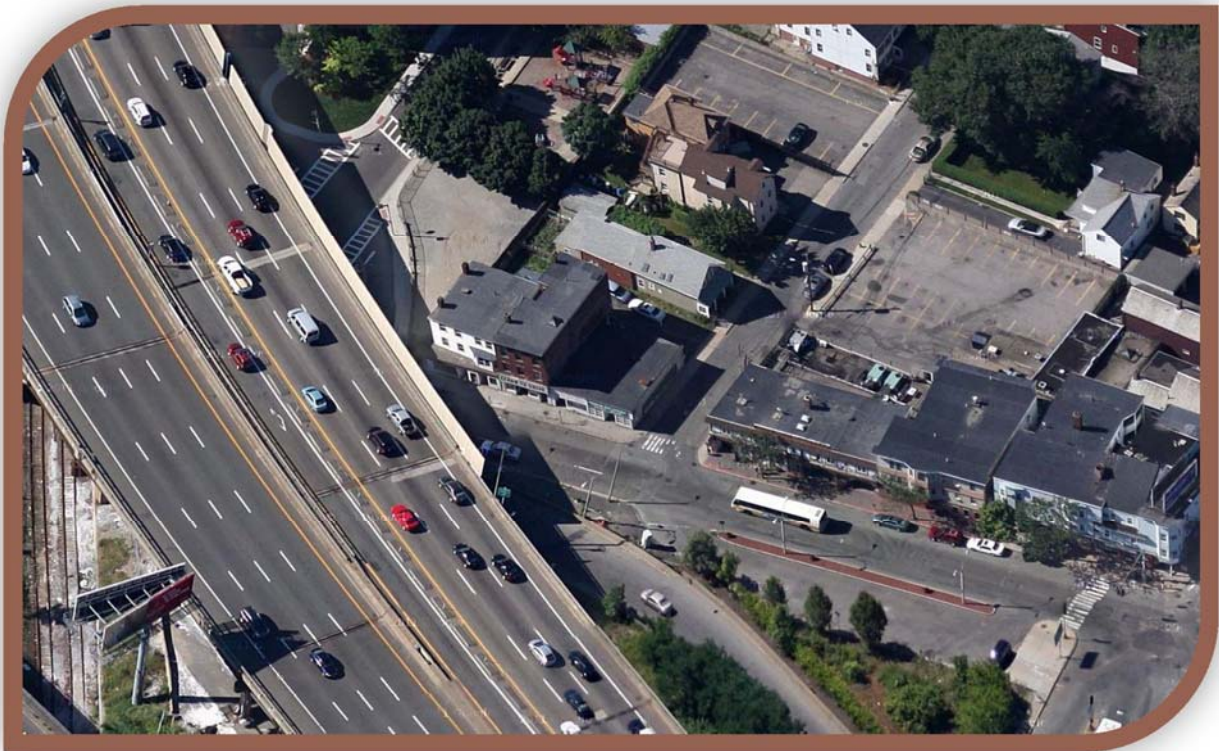


**2-8 Broadway
Somerville, Massachusetts**

Traffic & Parking Assessment



Design Consultants, Inc.

CIVIL ENGINEERS and LAND SURVEYORS

120 Middlesex Avenue, Suite 20

Somerville, MA 02145

617-776-3350p 617-776-7710f

Prepared by Design Consultants, Inc.

July 8, 2013

Executive Summary

This Traffic & Parking Assessment has been prepared to evaluate the potential impacts associated with the proposed redevelopment of the buildings at 2-8 Broadway in Somerville, Massachusetts. The project calls for the renovation of 2 and 4 Broadway, and the demolition of the existing building and construction of a new building at 8 Broadway. In all, the three buildings at 2-8 Broadway will have 3,239 SF of commercial space, and 11 residential units.

This study includes a review of the existing traffic and roadway conditions in the vicinity of the project site, as well as a review of the accident history at each study intersection. A parking utilization study is also included for the surrounding neighborhood streets. This study identifies background growth for the local roadway network, and estimates the additional vehicular traffic generated the proposed development project.

Summary of Results

- Based on the Institute of Transportation Engineers (ITE) methodology, the proposed development project is expected to generate a two (2) net new vehicles-trips during the weekday morning peak hour, and one (1) net new vehicle-trips during the weekday afternoon peak hour. On a daily basis, the proposed redevelopment project is expected to generate approximately 10 fewer vehicle-trips relative to the existing land uses on the project site.
- The existing crash rate at each study intersection is below the MassDOT District 4 and statewide averages.
- The project site is ideally located with respect to public transportation options. Sullivan Square Station provides access to the MBTA Orange Line subway. Additionally, there are numerous MBTA bus routes, both along Broadway itself and to/from Sullivan Square Station.
- The bicycle lanes on Broadway that will be provided as part of the current Broadway reconstruction project will encourage bicycle travel to and from the project site.
- There are many amenities within a short walking distance of the project site, which is expected to minimize and vehicular travel by the residents of the buildings at 2-8 Broadway.

This study indicates that the proposed project is expected to generate minimal additional vehicle-trips, due to the numerous alternate and more convenient forms of transportation readily available. The existing roadway network can easily accommodate the additional vehicular traffic generated by the proposed development project, with minimal impacts on traffic operations.

Table of Contents

1. Introduction.....	1
2. Existing Conditions	1
3. Traffic Volumes.....	5
4. Public Transportation	7
5. Safety Analysis	8
6. Future Conditions	9
7. Parking.....	15
8. Transportation Demand Management.....	17
9. Conclusion	18

1. Introduction

Design Consultants, Inc. (DCI) has prepared this traffic assessment to evaluate the potential impacts on the local transportation network associated with the proposed development project at 2-8 Broadway in Somerville. Straight Up Development is proposing to construct an renovate two existing buildings, demolish one existing building, and construct a new building. In aggregate, the three proposed buildings will house approximately 3,239 SF of commercial space and 11 residential units. The three existing buildings currently consist of 4,187 SF of commercial space and six (6) residential units.

This study includes a review of the existing traffic and roadway conditions in the vicinity of the project site, identifies background traffic growth for the study area, estimates additional traffic generated by the proposed development project, and includes an on-street parking utilization study.

2. Existing Conditions

Project Site

The project site at 2-8 Broadway is located on the south side of Broadway, between Mt. Pleasant Street and Caldwell Street. The existing three-story buildings at 2 Broadway and 4 Broadway will be renovated, the existing one-story building at 8 Broadway will be demolished and a new four-story building is proposed in its place.

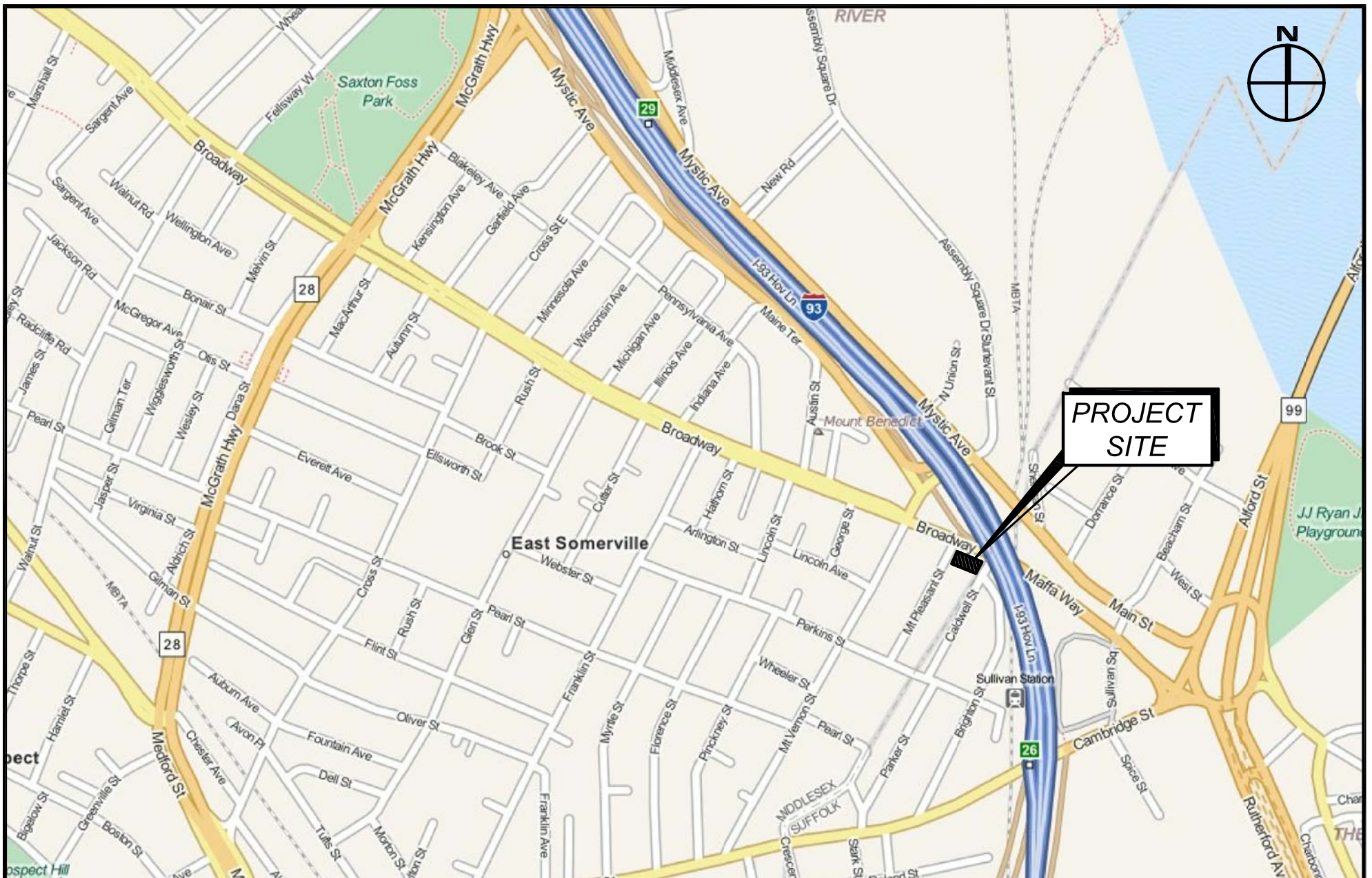
Study Area

A field inventory of the adjacent roadway system was conducted in May of 2013. This inventory included a collection of existing roadway geometry, on-street parking inventory, traffic control, and traffic volumes for the intersections in the vicinity of the project site.

The following study intersections are included in this report:

- Broadway / Caldwell Street
- Broadway / Mt. Pleasant Street
- Broadway / Mt. Vernon Street / Lombardi Street

Figure 1 shows the project site in relation to the larger transportation network.



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Consulting Engineers and Surveyors

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(617) 776-3350

**2-8 Broadway
Somerville, MA**

**Project
Location
Map**

Figure 1

Broadway

Broadway generally runs in an east-west direction through the City of Somerville between the Town of Arlington and the City of Boston. Broadway is generally a two-way roadway throughout Somerville, the only exception being in the immediate vicinity of this project site. To the east of Mt. Vernon Street / Lombardi Street, Broadway is a one-way roadway with traffic flowing in the eastbound direction. As it exists today, Broadway provides two eastbound travel lanes in the vicinity of the project site. However, Broadway is currently under construction (between the McGrath Highway and the Boston city line. When construction is complete, Broadway will provide a single eastbound travel lane and a 5-foot wide bicycle lane. The on-street parking on Broadway will be maintained. Additionally, the construction project will widen the sidewalk in front of 2-8 Broadway from approximately 8-feet wide (existing) to 15-feet wide (proposed). There is an existing municipal parking lot on the northeast corner of the Broadway / Mt. Vernon Street / Lombardi Street intersection. This parking lot will remain after the East Broadway reconstruction project is completed. Construction on East Broadway is currently scheduled to be completed by the Fall of 2014.



Broadway at Mount Pleasant Street, looking east at the project site

Mount Vernon, Mount Pleasant, and Caldwell Streets

Mt. Vernon Street, Mt. Pleasant Street, and Caldwell Street are minor residential roadways, with commercial establishments adjacent to Broadway. Mt. Pleasant Street is a one-way roadway with traffic traveling in the southbound direction. Both Mt. Vernon Street and Caldwell Street are one-way roadways with traffic traveling in the northbound direction. On-Street parking is permitted on the west side of Mt. Vernon Street and the west side of Mt. Pleasant Street. This parking is generally restricted to vehicles with residential parking permits. However, at the northern end of each street (near Broadway), there are a few metered and/or unrestricted parking spaces.

Broadway at Mt. Vernon Street / Lombardi Street

Mt. Vernon Street and Lombardi Street intersect Broadway is a four legged intersection controlled by a traffic signal. This traffic signal, Lombardi Street, and the nearby traffic signals further to the north on Lombardi Street have recently been reconstructed as part of the Assembly Drive Construction Project. However, it is noted that there are outstanding traffic signal control issues and the Assembly Drive Construction Project has not yet been 100% completed.

The Broadway eastbound approach currently provides two through travel lanes, and an exclusive left-turn lane. After the East Broadway reconstruction project is complete, the Broadway eastbound approach will provide a single through travel lane, an exclusive left-turn lane, and a bicycle lane. The Mt. Vernon Street northbound approach provides a single general purpose travel lane. The Lombardi Street southbound approach provides separate left-turn and right-turn only lanes. There are crosswalks across each leg of this intersection. An exclusive pedestrian phase allows pedestrians to safely cross any of these crosswalks without any vehicular conflicts.

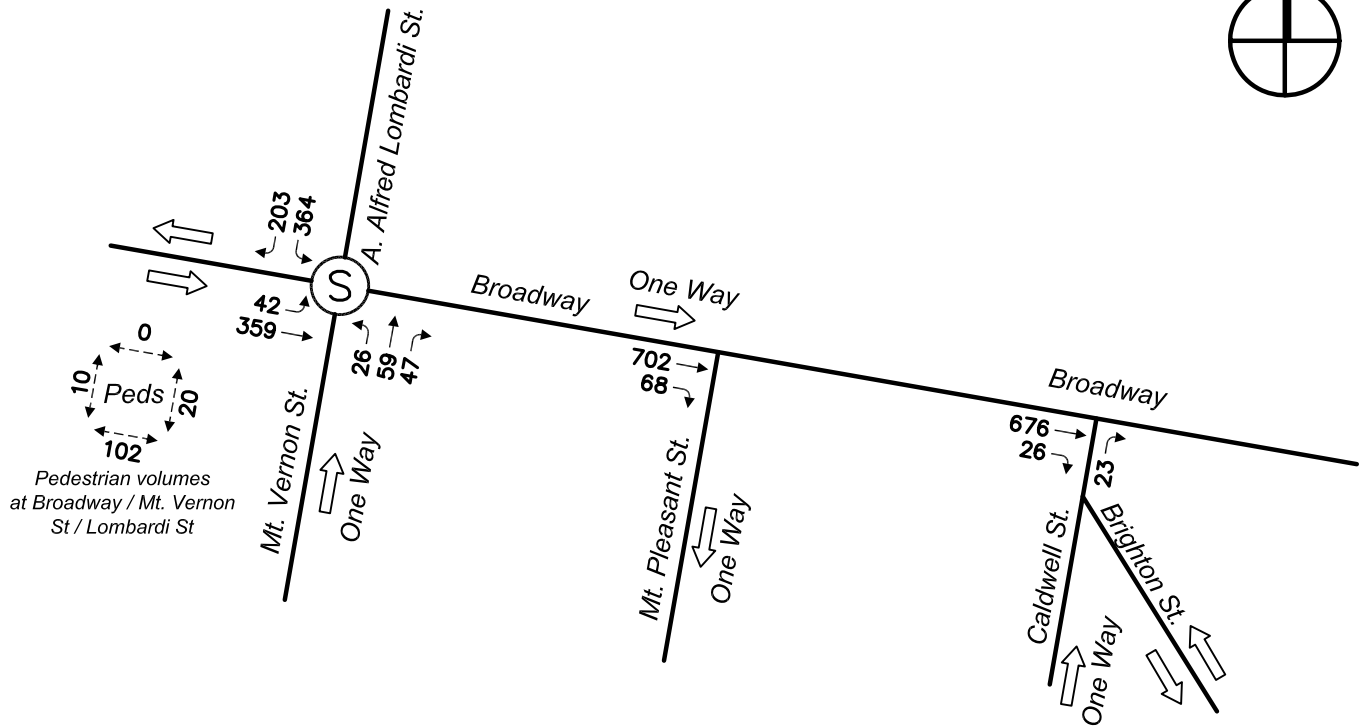
3. Traffic Volumes

Manual turning movement counts (TMC's) were collected at each study intersection during the morning peak period (7-9am) and the afternoon peak period (4-6pm) on a typical weekday. These hours generally represent the peak time periods for commuter traffic. The TMC data included all vehicular traffic, bicycles and pedestrians, and were collected on Thursday, May 2, 2013.

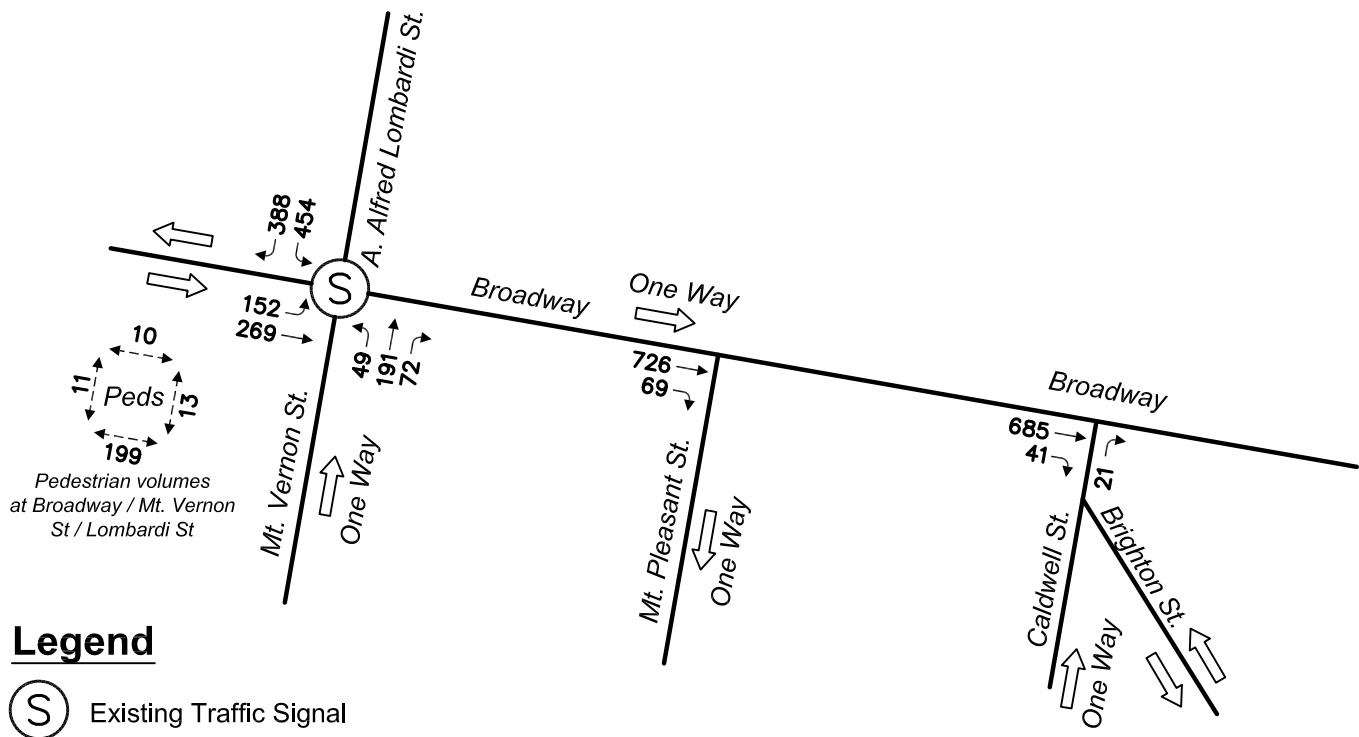
The most recent weekday seasonal adjustment factors from MassDOT were consulted, but no seasonal adjustments were required. The MassDOT seasonal adjustment data indicate that traffic volumes collected in the month of May are generally above average.

The existing weekday morning and afternoon peak hour traffic volumes are displayed on Figure 2. The complete traffic count data are provided in Appendix A.

Weekday Morning Peak Hour



Weekday Afternoon Peak Hour



Legend

(S) Existing Traffic Signal

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2-8 Broadway
 Somerville, MA

2013 Existing
 Peak Hour
 Traffic Volumes

Figure 2

4. Public Transportation

The project site at 2-8 Broadway is located approximately 700 feet from the entrance to Sullivan Square Station, approximately a 3-minute walk. Sullivan Square Station provides access to the MBTA Orange Line subway, as well as numerous MBTA bus routes. Additionally, the project site is located less than 200 feet from the closest eastbound bus stop on Broadway and approximately 400 feet from the closest westbound bus stop. Table 1, below, summarizes the nearby MBTA bus routes.

Table 1: MBTA Bus Routes

Bus Route #	From	via	To
86	Sullivan Square Station	Harvard Square	Cleveland Circle
89	Clarendon Hill / Davis Square	Broadway	Sullivan Square Station
90	Davis Square	Sullivan Square & Assembly Square Mall	Wellington Station
91	Sullivan Square Station	Washington Street	Central Square (Cambridge)
92	Assembly Square Mall	Sullivan Square, Main Street, and Haymarket Station	Downtown Boston
93	Sullivan Square Station	Bunker Hill Street & Haymarket Station	Downtown Boston
95	West Medford	Mystic Avenue	Sullivan Square Station
101	Malden Center Station	Salem Street, Main Street, and Broadway	Sullivan Square Station
104	Malden Center Station	Ferry Street & Broadway (in Everett)	Sullivan Square Station
105	Malden Center Station	Newland Street Housing & Main Street	Sullivan Square Station
109	Linden Square	Everett Square & Broadway (in Everett)	Sullivan Square Station
CT2	Sullivan Square Station	Union Square, Kendall/MIT, and Longwood Medical Area	Sullivan Square Station

As indicated in the table above, there are numerous MBTA bus routes in the vicinity of the project site. Furthermore, the Orange Line at the Sullivan Square Station provides fast and convenient access to downtown Boston, and provides connections to the entire MBTA public transportation system. The close and easy access to the extensive MBTA network is expected to be a primary consideration for residents of the project site.

5. Safety Analysis

To identify vehicle crash trends at the study intersections, accident data was obtained from MassDOT for the three latest years on record, 2008 – 2010. Crash rates for intersections are calculated based upon the number of crashes at an intersection and the volume of traffic travelling through an intersection on a daily basis. The MassDOT average crash rates are based upon the average number of crashes occurring per million vehicles entering signalized and unsignalized intersections. The average crash rates for MassDOT District 4 (which includes the City of Somerville) are 0.77 and 0.58 for signalized and unsignalized intersections, respectively. The MassDOT statewide average crash rates are 0.80 and 0.60 for signalized and unsignalized intersections, respectively. The crash data for all study intersections are summarized in Table 2.

Table 2: Summary of Accident Data

Intersection	2008	2009	2010	Total	Crash Rate
Broadway / Lombardi St / Mt. Vernon Street	2	1	1	4	0.21
Broadway / Mt. Pleasant Street	1	0	0	1	0.10
Broadway / Caldwell Street	0	0	0	0	0.00

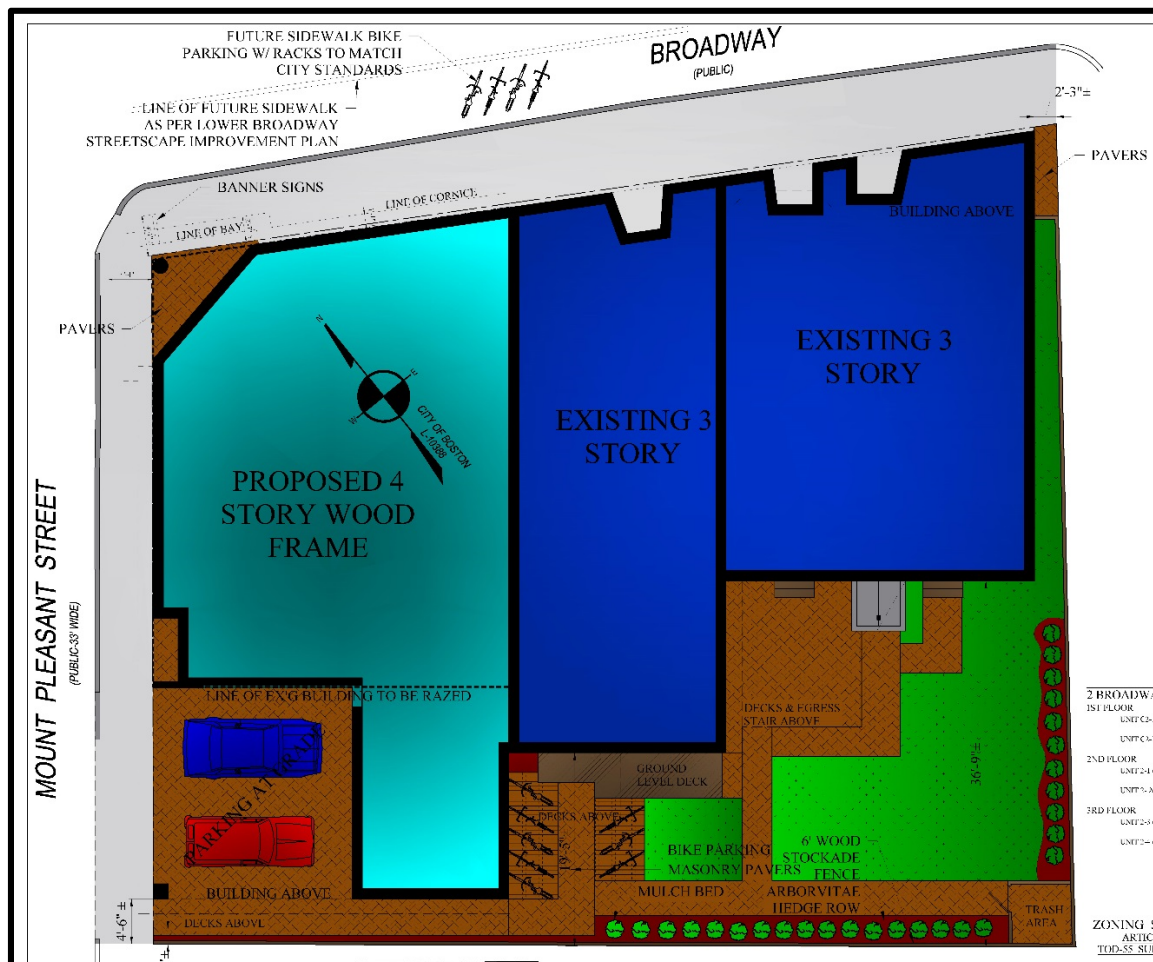
As indicated in Table 2, the crash rate at each study intersection is below the MassDOT District 4 average and below the statewide average crash rate. The MassDOT intersection crash rate worksheets are provided in Appendix B.

It is noted that the Somerville Police Department was contacted to obtain local police accident records for the three study intersection. At the time of this writing, the Somerville Police Department has not responded with the requested data. As such, only the MassDOT crash history data were used in this analysis.

6. Future Conditions

Project Site

The project proponent proposes to renovate the two existing three-story buildings located at 2 Broadway and 4 Broadway. The existing single-story building located at 8 Broadway will be demolished, and a new four-story building is proposed in its place. Across the three buildings, a total of 3,239 SF of commercial space and 11 residential units is proposed. An architectural site plan of the proposed buildings at 2-8 Broadway is shown below.



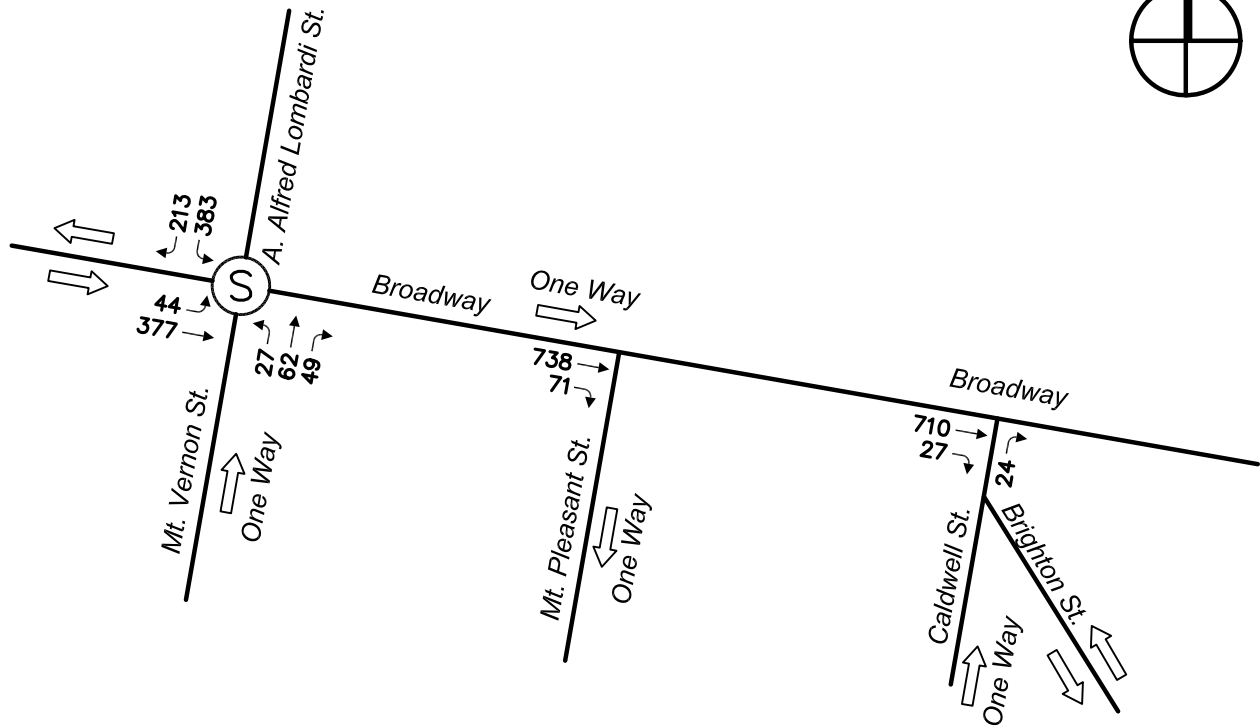
Proposed site plan, prepared by Choo & Company, Inc.

Future Traffic Volumes

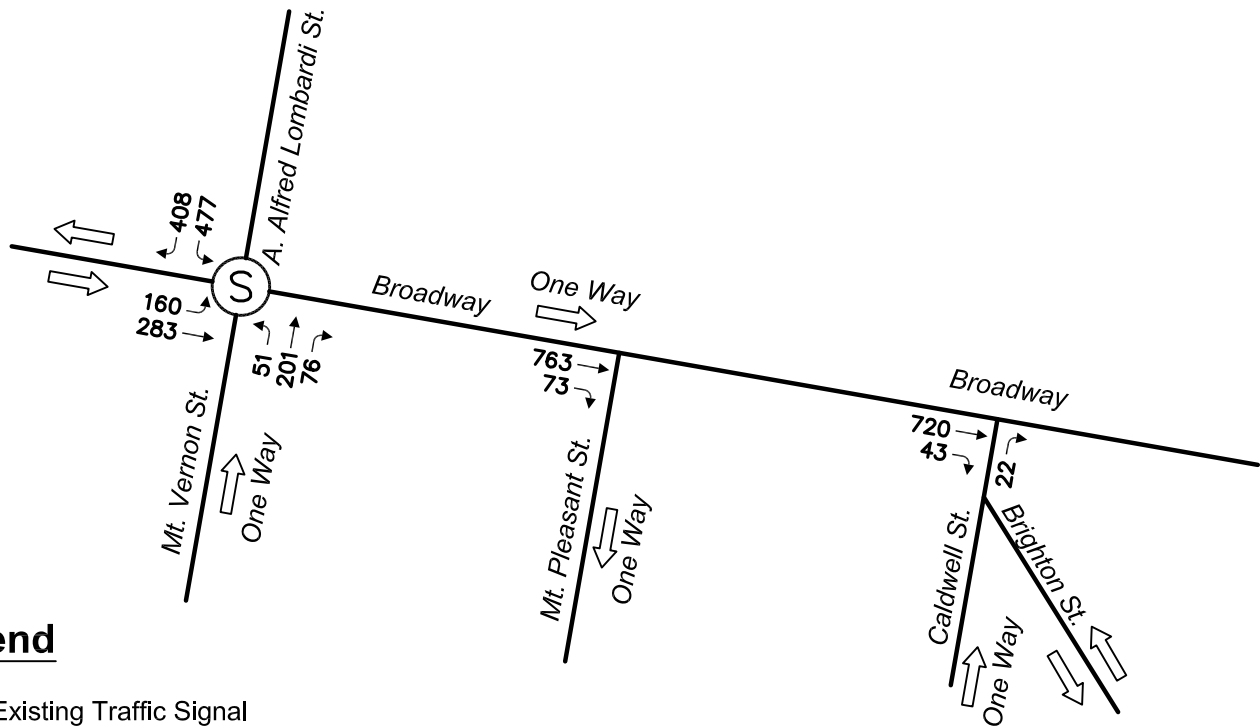
The existing 2013 traffic volumes at the Broadway / Mt. Vernon Street / Lombardi Street intersection were compared to peak hour traffic counts collected in 2006 as part of the Assembly Square Traffic Impact Study. The results of this comparison indicate that over the past seven years, traffic volumes in the vicinity of the project side of *decreased* by an average of 1.9% per year during the weekday morning peak hour and *decreased* by an average of 0.8% per year during the weekday afternoon peak hour.

However, to present a conservative analysis of the future analysis year, a 5-year projection to the year 2018, DCI has increased the 2013 peak hour vehicle volumes by an annual growth factor of 1%. The resultant 2018 Future No-Build peak hour intersection volume projections are shown in Figure 3.

Weekday Morning Peak Hour



Weekday Afternoon Peak Hour



Legend

(S) Existing Traffic Signal

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(617) 776-3350

2-8 Broadway
Somerville, MA

2018 No-Build
Peak Hour
Traffic Volumes

Figure 3

Project-Generated Vehicle-Trips

To estimate the trip generation characteristics of the proposed development project, the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th edition, 2012) was used. This manual provides vehicle-trip generation projections for various land-uses, based on research and data conducted by public agencies, developers, consulting firms, and professional associations. The trips generated by the proposed project were estimated through the use of the trip generation rates for ITE Land Use 220 (Apartments) and ITE Land Use 826 (Specialty Retail Center). The vehicle-trip generation for the proposed project was also compared to the vehicle-trip generation for the existing buildings at the project site. Lastly, the net new vehicle-trips were reduced by 10% due to the very close proximity of various public transportation options (discussed previously). As this project site is very well served, it is likely that this 10% estimate is low, and that this trip generation analysis represents a conservatively high estimate of the expected vehicle-trips coming to and from the project site. Table 3 summarizes the proposed trip generation for this development project. Complete trip generation calculations are provided in Appendix C.

Table 3: Trip Generation Summary

	Weekday Morning Peak Hour (vehicle-trips)			Weekday Afternoon Peak Hour (vehicle-trips)			Daily Trips
	Enter	Exit	Total	Enter	Exit	Total	Total
Existing Land Use							
6 Residential Units ⁽¹⁾	1	2	3	3	1	4	40
4,187 SF of retail space ⁽²⁾	2	1	3	5	6	11	186
Existing Total	3	3	6	8	7	15	226
Proposed Land Use							
11 Residential Units ⁽¹⁾	1	5	6	5	2	7	73
3,239 SF of retail space ⁽²⁾	1	1	2	4	5	9	144
Proposed Total	2	6	8	9	7	16	217
Net New Vehicle-Trips (Unadjusted)	-1	3	2	1	0	1	-9
10% Reduction ⁽³⁾	0	0	0	0	0	0	-1
Net New Vehicle-Trips	-1	3	2	1	0	1	-10

⁽¹⁾ Based on ITE Land Use 220 – Apartments

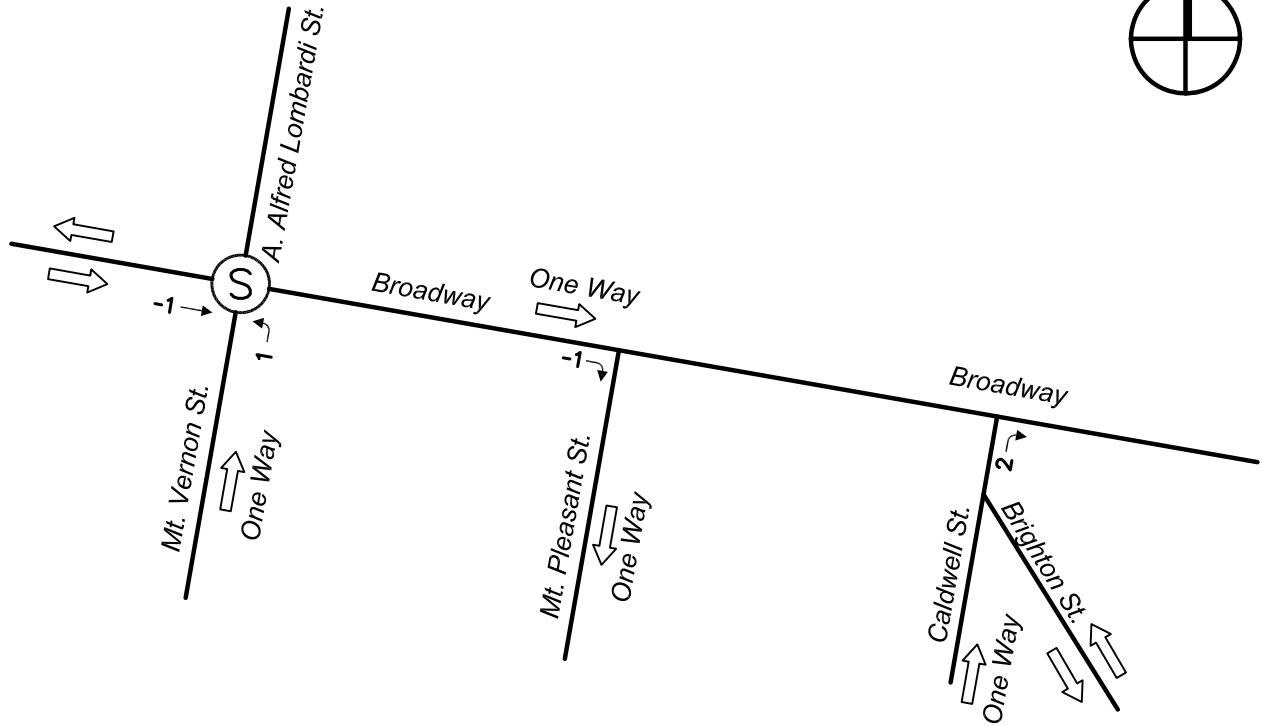
⁽²⁾ Based on ITE Land Use 826 – Specialty Retail Center

⁽³⁾ Adjustment due to proximity to public transportation

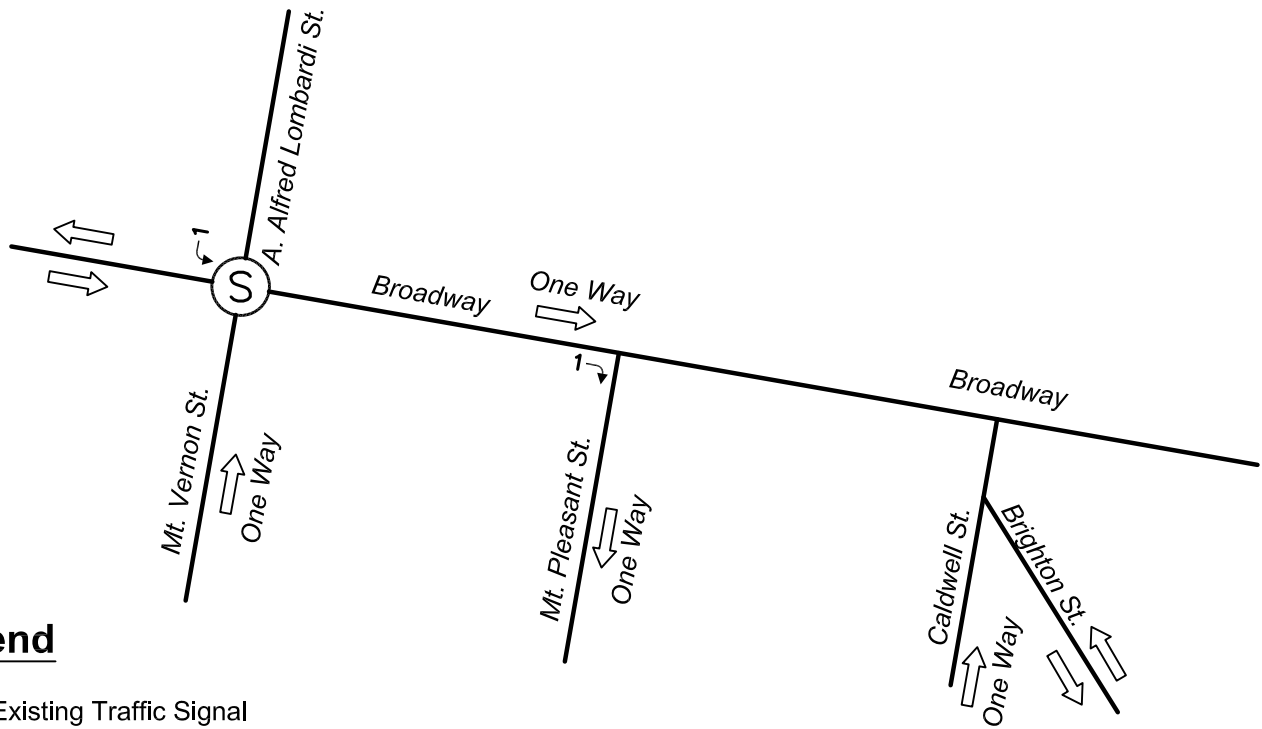
As indicated in Table 3, the proposed development project is expected to generate a total of two (2) net new vehicle-trips during the weekday morning peak hour, one (1) net new vehicle-trip during the weekday afternoon peak hour, and 10 fewer vehicle-trips over the course of a typical weekday relative to the existing land uses. It is noted that these peak hour vehicle-trips would represent an increase of 0.1% to 0.3% over the existing peak hour traffic volumes. These additional traffic volumes are generally less than the daily variation of traffic already on Broadway.

The project-generated vehicle trips, shown in Table 3, were then distributed onto the roadway network, using existing travel patterns. The net new site-generated vehicle trips are displayed in Figure 4, and the 2018 Future Build Peak Hour traffic volumes are shown in Figure 5. It is noted that where the net new vehicle-trips result in a fewer trips being generated than the existing land use, the 2018 future traffic volumes were reduced, as the existing buildings are currently unoccupied.

Weekday Morning Peak Hour



Weekday Afternoon Peak Hour



Legend

(S) Existing Traffic Signal

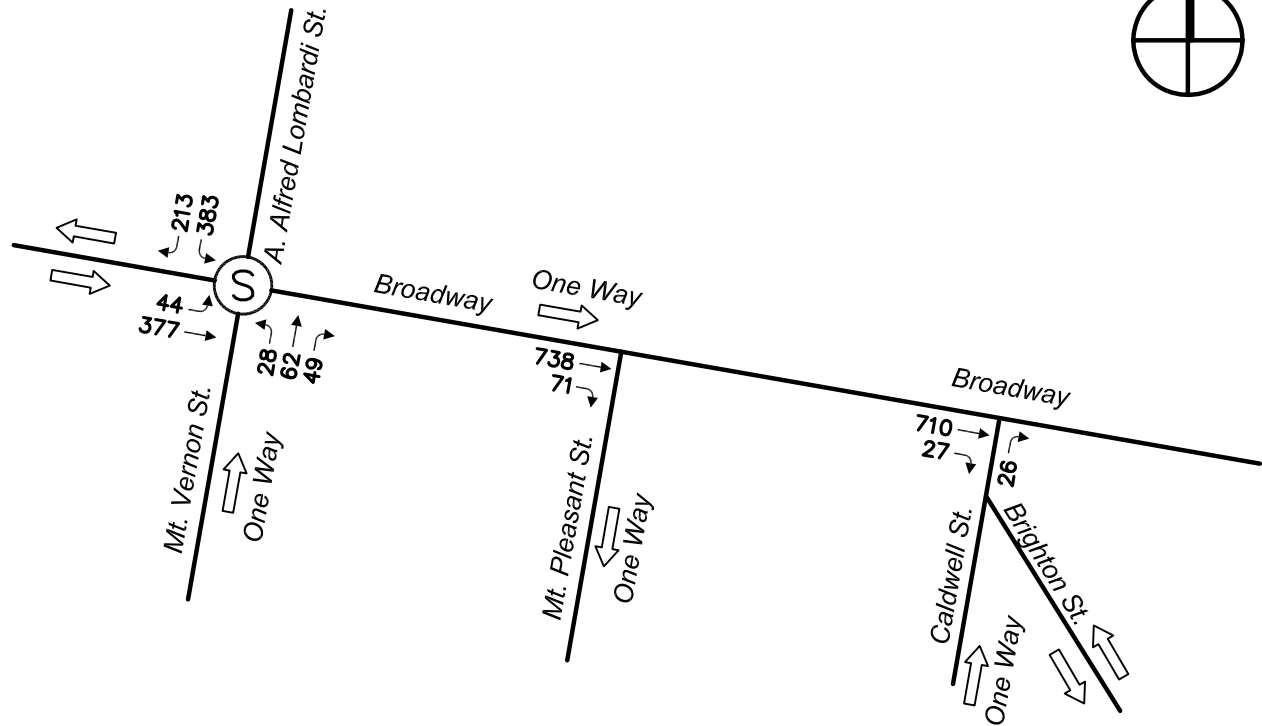
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(617) 776-3350

2-8 Broadway
Somerville, MA

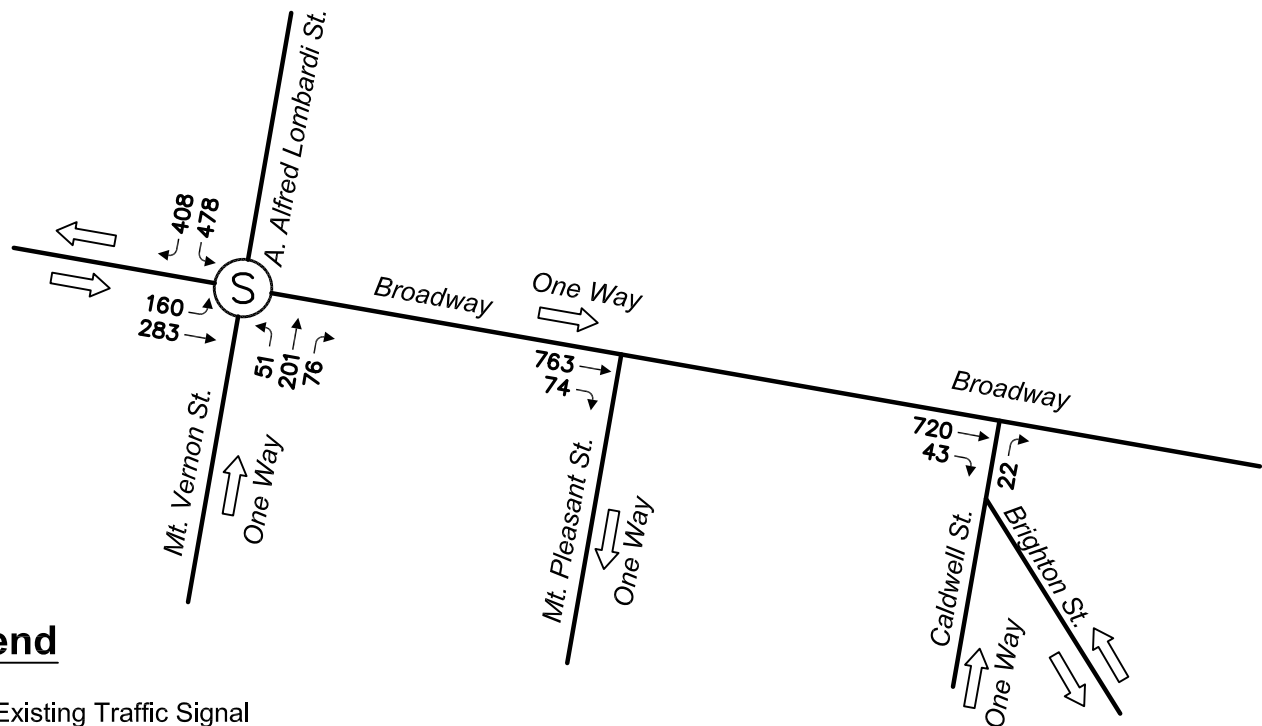
Site-Generated
Vehicle-Trips

Figure 4

Weekday Morning Peak Hour



Weekday Afternoon Peak Hour



Legend

(S) Existing Traffic Signal

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Consulting Engineers and Surveyors

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(617) 776-3350

2-8 Broadway
Somerville, MA

2018 Build
Peak Hour
Traffic Volumes

Figure 5

7. Parking

The existing project site at 2-8 Broadway has one small informal parking lot that has room for approximately two (2) off-street parking spaces. The proposed site plan for 2-8 Broadway will maintain two off-street parking spaces. Access to these two off-street parking spaces will be provided via the existing curb cut on Mount Pleasant Street.

The off-street parking requirements for projects in a TOD zone are one parking space per residential unit. The commercial space and six (6) of the residential units are existing, therefore the only required additional off-street parking is one space for each of the new five (5) residential units. The project proponent is seeking zoning relief for these five (5) off-street parking spaces.

Consequently, an on-street parking utilization study of the surrounding streets was conducted. This parking study included portions of Broadway, Mt. Vernon Street, Mt. Pleasant Street, Caldwell Street, and Brighton Street. The municipal parking lot on the north side of Broadway was also included in the parking study area. The figure below shows the areas that were included in the on-street parking study area.



On-Street Parking Study Area

The number of parked vehicles and the number of free spaces were observed during a typical weekday during the following time periods: 6:00-8:00am, 12:00-2:00pm, and 5:00-7:00pm. Additional parking observations were conducted on a Saturday between 11:00am and 2:00pm. The parking data were collected on Thursday, May 2, 2013 and on Saturday, May 4, 2013. Table 4 summarizes the results of this on-street parking study.

Table 4: Summary of On-Street Parking Study

Street	Side	Parking Type	Total No. of Spaces	Average No. of Available Parking Spaces ⁽¹⁾			
				Weekday			Saturday
				AM	Mid-Day	PM	Mid-Day
Broadway	North	unrestricted	2	1	0	1	0
	South	5 metered 3 unrestricted	8	6	3	4	3
Broadway Municipal Parking Lot		metered	9	9	2	4	4
		Zipcar parking only	1	0	0	0	0
Mt. Vernon St	West	residential permit	19	4	3	6	6
		unrestricted	3	0	0	0	1
	East	<i>no parking</i>	-	-	-	-	-
Mt. Pleasant St	West	residential permit	20	2	2	0	3
		metered	3	3	2	3	2
	East	<i>no parking</i>	-	-	-	-	-
Caldwell St	West	<i>no parking</i>	-	-	-	-	-
	East	<i>no parking</i>	-	-	-	-	-
Brighton St	West	<i>no parking</i>	-	-	-	-	-
	East	<i>no parking</i>	-	-	-	-	-
Total Study Area		metered/unrestricted	25	19	7	12	10
		residential permit	39	6	5	6	9
		Zipcar parking only	1	0	0	0	0
		Total	65	25	12	18	19

⁽¹⁾ The average number of available parking spaces is an average of all observations within each observation period

In addition to the parking spaces summarized in the table above, there are also two loading zone spaces on the south side of Broadway between George Street and Mt. Vernon Street. These two loading spaces are restricted Monday-Saturday between 8am and 6pm. Outside of those hours, these two loading spaces are available for public parking.

As indicated in Table 4, there were a total of 5-6 available resident-only parking spaces on Mt. Vernon and Mt. Pleasant Street during all observation periods on a typical weekday. During the Saturday Mid-Day period, there were an average of nine (9) available resident-only parking spaces. During the weekday morning observation period, it was noted that residents from other neighborhoods within Somerville drive to Mt. Pleasant Street and/or Mt. Vernon Street, park their vehicle, and then walk to the nearby Sullivan Station. This causes additional demand for residential parking spaces from beyond the residents of the immediate neighborhood. However, this behavior is also indicative of the very convenient public transportation options that are readily available within a short walking distance of the project site. In aggregate, there

were an average of 25 available parking spaces during the weekday morning period, and average of 12 available parking spaces during the weekday mid-day period, and an average of 18 available parking spaces during the weekday evening period. During the Saturday mid-day observations, there were an average of 19 total available parking spaces. It is expected that the available on-street parking supply will be sufficient to accommodate the proposed project. The complete data from the parking study are included in the attached Appendix D.

It is also noted that throughout each observation period, the single Zipcar only parking space was occupied. This indicates that the short-term car rental vehicle parked in this Zipcar space is often available for residents of this neighborhood to use.

8. Transportation Demand Management

The project site at 2-8 Broadway is very well situated to minimize reliance on automobiles as a primary mode of transportation. The project proponent will encourage residents of the sites to use the following modes, rather than travel by a single-occupancy vehicle.

1. Public Transportation. Given the very close proximity of both high-speed subway and numerous bus routes, public transportation is likely to be the primary method of travel to and from the project site.
2. Walking. The neighborhood surrounding the project site is very walkable. This is supported by the high numbers of pedestrians already walking in the area (see Figure 2 for existing pedestrian volumes). There are many public transportation options with a short walking distance, as well as various commercial establishments along Broadway. The tenants of the commercial portion of the project site will also likely benefit from the high level of pedestrian traffic already walking past the project site.
3. Bicycle. As discussed previously, the portion of Broadway from the McGrath Highway to the Boston City Line is currently being reconstructed. When this is completed, Broadway will have a 5-foot wide bicycle lane in each direction. Furthermore, secure bicycle parking will be provided for the residents of 2-8 Broadway, as shown previously in this report on the site plan.
4. Short-term Vehicle Rental. There is a dedicated Zipcar space in the municipal parking lot on the north side of Broadway. The project site is located approximately 250 feet from this dedicated Zipcar parking space. As noted in the parking study results, this Zipcar was observed to be available at almost all times. Therefore, it is deemed to be a reasonable and convenient alternative to replace vehicle-ownership.

All of the above alternative transportation options are likely to be more favorable and convenient than using an automobile for traveling to and from the project site. It is likely that these forms of transportation will all take precedence over automobiles as the preferred mode of transportation, and vehicular travel will be minimal.

9. Conclusion

The various traffic operation, safety analyses, and parking utilization data that have been included in this report all indicate that the proposed 11 residential units and 3,239 SF of commercial space at 2-8 Broadway will have minimal impacts to the surrounding roadways and intersections. The trip generation analysis indicates that the expected number of vehicle-trips traveling to and from the site will be minimal and is not expected to significantly impact traffic operations at any of the study intersection. Furthermore, the project site is ideally located with respect to public transportation and walkable amenities within the neighborhood. This location, together with the active encouragement from the project proponent is expected to minimize the number of new vehicle-trips generated by the proposed project.

Appendices

Appendix A: Traffic Count Data

Appendix B: Crash Rate Worksheets

Appendix C: Trip Generation Calculations

Appendix D: Parking Utilization Data

Appendix A

Traffic Count Data



Design Consultants, Inc.

Consulting Engineers and Surveyors



120 MIDDLESEX AVE · SOMERVILLE, MA 02145 · (617) 776-3350

LOCATION: Broadway / Mt. Pleasant St / Caldwell St

TIME: 7:00 - 9:00 AM

DATE: Thursday, May 2, 2013

WEATHER: cool, sunny

PROJ NO.: 2013-040

SHEET NO.:

CALCULATED BY: B. Pyburn

NOTES:

TIME	Broadway at Mt. Vernon Street							Broadway at Mt. Pleasant Street		Broadway at Caldwell Street		
	Broadway - EB		Mt. Vernon - NB			A. Alfred Lombardi Dr - SB		Broadway - EB		Broadway - EB		Caldwell St - NB
	Left	Thru	Left	Thru	Right	Left	Right	Thru	Right	Thru	Right	Right
7:00-7:15am	16	62	5	12	13	51	21	119	7	115	4	2
7:15-7:30am	9	67	4	7	13	68	33	137	11	134	3	8
7:30-7:45am	15	80	4	19	7	82	46	152	17	144	8	7
7:45-8:00am	13	107	5	14	15	92	46	199	15	190	9	5
8:00-8:15am	8	81	11	12	11	98	43	172	18	166	6	8
8:15-8:30am	6	91	6	14	14	92	68	179	18	176	3	3
8:30-8:45am	11	91	3	10	16	68	45	163	12	151	12	7
8:45-9:00am	21	86	6	10	9	103	53	185	13	178	7	6

TIME	across Mt. Vernon Street		across west leg of Broadway		across east leg of Broadway		across A. Alfred Lombardi Dr		across Mt. Pleasant Street		across Caldwell Street	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
7:00-7:15am	16		3		3							
7:15-7:30am	25		0		1							
7:30-7:45am	34		4		2							
7:45-8:00am	17		1		7							
8:00-8:15am	26		3		5							
8:15-8:30am	25		2		6							
8:30-8:45am	25		5		12							
8:45-9:00am	26		5		10							

Design Consultants, Inc.

Consulting Engineers and Surveyors



120 MIDDLESEX AVE · SOMERVILLE, MA 02145 · (617) 776-3350

LOCATION: Broadway / Mt. Pleasant St / Caldwell St

TIME: 4:00 - 6:00 PM

DATE: Thursday, May 2, 2013

WEATHER: cool & cloudy

PROJ NO.: 2013-040

SHEET NO.:

CALCULATED BY: J. Sobel

NOTES:

TIME	Broadway at Mt. Vernon Street							Broadway at Mt. Pleasant Street		Broadway at Caldwell Street		
	Broadway - EB		Mt. Vernon - NB			A. Alfred Lombardi Dr - SB		Broadway - EB		Broadway - EB		Caldwell St - NB
	Left	Thru	Left	Thru	Right	Left	Right	Thru	Right	Thru	Right	Right
4:00-4:15pm	25	55	9	29	18	92	76	149	16	143	6	3
4:15-4:30pm	29	63	4	36	17	101	96	158	23	154	4	2
4:30-4:45pm	49	63	10	46	20	104	105	169	18	162	7	4
4:45-5:00pm	35	60	15	41	18	114	99	180	12	168	12	5
5:00-5:15pm	31	69	8	49	15	117	114	182	19	172	10	6
5:15-5:30pm	37	77	16	55	19	119	70	195	20	183	12	6
5:30-5:45pm	37	77	10	52	21	108	85	189	17	176	13	5
5:45-6:00pm	18	66	7	43	8	109	74	167	16	158	9	4

TIME	across Mt. Vernon Street		across west leg of Broadway		across east leg of Broadway		across A. Alfred Lombardi Dr		across Mt. Pleasant Street		across Caldwell Street	
	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes
4:00-4:15pm	19	2	5		2	2	0	1				
4:15-4:30pm	41		1		10		4	1				
4:30-4:45pm	27		3		1		1					
4:45-5:00pm	50		2	2	0		1					
5:00-5:15pm	55		0		6		6					
5:15-5:30pm	67		6		6		2					
5:30-5:45pm	43	1	5		2		0					
5:45-6:00pm	50		4		7		0					

Broadway at Mt. Vernon Street

TIME	Broadway - EB				Mt. Vernon - NB				A. Alfred Lombardi Dr - SB			
	Left	Thru	app. Total	Left	Thru	Right	app. Total	Left	Right	app. Total	Int. Total	
7:00-7:15am	16	62	78	5	12	13	30	51	21	72	180	
7:15-7:30am	9	67	76	4	7	13	24	68	33	101	201	
7:30-7:45am	15	80	95	4	19	7	30	82	46	128	253	
7:45-8:00am	13	107	120	5	14	15	34	92	46	138	292	926
8:00-8:15am	8	81	89	11	12	11	34	98	43	141	264	1010
8:15-8:30am	6	91	97	6	14	14	34	92	68	160	291	1100
8:30-8:45am	11	91	102	3	10	16	29	68	45	113	244	1091
8:45-9:00am	21	86	107	6	10	9	25	103	53	156	288	1087
7:30-8:30am	42	359	401	26	59	47	132	364	203	567	1100	
PHF	0.70000	0.83879	0.83542	0.59091	0.77632	0.78333	0.97059	0.92857	0.74632	0.88594	0.94178	

Broadway at Mt. Vernon Street

TIME	Broadway - EB				Mt. Vernon - NB				A. Alfred Lombardi Dr - SB			
	Left	Thru	app. Total	Left	Thru	Right	app. Total	Left	Right	app. Total	Int. Total	
4:00-4:15pm	25	55	80	9	29	18	56	92	76	168	304	
4:15-4:30pm	29	63	92	4	36	17	57	101	96	197	346	
4:30-4:45pm	49	63	112	10	46	20	76	104	105	209	397	
4:45-5:00pm	35	60	95	15	41	18	74	114	99	213	382	1429
5:00-5:15pm	31	69	100	8	49	15	72	117	114	231	403	1528
5:15-5:30pm	37	77	114	16	55	19	90	119	70	189	393	1575
5:30-5:45pm	37	77	114	10	52	21	83	108	85	193	390	1568
5:45-6:00pm	18	66	84	7	43	8	58	109	74	183	325	1511
4:30-5:30pm	152	269	421	49	191	72	312	454	388	842	1575	
PHF	0.77551	0.87338	0.92325	0.76563	0.86818	0.90000	0.86667	0.95378	0.85088	0.91126	0.97705	

Appendix B

Crash Rate Worksheets

[Traffic & Safety Engineering Home](#) [Print this page](#)[<<back](#) | [1](#) | [2](#)[Accessible Pedestrian Signal Installation Policy](#)

Average Crash Rates

[Accident \(Crash\) Data](#)*Crash information queried on January 23, 2013*[Approved Signal Controls](#)

Intersection - Crashes per million entering vehicles

[Crash Rates](#)[Guide Sign Policy for Secondary State Highways](#)[Management Plans \(Flaggers and Police Details\)](#)[Massachusetts Amendments to the Federal MUTCD](#)[25% Design Submission Guidelines and Traffic Analysis Tools](#)[Mast Arm and Foundation Details Standard Drawings](#)[Road Safety Audits](#)[Roadway Safety Tips](#)[Speed Limit Regulations](#)[Strategic Highway Safety Plan](#)[Supplemental Sign Policy](#)[Top Crash Location Reports and Maps](#)[Traffic Safety Toolbox](#)

Location	Signalized Intersections	Unsignalized Intersections
Statewide	0.80	0.60
District 1*	0.92*	0.43*
District 2	0.82	0.68
District 3	0.89	0.66
District 4	0.77	0.58
District 5	0.77	0.58
District 6	0.76	0.58

* - District 1 should use Statewide Rates due to low sample total

2010 Functional Classification - crashes per million vehicle miles traveled

	Roadway Federal Functional Classification	Rural	Urban
Speed Limit Regulations	Statewide	0.92	1.95
Strategic Highway Safety Plan	Interstate	0.39	0.55
Supplemental Sign Policy	Principal arterial - other freeways and expressways	0.33	0.64
Top Crash Location Reports and Maps	Principal arterial - other	0.65	3.23
Traffic Safety Toolbox	Minor arterial	0.96	3.63
	Major collector	1.58	3.80
	Minor collector	2.36	-
	Local	1.35	1.87

Notes on Functional Classification Data

- Crash rates are based solely on Geocoded Crashes (*approximately 94% of all Crashes in the system but not uniformly Geocoded by Functional Classification*)
- If a crash occurred at an intersection or along two different functional classifications, the crash was assigned to the higher order roadway.
- Source of VMTs: <http://www.fhwa.dot.gov/policyinformation/statistics/2010/vm2.cfm>

[Translation Support](#)

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Somerville, MA COUNT DATE : May 2, 2013

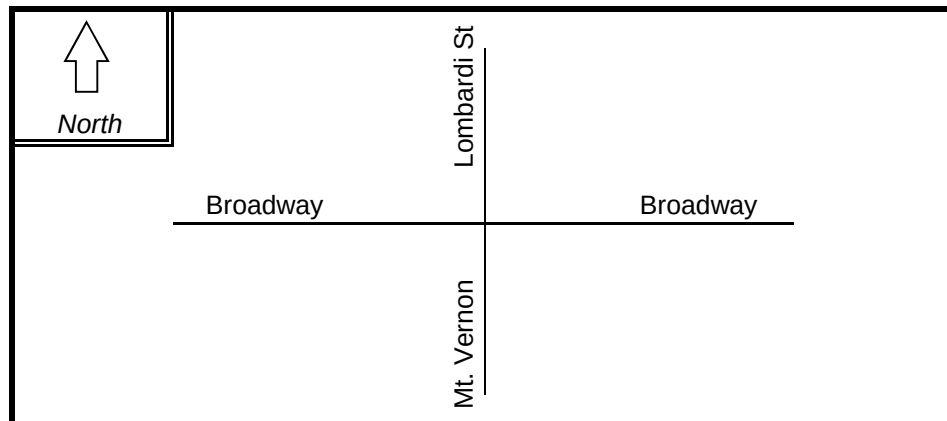
DISTRICT : 4 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : Broadway

MINOR STREET(S) : Lombardi Street / Mt. Vernon Street

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	NB	SB			
PEAK HOURLY VOLUMES (PM) :	421	312	842			1,575

" K " FACTOR : 0.090 INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : 17,500

TOTAL # OF CRASHES : 4 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (A) : 1.33

CRASH RATE CALCULATION :

0.21

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT District 4 average crash rate = 0.77 (signalized)

Project Title & Date : 2-8 Broadway, Somerville

May 13, 2013

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Somerville, MA COUNT DATE : May 2, 2013

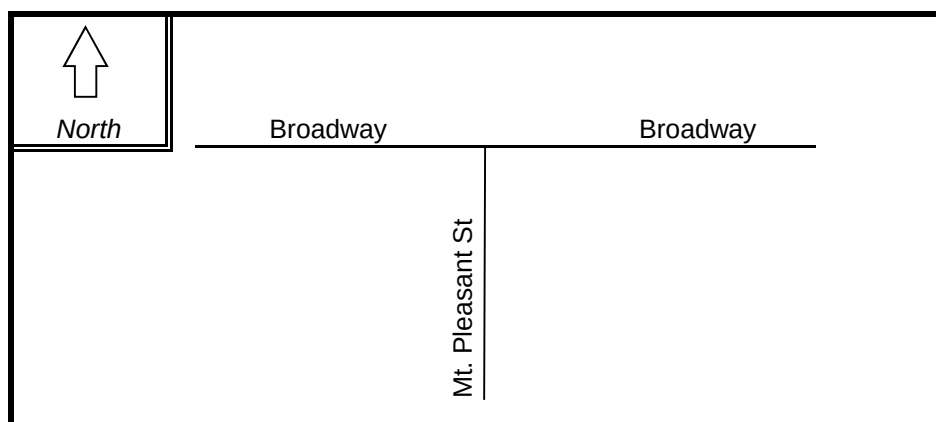
DISTRICT : 4 UNSIGNALIZED : ☒ SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : Broadway

MINOR STREET(S) : Mt. Pleasant Street

**INTERSECTION
DIAGRAM
(Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB					
PEAK HOURLY VOLUMES (PM) :	795					795

" K " FACTOR :

0.090

INTERSECTION ADT (V) = TOTAL DAILY
APPROACH VOLUME :

8,833

TOTAL # OF CRASHES :

1

OF
YEARS :

3

AVERAGE # OF
CRASHES PER YEAR (A) :

0.33

CRASH RATE CALCULATION :

0.10

RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : MassDOT District 4 average crash rate = 0.58 (unsignalized)

Project Title & Date : 2-8 Broadway, Somerville

May 13, 2013

Appendix C

Trip Generation Calculations

Design Consultants, Inc.

July 8, 2013

2-8 Broadway

Trip Generation Calculations

Based on ITE's Trip Generation Manual, 9th Edition (2012)

Proposed

Land Use: 220, Apartment

number of units: 11

	AM Peak	PM Peak	Weekday Daily
Average Rate (per num. of dwelling units)	0.51	0.62	6.65
Percent Entering	20%	65%	50%
Percent Exiting	80%	35%	50%
Total Trips	6	7	73
Entering Trips	1	5	37
Exiting Trips	5	2	36

Existing

Land Use: 220, Apartment

number of units: 6

	AM Peak	PM Peak	Weekday Daily
Average Rate (per num. of dwelling units)	0.51	0.62	6.65
Percent Entering	20%	65%	50%
Percent Exiting	80%	35%	50%
Total Trips	3	4	40
Entering Trips	1	3	20
Exiting Trips	2	1	20

Proposed

Land Use: 826, Specialty Retail Center

gross leasable area: 3,239 SF

	AM Peak *	PM Peak	Weekday Daily
Average Rate (per 1,000 SF)	0.70	2.71	44.32
Percent Entering	62%	44%	50%
Percent Exiting	38%	56%	50%
Total Trips	2	9	144
Entering Trips	1	4	72
Exiting Trips	1	5	72

Existing

Land Use: 826, Specialty Retail Center

gross leasable area: 4,187 SF

	AM Peak *	PM Peak	Weekday Daily
Average Rate (per 1,000 SF)	0.70	2.71	44.32
Percent Entering	62%	44%	50%
Percent Exiting	38%	56%	50%
Total Trips	3	11	186
Entering Trips	2	5	93
Exiting Trips	1	6	93

* Land Use 826, Specialty Retail Center does not contain any data regarding trips made during the AM peak hour of the adjacent street traffic. To estimate the trips in the AM peak hour of the adjacent street traffic, the Shopping Center (Land Use 820) land use was used. The ratio of the average rate in the AM peak hour of the adjacent street traffic (0.96) to the average rate in the PM peak hour of the adjacent street traffic (3.71) was applied to the average rate PM peak hour rate of Land Use 826. The percent entering/exiting from Land Use 820 was also used.

Proposed

Total Site Trips (unadjusted)

	AM Peak	PM Peak	Weekday Daily
Total Trips	8	16	217
Entering Trips	2	9	109
Exiting Trips	6	7	108

Existing

Total Site Trips (unadjusted)

	AM Peak	PM Peak	Weekday Daily
Total Trips	6	15	226
Entering Trips	3	8	113
Exiting Trips	3	7	113

Total **New** Site Trips(Proposed less Existing)

	AM Peak	PM Peak	Weekday Daily
Total Trips	2	1	-9
Entering Trips	-1	1	-4
Exiting Trips	3	0	-5

Total **New** Site Trips

(10% reduction due to proximity to public trans.)

	AM Peak	PM Peak	Daily
Total Trips	2	1	-10
Entering Trips	-1	1	-4
Exiting Trips	3	0	-6

Appendix D

Parking Study Data

Site Location: 2-8 Broadway

City: Somerville, MA

Date: Thursday, May 2, 2013

Weather: warm and sunny

Proj. No.: 2013-040

Sheet No.:

Field Tech.:

Notes:

Street		Weekday - Number of Parked Cars															
		5:00 - 7:00 pm															
		5:00 - 5:05 pm	5:06 - 5:11 pm	5:12 - 5:17 pm	5:17 - 5:23 pm	5:24 - 5:30 pm	5:30 - 5:36 pm	5:36 - 5:42 pm	5:42 - 5:48 pm	5:50 - 5:55 pm	5:55 - 6:00 pm	6:00 - 6:05 pm	6:15 - 6:20 pm	6:30 - 6:35 pm	6:45 - 6:50 pm		
Broadway	South	2	2	1	0	1	0	1	1	1	1	1	1	2	2		
	North	2	2	2	2	2	1	1	1	1	1	1	1	2	2		
Broadway	South	6	3	3	3	3	2	2	2	2	2	3	3	6	6		
	North	9	4	4	5	6	5	5	5	4	4	4	4	5	5		
Broadway	South	1	1	1	1	1	1	1	1	1	1	1	1	0	0		
	West	3	1	2	2	2	1	1	1	2	2	2	2	1	2		
Mt. Vernon Street	South	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
	West	9	6	7	7	7	7	7	7	7	7	7	6	6	6		
Mr. Pleasant Street	East	0															
	West	10	6	6	8	7	5	6	6	7	7	6	8	7	8		
Caldwell Street	East	0															
	West	20	20	20	20	20	20	20	20	20	18	18	20	20	19		
Brighton Street	East	3	1	1	1	0	0	0	0	0	0	0	0	0	0		
	West	0															
Caldwell Street	East	0															
	West	0															
Caldwell Street	East	0															
	West	0															

[illegible]



						Average Number of Parked Cars			
						Weekday			Saturday
Street	Side	From	To	Notes	Total No. of Spaces	AM	Mid-Day	PM	Mid-Day
Broadway	South	George Street	Mt. Vernon Street	1 metered space 1 non-metered space 2 loading zone spaces (Mon-Sat, 8am-6pm)	2	1.3333	2.0000	1.0714	1.4667
	North	George Street	Mt. Vernon Street	non-metered	2	1.0000	2.0000	1.5000	2.0000
Broadway	South	Mt. Vernon Street	Mt. Pleasant Street	4 metered spaces + 2 non-metered	6	0.4444	3.3333	3.0714	3.6667
	North	Municipal Parking Lot		9 metered spaces 1 zip car space	9 1	0.2222 1.0000	6.5556 1.0000	4.6429 0.8571	5.4000 0.9333
Broadway	South	Mt. Pleasant Street	Caldwell Street	metered parking	3	0.0000	1.4444	1.5714	0.2000
Mt. Vernon Street	West	Broadway	Lincoln Avenue	non-metered, non-permit	3	3.0000	2.6667	3.0000	1.5333
				residential permit only	9	7.7778	8.1111	6.7143	5.4667
	East	Broadway	Lincoln Avenue	no parking					
	West	Perkins Street	Lincoln Avenue	residential permit only	10	7.2222	8.1111	6.6429	7.4667
Mr. Pleasant Street	East	Perkins Street	Lincoln Avenue	no parking					
	East	Broadway	Perkins Street	no parking					
	West	Broadway	Perkins Street	residential permit only	20	18.3333	18.1111	19.6429	17.4000
				metered parking	3	0.3333	1.0000	0.2857	0.7333
Caldwell Street	East	Broadway	Perkins Street	no parking					
	West	Broadway	Perkins Street	no parking					
Brighton Street	East	Caldwell Street	south end of parking garage	no parking					
	West	Caldwell Street	south end of parking garage	no parking					

						Average Number of Available Spaces			
						Weekday			Saturday
Street	Side	From	To	Notes	Total No. of Spaces	AM	Mid-Day	PM	Mid-Day
Broadway	South	George Street	Mt. Vernon Street	1 metered space 1 non-metered space 2 loading zone spaces (Mon-Sat, 8am-6pm)	2	0.6667	0.0000	0.9286	0.5333
	North	George Street	Mt. Vernon Street	non-metered	2	1.0000	0.0000	0.5000	0.0000
Broadway	South	Mt. Vernon Street	Mt. Pleasant Street	4 metered spaces + 2 non-metered	6	5.5556	2.6667	2.9286	2.3333
	North	Municipal Parking Lot		9 metered spaces	9	8.7778	2.4444	4.3571	3.6000
				1 zip car space	1	0.0000	0.0000	0.1429	0.0667
Broadway	South	Mt. Pleasant Street	Caldwell Street	metered parking	3	3.0000	1.5556	1.4286	2.8000
Mt. Vernon Street	West	Broadway	Lincoln Avenue	non-metered, non-permit	3	0.0000	0.3333	0.0000	1.4667
				residential permit only	9	1.2222	0.8889	2.2857	3.5333
	East	Broadway	Lincoln Avenue	no parking					
	West	Perkins Street	Lincoln Avenue	residential permit only	10	2.7778	1.8889	3.3571	2.5333
Mr. Pleasant Street	East	Perkins Street	Lincoln Avenue	no parking					
	East	Broadway	Perkins Street	no parking					
	West	Broadway	Perkins Street	residential permit only	20	1.6667	1.8889	0.3571	2.6000
metered parking				3	2.6667	2.0000	2.7143	2.2667	
Caldwell Street	East	Broadway	Perkins Street	no parking					
Brighton Street	West	Broadway	Perkins Street	no parking					
	East	Caldwell Street	south end of parking garage	no parking					
Brighton Street	West	Caldwell Street	south end of parking garage	no parking					
				no parking					