



600 Unicorn Park Drive σ Woburn, MA 01801

Phone: 781-932-3201 σ Fax: 781-932-3413

MEMORANDUM

TO: Michael Barsamian
Skye Realty

FROM: Kenneth P. Cram, P.E.

DATE: April 13, 2023

RE: Proposed Mixed-Use
Westwood, MA

Bayside Engineering has prepared this traffic memorandum to qualitatively assess the traffic impacts associated with the re-use of the existing building at 190 Washington Street in Westwood, MA.

As currently proposed, the Project will consist of the renovation of the existing building into a first floor hair salon (approximately 1,887 gross square feet (gsf)) and second floor office space (approximately 1,928 gsf of space). Parking will be provided for thirteen (13) vehicles. Access will be provided by way of a full movement driveway to Washington Street at the northern edge of the site. The southern driveway will be closed.

This memorandum identifies existing conditions on Washington Street, performed crash research for the length of Washington Street in the site vicinity, compared trip generation projections, and offers an opinion on the expected Project's impacts. Based on the analysis, compared to the existing office building, the proposed project would have comparable impacts during the weekday morning and weekday evening peak hours compared to the former office use. Four (4) additional peak hour trips would be expected. When spread out of the course of an hour, this equates to one additional vehicle every fifteen minutes, on average.

EXISTING CONDITIONS

Washington Street is an Urban Minor Arterial roadway extending in a generally north/south direction. The roadway is primarily under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). However, within the study area, Washington Street is under the jurisdiction of the Town of Westwood. Washington Street provides one travel lane in each direction separated by a double-yellow centerline. Additional turn lanes are provided at key intersections. Land use along Washington Street in the study area is a mix of primarily residential properties. Sidewalks are provided on both sides of Washington Street. Figure 1 shows the site in relation to Washington Street.



Figure 1
Site Location Map

TRAFFIC VOLUMES

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were originally obtained in October 2015 as part of the Islington Village redevelopment study¹. Peak-period turning movement counts were conducted on Thursday, October 15, 2015 during the weekday morning and evening peak periods (7:00 to 9:00 AM and 4:00 to 6:00 PM) and on Saturday October 17, 2015 (10:30 AM to 1:30 PM). Daily traffic counts were conducted on Washington Street and School for a two day period using automatic traffic recorders (ATR).

¹ *Traffic Impact and Access Study, Islington Village Redevelopment*; Bayside Engineering; Woburn, MA; February 26, 2018.



Utilizing the projections from the study to develop baseline traffic volumes, Washington Street in front of the site is projected to carry approximately 20,000 vehicles per day (vpd) in 2023, with approximately 1,680 vehicles per hour (vph) during the weekday morning peak hour and approximately 1,940 vph during the weekday evening peak hour.

COLLISION ANALYSIS

Motor Vehicle Crash Data

Motor vehicle crash data for the study area was obtained from the MassDOT Crash Portal for 2017 through the end of 2022. The motor vehicle crash data was reviewed to determine crash trends in the study area. The crash data is summarized in Table 2 and included in the Appendix.

Four (4) crashes were reported within the vicinity of the site. Of these four (4) crashes, two (2) were sideswipe collisions, one (1) was a front-to-rear collision, and one (1) was a single vehicle crash. One (1) crash occurred during the morning peak hour period while the rest occurred outside of the peak hour periods. One (1) crash occurred under wet roadway conditions while the remainder occurred under dry conditions. Three (3) of the crashes resulted in only property damage while the outcome of the fourth is unrecorded. No fatalities were reported.

TABLE 2
MOTOR VEHICLE CRASH DATA SUMMARY^a

Scenario	Within 300 Feet of 190 Washington Street
<i>Year:</i>	
2017	0
2018	0
2019	1
2020	1
2021	1
<u>2022</u>	<u>1</u>
Total	4
<i>Average:</i>	0.67
<i>Type:</i>	
Angle	0
Rear-End	0
Head-On	0
Sideswipe	2
Single Vehicle Crash	1
Front-To-Rear	1
<u>Unknown</u>	<u>0</u>
Total	4
<i>Time of Day:</i>	
Weekday (7:00 to 9:00 AM)	1
Weekday (4:00 to 6:00 PM)	0
<u>Remainder of Day</u>	<u>3</u>
Total	4
<i>Pavement Conditions:</i>	
Dry	3
Wet	1
Snow/Ice	0
Other	0
<u>Unknown</u>	<u>0</u>
Total	4
<i>Severity:</i>	
Property Damage Only	3
Personal Injury	0
Fatal Accident	0
<u>Unknown</u>	<u>1</u>
Total	4

^aSource: MassDOT Impact Crash Portal.

^bAverage crashes over analysis period.

^cCrash rate per million entering vehicles (mev).

^dSignalized intersections are significant if rate >0.73 crashes per million vehicles, and unsignalized intersections are significant if rate >0.57 crashes per million vehicles.

TRAFFIC GENERATION

The site was previously used as an insurance agency (building square footage was approximately 3,162 gsf). The current proposal is to convert the existing 3,162 gsf into a hair salon on the first floor and office space on the second floor.

Former Site Traffic Generation

Site generated traffic was based on trip-generation data published by the ITE *Trip Generation* manual² for the existing vacant office building, assuming it were to be re-occupied. It was formerly an insurance agency office.

Trip generation data for Land Use Code (LUC) 710 – General Office Building was reviewed. The existing building comprises approximately 3,162 sf of space. The trip generation for the existing building is summarized in Table 3. The trip generation worksheets are included in the Appendix.

**TABLE 3
PREVIOUS TRIP GENERATION SUMMARY**

	Former Use as an Office Building Trips ^a
Average Weekday Daily Traffic	58
<i>Weekday Morning Peak Hour:</i>	
Entering	8
<u>Exiting</u>	<u>1</u>
Total	9
<i>Weekday Evening Peak Hour:</i>	
Entering	2
<u>Exiting</u>	<u>7</u>
Total	9

^aBased on ITE LUC 710 – General Office Building; 3,162 gsf.

On a typical weekday, the existing office would have been expected to generate 58 daily vehicle trips (29 vehicles entering and 29 vehicles exiting). During the weekday morning peak hour, 9 vehicle trips (8 vehicles entering and 1 vehicle exiting) would have been expected. During the weekday evening peak hour, 9 vehicle trips (2 vehicles entering and 7 vehicles exiting) would be expected.

²*Trip Generation*, Eleventh Edition; Institute of Transportation Engineers; Washington, DC; 2021.

Proposed Site Traffic Generation

Site generated traffic for the proposed salon and office was based on characteristics of in the current ITE *Trip Generation* manual³. ITE Land Use Code (LUC) 918 – Hair Salon and ITE LUC 710 – General Office were used. The Project’s traffic generation was determined as summarized in Table 4. The trip generation worksheets are included in the Appendix.

**TABLE 4
PROPOSED TRIP GENERATION SUMMARY**

	Proposed Hair Salon Trips ^a	Proposed Office Trips ^b	Total Trips
Average Weekday Daily Traffic	96	38	134
<i>Weekday Morning Peak Hour:</i>			
Entering	6	5	11
<u>Exiting</u>	<u>1</u>	<u>1</u>	<u>2</u>
Total	7	6	13
<i>Weekday Evening Peak Hour:</i>			
Entering	1	1	2
<u>Exiting</u>	<u>6</u>	<u>5</u>	<u>11</u>
Total	7	6	13

^aBased on ITE LUC 710 – Hair Salon; 1,887 gsf.

^bBased on ITE LUC 710 – General Office Building; 1,928 gsf.

On a typical weekday, the proposed Project is expected to generate 134 daily vehicle trips (67 vehicles entering and 67 vehicles exiting). During the weekday morning peak hour, 13 vehicle trips (11 vehicles entering and 2 vehicles exiting) are expected. During the weekday evening peak hour, 13 vehicle trips (2 vehicles entering and 11 vehicles exiting) are expected.

Table 5 compares the former office trip generation to those of the proposed Project.

³Ibid.

TABLE 5
TRIP GENERATION COMPARISON

	Former Use as an Office Building Trips ^a	Proposed Trips ^b
Average Weekday Daily Traffic	58	134
<i>Weekday Morning Peak Hour:</i>		
Entering	8	11
<u>Exiting</u>	<u>1</u>	<u>2</u>
Total	9	13
<i>Weekday Evening Peak Hour:</i>		
Entering	2	2
<u>Exiting</u>	<u>7</u>	<u>11</u>
Total	9	13

^aFrom Table 3.

^bFrom Table 4.

Compared to the existing office building, the proposed project would have comparable impacts during the weekday morning and weekday evening peak hours compared to the former office use. Four (4) additional peak hour trips would be expected. When spread out of the course of an hour, this equates to one additional vehicle every fifteen minutes, on average.

APPENDIX

TRIP GENERATION WORKSHEETS

190 Washington Street, Westwood, MA

Land Use Code (LUC) 710 - General Office Building

Source: Institute of Transportation Engineers (ITE) - 11th Edition

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Floor Area

Independent Variable (X): 3.162 ksf

AVERAGE WEEKDAY DAILY

$$\ln T = 0.87 \ln(X) + 3.05 \quad R^2 = 0.78$$

$$\ln T = 0.87 \ln(3.162) + 3.05 \quad 59 \text{ Studies, Average Rate} = 10.84 \text{ trips/ksf}$$

$$\ln T = 4.05 \quad \text{Avg size} = 163 \text{ ksf}$$

$$T = 57.49$$

$$T = 58 \text{ vehicle trips}$$

with 50% (29 vph) entering and 50% (29 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.86 \ln(X) + 1.16 \quad R^2 = 0.78$$

$$\ln T = 0.86 \ln(3.162) + 1.16 \quad 221 \text{ Studies, Average Rate} = 1.52 \text{ trips/ksf}$$

$$\ln T = 2.15 \quad \text{Avg size} = 201 \text{ ksf}$$

$$T = 8.59$$

$$T = 9 \text{ vehicle trips}$$

with 88% (8 vph) entering and 12% (1 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.83 \ln(X) + 1.29 \quad R^2 = 0.77$$

$$\ln T = 0.83 \ln(3.162) + 1.29 \quad 232 \text{ Studies, Average Rate} = 1.44 \text{ trips/ksf}$$

$$\ln T = 2.25 \quad \text{Avg size} = 199 \text{ ksf}$$

$$T = 9.45$$

$$T = 9 \text{ vehicle trips}$$

with 17% (2 vph) entering and 83% (7 vph) exiting.

SATURDAY DAILY

$$T = 2.21 * (X) \quad \text{No Formula}$$

$$T = 2.21 * (3.162) \quad 5 \text{ Studies, Average Rate} = 2.21 \text{ trips/ksf}$$

$$T = 6.99 \quad \text{Avg size} = 94 \text{ ksf}$$

$$T = 6 \text{ vehicle trips}$$

with 50% (3 vpd) entering and 50% (3 vpd) exiting.

0.95

0.95

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 0.53 * (X) \quad \text{No Formula}$$

$$T = 0.53 * (3.162) \quad 3 \text{ Studies, Average Rate} = 0.53 \text{ trips/ksf}$$

$$T = 1.68 \quad \text{Avg size} = 82 \text{ ksf}$$

$$T = 2 \text{ vehicle trips}$$

with 54% (1 vpd) entering and 46% (1 vpd) exiting.

0.32

0.32

190 Washington Street, Westwood, MA

Land Use Code (LUC) 918 - Hair Salon

Source: Institute of Transportation Engineers (ITE) - 11th Edition

Average Vehicle Trips Ends vs: ksf
Independent Variable (X): 1.887 ksf

DAILY

T = No Data
T = 1.887
T = 95.61
T = 96 vehicle trips
with 50% (48 vpd) entering and 50% (48 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = $1.45 * (X)$ Formula Not Given, Average Rate = 1.45 trij
T = $1.45 * (1.887)$ 1 Study, Average Size = 4 ksf
T = 6.55
T = 7 vehicle trips
with 83% (6 vph) entering and 17% (1 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF GENERATOR

T = $1.21 * (X)$ Formula Not Given, Average Rate = 1.21 trij
T = $1.21 * (1.887)$ 1 Study, Average Size = 4 ksf
T = 2.28
T = 2 vehicle trips
with 83% (2 vph) entering and 17% (0 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = $1.45 * (X)$ Formula Not Given, Average Rate = 1.45 trij
T = $1.45 * (1.887)$ 1 Study, Average Size = 4 ksf
T = 6.55
T = 7 vehicle trips
with 17% (1 vph) entering and 83% (6 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF GENERATOR

T = $1.94 * (X)$ Formula Not Given, Average Rate = 1.94 trij
T = $1.94 * (1.887)$ 1 Study, Average Size = 4 ksf
T = 3.66
T = 4 vehicle trips
with 38% (2 vph) entering and 62% (2 vph) exiting.

190 Washington Street, Westwood, MA

Land Use Code (LUC) 710 - General Office Building

Source: Institute of Transportation Engineers (ITE) - 11th Edition

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Floor Area

Independent Variable (X): 1.928 ksf

AVERAGE WEEKDAY DAILY

$$\ln T = 0.87 \ln(X) + 3.05 \quad R^2 = 0.78$$

$$\ln T = 0.87 \ln(1.928) + 3.05 \quad 59 \text{ Studies, Average Rate} = 10.84 \text{ trips/ksf}$$

$$\ln T = 3.62 \quad \text{Avg size} = 163 \text{ ksf}$$

$$T = 37.38$$

$$T = 38 \text{ vehicle trips}$$

with 50% (19 vph) entering and 50% (19 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.86 \ln(X) + 1.16 \quad R^2 = 0.78$$

$$\ln T = 0.86 \ln(1.928) + 1.16 \quad 221 \text{ Studies, Average Rate} = 1.52 \text{ trips/ksf}$$

$$\ln T = 1.72 \quad \text{Avg size} = 201 \text{ ksf}$$

$$T = 5.61$$

$$T = 6 \text{ vehicle trips}$$

with 88% (5 vph) entering and 12% (1 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.83 \ln(X) + 1.29 \quad R^2 = 0.77$$

$$\ln T = 0.83 \ln(1.928) + 1.29 \quad 232 \text{ Studies, Average Rate} = 1.44 \text{ trips/ksf}$$

$$\ln T = 1.83 \quad \text{Avg size} = 199 \text{ ksf}$$

$$T = 6.26$$

$$T = 6 \text{ vehicle trips}$$

with 17% (1 vph) entering and 83% (5 vph) exiting.

SATURDAY DAILY

$$T = 2.21 * (X) \quad \text{No Formula}$$

$$T = 2.21 * (1.928) \quad 5 \text{ Studies, Average Rate} = 2.21 \text{ trips/ksf}$$

$$T = 4.26 \quad \text{Avg size} = 94 \text{ ksf}$$

$$T = 4 \text{ vehicle trips}$$

with 50% (2 vpd) entering and 50% (2 vpd) exiting.

1.04

1.04

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 0.53 * (X) \quad \text{No Formula}$$

$$T = 0.53 * (1.928) \quad 3 \text{ Studies, Average Rate} = 0.53 \text{ trips/ksf}$$

$$T = 1.02 \quad \text{Avg size} = 82 \text{ ksf}$$

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

with 54% (1 vpd) entering and 46% (0 vpd) exiting.

0.52

0.00