

To: Alison C. Steinfeld, Planning Director
Town of Brookline Planning Department

From: James. D. Fitzgerald, P.E., LEED AP

Date: September 22, 2016

Subject: 420 Harvard Street - Traffic Peer Review

In general, the Traffic Impact Assessment by Vanasse & Associates, Inc. for the proposed development located at 420 Harvard Street and 49 Coolidge Street has been prepared in a professional manner, consistent with standard engineering practices with the exception of the issues identified below.

The Traffic Impact Assessment provides a comparison of anticipated trips generated by the proposed apartments and office/retail development. Plans showing proposed parking accommodations and circulation have also been reviewed. The following is a summary of Environmental Partners Group's traffic review of available documents.

Existing Conditions

Harvard Street, within the vicinity of the site, generally travels in a northwest/southeast direction and accommodates a single vehicle lane in each direction. On-street metered parking is provided intermittently along both sides of Harvard Street with operation Monday to Saturday, 8:00 AM to 8:00 PM with a maximum of two (2) hours. Sunday and holidays are excluded. Concrete sidewalks are provided along both sides of Harvard Street. Bicycle lanes are provided along most of Harvard Street with areas of shared vehicle/bicycle lanes. Land use along Harvard Street consists primarily of commercial properties. No speed limit is posted near the proposed site.

The primary project site is located at 420 Harvard Street, on the west corner of the Harvard Street at Fuller Street intersection. Fuller Street is a residential roadway that travels in a northeast/southwest direction and intersects Harvard Street at a four-legged signalized intersection. Additional exclusive left turn lanes exist at both Harvard Street approaches to the intersection. "No Parking Any Time" signs and "No Parking This Side" signs exist along both sides of Fuller Street within the vicinity of the site.

The project also includes redevelopment at 49 Coolidge Street that abuts the rear property line of 420 Harvard Street. Coolidge Street is parallel to Fuller Street and has a similar residential character except it is less traveled and has on-street parking. Coolidge Street intersects Harvard Street at an unsignalized intersection with Coolidge Street approaches operating under stop-sign control.

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A Massachusetts Bay Transit Authority (MBTA) Bus Route 66 stops at the intersection of Harvard at Coolidge Street, approximately 200 feet northwest of the project site. MBTA Bus Route 57/57A stops at the intersection of Brighton Avenue and Commonwealth Avenue which is approximately 2,700 feet north of the site. The Green Line (C Branch) has a local stop at Beacon Street at Summit Avenue approximately 2,100 feet south of the project site. The Green Line (B Branch) has a local stop at Commonwealth Avenue at Harvard Avenue approximately 2,100 feet north of the site.

Proposed Project

The latest proposed project entails the redevelopment of an existing office/residential building located at 420 Harvard Street from 3 apartments and 6,177 square feet of office space into 21 apartments and 4,815 square feet of retail space. It is our understanding that the most recent proposal anticipates 2,100 square feet of this retail space will be used for the (existing) ReMax office.

This project also includes the redevelopment of the adjacent property at 49 Coolidge Street from a single family residence into 3 apartments.

Access to 420 Harvard will be provided by way of the existing curb cut onto Fuller Street. Parking is proposed for 24 vehicles at the 420 Harvard site in a below-grade garage for residential, retail and ReMax uses. The existing driveway at 49 Coolidge Street will remain but will provide four (4) tandem surface parking spaces for commercial parking only.

Existing Traffic Volumes

July 2016 Turning Movement Counts were collected for this report during typical weekday morning and evening hours. Traffic volumes during the month of July are typically higher than the yearly average and appropriate for analysis without increasing. However, with the Devotion School located nearby, the July counts do not capture typical school traffic and pedestrians. Therefore observations were made to verify existing operations as discussed below.

The study limits appear to be reasonable and include the intersections of Harvard Street at Fuller Street and Harvard Street at Coolidge Street.

Intersection Safety

The report included a review of crash data at the study intersections from MassDOT. The number of accidents at the Harvard Street/Fuller Street intersection and at the Harvard Street/Coolidge Street intersection for the five-year period of 2010 through 2014 was found to be 8 and 3 respectively.

Crash rates were not calculated for either intersection in order to compare to MassDOT averages. Based on our evaluations of the provided crash history, the crash rates appear to be 0.32 C/MEV and 0.13 C/MEV at the Harvard Street/Fuller Street intersection and the Harvard Street/Coolidge Street intersection respectively, well below the State and District averages.

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However Town of Brookline accident data from MassDOT is known to be lacking due to (an) IT failure between the BPD and Mass RMV computer systems. Therefore reports from the Brookline Police Department would likely provide more accurate and reliable results.

Projected Traffic Volumes

Existing traffic volumes were projected the required 7 years to 2023 using an assumed background growth rate of 1% per year.

The report identifies four (4) development projects that are proposed within the area that would have an impact on future traffic volumes at study intersections: 384 Harvard Street, 345 Harvard Street, 40 Center Street, and 1299 Beacon Street. It appears that additional traffic volumes were incorporated in establishing the 2023 No-Build volumes (in addition to the 1% annual growth) but back up data was not provided to verify how the No-Build volumes were established.

Given the proximity to the above transit opportunities and general mode splits in the Town of Brookline, a reduction in anticipated site generated traffic was assumed based on census data from 2010-2014 American Community Survey 5-Year Estimates for Brookline. Based on the "Commuting to Work" information in this document, 26.7% of commuters use public transportation, 15.8% walk, 5.0% use other means and 7.2% work at home. Therefore projected apartment trips were reduced by 54.7% which seems reasonable. However the same 54.7% reduction was also used on retail trips which are unsupported given this was "Commuting to Work" information.

Trips were generated using the Institute of Transportation Engineers (ITE) LUC 220 for Apartments. According to ITE, "apartments are rental dwelling units located within the same building with at least three other dwelling units." The average rate method was used in generating apartment trips. However, the fitted curve method is more appropriate given the ITE data and would result in slightly greater anticipated trips, increasing volumes slightly from 12 to 15 trips in the morning peak hour and from 15 to 31 in the evening peak hour.

Based on the most recent proposal as outlined in a presentation by the Applicant on September 13, 2016, the size of the development has changed to consist of 24 apartments and 4,815 square feet of (subdividable) retail. It is our understanding that approximately 2,100 square feet of the retail will be used by the existing ReMax office, leaving approximately 2,715 of new retail development. Trip generation calculations for the retail use were based on 1,465 square feet instead of 2,715 square feet.

LUC 826 Specialty Retail Center was used in calculating retail trips. According to ITE, "specialty retail centers are generally small strip shopping centers that contain a variety of retail shops and specialize in quality apparel, hard goods and services, such as real estate offices, dance studios, florists and small restaurants." Available data points in ITE for this LUC are very limited, significantly impacting the accuracy of predicted trip generation. For instance, in the case of the evening peak hour, three data points are provided for approximately 15,000 square foot retail ranging from 45 to almost 100 trips and only two other data points are provided, both for substantially larger developments. (The provided trip generation for 1,465 square feet of retail calculated only 4 trips- 2 entering and 2 exiting- during the evening peak using ITE's average rate while using the fitted curve equation would result in 25 trips.) Since the proposed

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retail space is significantly smaller than the smallest data points provided for specialty retail space, local data or a different LUC would be required in order to accurately estimate the retail trips. Also identifying the type of retail proposed in the remaining space would assist in identifying the appropriate LUC and establishing the trip generation.

Traffic generated by the minor retail use is anticipated to peak on Saturdays; traffic counts and evaluations of site generated traffic were not provided for a Saturday mid-day peak hour.

Traffic Operations

Traffic analysis was performed to compare the future 2023 No-Build to the 2023 Build, reflecting the proposed residential/retail trips. Negligible increases in delay are anticipated with the volumes as they currently appear in the report without the above anticipated increases in trip generation.

- The Harvard Street/Fuller Street intersection will continue to operate at a LOS B during both morning and evening peak hours.
- The unsignalized Coolidge Street approach to Harvard Street will continue to operate a LOS C during the morning and evening peak hours.

Operations during the Saturday Mid-day peak hour were not evaluated.

Environmental Partners observed traffic briefly during the morning and evening peak periods to verify delays and queues in the operational analysis for a time when school was in session. A maximum of 6 vehicles (and an average of 3 vehicles) were observed to queue along the Fuller Street approach to Harvard Street during our brief observations in the morning peak period. A maximum of 4 vehicles (and an average of 3 vehicles) queued during the evening peak. The Fuller Street delays and queues documented in the report's analyses results for existing conditions are similar to those observed except longer queues were observed during the morning peak period (in September) compared to the operational analysis of traffic counts (from July). In all instances observed, queued vehicles cleared the intersection in one cycle.

At times during the morning peak hour, traffic will queue in front of the proposed site driveway as it does today but will continue to clear during each cycle, allowing exiting driveway vehicles to turn left onto Fuller Street. As discussed above, revisions to the trip generation are recommended to establish more accurate traffic volumes entering/exiting the site. The volumes presented in the study (before making refinements to trip generation) show only 4 exiting vehicles turning left from the site during the morning peak hour and 3 lefts during the evening peak hour. Even with a substantial increase in these volumes, it is still likely that one vehicle will turn left from the driveway every several minutes and therefore should be able to break into the stream of traffic similar as is done today.

Pedestrian Accommodations

The site plan shows pedestrian access to the lobby (including the elevator and stairs) via Fuller Street that is flush with the sidewalk elevation. Pedestrian access is also provided from the below-grade garage to the lobby via an elevator.

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The driveway entrance should not be depressed but should be at the elevation of the sidewalk to minimize impacts by pedestrians. This will also serve to bring attention to pedestrians in the sidewalk given the wide curb cut in a densely residential area and the Devotion School nearby. The Applicant has proposed illuminated actuated warning lights to warn pedestrians of exiting vehicles.

This redevelopment project will increase the foot traffic in the area. Considerations should be made for traffic signal upgrades including Accessible Pedestrian Signals and upgraded wheelchair ramps at the Harvard Street at Fuller Street intersection.

Parking- Spaces

24 parking spaces have been proposed in an underground garage at 420 Harvard Street. Of these spaces, 16 spaces are tandem and 8 are in a single row (two of which are handicapped). 8 spaces have been restricted to compact vehicles only.

The 8 single row spaces are for fulltime residential use only.

The second row of the tandem spaces (8 spaces) are for fulltime residential use only. The first row of the tandem spaces (8 spaces) is to be used by commercial uses during the daytime hours of 8am to 5pm and for residential uses during the nighttime hours of 5pm to 8am. It is the Applicant's intent that, during daytime hours, all keys of commercial vehicles will be managed by the commercial tenants for ease of mobility allowing for commercial vehicles to be moved for blocked (second row) residential vehicles. Residents in the second row trapped by a commercial vehicle during daytime hours will be required to go to the commercial establishments to ask for the vehicle to be moved in order to exit or enter the garage. It is unclear where entering vehicles will park temporarily while looking for someone to move the obstructing vehicle. It is anticipated that this shared parking system will be inconvenient without having a full time parking attendant on site.

4 tandem parking spaces are also proposed at 49 Coolidge Street for fulltime commercial tenants only, bringing the total of commercial parking spaces during the daytime to 12. As it is understood, these 12 spaces are for the employees and customers of ReMax and the remaining 2,700 square feet of retail space.

The Applicant committed that commercial owners will manage the keys of parked vehicles. Assuming the spaces will also be used for customers of the retail space or ReMax, it would be difficult to locate customers if they visit multiple businesses in the area. Customer use of these parking spaces would be feasible with an onsite fulltime parking attendant so customer vehicles can be moved.

During the nighttime hours when all 16 tandem spaces are used for residential purposes, it remains unclear how convenient parking can be provided when 8 parking spaces in the second row must contact owners in the first row to move their vehicle while they may be asleep, out or away. Again, it is anticipated that this shared parking system will be inconvenient without having a full time parking attendant on site.

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With the tandem parking at 49 Coolidge Street being used fulltime for commercial use, parking for the redeveloped house (three apartments) is anticipated to participate in the underground parking at 420 Harvard Street.

The total daytime commercial parking spaces will total 12 including the Fuller Street lot and the Coolidge Street lot (4 fulltime and 8 additional daytime spaces), 4 of which are for compact vehicles.

The nighttime residential parking totals 24 spaces (16 fulltime and 8 additional nighttime spaces), 8 of which are for compact vehicles. This would allow for one space per apartment should a convenient park share arrangement be worked out. It should be noted that the number of parking spaces for the apartments is lower than is required by the Town of Brookline Zoning By-Law. Also the percentage of spaces for compact vehicles (33%) exceeds the 25% maximum in the Zoning By-Law without authorization by special permit.

Parking- Access

The existing curb corners are located directly in front of the driveway openings and therefore do not allow for a vehicle to turn into or out of the driveway. The curb corners need to be offset from the opening to allow a vehicle to turn right into or out of the opening.

The ramp down to the garage is proposed at an 8% slope for the first 10 feet and then 16% for the remaining 45 feet and will be exposed to the elements. A slope of 16% is steep and especially problematic if exposed to snow and ice. At a minimum, considerations should be made for shielding the ramp from the elements or providing a heated surface.

The ramp grading does not meet the Zoning By Law 6.04.4.e indicating in no case shall the grade of the driveway within 20 feet of the property line be greater than 10 percent. A longer blending area to the sidewalk is recommended.

There is inadequate space for a standard passenger vehicle turning template to navigate the 180 degree turn at the bottom of the entrance ramp, even with conflicting with opposing (exiting) vehicles.

Sight Distance

Sight distance was reviewed for the site driveway. Speed data for Fuller Street was not provided and speed limit signs are not posted. Therefore a speed of 30 mph has been assumed for this thickly settled location. An independent sight distance calculation was performed using Stopping Sight Distance (SSD) calculations from the American Association of State Highway and Transportation Officials (AASHTO), the minimum sight distance required. Based on this, a sight distance of 200 feet is required for 30 mph.

Visibility from the proposed driveway will be limited by an existing 7 foot tall wooden fence along the southwestern property line that extends to the back of sidewalk. The wooden fence has alternating areas of pickets with smaller open spaces limiting visibility from the proposed driveway. Due to the fence obstruction, sight distance for a vehicle stopped behind the sidewalk

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without protruding into the sidewalk is estimated at only 150 feet, which does not meet the 200 foot sight distance requirement for 30 mph.

Zoning bylaw requirements (Section 6.04.4.f.1) for sight distance to pedestrians appears to be met.

Transit

The report recommends providing transit schedules on site, although not yet shown on the plans.

The following other Transportation Demand Management strategies will be *considered* according to the Applicant: providing a MBTA Charlie card to each new household after establishing residency; provide information on available pedestrian and bicycle facilities in the vicinity of the project site in a centralized location; promote MassRIDES to residents to arrange carpool matching between residents of the project and other neighborhood residents; and promote nearby Zipcar locations.

Bicycle

Bicycle racks have been proposed on the site plan.

Loading Zone/Trash Pickup

A new loading zone/trash pick-up area is proposed on-site, within the existing curb cut immediately north of the access to the parking garage.

Turning templates show that a southbound single unit truck will be unable to turn right into the loading bay. In order to accommodate this movement, the existing curb corner would need to be widened and the truck would have to encroach into oncoming (northbound) traffic to swing into the loading zone. Trucks backing into the loading zone from the same southbound Fuller Street direction would also have to encroach opposing traffic but to a lesser degree.

Loading times should be restricted to off-peak times to minimize traffic impacts and allow for easier access to the loading zone.

Provisions should be made for pick-up and drop-off traffic near the Fuller Street doorway to the proposed apartment lobby. Given the narrow nature of Fuller Street and the potential for stopped vehicles to block traffic and impacting the Harvard Street intersection, consideration should be made for restricting stops along Fuller Street in front of the proposed site and use the outer-most portion of the loading zone as a place for pick-up and drop-off vehicles to stop outside of the stream of Fuller Street traffic and pedestrians along the sidewalk.

Summary

- Accident data from the Brookline Police Department would provide more accurate and reliable crash results than those used from MassDOT.

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- Backup traffic volumes for the four (4) development projects anticipated have an impact on future traffic volumes at study intersections were not provided to verify how the No-Build volumes were established.
- Justification for using the 54.7% "Commuting to Work" reduction on retail trips should be provided.
- The fitted curve method should be used in generating morning and afternoon apartment trips for LUC 220 (Apartments) instead of the average rate method, increasing volumes slightly from 12 to 15 trips in the morning peak hour and from 15 to 31 in the evening peak hour.
- Based on the most recent proposal, it is our understanding that approximately 2,100 square feet of the 4,815 square feet of (subdividable) retail will be used by the existing ReMax office, leaving approximately 2,715 of new retail development. Trip generation calculations for the retail use were based on 1,465 square feet instead of 2,715 square feet.
- Available data points in ITE for LUC 826 Specialty Retail Center are very limited, significantly impacting the accuracy of predicted trip generation. Since the proposed retail space is significantly smaller than the smallest data points provided for specialty retail space, local data or a different LUC would be required in order to accurately estimate the retail trips. Also identifying the type of retail proposed in the remaining space would assist in identifying the appropriate LUC and establishing the trip generation.
- Traffic generated by the minor retail use is anticipated to peak on Saturdays; traffic counts and evaluations of site generated traffic were not provided for a Saturday mid-day peak hour.
- While traffic volumes during the collection month of July are typically higher than the yearly average and appropriate for analysis without increasing, observations were made while school is in session to identify potential increases in traffic given the nearby Devotion School. Brief observations in September show similar operations between the operational analysis of traffic counts (from July) with the observations (in September) except for longer queues during the morning peak in September. In all instances, traffic cleared the intersection in one cycle.
- At times during the morning peak hour, traffic will queue in front of the proposed site driveway as it does today but is anticipated to continue to clear during each cycle, allowing exiting driveway vehicles to turn left onto Fuller Street. As discussed above, revisions to the trip generation are recommended to establish more accurate traffic volumes entering/exiting the site. The volumes presented in the study (before making refinements to trip generation) show only 4 exiting vehicles turning left from the site during the morning peak hour and 3 lefts during the evening peak hour. Even with a substantial increase in these volumes, it is still likely that one vehicle will turn left from the driveway every several minutes and therefore should be able to break into the stream of traffic similar as is done today.

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- The driveway entrance should not be depressed but should be at the elevation of the sidewalk to minimize impacts by pedestrians. This will also serve to bring attention to pedestrians in the sidewalk given the wide curb cut in a densely residential area and the Devotion School nearby. The applicant has proposed illuminated actuated warning lights to warn pedestrians of exiting vehicles.
- This redevelopment project will increase the foot traffic in the area. Considerations should be made for traffic signal upgrades including Accessible Pedestrian Signals and upgraded wheelchair ramps at the Harvard Street at Fuller Street intersection.
- It is anticipated that this shared parking system (for both retail and resident uses) will be inconvenient without having a full time parking attendant on site. Without a fulltime attendant, it is unclear where entering vehicles will park temporarily while looking for someone to move the obstructing vehicle in the shared spaces. During the daytime, drivers who are blocked by a vehicle in the first row of tandem parking will have to go to the retail spaces to ask for the car to be moved. Long delays would result if the obstructing vehicle is owned by a customer who has gone into another store in the vicinity and cannot be located. At nighttime, residents of the apartments will have to contact owners in the first row of the tandem parking to move their vehicle but they may be asleep, out or away.
- The total daytime commercial parking spaces will total 12 including the Fuller Street lot and the Coolidge Street lot (4 fulltime and 8 additional daytime spaces), 4 of which are for compact vehicles. The nighttime residential parking totals 24 spaces (16 fulltime and 8 additional nighttime spaces), 8 of which are for compact vehicles. This would allow for one space per apartment should a convenient park share arrangement be worked out. It should be noted that the number of parking spaces for the apartments is lower than is required by the Town of Brookline Zoning By-Law. The percentage of spaces for compact vehicles (33%) exceeds the 25% maximum in the Zoning By-Law without authorization by special permit.
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- The ramp down to the garage is proposed at an 8% slope for the first 10 feet and then 16% for the remaining 45 feet and will be exposed to the elements. A slope of 16% is steep and could be especially problematic if exposed to snow and ice. At a minimum, considerations should be made for shielding the ramp from the elements or providing a heated pavement surface.
- The ramp grading does not meet the Zoning By Law 6.04.4.e indicating in no case shall the grade of the driveway within 20 feet of the property line be greater than 10 percent. A longer blending area to the sidewalk is recommended.

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- There is inadequate space for a standard passenger vehicle turning template to navigate the 180 degree turn at the bottom of the entrance ramp, even with conflicting with opposing (exiting) vehicles.
- Sight distance from the proposed driveway will be limited by an existing 7 foot tall wooden fence along the southwestern property line that extends to the back of sidewalk. Due to the fence obstruction, sight distance for a vehicle stopped behind the sidewalk without protruding into the sidewalk is estimated at only 150 feet, which does not meet the 200 foot sight distance requirement for 30 mph.
- The report recommends providing transit schedules on site, although not yet shown on the plans. The following other Transportation Demand Management strategies will be *considered* according to the Applicant: providing a MBTA Charlie card to each new household after establishing residency; provide information on available pedestrian and bicycle facilities in the vicinity of the project site in a centralized location; promote MassRIDES to residents to arrange carpool matching between residents of the project and other neighborhood residents; and promote nearby Zipcar locations.
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- Loading times should be restricted to off-peak times to minimize traffic impacts and allow for easier access to the loading zone.
- Provisions should be made for pick-up and drop-off traffic near the Fuller Street doorway to the proposed apartment lobby. Given the narrow nature of Fuller Street and the potential for stopped vehicles to block traffic and impacting the Harvard Street intersection, consideration should be made for restricting stops along Fuller Street in front of the proposed site and use the outer-most portion of the loading zone as a place for pick-up and drop-off vehicles to stop outside of the stream of Fuller Street traffic and pedestrians along the sidewalk.

Please do not hesitate to contact me with any questions.