

# Memorandum



Date: October 15, 2007

To: Board of Selectmen

From: Kien Ho, P.E., PTOE

BETA Project #: 3428

Subject: Summary Peer Review – Traffic  
Queset Commons – 40R Development

cc: Mark Bobrowski, Blatman, Bobrowski & Mead LLC  
Dave Colton Town Administrator

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At your request, BETA has undertaken a review of the traffic aspects of the proposed Queset Commons 40R mixed use development. The focus of our efforts has been to identify what off-site roadway and traffic improvements are required to mitigate the increases in traffic likely to result from the development of this Queset Commons. Detailed review of on-site features will take place later on in the review process.

Throughout this process, BETA has performed several cycles of review of materials prepared by the Proponent's Traffic Consultant, McMahan Associates (McMahan), including a review of a Draft Traffic Impact Study (TIS), dated June, 2007 and the subsequent review of an updated TIS, dated July, 2007. Review comments were summarized into Technical Memorandums provided to McMahan on June 22, 2007 and August 2, 2007, respectively.

BETA received an updated version of the TIS, dated August, 2007 and provided comments in a Technical Review Memorandum to McMahan, dated September 10, 2007, which is attached. Also, attached is McMahan's Response Letter, received on October 11, 2007. **As reflected in McMahan's Response Letter, our comments / concerns have been or are being addressed by the Proponent.** This memorandum to the Board is meant to summarize where things stand at this point.

## OVERVIEW OF PROPOSED DEVELOPMENT

At this time, we understand the proposed mixed use development to consist of 200 residential condominium units, 80 assisted living residential units, 60,000 square feet of retail space, a 16,000 square foot conference center, a 15,000 square foot food market and 11,000 square feet of office space. The site currently is undeveloped. Access to the site is proposed via the CVS drive intersecting Washington Street (Route 138) at Belmont Street (Route 123), and from Roosevelt Circle off Washington Street. An emergency access is also planned off Washington Street, south of the Kinder Care Learning Center.

The Proponent forecasts that approximately **65%** of the vehicles entering and **70%** of the vehicles exiting the site will do so at Belmont and Washington Street intersection and that approximately **35%** of the vehicles entering and **30%** of the vehicles exiting the site will do so via the northern drive at Roosevelt Circle.

Currently, Washington Street and Belmont Street carry approximately 16,700 and 18,400 vehicles per day, respectively in the vicinity of the site. The proposed development will generate 11,260 trips per day, of which 1,120 are internal trips (do not leave the site) and 1,004 are estimated to be pass-by trips

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(trips drawn from existing traffic). **The remaining estimated 9,136 trips per day are new trips to the area.**

Site related traffic is forecasted to increase daily traffic on Washington Street by **10% to 15%** and by **12%** increase on Belmont Street in proximity to the site. The development will generate an additional 274, 902, and 1,034 weekday AM, PM and Saturday midday peak hour trips, respectively. During peak hours, this additional traffic would account for an increase upwards of **30%** in the volume of traffic entering into the intersections of Washington Street / Belmont Street and Washington Street / Roosevelt Circle.

We note that both Washington Street (Route 138) and Belmont Street (Route 123) are State highways in the area of the proposed development.

Relative to parking supply, the Traffic Impact Study prepared by the Proponent indicates that 1,240 parking spaces would be required to satisfy zoning requirements, but only 898 parking spaces are proposed. The premise is that due to varying peak parking utilization rates for the individual land uses on site, these land uses can share the parking supply. The Proponent has been requested and has provided calculations and related documentation to justify this proposed reduced parking supply. **BETA has to complete its review of this material and will report findings to the Board at a later date.**

Recently, the Proponent has proposed to “phase” the Development and to “phase” the required off-site improvements. As of 10/12/07, McMahon is working on the preparation of revised analysis and materials to address and present the implications of this recent phasing decision. (Submittal to BETA is expected on 10/15/07). **BETA will need time to perform a detail review of this updated material and report back to the Board in a follow-up memo.**

## MITIGATION

Off-site roadway and traffic improvements will be required to mitigate traffic impacts of the development. These involve measures in a number of areas, but are mostly centered on the its access drive locations and, in particular, the intersection of Washington Street/Belmont Street, which serves as the main entrance to Queset Commons. The following off-site mitigations are envisioned at this time:

- Implement operational modifications to the existing signal at Washington St/Main St. (including any signal equipment modifications/upgrades that may be required to accomplish changes)
- Implement operational modifications to existing signal at Washington St/Central St. (including any signal equipment modifications/upgrades that may be required to accomplish changes)

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- Install conduit to a future traffic signal at the intersection of Washington St and Roosevelt Dr. Also, consider the creation of a left turn lane on Washington St, northbound.
- Install new traffic signal at the intersection of Washington St and Roosevelt Dr, when actual traffic volume levels approach the MUTCD signal warrant criteria.
- Revise access / egress and internal circulation patterns on the CVS and South Easton Saving Bank sites (including driveway turning restrictions to provide for safe movements)
- Provide for required geometric and signal improvements to the intersection of Washington St/Belmont St/Development Access Drive. Improvements shall:
  - Be sufficient to provide acceptable levels of service during peak hours with all phases of development, including proposed the Full Build.
  - Include protected left turns on Washington St and Belmont St with appropriate designated lanes.
  - Include pedestrian phasing (exclusive) and related features (wheelchair ramps, crosswalks and sidewalk)
  - Include all land takings, roadway and utility improvements to support the required traffic design.
  - Be in place and operational prior to the demand being realized.
  - Minimize disruption and public inconveniences related to construction phasing.

The Town may also want to consider having an understanding with the Developer to monitor traffic conditions relative to the following:

- Monitor traffic conditions at the intersection of Belmont St and Bristol Dr and install traffic signals, if warranted and if LOS drops to an unacceptable level.
- Count volumes and monitor conditions at the Stonehill's drives on Washington St and Belmont St. Implement corrective actions that may be needed due to increased traffic on Washington St and Belmont St.

October 2, 2007

*Received October 11, 2007*

Kien Ho  
BETA Group, Inc.  
315 Norwood Park South  
Norwood, Massachusetts 02062

RE: Response to Traffic Peer Review Comments  
Quset Commons - 40R Development

PRINCIPALS

Joseph W. McMahon, P.E.  
Rodney P. Plourde, Ph.D., P.E.  
Joseph J. DeSantis, P.E., PTOE  
John S. DePalma  
William T. Steffens

ASSOCIATES

Casey A. Moore, P.E.  
Gary R. McNaughton, P.E., PTOE  
John J. Mitchell, P.E.  
Christopher J. Williams, P.E.  
John F. Yacapsin, P.E.

Dear Mr. Ho:

This letter is in response to the traffic related comments raised by the Town's peer review consultant BETA Group, Inc. (BETA) in the memorandum regarding the proposed Quset Commons 40R development, dated September 10, 2007.

The current trip generation estimate for the proposed 40R development is a result of several comments received from BETA throughout the review process. The current conservative estimate of daily trip generation is approximately 11,260 total trips per day, of which 1,120 are internal trips and 1,004 are estimated to be pass-by trips. Conservatively, the remaining 9,136 trips per day are new trips to the area. However, the current trip generation estimate is much greater than the trip generation estimated in the original traffic study for this project.

McMahon originally estimated the trip generation by utilizing Land Use Code (LUC) 230 (Residential Condominiums/Townhouses) for the proposed 280 residential units and LUC 820 (Shopping Center) for the remaining land uses on site. The original trip generation estimate of daily traffic was approximately 8,419 trips per day of which 840 were internal trips and 1,032 were pass-by trips. The remaining 7,387 trips per day were new trips to the area.

Shopping Centers generally include a variety of land uses included in a mixed-use development such as retail stores, restaurants, offices, banks, and recreational facilities. The proposed 16,000 square foot conference center is not expected to be used at capacity on a daily basis.

Additionally, there is no available trip generation data for conference centers. In an effort to estimate the average trip generation for the conference center, McMahon combined the 16,000 square-foot conference center into the shopping center land use. By using this methodology the proposed conference center was estimated to generate approximately 14, 60, 83 total trips during the weekday morning, weekday afternoon and Saturday midday peak hours, respectively, and approximately 650 total trips during the average day. This trip estimation is consistent with the information we received from a similar type of facility in the area, which

indicated there would be approximately 100 trips per hour, during the peak hour, which occurs between six and seven o'clock on a Saturday. These results were submitted in the June 2007 report.

However, BETA requested that the individual land uses we included in LUC 820 and LUC 230 be reviewed independently and utilized to determine the internal capture rate and the overall trip generation of the project. To address BETA's comment, as there is no trip generation data available for conference centers, McMahan estimated the conference center trip generation by using LUC 710 (General Office) to conservatively estimate the weekday morning peak hour trips and LUC 820 to conservatively estimate the average weekday daily trips and the weekday afternoon and Saturday midday peak hour trips. The LUC 710 and LUC 820 rates were applied to double the square footage of the proposed conference center (32,000sf) to present an extremely conservative estimate of the number of trips associated with the proposed conference center. Using this methodology, the proposed conference center is estimated to generate 60, 236, and 330 total trips during the weekday morning, weekday afternoon, and Saturday midday peak hours, respectively, and approximately 2,590 total weekday daily trips. The revised trip generation estimate is approximately four times greater than the original estimate during all three peak hours analyzed as well as the average weekday daily trip generation estimate.

Additionally, as BETA requested, the internal trips were recalculated based on the land use codes being reviewed independently. This resulted in an increased internal capture rate of 26-percent during the weekday afternoon peak hour. To again present a conservative analysis McMahan applied an internal capture rate of 20-percent to the estimated trip generation. These results were submitted in the July 2007 report.

After McMahan recalculated the internal trip rate, based on BETA's request, and the results were reviewed, BETA requested McMahan reduce the internal capture rate to ten percent during all peak hours studied. McMahan complied and presented new results in a study submitted in August 2007.

As a result of BETA's comments, the total average daily trip generation increased by 33-percent and the average daily new trips to the site increase by 23-percent. The traffic volumes entering and exiting the site presented in the August 2007 report are extremely conservative; and have resulted in the mitigation for the proposed development approaching capacity.

#### **BETA Comment / McMahan Response**

- 1. The conceptual site plan provided does not appear to show the current footprint of the South Easton Savings Bank accurately. The drive thru teller lanes and associated building canopy appear to be missing. The existing building footprint of the South Easton Savings Bank should be reviewed and updated, as necessary.**

The revised site plan was presented at the meeting on September 24, 2007.

- 2. The disposition of the South Easton Savings Bank drive located directly off Washington Street is not addressed in the TIS. If this driveway is to remain, consideration should be given to restricting its use to right turns in only. Existing bank trips would need to be re-assigned to the site's access drive and capacity analysis modified, accordingly.**

The proponent will review the operations of this driveway with the tenant.

- 3. A plan should be provided indicating how traffic circulation will be handled within the CVS site, as well as verifying that traffic turning into CVS from Washington Street will not conflict with the traffic queue at the signal.**

The revised site plan was presented at the meeting on September 24, 2007.

- 4. The possibility of including a transit stop within the site has been suggested. The proponent should provide some insight into this suggestion.**

The proponent will work with the regional transit authority.

- 5. Proponents mitigation includes providing some signal timing and phasing changes (providing protective-permissive left turn phases for all approaches) at Washington Street/Belmont Street intersection. The Proponent should clarify, if this would require a new traffic signal controller or other signal equipment.**

New signal heads will be needed that show left turn arrows on all approaches of the intersection of Washington Street and Belmont Street. Further equipment needs will be verified as this project progresses.

- 6. Proponents mitigation includes providing some ancillary signal timing and phasing changes at Washington Street/Main Street, and Washington Street/Central Street intersections. The proponent should verify that these changes can be made with existing traffic signal equipment.**

New traffic signal controller or other signal equipment will not be needed at the intersection of Washington Street and Main Street. Further equipment needs will be verified as this project progresses.

- 7. In the TIS'S LOS analysis, lane assignments used are not consistent throughout the various study periods. In the Concept Plan, provided by the Proponent, the lane assignments for the proposed site drive consist of an exclusive left turn lane and a shared through/right lane. For the AM peak hour, the intersection was modeled as such. During the PM and Saturday Midday peak hours however, the intersection was modeled with a shared left/through lane and an exclusive right turn lane. Lane use must be consistent for all periods.**

The PM and Saturday Midday peak hour lane assignments at the intersection of Route 138 and Route 123 were modeled correctly in the analysis. The concept plan and AM peak hour analysis have been revised to reflect the proposed eastbound shared left/through and exclusive right turn lanes.

8. **Currently, both approaches of Washington Street have a shared through/left lane. The departure of Washington Street northbound consists of only one lane. This represents a lane balance discrepancy (2 through lanes to one departure lane). Currently, this configuration appears to operate in an acceptable manor as the Washington Street northbound departure is wide enough to facilitate the merger, however with the Development's additional volumes operational issues may be heightened.**

The departure of Washington Street northbound has enough pavement width to stripe two departure lanes extending north from Belmont Street on Washington Street for approximately 230 feet. Additional widening will be considered during the development of the mitigation plans.

9. **The Proponent's proposed signal phasing would modify the existing phasing to provide protected-permissive left-turn phases on all approaches. The proposed left turn volumes on both approaches on Washington Street are high (greater than 200 per hour) during future peak hour. There is a high probability that most through traffic on Washington Street would evade the shared through/left lanes to avoid being blocked during that portion of the phasing, when the left turns are operating under the permissive phase.**  
The mitigation proposed for this intersection has been revised. In Phase Three of the mitigation plan exclusive left-turn lanes are provided on Washington Street in both the northbound and southbound directions as well on the Belmont Street westbound approach.

10. **The Proponent's proposed phasing accommodates partial protective left turns via lead-lag left turns on Washington Street. The Manual on Uniform traffic Control Devices (MUTCD) does not preclude the use of lead-lag left turns under protective-permissive control; however, doing so creates "left turn trap" for southbound left turns at the end of the permissive phase. Also, at the beginning of the permissive phase, left turns from Washington Street, northbound, will face two opposing lanes of moving traffic, as it is initiated.**

The mitigation proposed for this intersection has been revised. No lead-lag phases are provided.

11. **An alternative would be to modify the shared through/left lanes to exclusive left-turn lanes and provide a leading protective phase for left turns. This would also address the lane balance issue on Washington Street northbound noted above. We suggest that the Proponent evaluate this alternative.**

The mitigation proposed for this intersection has been revised.

- 12. Also, we are concerned about the left turns from Belmont Street, which currently are only modestly opposed by the CVS/Bank traffic, but will be in conflict with a much heavier through movement from the new development using this site drive. While left turn phasing mitigation is proposed in the TIS, we questioned whether it is enough.**

The mitigation proposed for this intersection has been revised. The Belmont Street westbound approach to Washington Street has a protected phase.

- 13. BETA analyzed the McMahan Build Conditions with lane use consistent with the Concept Plan and determined this change would decrease the LOS during the PM and Saturday Midday conditions from C and D to D and E, respectively. In addition, we have safety concerns over the lead/lag left turn arrangement, as noted above, particularly given the high volume of the left turns. Applying alternative phasing to address these concerns, the LOS results are calculated to be at unacceptable levels. We recommend that intersection geometric improvements be evaluated.**

The mitigation proposed for this intersection has been revised. No lead-lag phases are provided.

- 14. An alternative measure would be to provide an exclusive left turn lane on Washington Street's northbound approach to Roosevelt Circle. With this lane in place the LOS would improve to A, B and B for the respective peak hours. This left turn lane should be considered even if the intersection is not signalized.**

There is sufficient ROW on Washington Street at Roosevelt Circle to provide an exclusive left-turn lane in the northbound direction. There is approximately 40 feet of pavement at this location. Such a left turn lane could be incorporated into the design of this intersection.

- 15. It appears, but is not conclusive, that traffic signal warrants will be satisfied under Build Conditions for the intersection of Washington Street/Roosevelt Circle. TIS states that a traffic signal at this location should be reserved until a definitive traffic signal warrant analysis can be performed with the development in place. Since the proposed signal at this location would need to be coordinated with the traffic signal at Washington Street/Belmont Street, conduit should be installed prior to completion of the development to accommodate this coordination at a later date.**

The conduit will be installed in areas of construction.

- 16. Currently, the intersection of Washington Street/Belmont Street operates without pedestrian accommodations. The inclusion of a pedestrian phase to this intersection is important, given the nature of the proposed development and existing land use on the easterly side of Washington Street. The addition of a pedestrian phase will likely result in a lower LOS, than as stated above.**

As part of the proposed 40R development project pedestrian accommodations can be provided. However, based on field observations there is not a pedestrian presence in the area. There are limited destinations of the opposite side of the street from the proposed development. There are not expected to be an appreciable amount of pedestrian volumes crossing the street as a result of the proposed project. There will be shared trips which were discussed in the report, however, these trips are pedestrian trips internal to the site and will not be crossing Route 138.

- 17. We request an updated Concept Plan for proposed mitigation to address the degraded Levels of Service noted above particularly the intersection of Washington Street and Belmont Street. This plan should reflect geometric modifications (including the bank driveway off of Washington Street), extent/nature of changes to the signal layout (proposed corner changes will require this, as might lane and phase modifications), location of pedestrian crosswalks/signal and so on.**

The concept plan will be provided.

- 18. Lastly, in the general vicinity of the site, there are a number of existing unsignalized intersections along Washington Street and Belmont Streets. Due to high traffic volumes on these roadways, many of the minor street approaches at these intersections operate at LOS F with long delays during peak hours. The additional traffic that will be added to Washington and Belmont Streets, as a result of this development will create more delay. For example, the LOS analysis indicates a significant increase in delay at Eisenhower Drive, (upwards of 190% increase over existing) and at Bristol Drive (upwards of 45% increase over existing). The Proponent should state how he intends to mitigate these impacts.**

Various independent research has been done documenting the conservative nature of the HCM analysis methodology, including research performed by the New England Institute of Transportation Engineers (NEITE) Technical Committee. A copy of their report, "Field Validation of MOE's for Unsignalized Intersection Analysis", is attached to this letter. This report illustrates the overstatement of unsignalized delay that results from the widely used Synchro analysis software and Highway Capacity Software (HCS), which are based on the HCM methodology. This overstatement is particularly evident for intersections with longer delays. The PICADY software was recognized in the NEITE research as the only software that, "reasonably replicates field measured average stopped delay." As a result, PICADY has gained growing acceptance by transportation professionals over recent years due to its ability to more accurately model delays and vehicle queues at unsignalized intersections. Based on the findings of the NEITE research, McMahan has performed additional capacity analysis for the intersections of Washington Street at Eisenhower Drive, Belmont Street at Bristol Street, and Washington Street at Roosevelt Street using PICADY. A table showing the PICADY analysis results is attached to this letter.

Based on the PICADY analysis results, which are attached to this letter, the eastbound movement from Eisenhower Drive at its intersection with Washington Street is shown to operate at LOS A during the weekday morning and Saturday midday peak hours and at LOS B during the weekday afternoon peak hour during the future-year, 2012, without development traffic conditions. The eastbound Eisenhower Drive movement is shown to operate at the same LOS during the future-year, 2012, with development conditions. The northbound movement from Bristol Drive at its intersection of Belmont Street and Bristol Drive is shown to operate at LOS A during the weekday morning peak hour and at LOS D during the weekday afternoon peak hour. During the future-year, 2012, with development traffic conditions the northbound Bristol Drive movement is shown to continue to operate at LOS A. During the weekday afternoon peak hour the northbound movement is shown to operate at LOS E. This decrease in LOS is a result of the 6.2 second increase in delay on the northbound movement. It is 0.9 seconds away from being LOS D. These results confirm that the intersection will operate effectively and the project will not have any appreciable impact on this intersection.

Please feel free to contact us if you have any questions or need additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary R. McNaughton". The signature is fluid and cursive, with a large initial "G" and "M".

Gary R. McNaughton, P.E., PTOE  
Vice President & General Manager

# Memorandum



Date: September 10, 2007

To: Gary McNaughton, P. E., PTOE  
McMahon Associates

From: Kien Ho, P.E., PTOE

Subject: Peer Review – Traffic  
Queset Commons – 40R Development  
cc: Mark Bobrowski, Blatman, Bobrowski & Mead LLC  
David Colton, Town Administrator

BETA Project #: 3428

BETA has undertaken a review of latest version of Traffic Impact Study (TIS), dated August, 2007, for the proposed Queset Commons 40R mixed use development. This Memorandum is being forward as a follow-up to this review and our telephone conversations of last week.

At this time, we understand the proposed mixed use development to consist of 200 residential condominium units, 80 assisted living residential units, 60,000 square feet of retail space, a 16,000 square foot conference center, a 15,000 square foot food market and 11,000 square feet of office space. The site currently is undeveloped. Access to the site is proposed via the CVS drive intersecting Washington Street (Route 138) at Belmont Street (Route 123), and from Roosevelt Circle of off Washington Street. An emergency access is also planned off Washington Street, south of the Kinder Care Learning Center.

Currently, Washington Street and Belmont Street carry approximately 16,700 and 18,400 vehicles per day, respectively in the vicinity of the site. The proposed development will generate 11,260 trips per day, of which 1,120 are internal trips (do not leave the site) and 1,004 are estimated to be pass-by trips (trips drawn from existing traffic). **The remaining 9,136 trips per day are new trips to the area.**

With distribution onto the roadway network, the generated trips would account for increase in daily traffic on Washington Street in the **range of 10%-15%** and a **12%** increase in daily traffic on Belmont Street in proximity to the site. The development will generate an additional 274, 902 and 1,034 weekday AM, PM and Saturday midday peak hour trips, respectively. During peak hours, this additional traffic would account for an increase upwards of **30%** in the volume of traffic entering into the intersections of Washington Street / Belmont Street and Washington Street / Roosevelt Circle.

Some comments of our Review Memorandum, dated August 2, 2007 remain open. These are restated here in combination with comments that have arisen from our review of the latest version of the TIS.

## Study Area / Intersections

BETA had made some initial recommendations in May, 2007 on the limits of the study area. For the most part, these have been addressed in the TIS. The exceptions are intersections of two Stonehill College Drives onto Routes 123 and 138. These were not addressed in the TIS, given the timing of the traffic data collection and study (college not in session). Operations at these locations are not seen as critical to the current purpose of this review, but should be studied by the Proponent at a later date as the development's design progresses.

We understand that traffic counts will be conducted once the College resumes in the fall, and that subsequently, a follow-up technical memorandum on intersection operations will be submitted.

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Gary McNaughton, P. E., PTOE, McMahon Associates

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## Trip Generation

A 16,000 SF Conference Center is proposed as part of the development. If the use of this element changes or evolves, say to a restaurant, trip generation of the site would need to be revisited and modified.

## Trip Distribution

The TIS'S current trip distribution to the two proposed full access/egress driveways assigns approximately **65%** of entering and **70%** of exiting vehicles to the access drive at Belmont and Washington Street, and **35%** of entering and **30%** of exiting vehicles to the northern drive at Roosevelt Circle.

Due to the critical nature of the operating conditions at these locations and the subjective nature of the current trip distribution assignment, we requested that a **“sensitivity analysis”** be performed. This sensitivity analysis was requested to “test” for possible operational issues that may arise from variations in the estimated trip distribution between the two site drives. We requested that the sensitivity analysis be performed to evaluate the site access drives under the following conditions:

- 100% of site traffic assigned to the access drive at Belmont / Washington Street
- Traffic from the components shown in “red” on the Exhibit, which follows, be assigned to Roosevelt Circle, given their proximity to this access drive. The result is the assignment of roughly **45%** of entering vehicles and **35%** of exiting vehicles to be assigned to Roosevelt Circle.

We received this sensitivity analysis via email on August 21, 2007.

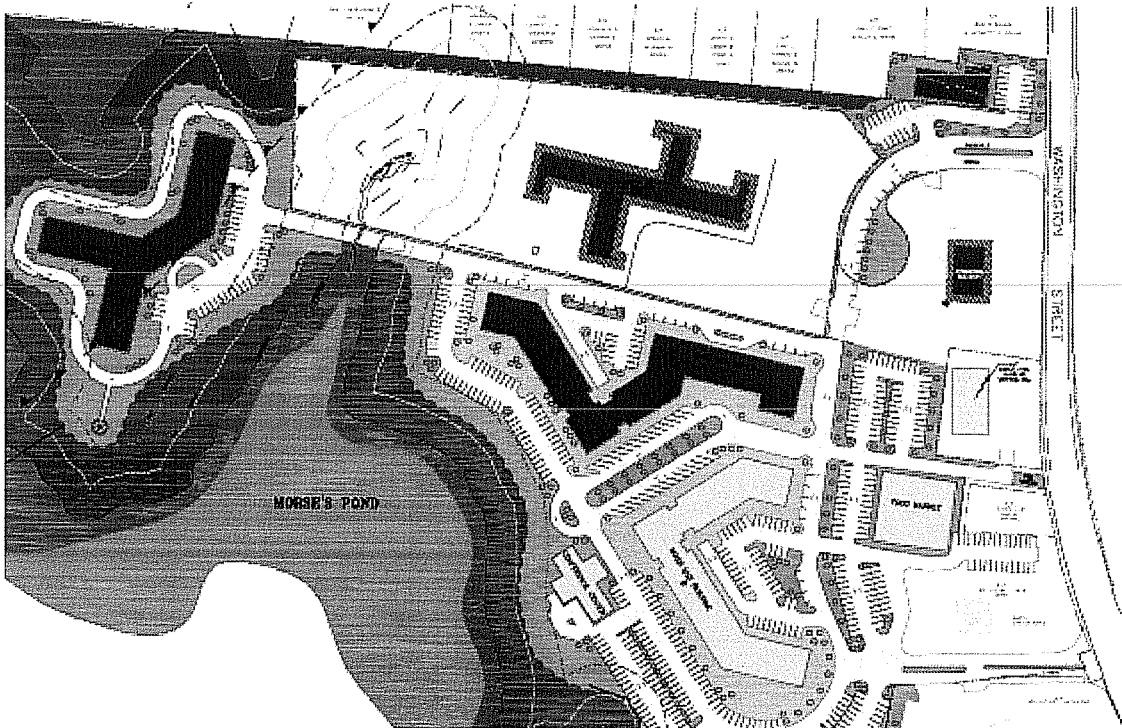


Exhibit - Uses to be Assigned to Roosevelt Circle

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Gary McNaughton, P. E., PTOE, McMahon Associates

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## Parking

Project documents indicate that 1,240 parking spaces would be required to satisfy zoning requirements, but only 898 parking spaces are proposed. This is a 28% reduction. It is the proponent's contention that due to varying peak parking utilization rates for the individual land uses on site, these land uses can share parking. Calculations (using the *Shared Parking Manual 2<sup>nd</sup> Edition* published by the Urban Land Institute) were requested to justify this proposed reduced parking supply.

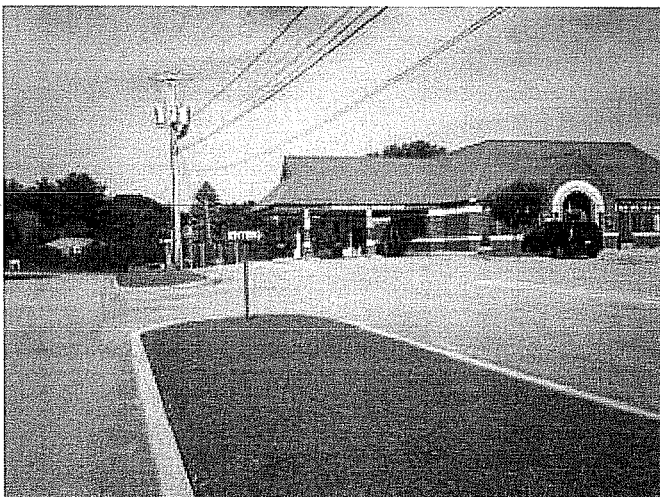
It was also requested that a parking strategy plan be provided that indicates the respective proximity and quantity of parking supply for each of the Development's various uses/components. The correlation between supply and use needs to be documented. For example: dedicated garage parking for the residential units should not be included in the shared use calculations.

**Parking information has recently been provided by the Proponent. Review of this data will follow the resolution of traffic issues identified here in.**

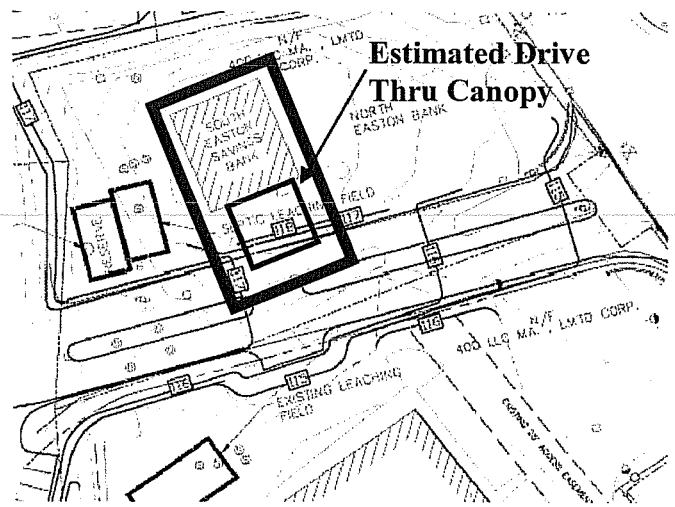
## Site Access Drive at Belmont Street Intersection

The conceptual site plan provided does not appear to show the current footprint of the South Easton Savings Bank accurately. The drive thru teller lanes and associated building canopy appear to be missing.

The area between the Bank and CVS will be the location of the main access drive to the Development. The existing drive is proposed to be widened to accommodate additional site related traffic. It appears that this widening may encroach upon the drive thru lanes of the bank and maybe the associated overhang. **The existing building footprint of the South Easton Savings Bank should be reviewed and updated, as necessary.**



Existing South Easton Savings Bank



South Easton Savings Bank as Shown on Site Plans

The disposition of South Easton Savings Bank drive located directly off Washington Street is not addressed in the TIS. If this driveway is to remain, consideration should be given to restricting its use to

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right turns in only. **Existing bank trips would need to be re-assigned to the site's access drive and capacity analysis modified, accordingly.**

Access to the CVS will be repositioned further to the west along the proposed site access drive than is currently provided. This change will have an effect on site circulation within the CVS site. **A plan should be provided indicating how traffic circulation will be handled within the CVS site, as well as verifying that traffic turning into CVS from Washington Street will not conflict with the traffic queue at the signal.**

The possibility of including a **transit stop** within the site has been suggested. The proponent should provide some insight into this suggestion.

## Mitigation

Currently, the TIS's proposed mitigation consists of:

- 1) Adding an exclusive left turn lane on the site's access drive at the intersection of Washington St/Belmont St. (This is the Proponent's property);
- 2) Providing some signal timing and phasing changes (providing protective-permissive left turn phases for all approaches) at Washington St/Belmont St intersection. **The Proponent should clarify, if this would require a new traffic signal controller or other signal equipment;**
- 3) Installing a traffic signal at the intersection of Washington St/Roosevelt Circle (if warranted with the development in place), and
- 4) Providing some ancillary signal timing and phasing changes at Washington St/Main St, and Washington St/Central St intersections. **(The Proponent should verify that these changes can be made with existing traffic signal equipment.)**

We have concerns with the proposed signal phasing / lane assignments assumed by the TIS at the Washington Street / Belmont Street intersection. These are as follows:

- In the TIS'S LOS analysis, lane assignments used are not consistent throughout the various study periods. In the Concept Plan, provided by the Proponent, the lane assignments for the proposed site drive consist of an exclusive left turn lane and a shared through/right lane. For the AM peak hour, the intersection was modeled as such. During the PM and Saturday Midday peak hours however, the intersection was modeled with a shared left/through lane and an exclusive right turn lane. **Lane use must be consistent for all periods.**

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- Currently, both approaches of Washington Street have a shared through/left lane. The departure of Washington Street northbound consists of only one lane. This represents a lane balance discrepancy (2 through lanes to one departure lane). Currently, this configuration appears to operate in an acceptable manner as the Washington Street northbound departure is wide enough to facilitate the merger, however with the Development's additional volumes operational issues may be heightened.
- The Proponent's proposed signal phasing would modify the existing phasing to provide **protected-permissive** left-turn phases on all approaches. The proposed left turn volumes on both approaches on Washington Street are high (greater than 200 per hour) during future peak hours. There is a high probability that most through traffic on Washington Street would evade the shared through/left lanes to avoid being blocked during that portion of the phasing, when the left turns are operating under the permissive phase.
- The Proponent's proposed phasing accommodates partial protective left turns via lead-lag left turns on Washington Street. The Manual on Uniform Traffic Control Devices (MUTCD) does not preclude the use of lead-lag left turns under protective-permissive control; however, doing so creates "left turn trap" for southbound left turns at the end of the permissive phase. Also, at the beginning of the permissive phase, left turns from Washington Street, northbound, will face two opposing lanes of moving traffic, as it is initiated.

**An alternative would be to modify the shared through/left lanes to exclusive left turn lanes and provide a leading protective phase for left turns. This would also address the lane balance issue on Washington Street northbound noted above. We suggest that the Proponent evaluate this alternative.**

- Also, we are concerned about the left turns from Belmont Street, which currently are only modestly opposed by the CVS / Bank traffic, but will be in conflict with a much heavier the through movement from the new development using this site drive. While left turn phasing mitigation is proposed in the TIS, we questioned whether it is enough.

## Level of Service

The TIS'S Level of Service predictions are reviewed in **Tables 1**. This table summarizes the LOS conditions for the Washington Street / Belmont Street intersection, including LOS with suggested phasing /modifications, as noted below.

BETA analyzed the McMahon Build Conditions with lane use consistent with the Concept Plan and determined this change would decrease the LOS during the PM and Saturday Midday conditions from C and D to D and E, respectively. (Column 3) In addition, we have safety concerns over the lead/lag left turn arrangement, as noted above, particularly given the high volume of the left turns. Applying alternative phasing to address these concerns, the LOS results are calculated to be at unacceptable levels (Column 4). **We recommend that intersection geometric improvements be evaluated.**

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<b>Table 1</b>					
<b>LOS Comparison Washington Street / Belmont Street</b>					
<b>Quset Commons 40R Development</b>					
<b>Easton, MA</b>					
<b>Period</b>	<b>-1- Existing</b>	<b>-2- No Build</b>	<b>-3- Build w/ McMahon Phasing*</b>	<b>-4- Build w/ BETA Phasing</b>	
AM	A	A	B (B)	B	
PM	C	C	C (D)	F	
SAT	B	B	D (E)	F	

\* (LOS) – for lane assignments matching Proponent’s Concept Plan

The results of the sensitivity analysis (100% of site traffic assigned to the drive at the Washington Street Belmont Street intersection (as requested by BETA and provided by McMahon) are presented in **Table 2**.

<b>Table 2</b>					
<b>LOS Comparison Washington Street / Belmont Street</b>					
<b>Sensitivity Analysis w/ 100% of Site Traffic</b>					
<b>Quset Commons 40R Development</b>					
<b>Easton, MA</b>					
<b>Period</b>	<b>-1- Existing</b>	<b>-2- No Build</b>	<b>-3- 100% of Site Traffic w/ McMahon Phasing</b>	<b>-4- 100% of Site Traffic w/ BETA Phasing</b>	
AM	A	A	B	C	
PM	C	C	F	F	
SAT	B	B	F	F	

As previously described, this sensitivity analysis was requested to expose operational deficiencies that may arise due to fluctuations in the site driveway trip distribution. This analysis reveals that the intersection would operate at unacceptable LOS under both the McMahon (Column 3) and BETA (Column 4) phasing conditions.

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The LOS results for the Washington Street / Roosevelt Circle intersection are presented in Table 3.

<b>Table 3</b>					
<b>LOS Comparison Washington Street / Roosevelt Circle</b>					
<b>Queset Commons 40R Development</b>					
<b>Easton, MA</b>					
	<b>-Unsignalized*-</b>		<b>-Signalized-</b>		
	<b>-1-</b>	<b>-2-</b>	<b>-3-</b>	<b>-4-</b>	<b>-5-</b>
<b>Period</b>	<b>Existing</b>	<b>No Build</b>	<b>Build w/ McMahon Phasing</b>	<b>Build w/ Sensitivity Analysis</b>	<b>Build w/ Sensitivity Analysis &amp; Left Turn</b>
AM	D	D	B	B	A
PM	E	E	C	F	B
SAT	C	C	D	E	B

\* Columns 1 and 2 represent LOS for Roosevelt Circle

Columns 1-3 in Table 3 presents the LOS stated in the TIS for the intersection of Washington Street / Roosevelt Circle. **LOS in Columns 3-5 includes the presence of a signal.** LOS in Column 3 assumes that approximately 35% of the site traffic enters and 30% of the site traffic exits via this drive per the TIS.

The sensitivity analysis shows that this access drive intersection is susceptible to lower LOS, if more site traffic uses this access. The sensitivity analysis has approximately 45% of the site traffic entering and 35% of the site traffic exiting via this drive. With this higher assignment, the LOS degrades be B, F and E for the weekday AM, PM and Saturday midday peak hours, respectively, as shown in Column 4. An alternative measure would be to provide an exclusive left turn lane on Washington Street's northbound approach. With this lane in place the LOS would improve to A, B and B for the respective peak hours. This left turn lane should be considered even if the intersection is not signalized, as addressed below.

It appears, but is not conclusive, that traffic signal warrants will be satisfied under Build Conditions for the intersection of Washington Street / Roosevelt Circle. TIS states that a traffic signal at this location should be reserved until a definitive traffic signal warrant analysis can be performed with the development in place. Since a proposed signal at this location would need to be coordinated with the traffic signal at Washington Street / Belmont Street, conduit should be installed prior to completion of the development to accommodate this coordination at a later date.

Currently, the intersection of Washington Street / Belmont Street operates without pedestrian accommodations. **The inclusion of a pedestrian phase to this intersection is important, given the nature of the proposed development and existing land use on the easterly side of Washington Street.** The addition of a pedestrian phase will likely result in a lower LOS, than as stated above.

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**We request an updated Concept Plan for proposed mitigation to address the degraded Levels of Service noted above. This plan should reflect geometric modifications (including the bank driveway off of Washington Street), extent / nature of changes to the signal layout (proposed corner changes will require this, as might lane and phase modifications), location of pedestrian crosswalks / signals and so on.**

Lastly, in the general vicinity of the site, there are a number of existing unsignalized intersections along Washington and Belmont Streets. Due to high traffic volumes on these roadways, many of the minor street approaches at these intersections operate at LOS F with long delays during peak hours. The additional traffic that will be added to Washington and Belmont Streets, as a result of this development will create more delay. For example, the LOS analysis indicates a significant increase in delay at Eisenhower Drive (upwards of 190% increase over existing) and at Bristol Drive (upwards of 45% increase over existing). **The Proponent should state how he intends to mitigate these impacts.**