ENGINEERING SUCCESS **TOGETHER**

October 17, 2014

Mr. Hans Larsen, Executive Director
Board of Selectmen
Town of Wellesley
525 Washington Street
Wellesley, Massachusetts 02482

Re: "Tolles-Parsons Senior Center Transportation Study – Final Report" Traffic Peer Review **Job #: 4505-04**

Dear Mr. Larsen:

Per your request, BETA Group, Inc. (BETA) has reviewed the "Tolles-Parsons Senior Center Transportation Study - Final Report" dated October 3, 2014. This report assesses the traffic impacts related to the proposed two-story 13,274 square foot senior center with 58 associated on-site parking spaces located at 494-496 Washington Street. We want to note that the current proposed Senior Center site includes one contiguous parcel when compared to the previous proposed site which comprised of only 496 Washington Street (formerly the American Legion). BETA had previously reviewed the Transportation Study dated August 3, 2013 associated with only the 496 Washington Street parcel. Our comments for the October 3, 2014 study are as follows:

STUDY AREA

The study proposes to relocate the Wellesley Senior Center from its existing location in the basement of the Wellesley Community Center, at 219 Washington Street, to a new free-standing building at 494-496 Washington Street.

The study area includes the following intersections surrounding the proposed Senior Center site:

- Washington Street (Route 16)/State Street/Kingsbury Street
- Washington Street (Route 16)/Wellesley Avenue/Brook Street
- Washington Street (Route 16)/Central Street (Route 135)/Grove Street
- Washington Street (Route 16)/Morton Street/WPD Driveway

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- Wellesley Avenue/Atwood Street/Dexter Road
- State Street/Atwood Street

It was noted that the proposed Senior Center site will include two driveways, one exclusive entrance and one exclusive exit. These two driveways were also included in the analysis. BETA finds the study area appropriate.

EXISTING CONDITIONS

This section discusses the existing roadway and intersection conditions. The proponent provided a detail description of the roadway and intersection conditions. BETA finds these descriptions appropriate, but note that on pages 5 and 6, the description for State Street is listed twice and Wellesley Avenue continues to Hunnewell Street not Cedar Street in the east.

EXISTING TRAFFIC VOLUMES

The proponent collected peak hour turning movement volumes at the Washington Street (Route 16)/Morton Street/WPD Driveway intersection on Thursday, May 23, 2013. Intersection volumes were also collected at State Street/Atwood Street and Wellesley Avenue/Atwood Street/Dexter Road on Wednesday, September 10, 2014. All other study area intersections were examined using volumes collected in 2012. Data collected in 2012 and 2013 were adjusted using a 1% annual growth rate to estimate respective 2014 volumes. The 1% rate is appropriate based on historical data.

Generally, BETA does not recommend collecting counts on Wednesdays due to the early release of students on Wednesdays. As part of this review, we contacted the Wellesley Public Schools and found that no early release was scheduled for the Middle School on this particular Wednesday; however, all the elementary schools had early release. BETA also reviewed historical traffic data in Wellesley collected from Monday to Friday. In general, traffic volumes on Wednesdays are not significantly different than other weekdays. Because the Senior Center Peak demand is outside of the commuting peak periods, recounting the traffic data would not change the analysis results.

To be conservative, the proponent did not apply seasonal factors to the count data as said factors would reduce the collected volumes based on MassDOT seasonal adjustment factors. BETA finds this methodology appropriate.

Automatic Traffic Recorder (ATR) counts were collected on Washington Street, west of Morton Street and on Atwood Street, west of Morton Street in September 2014. These data were compared with ATR counts collected on Washington Street in 2009, and counts collected on Atwood Street in 2002. The comparison, shown in Table 1 and Table 2, revealed that volumes on Washington Street decreased about 0.3% per year while volumes on Atwood Street increased about 1% per year. Based on these two tables, it was found that Washington Street carries

approximately 15,500 vehicles per day, while Atwood Street carries approximately 1,060 vehicles per day. We want to note that the back-up data sheets provided in the appendix shows the Washington Street ADT of 16,827 (as discussed below).

The attached appendix provides the back-up ATR count data for Washington Street, but not for Atwood Street; therefore it is not possible to compare data for Atwood Street. The Appendix includes ATR data collected for Washington Street in July of 2014 and show an ADT of 16,827 vehicles per day, approximately 4% higher than volumes shown in Table 1. These two tables and the Appendix should be updated to show consistent data. In addition, Table 1 and Table 2 should be updated to show Eastbound and Westbound columns in the Year 2014.

EXISTING INTERSECTION OPERATIONS

Using the updated traffic volume data, the proponent found:

- The intersection of Washington Street/State Street/Kingsbury Street operates at LOS D in the AM Peak Hour and LOS C in the PM Peak Hour. We want to note that due to the analysis software limitation, while the LOS is acceptable, the analysis also revealed queuing problems on Kingsbury Street and Washington Street due the oversaturated intersection capacity condition and the short queue storage available on the bridge.

- The intersection of Washington Street/Wellesley Avenue/Brook Street operates at LOS C in both AM and PM Peak Hours. Again due to the analysis software limitation, while the LOS is acceptable, the analysis also revealed queuing problems on Washington Street due the oversaturated intersection capacity condition and the close proximity of the Grove Street/Washington Street intersection.

- The intersection of Washington Street/Central Street/Grove Street operates at LOS E in the AM Peak Hour and LOS D in the PM Peak Hour. Similar to the Wellesley Ave intersection, while the LOS is acceptable, the software also revealed queuing problems on Central Street and Washington Street due to the oversaturated intersection capacity.

- All approaches of the unsignalized intersection of Washington Street/Morton Street/WPD Driveway operate at LOS D or better in both AM and PM Peak Hours.

- All approaches of the unsignalized intersection of State Street/Atwood Street operate at LOS C or better in both AM and PM Peak Hours.

- All approaches of the unsignalized intersection of Wellesley Avenue/Atwood Street/Dexter Road operate at LOS D or better in both AM and PM Peak Hours.

BETA finds this analysis acceptable.

CRASH HISTORY

Crash data were obtained from the Wellesley Police Department for the study area intersections between 2011 and 2013. Within the three years, 22 crashes occurred at Washington Street/Kingsbury Street/State Street; 3 crashes occurred at Washington Street/Wellesley Avenue/Brook Street; 3 crashes occurred at Washington Street/Central Street/Grove Street; 10 crashes occurred at Washington Street/Morton Street/WPD Driveway; 2 crashes occurred at State Street/Atwood Street; and 2 crashes occurred at Wellesley Avenue/Atwood Street/Dexter Road.

The intersection of Washington Street/Kingsbury Street/State Street was found to have a crash rate of 0.79, greater than the MassDOT District 6 average crash rate for signalized intersections (0.76). It was noted that the high crash rate was likely related to an increase in traffic at this intersection due to the closure of the Rockland Street Bridge in January 2012. For example, during the morning commuting peak period, approximately 500 vehicles were diverted to utilize the Kingsbury Street Bridge. The number of crashes decreased in 2013 when the Rockland Street Bridge was opened in January 2013.

BETA finds this analysis acceptable.

EXISTING PARKING CONDITIONS

The existing parking conditions along Washington Street were examined via parking studies completed in 2009 and 2012 by BETA. The proponent validated these studies by observing parking conditions in 2013 and 2014. Washington Street provides 48 public on-street spaces between Wellesley Avenue and Morton Street. The on-street parking is signed for two-hour parking only. This parking is primarily used by St. Paul's Parish and St. Paul's School, though some on-street parking is used for other nearby land uses including the police station. The existing site has been turned into an informal parking lot, utilized by the adjacent church/school. Parking observations revealed that both Washington Street and Atwood Street are used extensively during the St. Paul's School arrival and dismissal periods. BETA finds the parking evaluation acceptable.

EXISTING PEDESTRIAN FACILITY CONDITIONS

The proponent conducted sidewalk and crosswalk inventories within the study area and found the overall condition of sidewalks to be in excellent or good condition. The existing crosswalk adjacent the St. Paul Parish provides flashing yellow beacons when the pedestrian pushes a call button. When activated, the yellow beacons flash for 17 seconds. This crosswalk was found to be 38 feet long. Using an average walk speed of 2.9 feet per second, which is recommended when 100% of the walking population consists of elderly or young children, approximately 13 seconds of flash time is needed. As such, these flashing beacons provide adequate walking time and will be maintained. BETA finds this appropriate.

NO-BUILD (2019) VOLUMES

No-Build traffic volumes were estimated by applying a 1% growth rate per year for five years. This is consistent with other studies within the Town of Wellesley. Traffic volumes were also adjusted to

account for nearby projects that might increase traffic in the study area. Two projects were researched: Wellesley High School, and 576 Washington Street (Wellesley Inn). The Wellesley High School forecasts an increase in students by 2017, these trips were added to the network. The Belclare, 576 Washington Street project is scheduled to be completed in 2015 and includes 30 condominiums and 9,500 square feet of commercial space. BETA finds this acceptable.

NO-BUILD (2019) TRAFFIC OPERATIONS

Using the adjusted No-Build traffic volume data, the proponent performed a detailed traffic analysis and the results are as follows:

- The intersection of Washington Street/State Street/Kingsbury Street would operate at LOS D in the AM Peak Hour and LOS C in the PM Peak Hour. Due to the analysis software limitation, while the LOS is acceptable, the software also revealed queuing problems on Kingsbury Street and Washington Street due the oversaturated intersection capacity.

- The intersection of Washington Street/Wellesley Avenue/Brook Street degrades to LOS D in the AM Peak Hour, but continues to operate at LOS C in the PM Peak Hour. We want to note that the software also revealed queuing problems on Wellesley Avenue and Washington Street due the oversaturated intersection capacity and the close proximity of the Grove Street/Washington Street intersection.

- The intersection of Washington Street/Central Street/Grove Street degrades to LOS F in the AM Peak Hour and continues to operate at LOS D in the PM Peak Hour. The software also revealed queuing problems on Central Street and Washington Street due the oversaturated intersection capacity and the close proximity of the Wellesley Avenue/Washington Street intersection.

- All approaches of the unsignalized intersection of Washington Street/Morton Street/WPD Driveway operate at LOS E or better in both the AM and PM Peak Hours.

- All approaches of the unsiganalized intersection of State Street/Atwood Street operate at LOS E or better in both the AM and PM Peak Hours.

- All approaches of the unsignalized intersection of Wellesley Avenue/Atwood Street/Dexter Road operate at LOS E or better in both the AM and PM Peak Hours.

BETA finds this analysis acceptable.

TRIP GENERATION

Since the Institute of Transportation Engineers *Trip Generation Manual* does not include a specific land use for Senior Centers, the proponent collected empirical data for the existing Wellesley Senior Center location and two relatively new senior centers located in Belmont and Needham,

Massachusetts. The proponent concluded that the proposed Senior Center will draw approximately 150 visitors per day based on the proposed program. It was also estimated that approximately five staff members and/or volunteers will access the site each day. BETA finds this estimate acceptable.

MODE SHARE

Mode share was determined based on a survey of visitors to the existing Wellesley Senior Center in June 2009. Based on the location of the proposed site and the activities proposed, it was estimated that the percentage of carpooling visitors and walking/biking visitors will be slightly higher than the existing site. This study estimates approximately 61% of visitors to drive alone; 25% to carpool; 4% to be dropped off; 6% to ride transit; and 4% to walk or bike. BETA finds the mode share percentages to be appropriate.

NEW TRIPS

Based on the estimated trip generation this site is expected to generate 72 trips (36 in and 36 out) in the Senior Center peak hour on a typical day. The estimated peak hour for the proposed Senior Center is 9:45AM – 10:45AM. To provide a conservative analysis of traffic, even though the Senior Center peak hour occurs outside of the AM (7:30 to 8:30 AM) and PM (5:00 to 6:00PM) peak commuting periods, the proponent applied and analyzed these generated trips as if they were actually occurring in the AM and PM commuter peak hours. BETA finds the analysis methodology acceptable.

TRIP DISTRIBUTION

Trip distribution was determined based on U.S. Census 2010 data and developed as follows:

- 21% of trips via Washington Street from the northeast
- 13% of trips via Kingsbury Street from the north
- 19% of trips via Wellesley Avenue from the east
- 36% of trips via Central Street from the west
- 5.5% of trips via Grove Street from the south
- 5.5% of trips via Washington Street from the southwest

Total 100%

BETA finds the trip distribution acceptable.

BUILD (2019) TRAFFIC OPERATIONS

Based on the trip generation, distribution, traffic assignment and No-Build condition data, the Build condition was developed and analyzed. The intersection analysis results are as follows:

- The intersection of Washington Street/State Street/Kingsbury Street would continue to operate at LOS D and C in the AM Peak and PM Peak period respectively. We want to note that due to the analysis software limitation, while the LOS is acceptable, the analysis also

revealed queuing problem on Kingsbury Street and Washington Street due the oversaturated intersection capacity condition.

- The intersection of Washington Street/Wellesley Avenue/Brook Street continues to operate at LOS D and C in the AM Peak and PM Peak period respectively. Due to software limitation, even though the LOS is acceptable, the software also revealed queuing problems on Wellesley Avenue and Washington Street due the oversaturated intersection capacity and the close proximity of the Grove Street/Washington Street intersection.

- The intersection of Washington Street/Central Street/Grove Street would operate at LOS F and D in the AM Peak and PM Peak period respectively. Similar to the Wellesley Avenue intersection, the analysis also revealed queuing problems on Central Street and Washington Street due to the oversaturated intersection capacity.

- All approaches of the unsignalized intersection of Washington Street/Morton Street/WPD Driveway continue to operate at LOS E or better in both the AM and PM Peak Hours.

- All approaches of the unsiganalized intersection of State Street/Atwood Street continue to operate at LOS E or better in both the AM and PM Peak Hours.

- All approaches of the unsignalized intersection of Wellesley Avenue/Atwood Street/Dexter Road continue to operate at LOS E or better in both the AM and PM Peak Hours.

- The Senior Center entrance driveway was found to operate at LOS A for both Washington Street approaches in both AM and PM Peak Hours.

- The Senior Center exit driveway was found to operate at LOS D in the AM Peak Hour and LOS C in the PM Peak Hour.

BETA finds this analysis acceptable, but note that Table 17 should be updated to display the PM Peak Hour operating conditions.

FUTURE PARKING CONDITIONS

The proposed Senior Center will have 58 parking spaces on-site. Washington Street, between Morton Street and Wellesley Avenue, contains 48 on-street spaces. These spaces are limited to two-hour use. It is estimated that four of these metered spaces will be removed to provide room for the new Senior Center driveways. As such, 44 on-street spaces will be maintained along Washington Street, between Wellesley Avenue and Morton Street, for public use.

The proponent provided a detailed parking supply and demand analysis. Based on the analysis, the peak forecasted demand on a typical day is 56 parking spaces. The proposed site has 58 parking

spaces on-site. Therefore, all the Senior Center parking demand will be accommodated on-site and Center will not impact adjacent on-street parking. BETA finds this acceptable.

SIGHT DISTANCE

The proponent performed a sight distance analysis for the proposed Senior Center exit driveway. Sight distance analysis is not required for the entrance driveway as vehicles will not be exiting via this driveway. Based on the ATR data collected in 2014, the 85th percentile speed on Washington Street is 30mph. According to the American Association of State Highway and Transportation officials (AASHTO) guidelines, the required Stopping Sight Distance (SSD) for a vehicle traveling at 30mph is 200 feet. The sight distance analysis revealed vehicles traveling southbound on Washington Street have an adequate SSD of 820 feet while vehicles traveling northbound on Washington Street have an adequate SSD of 635 feet. It was noted that these sight distances may be impacted by parking activity at the adjacent on-street parking spaces on Washington Street, however this activity is sporadic in nature and primarily occurs during St. Paul Parish and St. Paul School peaks. The site plan proposes restricting parking on either side of the proposed exit driveway to maintain sight lines. As noted, the effort to maintain sight lines and provide driveways for the proposed site only removes four parking spaces from Washington Street. BETA finds the sight distance analysis acceptable.

ROADWAY AND PARKING IMPACTS-PSI CRITERIA

Since this project does not greatly increase traffic volumes outside of the typical traffic growth, this project does not meet the Project of Significant Impact (PSI) requirements for impacted roadways/intersections. The PSI guidelines define an impacted roadway segment as a signalized intersection having 20 or more peak-hour, project related trips and an increase in daily or peak-hour volume of 5% or more and there shall be no degradation in the overall level of service. This guideline also applies to an unsignalized intersection with the exception of the minor street approach peak-hour volume of 50 or more vehicles per hour.

While the PSI requirements for impacted roadways are based on the commuting peak periods, we want to note that the peak hour (9:45AM – 10:45AM) for the proposed Senior Center occurs outside of the AM (7:30 to 8:30 AM) and PM (5:00 to 6:00PM) peak commuting periods. To provide a conservative analysis of traffic, the proponent applied and analyzed these generated trips as if they were actually occurring in the AM and PM commuter peak hours.

Parking needs for the proposed Senior Center can be fully contained on-site based on the parking supply and demand analysis.

SITE PLAN REVIEW

The proposed site plan shows one contiguous parcel (494-496 Washington Street) with 58 parking spaces on-site and a one-way site circulating pattern. An entrance driveway is proposed on the south side of the site which allows traffic to circulate in a counter-clockwise motion towards an exit driveway located to the north. The driveways provide for one lane of travel. The proposed parking

lot provides a turn-around such that vehicles do not need to utilize Washington Street to circulate within the site. This contains all site related traffic and parking maneuvers on-site, which minimize traffic impact on Washington Street. Our comments are as follows:

1. The proposed island located in front of the main entrance is shown as flush mounted curb, for safety purposes and to ensure that vehicles will not drive on the sidewalk/waiting area, pavement markings or textured pavement should be considered to delineate the pavement area from the waiting area.
2. The proponent should ensure that adequate turn radii are provided for fire trucks and buses that access the site.

If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,
BETA Group, Inc.

Kien Ho, PE, PTOE
Vice President

cc: Meghan Jop, Deputy Director; Town of Wellesley

Tyler de Ruiter, EIT; BETA Group, Inc.

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