

Ref.: 22106

November 8, 2022

Ms. Jennifer Hager, Planning Director
Town of Sutton
4 Uxbridge Road
Sutton, MA 01590

Reg.: Traffic Peer Review
Unified Global Packaging Group
Boston Road, Sutton, MA

Dear Jennifer:

Chappell Engineering Associates, LLC (CEA) has reviewed the twenty-four sheet Roadway Improvement plans titled “15047 SUTTON BOSTON ROAD” prepared by Vanasse Hangen Brustlin, Inc. and dated September 28, 2022, for conformance to applicable MassDOT and AASHTO guidelines. This letter summarizes our findings and should be read in conjunction with the marked-up plan sheets attached. Furthermore, this letter addresses original site plan comments provided by RMA in their June 24, 2022 letter.

Bicycle Accommodations

The Central Massachusetts Regional Planning Commission has designated Boston Road in the project area as having a “medium potential” for “everyday biking”. Within the project limits on Boston Road the roadway cross section consists of either three 11’ – 0” travel lanes and two 2’ – 0” shoulders or two 11’ – 0” travel lanes and a variable width scored concrete island.

The Functional Classification of the roadway is Urban Minor Arterial. MassDOT requires all roadways classified as arterials to include 4’ shoulders as indicated in the 2006 Project Development and Design Guide (PDDG), Exhibit 5-12, “Width of Useable Shoulders”. However, Exhibit 5-12 notes that “Shoulder widths less than the values shown may be used if a design exception is obtained” and the descriptive text states that “If a design exception is obtained,

shoulders narrower than 4 feet may be used in constrained areas where separate pedestrian accommodation is provided and shared bicycle/motor vehicle accommodation is suitable. Examples of these conditions are where design speeds are less than 45 miles per hour and traffic volumes are relatively low (less than 4,000 vehicles per day) ...". PDDG Exhibit 5-11, "Minimum Shoulder Width (in feet) to Provide Various Functions" indicates that a 2' shoulder on an arterial will provide for encroachment and off-tracking of wide vehicles but will not provide for "errant vehicles" (3.0' minimum width) or for bicycle use (4.0' minimum width).

Within the project limits on Boston Road, the 11' – 0" travel lane and the 2' – 0" shoulder will effectively operate as a shared use lane for motor vehicles and bicycles. The combined 13' – 0" width is less than the 14' – 0" recommended by MassDOT and AASHTO as a minimum shared use lane width, and the tendency for drivers to encroach into the adjacent travel lane when passing a bicyclist will increase. The risks associated with encroachment are offset to a certain extent by the generally generous sight lines, the low traffic volumes, and relatively low vehicular speeds within the project limits. **The town should consider requiring bicycle accommodations.**

Plan Specific Comments

Sheet 1: Title Sheet and Index

- a. In addition to Design Speed and Functional Classification, MassDOT's Design Designation information includes traffic data such as ADT, K, D, T, and DHV. Is this data available?

Sheet 4: Typical Sections

- a. A Typical Section is needed for Unified Parkway.
- b. If the cross slope of the Proposed HMA Walk is constant it should be noted.
- c. The thickness of the Proposed Scored Concrete Pavement (8" – 9") is in conflict with the thickness shown on Sheet 22 of 24.
- d. The existing Town Layout lines should be represented on the Typical Sections.
- e. Additional comments noted on the plan.

Sheet 5: Construction Plan, 1 of 3

- a. Why is the SMH at ~sta. 21+25 RT called to be adjusted? There is no other work proposed in the area.
- b. The proposed HMA walk does not connect to an accessible route. Is this problematic?
- c. Additional comments noted on the plan.

Sheet 6: Construction Plan, 2 of 3

- a. Coordinate location of the relocated UP# 94/68 with the location of the buried ET&C lines as shown on the Bohler plans.
- b. The relocated OHW from UP# 93/67 to UP# 94/68 will require trimming of the 68" Sycamore canopy.
- c. It should be noted that the proposed masonry wall along the house across the street from Unified Parkway could severely restrict sight lines exiting that driveway depending on how tall it is.
- d. Additional comments noted on the plan.

Sheet 7: Construction Plan, 3 of 3

- a. The guy wire proposed at UP# 97/71 may need to be replaced with a push brace.
- b. Additional comments noted on the plan.

Sheet 8: Boston Road Profile, 1 of 3

- a. Add station and elevation of angle point at ~station 23+60.
- b. Additional comment noted on the plan.

Sheet 11: Unified Parkway Profile, 1 of 1

- a. The Boston Rd. PGL gives 399.19 at the intersection of the two baselines. From the Boston Rd. grading it appears that the Unified Parkway PGL should continue to slope downward past the Boston Road gutter line, on Boston Road itself.

Sheet 12: Curb Tie and Grading 1 of 3

- a. Non-concentric northside curbline geometry is not provided from the limit of work to the PT sta. 24+18.61, 24.00' LT.

Sheet 13: Curb Tie and Grading, 2 of 3

- a. Non-concentric northwest curbline curve data is not provided from Boston Rd. PC sta. 27+65.44, 24.00' LT to Unified Parkway PCC sta. 55+33.9 RT.
- b. Non-concentric northeast curbline curve and tangent data is not provided from Unified Parkway PT sta. 54+86.4, 17.0' LT to Boston Rd. PRC sta. 29+42.80, 24.50' LT.
- c. See the insert Sheet 13 lower left. The grading in the vicinity of the scored concrete island raises some concerns. For example, at Boston Rd. station 29+50 there are significant grade breaks between the southern edge of the scored concrete island, the SYL offset by 2', and the Boston Rd. southern EOP offset by an additional 13'.

The grading in this area should be reviewed and revised as necessary as the design is further developed.

- d. Additional comments noted on the plan.

Sheet 14: Curb Tie and Grading, 3 of 3

- a. The Sheet 4 Typical Section defines the swale geometry. The Bohler Grading and Drainage Plan E does not take into account this swale. It appears that for the most part the swale can be constructed without impacting the berm proposed by Bohler as part of their Stormwater Management Area #4, however this is not the case for Boston Rd. stations 31+25 to 31+75. Please review and revise as necessary. The grading of the proposed swale should be further developed and shown on Sheet 14.
- b. Additional comments noted on the plan.

Sheet 16: Traffic Plans, 2 of 3

- a. The right-turn by trucks from Boston Rd. WB on to the Unified Parkway NB does not appear to be prohibited.
- b. Consider including right turn lane only pavement markings on Unified Road.
- c. Include an R3-8L sign for EB left turns into Unified Parkway near Sta. 27 or 28.

Sheets 19 and 20: Temporary Traffic Control Plans, 1 and 2 of 2

- a. See plans for comments.

Sheet 21: Construction Details, 1 of 3

- a. Consider providing a tree protection detail. If there are locations where tree protection would be advisable, add to Construction Plans.
- b. Consider specifying that the catch basin grate must be bicycle safe.

Sheet 24: Critical Cross Sections

- a. Add existing Town Layout lines station 27+50, LT and RT.

Response to RMA Traffic Comments

Responses were provided to the original site plan comments supplied in the RMA letter dated June 24, 2022. For ease of reading, this letter paraphrases our initial comments where additional information was requested, the applicant's responses, and any additional comments we have at this time (in bold).

Comment 16: Available sight distances from the proposed Unified Parkway intersections with Boston Road and Providence Road were not measured or compared with minimum requirements. It was recommended that the applicant measure sight distances at the proposed site driveway locations and compare the findings with the minimum requirements based on observed 85th percentile speeds on the adjacent streets as established by the American Association of State Highway and Transportation Officials (AASHTO).

The applicant responded that sight distance measurements were conducted at the proposed intersections of Boston Road at Unified Parkway and Providence Street at Unified Parkway in conformance with guidelines of the American Association of State Highway and Transportation Officials (AASHTO)1. Both Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) were considered in the evaluation. Sight distance calculations along Boston Road were based on observed 85th percentile speeds of 44 mph in the westbound direction and 37 mph in the eastbound direction. Sight distance calculations along Providence Road were based on observed 85th percentile speeds of 44 mph in the northbound direction and 39 mph in the southbound direction. The calculations also incorporate the vertical grade of each roadway at the intersections.

The proposed design will result in sight lines at both intersections meeting and exceeding the requirements under the future conditions. It was noted that, at the intersection of Providence Road and Unified Parkway, some limited vegetation clearing/pruning within the public right of way and on site would be undertaken to improve the existing sight lines to achieve the desirable ISD. **Comment resolved.**

Comment 18: Truck turning movements are shown for right turns into and out of the site at the Providence Road driveway, however no turning movements are shown at the Boston Road driveway. It was recommended that tractor trailer truck (WB-67) turning movements also be shown at the Boston Road intersection with Unified Parkway. The applicant responded that truck turning templates for the site driveways on Unified Parkway are included in the revised site plans prepared by Bohler Engineering. The applicant is currently updating the off-site roadway improvement plans based on the initial comments received from various sources. Truck turning templates for the intersection of Boston Road/Unified Parkway will be included in an updated submittal of the revised roadway improvement plans under a separate cover when they are ready.

Now that the plans have been updated, the applicant has included tractor trailer truck (WB-67) turning movements at the intersection of Boston Road/Unified Parkway for the left turn in and right turn out movements (i.e., predominant

movements to/from Route 146). It was noted that tractor trailer trucks will be prohibited from turning left out of Unified Parkway. Any occasional truck arriving from the east would have convenient access to the Unified Parkway intersection on Providence Street to turn into the development sites, and therefore will not need to travel on Boston Road and turn right onto Unified Parkway.

Comment resolved.

Comment 24: Based on a review of the roadway improvement plans, two lanes westbound will be carried through from Unified Parkway to Galaxy Pass. Eastbound a dedicated left turn lane will be provided into Unified Parkway. The site plan shows dedicated left and right turn lanes on Unified Parkway however the roadway improvement plans do not show that. It was recommended that the site plan and roadway improvement plans coincide to show the proposed lane arrangements. The applicant responded that they are currently updating the off-site roadway improvement plans based on the initial feedback from the Board in an effort to not impact the adjacent Sycamore tree. Revised roadway plans will be included in an updated submittal under a separate cover when they are ready.

A revised roadway improvement plan was sent via email on June 23, 2022. The site plan is still conceptual, however, the proposed site driveway on Boston Road was shifted slight east to prevent impacts to the adjacent Sycamore tree. Based on an initial review of the site plan, there are a few initial comments associated with design. A two-lane approach should be shown on Unified Parkway if two lanes are proposed in the future. All travel lanes on Unified Parkway should be 12 feet wide with five-foot shoulders to accommodate bike travel on Unified Parkway. The stop line on Unified Parkway should be parallel to Boston Road. On Boston Road, 11-foot-wide through lanes should be provided with a 10-foot-wide dedicated left turn lane. Four-foot-wide shoulders (preferably five feet) should be provided to accommodate bike travel on Boston Road. Any proposed signage should be shown on the plans. WB-67 truck turning movements should be shown on the plans as well as sight lines. Furthermore, the revised plans no longer show two westbound travel lanes between Unified Parkway and Galaxy Pass. The applicant should confirm if the lengths of the dedicated left turn lanes into Galaxy Pass and Unified Parkway are adequate to accommodate demand.

Based on the revised plan set, the applicant has provided most of the aforementioned recommendations with the exception of the five-foot-wide shoulders on Boston Road to accommodate bike travel. It was noted that wide shoulders cannot be provided on Boston Road without impacts to the Sycamore tree. A sidewalk is proposed within the site limits along Boston Road and on Unified Parkway.

The Applicant also noted that they are not proposing any changes to the intersection of Boston Road at Galaxy Pass. The Boston Road westbound approach will continue to operate as a through lane and a shared through/left-turn lane and the eastbound approach will continue to operate as a through lane and a shared through/right-turn lane. It was noted that analysis conducted and presented in the previous response to comment submittal dated June 8, 2022 indicates that the maximum queues during the peak hours will not exceed 80 feet (approximately 3 vehicles) under the Build conditions. The existing geometry at the intersection of Boston Road at Galaxy Pass is adequate to accommodate the future traffic demand during both the weekday morning and evening peak hours. CEA/RMA concurs with these findings. **Comment resolved pending the town's desire to accommodate bicycle travel along Boston Road.**

Comment 25: The proposed stop line on Unified Parkway at its intersection with Boston Road is set far back from the road. This stop line location will result in sight line restrictions at the driveway given the grades and vegetation on either side of the driveway. It was recommended that the stop line be moved forward (no further than 10 feet from the new Boston Road curb line). The corner radii may need to be increased, or Unified Parkway widened at this intersection to allow tractor trailer trucks to safely make the turns based on this stop line location. In addition, a sight line plan and profile should be provided showing that minimum required sight lines can be attained at this location.

As noted in Comment 16, sight line analyses were included in this submittal. **Comment resolved.**

Comment 26: As mentioned in Comment 18, it was recommended that truck turning movements be shown on the plans. Truck turning movements were included in this submission. **Comment resolved.**

Comment 27: The plan proposes 12-foot wide through and left-turn lanes with 2-foot-wide paved shoulders. It was recommended that the applicant consider 11-foot wide through lanes and 10-foot wide left-turn lanes to allow 5-foot-wide paved shoulders to be constructed that would accommodate bicycle traffic along Boston Road. The applicant responded that the project design team believes that 10-foot-wide turn lanes would not be adequate for efficient and safe traffic operations. Reducing the through travel lanes to less than 12 feet was also determined to be less desirable, but will be investigated further. As previously mentioned, the applicant is currently updating the off-site roadway improvement plans based on the initial feedback from the Board in an effort to not impact the adjacent Sycamore tree. Revised roadway plans will be included in an updated submittal under a separate cover when they are ready.

As noted in Comment 24, the roadway plans were revised to prevent any impacts to the Sycamore tree and now include 11-foot wide through and turn lanes and 2-foot-wide shoulders. In order to preserve the tree, five-foot wide shoulders cannot be provided. **Comment resolved pending the town's desire to accommodate bicycle travel along Boston Road.**

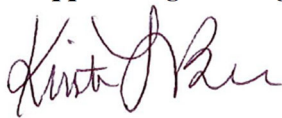
Comment 28: It was suggested that the plans show the proposed 5-foot-wide sidewalk along the westerly side of Unified Parkway and how this sidewalk will terminate at the intersection. The applicant responded that the sidewalk, as well as 5-foot paved shoulders mentioned in the prior comment, contribute to added cross-sectional width, which needs to be balanced with the goal of minimizing impacts to large growth trees, stonewalls, and adjacent property access, etc. The Applicant proposes to continue reviewing the multimodal needs for the corridor with the Town Planning Department and will incorporate the features that are deemed most important to the Town within the available ROW.

The applicant responded that the updated roadway improvement plans show the proposed sidewalk extended to the property limit. The sidewalk is generally located five feet from the edge of the roadway, but meanders farther away from the tree as shown in the updated roadway design plans. **Comment resolved.**

Please feel free to contact me should you have any questions regarding the above.

Sincerely,

Chappell Engineering Associates, LLC

A handwritten signature in dark ink, appearing to read "Kirsten Braun".

Kirsten Braun, P.E.
Project Manager