MEMO

TO: Kim Hazavartian, P.E. PTOE, Ph.D

FROM: Phillip Cherry, PE, PTOE

SUBJECT: 144 Seekonk Street Traffic Study
Response to the Traffic Peer Review

DATE: October 23, 2019

WSP is in receipt of the TEPP LLC Traffic Peer Review Memorandum dated September 30, 2019 (TEPP Comment Memo) outlining their comment on the Traffic Study Memorandum (Traffic Study) prepared for the proposed 96 unit residential development at 144 Seekonk Street. WSP has reviewed to comments provided and offers the following responses and additional information:

Traffic Study Networks

T.1. The Traffic Study presented the weekday AM-street peak hour and weekday PM-street peak hour under the follow conditions:

- *2019 existing*
- *2019 build*
- *2026 no-build*
- *2026 build*

The Traffic Study body should include traffic-volume networks that depict:

- *the above peak hours and conditions for the expanded study area described below*
- *site-traffic volumes alone*

The traffic-volume networks will help readers:

- *understand existing traffic*
- *understand future traffic volumes*
- *compare traffic volumes to understand better Project traffic impacts*

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The revised traffic impact study includes traffic diagrams from the Synchro model, showing the extent of the revised study area.

T.2. The only intersection that the Traffic Study analyzes is the Seekonk Street/proposed driveway intersection. The Traffic Study area should be expanded to include the following intersections:

- *Seekonk Street/Cleveland Street*
- *Seekonk Street/Fruit Street*

See, Norfolk Subdivision Rules and Regulations, 3.3.2.23.1.4. Further, TEPP LLC recommends that WSP confer with the Town Planner to assess if the Project-generated traffic will likely use any other intersections that may already experience delays, such as

- *Main Street/Seekonk Street*
- *Route 27/South Street*

During the October 2, Norfolk Zoning Board Association (ZBA) Meeting, the developer team was asked to collect new traffic data and at additional intersections. However, Columbia Gas was performing work on Seekonk Street at the site, which would have rendered the count data invalid. Columbia Gas left Seekonk Street a week after the Zoning Board meeting; however, by this time, there was not enough time to order, collect, review, and incorporate new count data.

Seekonk Street at Cleveland Street

In lieu of additional count data, the team sought to utilize recent data from other studies as a supplement source of information. After the October 2 ZBA Meeting, the development team e-mailed the Norfolk Town Planner to ask about any recent or upcoming developments in the vicinity of 144 Seekonk Street, in order to leverage this in the analysis.

The revised traffic study includes the Seekonk Street at Cleveland Street intersection and incorporates traffic volume data from the Enclave development [LOCATED WHERE] which included this intersection in its analysis. The traffic volumes from that study were combined with the 144 Seekonk Street study volumes to produce revised 2026 Build Conditions analysis.

The analysis indicates that even with the added trips from the 144 Seekonk St development, increasing Cleveland Street and Seekonk Street traffic volumes to account for background growth, and then increasing each facility by another 10%, the intersection is projected to operate acceptably [LOS C].

Seekonk Street at Fruit Street

In lieu of count data for the Seekonk Street at Fruit Street intersection, count data from the 84 Cleveland Street residential development in Norfolk was used to develop

volumes for the intersection. This study had volumes for the Cleveland Street at Fruit Street intersection, which is proximate to the Seekonk Street at Fruit Street intersection. These volumes were used in concert with the traffic count data collected for the 144 Seekonk Street project to estimate turning movement volumes at the Seekonk Street at Fruit Street intersection in the 2019 Existing Conditions as well as 2026 No Build and Build Conditions.

The 2016 volumes collected as part of that study were grown by 3% for the existing conditions and grown by 20% (to the 2026 No Build and Build Conditions) and then entered into the respective Synchro models. The turning movement distribution from Fruit Street to Seekonk Street was estimated, based on the prevailing travel pattern along Seekonk Street, and based on these volumes.

As shown in the table, the level of service on the unsignalized fruit street approach is projected to be LOS B in the existing, future no build, and future build conditions. In addition, the table indicates that delays are expected to increase by less than 1.0 seconds between the 2026 No Build and Build Conditions.

South Street at MA 27 Intersection

The South Street at MA 27 (High Street) intersection is located in the town of Medfield 2.5 miles from the proposed driveway. The signal (and its related timing and operations) at the intersection are not under the Town of Norfolk's jurisdiction. In addition, its operations are influenced by not only travel patterns and land uses located along multiple Seekonk Street cross streets, but also by Medfield and Walpole commute patterns.

The team corresponded with the Medfield Town Planner to attempt to obtain recent count data or traffic analyses that included the South Street at MA-27 intersection, and received a response that there were no recent studies in the area. Based on the revised site plan that includes 84 units, the development is projected to generate 63 trips in the morning peak hour, 47 of which are projected to turn north towards the South Street at MA-27 intersection, which equates to approximately 1-2 additional vehicles per signal cycle. Observations made at 7:50 AM on the morning of October 15 showed northbound queues on South Street at the intersection of 12-15 vehicles; however, no cycle failures (based on queueing) were observed during the multiple cycles observed.

Seekonk Street at Main Street Intersection

Based on the trip distribution, which indicates that most trips from the proposed development will turn right onto northbound Seekonk Street, there are only projected to be 14 and 10 trips in the 2026 AM and PM peak hours, respectively, headed south towards the Seekonk Street at Main Street intersection. Even if all of these vehicles reach Main Street, this is equivalent to only one vehicle every 5 and 6 minutes, which should not adversely affect the stop controlled intersection's operations.

T.3. An automatic-traffic recorder (ATR) was placed on Seekonk Street on Wednesday, November 30, 2016 and Thursday, December 1, 2016. These data are greater than two years old and are not current pursuant to Massachusetts Department of Transportation Traffic Impact Assessment Guidelines dated March 13, 2014, unless the reviewing authority accepts the data. Since obtaining ATR data is not time- or labor-intensive, and can usually be done in a short period of time, we recommend that WSP collect new ATR data over at least a two-day period, mid-week, and not during a week with a holiday or a school vacation.

Please see the first paragraph of the response to comment T2, regarding the utility work and count data timeline.

Traffic Study Vehicle Speeds

T.4. The ATR obtained speed data on Seekonk Street near the site. The Traffic Study reported the:

- *posted speed limit was 35 miles per hour (mph)*
- *northbound 85th percentile speed was 40 mph*
- *southbound 85th percentile speed was 41 mph*

As noted above, these data are more than two years old, and therefore should be updated.

Please see the first paragraph of the response to comment T2, regarding the utility work and count data timeline. In addition, as documented in the revised study, "25 MPH - INTERSECTION AHEAD" signs were installed on Seekonk Street both north and south of the proposed driveway. These signs should reduce both the northbound and southbound 85th percentile prevailing speeds on Seekonk Street near the driveway. Anecdotal (car following) data from an October 15 site visit indicates vehicles traveling at speeds less than 35 mph.

Traffic Study Sight Distances

T.5. The Traffic Study provided an opinion that the Seekonk Street/proposed driveway intersection provides stopping sight distance (SSD) both to/from the north and south along Seekonk Street, per the American Association of State Highway and Transportation Officials (AASHTO). With respect to intersection sight distance (ISD), the Traffic Study states that AASHTO's "desirable" sight distance is not met in either direction due to vegetation. The Traffic Study did not provide a plan or profile supporting either of its SSD and ISD statements.

T.6. Concerning ISD, AASHTO states:

> *If available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle.*

To enhance vehicle operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.

To elaborate, SSD is the linear distance that a vehicle on the major road (i.e., Seekonk Street) travels to stop to avoid a collision with another object in its lane of travel (i.e., another vehicle stopped, a child chasing a ball, etc.). Providing ISD limits the speed reductions of major-road vehicles to avoid collisions with vehicles exiting from the minor road.

Table 1 summarizes information in the Traffic Study indicating that existing sight distances at the Seekonk Street/proposed driveway intersection do not provide AASHTO values for SSD and ISD. The Applicant should provide a plan and profile showing appropriate sight distances at this intersection in both directions and should identify full improvement measures. The Traffic Study did not state whether the vegetation limiting sight distances is on private property, or is within the Seekonk Street right-of-way. If the vegetation is on private property, the applicant would need to obtain a view easement to maintain appropriate sight distances.

See Table 1 in TEPP Comment Memo.

The revised traffic study includes Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) figures that illustrate sight triangles. These figures illustrate the trees and shrubbery / vegetation (located either on the developer's property or along Seekonk Street within Norfolk ROW) that would need to be removed to achieve the necessary Stopping Sight Distance (SSD) and required Intersection Sight Distance (ISD). As discussed during the October ZBA meeting, the AASHTO defined SSD is required, and ISD must also be at least the length of the SSD. Meeting the AASHTO defined ISD, which is longer than SSD for the same speed, is recommended but not required.

The October 15 site visit confirms that trees on property and trees and shrubbery in Norfolk right of way could be removed to provide the required ISD and SSD.

Traffic Study Accidents

T.7. The Traffic Study should provide accident history and rate analysis as applicable for Seekonk Street at least between and including its intersections with Cleveland Street, to the north, and Fruit Street, to the south. The accident history and rate analysis should be for the five most recent years of appropriate data available from the Massachusetts Department of Transportation.

Crash data from 2014-2018 was downloaded from the MassDOT Crash Portal and included in the report. The analysis found that there were five (5) crashes along a 0.5 mile segment of Seekonk Street centered on the proposed driveway. When converted to a segment crash rate, it was found that this segment of Seekonk Street was less than the statewide average for urban minor arterials. Please see the revised report for the crash data.

Traffic Study Pedestrians, Bicycles and Transit

T.8. The Traffic Study should present existing and future pedestrian, bicycles and transit considerations on the site and in the area.

A multi-modal discussion has been included in the report, covering pedestrian, bicycle, and transit data. The commuter rail station is a 2.0 mile walk from the proposed development. There are currently no sidewalks along Seekonk Street to the south towards Main Street, although anecdotal evidence indicates some residents walk and jog along Seekonk Street along the narrow shoulder or just outside the edge of pavement.

Traffic Study Site Trips

T.9. The proposed development was analyzed as 96 single-family-detached housing units. The analysis used the Institute of Transportation Engineers (ITE) Trip Generation Manual, per typical professional practice. TEPP LLC calculated weekday vehicle-trips as:

- *daily, 1,001 (total of in and out), compared to 906 in the Traffic Study*
- *AM-street-peak hour, 73 (18 in and 55 out), the same as in the traffic study*
- *PM-street-peak hour, 98 (62 in and 36 out), the same as in the traffic study*

The difference in weekday-daily vehicle trips does not affect weekday-street-peak hour traffic operations.

Based on a revised site plan that reduces the proposed number of units from 96 to 84, the trip generation values have been revised. The reduced number of units would reduce the traffic impacts on Seekonk Street and surrounding intersections.

T.10. The Traffic Study distributed and assigned site trips along Seekonk Street as follows:

- *to and from the north, 75 percent*
- *to and from the south, 25 percent*

This distribution and assignment is consistent with existing traffic patterns reported in the body of the traffic study, subject to updated traffic counts.

The proposed trip distribution has been maintained.

Traffic Study Capacity Analysis

T.11. The Traffic Study body presents capacity analysis, including levels of service and delays for Seekonk Street/proposed driveway intersection. More complete capacity analysis, including queues, is appended to the Traffic Study. The presented levels of service are high, with low delays and short queues. However, the Traffic Study should be expanded to present levels of service, delays and queues at the intersections discussed in the "traffic study networks" section above.

The traffic operations has been updated, given the reduced number of units (96 to 84). Please see the response to comment T2 for discussion of the other study area intersections.

The revised site plan no longer includes the roundabout where the driveway intersects the development. The is a new "roundabout" further south to allow school buses and emergency vehicles to turn around.

Traffic Study Roadway and Roundabout Design

Single Access Point

T.12. The Norfolk Subdivision Rules and Regulations require that subdivisions having 25 or more lots "shall have at least two points of access to an existing through street separated by a minimum distance of 350 feet, or shall have two separate passable access routes via existing primary streets to an existing through street where the points of access are." The Project has 96 housing units on 70 lots, with one access point on Seekonk Street. The Applicant should confirm that an emergency access, remote from the proposed roadway, is not available or practicable, and if not, should consider additional safety mitigation measures.

Safety risk increases as the length of single access increase and intensity of land development increases. Longer single-access roadways increase the risk of an incident, such as a fallen tree or vehicle accident, which could block or impede emergency response. More intense land developments, such as those with larger numbers of dwelling units, are likely to increase the need for and frequency of emergency response.

The revised site plan has modified the driveway to improve redundant access and now includes a circular turn-around area (similar to a roundabout with two approaches) approximately halfway along the driveway from Seekonk Street to the location of the proposed units. This turn-around would allow passenger vehicles, buses, and emergency vehicles to enter the development and then turn-around to exit to the street without entering the heart of the development. It also allows for greater redundancy if vehicles break down or if a tree were to fall across the driveway.

Additional discussion has been included in the revised study report that provides greater detail.

Internal Roadway Network

T.13. The applicant should provide a "swept path" analysis and plan, utilizing tools such as turning templates or the AutoTURN software program, demonstrating that all of the Town of Norfolk's emergency vehicles and other anticipated large vehicles can safely navigate the proposed roadway and roundabout. Further the Applicant should make the median of the main entrance segment traversable by emergency vehicles. Also, the Applicant should consider modifying the end of the proposed stub driveway at Units 16 and 17 to provide a hammer head turnaround, to enable vehicles, including emergency vehicles, to reverse direction.

The site plan has been revised and a swept path analysis has been performed as part of these revisions.

T.14. The Applicant should demonstrate that the anticipated range of vehicles can: (a) appropriately make turning movements at the Seekonk Street/proposed driveway intersection, (b) appropriately enter and exit from the proposed parking spaces near the proposed community mailbox; and (c) appropriately enter and exit from the proposed residential units along the proposed driveway.

The site plan has been modified to remove the roundabout, making it easier to enter and exit each resident's driveway.

T.15. The Applicant should provide a STOP sign on the proposed driveway approach to Seekonk Street. Further, as noted above, the Applicant should explain how future residents can safely walk to Seekonk Street, and identify where sidewalks are located on Seekonk Street and cross streets within one mile of the Project site.

A stop sign will be included on the proposed driveway's approach to Seekonk Street and stop signs and crosswalks will be added where appropriate within the development.

No sidewalks were observed on Seekonk Street between the proposed driveway and Main Street to the south. Sidewalks begin on the west side of South Street (Seekonk Street continues into South Street), beginning at Indian Hill Road, which lies on the boundary of the town of Norfolk and Medfield.