, MA

File Name : 1059_Main_Driveway_Nov_2020_11-12-2020
Site Code : 1059
Start Date : 11/12/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

Start Time	Southbound Approach From North					Douglas Street From East					Main Driveway From South					Douglas Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	40	2	0	42	0	0	0	0	0	0	68	0	0	68	110
07:15 AM	0	0	0	0	0	0	26	8	0	34	0	0	0	0	0	0	64	0	0	64	98
07:30 AM	0	0	0	0	0	0	46	10	0	56	0	0	0	0	0	1	60	0	0	61	117
07:45 AM	0	0	0	0	0	0	46	9	0	55	0	0	0	0	0	2	66	0	0	68	123
Total	0	0	0	0	0	0	158	29	0	187	0	0	0	0	0	3	258	0	0	261	448
08:00 AM	0	0	0	0	0	0	42	5	0	47	1	0	0	0	1	1	51	0	0	52	100
08:15 AM	0	0	0	0	0	0	45	12	0	57	0	0	0	0	0	1	63	0	0	64	121
08:30 AM	0	0	1	0	1	0	40	10	0	50	1	0	0	0	1	3	47	0	0	50	102
08:45 AM	0	0	0	0	0	0	46	13	0	59	0	0	0	0	0	3	43	0	0	46	105
Total	0	0	1	0	1	0	173	40	0	213	2	0	0	0	2	8	204	0	0	212	428
03:00 PM	0	0	0	0	0	0	56	9	0	65	0	0	0	0	0	0	63	0	0	63	128
03:15 PM	0	0	0	0	0	0	81	10	0	91	0	0	2	0	2	0	50	0	0	50	143
03:30 PM	0	0	0	0	0	0	97	17	0	114	1	0	0	0	1	3	119	0	0	122	237
03:45 PM	0	0	0	0	0	0	87	20	0	107	0	0	0	0	0	0	71	0	0	71	178
Total	0	0	0	0	0	0	321	56	0	377	1	0	2	0	3	3	303	0	0	306	686
04:00 PM	0	0	0	0	0	0	65	2	0	67	0	0	0	0	0	0	67	0	0	67	134
04:15 PM	0	0	0	0	0	0	69	1	0	70	0	0	0	0	0	1	64	0	0	65	135
04:30 PM	0	0	0	0	0	0	84	3	0	87	1	0	2	0	3	0	63	0	0	63	153
04:45 PM	0	0	0	0	0	0	67	2	0	69	0	0	0	0	0	1	63	0	0	64	133
Total	0	0	0	0	0	0	285	8	0	293	1	0	2	0	3	2	257	0	0	259	555
05:00 PM	0	0	0	0	0	0	75	4	0	79	0	0	0	0	0	1	59	0	0	60	139
05:15 PM	0	0	0	0	0	1	92	8	0	101	0	0	4	0	4	0	67	0	0	67	172
05:30 PM	0	0	0	0	0	0	73	2	0	75	0	0	6	0	6	1	61	0	0	62	143
05:45 PM	0	0	0	0	0	0	73	6	0	79	0	0	3	0	3	1	53	0	0	54	136
Total	0	0	0	0	0	1	313	20	0	334	0	0	13	0	13	3	240	0	0	243	590
Grand Total	0	0	1	0	1	1	1250	153	0	1404	4	0	17	0	21	19	1262	0	0	1281	2707
Apprch %	0	0	100	0		0.1	89	10.9	0		19	0	81	0		1.5	98.5	0	0		
Total %	0	0	0	0	0	0	46.2	5.7	0	51.9	0.1	0	0.6	0	0.8	0.7	46.6	0	0	47.3	
Lights	0	0	1	0	1	1	1209	129	0	1339	4	0	16	0	20	16	1220	0	0	1236	2596
% Lights	0	0	100	0	100	100	96.7	84.3	0	95.4	100	0	94.1	0	95.2	84.2	96.7	0	0	96.5	95.9
Mediums	0	0	0	0	0	0	27	9	0	36	0	0	0	0	0	0	25	0	0	25	61
% Mediums	0	0	0	0	0	0	2.2	5.9	0	2.6	0	0	0	0	0	0	2	0	0	2	2.3
Articulated Trucks																					
% Articulated Trucks	0	0	0	0	0	0	1.1	9.8	0	2.1	0	0	5.9	0	4.8	15.8	1.3	0	0	1.6	1.8

Campanelli Business Park Empirical Data
Uxbridge, MA

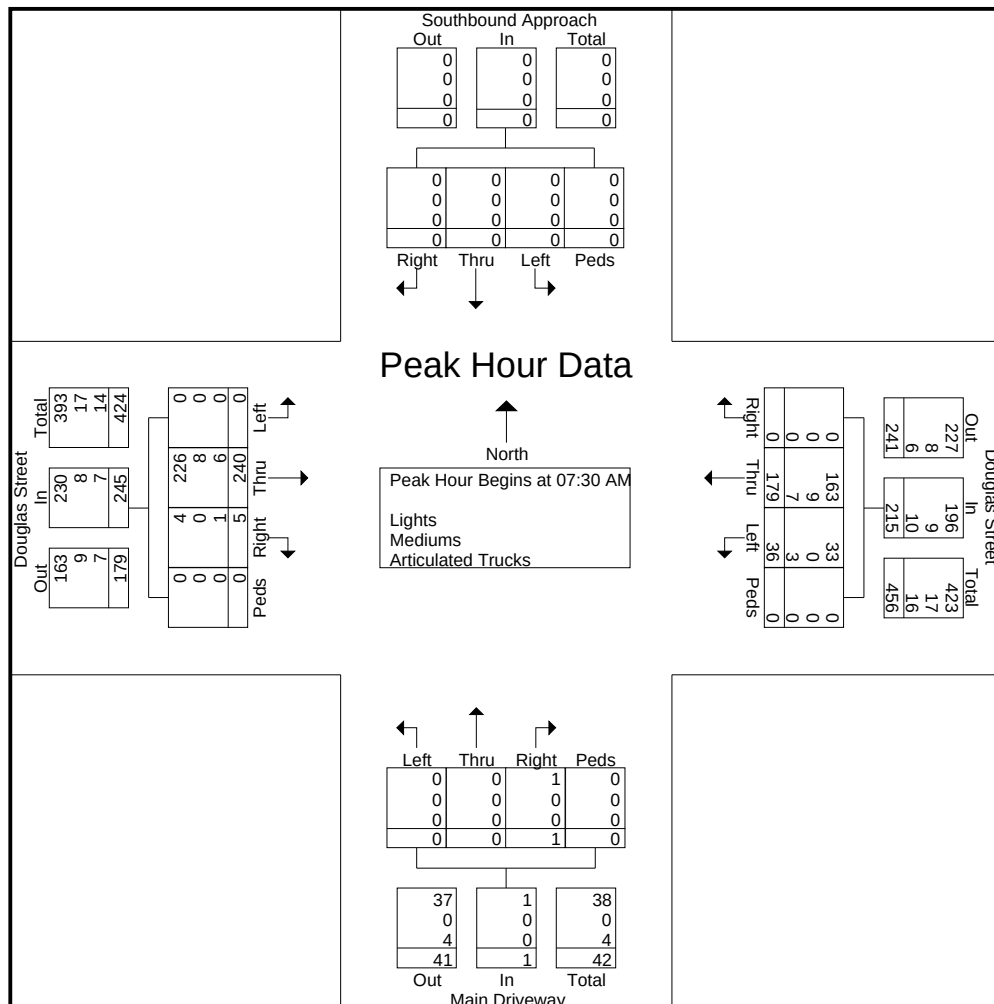
MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Douglas Street
NB: Main Driveway
Uxbridge, MA

File Name : 1059_Main_Driveway_Nov_2020_11-12-2020
Site Code : 1059
Start Date : 11/12/2020
Page No : 2

	Southbound Approach From North					Douglas Street From East					Main Driveway From South					Douglas Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	46	10	0	56	0	0	0	0	0	1	60	0	0	61	117
07:45 AM	0	0	0	0	0	0	46	9	0	55	0	0	0	0	0	2	66	0	0	68	123
08:00 AM	0	0	0	0	0	0	42	5	0	47	1	0	0	0	1	1	51	0	0	52	100
08:15 AM	0	0	0	0	0	0	45	12	0	57	0	0	0	0	0	1	63	0	0	64	121
Total Volume	0	0	0	0	0	0	179	36	0	215	1	0	0	0	1	5	240	0	0	245	461
% App. Total	0	0	0	0	0	0	83.3	16.7	0		100	0	0	0	0	2	98	0	0		
PHF	.000	.000	.000	.000	.000	.000	.973	.750	.000	.943	.250	.000	.000	.000	.250	.625	.909	.000	.000	.901	.937
Lights	0	0	0	0	0	0	163	33	0	196	1	0	0	0	1	4	226	0	0	230	427
% Lights	0	0	0	0	0	0	91.1	91.7	0	91.2	100	0	0	0	100	80.0	94.2	0	0	93.9	92.6
Mediums	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	0	8	0	0	8	17
% Mediums	0	0	0	0	0	0	5.0	0	0	4.2	0	0	0	0	0	0	3.3	0	0	3.3	3.7
Articulated Trucks	0	0	0	0	0	0	7	3	0	10	0	0	0	0	0	1	6	0	0	7	17
% Articulated Trucks	0	0	0	0	0	0	3.9	8.3	0	4.7	0	0	0	0	0	20.0	2.5	0	0	2.9	3.7



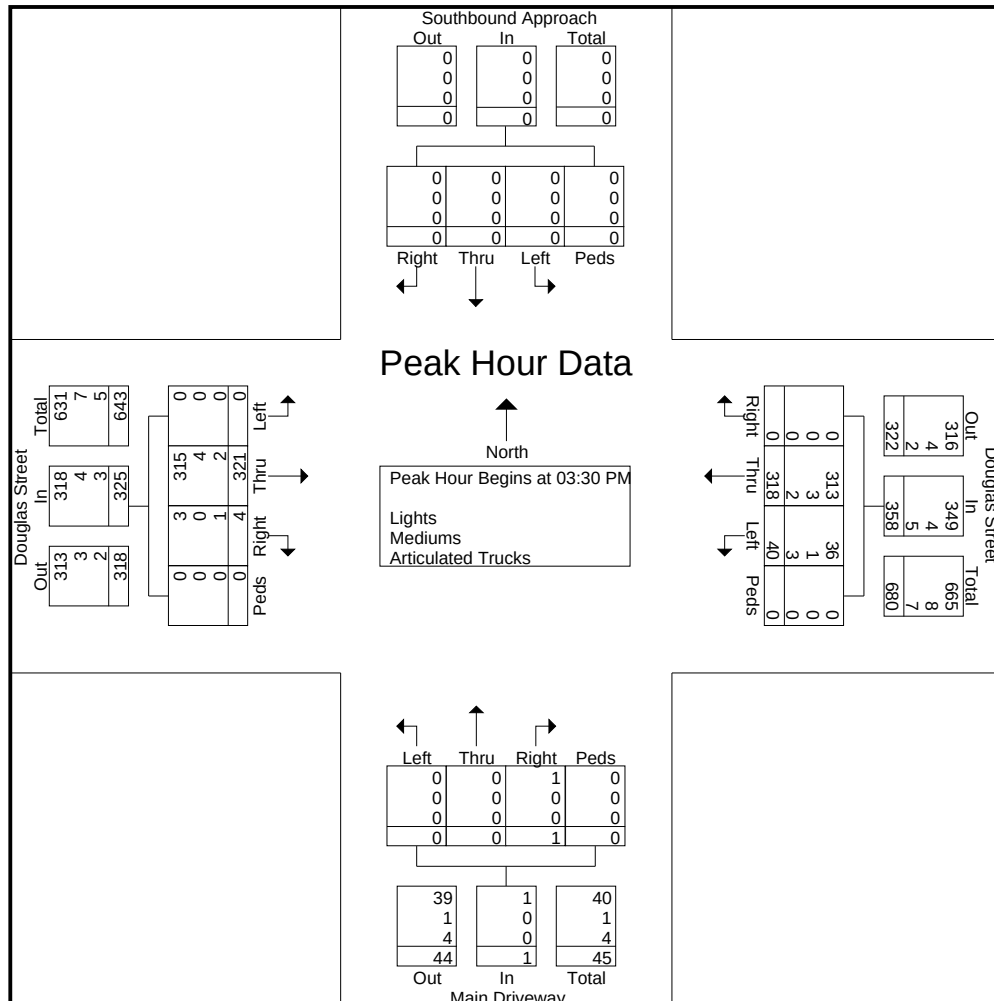
MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Douglas Street
NB: Main Driveway
Uxbridge, MA

File Name : 1059_Main_Driveway_Nov_2020_11-12-2020
Site Code : 1059
Start Date : 11/12/2020
Page No : 3

	Southbound Approach From North					Douglas Street From East					Main Driveway From South					Douglas Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	0	0	0	0	0	0	97	17	0	114	1	0	0	0	1	3	119	0	0	122	237
03:45 PM	0	0	0	0	0	0	87	20	0	107	0	0	0	0	0	0	71	0	0	71	178
04:00 PM	0	0	0	0	0	0	65	2	0	67	0	0	0	0	0	0	67	0	0	67	134
04:15 PM	0	0	0	0	0	0	69	1	0	70	0	0	0	0	0	1	64	0	0	65	135
Total Volume	0	0	0	0	0	0	318	40	0	358	1	0	0	0	1	4	321	0	0	325	684
% App. Total	0	0	0	0	0	0	88.8	11.2	0		100	0	0	0	0	1.2	98.8	0	0		
PHF	.000	.000	.000	.000	.000	.000	.820	.500	.000	.785	.250	.000	.000	.000	.250	.333	.674	.000	.000	.666	.722
Lights	0	0	0	0	0	0	313	36	0	349	1	0	0	0	1	3	315	0	0	318	668
% Lights	0	0	0	0	0	0	98.4	90.0	0	97.5	100	0	0	0	100	75.0	98.1	0	0	97.8	97.7
Mediums	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	0	4	0	0	4	8
% Mediums	0	0	0	0	0	0	0.9	2.5	0	1.1	0	0	0	0	0	0	1.2	0	0	1.2	1.2
Articulated Trucks	0	0	0	0	0	0	2	3	0	5	0	0	0	0	0	1	2	0	0	3	8
% Articulated Trucks	0	0	0	0	0	0	0.6	7.5	0	1.4	0	0	0	0	0	25.0	0.6	0	0	0.9	1.2



MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Douglas Street
NB: Exit Driveway
Uxbridge, MA

File Name : 1059_Exit_Driveway_Nov_2020_11-12-2020
Site Code : 1059
Start Date : 11/12/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

Start Time	Douglas Street From East				Exit Driveway From South				Douglas Street From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
07:00 AM	43	0	0	43	1	0	0	1	0	68	0	68	112
07:15 AM	38	0	0	38	1	0	0	1	0	65	0	65	104
07:30 AM	58	0	0	58	1	0	0	1	0	60	0	60	119
07:45 AM	56	0	0	56	2	0	0	2	0	66	0	66	124
Total	195	0	0	195	5	0	0	5	0	259	0	259	459
08:00 AM	49	0	0	49	2	0	0	2	0	54	0	54	105
08:15 AM	59	0	0	59	1	0	0	1	0	63	0	63	123
08:30 AM	49	0	0	49	0	0	0	0	0	50	0	50	99
08:45 AM	59	0	0	59	2	1	0	3	0	42	0	42	104
Total	216	0	0	216	5	1	0	6	0	209	0	209	431
03:00 PM	65	0	0	65	5	0	0	5	0	64	0	64	134
03:15 PM	92	0	0	92	2	0	0	2	0	49	0	49	143
03:30 PM	113	0	0	113	8	1	0	9	0	119	0	119	241
03:45 PM	104	0	0	104	3	2	0	5	0	72	0	72	181
Total	374	0	0	374	18	3	0	21	0	304	0	304	699
04:00 PM	69	0	0	69	4	0	0	4	0	66	0	66	139
04:15 PM	73	0	0	73	8	0	0	8	0	66	0	66	147
04:30 PM	86	0	0	86	8	0	0	8	0	65	0	65	159
04:45 PM	68	0	0	68	4	1	0	5	0	63	0	63	136
Total	296	0	0	296	24	1	0	25	0	260	0	260	581
05:00 PM	77	0	0	77	5	0	0	5	0	61	0	61	143
05:15 PM	101	0	0	101	11	0	0	11	0	66	0	66	178
05:30 PM	74	0	0	74	14	0	0	14	0	65	0	65	153
05:45 PM	81	0	0	81	7	0	0	7	0	53	0	53	141
Total	333	0	0	333	37	0	0	37	0	245	0	245	615
Grand Total	1414	0	0	1414	89	5	0	94	0	1277	0	1277	2785
Apprch %	100	0	0		94.7	5.3	0		0	100	0		
Total %	50.8	0	0	50.8	3.2	0.2	0	3.4	0	45.9	0	45.9	
Lights	1349	0	0	1349	80	5	0	85	0	1234	0	1234	2668
% Lights	95.4	0	0	95.4	89.9	100	0	90.4	0	96.6	0	96.6	95.8
Mediums	35	0	0	35	2	0	0	2	0	28	0	28	65
% Mediums	2.5	0	0	2.5	2.2	0	0	2.1	0	2.2	0	2.2	2.3
Articulated Trucks	30	0	0	30	7	0	0	7	0	15	0	15	52
% Articulated Trucks	2.1	0	0	2.1	7.9	0	0	7.4	0	1.2	0	1.2	1.9

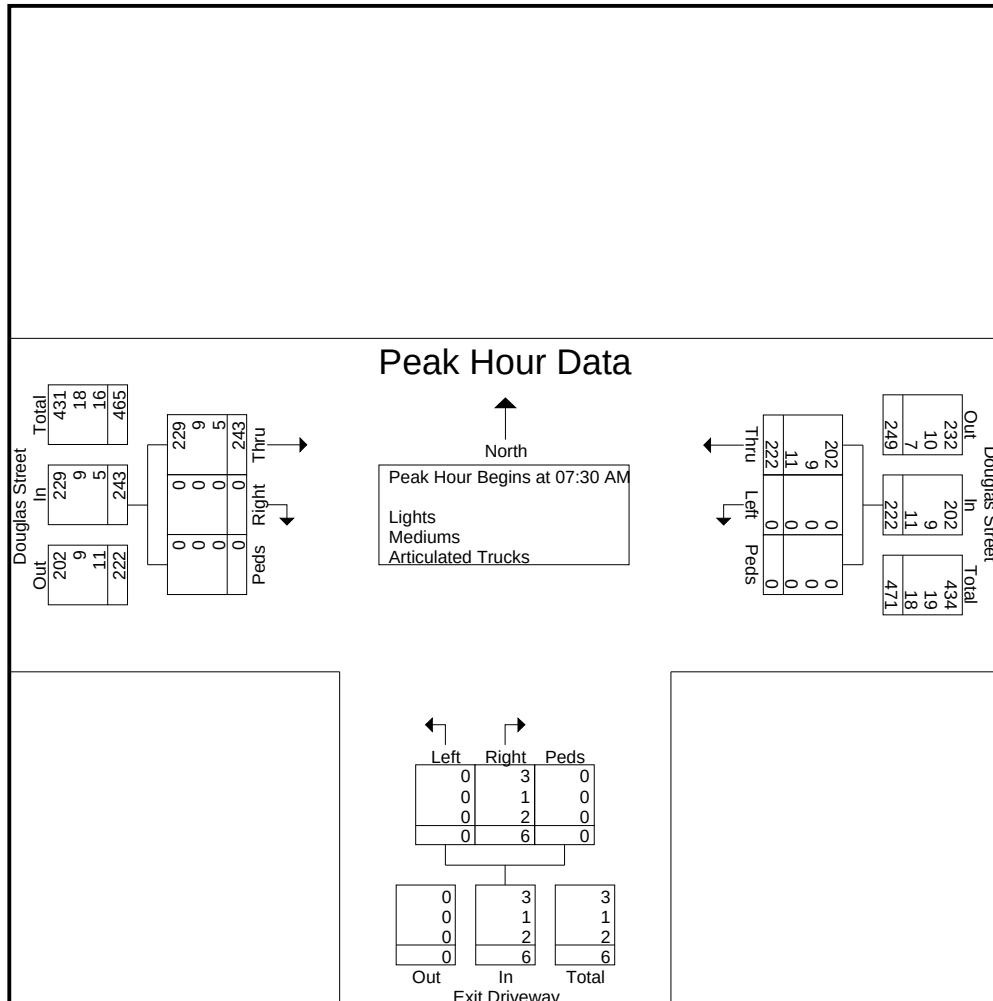
MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Douglas Street
NB: Exit Driveway
Uxbridge, MA

File Name : 1059_Exit_Driveway_Nov_2020_11-12-2020
Site Code : 1059
Start Date : 11/12/2020
Page No : 2

	Douglas Street From East				Exit Driveway From South				Douglas Street From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	58	0	0	58	1	0	0	1	0	60	0	60	119
07:45 AM	56	0	0	56	2	0	0	2	0	66	0	66	124
08:00 AM	49	0	0	49	2	0	0	2	0	54	0	54	105
08:15 AM	59	0	0	59	1	0	0	1	0	63	0	63	123
Total Volume	222	0	0	222	6	0	0	6	0	243	0	243	471
% App. Total	100	0	0		100	0	0		0	100	0		
PHF	.941	.000	.000	.941	.750	.000	.000	.750	.000	.920	.000	.920	.950
Lights	202	0	0	202	3	0	0	3	0	229	0	229	434
% Lights	91.0	0	0	91.0	50.0	0	0	50.0	0	94.2	0	94.2	92.1
Mediums	9	0	0	9	1	0	0	1	0	9	0	9	19
% Mediums	4.1	0	0	4.1	16.7	0	0	16.7	0	3.7	0	3.7	4.0
Articulated Trucks	11	0	0	11	2	0	0	2	0	5	0	5	18
% Articulated Trucks	5.0	0	0	5.0	33.3	0	0	33.3	0	2.1	0	2.1	3.8



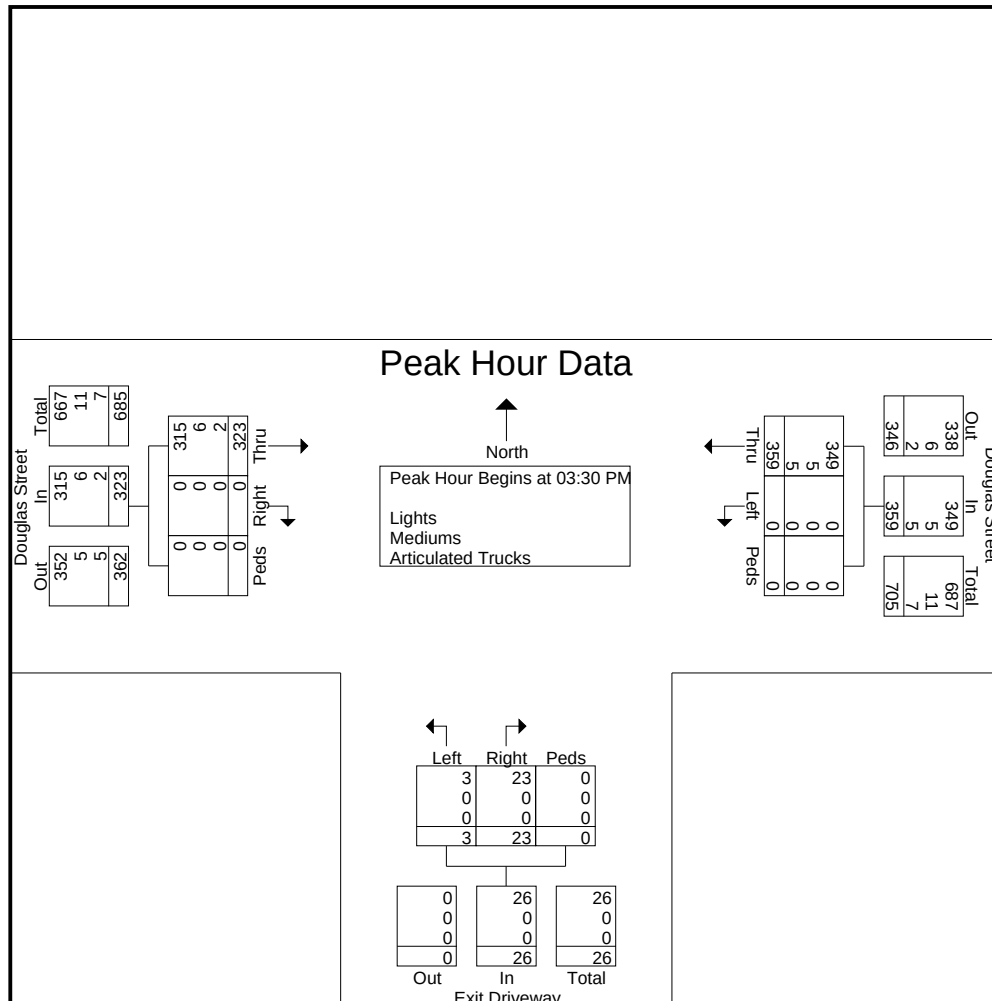
MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Douglas Street
NB: Exit Driveway
Uxbridge, MA

File Name : 1059_Exit_Driveway_Nov_2020_11-12-2020
Site Code : 1059
Start Date : 11/12/2020
Page No : 3

	Douglas Street From East				Exit Driveway From South				Douglas Street From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:30 PM													
03:30 PM	113	0	0	113	8	1	0	9	0	119	0	119	241
03:45 PM	104	0	0	104	3	2	0	5	0	72	0	72	181
04:00 PM	69	0	0	69	4	0	0	4	0	66	0	66	139
04:15 PM	73	0	0	73	8	0	0	8	0	66	0	66	147
Total Volume	359	0	0	359	23	3	0	26	0	323	0	323	708
% App. Total	100	0	0		88.5	11.5	0		0	100	0		
PHF	.794	.000	.000	.794	.719	.375	.000	.722	.000	.679	.000	.679	.734
Lights	349	0	0	349	23	3	0	26	0	315	0	315	690
% Lights	97.2	0	0	97.2	100	100	0	100	0	97.5	0	97.5	97.5
Mediums	5	0	0	5	0	0	0	0	0	6	0	6	11
% Mediums	1.4	0	0	1.4	0	0	0	0	0	1.9	0	1.9	1.6
Articulated Trucks	5	0	0	5	0	0	0	0	0	2	0	2	7
% Articulated Trucks	1.4	0	0	1.4	0	0	0	0	0	0.6	0	0.6	1.0



T-5: Trip Generation Calculations

	TRUCK TRIPS		
	Building 2	Building 3	TOTAL
	HCW Transload and Short-Term Storage	HCW Transload and Short-Term Storage	HCW Transload and Short-Term Storage
	154 680,000 240,000 SF to 1,820,000 SF 798,000 SF 91	154 325,000 240,000 SF to 1,820,000 SF 798,000 SF 91	154 1,005,000 240,000 SF to 1,820,000 SF 798,000 SF 91
LUC Size of Development or Number of Employees Range of ITE Independent Variable (Weekday Daily) Average ITE Independent Variable (Weekday Daily) Number of Studies (Weekday Daily)			
Weekday Daily	(average rate)	(average rate)	
Enter	75	36	111
Exit	75	36	111
Total	150	72	222
Weekday Morning Peak Hour (Peak of Generator)	(average rate)	(average rate)	
Enter	4	2	6
Exit	3	1	4
Total	7	3	10
Weekday Evening Peak Hour (Peak of Generator)	(average rate)	(average rate)	
Enter	7	4	11
Exit	7	3	10
Total	14	7	21
Weekday Morning Peak Hour (Peak of Adjacent Street)	(average rate)	(average rate)	
Enter	7	3	10
Exit	7	4	11
Total	14	7	21
Weekday Evening Peak Hour (Peak of Adjacent Street)	(average rate)	(average rate)	
Enter	3	1	4
Exit	4	2	6
Total	7	3	10

T-6: Empirical Traffic Data

	UN1F1ED Sites		Total (based on empirical data)	ITE Rates (for reference)
	580 Fort Pond Road - Lancaster, MA	68 Providence Road - Sutton, MA		
Count Date	9/8/2021	2/10, 2/15, 2/16/2022 (Average)		
Size (sf)	255000	60000	315000	
AM Peak Hour				
Enter	9	9	18	
Exit	4	4	8	
Total	13	13	26	
PM Peak Hour				
Enter	3	4	7	
Exit	7	9	16	
Total	10	13	23	
Rates per ksf				
AM Peak Hour				
Enter	0.04	0.15	0.04	0.0616
Exit	0.02	0.07	0.02	0.0184
Total	0.05	0.22	0.08	0.08
PM Peak Hour				
Enter	0.01	0.07	0.02	0.028
Exit	0.03	0.15	0.04	0.072
Total	0.04	0.22	0.07	0.1

PDI File #: **218148 B**
 Location: **N: #580 Driveway**
 Location: **E: Fort Pond Road W: Fort Pond Road**
 City, State: **Lancaster, MA**
 Client: **VHB/ J. Plourde**
 Site Code: **14260.01**
 Count Date: **Wednesday, September 8, 2021**
 Start Time: **7:00 AM**
 End Time: **9:00 AM**
 Class:



Cars and Heavy Vehicles (Combined)

	#580 Driveway				Fort Pond Road				Fort Pond Road				Total
	from North				from East				from West				
	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	
7:00 AM	1	1	0	2	0	3	0	3	6	0	0	6	11
7:15 AM	1	1	0	2	1	1	0	2	10	0	0	10	14
7:30 AM	0	1	0	1	0	3	0	3	10	3	0	13	17
7:45 AM	0	0	0	0	1	5	0	6	13	1	0	14	20
Total	2	3	0	5	2	12	0	14	39	4	0	43	62
8:00 AM	1	0	0	1	1	7	0	8	10	1	0	11	20
8:15 AM	1	1	0	2	1	1	0	2	10	1	0	11	15
8:30 AM	1	1	0	2	0	9	0	9	6	0	0	6	17
8:45 AM	0	0	0	0	0	7	0	7	5	0	0	5	12
Total	3	2	0	5	2	24	0	26	31	2	0	33	64
Grand Total	5	5	0	10	4	36	0	40	70	6	0	76	126
Approach %	50.0	50.0	0.0		10.0	90.0	0.0		92.1	7.9	0.0		
Total %	4.0	4.0	0.0	7.9	3.2	28.6	0.0	31.7	55.6	4.8	0.0	60.3	
Exiting Leg Total	10				75				41				126
Cars	2	1	0	3	1	28	0	29	64	3	0	67	99
% Cars	40.0	20.0	0.0	30.0	25.0	77.8	0.0	72.5	91.4	50.0	0.0	88.2	78.6
Exiting Leg Total	4				65				30				99
Heavy Vehicles	3	4	0	7	3	8	0	11	6	3	0	9	27
% Heavy Vehicles	60.0	80.0	0.0	70.0	75.0	22.2	0.0	27.5	8.6	50.0	0.0	11.8	21.4
Exiting Leg Total	6				10				11				27

Peak Hour Analysis from 07:00 AM to 09:00 AM begins at:

7:30 AM	#580 Driveway				Fort Pond Road				Fort Pond Road				Total
	from North				from East				from West				
	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	
7:30 AM	0	1	0	1	0	3	0	3	10	3	0	13	17
7:45 AM	0	0	0	0	1	5	0	6	13	1	0	14	20
8:00 AM	1	0	0	1	1	7	0	8	10	1	0	11	20
8:15 AM	1	1	0	2	1	1	0	2	10	1	0	11	15
Total Volume	2	2	0	4	3	16	0	19	43	6	0	49	72
% Approach Total	50.0	50.0	0.0		15.8	84.2	0.0		87.8	12.2	0.0		
PHF	0.500	0.500	0.000	0.500	0.750	0.571	0.000	0.594	0.827	0.500	0.000	0.875	0.900
Cars	1	1	0	2	1	12	0	13	39	3	0	42	57
Cars %	50.0	50.0	0.0	50.0	33.3	75.0	0.0	68.4	90.7	50.0	0.0	85.7	79.2
Heavy Vehicles	1	1	0	2	2	4	0	6	4	3	0	7	15
Heavy Vehicles %	50.0	50.0	0.0	50.0	66.7	25.0	0.0	31.6	9.3	50.0	0.0	14.3	20.8
Cars Enter Leg	1	1	0	2	1	12	0	13	39	3	0	42	57
Heavy Enter Leg	1	1	0	2	2	4	0	6	4	3	0	7	15
Total Entering Leg	2	2	0	4	3	16	0	19	43	6	0	49	72
Cars Exiting Leg				4				40				13	57
Heavy Exiting Leg				5				5				5	15
Total Exiting Leg				9				45				18	72

PDI File #: **218148 B**
 Location: **N: #580 Driveway**
 Location: **E: Fort Pond Road W: Fort Pond Road**
 City, State: **Lancaster, MA**
 Client: **VHB/ J. Plourde**
 Site Code: **14260.01**
 Count Date: **Wednesday, September 8, 2021**
 Start Time: **4:00 PM**
 End Time: **6:00 PM**
 Class:



Cars and Heavy Vehicles (Combined)

	#580 Driveway				Fort Pond Road				Fort Pond Road				Total
	from North				from East				from West				
	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	
4:00 PM	2	3	0	5	0	28	0	28	6	2	0	8	41
4:15 PM	1	0	0	1	1	23	0	24	1	0	0	1	26
4:30 PM	1	0	0	1	0	26	0	26	9	0	0	9	36
4:45 PM	0	0	0	0	0	31	0	31	3	0	0	3	34
Total	4	3	0	7	1	108	0	109	19	2	0	21	137
5:00 PM	0	2	0	2	1	13	0	14	3	0	0	3	19
5:15 PM	0	0	0	0	0	19	0	19	2	1	0	3	22
5:30 PM	0	0	0	0	0	13	0	13	1	0	0	1	14
5:45 PM	0	0	0	0	0	5	0	5	2	1	0	3	8
Total	0	2	0	2	1	50	0	51	8	2	0	10	63
Grand Total	4	5	0	9	2	158	0	160	27	4	0	31	200
Approach %	44.4	55.6	0.0		1.3	98.8	0.0		87.1	12.9	0.0		
Total %	2.0	2.5	0.0	4.5	1.0	79.0	0.0	80.0	13.5	2.0	0.0	15.5	
Exiting Leg Total	6				32				162				200
Cars	2	3	0	5	1	156	0	157	23	1	0	24	186
% Cars	50.0	60.0	0.0	55.6	50.0	98.7	0.0	98.1	85.2	25.0	0.0	77.4	93.0
Exiting Leg Total	2				26				158				186
Heavy Vehicles	2	2	0	4	1	2	0	3	4	3	0	7	14
% Heavy Vehicles	50.0	40.0	0.0	44.4	50.0	1.3	0.0	1.9	14.8	75.0	0.0	22.6	7.0
Exiting Leg Total	4				6				4				14

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

4:00 PM	#580 Driveway				Fort Pond Road				Fort Pond Road				Total
	from North				from East				from West				
	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	
4:00 PM	2	3	0	5	0	28	0	28	6	2	0	8	41
4:15 PM	1	0	0	1	1	23	0	24	1	0	0	1	26
4:30 PM	1	0	0	1	0	26	0	26	9	0	0	9	36
4:45 PM	0	0	0	0	0	31	0	31	3	0	0	3	34
Total Volume	4	3	0	7	1	108	0	109	19	2	0	21	137
% Approach Total	57.1	42.9	0.0		0.9	99.1	0.0		90.5	9.5	0.0		
PHF	0.500	0.250	0.000	0.350	0.250	0.871	0.000	0.879	0.528	0.250	0.000	0.583	0.835
Cars	2	2	0	4	1	106	0	107	16	1	0	17	128
Cars %	50.0	66.7	0.0	57.1	100.0	98.1	0.0	98.2	84.2	50.0	0.0	81.0	93.4
Heavy Vehicles	2	1	0	3	0	2	0	2	3	1	0	4	9
Heavy Vehicles %	50.0	33.3	0.0	42.9	0.0	1.9	0.0	1.8	15.8	50.0	0.0	19.0	6.6
Cars Enter Leg	2	2	0	4	1	106	0	107	16	1	0	17	128
Heavy Enter Leg	2	1	0	3	0	2	0	2	3	1	0	4	9
Total Entering Leg	4	3	0	7	1	108	0	109	19	2	0	21	137
Cars Exiting Leg				2				18				108	128
Heavy Exiting Leg				1				4				4	9
Total Exiting Leg				3				22				112	137

#68 Providence Road Driveway

0

City, State: Sutton, MA

Client: VHB/ V. Kalikiri

Site Code: 87546.21



PDI File # 228393 ATR-A

Count Date:

Thursday, February 10, 2022

Direction:

EB (Enter)

AM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0
12:15 AM	0	0	0	0
12:30 AM	0	0	0	0
12:45 AM	0	0	0	0
1:00 AM	0	0	0	0
1:15 AM	0	0	0	0
1:30 AM	0	0	0	0
1:45 AM	0	0	0	0
2:00 AM	0	0	0	0
2:15 AM	0	0	0	0
2:30 AM	0	1	0	1
2:45 AM	0	0	0	0
3:00 AM	0	0	0	0
3:15 AM	0	0	0	0
3:30 AM	0	0	0	0
3:45 AM	0	0	0	0
4:00 AM	0	0	0	0
4:15 AM	0	0	0	0
4:30 AM	0	0	0	0
4:45 AM	0	0	0	0
5:00 AM	1	0	0	1
5:15 AM	0	0	0	0
5:30 AM	0	0	0	0
5:45 AM	0	0	0	0
6:00 AM	4	0	0	4
6:15 AM	3	0	2	5
6:30 AM	2	0	0	2
6:45 AM	0	0	0	0
7:00 AM	1	0	0	1
7:15 AM	2	0	1	3
7:30 AM	1	0	0	1
7:45 AM	0	0	0	0
8:00 AM	1	0	0	1
8:15 AM	1	0	0	1
8:30 AM	1	0	0	1
8:45 AM	1	0	0	1
9:00 AM	0	0	0	0
9:15 AM	0	0	1	1
9:30 AM	1	0	1	2
9:45 AM	0	0	0	0
10:00 AM	0	0	0	0
10:15 AM	1	0	0	1
10:30 AM	0	0	0	0
10:45 AM	0	0	0	0
11:00 AM	0	0	0	0
11:15 AM	0	0	0	0
11:30 AM	1	0	0	1
11:45 AM	0	1	0	1

AM Total	21	2	5	28
Percentage	75.00%	7.14%	17.86%	
AM Peak	5:45 AM	1:45 AM	5:30 AM	5:45 AM
Volume	9	1	2	11

PM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	0	0
12:15 PM	0	0	0	0
12:30 PM	1	0	0	1
12:45 PM	2	0	0	2
1:00 PM	1	0	0	1
1:15 PM	1	0	0	1
1:30 PM	0	0	0	0
1:45 PM	2	0	0	2
2:00 PM	0	0	0	0
2:15 PM	0	0	0	0
2:30 PM	1	0	1	2
2:45 PM	0	0	0	0
3:00 PM	1	1	0	2
3:15 PM	0	0	1	1
3:30 PM	0	0	0	0
3:45 PM	0	0	0	0
4:00 PM	0	0	0	0
4:15 PM	1	0	0	1
4:30 PM	2	0	0	2
4:45 PM	0	1	1	2
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
6:00 PM	0	0	0	0
6:15 PM	1	0	0	1
6:30 PM	0	0	0	0
6:45 PM	1	0	0	1
7:00 PM	0	0	0	0
7:15 PM	0	0	0	0
7:30 PM	0	0	0	0
7:45 PM	0	0	0	0
8:00 PM	0	0	0	0
8:15 PM	0	0	0	0
8:30 PM	0	1	0	1
8:45 PM	0	1	0	1
9:00 PM	0	0	0	0
9:15 PM	0	0	0	0
9:30 PM	0	0	0	0
9:45 PM	0	0	0	0
10:00 PM	0	0	0	0
10:15 PM	0	0	0	0
10:30 PM	0	0	0	0
10:45 PM	0	0	0	0
11:00 PM	0	0	0	0
11:15 PM	0	0	0	0
11:30 PM	0	0	0	0
11:45 PM	0	0	0	0

PM Total	14	4	3	21
Percentage	66.67%	19.05%	14.29%	
PM Peak	12:30 PM	8:00 PM	2:30 PM	12:30 PM
Volume	5	2	2	5

Day Total	35	6	8	49
Percentage	71.43%	12.24%	16.33%	

#68 Providence Road Driveway
0
City, State: Sutton, MA
Client: VHB/ V. Kalikiri
Site Code: 87546.21



PDI File # 228393 ATR-A

Count Date: Tuesday, February 15, 2022
Direction: EB (Enter)

AM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0
12:15 AM	0	0	0	0
12:30 AM	0	0	0	0
12:45 AM	0	0	0	0
1:00 AM	0	0	0	0
1:15 AM	0	0	0	0
1:30 AM	0	0	0	0
1:45 AM	0	0	0	0
2:00 AM	0	0	0	0
2:15 AM	0	0	0	0
2:30 AM	0	1	0	1
2:45 AM	0	0	0	0
3:00 AM	0	0	0	0
3:15 AM	0	0	0	0
3:30 AM	1	0	0	1
3:45 AM	0	1	0	1
4:00 AM	0	0	0	0
4:15 AM	0	0	0	0
4:30 AM	0	0	0	0
4:45 AM	0	0	0	0
5:00 AM	0	0	0	0
5:15 AM	0	0	0	0
5:30 AM	0	0	0	0
5:45 AM	0	0	0	0
6:00 AM	4	0	1	5
6:15 AM	1	0	0	1
6:30 AM	1	0	1	2
6:45 AM	1	0	0	1
7:00 AM	2	0	1	3
7:15 AM	0	0	0	0
7:30 AM	2	0	0	2
7:45 AM	0	0	0	0
8:00 AM	2	0	0	2
8:15 AM	3	0	0	3
8:30 AM	3	0	0	3
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	1	0	1	2
9:45 AM	0	0	0	0
10:00 AM	0	0	0	0
10:15 AM	0	0	0	0
10:30 AM	0	0	1	1
10:45 AM	0	0	0	0
11:00 AM	0	0	0	0
11:15 AM	0	0	0	0
11:30 AM	1	0	0	1
11:45 AM	0	0	0	0

AM Total	22	2	5	29
Percentage	75.86%	6.90%	17.24%	
AM Peak	7:45 AM	1:45 AM	5:45 AM	6:00 AM
Volume	8	1	2	9

PM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	0	0
12:15 PM	0	0	0	0
12:30 PM	1	1	0	2
12:45 PM	1	1	0	2
1:00 PM	2	0	0	2
1:15 PM	2	0	0	2
1:30 PM	0	0	0	0
1:45 PM	1	0	0	1
2:00 PM	0	0	0	0
2:15 PM	2	0	0	2
2:30 PM	0	0	0	0
2:45 PM	0	0	0	0
3:00 PM	1	0	0	1
3:15 PM	1	0	0	1
3:30 PM	0	1	0	1
3:45 PM	0	1	2	3
4:00 PM	0	0	1	1
4:15 PM	0	0	0	0
4:30 PM	0	0	0	0
4:45 PM	2	0	0	2
5:00 PM	0	0	0	0
5:15 PM	0	0	0	0
5:30 PM	0	0	1	1
5:45 PM	0	0	0	0
6:00 PM	0	0	0	0
6:15 PM	0	1	0	1
6:30 PM	0	0	0	0
6:45 PM	1	0	0	1
7:00 PM	1	0	0	1
7:15 PM	0	0	0	0
7:30 PM	0	0	0	0
7:45 PM	0	0	0	0
8:00 PM	0	0	1	1
8:15 PM	0	0	0	0
8:30 PM	0	0	0	0
8:45 PM	0	0	0	0
9:00 PM	0	0	0	0
9:15 PM	0	0	0	0
9:30 PM	0	0	0	0
9:45 PM	0	0	0	0
10:00 PM	0	0	0	0
10:15 PM	0	0	0	0
10:30 PM	0	0	0	0
10:45 PM	0	0	0	0
11:00 PM	0	0	0	0
11:15 PM	0	0	0	0
11:30 PM	0	0	0	0
11:45 PM	0	0	0	0

PM Total	15	5	5	25
Percentage	60.00%	20.00%	20.00%	
PM Peak	12:30 PM	12:00 PM	3:15 PM	12:30 PM
Volume	6	2	3	8

Day Total	37	7	10	54
Percentage	68.52%	12.96%	18.52%	

#68 Providence Road Driveway

0

City, State: Sutton, MA

Client: VHB/ V. Kalikiri

Site Code: 87546.21

PRECISION
D A T A
INDUSTRIES, LLC157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

PDI File # 228393 ATR-A

Count Date:

Wednesday, February 16, 2022

Direction:

EB (Enter)

AM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0
12:15 AM	0	0	0	0
12:30 AM	0	0	0	0
12:45 AM	0	0	0	0
1:00 AM	0	0	0	0
1:15 AM	0	0	0	0
1:30 AM	0	0	0	0
1:45 AM	0	0	0	0
2:00 AM	0	0	0	0
2:15 AM	0	1	0	1
2:30 AM	0	0	0	0
2:45 AM	0	0	0	0
3:00 AM	0	0	0	0
3:15 AM	0	0	0	0
3:30 AM	0	0	0	0
3:45 AM	0	0	0	0
4:00 AM	0	0	0	0
4:15 AM	0	0	0	0
4:30 AM	0	0	0	0
4:45 AM	0	0	0	0
5:00 AM	0	0	0	0
5:15 AM	0	0	0	0
5:30 AM	0	0	0	0
5:45 AM	2	0	0	2
6:00 AM	2	0	1	3
6:15 AM	2	0	0	2
6:30 AM	2	0	0	2
6:45 AM	2	0	0	2
7:00 AM	0	0	0	0
7:15 AM	2	0	0	2
7:30 AM	1	0	0	1
7:45 AM	0	0	0	0
8:00 AM	2	0	0	2
8:15 AM	3	0	0	3
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	1	0	0	1
9:45 AM	0	0	0	0
10:00 AM	2	0	0	2
10:15 AM	2	0	1	3
10:30 AM	0	0	0	0
10:45 AM	0	0	0	0
11:00 AM	0	0	0	0
11:15 AM	2	0	0	2
11:30 AM	0	0	0	0
11:45 AM	0	0	1	1

AM Total	25	1	3	29
Percentage	86.21%	3.45%	10.34%	
AM Peak	5:45 AM	1:30 AM	5:15 AM	5:45 AM
Volume	8	1	1	9

PM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	1	0	0	1
12:15 PM	0	0	1	1
12:30 PM	1	0	0	1
12:45 PM	0	1	1	2
1:00 PM	3	0	0	3
1:15 PM	0	0	0	0
1:30 PM	0	1	0	1
1:45 PM	1	0	0	1
2:00 PM	0	0	1	1
2:15 PM	0	0	0	0
2:30 PM	0	0	0	0
2:45 PM	0	1	0	1
3:00 PM	0	0	0	0
3:15 PM	0	0	0	0
3:30 PM	0	1	0	1
3:45 PM	0	0	0	0
4:00 PM	0	0	0	0
4:15 PM	1	1	0	2
4:30 PM	0	0	0	0
4:45 PM	1	1	0	2
5:00 PM	1	0	1	2
5:15 PM	1	0	0	1
5:30 PM	0	0	0	0
5:45 PM	1	0	0	1
6:00 PM	0	0	0	0
6:15 PM	0	1	0	1
6:30 PM	0	1	0	1
6:45 PM	0	0	0	0
7:00 PM	0	0	0	0
7:15 PM	0	0	0	0
7:30 PM	0	0	0	0
7:45 PM	0	0	0	0
8:00 PM	0	0	0	0
8:15 PM	0	0	0	0
8:30 PM	0	0	0	0
8:45 PM	0	0	0	0
9:00 PM	0	0	0	0
9:15 PM	0	0	0	0
9:30 PM	0	1	0	1
9:45 PM	0	0	0	0
10:00 PM	0	0	0	0
10:15 PM	0	0	0	0
10:30 PM	0	0	0	0
10:45 PM	0	0	0	0
11:00 PM	0	0	0	0
11:15 PM	0	0	0	0
11:30 PM	0	0	0	0
11:45 PM	0	0	0	0

PM Total	11	9	4	24
Percentage	45.83%	37.50%	16.67%	
PM Peak	12:15 PM	12:45 PM	12:00 PM	12:15 PM
Volume	4	2	2	7

Day Total	36	10	7	53
Percentage	67.92%	18.87%	13.21%	

#68 Providence Road Driveway

0

City, State: Sutton, MA

Client: VHB/ V. Kalikiri

Site Code: 87546.21



PDI File # 228393 ATR-A

Count Date:

Thursday, February 10, 2022

Direction:

WB (Exit)

AM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0
12:15 AM	0	0	0	0
12:30 AM	0	0	0	0
12:45 AM	0	0	0	0
1:00 AM	0	0	0	0
1:15 AM	0	0	0	0
1:30 AM	0	0	0	0
1:45 AM	0	0	0	0
2:00 AM	0	0	0	0
2:15 AM	0	0	0	0
2:30 AM	0	0	1	1
2:45 AM	0	0	0	0
3:00 AM	0	0	0	0
3:15 AM	0	0	0	0
3:30 AM	0	0	0	0
3:45 AM	0	0	0	0
4:00 AM	0	0	0	0
4:15 AM	0	0	0	0
4:30 AM	0	0	0	0
4:45 AM	0	0	0	0
5:00 AM	1	0	0	1
5:15 AM	0	0	0	0
5:30 AM	0	0	0	0
5:45 AM	0	0	0	0
6:00 AM	0	0	0	0
6:15 AM	0	2	0	2
6:30 AM	0	2	1	3
6:45 AM	0	0	0	0
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	1	1
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	1	0	0	1
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	1	0	1
9:30 AM	0	0	0	0
9:45 AM	0	0	0	0
10:00 AM	1	0	1	2
10:15 AM	0	0	0	0
10:30 AM	0	0	0	0
10:45 AM	0	0	0	0
11:00 AM	0	0	0	0
11:15 AM	0	0	0	0
11:30 AM	0	0	0	0
11:45 AM	0	0	0	0

AM Total	3	5	4	12
Percentage	25.00%	41.67%	33.33%	
AM Peak	4:15 AM	5:45 AM	1:45 AM	5:45 AM
Volume	1	4	1	5

PM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	1	0	1	2
12:15 PM	0	0	0	0
12:30 PM	2	0	0	2
12:45 PM	1	0	0	1
1:00 PM	2	0	0	2
1:15 PM	2	0	0	2
1:30 PM	0	0	0	0
1:45 PM	1	0	0	1
2:00 PM	0	0	0	0
2:15 PM	0	0	0	0
2:30 PM	1	0	0	1
2:45 PM	0	0	0	0
3:00 PM	2	0	1	3
3:15 PM	0	0	0	0
3:30 PM	0	0	0	0
3:45 PM	4	0	0	4
4:00 PM	2	0	0	2
4:15 PM	3	0	0	3
4:30 PM	2	0	0	2
4:45 PM	1	0	0	1
5:00 PM	1	0	0	1
5:15 PM	0	0	1	1
5:30 PM	0	0	0	0
5:45 PM	0	0	0	0
6:00 PM	2	0	0	2
6:15 PM	3	0	0	3
6:30 PM	1	0	0	1
6:45 PM	0	0	0	0
7:00 PM	1	0	0	1
7:15 PM	0	0	0	0
7:30 PM	0	0	0	0
7:45 PM	0	0	0	0
8:00 PM	0	0	0	0
8:15 PM	0	0	0	0
8:30 PM	0	0	1	1
8:45 PM	0	0	1	1
9:00 PM	0	0	0	0
9:15 PM	0	0	0	0
9:30 PM	0	0	0	0
9:45 PM	0	0	0	0
10:00 PM	0	0	0	0
10:15 PM	0	0	0	0
10:30 PM	0	0	0	0
10:45 PM	0	0	0	0
11:00 PM	0	0	0	0
11:15 PM	0	0	0	0
11:30 PM	0	0	0	0
11:45 PM	0	0	0	0

PM Total	32	0	5	37
Percentage	86.49%	0.00%	13.51%	
PM Peak	3:45 PM	12:00 PM	8:00 PM	3:45 PM
Volume	11	0	2	11

Day Total	35	5	9	49
Percentage	71.43%	10.20%	18.37%	

#68 Providence Road Driveway

0

City, State: Sutton, MA

Client: VHB/ V. Kalikiri

Site Code: 87546.21



PDI File # 228393 ATR-A

Count Date:

Tuesday, February 15, 2022

Direction:

WB (Exit)

AM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0
12:15 AM	0	0	0	0
12:30 AM	0	0	0	0
12:45 AM	0	0	0	0
1:00 AM	0	0	0	0
1:15 AM	0	0	0	0
1:30 AM	0	0	0	0
1:45 AM	0	0	0	0
2:00 AM	0	0	0	0
2:15 AM	0	0	0	0
2:30 AM	0	0	0	0
2:45 AM	0	0	1	1
3:00 AM	0	0	0	0
3:15 AM	0	0	0	0
3:30 AM	1	0	0	1
3:45 AM	0	0	0	0
4:00 AM	0	0	1	1
4:15 AM	0	0	0	0
4:30 AM	0	0	0	0
4:45 AM	0	0	0	0
5:00 AM	0	0	0	0
5:15 AM	0	0	0	0
5:30 AM	0	0	0	0
5:45 AM	0	0	0	0
6:00 AM	0	0	0	0
6:15 AM	0	1	0	1
6:30 AM	0	1	0	1
6:45 AM	0	0	0	0
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	1	1
8:00 AM	0	0	0	0
8:15 AM	1	0	0	1
8:30 AM	2	0	0	2
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	0	0	0	0
9:45 AM	0	0	1	1
10:00 AM	0	0	0	0
10:15 AM	0	0	0	0
10:30 AM	0	0	0	0
10:45 AM	0	0	1	1
11:00 AM	0	0	0	0
11:15 AM	0	0	0	0
11:30 AM	0	0	0	0
11:45 AM	1	0	0	1

AM Total	5	2	5	12
Percentage	41.67%	16.67%	41.67%	
AM Peak	7:45 AM	5:45 AM	2:00 AM	7:45 AM
Volume	3	2	1	4

PM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	0	0
12:15 PM	2	0	0	2
12:30 PM	1	0	0	1
12:45 PM	3	1	1	5
1:00 PM	1	0	1	2
1:15 PM	0	0	0	0
1:30 PM	0	0	0	0
1:45 PM	0	0	0	0
2:00 PM	0	0	0	0
2:15 PM	2	0	0	2
2:30 PM	0	0	0	0
2:45 PM	0	0	0	0
3:00 PM	0	0	0	0
3:15 PM	1	0	0	1
3:30 PM	1	0	0	1
3:45 PM	2	0	0	2
4:00 PM	2	1	1	4
4:15 PM	2	0	0	2
4:30 PM	1	0	1	2
4:45 PM	3	0	0	3
5:00 PM	4	0	0	4
5:15 PM	1	0	0	1
5:30 PM	1	0	0	1
5:45 PM	1	0	0	1
6:00 PM	0	0	0	0
6:15 PM	2	0	0	2
6:30 PM	1	0	1	2
6:45 PM	1	0	0	1
7:00 PM	0	0	0	0
7:15 PM	1	0	0	1
7:30 PM	0	0	0	0
7:45 PM	0	0	0	0
8:00 PM	0	0	0	0
8:15 PM	0	0	0	0
8:30 PM	0	0	0	0
8:45 PM	0	0	0	0
9:00 PM	0	0	0	0
9:15 PM	0	0	0	0
9:30 PM	0	0	0	0
9:45 PM	0	0	0	0
10:00 PM	0	0	0	0
10:15 PM	0	0	0	0
10:30 PM	0	0	0	0
10:45 PM	0	0	0	0
11:00 PM	0	0	0	0
11:15 PM	0	0	0	0
11:30 PM	0	0	0	0
11:45 PM	0	0	0	0

PM Total	33	2	5	40
Percentage	82.50%	5.00%	12.50%	
PM Peak	4:15 PM	12:00 PM	12:15 PM	4:00 PM
Volume	10	1	2	11

Day Total	38	4	10	52
Percentage	73.08%	7.69%	19.23%	

#68 Providence Road Driveway

0

City, State: Sutton, MA

Client: VHB/ V. Kalikiri

Site Code: 87546.21



PDI File # 228393 ATR-A

Count Date:

Wednesday, February 16, 2022

Direction:

WB (Exit)

AM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0
12:15 AM	0	0	0	0
12:30 AM	0	0	0	0
12:45 AM	0	0	0	0
1:00 AM	0	0	0	0
1:15 AM	0	0	0	0
1:30 AM	0	0	0	0
1:45 AM	0	0	0	0
2:00 AM	0	0	0	0
2:15 AM	0	0	0	0
2:30 AM	0	0	1	1
2:45 AM	0	0	0	0
3:00 AM	0	0	0	0
3:15 AM	0	0	0	0
3:30 AM	0	0	0	0
3:45 AM	0	0	0	0
4:00 AM	0	0	0	0
4:15 AM	0	0	0	0
4:30 AM	0	0	0	0
4:45 AM	0	0	0	0
5:00 AM	0	0	0	0
5:15 AM	0	0	0	0
5:30 AM	0	0	0	0
5:45 AM	0	0	0	0
6:00 AM	0	0	0	0
6:15 AM	0	3	1	4
6:30 AM	0	0	0	0
6:45 AM	0	0	0	0
7:00 AM	0	0	0	0
7:15 AM	0	0	0	0
7:30 AM	0	0	0	0
7:45 AM	0	0	0	0
8:00 AM	0	0	1	1
8:15 AM	1	0	0	1
8:30 AM	0	0	0	0
8:45 AM	0	0	0	0
9:00 AM	0	0	0	0
9:15 AM	0	0	0	0
9:30 AM	0	0	0	0
9:45 AM	0	0	0	0
10:00 AM	1	0	0	1
10:15 AM	0	0	0	0
10:30 AM	0	1	0	1
10:45 AM	2	0	0	2
11:00 AM	0	0	0	0
11:15 AM	1	0	0	1
11:30 AM	1	0	0	1
11:45 AM	1	0	0	1

AM Total	7	4	3	14
Percentage	50.00%	28.57%	21.43%	
AM Peak	10:45 AM	5:30 AM	1:45 AM	5:30 AM
Volume	4	3	1	4

PM	Cars	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	1	0	0	1
12:15 PM	2	0	0	2
12:30 PM	0	1	1	2
12:45 PM	2	1	0	3
1:00 PM	1	0	0	1
1:15 PM	0	0	1	1
1:30 PM	0	0	0	0
1:45 PM	0	1	0	1
2:00 PM	0	0	0	0
2:15 PM	1	0	0	1
2:30 PM	0	0	0	0
2:45 PM	0	0	0	0
3:00 PM	1	1	0	2
3:15 PM	0	0	0	0
3:30 PM	0	0	0	0
3:45 PM	2	0	0	2
4:00 PM	2	0	0	2
4:15 PM	3	0	0	3
4:30 PM	2	0	0	2
4:45 PM	1	0	0	1
5:00 PM	1	1	0	2
5:15 PM	0	0	0	0
5:30 PM	2	0	1	3
5:45 PM	1	0	0	1
6:00 PM	4	0	0	4
6:15 PM	1	0	0	1
6:30 PM	2	0	1	3
6:45 PM	0	1	0	1
7:00 PM	0	0	0	0
7:15 PM	0	0	0	0
7:30 PM	0	0	0	0
7:45 PM	0	0	0	0
8:00 PM	0	0	0	0
8:15 PM	0	0	0	0
8:30 PM	0	0	0	0
8:45 PM	0	0	0	0
9:00 PM	0	0	0	0
9:15 PM	0	0	0	0
9:30 PM	0	0	0	0
9:45 PM	0	0	1	1
10:00 PM	0	0	0	0
10:15 PM	0	0	0	0
10:30 PM	0	0	0	0
10:45 PM	0	0	0	0
11:00 PM	0	0	0	0
11:15 PM	0	0	0	0
11:30 PM	0	0	0	0
11:45 PM	0	0	0	0

PM Total	29	6	5	40
Percentage	72.50%	15.00%	12.50%	
PM Peak	3:45 PM	12:00 PM	12:30 PM	3:45 PM
Volume	9	2	2	9

Day Total	36	10	8	54
Percentage	66.67%	18.52%	14.81%	

0

Client: VHB/ V. Kalikiri

Site Code: 87546.21

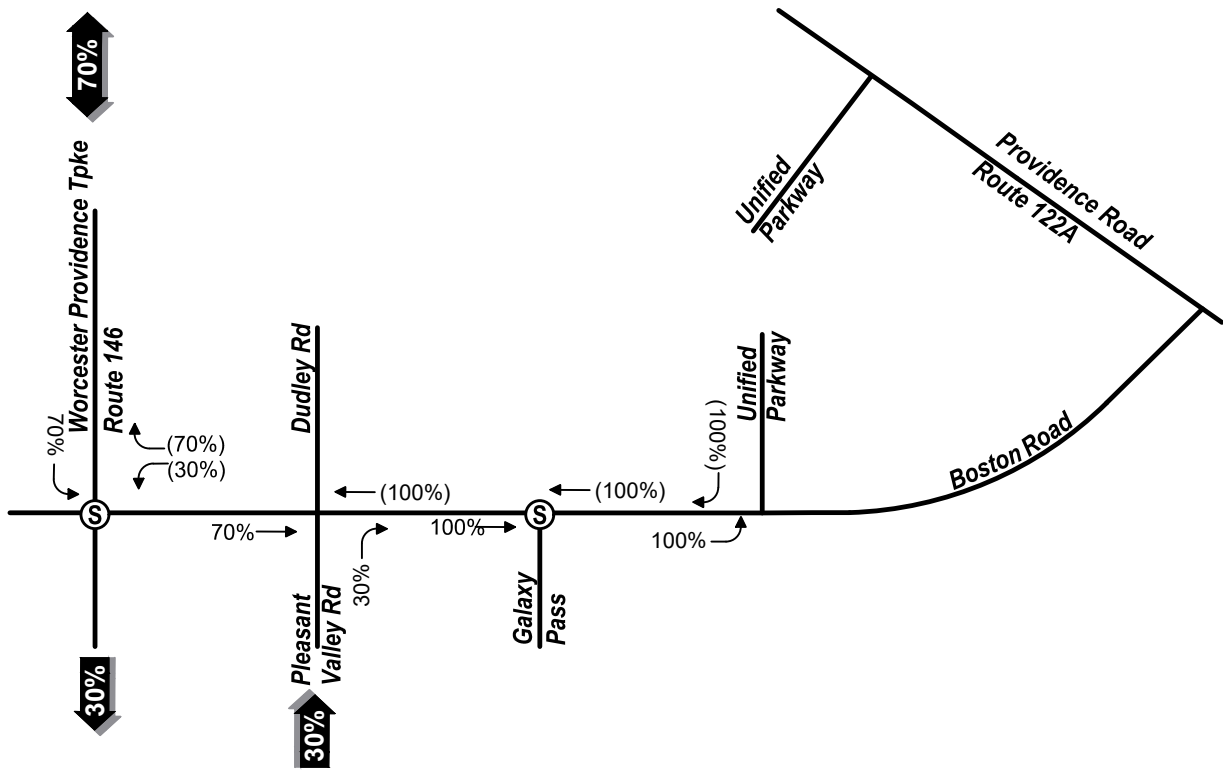


228393 ATR-A

Weekly Report

[illegible]

T-7: Truck Trip Distribution and Trip Assignment

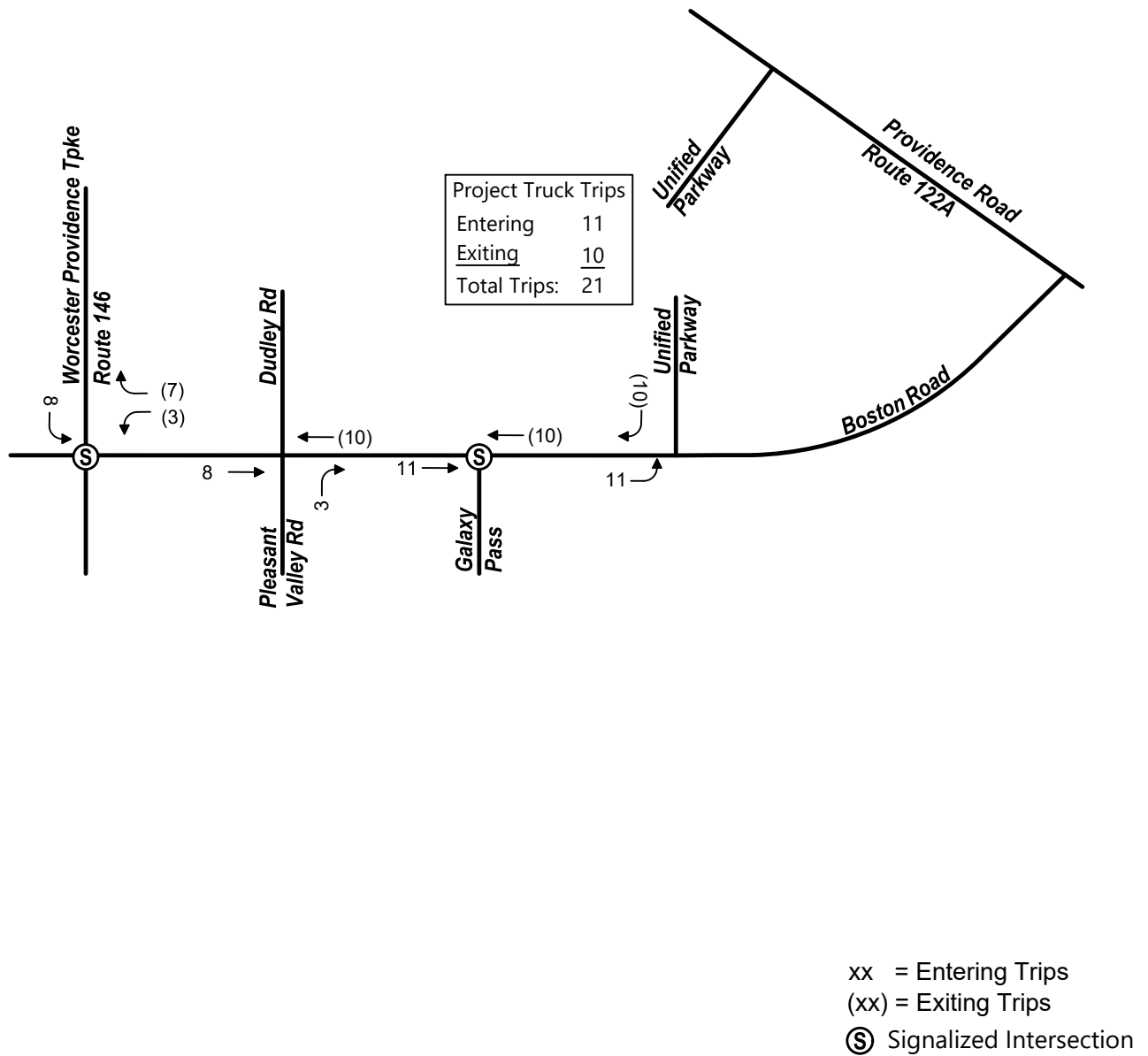


xx% = Entering Trips
 (xx%) = Exiting Trips
 (S) Signalized Intersection



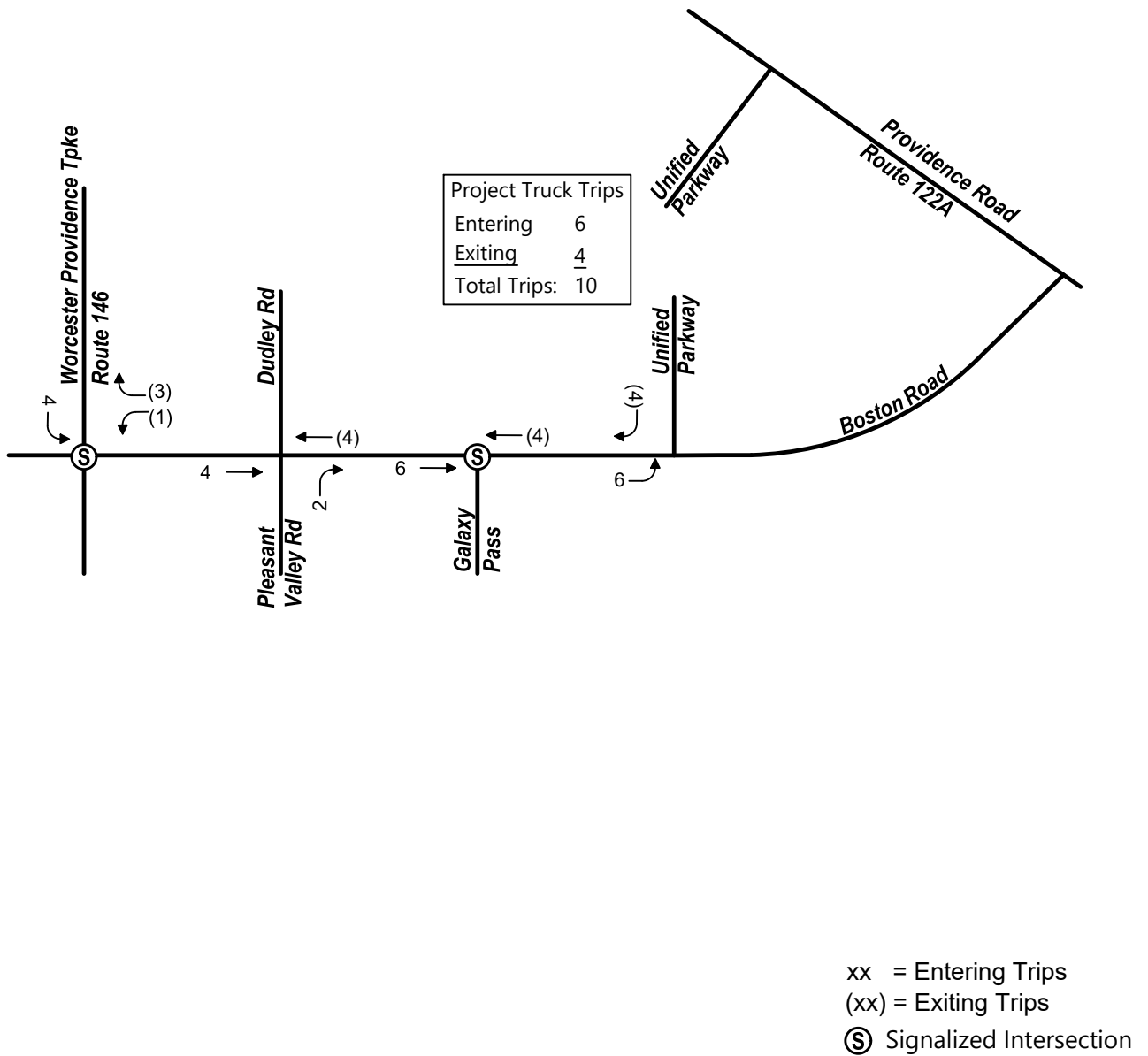
Truck Trip Distribution
 UN1F1ED Sutton
 Sutton, Massachusetts

Figure T7



Weekday Evening Peak Hour
Project Generated Truck Trips
UN1F1ED Sutton
Sutton, Massachusetts

Figure T8



Weekday Morning Peak Hour
 Project Generated Truck Trips
 UN1F1ED Sutton
 Sutton, Massachusetts

Figure T9

T-8: Operations Analysis

Existing Conditions							No-Build							Build						
		v/c Ratio	Delay (s)	Level of Service	Queue Length	Queue Length			v/c Ratio	Delay (s)	Level of Service	Queue Length	Queue Length			v/c Ratio	Delay (s)	Level of Service	Queue Length	Queue Length
					50th (ft)	95th (ft)						50th (ft)	95th (ft)						50th (ft)	95th (ft)
Route 146 at Boston	EBL	0.78	91	F	164	184	Route 146 at Boston Road	EBL	0.68	82	F	124	201	Route 146 at Boston Road	EBL	0.69	85	F	125	201
	EBT	0.55	66	E	166	189		EBT	0.47	65	E	130	213		EBT	0.49	66	E	139	221
	EBR	0.05	59	E	0	0		EBR	0.04	60	E	0	4		EBR	0.04	61	E	0	4
	WBL	0.68	78	E	122	163		WBL	0.69	77	E	124	177		WBL	0.71	80	E	132	185
	WBT	0.79	83	F	225	317		WBT	0.79	81	F	224	#338		WBT	0.76	79	E	227	#338
	WBR	0.87	97	F	206	#346		WBR	0.88	97	F	207	#404		WBR	0.90	101	F	225	#434
	NBT	1.04	73	E	~1102	#1235		NBT	1.11	97	F	~1210	#1384		NBT	1.13	107	F	~1237	#1384
	SBL	0.65	77	E	119	163		SBL	0.67	77	E	123	176		SBL	0.74	80	F	145	203
	SBT	0.55	19	B	375	404		SBT	0.60	19	B	418	493		SBT	0.60	19	B	419	493
	SBR	0.03	5	A	0	11		SBR	0.03	5	A	0	11		SBR	0.03	5	A	0	11
		0.94	59	E					0.98	69	E					0.99	74	E		
Boston Road at Galaxy Pass							Boston Road at Galaxy Pass							Boston Road at Galaxy Pass						
	EBT	0.27	5	A	17	34		EBT	0.27	5	A		37		EBT	0.31	5	A	22	45
	WBT	0.42	6	A	28	52		WBT	0.43	6	A	30	59		WBT	0.44	6	A	31	62
	NBL	0.25	11	B	9	24		NBL	0.23	11	B	8	28		NBL	0.23	11	B	9	29
		0.47	7	A					0.47	7	A					0.48	7	A		

Existing Conditions							No-Build							Build									
Boston Road at Pleasant Valley Road at Dudley Road		Demand	v/c Ratio	Delay (s)	Level of Service	Queue Length	Boston Road at Pleasant Valley Road at Dudley Road		Demand	v/c Ratio	Delay (s)	Level of Service	Queue Length	Boston Road at Pleasant Valley Road at Dudley Road		Demand	v/c Ratio	Delay (s)	Level of Service	Queue Length			
						95th (ft)							95th (ft)							95th (ft)	95th (ft)		
	EBL	15	0.02	9	A	3		EBL	20	0.02	9	A	3		EBL	20	0.02	9	A	3			
	NBLn1	175	0.33	14	B	38		NBLn1	190	0.37	15	C	43		NBLn1	220	0.44	17	C	55			
	SBLn1	50	0.17	16	C	15		SBLn1	55	0.17	17	C	15		SBLn1	55	0.18	18	C	18			
Boston Road at Providence Rd		WBL	265	0.20	8	A	18	Boston Road at Providence Rd		WBL	305	0.23	8	A	23	Boston Road at Providence Rd		WBL	315	0.24	8	A	23
															Boston Road at Site Driveway								
															EBL	70	0.08	9	A	8			
															SBLn1	25	0.08	16	C	8			
															Providence Rd at Site Driveway								
															WBL	10	0.01	8	A	0			
															NBLn1	10	0.02	11	B	3			

Weekday Evening Operations Analysis																				
Existing Conditions							No-Build						Build							
			Level of	Queue	Queue					Level of	Queue	Queue				Level of	Queue	Queue		
			Service	Length	Length					Service	Length	Length				Service	Length	Length		
			v/c Ratio	Delay (s)	50th (ft)	95th (ft)				v/c Ratio	Delay (s)	50th (ft)	95th (ft)				v/c Ratio	Delay (s)	50th (ft)	95th (ft)
Route 146 at Boston Road							Route 146 at Boston Road						Route 146 at Boston Road							
	EBL	0.61	78	E	98	161		EBL	0.62	81	F	99	167		EBL	0.63	82	F	101	167
	EBT	0.53	69	E	125	192		EBT	0.57	72	E	137	212		EBT	0.58	73	E	144	221
	EBR	0.03	62	E	0	0		EBR	0.03	64	E	0	0		EBR	0.03	65	E	0	0
	WBL	0.73	76	E	146	210		WBL	0.79	82	F	164	230		WBL	0.85	89	F	190	#279
	WBT	0.77	80	F	210	316		WBT	0.81	86	F	229	341		WBT	0.79	83	F	243	#369
	WBR	0.61	70	E	118	237		WBR	0.76	83	F	166	#312		WBR	0.88	99	F	218	#417
	NBT	0.86	40	D	697	867		NBT	0.97	54	D	905	#1129		NBT	0.98	58	E	937	#1129
	SBL	0.83	82	F	188	#289		SBL	0.92	98	F	222	#352		SBL	1.02	>120	F	~253	#387
	SBT	0.70	19	B	531	700		SBT	0.79	23	C	706	877		SBT	0.80	24	C	744	877
	SBR	0.04	5	A	0	13		SBR	0.05	5	A	1	15		SBR	0.05	5	A	1	15
		0.84	40	D					0.94	48	D					0.99	54	D		
Boston Road at Galaxy Pass							Boston Road at Galaxy Pass						Boston Road at Galaxy Pass							
	EBT	0.33	6	A	21	43		EBT	0.35	6	A	23	51		EBT	0.37	6	A	27	58
	WBT	0.47	7	A	30	59		WBT	0.49	7	A	31	66		WBT	0.52	7	A	38	80
	NBL	0.31	10	A	13	41		NBL	0.32	10	A	14	44		NBL	0.33	11	B	17	50
		0.54	7	A					0.55	7	A					0.58	7	A		

Existing Conditions							No-Build						Build							
			Level of	Queue						Level of	Queue					Level of	Queue			
			Service	Length						Service	Length					Service	Length			
			Demand	v/c Ratio	Delay (s)	95th (ft)				Demand	v/c Ratio	Delay (s)	95th (ft)				Demand	v/c Ratio	Delay (s)	95th (ft)
Boston Road at Pleasant Valley Road at Dudley Road							Boston Road at Pleasant Valley Road at Dudley Road						Boston Road at Pleasant Valley Road at Dudley Road							
	EBL	20	0.03	9	A	3		EBL	25	0.03	9	A	3		EBL	25	0.03	10	A	3
	WBL	5	0.01	8	A	0		WBL	5	0.01	8	A	0		WBL	5	0.01	8	A	0
	NBLn1	150	0.47	23	C	60		NBLn1	165	0.52	26	D	70		NBLn1	185	0.61	32	D	95
	SBLn1	70	0.27	20	C	28		SBLn1	75	0.28	22	C	28		SBLn1	75	0.34	27	D	35
Boston Road at Providence Rd							Boston Road at Providence Rd						Boston Road at Providence Rd							
	WBL	311	0.27	9	A	28		WBL	305	0.24	8	A	25		WBL	350	0.32	9	A	35
	NBLn1	277	0.49	16	C	68		NBLn1	290	0.44	14	B	58		NBLn1	335	0.66	23	C	123
												Boston Road at Site Driveway								
													EBL	40	0.05	9	A	5		
													SBLn1	90	0.24	17	C	23		
												Providence Rd at Site Driveway								
													WBL	5	0.00	8	A	0		
													NBLn1	25	0.05	12	B	5		

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	100	110	50	185	180	270	0	2155	10	45	140	1360	45
Future Volume (vph)	100	110	50	185	180	270	0	2155	10	45	140	1360	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	450		300	300		300	0		0		550		225
Storage Lanes	1		1	1		1	0		0		2		1
Taper Length (ft)	25			25			25				25		
Satd. Flow (prot)	1805	1845	1509	3335	1810	1568	0	4756	0	0	3485	4590	1568
Flt Permitted	0.950			0.950							0.950		
Satd. Flow (perm)	1805	1845	1509	3335	1810	1568	0	4756	0	0	3485	4590	1568
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)			102			135							51
Link Speed (mph)		30			30			30				30	
Link Distance (ft)		1384			734			2194				1721	
Travel Time (s)		31.5			16.7			49.9				39.1	
Peak Hour Factor	0.67	0.67	0.67	0.86	0.86	0.86	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	3%	7%	5%	5%	3%	0%	9%	0%	2%	0%	13%	3%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	149	164	75	215	209	314	0	2405	0	0	210	1545	51
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Detector Phase	3	8	8	7	4	4		6		5	5	2	2 3
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0		20.0		7.0	7.0	20.0	
Minimum Split (s)	14.5	14.8	14.8	13.8	14.8	14.8		26.3		13.4	13.4	26.3	
Total Split (s)	27.5	35.8	35.8	26.8	35.8	35.8		86.3		26.4	26.4	86.3	
Total Split (%)	15.6%	20.3%	20.3%	15.2%	20.3%	20.3%		49.0%		15.0%	15.0%	49.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	
All-Red Time (s)	4.5	4.8	4.8	3.8	4.8	4.8		3.3		3.4	3.4	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3		6.4	6.3		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag		Lag		Lead	Lead		
Lead-Lag Optimize?													
Recall Mode	None	None	None	None	None	None		Min		None	None	Min	
Act Effct Green (s)	17.5	26.6	26.6	15.8	24.2	24.2		80.4		15.3	102.1	127.1	
Actuated g/C Ratio	0.11	0.16	0.16	0.10	0.15	0.15		0.49		0.09	0.62	0.77	
v/c Ratio	0.78	0.55	0.23	0.68	0.79	0.91		1.04		0.65	0.55	0.04	
Control Delay	99.8	72.3	5.5	84.4	90.2	70.0		71.9		83.4	19.9	1.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay	99.8	72.3	5.5	84.4	90.2	70.0		71.9		83.4	19.9	1.3	
LOS	F	E	A	F	F	E		E		F	B	A	
Approach Delay		70.0			79.9			71.9			26.7		
Approach LOS		E			E			E			C		
Queue Length 50th (ft)	164	166	0	122	225	206		~1102		119	375	0	
Queue Length 95th (ft)	184	189	0	163	317	#346		#1235		163	404	11	
Internal Link Dist (ft)		1304			654			2114			1641		
Turn Bay Length (ft)	450		300	300		300				550		225	
Base Capacity (vph)	219	332	355	404	307	378		2309		423	2963	1230	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Reduced v/c Ratio	0.68	0.49	0.21	0.53	0.68	0.83		1.04		0.50	0.52	0.04	

Intersection Summary

Area Type: Other

Cycle Length: 176

Actuated Cycle Length: 165.5

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 57.6

Intersection LOS: E

Intersection Capacity Utilization 93.6%

ICU Level of Service F

Analysis Period (min) 15

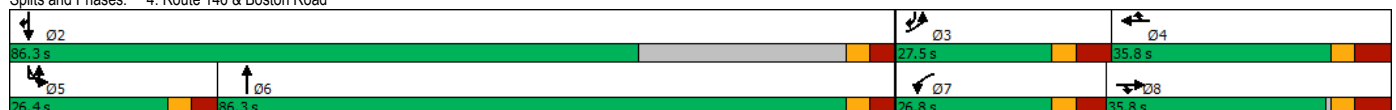
- Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Route 146 & Boston Road



													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	100	110	50	185	180	270	0	2155	10	45	140	1360	45
Future Volume (vph)	100	110	50	185	180	270	0	2155	10	45	140	1360	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		0.91			0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)	1805	1845	1509	3335	1810	1568		4757			3485	4590	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (perm)	1805	1845	1509	3335	1810	1568		4757			3485	4590	1568
Peak-hour factor, PHF	0.67	0.67	0.67	0.86	0.86	0.86	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Adj. Flow (vph)	149	164	75	215	209	314	0	2394	11	51	159	1545	51
RTOR Reduction (vph)	0	0	63	0	0	115	0	0	0	0	0	0	12
Lane Group Flow (vph)	149	164	12	215	209	199	0	2405	0	0	210	1545	39
Heavy Vehicles (%)	0%	3%	7%	5%	5%	3%	0%	9%	0%	2%	0%	13%	3%
Turn Type	Prot	NA	Prot	Prot	NA	Prot	NA	NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Actuated Green, G (s)	17.5	26.6	26.6	15.8	24.2	24.2		80.4			15.3	102.1	125.9
Effective Green, g (s)	17.5	26.6	26.6	15.8	24.2	24.2		80.4			15.3	102.1	125.9
Actuated g/C Ratio	0.11	0.16	0.16	0.10	0.15	0.15		0.49			0.09	0.62	0.76
Clearance Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	190	296	242	318	264	229		2312			322	2833	1193
v/s Ratio Prot	c0.08	0.09	0.01	0.06	0.12	c0.13		c0.51			0.06	c0.34	0.02
v/s Ratio Perm													
v/c Ratio	0.78	0.55	0.05	0.68	0.79	0.87		1.04			0.65	0.55	0.03
Uniform Delay, d1	72.1	63.9	58.7	72.3	68.2	69.0		42.5			72.5	18.3	4.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	18.8	2.2	0.1	5.6	14.9	27.4		30.2			4.7	0.2	0.0
Delay (s)	90.9	66.2	58.8	77.9	83.1	96.5		72.7			77.2	18.5	4.8
Level of Service	F	E	E	E	F	F		E			E	B	A
Approach Delay (s)		74.3			87.3			72.7				24.9	
Approach LOS		E			F			E				C	
Intersection Summary													
HCM 2000 Control Delay			58.6										
HCM 2000 Volume to Capacity ratio			0.94										
Actuated Cycle Length (s)			165.4										
Intersection Capacity Utilization			93.6%										
Analysis Period (min)			15										
c Critical Lane Group													

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	305	80	55	440	125	70
Future Volume (vph)	305	80	55	440	125	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3345	0	0	3469	3292	0
Flt Permitted				0.865	0.969	
Satd. Flow (perm)	3345	0	0	3015	3292	0
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	62				90	
Link Speed (mph)	30			30	30	
Link Distance (ft)	280			831	853	
Travel Time (s)	6.4			18.9	19.4	
Peak Hour Factor	0.85	0.85	0.84	0.84	0.78	0.78
Heavy Vehicles (%)	5%	3%	0%	4%	3%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	453	0	0	589	250	0
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	6.0		4.0	6.0	6.0	
Minimum Split (s)	11.0		9.0	11.0	11.0	
Total Split (s)	27.0		15.0	42.0	18.0	
Total Split (%)	45.0%		25.0%	70.0%	30.0%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	Min		None	Min	None	
Act Effct Green (s)	15.2			15.2	7.2	
Actuated g/C Ratio	0.47			0.47	0.22	
v/c Ratio	0.28			0.42	0.31	
Control Delay	5.3			7.0	7.8	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.3			7.0	7.8	
LOS	A			A	A	
Approach Delay	5.3			7.0	7.8	
Approach LOS	A			A	A	
Queue Length 50th (ft)	17			28	9	
Queue Length 95th (ft)	34			52	24	
Internal Link Dist (ft)	200			751	773	
Turn Bay Length (ft)						
Base Capacity (vph)	2336			2987	1393	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.19			0.20	0.18	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 32.5
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 6.6
 Intersection LOS: A
 Intersection Capacity Utilization 43.0%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 9: Galaxy Pass & Boston Road



	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	305	80	55	440	125	70
Future Volume (vph)	305	80	55	440	125	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	0.97			1.00	0.95	
Flt Protected	1.00			0.99	0.97	
Satd. Flow (prot)	3344			3467	3292	
Flt Permitted	1.00			0.86	0.97	
Satd. Flow (perm)	3344			3015	3292	
Peak-hour factor, PHF	0.85	0.85	0.84	0.84	0.78	0.78
Adj. Flow (vph)	359	94	65	524	160	90
RTOR Reduction (vph)	33	0	0	0	70	0
Lane Group Flow (vph)	420	0	0	589	180	0
Heavy Vehicles (%)	5%	3%	0%	4%	3%	2%
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Actuated Green, G (s)	15.2			15.2	7.1	
Effective Green, g (s)	15.2			15.2	7.1	
Actuated g/C Ratio	0.47			0.47	0.22	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1573			1418	723	
v/s Ratio Prot	0.13				c0.05	
v/s Ratio Perm				c0.20		
v/c Ratio	0.27			0.42	0.25	
Uniform Delay, d1	5.2			5.6	10.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.2	0.2	
Delay (s)	5.3			5.8	10.6	
Level of Service	A			A	B	
Approach Delay (s)	5.3			5.8	10.6	
Approach LOS	A			A	B	
Intersection Summary						
HCM 2000 Control Delay			6.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			32.3	Sum of lost time (s)	15.0	
Intersection Capacity Utilization			43.0%	ICU Level of Service	A	
Analysis Period (min)			15			
c Critical Lane Group						

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	240	5	0	565	0	35	10	130	15	0	35
Future Vol, veh/h	15	240	5	0	565	0	35	10	130	15	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	90	90	90	79	79	79
Heavy Vehicles, %	0	3	0	0	5	0	10	11	5	18	0	7
Mvmt Flow	17	273	6	0	642	0	39	11	144	19	0	44
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	642	0	0	279	0	0	631	952	140	818	955	321
Stage 1	-	-	-	-	-	-	310	310	-	642	642	-
Stage 2	-	-	-	-	-	-	321	642	-	176	313	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.7	6.72	7	7.86	6.5	7.04
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.72	-	6.86	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.72	-	6.86	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.6	4.11	3.35	3.68	4	3.37
Pot Cap-1 Maneuver	952	-	-	1295	-	-	350	243	873	242	260	660
Stage 1	-	-	-	-	-	-	653	636	-	393	472	-
Stage 2	-	-	-	-	-	-	643	446	-	764	661	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	952	-	-	1295	-	-	321	238	873	192	255	660
Mov Cap-2 Maneuver	-	-	-	-	-	-	321	238	-	192	255	-
Stage 1	-	-	-	-	-	-	639	623	-	385	472	-
Stage 2	-	-	-	-	-	-	600	446	-	613	647	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0			14.2			16.3		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	583		952	-	-	1295	-	-	381			
HCM Lane V/C Ratio	0.334		0.018	-	-	-	-	-	0.166			
HCM Control Delay (s)	14.2		8.8	0.1	-	0	-	-	16.3			
HCM Lane LOS	B		A	A	-	A	-	-	C			
HCM 95th %tile Q(veh)	1.5		0.1	-	-	0	-	-	0.6			

Intersection						
Int Delay, s/veh	7.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	75	20	265	115	20	245
Future Vol, veh/h	75	20	265	115	20	245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	93	93	87	87
Heavy Vehicles, %	3	38	2	2	17	2
Mvmt Flow	96	26	285	124	23	282
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	122	0	803	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	694	-
Critical Hdwy	-	-	4.12	-	6.57	6.22
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	-	-	2.218	-	3.653	3.318
Pot Cap-1 Maneuver	-	-	1465	-	333	945
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	469	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1465	-	263	945
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	371	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		5.6		12.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	790	-	-	1465	-	
HCM Lane V/C Ratio	0.386	-	-	0.195	-	
HCM Control Delay (s)	12.4	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	1.8	-	-	0.7	-	

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	80	105	45	250	185	250	0	1820	20	55	260	2035	65
Future Volume (vph)	80	105	45	250	185	250	0	1820	20	55	260	2035	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	450		300	300		300	0		0		550		225
Storage Lanes	1		1	1		1	0		0		2		1
Taper Length (ft)	25			25			25				25		
Satd. Flow (prot)	1752	1881	1615	3467	1881	1599	0	4933	0	0	3489	4940	1615
Flt Permitted	0.950			0.950							0.950		
Satd. Flow (perm)	1752	1881	1615	3467	1881	1599	0	4933	0	0	3489	4940	1615
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)			102			158		1					71
Link Speed (mph)		30			30			30				30	
Link Distance (ft)		1384			734			2194				1721	
Travel Time (s)		31.5			16.7			49.9				39.1	
Peak Hour Factor	0.87	0.87	0.87	0.93	0.93	0.93	0.90	0.90	0.90	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	1%	1%	1%	0%	5%	0%	2%	0%	5%	0%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	92	121	52	269	199	269	0	2044	0	0	343	2212	71
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Detector Phase	3	8	8	7	4	4		6		5	5	2	2 3
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0		20.0		7.0	7.0	20.0	
Minimum Split (s)	14.5	14.8	14.8	13.8	14.8	14.8		26.3		13.4	13.4	26.3	
Total Split (s)	27.5	35.8	35.8	26.8	35.8	35.8		86.3		26.4	26.4	86.3	
Total Split (%)	15.6%	20.3%	20.3%	15.2%	20.3%	20.3%		49.0%		15.0%	15.0%	49.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	
All-Red Time (s)	4.5	4.8	4.8	3.8	4.8	4.8		3.3		3.4	3.4	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3		6.4	6.3		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag		Lag		Lead	Lead		
Lead-Lag Optimize?													
Recall Mode	None	None	None	None	None	None		Min		None	None	Min	
Act Effct Green (s)	13.9	19.4	19.4	17.2	22.0	22.0		77.5			19.1	103.1	124.6
Actuated g/C Ratio	0.09	0.12	0.12	0.11	0.14	0.14		0.48			0.12	0.64	0.77
v/c Ratio	0.61	0.54	0.18	0.73	0.77	0.76		0.86			0.83	0.70	0.06
Control Delay	89.9	76.2	1.4	82.9	88.5	42.0		42.4			87.3	21.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.0
Total Delay	89.9	76.2	1.4	82.9	88.5	42.0		42.4			87.3	21.2	1.1
LOS	F	E	A	F	F	D		D			F	C	A
Approach Delay		66.3			69.5			42.4				29.3	
Approach LOS		E			E			D				C	
Queue Length 50th (ft)	98	125	0	146	210	118		697			188	531	0
Queue Length 95th (ft)	161	192	0	210	316	237		867			#289	700	13
Internal Link Dist (ft)		1304			654			2114				1641	
Turn Bay Length (ft)	450		300	300		300					550		225
Base Capacity (vph)	220	338	374	435	330	411		2478			438	3300	1315
Starvation Cap Reductn	0	0	0	0	0	0		0			0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0			0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0			0	0	0
Reduced v/c Ratio	0.42	0.36	0.14	0.62	0.60	0.65		0.82			0.78	0.67	0.05

Intersection Summary

Area Type: Other

Cycle Length: 176

Actuated Cycle Length: 160.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 41.0

Intersection LOS: D

Intersection Capacity Utilization 89.2%

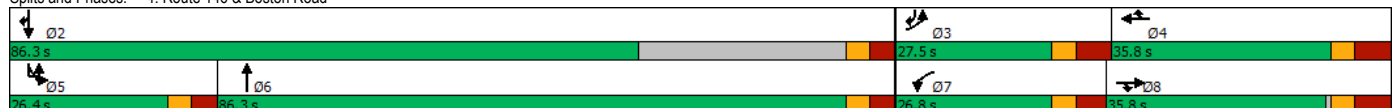
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Route 146 & Boston Road



													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	80	105	45	250	185	250	0	1820	20	55	260	2035	65
Future Volume (vph)	80	105	45	250	185	250	0	1820	20	55	260	2035	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		0.91			0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)	1752	1881	1615	3467	1881	1599		4935			3489	4940	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (perm)	1752	1881	1615	3467	1881	1599		4935			3489	4940	1615
Peak-hour factor, PHF	0.87	0.87	0.87	0.93	0.93	0.93	0.90	0.90	0.90	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	121	52	269	199	269	0	2022	22	60	283	2212	71
RTOR Reduction (vph)	0	0	46	0	0	136	0	1	0	0	0	0	16
Lane Group Flow (vph)	92	121	6	269	199	133	0	2043	0	0	343	2212	55
Heavy Vehicles (%)	3%	1%	0%	1%	1%	1%	0%	5%	0%	2%	0%	5%	0%
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Actuated Green, G (s)	13.9	19.4	19.4	17.2	22.0	22.0		77.6			19.1	103.1	123.3
Effective Green, g (s)	13.9	19.4	19.4	17.2	22.0	22.0		77.6			19.1	103.1	123.3
Actuated g/C Ratio	0.09	0.12	0.12	0.11	0.14	0.14		0.48			0.12	0.64	0.77
Clearance Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	151	227	195	371	257	219		2384			414	3171	1239
v/s Ratio Prot	0.05	0.06	0.00	c0.08	c0.11	0.08		c0.41			0.10	c0.45	0.03
v/s Ratio Perm													
v/c Ratio	0.61	0.53	0.03	0.73	0.77	0.61		0.86			0.83	0.70	0.04
Uniform Delay, d1	70.7	66.3	62.3	69.4	66.9	65.2		36.6			69.1	18.6	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	6.8	2.4	0.1	6.9	13.5	4.7		3.3			12.8	0.7	0.0
Delay (s)	77.5	68.7	62.4	76.3	80.4	69.9		39.9			82.0	19.3	4.5
Level of Service	E	E	E	E	F	E		D			F	B	A
Approach Delay (s)		70.5			75.1			39.9				27.1	
Approach LOS		E			E			D				C	
Intersection Summary													
HCM 2000 Control Delay			40.0										
HCM 2000 Level of Service													D
HCM 2000 Volume to Capacity ratio			0.84										
Actuated Cycle Length (s)			160.6										28.0
Intersection Capacity Utilization			89.2%										E
ICU Level of Service													
Analysis Period (min)			15										
c Critical Lane Group													

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	340	130	80	420	200	105
Future Volume (vph)	340	130	80	420	200	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3434	0	0	3551	3349	0
Flt Permitted				0.796	0.968	
Satd. Flow (perm)	3434	0	0	2850	3349	0
Right Turn on Red	Yes					Yes
Satd. Flow (RTOR)	105				119	
Link Speed (mph)	30			30	30	
Link Distance (ft)	280			831	853	
Travel Time (s)	6.4			18.9	19.4	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.88	0.88
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	553	0	0	575	346	0
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	6.0		4.0	6.0	6.0	
Minimum Split (s)	11.0		9.0	11.0	11.0	
Total Split (s)	27.0		15.0	42.0	18.0	
Total Split (%)	45.0%		25.0%	70.0%	30.0%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	Min		None	Min	None	
Act Effct Green (s)	13.3			13.3	7.6	
Actuated g/C Ratio	0.43			0.43	0.24	
v/c Ratio	0.36			0.47	0.38	
Control Delay	5.6			7.9	8.1	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.6			7.9	8.1	
LOS	A			A	A	
Approach Delay	5.6			7.9	8.1	
Approach LOS	A			A	A	
Queue Length 50th (ft)	21			30	13	
Queue Length 95th (ft)	43			59	41	
Internal Link Dist (ft)	200			751	773	
Turn Bay Length (ft)						
Base Capacity (vph)	2498			2828	1491	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.22			0.20	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 31.1
Natural Cycle: 40
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 7.1
Intersection Capacity Utilization 49.0%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

Splits and Phases: 9: Galaxy Pass & Boston Road



	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	340	130	80	420	200	105
Future Volume (vph)	340	130	80	420	200	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	0.96			1.00	0.95	
Flt Protected	1.00			0.99	0.97	
Satd. Flow (prot)	3435			3552	3351	
Flt Permitted	1.00			0.80	0.97	
Satd. Flow (perm)	3435			2850	3351	
Peak-hour factor, PHF	0.85	0.85	0.87	0.87	0.88	0.88
Adj. Flow (vph)	400	153	92	483	227	119
RTOR Reduction (vph)	60	0	0	0	90	0
Lane Group Flow (vph)	493	0	0	575	256	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Actuated Green, G (s)	13.3			13.3	7.6	
Effective Green, g (s)	13.3			13.3	7.6	
Actuated g/C Ratio	0.43			0.43	0.25	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1478			1226	824	
v/s Ratio Prot	0.14				c0.08	
v/s Ratio Perm				c0.20		
v/c Ratio	0.33			0.47	0.31	
Uniform Delay, d1	5.9			6.3	9.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.3	0.2	
Delay (s)	6.0			6.6	9.7	
Level of Service	A			A	A	
Approach Delay (s)	6.0			6.6	9.7	
Approach LOS	A			A	A	
Intersection Summary						
HCM 2000 Control Delay			7.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			30.9	Sum of lost time (s)	15.0	
Intersection Capacity Utilization			49.0%	ICU Level of Service	A	
Analysis Period (min)			15			
c Critical Lane Group						

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Vol, veh/h	20	360	5	5	595	20	45	20	85	25	0	45
Future Vol, veh/h	20	360	5	5	595	20	45	20	85	25	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	91	91	91	86	86	86	82	82	82
Heavy Vehicles, %	0	1	0	0	1	0	0	6	1	4	0	0
Mvmt Flow	23	419	6	5	654	22	52	23	99	30	0	55
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	676	0	0	425	0	0	805	1154	213	942	1146	338
Stage 1	-	-	-	-	-	-	468	468	-	675	675	-
Stage 2	-	-	-	-	-	-	337	686	-	267	471	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.62	6.92	7.58	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.62	-	6.58	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.62	-	6.58	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.06	3.31	3.54	4	3.3
Pot Cap-1 Maneuver	925	-	-	1145	-	-	277	190	795	215	201	664
Stage 1	-	-	-	-	-	-	550	550	-	405	456	-
Stage 2	-	-	-	-	-	-	656	436	-	710	563	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	925	-	-	1145	-	-	246	182	795	165	193	664
Mov Cap-2 Maneuver	-	-	-	-	-	-	246	182	-	165	193	-
Stage 1	-	-	-	-	-	-	532	532	-	392	453	-
Stage 2	-	-	-	-	-	-	598	433	-	575	544	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.1			22.7			20.4		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	375	925	-	-	1145	-	-	319				
HCM Lane V/C Ratio	0.465	0.025	-	-	0.005	-	-	0.268				
HCM Control Delay (s)	22.7	9	0.1	-	8.2	0	-	20.4				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	2.4	0.1	-	-	0	-	-	1.1				

Intersection						
Int Delay, s/veh	7.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↶	↶	↶
Traffic Vol, veh/h	182	35	311	132	19	258
Future Vol, veh/h	182	35	311	132	19	258
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	85	85	88	88
Heavy Vehicles, %	0	0	1	1	11	1
Mvmt Flow	198	38	366	155	22	293
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	236	0	1104	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	887	-
Critical Hdwy	-	-	4.11	-	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	5.51	-
Critical Hdwy Stg 2	-	-	-	-	5.51	-
Follow-up Hdwy	-	-	2.209	-	3.599	3.309
Pot Cap-1 Maneuver	-	-	1337	-	224	825
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	388	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1337	-	157	825
Mov Cap-2 Maneuver	-	-	-	-	157	-
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	272	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	6.1	16			
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	639	-	-	1337	-	
HCM Lane V/C Ratio	0.493	-	-	0.274	-	
HCM Control Delay (s)	16	-	-	8.7	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	2.7	-	-	1.1	-	

Lanes, Volumes, Timings
4: Route 146 & Boston Road

06/01/2022

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↰	↱	↰	↱	↱
Traffic Volume (vph)	105	120	55	205	195	305	0	2390	10	50	160	1640	50
Future Volume (vph)	105	120	55	205	195	305	0	2390	10	50	160	1640	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	450		300	300		300	0		0		550		225
Storage Lanes	1		1	1		1	0		0		2		1
Taper Length (ft)	25			25			25				25		
Satd. Flow (prot)	1805	1845	1509	3335	1810	1568	0	4756	0	0	3408	4590	1568
Flt Permitted	0.950			0.950							0.950		
Satd. Flow (perm)	1805	1845	1509	3335	1810	1568	0	4756	0	0	3408	4590	1568
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)			102			150							53
Link Speed (mph)		30			30			30				30	
Link Distance (ft)		1384			734			2194				1721	
Travel Time (s)		31.5			16.7			49.9				39.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	7%	5%	5%	3%	0%	9%	0%	2%	3%	13%	3%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	114	130	60	223	212	332	0	2581	0	0	221	1726	53
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	23
Permitted Phases													
Detector Phase	3	8	8	7	4	4		6		5	5	2	23
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0		20.0		7.0	7.0	20.0	
Minimum Split (s)	14.5	14.8	14.8	13.8	14.8	14.8		26.3		13.4	13.4	26.3	
Total Split (s)	27.5	35.8	35.8	26.8	35.8	35.8		86.3		26.4	26.4	86.3	
Total Split (%)	15.6%	20.3%	20.3%	15.2%	20.3%	20.3%		49.0%		15.0%	15.0%	49.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	
All-Red Time (s)	4.5	4.8	4.8	3.8	4.8	4.8		3.3		3.4	3.4	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3		6.4	6.3		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag		Lag		Lead	Lead		
Lead-Lag Optimize?													
Recall Mode	None	None	None	None	None	None		Min		None	None	Min	
Act Effct Green (s)	15.3	24.4	24.4	16.0	24.4	24.4		80.4			15.8	102.6	125.4
Actuated g/C Ratio	0.09	0.15	0.15	0.10	0.15	0.15		0.49			0.10	0.63	0.76
v/c Ratio	0.68	0.47	0.19	0.69	0.79	0.92		1.11			0.68	0.60	0.04
Control Delay	93.6	70.7	2.0	83.9	88.7	68.2		94.2			83.4	20.3	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.0
Total Delay	93.6	70.7	2.0	83.9	88.7	68.2		94.2			83.4	20.3	1.2
LOS	F	E	A	F	F	E		F			F	C	A
Approach Delay		65.7			78.4			94.2				26.8	
Approach LOS		E			E			F				C	
Queue Length 50th (ft)	124	130	0	124	224	207		~1210			123	418	0
Queue Length 95th (ft)	201	213	4	177	#338	#404		#1384			176	493	11
Internal Link Dist (ft)		1304			654			2114				1641	
Turn Bay Length (ft)	450		300	300		300					550		225
Base Capacity (vph)	221	324	349	408	310	393		2332			417	2993	1243
Starvation Cap Reductn	0	0	0	0	0	0		0			0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0			0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0			0	0	0
Reduced v/c Ratio	0.52	0.40	0.17	0.55	0.68	0.84		1.11			0.53	0.58	0.04

Intersection Summary

Area Type: Other

Cycle Length: 176

Actuated Cycle Length: 164

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 66.7

Intersection LOS: E

Intersection Capacity Utilization 100.4%

ICU Level of Service G

Analysis Period (min) 15

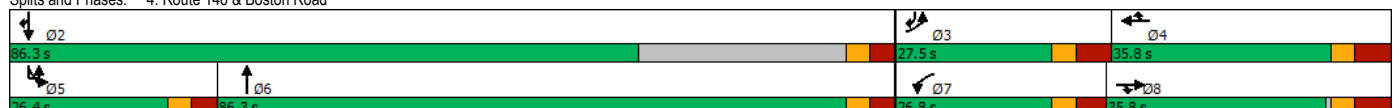
- Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Route 146 & Boston Road



HCM Signalized Intersection Capacity Analysis
4: Route 146 & Boston Road

06/01/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	105	120	55	205	195	305	0	2390	10	50	160	1640	50
Future Volume (vph)	105	120	55	205	195	305	0	2390	10	50	160	1640	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		0.91			0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)	1805	1845	1509	3335	1810	1568		4757			3408	4590	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (perm)	1805	1845	1509	3335	1810	1568		4757			3408	4590	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	130	60	223	212	332	0	2570	11	53	168	1726	53
RTOR Reduction (vph)	0	0	51	0	0	128	0	0	0	0	0	0	13
Lane Group Flow (vph)	114	130	9	223	212	204	0	2581	0	0	221	1726	40
Heavy Vehicles (%)	0%	3%	7%	5%	5%	3%	0%	9%	0%	2%	3%	13%	3%
Turn Type	Prot	NA	Prot	Prot	NA	Prot	NA	NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Actuated Green, G (s)	15.3	24.4	24.4	16.0	24.4	24.4		80.4			15.8	102.6	124.2
Effective Green, g (s)	15.3	24.4	24.4	16.0	24.4	24.4		80.4			15.8	102.6	124.2
Actuated g/C Ratio	0.09	0.15	0.15	0.10	0.15	0.15		0.49			0.10	0.63	0.76
Clearance Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	168	274	224	325	269	233		2333			328	2873	1188
v/s Ratio Prot	0.06	0.07	0.01	c0.07	0.12	c0.13		c0.54			0.06	c0.38	0.03
v/s Ratio Perm													
v/c Ratio	0.68	0.47	0.04	0.69	0.79	0.88		1.11			0.67	0.60	0.03
Uniform Delay, d1	71.9	63.9	59.7	71.5	67.3	68.3		41.8			71.6	18.4	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	10.4	1.3	0.1	5.9	14.1	28.7		54.8			5.4	0.4	0.0
Delay (s)	82.3	65.2	59.8	77.4	81.4	97.0		96.6			76.9	18.7	4.9
Level of Service	F	E	E	E	F	F		F			E	B	A
Approach Delay (s)		70.5			87.0			96.6				24.8	
Approach LOS		E			F			F				C	
Intersection Summary													
HCM 2000 Control Delay		68.5											
HCM 2000 Level of Service													E
HCM 2000 Volume to Capacity ratio		0.98											
Actuated Cycle Length (s)		163.9						28.0					
Intersection Capacity Utilization		100.4%											G
ICU Level of Service													
Analysis Period (min)		15											
c Critical Lane Group													

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	335	85	60	505	135	75
Future Volume (vph)	335	85	60	505	135	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	0		2	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3348	0	0	3438	3292	0
Flt Permitted				0.868	0.969	
Satd. Flow (perm)	3348	0	0	2999	3292	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	59				82	
Link Speed (mph)	30			30	30	
Link Distance (ft)	298			234	853	
Travel Time (s)	6.8			5.3	19.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	3%	0%	5%	3%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	456	0	0	614	229	0
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	6.0		4.0	6.0	6.0	
Minimum Split (s)	11.0		9.0	11.0	11.0	
Total Split (s)	27.0		15.0	42.0	18.0	
Total Split (%)	45.0%		25.0%	70.0%	30.0%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	Min		None	Min	None	
Act Effct Green (s)	15.7			15.7	7.1	
Actuated g/C Ratio	0.48			0.48	0.22	
v/c Ratio	0.28			0.43	0.30	
Control Delay	5.2			7.0	8.0	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.2			7.0	8.0	
LOS	A			A	A	
Approach Delay	5.2			7.0	8.0	
Approach LOS	A			A	A	
Queue Length 50th (ft)	17			30	8	
Queue Length 95th (ft)	37			59	28	
Internal Link Dist (ft)	218			154	773	
Turn Bay Length (ft)						
Base Capacity (vph)	2304			2968	1366	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.20			0.21	0.17	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 32.9
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 6.5
 Intersection Capacity Utilization 46.4%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Galaxy Pass & Boston Road

↙ Ø1 15 s	→ Ø2 27 s	↖ Ø4 18 s
← Ø6 42 s		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (vph)	335	85	60	505	135	75
Future Volume (vph)	335	85	60	505	135	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	0.97			1.00	0.95	
Flt Protected	1.00			0.99	0.97	
Satd. Flow (prot)	3347			3437	3293	
Flt Permitted	1.00			0.87	0.97	
Satd. Flow (perm)	3347			2999	3293	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	92	65	549	147	82
RTOR Reduction (vph)	31	0	0	0	64	0
Lane Group Flow (vph)	425	0	0	614	165	0
Heavy Vehicles (%)	5%	3%	0%	5%	3%	2%
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Actuated Green, G (s)	15.7			15.7	7.1	
Effective Green, g (s)	15.7			15.7	7.1	
Actuated g/C Ratio	0.48			0.48	0.22	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1602			1435	712	
v/s Ratio Prot	0.13				c0.05	
v/s Ratio Perm				c0.20		
v/c Ratio	0.27			0.43	0.23	
Uniform Delay, d1	5.1			5.6	10.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.2	0.2	
Delay (s)	5.2			5.8	10.8	
Level of Service	A			A	B	
Approach Delay (s)	5.2			5.8	10.8	
Approach LOS	A			A	B	
Intersection Summary						
HCM 2000 Control Delay			6.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			32.8	Sum of lost time (s)	15.0	
Intersection Capacity Utilization			46.4%	ICU Level of Service	A	
Analysis Period (min)			15			
c Critical Lane Group						

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	20	265	5	0	625	15	40	10	140	15	0	40
Future Vol, veh/h	20	265	5	0	625	15	40	10	140	15	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	0	5	0	10	11	5	18	0	7
Mvmt Flow	22	288	5	0	679	16	43	11	152	16	0	43
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	695	0	0	293	0	0	675	1030	147	881	1024	348
Stage 1	-	-	-	-	-	-	335	335	-	687	687	-
Stage 2	-	-	-	-	-	-	340	695	-	194	337	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.7	6.72	7	7.86	6.5	7.04
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.72	-	6.86	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.72	-	6.86	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.6	4.11	3.35	3.68	4	3.37
Pot Cap-1 Maneuver	910	-	-	1280	-	-	325	218	864	217	237	634
Stage 1	-	-	-	-	-	-	631	619	-	368	450	-
Stage 2	-	-	-	-	-	-	627	421	-	745	645	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	910	-	-	1280	-	-	296	212	864	168	230	634
Mov Cap-2 Maneuver	-	-	-	-	-	-	296	212	-	168	230	-
Stage 1	-	-	-	-	-	-	613	601	-	357	450	-
Stage 2	-	-	-	-	-	-	584	421	-	585	626	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0			15.4			16.9		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	552	910	-	-	1280	-	-	361				
HCM Lane V/C Ratio	0.374	0.024	-	-	-	-	-	0.166				
HCM Control Delay (s)	15.4	9.1	0.1	-	0	-	-	16.9				
HCM Lane LOS	C	A	A	-	A	-	-	C				
HCM 95th %tile Q(veh)	1.7	0.1	-	-	0	-	-	0.6				

Intersection						
Int Delay, s/veh	7.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↓	
Traffic Vol, veh/h	90	20	305	135	20	270
Future Vol, veh/h	90	20	305	135	20	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	93	93	87	87
Heavy Vehicles, %	3	36	2	2	18	2
Mvmt Flow	123	27	328	145	23	310
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	150	0	938	137
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	801	-
Critical Hdwy	-	-	4.12	-	6.58	6.22
Critical Hdwy Stg 1	-	-	-	-	5.58	-
Critical Hdwy Stg 2	-	-	-	-	5.58	-
Follow-up Hdwy	-	-	2.218	-	3.662	3.318
Pot Cap-1 Maneuver	-	-	1431	-	275	911
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	415	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1431	-	207	911
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	312	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	5.7	13.8			
HCM LOS			B			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	738	-	-	1431	-	
HCM Lane V/C Ratio	0.452	-	-	0.229	-	
HCM Control Delay (s)	13.8	-	-	8.3	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	2.4	-	-	0.9	-	

Intersection Summary	
Area Type:	Other
Cycle Length:	176
Actuated Cycle Length:	165.7
Natural Cycle:	120
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.97
Intersection Signal Delay:	48.4
Intersection Capacity Utilization	98.1%
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

 Ø2 86.3 s		 Ø3 27.5 s		 Ø4 35.8 s	
 Ø5 26.4 s		 Ø6 86.3 s		 Ø7 26.8 s	
				 Ø8 35.8 s	

HCM Signalized Intersection Capacity Analysis
4: Route 146 & Boston Road

06/01/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations							0		20	60			
Traffic Volume (vph)	85	120	50	275	200	280	0	2115	20	60	300	2300	70
Future Volume (vph)	85	120	50	275	200	280	0	2115	20	60	300	2300	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		0.91			0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)	1752	1881	1615	3467	1881	1599		4935			3490	4940	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (perm)	1752	1881	1615	3467	1881	1599		4935			3490	4940	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	130	54	296	215	301	0	2299	22	65	326	2500	76
RTOR Reduction (vph)	0	0	47	0	0	131	0	1	0	0	0	0	17
Lane Group Flow (vph)	92	130	7	296	215	170	0	2320	0	0	391	2500	59
Heavy Vehicles (%)	3%	1%	0%	1%	1%	1%	0%	5%	0%	2%	0%	5%	0%
Turn Type	Prot	NA	Prot	Prot	NA	Prot	NA	NA	Prot	Prot	NA	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Actuated Green, G (s)	14.0	20.0	20.0	18.0	23.3	23.3		80.2			20.1	106.7	127.0
Effective Green, g (s)	14.0	20.0	20.0	18.0	23.3	23.3		80.2			20.1	106.7	127.0
Actuated g/C Ratio	0.08	0.12	0.12	0.11	0.14	0.14		0.48			0.12	0.64	0.77
Clearance Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	148	227	195	376	264	224		2390			423	3182	1238
v/s Ratio Prot	0.05	0.07	0.00	c0.09	c0.11	0.11		c0.47			0.11	c0.51	0.04
v/s Ratio Perm													
v/c Ratio	0.62	0.57	0.03	0.79	0.81	0.76		0.97			0.92	0.79	0.05
Uniform Delay, d1	73.2	68.8	64.3	71.9	69.1	68.5		41.6			72.0	21.2	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	7.9	3.5	0.1	10.4	17.3	14.1		12.3			25.8	1.3	0.0
Delay (s)	81.1	72.2	64.3	82.3	86.3	82.6		53.9			97.8	22.5	4.7
Level of Service	F	E	E	F	F	F		D			F	C	A
Approach Delay (s)		73.6			83.5			53.9				32.0	
Approach LOS		E			F			D				C	
Intersection Summary													
HCM 2000 Control Delay			48.3		HCM 2000 Level of Service							D	
HCM 2000 Volume to Capacity ratio			0.94										
Actuated Cycle Length (s)			165.6		Sum of lost time (s)							28.0	
Intersection Capacity Utilization			98.1%		ICU Level of Service							F	
Analysis Period (min)			15										
c Critical Lane Group													

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	390	140	85	465	215	115
Future Volume (vph)	390	140	85	465	215	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	0		2	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3440	0	0	3551	3349	0
Flt Permitted				0.795	0.968	
Satd. Flow (perm)	3440	0	0	2846	3349	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	95				125	
Link Speed (mph)	30			30	30	
Link Distance (ft)	293			208	853	
Travel Time (s)	6.7			4.7	19.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	576	0	0	597	359	0
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	6.0		4.0	6.0	6.0	
Minimum Split (s)	11.0		9.0	11.0	11.0	
Total Split (s)	27.0		15.0	42.0	18.0	
Total Split (%)	45.0%		25.0%	70.0%	30.0%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	Min		None	Min	None	
Act Effct Green (s)	13.5			13.5	7.8	
Actuated g/C Ratio	0.43			0.43	0.25	
v/c Ratio	0.38			0.49	0.39	
Control Delay	5.9			8.1	8.2	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.9			8.1	8.2	
LOS	A			A	A	
Approach Delay	5.9			8.1	8.2	
Approach LOS	A			A	A	
Queue Length 50th (ft)	23			31	14	
Queue Length 95th (ft)	51			66	44	
Internal Link Dist (ft)	213			128	773	
Turn Bay Length (ft)						
Base Capacity (vph)	2480			2811	1483	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.23			0.21	0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 31.5
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 7.3
 Intersection Capacity Utilization 52.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Galaxy Pass & Boston Road

↙ Ø1 15 s	→ Ø2 27 s	↖ Ø4 18 s
← Ø6 42 s		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	390	140	85	465	215	115
Future Volume (vph)	390	140	85	465	215	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	0.96			1.00	0.95	
Flt Protected	1.00			0.99	0.97	
Satd. Flow (prot)	3442			3552	3350	
Flt Permitted	1.00			0.80	0.97	
Satd. Flow (perm)	3442			2847	3350	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	424	152	92	505	234	125
RTOR Reduction (vph)	54	0	0	0	94	0
Lane Group Flow (vph)	522	0	0	597	265	0
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Actuated Green, G (s)	13.5			13.5	7.8	
Effective Green, g (s)	13.5			13.5	7.8	
Actuated g/C Ratio	0.43			0.43	0.25	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1484			1227	834	
v/s Ratio Prot	0.15				c0.08	
v/s Ratio Perm				c0.21		
v/c Ratio	0.35			0.49	0.32	
Uniform Delay, d1	6.0			6.4	9.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.3	0.2	
Delay (s)	6.1			6.7	9.8	
Level of Service	A			A	A	
Approach Delay (s)	6.1			6.7	9.8	
Approach LOS	A			A	A	
Intersection Summary						
HCM 2000 Control Delay		7.2		HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio		0.55				
Actuated Cycle Length (s)		31.3		Sum of lost time (s)	15.0	
Intersection Capacity Utilization		52.8%		ICU Level of Service	A	
Analysis Period (min)		15				
c Critical Lane Group						

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔↔			↔↔	
Traffic Vol, veh/h	25	410	5	5	655	20	50	20	95	25	0	50
Future Vol, veh/h	25	410	5	5	655	20	50	20	95	25	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	6	1	4	0	0
Mvmt Flow	27	446	5	5	712	22	54	22	103	27	0	54
Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	734	0	0	451	0	0	869	1247	226	1021	1238	367
Stage 1	-	-	-	-	-	-	503	503	-	733	733	-
Stage 2	-	-	-	-	-	-	366	744	-	288	505	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.62	6.92	7.58	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.62	-	6.58	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.62	-	6.58	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.06	3.31	3.54	4	3.3
Pot Cap-1 Maneuver	880	-	-	1120	-	-	249	167	780	188	177	636
Stage 1	-	-	-	-	-	-	524	530	-	374	429	-
Stage 2	-	-	-	-	-	-	631	410	-	690	544	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	880	-	-	1120	-	-	219	159	780	141	168	636
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	159	-	141	168	-
Stage 1	-	-	-	-	-	-	503	508	-	359	426	-
Stage 2	-	-	-	-	-	-	572	407	-	550	522	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	0.7		0.1		26		22					
HCM LOS					D		C					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	347	880	-	-	1120	-	-	293				
HCM Lane V/C Ratio	0.517	0.031	-	-	0.005	-	-	0.278				
HCM Control Delay (s)	26	9.2	0.2	-	8.2	0	-	22				
HCM Lane LOS	D	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	2.8	0.1	-	-	0	-	-	1.1				

Intersection						
Int Delay, s/veh	7.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	
Traffic Vol, veh/h	90	20	305	135	20	270
Future Vol, veh/h	90	20	305	135	20	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	85	85	88	88
Heavy Vehicles, %	0	0	1	1	11	1
Mvmt Flow	98	22	359	159	23	307
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	120	0	986	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	877	-
Critical Hdwy	-	-	4.11	-	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	5.51	-
Critical Hdwy Stg 2	-	-	-	-	5.51	-
Follow-up Hdwy	-	-	2.209	-	3.599	3.309
Pot Cap-1 Maneuver	-	-	1474	-	264	947
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	392	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1474	-	194	947
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	894	-
Stage 2	-	-	-	-	287	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		5.7		13.6	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	747	-	-	1474	-	
HCM Lane V/C Ratio	0.441	-	-	0.243	-	
HCM Control Delay (s)	13.6	-	-	8.2	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	2.3	-	-	1	-	

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	105	125	55	215	195	315	0	2390	10	50	195	1640	50
Future Volume (vph)	105	125	55	215	195	315	0	2390	10	50	195	1640	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	450		300	300		300	0		0		550		225
Storage Lanes	1		1	1		1	0		0		2		1
Taper Length (ft)	25			25			25				25		
Satd. Flow (prot)	1805	1845	1509	3335	1810	1553	0	4756	0	0	3380	4590	1568
Flt Permitted	0.950			0.950							0.950		
Satd. Flow (perm)	1805	1845	1509	3335	1810	1553	0	4756	0	0	3380	4590	1568
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)			102			150							53
Link Speed (mph)		30			30			30				30	
Link Distance (ft)		1384			734			2194				1721	
Travel Time (s)		31.5			16.7			49.9				39.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	7%	5%	5%	4%	0%	9%	0%	2%	4%	13%	3%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	114	136	60	234	212	342	0	2581	0	0	258	1726	53
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Detector Phase	3	8	8	7	4	4		6		5	5	2	2 3
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0		20.0		7.0	7.0	20.0	
Minimum Split (s)	14.5	14.8	14.8	13.8	14.8	14.8		26.3		13.4	13.4	26.3	
Total Split (s)	27.5	35.8	35.8	26.8	35.8	35.8		86.3		26.4	26.4	86.3	
Total Split (%)	15.6%	20.3%	20.3%	15.2%	20.3%	20.3%		49.0%		15.0%	15.0%	49.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	
All-Red Time (s)	4.5	4.8	4.8	3.8	4.8	4.8		3.3		3.4	3.4	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3		6.4	6.3		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag		Lag		Lead	Lead		
Lead-Lag Optimize?													
Recall Mode	None	None	None	None	None	None		Min		None	None	Min	
Act Effct Green (s)	15.4	25.3	25.3	16.6	25.7	25.7		80.3		17.3	104.0	126.9	
Actuated g/C Ratio	0.09	0.15	0.15	0.10	0.15	0.15		0.48		0.10	0.62	0.76	
v/c Ratio	0.69	0.49	0.19	0.71	0.76	0.93		1.13		0.74	0.60	0.04	
Control Delay	95.1	71.9	2.0	85.7	86.4	71.6		103.4		86.7	20.7	1.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay	95.1	71.9	2.0	85.7	86.4	71.6		103.4		86.7	20.7	1.2	
LOS	F	E	A	F	F	E		F		F	C	A	
Approach Delay		66.9			79.8			103.4			28.6		
Approach LOS		E			E			F			C		
Queue Length 50th (ft)	125	139	0	132	227	225		~1237		145	419	0	
Queue Length 95th (ft)	201	221	4	185	#338	#434		#1384		203	493	11	
Internal Link Dist (ft)		1304			654			2114			1641		
Turn Bay Length (ft)	450		300	300		300				550		225	
Base Capacity (vph)	217	318	345	401	304	386		2289		406	2939	1235	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Reduced v/c Ratio	0.53	0.43	0.17	0.58	0.70	0.89		1.13		0.64	0.59	0.04	

Intersection Summary

Area Type: Other

Cycle Length: 176

Actuated Cycle Length: 166.8

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 71.5

Intersection LOS: E

Intersection Capacity Utilization 102.1%

ICU Level of Service G

Analysis Period (min) 15

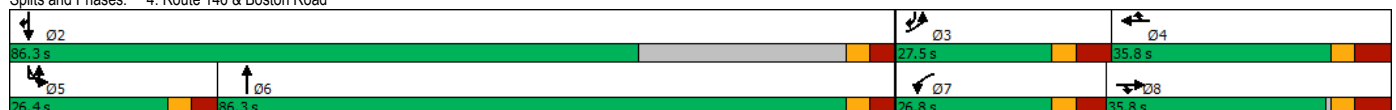
- Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Route 146 & Boston Road



													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	105	125	55	215	195	315	0	2390	10	50	195	1640	50
Future Volume (vph)	105	125	55	215	195	315	0	2390	10	50	195	1640	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		0.91			0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)	1805	1845	1509	3335	1810	1553		4757			3380	4590	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (perm)	1805	1845	1509	3335	1810	1553		4757			3380	4590	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	136	60	234	212	342	0	2570	11	53	205	1726	53
RTOR Reduction (vph)	0	0	51	0	0	127	0	0	0	0	0	0	13
Lane Group Flow (vph)	114	136	9	234	212	215	0	2581	0	0	258	1726	40
Heavy Vehicles (%)	0%	3%	7%	5%	5%	4%	0%	9%	0%	2%	4%	13%	3%
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Actuated Green, G (s)	15.4	25.3	25.3	16.6	25.8	25.8		80.3			17.3	104.0	125.7
Effective Green, g (s)	15.4	25.3	25.3	16.6	25.8	25.8		80.3			17.3	104.0	125.7
Actuated g/C Ratio	0.09	0.15	0.15	0.10	0.15	0.15		0.48			0.10	0.62	0.75
Clearance Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	166	279	228	331	279	240		2290			350	2861	1181
v/s Ratio Prot	0.06	0.07	0.01	c0.07	0.12	c0.14		c0.54			0.08	c0.38	0.03
v/s Ratio Perm													
v/c Ratio	0.69	0.49	0.04	0.71	0.76	0.90		1.13			0.74	0.60	0.03
Uniform Delay, d1	73.4	64.8	60.4	72.7	67.5	69.2		43.3			72.5	19.0	5.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	11.2	1.3	0.1	6.7	11.3	31.8		63.5			7.9	0.4	0.0
Delay (s)	84.6	66.2	60.5	79.5	78.8	101.0		106.7			80.4	19.3	5.2
Level of Service	F	E	E	E	E	F		F			F	B	A
Approach Delay (s)		71.8			88.7			106.7				26.7	
Approach LOS		E			F			F				C	
Intersection Summary													
HCM 2000 Control Delay			73.8		HCM 2000 Level of Service							E	
HCM 2000 Volume to Capacity ratio			0.99										
Actuated Cycle Length (s)			166.8		Sum of lost time (s)							28.0	
Intersection Capacity Utilization			102.1%		ICU Level of Service							G	
Analysis Period (min)			15										
c Critical Lane Group													

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	405	85	60	525	135	75
Future Volume (vph)	405	85	60	525	135	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	0		2	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3333	0	0	3438	3292	0
Flt Permitted				0.860	0.969	
Satd. Flow (perm)	3333	0	0	2971	3292	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	46				82	
Link Speed (mph)	30			30	30	
Link Distance (ft)	298			234	853	
Travel Time (s)	6.8			5.3	19.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	3%	0%	5%	3%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	532	0	0	636	229	0
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	6.0		4.0	6.0	6.0	
Minimum Split (s)	11.0		9.0	11.0	11.0	
Total Split (s)	27.0		15.0	42.0	18.0	
Total Split (%)	45.0%		25.0%	70.0%	30.0%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	Min		None	Min	None	
Act Effct Green (s)	16.3			16.3	7.1	
Actuated g/C Ratio	0.49			0.49	0.21	
v/c Ratio	0.32			0.44	0.30	
Control Delay	5.6			7.0	8.2	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.6			7.0	8.2	
LOS	A			A	A	
Approach Delay	5.6			7.0	8.2	
Approach LOS	A			A	A	
Queue Length 50th (ft)	22			31	9	
Queue Length 95th (ft)	45			62	29	
Internal Link Dist (ft)	218			154	773	
Turn Bay Length (ft)						
Base Capacity (vph)	2253			2938	1344	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.24			0.22	0.17	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 33.5
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 6.6
 Intersection Capacity Utilization 48.9%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 9: Galaxy Pass & Boston Road

↙ Ø1	→ Ø2	↖ Ø4
15 s	27 s	18 s
← Ø6		
42 s		

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (vph)	405	85	60	525	135	75
Future Volume (vph)	405	85	60	525	135	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	0.97			1.00	0.95	
Flt Protected	1.00			0.99	0.97	
Satd. Flow (prot)	3334			3437	3293	
Flt Permitted	1.00			0.86	0.97	
Satd. Flow (perm)	3334			2972	3293	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	92	65	571	147	82
RTOR Reduction (vph)	24	0	0	0	65	0
Lane Group Flow (vph)	508	0	0	636	164	0
Heavy Vehicles (%)	6%	3%	0%	5%	3%	2%
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Actuated Green, G (s)	16.3			16.3	7.1	
Effective Green, g (s)	16.3			16.3	7.1	
Actuated g/C Ratio	0.49			0.49	0.21	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1627			1450	700	
v/s Ratio Prot	0.15				c0.05	
v/s Ratio Perm				c0.21		
v/c Ratio	0.31			0.44	0.23	
Uniform Delay, d1	5.2			5.6	10.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.2	0.2	
Delay (s)	5.3			5.8	11.1	
Level of Service	A			A	B	
Approach Delay (s)	5.3			5.8	11.1	
Approach LOS	A			A	B	
Intersection Summary						
HCM 2000 Control Delay			6.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			33.4	Sum of lost time (s)	15.0	
Intersection Capacity Utilization			48.9%	ICU Level of Service	A	
Analysis Period (min)			15			
c Critical Lane Group						

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	70	410	565	10	5	20
Future Vol, veh/h	70	410	565	10	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	9	4	3	0	0	20
Mvmt Flow	76	446	614	11	5	22
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	625	0	-	0	1218	620
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	598	-
Critical Hdwy	4.19	-	-	-	6.4	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.281	-	-	-	3.5	3.48
Pot Cap-1 Maneuver	923	-	-	-	201	457
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	923	-	-	-	179	457
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	481	-
Stage 2	-	-	-	-	553	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.3	0		16.2		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	923	-	-	-	349	
HCM Lane V/C Ratio	0.082	-	-	-	0.078	
HCM Control Delay (s)	9.2	0	-	-	16.2	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3	

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Vol, veh/h	20	305	5	0	645	15	40	10	170	15	0	40
Future Vol, veh/h	20	305	5	0	645	15	40	10	170	15	0	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	0	0	5	0	10	11	5	18	0	7
Mvmt Flow	22	332	5	0	701	16	43	11	185	16	0	43
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	717	0	0	337	0	0	730	1096	169	925	1090	359
Stage 1	-	-	-	-	-	-	379	379	-	709	709	-
Stage 2	-	-	-	-	-	-	351	717	-	216	381	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.7	6.72	7	7.86	6.5	7.04
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.72	-	6.86	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.72	-	6.86	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.6	4.11	3.35	3.68	4	3.37
Pot Cap-1 Maneuver	893	-	-	1234	-	-	296	198	836	201	217	623
Stage 1	-	-	-	-	-	-	593	591	-	356	440	-
Stage 2	-	-	-	-	-	-	617	411	-	722	617	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	893	-	-	1234	-	-	269	192	836	146	210	623
Mov Cap-2 Maneuver	-	-	-	-	-	-	269	192	-	146	210	-
Stage 1	-	-	-	-	-	-	575	573	-	345	440	-
Stage 2	-	-	-	-	-	-	574	411	-	535	598	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0			16.7			18.4		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	544		893	-	-	1234	-	-	329			
HCM Lane V/C Ratio	0.44		0.024	-	-	-	-	-	0.182			
HCM Control Delay (s)	16.7		9.1	0.1	-	0	-	-	18.4			
HCM Lane LOS	C		A	A	-	A	-	-	C			
HCM 95th %tile Q(veh)	2.2		0.1	-	-	0	-	-	0.7			

Intersection						
Int Delay, s/veh	7.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰↱	↰↱	
Traffic Vol, veh/h	95	20	315	145	20	275
Future Vol, veh/h	95	20	315	145	20	275
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	93	93	87	87
Heavy Vehicles, %	3	38	2	2	17	2
Mvmt Flow	130	27	339	156	23	316
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	157	0	978	144
Stage 1	-	-	-	-	144	-
Stage 2	-	-	-	-	834	-
Critical Hdwy	-	-	4.12	-	6.57	6.22
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	-	-	2.218	-	3.653	3.318
Pot Cap-1 Maneuver	-	-	1423	-	261	903
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	402	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1423	-	193	903
Mov Cap-2 Maneuver	-	-	-	-	193	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	297	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		5.7		14.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	723	-	-	1423	-	
HCM Lane V/C Ratio	0.469	-	-	0.238	-	
HCM Control Delay (s)	14.3	-	-	8.3	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	2.5	-	-	0.9	-	

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↱	↱	
Traffic Vol, veh/h	175	10	10	235	5	5
Future Vol, veh/h	175	10	10	235	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	0	0	1	0	0
Mvmt Flow	190	11	11	255	5	5
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	201	0	473	196
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	277	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1383	-	553	850
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	774	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1383	-	548	850
Mov Cap-2 Maneuver	-	-	-	-	548	-
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	767	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.3		10.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	666	-	-	1383	-	
HCM Lane V/C Ratio	0.016	-	-	0.008	-	
HCM Control Delay (s)	10.5	-	-	7.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	85	125	50	310	210	315	0	2115	20	60	320	2300	70
Future Volume (vph)	85	125	50	310	210	315	0	2115	20	60	320	2300	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	450		300	300		300	0		0		550		225
Storage Lanes	1		1	1		1	0		0		2		1
Taper Length (ft)	25			25			25				25		
Satd. Flow (prot)	1752	1881	1615	3433	1881	1568	0	4937	0	0	3405	4940	1615
Flt Permitted	0.950			0.950							0.950		
Satd. Flow (perm)	1752	1881	1615	3433	1881	1568	0	4937	0	0	3405	4940	1615
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)			102			152		1					71
Link Speed (mph)		30			30			30				30	
Link Distance (ft)		1384			734			2194				1721	
Travel Time (s)		31.5			16.7			49.9				39.1	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	1%	0%	2%	1%	3%	0%	5%	0%	2%	3%	5%	0%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	92	136	54	333	226	339	0	2321	0	0	413	2500	76
Turn Type	Prot	NA	Prot	Prot	NA	Prot		NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Detector Phase	3	8	8	7	4	4		6		5	5	2	2 3
Switch Phase													
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0		20.0		7.0	7.0	20.0	
Minimum Split (s)	14.5	14.8	14.8	13.8	14.8	14.8		26.3		13.4	13.4	26.3	
Total Split (s)	27.5	35.8	35.8	26.8	35.8	35.8		86.3		26.4	26.4	86.3	
Total Split (%)	15.6%	20.3%	20.3%	15.2%	20.3%	20.3%		49.0%		15.0%	15.0%	49.0%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	
All-Red Time (s)	4.5	4.8	4.8	3.8	4.8	4.8		3.3		3.4	3.4	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3		6.4	6.3		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag		Lag		Lead	Lead		
Lead-Lag Optimize?													
Recall Mode	None	None	None	None	None	None		Min		None	None	Min	
Act Effct Green (s)	14.1	21.1	21.1	19.2	25.4	25.4		80.2		20.0	106.6	128.3	
Actuated g/C Ratio	0.08	0.13	0.13	0.11	0.15	0.15		0.48		0.12	0.64	0.76	
v/c Ratio	0.63	0.58	0.19	0.85	0.80	0.93		0.98		1.02	0.80	0.06	
Control Delay	93.4	78.9	1.4	93.1	89.3	69.7		58.1		119.8	26.0	1.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay	93.4	78.9	1.4	93.1	89.3	69.7		58.1		119.8	26.0	1.3	
LOS	F	E	A	F	F	E		E		F	C	A	
Approach Delay		68.8			83.3			58.1			38.4		
Approach LOS		E			F			E			D		
Queue Length 50th (ft)	101	144	0	190	243	218		937		~253	744	1	
Queue Length 95th (ft)	167	221	0	#279	#369	#417		#1129		#387	877	15	
Internal Link Dist (ft)		1304			654			2114			1641		
Turn Bay Length (ft)	450		300	300		300				550		225	
Base Capacity (vph)	209	322	361	410	314	388		2359		406	3139	1305	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0	
Reduced v/c Ratio	0.44	0.42	0.15	0.81	0.72	0.87		0.98		1.02	0.80	0.06	

Intersection Summary

Area Type: Other

Cycle Length: 176

Actuated Cycle Length: 167.8

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 53.0

Intersection LOS: D

Intersection Capacity Utilization 100.8%

ICU Level of Service G

Analysis Period (min) 15

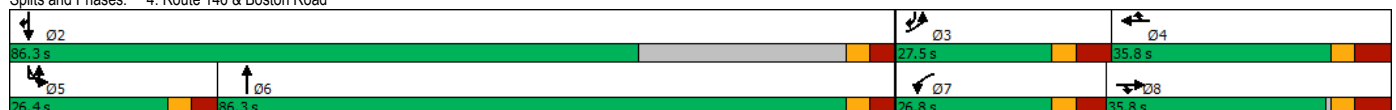
- Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Route 146 & Boston Road



													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	85	125	50	310	210	315	0	2115	20	60	320	2300	70
Future Volume (vph)	85	125	50	310	210	315	0	2115	20	60	320	2300	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00		0.91			0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)	1752	1881	1615	3433	1881	1568		4935			3405	4940	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		1.00			0.95	1.00	1.00
Satd. Flow (perm)	1752	1881	1615	3433	1881	1568		4935			3405	4940	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	136	54	333	226	339	0	2299	22	65	348	2500	76
RTOR Reduction (vph)	0	0	47	0	0	129	0	1	0	0	0	0	17
Lane Group Flow (vph)	92	136	7	333	226	210	0	2320	0	0	413	2500	59
Heavy Vehicles (%)	3%	1%	0%	2%	1%	3%	0%	5%	0%	2%	3%	5%	0%
Turn Type	Prot	NA	Prot	Prot	NA	Prot	NA	NA		Prot	Prot	NA	pt+ov
Protected Phases	3	8	8	7	4	4		6		5	5	2	2 3
Permitted Phases													
Actuated Green, G (s)	14.1	21.1	21.1	19.2	25.5	25.5		80.2			20.0	106.6	127.0
Effective Green, g (s)	14.1	21.1	21.1	19.2	25.5	25.5		80.2			20.0	106.6	127.0
Actuated g/C Ratio	0.08	0.13	0.13	0.11	0.15	0.15		0.48			0.12	0.64	0.76
Clearance Time (s)	7.5	7.8	7.8	6.8	7.8	7.8		6.3			6.4	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	147	236	203	392	285	238		2358			405	3138	1222
v/s Ratio Prot	0.05	0.07	0.00	c0.10	0.12	c0.13		c0.47			c0.12	0.51	0.04
v/s Ratio Perm													
v/c Ratio	0.63	0.58	0.03	0.85	0.79	0.88		0.98			1.02	0.80	0.05
Uniform Delay, d1	74.3	69.1	64.4	72.9	68.6	69.7		43.2			73.9	22.6	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	1.00
Incremental Delay, d2	8.1	3.4	0.1	15.7	14.0	29.5		14.9			49.8	1.5	0.0
Delay (s)	82.4	72.5	64.5	88.5	82.6	99.2		58.0			123.7	24.1	5.2
Level of Service	F	E	E	F	F	F		E			F	C	A
Approach Delay (s)		74.2			91.1			58.0				37.4	
Approach LOS		E			F			E				D	
Intersection Summary													
HCM 2000 Control Delay			53.8		HCM 2000 Level of Service							D	
HCM 2000 Volume to Capacity ratio			0.99										
Actuated Cycle Length (s)			167.8		Sum of lost time (s)							28.0	
Intersection Capacity Utilization			100.8%		ICU Level of Service							G	
Analysis Period (min)			15										
c Critical Lane Group													

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕↕	
Traffic Volume (vph)	435	140	85	545	215	115
Future Volume (vph)	435	140	85	545	215	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	0		2	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3403	0	0	3494	3349	0
Flt Permitted				0.803	0.968	
Satd. Flow (perm)	3403	0	0	2825	3349	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	81				125	
Link Speed (mph)	30			30	30	
Link Distance (ft)	293			208	853	
Travel Time (s)	6.7			4.7	19.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	0%	3%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	625	0	0	684	359	0
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Detector Phase	2		1	6	4	
Switch Phase						
Minimum Initial (s)	6.0		4.0	6.0	6.0	
Minimum Split (s)	11.0		9.0	11.0	11.0	
Total Split (s)	27.0		15.0	42.0	18.0	
Total Split (%)	45.0%		25.0%	70.0%	30.0%	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	Min		None	Min	None	
Act Effct Green (s)	15.5			15.5	8.0	
Actuated g/C Ratio	0.46			0.46	0.24	
v/c Ratio	0.39			0.53	0.41	
Control Delay	5.9			8.2	9.2	
Queue Delay	0.0			0.0	0.0	
Total Delay	5.9			8.2	9.2	
LOS	A			A	A	
Approach Delay	5.9			8.2	9.2	
Approach LOS	A			A	A	
Queue Length 50th (ft)	27			38	17	
Queue Length 95th (ft)	58			80	50	
Internal Link Dist (ft)	213			128	773	
Turn Bay Length (ft)						
Base Capacity (vph)	2314			2742	1400	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.27			0.25	0.26	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 33.7
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 56.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 9: Galaxy Pass & Boston Road



	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (vph)	435	140	85	545	215	115
Future Volume (vph)	435	140	85	545	215	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	0.96			1.00	0.95	
Flt Protected	1.00			0.99	0.97	
Satd. Flow (prot)	3401			3495	3350	
Flt Permitted	1.00			0.80	0.97	
Satd. Flow (perm)	3401			2826	3350	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	473	152	92	592	234	125
RTOR Reduction (vph)	44	0	0	0	95	0
Lane Group Flow (vph)	581	0	0	684	264	0
Heavy Vehicles (%)	3%	0%	0%	3%	1%	1%
Turn Type	NA		custom	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases			1			
Actuated Green, G (s)	15.5			15.5	8.0	
Effective Green, g (s)	15.5			15.5	8.0	
Actuated g/C Ratio	0.46			0.46	0.24	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1573			1307	800	
v/s Ratio Prot	0.17				c0.08	
v/s Ratio Perm				c0.24		
v/c Ratio	0.37			0.52	0.33	
Uniform Delay, d1	5.8			6.4	10.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.1			0.4	0.2	
Delay (s)	6.0			6.8	10.8	
Level of Service	A			A	B	
Approach Delay (s)	6.0			6.8	10.8	
Approach LOS	A			A	B	
Intersection Summary						
HCM 2000 Control Delay			7.3		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			33.5		Sum of lost time (s)	15.0
Intersection Capacity Utilization			56.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						