

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

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

Date: October 18, 2016

Subject: 420 Harvard Street ó Responses to Traffic Peer Review

In general, Vanasse & Associates' responses and subsequent evaluations adequately address Environmental Partners' comments with a few exceptions. The following outlines items that require further clarification and relevant items that have been addressed. (Skipped comments are those that are not anticipated to require further discussion.)

Comment 1

EPG's Original Comment: Accident data from the Brookline Police Department would provide more accurate and reliable crash results than those used from MassDOT.

VAI's Response: *Accident data has been provided from the Brookline Police Department for Harvard Street/Fuller Street, Harvard Street/Coolidge Street, and Fuller Street between Harvard Street and Winchester Street. A total of 21 crashes were identified for January 2015 to date. Only four (4) crashes were significant enough to require an official Police Report; none of these occurred at the Harvard Street/Fuller Street intersection and one (1) occurred at the Harvard Street/Coolidge Street intersection.*

The remaining 17 crashes were minor events and either did not require police reports or were reported by operators after the events occurred. In these cases, only Accident Abstract Reports are available and these do not indicate type, road surface, lighting, or other identifying information. A summary of the data is provided in the Technical Appendix to this document.

EPG's Response: The provided crash data from the Police Department shows an increase in crashes from that previously presented using MassDOT records. At the Harvard/Coolidge intersection, 5 crashes in three years were recorded, resulting in 1.7 crashes per year (higher than the 0.6 crashes per year found in MassDOT data). At the Harvard/Fuller intersection, 7 crashes were recorded in three years, resulting in 2.3 crashes per year (higher than the 1.6 crashes per year found in MassDOT data). Even with the higher crash data

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from the Police Department, however, the crash rate calculation (comparing crashes to traffic volumes) remains significantly lower than the statewide and local district averages. Therefore, safety deficiencies at the two intersections are not apparent in the Police Department and MassDOT crash records.

Comment 2

EPG's Original Comment: 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.

VAI's Response: *No traffic studies were prepared for these four projects; therefore VAI estimated trip generation and distribution onto the study network. The backup data is provided in the Appendix.*

EPG's Response: VAI's approximate trip generation of four anticipated nearby developments used to establish future No-Build volumes appears to be reasonable. Volumes are conservatively high as they were not reduced to account for alternative modes of transportation such as walking, bicycling and transit commuters.

Comment 3

EPG's Original Comment: Justification for using the 54.7% "Commuting to Work" reduction on retail trips should be provided.

VAI's Response: *The census data does not track mode split of retail trips in this area. However, observations indicate significant foot traffic to the retail shops and stores from the neighborhood and adjacent shops. Our expectation is that the retail use would be more of a local attraction with trips made from the neighborhood and adjacent shops and uses, and not a long-distance destination requiring a trip via automobile.*

In addition, a planning study conducted for the City of Cambridge determined a retail mode share of 35 percent automobile trips for the Central Square/Kendall Square area, an area of retail mixed with commercial and residential development similar to this area of Brookline. This would indicate a 65 percent reduction on retail trips compared with the 54.7 percent used in the study, making the analysis approach used in the study conservative. Excerpts from the study are included in the Appendix.

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EPG's Response: Based on the provided supplemental information and the minor retail use, EPG concurs that 54.7% seems to be a reasonable reduction for retail trips.

Comment 5

EPG's Original Comment: 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.

VAI's Response: *The size of the retail component continues to evolve. For the September 8 traffic update, the retail was proposed at 1,465 square feet (sf). The latest plans have noted the retail at 2,106 sf.*

EPG's Response: The additional retail size of 2,106 sf has been used in the revised trip generation calculations. The retail and ReMax square footage is not shown on the provided site plans for verification however.

The revisions to trip generation were incorporated into the traffic model and analyzed in order to update the comparison between 2023 No-Build and 2023 Build operations (and identify operational impacts caused by site generated traffic). The minor changes continue to show that the site will have only a negligible impact on adjacent intersections, increasing delay along the eastbound Fuller Street approach by only 1 second during the morning peak hour.

Comment 6

EPG's Original Comment: 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.

VAI's Response: *The retail tenant is not known at this time. All that is known is that some "dry", i.e. non-food retail is expected. Regarding the use of LUC 826, it is acknowledged that data points for this use are limited; however, the other retail and service uses for which data exist are very specific and not appropriate to this site; i.e., the retail is not proposed to be a "Tractor Supply Store" or a "Home Improvement Warehouse".*

The benefit of using Specialty Retail Center is that some of the store types contained in that land use’s database could go in to the site, such as apparel, hard goods, and florists. A similar type of use, LUC 820 “Shopping Center” was also reviewed, but the average size of 331,000 sf is much larger than either the average for Specialty Retail Center (25,000 sf) or the proposed retail area for the site (1,465 sf). However, trips were calculated using the data from LUC 820, using the retail size of 1,465 sf for ease of comparison. The net result is one (1) additional trip during the weekday evening peak hour, with no additional trips during the weekday daily or weekday morning peak hour. During a Saturday daily period, the increase is 12 trips over a 24-hour period and during the Saturday midday peak hour the increase is one (1) additional trip. Since these results are similar to the original results using Specialty Retail Center, this is confirmation that the retail trip estimate is reasonably accurate. This is summarized in Table 1.

**Table 1
RETAIL TRIP GENERATION COMPARISON**

Time Period	Specialty Retail Center Trips ^a	Shopping Center Trips ^b	Difference
Average Weekday Daily Traffic	64	64	-
<i>Weekday Morning Peak Hour:</i>			
Entering	1	1	-
Exiting	<u>0</u>	<u>0</u>	<u>-</u>
Total	1	1	-
<i>Weekday Evening Peak Hour:</i>			
Entering	2	2	0
Exiting	<u>2</u>	<u>3</u>	<u>1</u>
Total	4	5	1
Average Weekday Daily Traffic	62	74	12
<i>Saturday Midday Peak Hour:</i>			
Entering	3	4	1
Exiting	<u>3</u>	<u>3</u>	<u>0</u>
Total	6	7	1

^aBased on ITE LUC 826, Specialty Retail Center and 1,465 sf.

^bBased on ITE LUC 820, Shopping Center and 1,465 sf.

This comparison was based on the previous size of 1,465 sf. At the currently proposed size of 2,106 sf, the difference is 1 additional AM trip; 2 additional PM trips, and 3 additional Saturday midday trips using LUC 826; using LUC 820 the difference is 1 additional AM trip; 3 additional PM trips; and 3 additional Saturday midday trips.

EPG’s Response:

A trip generation comparison of a “Shopping Center” use was provided for lack of better available information. The result was a negligible difference from the originally used “Specialty Retail Center”. While neither LUC is ideal for the retail component of

this development, any further studies of the retail component's trip generation would likely identify minimal (if any) changes and have a negligible impact on vehicular delay given the minor retail use and the high percentage of non-vehicular trips anticipated.

Comment 7

EPG's Original Comment: 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.

VAI's Response:

As shown in Table 2, Saturday midday peak-hour trips are not considerably greater than those during the weekday evening peak hour. Two (2) additional vehicle trips over the course of a 60-minute period is not likely to change intersection operations or result in a significant delay at any location.

Research was conducted into traffic conditions on a Saturday in this area. The Brookline Transportation Engineering Department was contacted for any Saturday traffic count information in this area, but was not able to provide any data. Peak hour counts were obtained for another location in Brookline at the intersections of Hammond Street with Heath Street and Boylston Street. These data indicate that the Saturday midday peak-hour volume is lower than either the weekday morning peak hour or the weekday evening peak hour. This data is shown in Table 2.

**Table 2
PEAK HOUR VOLUME COMPARISON**

Time Period	Hammond Street at Heath Street (vehicles per hour)	Hammond Street at Boylston Street (vehicles per hour)
Weekday Morning Peak Hour	1,390	3,889
Weekday Evening Peak Hour	1,508	3,791
Saturday Midday Peak Hour	1,204	3,674

^aBased on counts conducted in November 2014 by VAI.

^bBased on counts conducted in October 2016 by VAI.

In addition, data from the nearest continuous traffic-volume counter¹ was obtained that indicates Saturday volumes represent approximately 81 percent of the average weekday volume at this location. This information is provided in the Appendix. By inference, this indicates that Saturday volumes in the area are likely no higher than weekday volumes and the retail trips are not

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expected to have an impact any more significant than what has been shown during the weekday morning peak hour or the weekday evening peak hour.

EPG's Response:

Based on the provided data showing less traffic on Town roadways on Saturdays versus weekdays and the fact that the retail component of the proposed development is minor, further evaluation of the Saturday peak hour does not appear to be warranted.

Comment 10

EPG's Original Comment: 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.

VAI's Response:

The driveway ramps have been revised so that the ramp grading starts at the back of the sidewalk. REVISED PLANS TO BE PROVIDED.

EPG's Response:

VAI's response is not accurate; the revised plans continue to show a depressed driveway. Wheelchair ramps have been added on either side to connect to the existing sidewalks. While the proposed configuration likely eases slope deficiencies along the proposed ramps, it requires pedestrians to transition to the elevation of the roadway, similar to crossing at a street. A conventional driveway apron with minor elevation transitions on either side is recommended to minimize impacts to pedestrians and to highlight the pedestrian sidewalk given the wide curb cut in a densely residential area with the Devotion School nearby.

Comment 11

EPG's Original Comment: 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.

VAI's Response:

The project provides negligible impacts at the intersection and is providing affordable housing in the area which is a benefit for the Town; off-site mitigation such as an upgrade of adequately functioning traffic signals is not possible.

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EPG's Response:

The evaluations depend on reduced site generated vehicular traffic due to substantial use of alternative modes of transportation such as walking, transit (requiring walking to stops) and bicycling. Providing safety features directly adjacent to the proposed site will only serve to benefit the safety of residents and will encourage these alternative modes of transportation. Considerations should be made for traffic signal upgrades including Accessible Pedestrian Signals and upgraded wheelchair ramps at the Harvard Street at Fuller Street intersection.

Comment 12

EPG's Original Comment: 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.

VAI's Response:

The parking system has been revised to provide 4 commercial spaces and 19 residential spaces for a total of 23 spaces in the garage. There will be no sharing of spaces. Customers of the office and retail uses will not be permitted to park in the garage. Twelve spaces will be tandem spaces and residents will be required to coordinate access to the second row of spaces. REVISED PLANS TO BE PROVIDED

EPG's Response:

The parking garage plan shows a total 16 tandem spaces (not 12). Of these tandem spaces, 12 tandem spaces will be used for residents while 4 will be for commercial (employee) use. There are an additional 7 single row residential spaces in the garage. An additional 4 tandem spaces are available for commercial (employee) use at the 49 Coolidge parcel.

In summary, the total spaces consist of:

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Commercial Parking:	4 compact/tandem spaces, in garage
	4 standard/tandem spaces at #49 Coolidge
Residential Parking:	4 compact /tandem spaces in garage
	8 standard/tandem spaces in garage
	6 standard/single-row in garage
	<u>1 accessible/single-row in garage</u>
TOTAL:	27 spaces

The label indicating number of parking spaces in the garage on the site plan should be revised to reflect the actual spaces in the garage per above.

Although it seems that coordination between employees to move parked vehicles in the tandem spaces is feasible, the question remains how residents will move their neighbor's vehicle to access their space. Without a fulltime attendant, it is unclear where entering vehicles will park temporarily while looking for someone to move the obstructing vehicle in the spaces. 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.

It is recommended that the accessible parking space be located on the shortest accessible route to the elevator, such as in the vicinity of spaces #9 and 10.

Comment 13

EPG's Original Comment: 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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VAI's Response: *The parking ratio has been reduced to provide a rate of 0.76 spaces per residential unit. This rate is consistent with the proposed town meeting warrant article on parking.*

EPG's Response: The town meeting warrant article has not been adopted yet. Regardless, the number of residential parking spaces is anticipated to be reasonable if a realistic system could be worked out to allow access into and out of the blocked tandem residential spaces. Without a reasonably efficient system, all of the identified parking spaces may not be utilized resulting in a lower parking space ratio.

The retail on-site parking has been designated as employee parking. Therefore, all driving customers for the retail space or ReMax will need to occupy on-street parking along Harvard Street or the municipal parking lot, reducing current supply.

Comment 14

EPG's Original Comment: 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. They need to be offset from the opening to allow a vehicle to turn right into or out of the opening.

VAI's Response: *REVISED PLANS TO BE PROVIDED*

EPG's Response: The revised plan only shows the northern curb corner offset at the driveway opening but not the southern corner. Based on passenger vehicle templates, the southern curb corner should also be offset from the opening to allow a vehicle to turn right onto Fuller Street without encroaching the curb.

Comment 15

EPG's Original Comment: 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.

VAI's Response: *REVISED PLANS TO BE PROVIDED*

EPG's Response: A heated pavement surface along the exit ramp has been labeled on the plan. Unless a wall is proposed to shield snow from drifting onto the entrance ramp, both ramps should be heated. Also, adequate drainage accommodations should be provided at the base of the ramps for drainage runoff.

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Comment 16

EPG's Original Comment: 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.

VAI's Response: *The ramp grading has been revised to an 8 percent slope within twenty feet of the property line.*

EPG's Response: The revised plan has been altered to provide the required 20 feet of 8% slope behind the sidewalk followed by 16% for the remaining distance.

Comment 17

EPG's Original Comment: 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.

VAI's Response: *REVISED PLANS TO BE PROVIDED*

EPG's Response: The revised parking layout has been redesigned to accommodate a vehicle to turn 180 degrees at the bottom of the ramp. The new clearance is just enough for one vehicle to either enter or exit the garage at a time; the width does not allow for two vehicles to pass concurrently (in opposite directions) at the 180 degree bend. Therefore, it is recommended that a mirror be provided at the bend for improved visibility of oncoming opposing vehicles.

Comment 18

EPG's Original Comment: 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.

VAI's Response: *The 200 foot sight distance requirement for 30 mph referenced above is for Stopping Sight Distance (SSD), which measures the distance between the major road driver's eye at a height of 3.5 feet and an obstruction in the road, representative of the height of automobile headlights and taillights. A vehicle traveling at 30 mph requires a certain distance to stop safely, while a vehicle traveling faster or slower requires more or less distance,*

respectively. Discussion with the Peer Reviewer indicated that the 30 mph major road speed was an estimate and that they had not performed speed measurements.

Accordingly, VAI conducted speed measurements on eastbound and westbound Fuller Street at the site driveway. These measurements are summarized in Table 3 below.

Table 3
FULLER STREET SPEED SUMMARY^a

Speed Characteristic	Fuller Street Eastbound (towards Harvard St) Miles per hour (mph)	Fuller Street Westbound (from Harvard St) mph
Average	18	18
85 th Percentile ^b	21	23
Posted Speed Limit	30	30

^aBased on speed observations conducted by VAI on September 29, 2016.

^bUsed in determination of sight distance requirements.

Based on AASHTO guidelines and the speeds shown in Table 3, the sight distance requirement for vehicles traveling on Fuller Street is approximately 120 feet for eastbound vehicles, and approximately 135 feet for westbound vehicles. Measurements conducted in the field indicate that a motorist traveling on Fuller Street either eastbound or westbound can see over 500 feet to the site driveway. Therefore, this requirement for safe SSD is met.

Another set of measurements was conducted at the request of the Peer Reviewer. This is the distance between a vehicle traveling eastbound on Fuller Street and an object representing a vehicle located at the back of the sidewalk, waiting to pull out from the driveway. This distance is shown below in Figure 1.

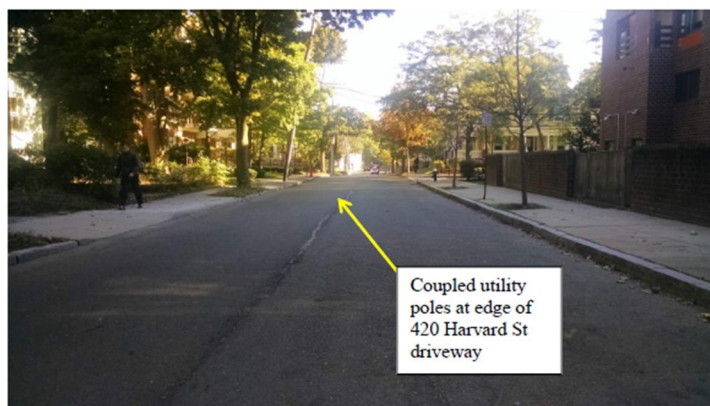


Figure 1: Eastbound Fuller Street Sight Distance of 418' to driveway.

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As shown in Figure 1 and measured in the field, a distance of 418 feet is available for motorists traveling eastbound on Fuller Street. This exceeds the SSD requirements identified by AASHTO for this criterion indicating safe sight distance is available. In addition, approximately 404 feet of sight distance is available from the proposed driveway location at the back of the sidewalk looking west up Fuller Street. This is shown in Figure 2.

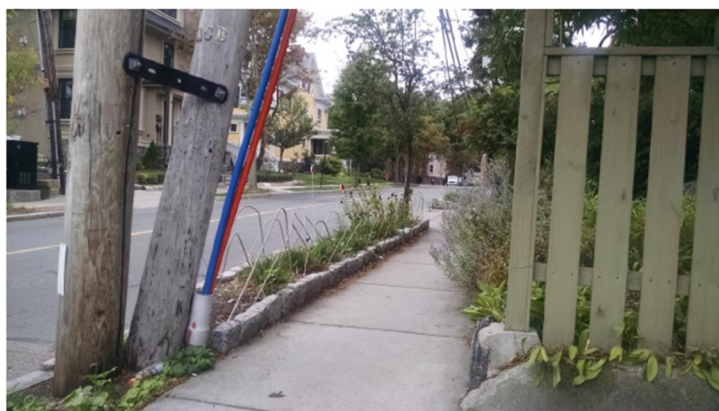


Figure 2: Westbound Sight Distance of 404' from driveway

It should be noted that the utility poles shown in Figure 2 are proposed to be relocated.

EPG's Response:

The above recent supplemental data shows a substantially slower 85th percentile travel speed of 21 to 23 mph along Fuller Street than the originally assumed conservative 30 mph. As a result, it appears that Stopping Sight Distance (SSD) is adequate. As explained above, SSD is the distance that the Fuller Street vehicle needs to safely stop before colliding with an obstruction in its path such as a vehicle exiting the site driveway. It is the minimum sight distance requirement and is being met.

Ideally, the driver exiting the site driveway would have additional visibility of oncoming Fuller Street eastbound traffic while stopped behind the sidewalk in order to reduce the potential for the exiting vehicle to protrude into the sidewalk to see oncoming traffic. (VAIø Figure 2 above shows line-of-sight of an exiting vehicle stopped on the sidewalk to gain clear sight of oncoming traffic.) The adjacent fence is not solid and the space between boards affords drivers stopped behind the sidewalk some small level of interrupted visibility. However, it is likely that some vehicles will stop in the sidewalk to get improved line-of-sight around the existing fence given the urban environment. Although alterations to the adjacent fence would be preferred, speed counts indicate a slow travel speed along Fuller Street and the minimum SSD requirements for Fuller Street traffic are met regardless.

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Comment 19

EPG's Original Comment: 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.

VAI's Response: *No response necessary.*

EPG's Response: It is anticipated that these TDM strategies will be followed.

Comment 20

EPG's Original Comment: 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 into opposing traffic but to a lesser degree.

VAI's Response: *REVISED PLANS TO BE PROVIDED*

EPG's Response: Vehicle templates were provided for a single-unit truck travelling southbound from Harvard Street, encroaching into opposing Fuller Street traffic and then backing into the loading bay. The relocated curb cut and additional (adjacent) ADA parking space allows easier access and less encroachment into northbound Fuller Street than originally shown. Also loading bay hours will be restricted to off peak times.

Comment 21

EPG's Original Comment: Loading times should be restricted to off-peak times to minimize traffic impacts and allow for easier access to the loading zone.

VAI's Response: *Trucks are proposed to back into the loading bay and accordingly deliveries will be restricted to off-peak times so as to minimize conflicts with traffic movements in the area.*

EPG's Response: Loading bay restriction times should be enforced.

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Comment 22

EPG's Original Comment: 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 outermost 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.

VAI's Response: *It is anticipated this area can be used as a drop-off area for motorists. It is also important to note that this is a 28-unit apartment building and pick-up and drop-off trips are expected to be low enough as to represent minimal conflicts with other users of the garage/loading bay.*

EPG's Response: The above intent to allow the loading zone to also be used as a pick-up/drop-off area has not been shown on the plan. It is anticipated that the loading bay usage for the proposed development will be low and will allow for the space to be shared with pick-up and drop-off vehicles.

Also, an ADA parking space has been provided between the entrance ramp and the loading bay. A grade difference is anticipated between the parking space and the ramp yet width for a wall has not been shown.

Please do not hesitate to contact me with any questions.