

October 31, 2012  
N-S Project No. 11258.002

Mr. Jeff Dobson  
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Director, Planning & Codes Department  
P.O. Box 788  
Brentwood, TN 37024-0788

**Subject: Review of Traffic Impact and Parking Study  
Streets of Brentwood Master Plan  
Brentwood, Tennessee**

Dear Jeff:

Per your request, please accept this correspondence as our review of the traffic and parking study for the proposed Streets of Brentwood project. The summary provides an independent technical review of the applicant's analysis and recommendations.

On behalf of H.G. Hill Realty Company and GBT Realty Corporation, RPM Transportation Consultants prepared a comprehensive technical study regarding the project's anticipated traffic and parking impacts. As stated in the master plan, and confirmed in the RPM study, the mixed-use project proposes to include the following land uses: 413,809 square feet (sf) of office space; 100,338sf of retail space; 40,000sf of restaurant uses; 1,650 seat modern cinema; 251 unit apartment; and a 150-room hotel. The applicant's study used customary transportation planning and engineering procedures to forecast and model anticipated impacts of the project.

The purpose of this independent review is to confirm the applicant's study procedures and assumptions, to assess the proposed recommendations and offer additional points of consideration. The review comments presented here follow the same sequence of topics as presented in the applicant's report.

Below you will find a brief summary outlining the contents of our report followed by the detailed analysis. The brief summary provides a glimpse of the main issues addressed. The detailed analysis gives background information and more specific explanations and discussion.

### **Summary of Review**

- Our review found the RPM traffic and parking study followed industry-standard practices. The report documents the typical steps and procedures for completing traffic impact studies.
- The traffic study discusses the importance and the project's reliance on shared trips and trips captured internally within the site. (*see page 3*)
- The report's analysis predicts that with the proposed improvements the expected traffic impacts can be managed by the surrounding transportation network. We reviewed the study's assumptions and procedures and generally accept its results. In some instances, our review highlights additional concerns and points of emphasis.
- The traffic study accounted for background traffic through the project's build-out year. The traffic study recommended a neutral 0% growth rate for future traffic. We suggest considering a 1% per year rate. The traffic study includes future traffic demand from projects not yet implemented but under development in the area. (*see page 3*)
- Our review noted the project's plan of utilizing multiple, distributed access points as a primary source for the project's ability to handle traffic flow around the site.
- We believe the study's shared parking analysis addresses the issues related to analyzing the site's parking needs. The study proposes a reduction in the required number of spaces based on the

shared parking analysis. The number of parking spaces proposed by the site plan is within the limits required by the zoning ordinance, but provides more spaces than the minimum recommended by the parking study. (*see page 5*)

- The study defines its project study limits within the area surrounding the proposed site. We have some concern that the impacts from the site will extend to other area intersections. City staff may wish to consider the need for the traffic study to include additional intersections.
- Our review provides additional comments and raises concerns with the position and design of specific access points. (*see pages 6 and 7*)
  - For Site Access 4 (Maryland Way East Garage), we recommend consideration of relocating the driveway to the west providing separation from the left-turn lane at Maryland Way and Franklin Rd.
  - For Site Access 5 (Franklin Rd Garage), we recommend entering left-turns be prohibited.
  - For Site Access 3 (Maryland Way West Garage), we express some concern for the close proximity of this drive to the East Park Drive intersection.
  - For all secondary access points (Site Access Points 3, 4 and 5), we recommend the proposed improvements include additional transition taper and storage lengths
  - For all secondary access points (Site Access Points 3, 4 and 5), we recommend consideration be given to providing a small concrete (curb) barrier as a median to physically prevent drivers from completing left-turn movements from the right-in/right-out driveways.
- We considered the study's recommendation of reducing the lane widths on the east leg of Church St at Franklin Rd. While there are safety considerations, we believe 11 foot lanes would not create any unusual negative impacts. As an alternative, we suggest the departing (eastbound) lanes of Church St could remain at 12 feet by adjusting the westbound approach lanes to 10.5 feet width. We also recommend additional arrow pavement markings be installed. (*see page 5*)
- We reviewed the study's proposal to modify the southbound lane assignments and traffic signal phasing at Maryland Way and East Park Drive. The study's recommendation proposes to re-assign southbound East Park Dr based on the study's proposed traffic projections while also accounting for the need to add the new southbound through movement into the site. As a result, the study proposed to provide a leading northbound left-turn phase and a permissive-only phasing for the southbound approach. In this arrangement, the proposal does not implement "split phase" operation. In either case, our review determined the East Park Drive signal will experience increased congestion and lower level-of-service, with particular impacts on the southbound approach lane groups. (*see page 8*)
- We recommend the traffic study utilize information from the city's existing coordinated signal system in conducting its traffic signal analysis. Incorporating actual signal timings and settings into the analysis will help standardize the study's assumptions and reduce variations in predicted results. Also, we suggest the study investigate utilizing permissive-only left-turn operation for side street phases. Where possible, this would likely result in more efficient signal operations and pedestrian crossing timings. We recommend the project applicant be required to provide measures to update surrounding coordinated signal timings. (*see page 9*)
- At the request of staff, we provide a brief discussion on the possibility that the 17 acre site be developed strictly with office space as allowed by current zoning. We present thoughts on the differences in dynamics between the mixed-use site and the possibility of a development with only office space. (*see pages 9 and 10*)



## **Full Report with Detailed Review**

### **Overview and Existing Conditions**

- The RPM study provides a detailed overview of the project including its site layout, intended land uses and points of proposed access. The applicant proposes a change to the site's zoning from C-1 to C-4 (commercial town center). Based on the site plan and described uses, the proposed project appears to meet the intent of the zoning district objectives and is within a 0.5 mile of the land originally zoned C-4, as required by the zoning ordinance.
- The traffic impact study adequately summarizes the proposed land uses. While specific square footage of individual leasable spaces could not be verified, we believe the study's analysis consistently applies the assumptions provided by the applicant's master plan.
- The traffic study repeatedly highlights the importance of the site's multi-use nature promoting shared and internal trips. This is a critical concept in terms of meeting its transportation goals and assumptions. In general, the proposed project, and its analysis, relies on the cross-sharing of land uses to reduce the dependency on vehicle-based trips. As the project moves through the review and approval process, the project, in part, should be reviewed in terms of its ability to meet its trip-sharing (i.e. internal capture) goals. Pedestrian connectivity and mobility within the site (particularly originating from parking areas and between site destinations) and from adjacent land uses (from Maryland Way and Franklin Road) will likely determine the site's success at reducing the magnitude of externally generated vehicle trips.
- In general, we concur with the proposal's approach to serve the site via several strategically positioned access points. The site's location and the nature of the surrounding roadway network limit the ability to expand or undertake extensive roadway improvements. In response, the site plan proposes to provide multiple connections with varying degrees of accessibility, varying from right-in/right-out driveways with turn restriction to full-access signalized intersection.
- While we support the use of restricted-use driveways, we recommend attention be placed on positioning, selection of allowed movements, and measures used to control prohibited turns.
- The traffic study sufficiently describes the project area's existing conditions and the data collected. Our review noted the study conducted some intersection volume counts on days when local schools were not in session. The study states the differences were not significant and completed a manual balancing of the traffic to help account for school-related traffic.
- We noticed the study's defined project area focused on the area surrounding the proposed site. We have some concern that the impacts from the site will extend to other area intersections already experiencing congested conditions. City staff may wish to consider the need for the traffic study to analyze intersections further west along Maryland Way, east along Church St or north along Franklin Rd.
- Our review noted minor inconsistencies between the existing peak hour traffic volume schematic (Figure 4) and the detailed turning movement count tables (Exhibit B). The counts for certain movements do not correlate. Although the differences are not significant, some review to ensure consistency may be justified.

### **Background Traffic Conditions**

- The study assumes project build-out to occur by 2016, providing a time horizon to estimate effects of background traffic.
- The impact study documents that traffic growth on the adjacent street network has declined over the last five years. Based on this, the study assumed a 0% growth rate for the background traffic.
- The traffic analysis estimates pending future growth created by three (3) site-specific projects currently under development (PLC tract, Tapestry and proposed Synergy hotel). We concur that it is good practice to account for nearby projects that may, in effect, contribute to future background traffic. Although the study addresses traffic from the Synergy hotel, we note traffic from Synergy's proposed commercial land uses was not considered. While some of this traffic may act as pass-by traffic, the Synergy retail land uses would contribute some demand. As a result, overall



conditions at the relocated Hill Center Brentwood/Executive Center Drive intersection may be underestimated based on future hotel and retail uses.

- It is often a subjective decision based on professional judgment whether to use a 0% growth rate when historic data reports negative traffic growth. Recent economic conditions likely have been the greatest contributor to this. While the impact study accounted for known projects, city staff may desire consideration of a modest background growth rate if it reasonably expects economic conditions to change. We feel a 1% per year growth rate may be a reasonable expectation.

#### Traffic Generation

- The traffic study references use of the 8<sup>th</sup> Edition of ITE’s *Trip Generation Manual* to forecast expected site-generated trips. It should be noted the 9<sup>th</sup> Edition is now available. We reviewed the 9<sup>th</sup> Edition and found some guidelines had not changed, and those that did would result in only minor differences.
- Our review found that the traffic study mistakenly identifies the Apartment land use code as 230. The correct code is 220. However, we believe the analysis uses the proper formulas and calculations. City staff may desire the applicant to verify this.
- We concur with overall procedures used to forecast the trips generated by each land use. The analysis predicts the development will generate an unadjusted total of 1,394 AM and 2,036 PM trips. These raw numbers do not reflect the reductions in trips based on “pass-by” (25%-30%) and internal capture (30%-40%) factors that are used by the study, and typical of industry standards.

	Trip Generated By Proposed Site				
	Daily Traffic	AM Peak		PM Peak	
		Enter	Exit	Enter	Exit
<b>Unadjusted (Raw) Total Trips</b>	20,138	914	480	915	1,121
<b>Reduction for Internal Trips</b>	(6,043)	(214)	(214)	(392)	(392)
<b>Reduction for Pass-By Trips</b>	(2,259)	(65)	(51)	(88)	(62)
<b>New Trips on External Street Network</b>	11,836	635	215	435	667

The above table summarizes how the effects of internally generated trips and pass-by trips reduce the raw trip generation forecast. Although these factors represent a significant trip reduction, our review found the study’s assumption were based on national trends and established practices.

Overall, the study’s internal capture assumptions may be considered slightly aggressive, but the factors used are within average values reported and recommended by ITE and NCHRP publications. One example of its aggressiveness is the study’s methodology assuming an average walking distance of 500 feet between all land uses within the development (see pages 159 and 161 within Appendix F).

#### Traffic Assignment

- We noted that the trip assignment figures in the Appendix do not specifically make reference to the proposed hotel. This may be an incidental oversight and we assumed the hotel’s traffic assignment is included in the retail numbers. Staff may consider getting confirmation.
- Our review noted that the study assigned only 5% of office trips and 5% of commercial trips to the WB left turn from Church St onto Franklin Rd. The traffic study directs some of the trips originating from Church St/Cloverland Dr along a Centerview Dr/Chadwick Dr path. Our review expected a higher traffic assignment assigned to the Church St WB approach.
- The study assigns nearly 10% of all entering trips to the access driveway on Franklin Rd (Site Access 5). Given the interaction between this entering traffic and the through traffic on Franklin Rd, we recommend this access driveway be designed to above-minimum standards to provide a high level of operational performance.



- Our review noted that the project access plan would allow left-turns into the secondary access point located on Franklin Rd (Site Access 5). This is of particular interest because it is the only non-signalized access allowing entering left-turns. It should be noted that this NB left-turn movement occurs within the NB left-turn storage bay area of the Franklin Rd/Maryland Way signalized intersection.

#### Traffic (LOS) Analysis

- We confirmed the traffic study followed industry standard protocol using procedures from the *Highway Capacity Manual*.
- The proposed signal at the relocated Hill Center / Executive Center Dr appears to meet stated warrants. While Warrants 1C and 3 have generally become less important, satisfying Warrants 1B and 2 under existing (redistributed) and proposed conditions is noteworthy. The signal would provide a primary path for those with destinations into the Hill Center.
- For clarification, our review found the intersection name for the relocated Hill Center/Executive Center Drive is referred to as “New Starbucks Drive” on pages 106, 116, 127, and 137 of Appendix D (Level-of-Service summary sheets).
- We reviewed the level-of-service summary sheets for accuracy and found no obvious omissions or errors. Other than the intersections of Maryland Way/East Park Drive and Franklin Rd/Church St, the secondary access points were reported to operate within acceptable limits. This is mostly attributable to the fact the site’s trips are distributed between multiple driveways and the plan proposes to prohibit most entering and exiting left-turns.

#### Shared Parking Analysis

- The report’s shared parking analysis refers to the City of Brentwood’s zoning ordinance allowing for the consideration of shared parking within the C-4 zoning district (up to 30% reduction allowed by ordinance).
- Our review confirmed the study’s use of standard practices as outlined in *Shared Parking* published by the Urban Land Institute. The amount of parking recommended by the study (a minimum of 2,500 spaces) appears appropriate for the conditions reported in the site plan. This amount exceeds the minimum required by ordinance.
- Our review attempted to confirm the number of spaces shown on the master plan. While the master plan’s legend shows 2,722 spaces, we could not verify this amount. It is unclear if this amount includes the on-street parking spaces shown on the master site plan or exclusively refers to the garage parking. Based on parking space data on the provided illustrations, the amount of proposed parking appears to exceed the number recommended in the study.
- The creation of a full-access, signalized intersection at Chadwick Drive and Site Access 2 appears to impact existing parking for the Hill Center development. The project’s master plan shows 26 additional spaces being created as a result of the site work. The plan implies these spaces will be in addition to the amount currently provided and is not included in the 2,722 spaces provided within the Streets of Brentwood site. These assumptions were not verifiable with the information given in the traffic and parking study. We recommend the applicant clarify the intent of the additional surface parking shown in the southeast quadrant of the Franklin Rd/Chadwick Dr intersection.

#### Review of Proposed Recommendations

- **Intersection of Franklin Rd and Church St/Maryland Way**  
We reviewed the study’s recommendation to modify the lane assignments for the WB approach. While the proposed development does not impact the WB right-turn movement (i.e. does not contribute additional trips), the proposed improvement is an attempt to address overall intersection performance and indirectly improve other traffic movements that are impacted by the site. Although modest, this measure could result in some improvement in intersection operations.



Given the pavement width documented in the study, creating 11' lanes would allow for the addition of a WB right-turn lane. This measure would “relieve pressure” on the westbound through movement during peak periods by providing a dedicated pair of through lanes. It may also allow modification of signal timing settings that could be re-distributed to other movements.

If pursued, we recommend careful consideration be given to the implementation of the pavement marking transition between the existing 5-lane section and the proposed lane assignments to minimize driver confusion and vehicle crashes. In addition, the use of additional thru and turn arrow pavement markings should be considered in advance of the intersection (in addition to the ground mounted sign recommended by the study). We recommend consideration be given on the use of the dotted lane line on the approach to the WB right-turn lane as shown in Figure 8a. This delineation could create indecisive situations for drivers exiting Pewitt Drive as drivers attempt to determine if approaching vehicles intend to turn right into Pewitt Drive or onto northbound Franklin Rd.

The proposal to narrow the travel lanes on Church St should also consider any impact this may have on safety as it relates to an increase in traffic crashes, most notably sideswipe. Based on our judgment, this may most likely be a factor for the dual southbound left-turning movement onto eastbound Church St. Dual turning movements are more susceptible to these crashes as lanes become narrower. The potential for this effect should be weighed against the benefit of providing the additional right-turn lanes. As an alternative, city staff may consider three 10.5' lanes for the westbound approach while maintaining the existing 12' lane width for the two eastbound departing lanes. In general, we feel the lane width adjustment to 11' lanes would not present undue negative impacts to the eastbound departing movement.

- **Intersection of Site Access 5 (Franklin Rd Garage Access) and Franklin Rd**

We have concerns about the level of access proposed for this intersection. This is the only secondary access that allows left-turns into the site. Most notably, the access point occurs within the dual left-turn bay serving the Franklin Rd / Maryland Way signalized intersection. We have reservations about allowing left-turns from Franklin Rd to enter this access driveway. This situation has the potential to violate driver expectancy, elevate the likelihood of vehicle crashes and negatively impact the operations of the NB left-turn lane onto Maryland Way. Vehicles waiting to turn left into the site could substantially disrupt the ability of other drivers to safely and efficiently utilize the left-turn storage onto Maryland Way. We recommend consideration be given to making Site Access 5 a right-in/right-out only similar to the other secondary accesses. With the availability of much longer stacking distance, it seems the proposed signal at Chadwick Dr would provide an acceptable, and likely safer and less disruptive, left-turning opportunity for these vehicles into the site. If considered, we suggest the traffic study be refined to analyze the proposed signal operations at Chadwick Dr given this additional entering traffic.

- **General Comments Applicable for Right-In/Right-Out Drives (Site Accesses 3, 4 and 5)**

In general, we recommend strong consideration be given to providing taper transition and full-width storage at all secondary driveways.

- For Site Accesses 3 and 4 (Maryland Way West and East Garages), the traffic study does not address taper or storage lengths. Although it may seem nominal for lower priority drives, we advocate providing the opportunity for turning vehicles to decelerate and complete their turning movement away from the mainline travel lanes serves. This helps preserve the integrity of traffic operations on the primary highway. We believe this would help maintain the efficiency and operational functionality of Maryland Way and Franklin Rd, especially during peak periods. In general, we recommend a minimum taper length of about 75 feet and storage length of about 75 feet.



- At Site Access 3 ((Maryland Way West and Garage), we note the very short distance between Site Access 3 to the taper transition of the East Park Dr right-turn lane. Typical practice desires a minimum of 100 feet between driveways. The traffic signal at East Park Dr will already have recurrent impacts on the driveway’s operation. We believe there is potential for this condition to further negatively impact traffic operations. Thought should be given comparing the benefit of the eastbound right-turn lane to the resulting traffic operations.
- For Site Access 5 (Franklin Rd Garage access), the study’s recommendations already suggest these measures. However, given the magnitude of traffic volumes and prevailing speeds on Franklin Rd, we believe additional transitional taper would be beneficial. We recommend up to 100 feet of taper be provided. A slight reduction of the study’s recommended storage length to accommodate a longer taper length may be considered.

We recommend the study team consider providing physical barriers to prevent drivers from completing left-turn movements exiting right-in/right-out driveways. Our review of the site plan found that all three garage access points occur adjacent to dedicated left-turn storage lanes associated with signalized intersections. The ability to provide positive deterrents would benefit traffic operations and decrease potential for crashes. As part of the site construction, the design team should investigate the ability to provide a narrow concrete median (or other barrier). Design considerations should include the size and curb type applicable if installed. The barrier may be limited to the area immediately adjacent to the access point with a length sufficient to discourage the movement. Measures to provide visibility may also be provided.

Also, our review considered the position of Site Access 4 (Maryland Way East Garage Access). The proposed site plan shows the driveway about mid-block between East Park Dr and Franklin Rd. We raise concern in locating the driveway directly adjacent to the eastbound left-turn lanes serving the signal at Franklin Rd. We recommend consideration be given to locating this driveway further east beyond the area of the left-turn lanes, possibly between Building “J” and the proposed hotel. This would provide separation from the referenced turn lanes and likely allow for the recommended transition taper and storage lengths for the entering right-turn movement.

- **Intersection of Chadwick Drive/Proposed Site Access 2 and Franklin Rd**

Review of the traffic signal capacity summary sheets noted it may be possible to eliminate use of protected-permissive left-turn phasing for the minor street approaches. The side street traffic volumes suggest the signal operation may be further optimized using permissive-only left-turn operation. The benefits of this are two-fold: greater flexibility in providing coordinated signal operation along Franklin Rd and allowing the traffic signal to better accommodate and serve pedestrian demand.

- **Intersection of Relocated Hill Center Drive/Executive Center Drive and Franklin Rd**

Our review of the study’s written and graphical recommendations for this intersection noted the following observations.

- We recommend the proposed northbound and southbound left-turn lanes be marked to provide longer storage lengths. Our review indicates the existing center two-way left-turn lane may allow for greater storage than stated in the study. Turn lanes with storage capacity of 150’-200’ seem desirable.
- Review of the traffic signal capacity summary sheets found justification for eliminating the use of protected-permissive left-turn phasing for the minor street approaches. The side street traffic volumes suggest the signal operation may be further optimized using permissive-only left-turn operation. The benefits of this are two-fold: allows greater flexibility in providing coordinated signal operation



along Franklin Rd and also allows the traffic signal to better accommodate and serve pedestrian demand.

- **Intersection of East Park Drive and Maryland Way**

We reviewed the recommendations for this intersection and found items for additional consideration.

- The site plan illustrates and the traffic study recommends lane assignments and storage lengths of 85 feet for the northbound exiting movement. The study's traffic capacity summary sheet documents vehicle demand in excess of 200 vehicles and 300 vehicles in the AM and PM peaks, respectively. While the study recommends an exclusive NB left-turn, we believe the NB left-turn demand (155-AM; 132-PM) coupled with the through and right-turning vehicles could create excessive queuing and spillover upstream into the site, which would have the potential to impact on-street parking operations. We recommend the left-turn lane have a storage length of approximately 125ft. This would provide storage capacity for an average number of vehicles per cycle as predicted by the study's capacity analysis.
- We recommend the proposed on-street parking shown near the East Park Drive intersection be maintained outside the limits of the intersection turn lanes. Although we understand the graphic is illustrative in nature, Figure 8d implies the on-street parking may have direct impact on the operations at the East Park Dr signal. On-street parking, while encouraged within the development, should be kept separated from the site's main access driveways.
- Per staff's request, we completed a review of the East Park signal operation. Attention was given to how the project proposes to change the intersection's lane assignments and signal phasing.

The study recommends multiple changes to East Park Drive's southbound approach. The project proposes converting the single SB left-turn lane to a shared left-through lane while maintaining the exclusive right-turn lane. As part of this change, the signal operation would be modified to provide protected-permissive left-turn phasing for the NB approach, while the southbound approach operates under permissive left-turn operation. The only significant change to either Maryland Way approach would be the addition of an eastbound right-turn lane into the site.

For clarification, the study's traffic analysis does not propose a "split phase" operation for the northbound and southbound movements. Based on the signal phasing shown in the signal capacity summary sheets (pages 130 and 140 in Appendix D), the northbound and southbound approaches would operate first with a concurrent leading northbound left arrow and green-ball through indication, once the northbound left-turn arrow terminates, green ball indications would allow the southbound movement to commence, including its permissive only left-turn operation. In general, the northbound left-turn would always have first opportunity to be active. After the northbound arrow ends, the southbound direction would receive its green-ball only indications.

It appears the study recommends the changes to the southbound lane assignments and signal phasing in an attempt to preserve the use of the southbound exclusive right-turn lane with implementation of a right-turn overlap (the study predicts over 340 southbound right-turning vehicles under proposed conditions). For the southbound left-turn, the study predicts an AM peak of 53 vehicles, but a demand of 166 vehicles in the PM peak. The study calculated the intersection, as a whole,



would operate at a level-of-service “C” and “D” in the AM and PM peaks, respectively. Specifically, the study reports the southbound approach itself would operate at a level-of-service “E” for both peak periods.

Assuming no restrictions, the preferred improvement would be to provide separate left, through and right lanes for the southbound approach. However, this consideration was not offered by the applicant team. Under its “Projected without proposed improvements” scenario, the traffic study analyzed standard protected-permitted operation for all approaches which resulted in worse overall level-of-service conditions. Without the ability to provide separate lanes for the southbound left-turn, through and right-turn movements, few worthwhile alternatives exist. The eastbound right-turn lane proposed by the study provides minimal impact in terms of overall signal operation.

- **Final General Considerations**

- It should be noted that the Maryland Way and Franklin Rd corridors operate under coordinated signal operation. If not already incorporated, we would recommend the traffic signal settings used within the capacity analysis refer to the city’s existing signal timings and settings. By incorporating actual signal timing data currently deployed in the field, the analysis would more accurately reflect expected conditions. This would serve to provide consistent input parameters for all intersections studied.
  - We also recommend the applicant be required to provide updated coordinated signal timings along Franklin Rd and Maryland Way/Church St based on proposed conditions. The extent of these improvements should extend to the limits impacted by the Streets of Brentwood project. These timings should be monitored and adjusted as the site is built-out.
  - Being a state route, project planners should coordinate with TDOT officials to obtain input and approval for proposed improvements on Franklin Rd.
  - We recommend the frontage of the proposed project along Franklin Rd and Maryland Way be designed in a way to promote and invite pedestrian activity. The proposed development has the potential to create bi-directional pedestrian movements from areas extending to Chadwick Dr, Church St and Maryland Way.
  - In connection to providing pedestrian-oriented facilities, we recommend the design team consider ways to promote pedestrian crossings while maintaining efficient signal operations for vehicular traffic. Measures, such as use of concurrent right-turn overlap phases, should be considered to minimize conflicts between pedestrians and right-turning traffic. At signalized intersections where prevailing traffic volumes allow, the use of permissive left-turn operations should be considered for side street operations in place of protected-permissive signal phasing. Permissive operation has the potential to provide extended durations of pedestrian clearance time. The use of curb-extensions, or bulb-out treatments, at intersections may be considered to reduce pedestrian crossing distances and exposure to the travelway.
- **Consideration of Project Site Developed Exclusively with Office Land Uses**  
Per staff request, we offer the following thoughts regarding the site being developed exclusively as office space. The project’s traffic study identifies the site could support up to 760,000 square feet of office space under current zoning.
    - Using similar trip generation procedures as the impact study, the site could be expected to generate approximately 950 AM trips (836 entering, 114 exiting) and 930 PM trips (158 entering and 772 exiting). These estimates are unadjusted for pass-by trips or internal capture. Unlike the multi-use development, an exclusive office development would be expected to have negligible trip reductions for pass-by trips or internal capture. So,



comparing the generated trips for the all-office scenario to the amount of trips predicted for the multi-use site, the all-office scenario is estimated to have a slightly higher (10%) trip generation in the AM peak and the mixed-used development would have modestly higher generation (15%) in the PM peak. However, the PM trips for the multi-use site would be more evenly distributed between entering and existing movements, whereas the all-office scenario would experience mostly existing trips.

- As with the multi-use site, we would expect multiple site access points, including full-access and turn-restricted driveways would be utilized.
- Consideration needs to be given to the peak split for the all-office scenario. Unlike the mixed-use site, the all-office scenario would be peak-oriented: 88% of AM trips would be entering trips, 83% of PM trips would be exiting. This demand would likely place strain on the site's ability to serve the beginning and end of day travel patterns. More extensive improvements to the transportation system and site access points would likely be required to meet minimum operating thresholds.
- Improvements related to pedestrian enhancements and Town Center zoning initiatives would likely not be implemented.
- Opportunities related to shared parking and internally-generated trips would be lacking.

We hope you find the described information helpful as the City considers this project. Please let us know if there are any questions or if we can be of further assistance.

Sincerely,  
NEEL-SCHAFFER, INC.



Gregory Judy, P.E., PTOE  
Senior Project Manager

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