

PRINCIPALS

Robert J. Michaud, P.E.

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MEMORANDUM

DATE: May 11, 2015

TO: Legacy Construction & Maintenance, LLC
Attn: Mr. Charles Zammuto
11 Placid Road
Newton, MA 02459

FROM: Daniel J. Mills, P.E., PTOE – Principal
Daniel A. Dumais, P.E. – Senior Project Manager

RE: **Mixed-Use Re-development**
620 Broadway, Somerville, Massachusetts



Daniel J. Mills
5-11-2015

MDM Transportation Consultants, Inc. (MDM) has prepared this traffic impact statement (TIS) to evaluate the site programming, trip generation, and parking characteristics, associated with the proposed mixed-use re-development of the gasoline service station/mini-mart located at 620 Broadway in Somerville, Massachusetts.

Key findings of the evaluation are as follows:

- *Site Programming.* The existing Site is occupied by an existing 1,555± square-foot (sf) convenience store building that includes sales area and four fuel pumps (8 fueling positions) with access/egress provided via two full access/egress driveways along Broadway. Under the proposed re-development plan, the existing building, fuel pumps, and parking areas will all be removed and a new 4 story mixed-use building will be constructed at the Site. The project is proposed to include 2,850± sf of ground floor commercial space with 11 residential units on the upper floors. Access and egress for the Site is proposed via a single full access/egress driveway along Broadway at the eastern most part of the Site.
- *Reduced Traffic Generator.* Industry-standard trip rates published by the Institute of Transportation Engineers (ITE) indicate that the proposed mixed-use development will generate 8 to 15 vehicle-trips during the weekday peak hours. The proposed mixed-use development is estimated to generate up to 85 percent fewer vehicle trips compared to the existing gasoline service station/mini-mart.

- *Adequate On-Site Parking Supply for Residential Units.* Based on US Census data and Institute of Transportation Engineers' parking generation data, anticipated parking activity at the Site for the residential units is projected to be 15 vehicles during the overnight hours which can be accommodated by the 15 on-site parking spaces.
- *Adequate On-Site Parking Supply for Commercial Space.* Due to parking characteristics associated with the residential use, on-site parking spaces are not expected to be fully occupied by residents during regular business hours. This provides the building management with an opportunity to designate a number of on-site parking spaces to be shared during the daytime with the commercial space without relying on the existing street parking. It is expected that 5 to 10 spaces will be unused by residents during daytime hours and could be made available to commercial tenants. In addition, by eliminating one of the existing site driveways, an additional two to three on-street parking spaces will be added to the City's local parking supply.

In summary, trip generation for the development is projected to be nominal with 8 to 15 vehicle-trips during the weekday peak hours. The proposed mixed-use development is estimated to generate up to 85 percent fewer vehicle trips than the current gasoline service station/mini-mart. The peak residential parking activity at the Site is projected to be 15 vehicles during the overnight hour which would be accommodated by the proposed 15 parking spaces on-site. During daytime periods, unused spaces will be available on-site to accommodate a shared parking arrangement for the proposed commercial space, if needed.

PROJECT DESCRIPTION

The Site (Shield Service Station) is located along the southern side of Broadway at 620 Broadway located in Somerville, Massachusetts. The site is bordered by Broadway to the north, a commercial property to the east, and railroad tracks to the west. The proximity of the site in relation to the regional transportation system is shown in **Figure 1**.

Existing Use

The existing Site is occupied by an existing 1,555± square-foot (sf) convenience store building that includes sales area and four fuel pumps (8 fueling positions). Access and egress for the Site is provided by two full access/egress driveways along Broadway. On-site parking is currently provided for approximately 12 vehicles.

Proposed Use

Under the proposed re-development plan, the existing building, fuel pumps, and parking areas will all be removed and a new 4 story mixed-use building will be constructed at the Site. The project is proposed to include 2,850± sf of ground floor commercial space and 11 residential units. Access and egress for the Site is proposed via a single full access/egress driveway along Broadway at the eastern most part of the Site. The closure of the western site driveway will



Figure 1

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Site Location

result in the ability to add two to three additional on-street parking spaces along Broadway. On-site parking is proposed for 15 vehicles to be located in a first floor parking garage. A preliminary site plan prepared by Bourque Design is shown in **Figure 2**.

EXISTING ROADWAY CHARACTERISTICS

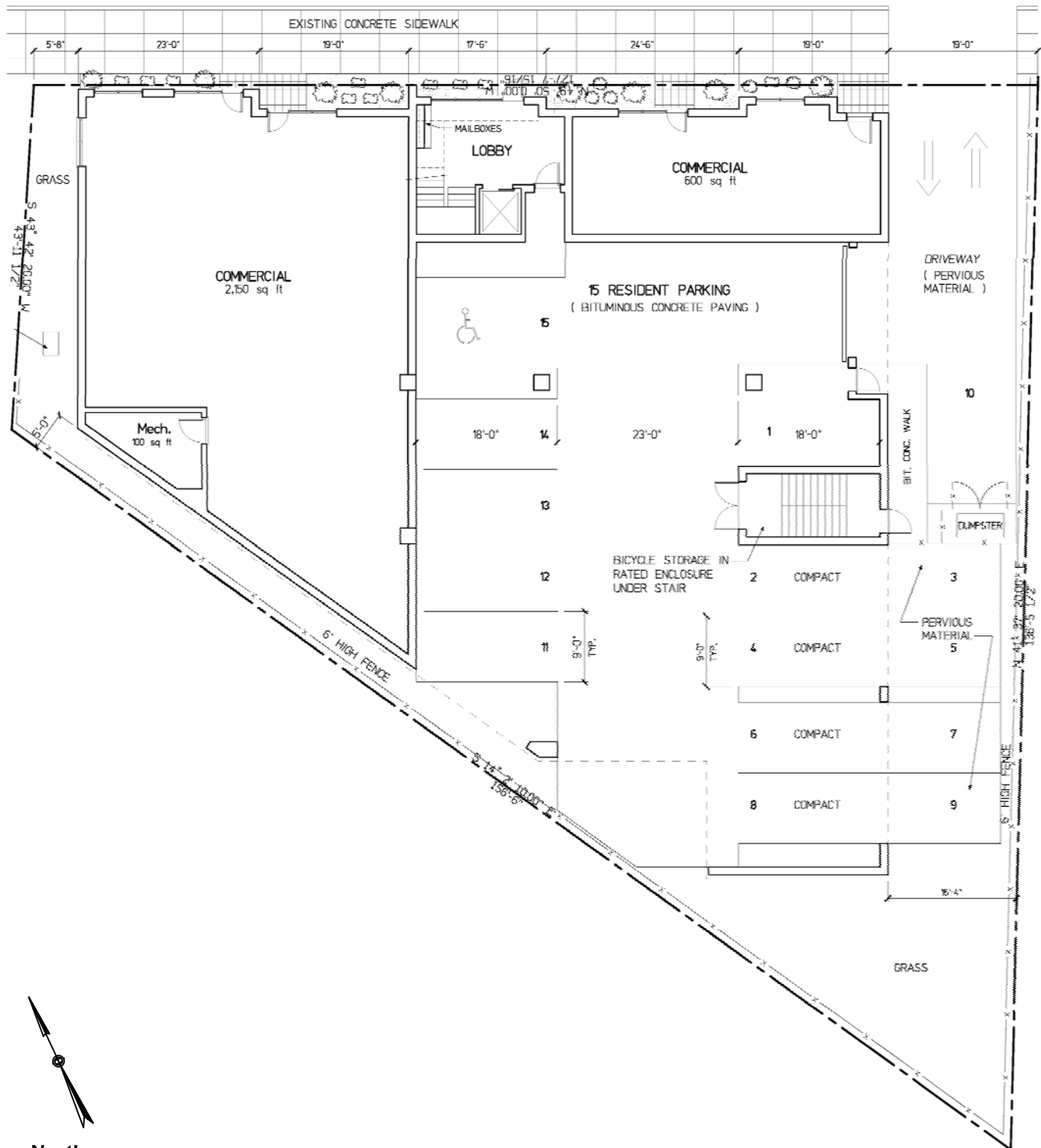
Broadway is generally an east-west roadway under local (City) jurisdiction. Broadway is classified by the Massachusetts Department of Transportation (MassDOT) as an Urban Minor Arterial roadway. In the immediate study area Broadway is currently under construction but generally provides one 16-foot vehicular travel lane, a 5-foot bike lane, and a 7-foot parking lane in each direction for a total pavement width of approximately 56 feet. Additional turn lanes are provided at the roadways major intersections. Cement concrete sidewalks are provided on both sides of the road and on-street parking is allowed on both sides of the street. Pavement markings include a double yellow centerline and bike lane pavement markings. The posted (regulatory) speed limit along Broadway in the study area is 30 miles per hour (mph). Land use along Broadway includes a mix of land uses, including but not limited to residential homes, office buildings, medical office buildings, gasoline service stations, commercial properties, restaurants, and recreational fields/playground (Trum Field).

PUBLIC TRANSPORTATION

The Massachusetts Bay Transit Authority (MBTA) operates the redline subway service at Davis Station located less than 1-mile from the Site. Davis Station also provides connections to various additional regional transit connections. Specific route and schedule information for all available services currently operated in the immediate area are provided in the **Attachments** and are as follows:

- *MBTA Subway Service:* The redline subway runs from Mattapan and Braintree Stations to Alewife Station with a stop in the area at Davis Station which is located less than 1-mile from the Site. Service generally runs Monday through Saturday 5:30 am to 2:30 am and Sunday's 6:00 am to 1:00 am with headways approximately 15 minutes. Davis Station also provides connections to various regional transit connections including Routes 87, 88, 89, 90, and 96.
- *Route 80:* Bus Route 80 runs from Arlington Center to Lechmere Station. The route passes adjacent to the Site along Broadway. Service generally runs Monday through Saturday 5:00 am to 1:20 am and Sundays 6:30 am to 12:20 am.
- *Route 89:* Bus Route 89 runs from Claredon Hill or Davis Square to Sullivan Square Station. The route passes adjacent to the Site along Broadway. Service generally runs Monday through Saturday 4:30 am to 1:30 am and Sundays 5:15 am to 1:10 am.

Broadway



North

Scale: Not to Scale

Site Plan Source: Bourque Design

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Figure 2

Preliminary Site Layout

It should be noted that the MBTA's Greenline Extension Project will provide a new rapid transit station within 500 feet of the site. This new station at Bell Square is expected to be completed in approximately five years and will provide the site with more convenient access to public transportation.

TRIP GENERATION COMPARISON

Trip generation estimates for the proposed mixed-used development and current use as a gasoline service station /mini-mart (Shields Service Station) are developed using industry-standard trip rates published by the Institute of Transportation Engineers (ITE). This allows a direct comparison of net vehicle trips for these uses for peak hours of operation. Trip generation estimates for the site have been estimated for the weekday morning and weekday evening peak traffic hours – representative of the highest combined trip activity periods and adjacent street traffic. Trip estimates were developed for the proposed mixed-use development by applying trip rates published by ITE's *Trip Generation*¹ for land use code (LUC) 220 – Apartment and LUC 826 Specialty Retail. Trip estimates were developed for the existing gasoline service station/mini-mart based on ITE LUC 945 Gasoline/Service Station with Convenience Market. **Table 1** presents a summary and comparison of the site trip generation for both the current and proposed use of the Site.

TABLE 1
TRIP GENERATION COMPARISON

Peak Hour/ Direction of Travel	Vehicle Trip Estimate		
	Existing Use Gas Station w/ Convenience Market ¹	Proposed Mixed-Use Development ²	Difference
Weekday Morning Peak Hour:			
Entering	41	2	-39
<u>Exiting</u>	<u>41</u>	<u>6</u>	<u>-35</u>
Total	82	8	-74
Weekday Evening Peak Hour:			
Entering	54	9	-45
<u>Exiting</u>	<u>54</u>	<u>6</u>	<u>-48</u>
Total	108	15	-93
Daily (24 Hour Weekday)	1,302	200	-1,102

¹ Based on ITE LUC 945 applied to 8 fueling positions.

² Based on ITE LUC 220 applied to 11 units and LUC 826 applied to 2,850 sf.

¹*Trip Generation*, Ninth Edition; Institute of Transportation Engineers; Washington, DC; 2012.

As summarized in **Table 1**, ITE-based trip generation estimates indicate that proposed mixed-use development will generate 8 to 15 vehicle-trips during the weekday peak hours. The proposed mixed-use development is estimated to generate up to 85 percent fewer vehicle trips than the current gasoline service station/mini-mart.

PARKING ANALYSIS

MDM has prepared a parking assessment to determine whether 15 parking spaces are adequate to accommodate the proposed development. US Census Journey-to-Work and vehicle ownership data, as well as the Institute of Transportation Engineers' parking generation data have been considered in this evaluation.

MDM notes that field observation indicate that the bridge located just west of the Site along Broadway is currently under construction and on-street parking is temporarily restricted in some areas, thus, an inventory of existing parking demand is not feasible and would not adequately summarize the local on-street parking vacancy rates. Therefore, this parking assessment focuses on the estimated parking demands of the Site.

Mode Share

US Census² data for the City of Somerville indicates that approximately 41 percent of area residents either walk, bike, carpool or use public transportation as a means to get to work. MBTA bus routes 80 and 89 have stops immediately adjacent to the Site with direct connections to Lechmere Station, Davis Square, and Sullivan Square Station. In the future, the proposed Greenline Station at Ball Square will provide more convenient access to the MBTA's rapid transit service.

US Census data also indicates an average vehicle ownership of 1.1 vehicles per household³ within Somerville, resulting in a demand of approximately 12 parked vehicles for the proposed eleven residential units. US Census data, MBTA bus route information, and vehicle ownership statistics are provided in the **Attachments**.

Industry Standard Parking Demand Estimate

Peak parking generation rates for residential land uses, including apartment complexes, are published by the Institute of Transportation Engineers (ITE) in *Parking Generation*⁴ which provides a basis for identifying parking demand characteristics for various land uses. **Table 2** provides a summary of peak parking demands for the most appropriate residential land use (i.e., apartment use) in an urban environment. The ratio provided also accounts for average visitor parking activity.

² Journey to Work, US Census Bureau, Census 2000 Summary File 3 (QT-P23)

³ Renter Occupied housing units, US Census Bureau, Census 2000 Summary File 4 (QT-H11)

⁴ *Parking Generation, 4th Edition*, Institute of Transportation Engineers, Washington D.C. 2010

TABLE 2
ITE PEAK PARKING DEMAND

PROPOSED USE	ITE PEAK PARKING DEMAND RATE ¹	PEAK PARKING DEMAND
Residential (11-units)	1.36 spaces per unit	15 spaces

¹ ITE Average parking demand per LUC 221 (Apartment) adjusted by 13% (increased) for an average bedroom count >2.0 applied to eleven residential units.

As summarized in **Table 2**, residential peak parking demand for an 11-unit residential complex is approximately 15 vehicles based on ITE parking generation rates with peak demands occurring during the overnight hours. MDM notes that the above peak parking demand derived from industry standard parking demand rates correlates well with the peak parking demand derived from vehicle ownership statistics for Somerville.

Time-of-day factors published by ITE for a residential use were used to model typical hourly parking demands for the residential units at the Site. As shown in **Figure 3**, parking activity at the Site is projected to be 15 vehicles or less throughout the day which can be accommodated by the 15 on-site parking spaces. During daytime periods, unused spaces will be available on-site to accommodate a shared parking arrangement for the proposed commercial space, if needed.

CONCLUSION

Trip generation for the development is projected to be nominal with 8 to 15 vehicle-trips during the weekday peak hours. In general, the proposed mixed-use development is estimated to generate up to 85 percent fewer vehicle trips than the current gasoline service station/mini-mart. The peak residential parking activity at the Site is projected to be 15 vehicles during overnight hours which would be accommodated by the proposed 15 parking spaces on-site. It is expected that 5 to 10 spaces will be unused by residents during daytime hours and could be made available to commercial tenants through a shared parking arrangement. Lastly, by eliminating one of the existing site driveways, an additional two to three on-street parking spaces will be added to the City's local parking supply and may also be available for use by the proposed commercial space.

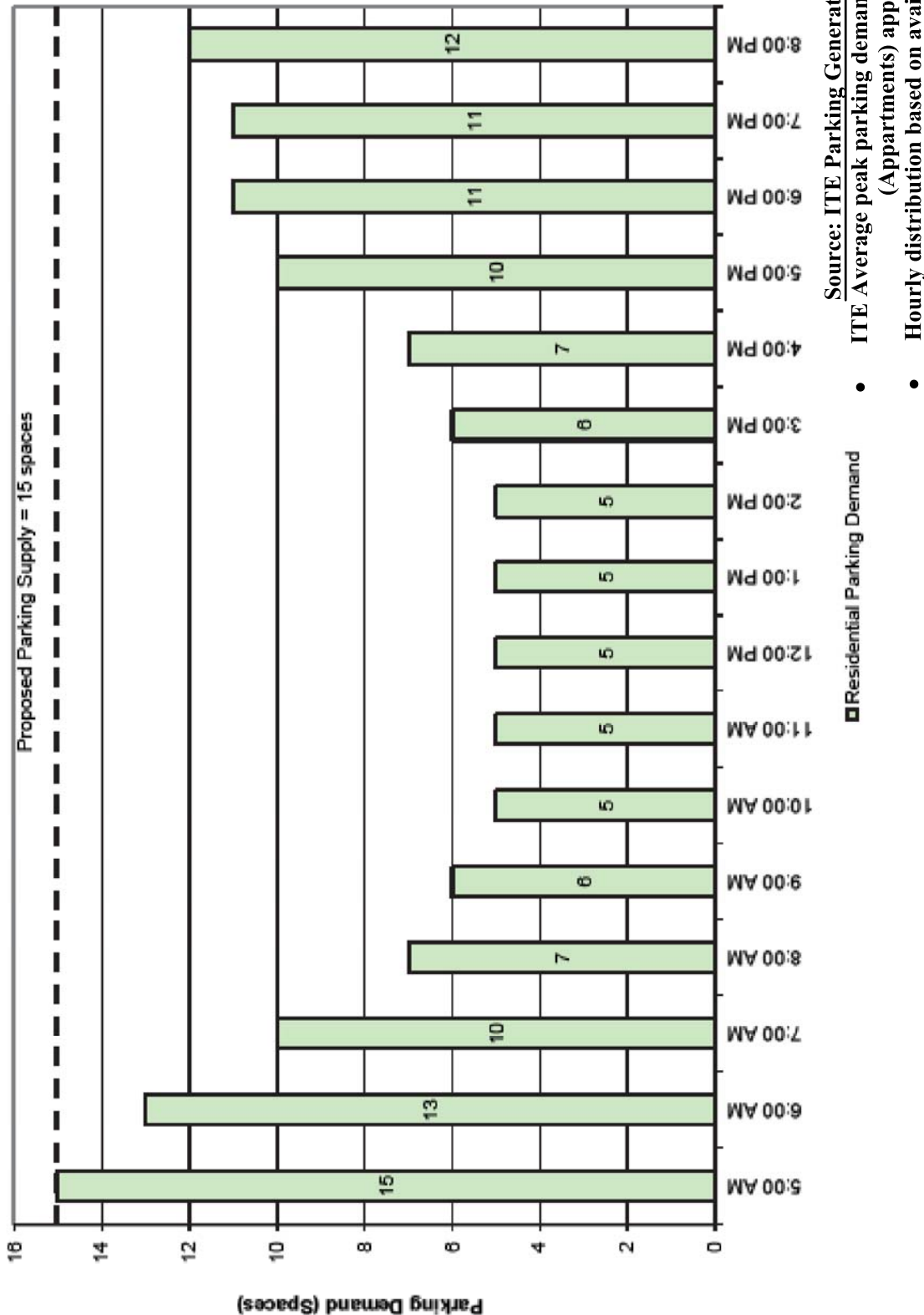


Figure 3

Hourly Parking Demand (ITE)

Attachments

- Mode Share/ Public Transportation Data
- Trip Generation Data
- ITE Parking/ Hourly Distribution Data
- Business Parking Permit Application

□ Mode Share/ Public Transportation Data



QT-P23

Journey to Work: 2000

Census 2000 Summary File 3 (SF 3) - Sample Data

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see <http://www.census.gov/prod/cen2000/doc/sf3.pdf>

Subject	Census Tract 3503, Middlesex County, Massachusetts		Somerville city, Massachusetts	
	Number	Percent	Number	Percent
MEANS OF TRANSPORTATION AND CARPOOLING				
Workers 16 and over	1,447	100.0	44,977	100.0
Car, truck, or van	930	64.3	25,011	55.6
Drove alone	805	55.6	20,363	45.3
Carpooled	125	8.6	4,648	10.3
In 2-person carpool	114	7.9	3,780	8.4
In 3-person carpool	11	0.8	605	1.3
In 4-person carpool	0	0.0	103	0.2
In 5- or 6-person carpool	0	0.0	91	0.2
In 7-or-more-person carpool	0	0.0	69	0.2
Workers per car, truck, or van	1.07	(X)	1.11	(X)
Public transportation	358	24.7	13,129	29.2
Bus or trolley bus	110	7.6	4,237	9.4
Streetcar or trolley car (público in Puerto Rico)	59	4.1	253	0.6
Subway or elevated	189	13.1	8,328	18.5
Railroad	0	0.0	207	0.5
Ferryboat	0	0.0	0	0.0
Taxicab	0	0.0	104	0.2
Motorcycle	8	0.6	30	0.1
Bicycle	62	4.3	1,251	2.8
Walked	47	3.2	4,246	9.4
Other means	9	0.6	237	0.5
Worked at home	33	2.3	1,073	2.4
TRAVEL TIME TO WORK				
Workers who did not work at home	1,414	100.0	43,904	100.0
Less than 10 minutes	111	7.9	3,211	7.3
10 to 14 minutes	172	12.2	4,570	10.4
15 to 19 minutes	194	13.7	5,877	13.4
20 to 24 minutes	160	11.3	6,235	14.2
25 to 29 minutes	89	6.3	3,094	7.0
30 to 34 minutes	332	23.5	9,561	21.8
35 to 44 minutes	141	10.0	3,976	9.1
45 to 59 minutes	123	8.7	4,308	9.8
60 to 89 minutes	62	4.4	2,451	5.6
90 or more minutes	30	2.1	621	1.4
Mean travel time to work (minutes)	27.6	(X)	27.8	(X)
TIME LEAVING HOME TO GO TO WORK				
Workers who did not work at home	1,414	100.0	43,904	100.0
5:00 to 5:59 a.m.	80	5.7	1,883	4.3
6:00 to 6:29 a.m.	80	5.7	2,448	5.6
6:30 to 6:59 a.m.	134	9.5	3,227	7.4
7:00 to 7:29 a.m.	177	12.5	4,826	11.0
7:30 to 7:59 a.m.	233	16.5	6,861	15.6
8:00 to 8:29 a.m.	176	12.4	7,811	17.8



QT-H11

Vehicles Available and Household Income in 1999: 2000

Census 2000 Summary File 4 (SF 4) - Sample Data

NOTE: Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see <http://www.census.gov/prod/cen2000/doc/sf4.pdf>

Population Group: Total population

Subject	Somerville city, Middlesex County, Massachusetts	
	Number	Percent
TENURE BY VEHICLES AVAILABLE		
Owner-occupied housing units	9,663	100.0
No vehicle available	1,484	15.4
1 vehicle available	4,170	43.2
2 vehicles available	3,022	31.3
3 vehicles available	672	7.0
4 vehicles available	246	2.5
5 or more vehicles available	69	0.7
Vehicles per household	1.4	(X)
Renter-occupied housing units	21,892	100.0
No vehicle available	5,690	26.0
1 vehicle available	10,418	47.6
2 vehicles available	4,403	20.1
3 vehicles available	1,060	4.8
4 vehicles available	188	0.9
5 or more vehicles available	133	0.6
Vehicles per household	1.1	(X)
TENURE BY HOUSEHOLD INCOME IN 1999		
Owner-occupied housing units	9,663	100.0
Less than \$5,000	204	2.1
\$5,000 to \$9,999	295	3.1
\$10,000 to \$14,999	430	4.4
\$15,000 to \$19,999	424	4.4
\$20,000 to \$24,999	347	3.6
\$25,000 to \$34,999	916	9.5
\$35,000 to \$49,999	1,509	15.6
\$50,000 to \$74,999	2,076	21.5
\$75,000 to \$99,999	1,412	14.6
\$100,000 to \$149,999	1,399	14.5
\$150,000 or more	651	6.7
Median (dollars)	58,041	(X)
Renter-occupied housing units	21,892	100.0
Less than \$5,000	958	4.4
\$5,000 to \$9,999	1,622	7.4
\$10,000 to \$14,999	1,364	6.2
\$15,000 to \$19,999	1,166	5.3
\$20,000 to \$24,999	1,151	5.3
\$25,000 to \$34,999	2,512	11.5
\$35,000 to \$49,999	4,010	18.3
\$50,000 to \$74,999	4,753	21.7
\$75,000 to \$99,999	2,236	10.2
\$100,000 to \$149,999	1,567	7.2
\$150,000 or more	553	2.5
Median (dollars)	42,251	(X)

schedule change

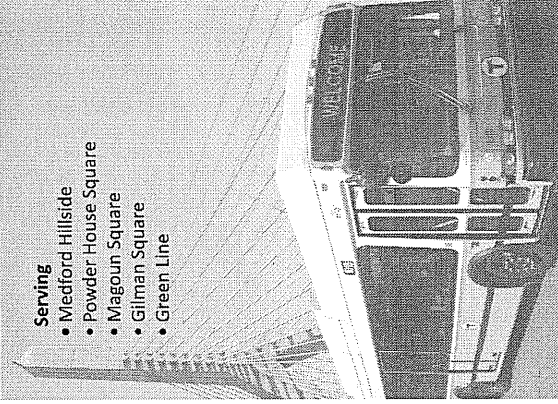
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Spring March 21, 2015 - June 19, 2015

Arlington Center- Lechmere Station

Serving

- Medford Hillside
- Powder House Square
- Magoun Square
- Gilman Square
- Green Line

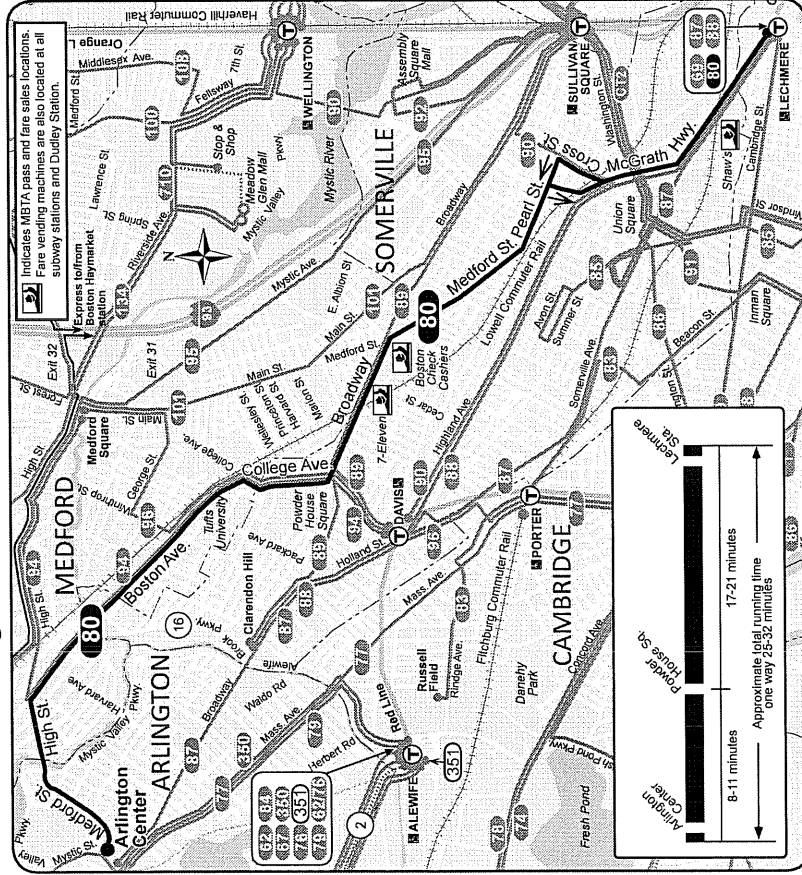


Massachusetts Bay
Transportation Authority

massDOT

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

Route 80 Arlington Center - Lechmere Station



schedule change

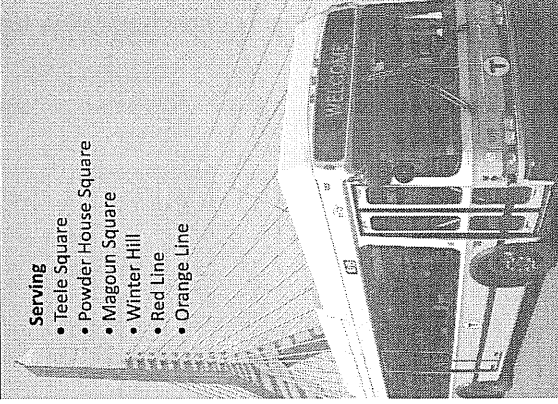
89

Spring March 21, 2015 - June 19, 2015

Clarendon Hill or Davis Square-Sullivan Sq. Station

Serving

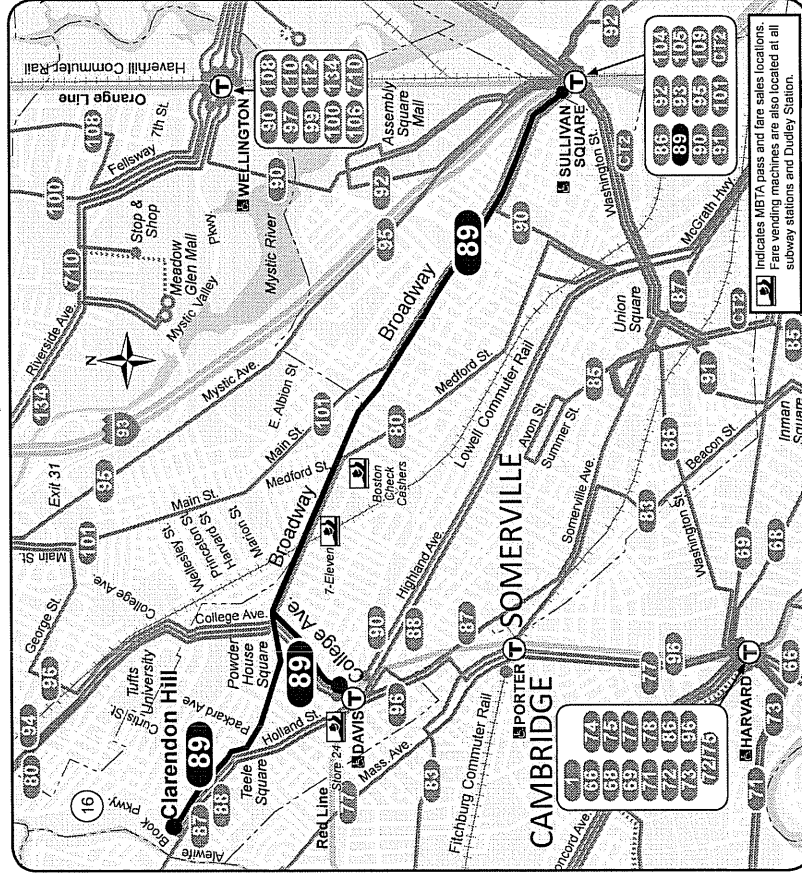
- Teele Square
- Powder House Square
- Magoun Square
- Winter Hill
- Red Line
- Orange Line



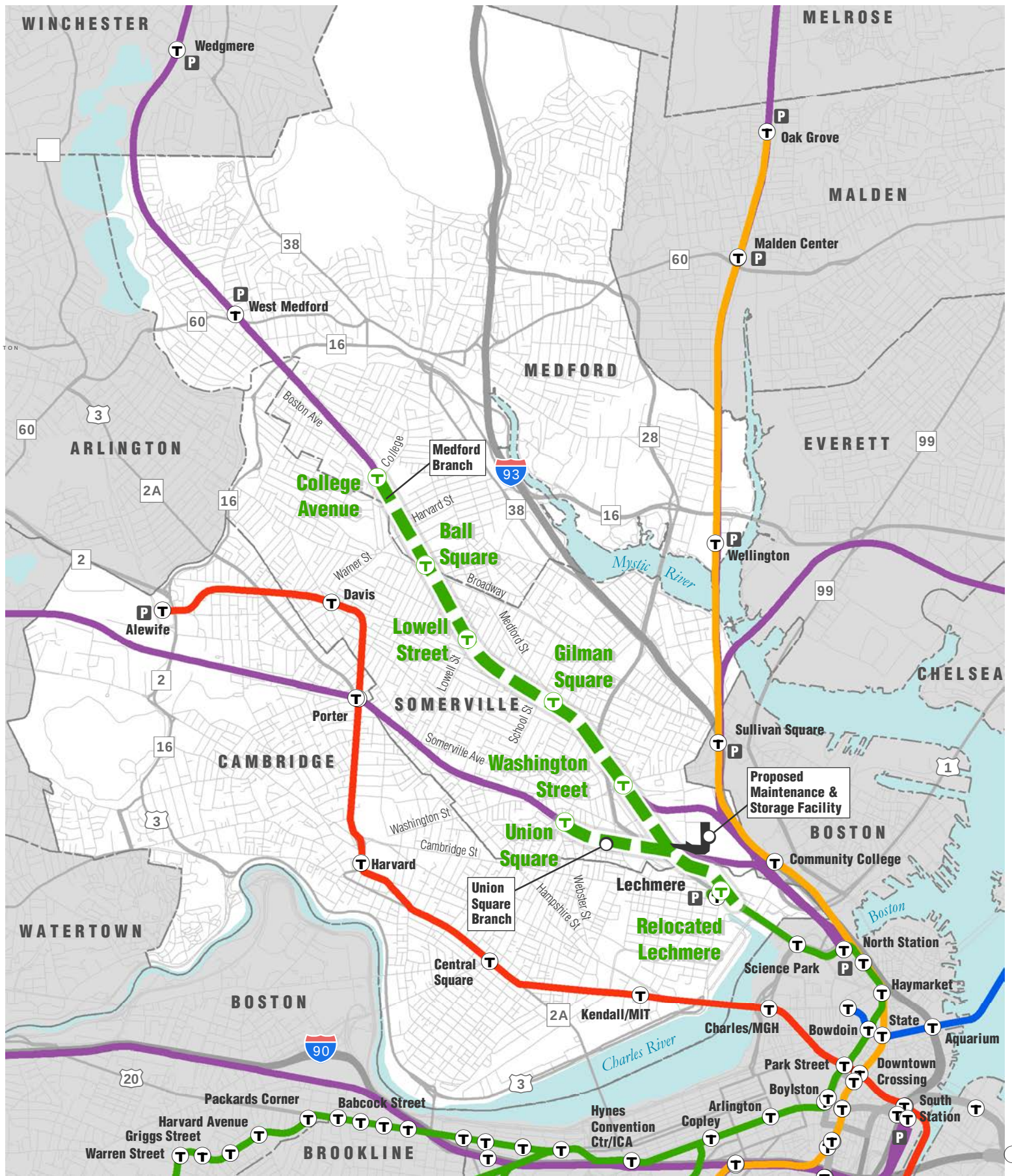
Massachusetts Bay Transportation Authority **MBTADOT**

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

Route 89 Clarendon Hill or Davis Square - Sullivan Square Station



89									
Weekday					Saturday				
Inbound					Inbound				
Leave	Arrive	Leave	Arrive	Outbound	Leave	Arrive	Leave	Arrive	Outbound
Clarendon Hill	Winter Hill	Sullivan Station	Winter Hill	Clarendon Hill	Clarendon Hill	Winter Hill	Sullivan Station	Winter Hill	Clarendon Hill
a 4:33A	5:05	5:24A	5:58A	5:37A	a 4:33A	5:07	5:10A	5:14A	5:20A
5:00	5:30	5:49	6:16	5:37A	5:07	5:30	5:45	5:51	6:00A
5:25	5:50	6:02	6:38	6:16	5:30	6:04	6:20	6:28	6:35
5:50	6:15	6:34	6:49	7:14	6:04	6:04	6:55	7:01	7:10
6:15	6:03A	6:22	6:34	7:13	6:43	6:48	6:55	7:30	7:38
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6:40	6:53	6:58	7:08	7:35	7:53	7:58	8:05	8:40	8:46
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7:09	7:17	7:28	7:35	7:53	8:04	8:31	8:36	9:15	9:22
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12:58P	1:30	1:46	1:53	12:49P	8:04	8:31	8:36	9:15	9:22
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				11:02	8:04	8:31	8:36	9:15	9:22
				11:22	8:04	8:31	8:36	9:15	9:22
				11:42	8:04	8:31	8:36	9:15	9:22
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				12:22	8:04	8:31	8:36	9:15	9:22
				12:42	8:04	8:31	8:36	9:15	9:22
				13:02	8:04	8:31	8:36	9:15	9:22
				13:22	8:04	8:31	8:36	9:15	9:22
				13:42	8:04	8:31	8:36	9:15	9:22
				14:02	8:04	8:31	8:36	9:15	9:22
				14:22	8:04	8:31	8:36	9:15	9:22
				14:42	8:04	8:31	8:36	9:15	9:22
				15:02	8:04	8:31	8:36	9:15	9:22
				15:22	8:04	8:31	8:36	9:15	9:22
				15:42	8:04	8:31	8:36	9:15	9:22
				16:02	8:04	8:31	8:36	9:15	9:22
				16:22	8:04	8:31	8:36	9:15	9:22
				16:42	8:04	8:31	8:36	9:15	9:22
				17:02	8:04	8:31	8:36	9:15	9:22
				17:22	8:04	8:31	8:36	9:15	9:22
				17:42	8:04	8:31	8:36	9:15	9:22
				18:02	8:04	8:31	8:36	9:15	9:22
				18:22	8:04	8:31	8:36	9:15	9:22
				18:42	8:04	8:31	8:36	9:15	9:22
				19:02	8:04	8:31	8:36	9:15	9:22
				19:22	8:04	8:31	8:36	9:15	9:22
				19:42	8:04	8:31	8:36	9:15	9:22
				20:02	8:04	8:31	8:36	9:15	9:22
				20:22	8:04	8:31	8:36	9:15	9:22
				20:42	8:04	8:31	8:36	9:15	9:22
				21:02	8:04	8:31	8:36	9:15	9:22
				21:22	8:04	8:31	8:36	9:15	9:22
				21:42	8:04	8:31	8:36	9:15	9:22
				22:02	8:04	8:31	8:36	9:15	9:22
				22:22	8:04	8:31	8:36	9:15	9:22
				22:42	8:04	8:31	8:36	9:15	9:22
				23:02	8:04	8:31	8:36	9:15	9:22
				23:22	8:04	8:31	8:36	9:15	9:22
				23:42	8:04	8:31	8:36	9:15	9:22
				24:02	8:04	8:31	8:36	9:15	9:22
				24:22	8:04	8:31	8:36	9:15	9:22
				24:42	8:04	8:31	8:36	9:15	9:22
				25:02	8:04	8:31	8:36	9:15	9:22
				25:22	8:04	8:31	8:36	9:15	9:22
				25:42	8:04	8:31	8:36	9:15	9:22
				26:02	8:04	8:31	8:36	9:15	9:22
				26:22	8:04	8:31	8:36	9:15	9:22
				26:42	8:04	8:31	8:36	9:15	9:22
				27:02	8:04	8:31	8:36	9:15	9:22
				27:22	8:04	8:31	8:36	9:15	9:22
				27:42	8:04	8:31	8:36	9:15	9:22
				28:02	8:04	8:31	8:36	9:15	9:22
				28:22	8:04	8:31	8:36	9:15	9:22
				28:42	8:04	8:31	8:36	9:15	9:22
				29:02	8:04	8:31	8:36	9:15	9:22
				29:22	8:04	8:31	8:36	9:15	9:22
				29:42	8:04	8:31	8:36	9:15	9:22
				30:02	8:04	8:31	8:36	9:15	9:22
				30:22	8:04	8:31	8:36	9:15	9:22
				30:42	8:04	8:31	8:36	9:15	9:22
				31:02	8:04	8:31	8:36	9:15	9:22
				31:22	8:04	8:31	8:36	9:15	9:22
				31:42	8:04	8:31	8:36	9:15	9:22
				32:02	8:04	8:31	8:36	9:15	9:22
				32:22	8:04	8:31	8:36	9:15	9:22
				32:42	8:04	8:31	8:36	9:15	9:22
				33:02	8:04	8:31	8:36	9:15	9:22
				33:22	8:04	8:31	8:36	9:15	9:22
				33:42	8:04	8:31	8:36	9:15	9:22
				34:02	8:04	8:31	8:36	9:15	9:22
				34:22	8:04	8:31	8:36	9:15	9:22
				34:42	8:04	8:31	8:36	9:15	9:22
				35:02	8:04	8:31	8:36	9:15	9:22
				35:22	8:04	8:31	8:36	9:15	9:22
				35:42	8:04	8:31	8:36	9:15	9:22
				36:02	8:04	8:31	8:36	9:15	9:22
				36:22	8:04	8:31	8:36	9:15	9:22
				36:42	8:04	8:31	8:36	9:15	9:22
				37:02	8:04	8:31	8:36	9:15	9:22
				37:22	8:04	8:31	8:36	9:15	9:22
				37:42	8:04	8:31	8:36	9:15	9:22
				38:02	8:04	8:31	8:36	9:15	9:22
				38:22	8:04	8:31	8:36	9:15	9:22
				38:42	8:04	8:31	8:36	9:15	9:22
				39:02	8:04	8:31	8:36	9:15	9:22
				39:22	8:04	8:31	8:36	9:15	9:22
				39:42	8:04	8:31	8:36	9:15	9:22
				40:02	8:04	8:31	8:36	9:15	9:22
				40:22	8:04	8:31	8:36	9:15	9:22
				40:42	8:04	8:31	8:36	9:15	9:22
				41:02	8:04	8:31	8:36	9:15	9:22
				41:22	8:04	8:31	8:36	9:15	9:22
				41:42	8:04	8:31	8:36	9:15	9:22
				42:02	8:04	8:31	8:36	9:15	9:22
				42:22	8:04	8:31	8:36	9:15	9:22
				42:42	8:04	8:31	8:36	9:15	9:22
				43:02	8:04	8:31	8:36	9:15	9:22



GREEN LINE EXTENSION PROJECT

Project Area Map | Cambridge, Somerville, Medford, MA

- MBTA Blue Line
- MBTA Green Line
- MBTA Orange Line
- MBTA Red Line
- MBTA Silver Line
- MBTA Commuter Rail
- Existing Station
- Proposed Station
- Proposed Maintenance Facility
- MBTA Parking Lot
- Green Line Proposed Action



Source: MassGIS

0 0.25 0.5 1 Miles



□ Trip Generation Data

Institute of Transportation Engineers (ITE) 9th Edition**Land Use Code (LUC) 945 - Gasoline/Service Station with Convenience Market**

Average Vehicle Trips Ends vs: Vehicle Fueling Positions
Independent Variable (X): 8

AVERAGE WEEKDAY DAILY

$$T = 162.78 * (X)$$

$$T = 162.78 * 8$$

$$T = 1302.24$$

$$T = 1,302 \text{ vehicle trips}$$

with 50% (651 vph) entering and 50% (651 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 10.16 * (X)$$

$$T = 10.16 * 8$$

$$T = 81.28$$

$$T = 82 \text{ vehicle trips}$$

with 50% (41 vph) entering and 50% (41 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 13.51 * (X)$$

$$T = 13.51 * 8$$

$$T = 108.08$$

$$T = 108 \text{ vehicle trips}$$

with 50% (54 vph) entering and 50% (54 vph) exiting.

SATURDAY DAILY

No Available

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

No Available

Institute of Transportation Engineers (ITE) 9th Edition Land Use Code (LUC) 220 - Apartment
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Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 11

AVERAGE WEEKDAY DAILY

$T = 6.65 * X$
 $T = 6.65 * 11$
 $T = 73.15$
 $T = 74$ vehicle trips
with 50% (37 vpd) entering and 50% (37 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.51 * X$
 $T = 0.51 * 11$
 $T = 5.61$
 $T = 6$ vehicle trips
with 20% (1 vph) entering and 80% (5 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.62 * X$
 $T = 0.62 * 11$
 $T = 6.82$
 $T = 7$ vehicle trips
with 65% (5 vph) entering and 35% (2 vph) exiting.

SATURDAY DAILY

$T = 6.39 * X$
 $T = 6.39 * 11$
 $T = 70.29$
 $T = 70$ vehicle trips
with 50% (35 vpd) entering and 50% (35 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$T = 0.52 * X$
 $T = 0.52 * 11$
 $T = 5.72$
 $T = 6$ vehicle trips
with 50% (3 vph) entering and 50% (3 vph) exiting.

Institute of Transportation Engineers (ITE) 9th Edition
Land Use Code (LUC) 826 - Specialty Retail Center

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Leasable Area
 Independent Variable (X): 2.85

AVERAGE WEEKDAY DAILY

$T = 44.32 * (X)$ (Small Sample Size - Use with Caution)
 $T = 44.32 * 2.85$
 $T = 126.31$
 $T = 126$ vehicle trips
 with 50% (63 vpd) entering and 50% (63 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

ITE LUC 820 Weekday Morning Trip Rate = ITE LUC 826 Weekday Morning Trip Rate
 ITE LUC 820 Weekday Evening Trip Rate ITE LUC 826 Weekday Evening Trip Rate

$$\frac{0.96}{3.73} = \frac{(Y)}{2.71} \quad Y = 0.69747989$$

$T = Y * 2.9$
 $T = 1.9878$
 $T = 2$ vehicle trips
 with 62% (1 vph) entering and 38% (1 vph) exiting.
(same distribution split as ITE LUC 820 during the weekday morning peak hour of adjacent street traffic)

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 2.71 * (X)$ (Small Sample Size - Use with Caution)
 $T = 2.71 * 2.9$
 $T = 7.72$
 $T = 8$ vehicle trips
 with 44% (4 vph) entering and 56% (4 vph) exiting.

SATURDAY DAILY

$T = 42.040 * (X)$ (Small Sample Size - Use with Caution)
 $T = 42.040 * 2.85$
 $T = 119.81$
 $T = 120$ vehicle trips
 with 50% (60 vpd) entering and 50% (60 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR

ITE LUC 820 Saturday Midday Trip Rate = ITE LUC 826 Saturday Midday Trip Rate
 ITE LUC 820 Saturday Daily Trip Rate ITE LUC 826 Saturday Daily Trip Rate

$$\frac{4.82}{49.97} = \frac{(Y)}{42.04} \quad Y = 4.05508905$$

$T = Y * 2.9$
 $T = 11.557$
 $T = 12$ vehicle trips
 with 52% (6 vph) entering and 48% (6 vph) exiting.
(same distribution split as ITE LUC 820 during the Saturday midday peak hour of generator)

Summary

Pass-By: 0.25

	Total	Pass-By	Net New
PM			
In	4	1	3
Out	<u>4</u>	<u>1</u>	<u>3</u>
Total	8	2	6
Sat			
In	6	1	5
Out	<u>6</u>	<u>1</u>	<u>4</u>
Total	12	3	9
Daily			
In	63	16	47
Out	<u>63</u>	<u>16</u>	<u>47</u>
Total	126	32	95
Sat Daily			
In	60	15	45
Out	<u>60</u>	<u>15</u>	<u>45</u>
Total	120	30	90

- ITE Parking/ Hourly Distribution Data

Land Use: 221

Low/Mid-Rise Apartment

Description

Low/mid-rise apartments are rental dwelling units located within the same building with at least three other dwelling units: for example, quadraplexes and all types of apartment buildings. The study sites in this land use have one, two, three, or four levels. High-rise apartment (Land Use 222) is a related use.

Database Description

The database consisted of a mix of suburban and urban sites. Parking demand rates at the suburban sites differed from those at urban sites and, therefore, the data were analyzed separately.

- Average parking supply ratio: 1.4 parking spaces per dwelling unit (68 study sites). This ratio was the same at both the suburban and urban sites.
- Suburban site data: average size of the dwelling units at suburban study sites was 1.7 bedrooms, and the average parking supply ratio was 0.9 parking spaces per bedroom (three study sites).
- Urban site data: average size of the dwelling units was 1.9 bedrooms with an average parking supply ratio of 1.0 space per bedroom (11 study sites).

Saturday parking demand data were only provided at two suburban sites. One site with 1,236 dwelling units had a parking demand ratio of 1.33 vehicles per dwelling unit based on a single hourly count between 10:00 and 11:00 p.m. The other site with 55 dwelling units had a parking demand ratio of 0.92 vehicles per dwelling unit based on counts between the hours of 12:00 and 5:00 a.m.

Sunday parking demand data were only provided at two urban sites. One site with 15 dwelling units was counted during consecutive hours between 1:00 p.m. and 5:00 a.m. The peak parking demand ratio at this site was 1.00 vehicle per dwelling unit. The peak parking demand occurred between 12:00 and 5:00 a.m. The other site with 438 dwelling units had a parking demand ratio of 1.10 vehicles per dwelling unit based on a single hourly count between 11:00 p.m. and 12:00 a.m.

Four of the urban sites were identified as affordable housing.

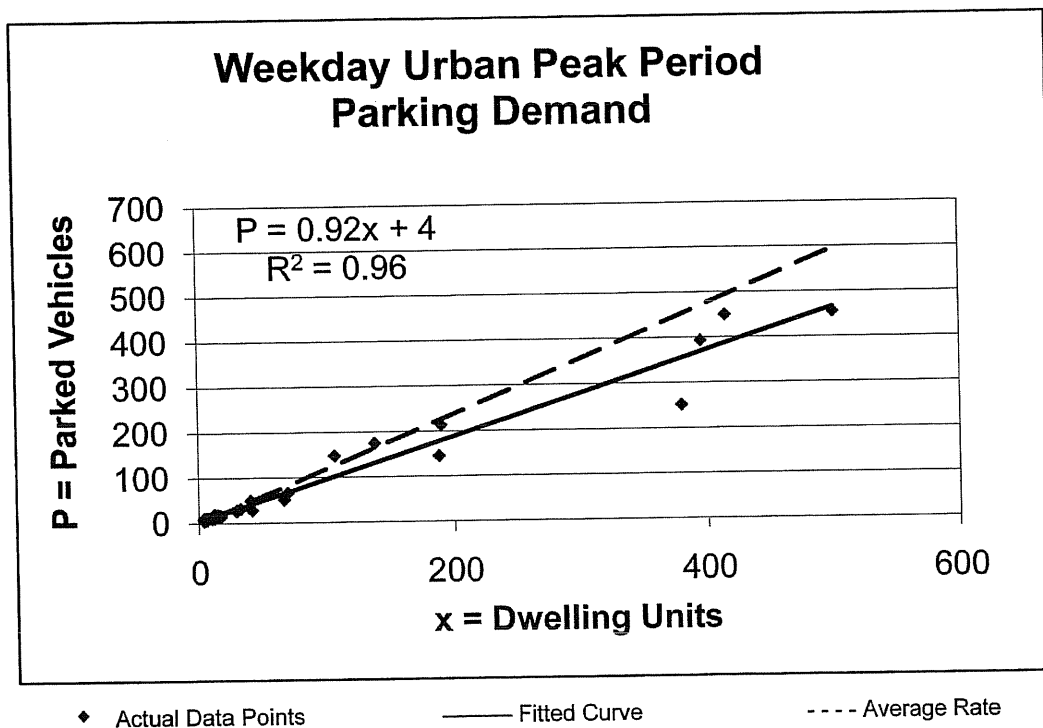
Several of the suburban study sites provided data regarding the number of bedrooms in the apartment complex. Although these data represented only a subset of the complete database for this land use, they demonstrated a correlation between number of bedrooms and peak parking demand. Study sites with an average of less than 1.5 bedrooms per dwelling unit in the apartment complex reported peak parking demand at 92 percent of the average peak parking demand for all study sites with bedroom data. Study sites with less than 2.0 but greater than or equal to 1.5 bedrooms per dwelling unit reported peak parking demand at 98 percent of the average. Study sites with an average of 2.0 or greater bedrooms per dwelling unit reported peak parking demand at 13 percent greater than the average.

For the urban study sites, the parking demand data consisted of single or discontinuous hourly counts and therefore a time-of-day distribution was not produced. The following table presents a time-of-day distribution of parking demand at the suburban study sites.

Land Use: 221 Low/Mid-Rise Apartment

Average Peak Period Parking Demand vs. Dwelling Units
On a: Weekday
Location: Urban

Statistic	Peak Period Demand
Peak Period	10:00 p.m.–5:00 a.m.
Number of Study Sites	40
Average Size of Study Sites	70 dwelling units
Average Peak Period Parking Demand	1.20 vehicles per dwelling unit
Standard Deviation	0.42
Coefficient of Variation	35%
95% Confidence Interval	1.07–1.33 vehicles per dwelling unit
Range	0.66–2.50 vehicles per dwelling unit
85th Percentile	1.61 vehicles per dwelling unit
33rd Percentile	0.93 vehicles per dwelling unit



□ Business Parking Permit Application



DEPARTMENT OF TRAFFIC & PARKING
traffic@somervillema.gov
(617) 625-6600 ext: 7900
133 Holland Street, Somerville, MA 02143
www.ParkSomerville.com

Business Parking Permit Application

Date: _____

Name: _____

Employer: _____

Complete business mailing address & zip code:

Phone: _____

Email: _____

License Plate: _____

☐ Check box if you have current Business Parking Permit

NUMBER IN ORDER OF PREFERENCE:

___ On-Street Parking

Desired location: _____

Off-Street Parking:

___ (Davis Square) Buena Vista Road Lot

___ (Davis Square) Grove Street Lot
between Highland Avenue and Elm Street

___ (Davis Square) Rite Aid Lot

___ (Magoun Square) Magoun Square Lot

SHIFT:

___ 1st Shift (8am-6pm)

___ 2nd Shift (6pm-3:30am)

___ Other (list hours, 10hr maximum)

Two-shift permits are required for periods over 10 hours; fee will be charged as TWO permits

Application must include following:

☐ **Copy of Vehicle Registration**

Must be a Massachusetts (or neighboring state) vehicle registration. Permits not issued if outside Massachusetts commuting distance.

☐ **Copy of payroll stub or statement on employer letterhead confirming employment**

☐ **If paying by mail, include check or money order.**

ADDITIONAL INFORMATION:

- On-Street Permits issued on annual basis (\$150/year).
- Off-Street Permits issued in increments of three, six, or twelve months (\$100/month).
- You will be charged the cost of TWO permits for shift times exceeding 10 hours.
- While attempts are made to accommodate location requests, assignments are based on availability.
- You will be contacted by email upon approval of your application.
- Applications that include payment will have the permits sent by mail and **MUST** include complete address information. You may also pay in person at the Traffic and Parking Office when you pick up your permit. Check, cash or credit card payment accepted.
- **ALL** outstanding parking tickets must be PAID before application is processed.
- Permits are non-transferable and non-refundable.
- Permit applications are accepted by email or standard mail.
- Contact Barbara Sullivan to submit permits/questions:
 - o Email: bsullivan@somervillema.gov
 - o Phone: 617-625-6600 ext. 7935