

Ms. Juliet T. H. Walker, AICP
Planning Director
Planning Department
1 Junkins Avenue
Portsmouth, NH 03801

June 4, 2019

Ref. T0884

Re: Cate Street Extension Roadway Design Peer Review #2

Dear Ms. Walker:

On behalf of the City of Portsmouth, TEC, Inc. (TEC) has completed an engineering peer review of the revised Cate Street Extension roadway design based on updated and supplemental material submitted by the Applicant and dated May 2019, including responses to peer review comments previously offered by TEC in a letter dated May 13, 2019. The following details the results of this review:

Reference Documents:

The following documents provided by the City of Portsmouth Planning Department were included as part of this review:

- *Cate Street Roadway Plans*, prepared by Fuss & O'Neill – dated May 2019
- *West End Yards Site Plans*, prepared by Fuss & O'Neill – dated May 2019
- *Response to Cate Street Extension Roadway Design Peer Review*, letter prepared by Fuss & O'Neill – dated May 20, 2019

After review of the reference documents cited above, TEC offers the following comments and recommendations (in **BOLD**) to be addressed by the Applicant, at the discretion and direction of the City. The comment numbering system from the May 13, 2019 peer review has been utilized for consistency, with new comments added at the end:

Horizontal Alignment and Roadway Plan Review:

1. Please confirm the intended design speed of Cate Street / Cate Street Extension. It appears that most, but not all, design parameters are consistent with a design speed of 30 mph.

Fuss & O'Neill Response:

The design speed for the Cate Street Extension is 25 mph.

It should be noted that the City preferred alignment at the intersection of Cate Street and Bartlett Street would not support a design speed too much above 20 mph. The maximum centerline radius that can be fit to the City Right of Way and Easements provided by the adjacent approved, under construction, Townhouse project prior the rail Road bridge to the south is a radius of 110-ft.

According to AASHTO's Policy For Geometric Design Section 5.3, Local Streets in Urban Areas, Table 3-7, a minimum radius of 110-ft will support a design speed between 20 and 25 mph. We employed a radius of 155-ft to round up. See Attached excerpt from AASHTO.

The City classifies Cate Street / Cate Street Extension as a Neighborhood Connector, per the City of Portsmouth Complete Streets Design Guidelines, dated June 2017. Accordingly, the design speed for this roadway should be 30 mph. To the maximum extent practical, all design criteria should meet a design speed of 30 mph, or adequate justification shall be provided for specific elements not meeting this design speed, for consideration by the City.

The radius cited per AASHTO Table 3.7 is applicable for a roadway that is superelevated at 4.0%; however, the typical roadway sections and grading plans show that the roadway is crowned at 2.0%. AASHTO Table 3.13 indicates the minimum radii for various cross slopes, including normal crown (-2.0%).

The reconfiguration of the intersection of Cate Street and Bartlett Street is now shown, which is noted to be the City's preferred alternative. Please see Comments #15 and #55 below for additional comments regarding this intersection design. In addition, more complete roadway design plans should be provided for this intersection.

2. Label radii of horizontal curves on baseline alignment.

Fuss & O'Neill Response:

The curve data has been added to the baseline alignment. Please refer to sheets CS101 through CS-104 of the Roadway Plans.

Although the radii are now labeled, some labels conflict with other text or plan detail and should be adjusted for better legibility.

3. The proposed alignment of Cate Street Extension at the Route 1 Bypass / Borthwick Avenue intersection causes the westbound through movement to approach the existing raised median island within Borthwick Avenue at an angle. Consider revising the alignment of Cate Street Extension at this intersection to provide a better alignment for through traffic (refer to attached markup of Sheet CS-101).

Fuss & O'Neill Response:

Eric Eby had a similar concern at the last TAC Work Session. Shortly after that meeting we made alignment corrections to the Cate Street Extension to better align the through movements.

Please refer to Sheet CS-101 of the Roadway Plans.

The revised Cate Street Extension alignment is still not ideal for a new major intersection with US Route 1 Bypass. It is noted that, while the westbound through movement is improved, the eastbound through movement from Borthwick Avenue is still not aligned well. A three lane approach with a 6-foot wide raised median, as previously recommended, would improve the operation and alignment of the intersection by allowing the left turn lanes to oppose the median islands.

4. Per Section VI of the City of Portsmouth Subdivision Rules & Regulations, a minimum 25' radius should be provided at all street corners (e.g. northeast corner of Cate Street Extension / US Route 1 Bypass, driveway at Station 4+00 right, Cate Street at Station 8+00 left, driveway at Station 9+50 right, and driveway at Station 13+15 right).

Fuss & O'Neill Response:

The radii for the intersections are as follows:

<i>Route 1 Bypass / Cate Street Extension</i>	<i>Northeast = 20-ft, Southeast = 50-ft</i>
<i>Driveway Station 4+00 Right</i>	<i>radii=20-ft</i>
<i>Cate Street / Cate Street Extension</i>	<i>800+00 left = 20-ft, 9+50 right = 20-ft (slated to become pedestrian way, possibly)</i>
<i>Driveway Station 13+15 Right</i>	<i>R1=15-ft, R2=25-ft</i>

The 20-ft radii at the Cate Street Extension / Route 1 Bypass is 20-ft in order to provide more protection / separation to the Traffic signal mast arm. It can be changed to 25-ft if necessary. However the 50-ft radius suggested in #5 below will require a relocation of the Traffic Light Mast Arm. Turning movement checks at this intersection show that a larger radius is unwarranted.

It should be notes that the radii at the driveways of the adjacent townhouse project are 15-ft. The driveway radii throughout the project are sufficient to allow for ingress and egress of delivery vehicles and more importantly emergency vehicles.

The table provided does not address the City's requirement for minimum curb return radii of R=25'.

- a. **The northeast corner of Cate Street Extension / US Route 1 Bypass should be R=25' minimum, and vehicle turning simulations should be provided to illustrate that the selected radius can accommodate the double-right turn proposed.**
 - b. **Proposed drives at Station 3+50 RT (U-Haul) & Station 5+00 RT (primary site access) should have corner radii of R=25'.**
 - c. **Cate Street (existing road) should have corner radii of R=25'.**
 - d. **Other drives are residential and, while we recommend R=25', are acceptable as currently proposed.**
5. Consider revising the proposed 20-foot radius at the northeast corner of the Cate Street Extension / Route 1 Bypass intersection to a 50-foot radius. It is noted that the existing traffic signal mast arm foundation is at the edge of pavement and is a design constraint. However, if the northern curb line of Cate Street Extension were re-aligned and shifted to the south as suggested (refer to attached markup of Sheet CS-101), a 50-foot radius curve may fit while maintaining the existing traffic signal mast arm and guardrail. At minimum this curve radius should be 25' (see Comment #4).

Fuss & O'Neill Response:

As stated above, the 20-ft radius was used at the northwest corner of Cate Street Extension and Route 1 Bypass in order to provide more protection to the Traffic Light Mast Arm. A 25-ft radius will fit without interfering with the guardrail or Mast Arm, however a larger radius of 25-ft will reduce the separation from the travel lane and the Mast Arm. A 50-ft radius will require a replacement of the Mast Arm entirely and the turning movements at the intersection show this would be unwarranted. In the event that the City desires a larger radius at the intersection a 25-ft radius can be revised into the design.

- a. **The northeast corner of Cate Street Extension / US Route 1 Bypass appears to be too tight to accommodate truck turning movements. The truck-turning exhibit on Sheet CT-107 shows a WB-67 traveling over the curb and guardrail. Provide a minimum corner radius of R=25' and provide vehicle turning simulations to illustrate that the selected radius can accommodate both the double-right turn proposed and a WB-67 within the roadway.**
- b. **Consider relocating the existing mast arm. It appears to be within the typical offset required by NHDOT of 7' beyond the curb line.**
- c. **Improvements to the signalized intersection, to be permitted through NHDOT, should be designed concurrently with the Cate Street Extension project.**

6. The Cate Street Extension westbound approach to US Route 1 Bypass appears to be excessively wide. Consider revising the approach layout to consist of an exclusive left-turn lane, a through lane, and an exclusive right-turn lane (refer to attached markup of Sheet CS-101).

Fuss & O'Neill Response:

The Traffic Study by Stephen Pernaw recommends delineation of the westbound approach with a shared left-through-right lane and an exclusive right-turn lane. This is what the design reflects.

While the Pernaw traffic study recommends this lane configuration, other alternatives should be considered for this newly constructed major intersection with US Route 1 Bypass, including a three lane approach (left-through-right).

- a. **The traffic volumes presented in the Pernaw traffic study indicate a significantly higher volume of right turns versus the through and left turn movements.**
 - b. **Traffic queuing in the shared through-left-right lane may block access to the right turn lane.**
 - c. **Provide vehicle turning simulations to illustrate that the intersection can accommodate the double-right turn proposed.**
7. Consider revising the 15' wide receiving lane on Cate Street Extension eastbound to be comprised of an 11' wide lane and a 4' wide shoulder.

Fuss & O'Neill Response:

A complete re-working of the Cate Street Extension / Route 1 Bypass / Borthwick Avenue intersection has taken place to address concerns voiced by Eric Eby, City Traffic Engineer and echoed by Peer Review comment #3 and this comment #7.

The revisions to the intersection allow eastbound traffic from Borthwick Avenue entering Cate Street Extension to smoothly cross Route 1 Bypass. The revisions also allow Traffic proceeding westbound from Cate Street Extension to Borthwick Avenue to make a smooth movement while crossing Route 1 Bypass.

See response to Comment #3 above.

8. Provide turning movement simulations for the intended design vehicle entering / exiting Cate Street Extension from US Route 1 Bypass. Utilize WB-67 design vehicle, if applicable (Sheet CT-103).

Fuss & O'Neill Response:

The design vehicle and turning movements have been updated.

Various design vehicles are used throughout plan sheets CT-101 through CT 107 and many turning simulations provided illustrate that the applicable design vehicle turning movement is not accommodated within the corresponding travel lane or within the roadway itself. Please confirm the intended design vehicle for the site development, Cate Street Extension, Cate Street, Bartlett Street, and the U-Haul driveway and provide applicable turning movement simulations that do not encroach on opposing lanes or extend beyond the roadway.

9. The existing guardrail at the northeast corner of US Route 1 Bypass / Cate Street Extension will need to be modified to provide a gap for the shared use path, with appropriate crash worthy end terminals for vehicular traffic.

Fuss & O'Neill Response:

The guardrail at the Northeast corner of Cate Street Extension at the intersection with Route 1 Bypass will be modified as ultimately discussed with and approved by NHDOT. Discussions regarding the Traffic Study and subsequent design are ongoing with NHDOT. The decided upon guardrail detail will be added to the plans. As of yet the desired guardrail termination has not been decided. The necessary gap will be provided to allow the shared use path to be accessed and ultimately extended across Route 1 Bypass and along Borthwick Avenue as outlined in the Seacoast Greenway Master Plan.

Improvements to the signalized intersection, to be permitted through NHDOT, should be designed concurrently with the Cate Street Extension project. See prior comments regarding review of this corner to accommodate the intended turning movements and design vehicles.

10. Consider extending the raised median island on Cate Street Extension from Station 1+60 to Station 3+50 (refer to attached markup of Sheet CS-101). While this would restrict the U-Haul driveway access to right-in / right-out only, allowing left turns at this intersection may be a safety concern, given its proximity to the signalized US Route 1 Bypass intersection. It is understood that U-Haul may have requested full access to this intersection; however, further coordination should be conducted to ensure the long-term operational safety at this driveway access.

Comment adequately addressed.

11. Remove the horizontal angle point in the proposed alignment at Station 4+50.47 (Sheet CS-101). Utilize a horizontal curve at this location with radius and length appropriate for the intended design speed of the roadway.

Comment adequately addressed.

12. Revise the horizontal curve located at Station 9+73.3 (Sheet CS-102). Currently the curve is too sharp/short and should be revised to meet NHDOT minimum curve length for the intended design speed of the roadway.

Fuss & O'Neill Response:

The horizontal curve length has been revised to be the prescribed length for the design speed. AASHTO Guidance, which NHDOT has adopted, recommends lengths equal to or greater than 3 times the design speed. In the case of Cate Street Extension, the design speed is 25 mph as controlled by the reverse curves as you approach Bartlett Street. Therefore, all curves should be 75-ft in length or greater and they now are.

It is noted that the horizontal curve at Station 18+81 is labeled as L=55.61'.

13. The currently proposed horizontal reverse curves at Station 11+46 and Station 13+94 appear to have radii of approximately 150'. Per AASHTO Green Book Table 3-13, for a roadway with normal crown (-2.0%), the minimum radius should be 198' and 333' for design speeds of 25 mph and 30 mph, respectively. While impacts to the proposed site layout and abutting properties may be deemed too significant to accommodate a 30 mph design speed at this location, at minimum, recommend revising the reverse curves consistent with a design speed of 25 mph.

Fuss & O'Neill Response:

The Horizontal Curves nearer to Bartlett Street on Cate Street Extension are 155-ft radius curves. Per AASHTO's Policy For Geometric Design Section 5.3, Local Streets in Urban Areas, Table 3-7 states a minimum radius of 154.3-ft is acceptable for a design speed of 25-mph. We employed a radius of 155-ft to round up. See Attached excerpt from AASHTO.

The sizing of the radii was not taken lightly. Linda Greer, PE, PTOE of Fuss & O'Neill and Stephen G. Pernaw, PE, PTOE were both consulted and concluded for a street of this nature, utilizing the guidance of section 5.3, table 3-7 was appropriate. This is also in line with the City's desires for calmer streets.

Please see response to Comment #1 above.

14. Recommend increasing the roadway width through the horizontal reverse curves at Station 11+46 and Station 13+94 to accommodate off-tracking of tractor trailers. Depending on the horizontal radius selected (see Comment #13), a typical section consisting of 11' lanes and 4' shoulders may be appropriate to accommodate two WB-62 vehicles passing along the curves. Also consider if this typical section should be utilized for the entire roadway for consistency.

Fuss & O'Neill Response:

The additional, 3-ft recommended has been added to the shoulders in the curves as you approach Bartlett Street. The curves have had the WB-62 vehicles driven through and a supporting exhibit will be prepared.

The vehicle simulations shown on Sheet CT-106 appear to mount the outside curbs on both directions. Also see response to Comment #13 above. Provide revised vehicle simulations and/or provide additional width such that these vehicles can be accommodated without encroachment into the opposing lanes. Also, consider if a WB-67 design vehicle should be utilized, or provide justification for the selected design vehicle.

15. The Cate Street baseline alignment approaching the Cate Street / Bartlett Street intersection does not appear to properly transition to the proposed roadway layout depicted, which is associated with the adjacent townhouse development. Further, City staff has advised that realignment of the Cate Street / Bartlett Street intersection (such that the easterly leg of Bartlett Street is the minor approach under stop control), as discussed in prior peer reviews of the project's Traffic Impact and Access Study, should be implemented by the Applicant.

Fuss & O'Neill Response:

The Alignment and subsequent design of the intersection has been provided in accordance with this comment, earlier discussions at TAC Work Sessions with Eric Eby, PE, City Traffic Engineer, and with the recommendations in Stephen G. Pernaw's Traffic Study. Converting Cate Street Extension to the through street and Bartlett Street to Stop control is represented on the Roadway Plans.

While the general configuration is consistent with the City's preferred alternative, the following items are noted regarding the proposed layout shown on Sheets CS-104 & CS-105:

- a. **The mid-block crosswalks at Station 17+50 and Station 22+50 are not in safe locations relative to queued vehicles and turning movements at the intersection, and it is unclear if adequate sight distance is provided. It is recommended to revise the design to provide crossings within the intersection, and verify adequate sight distance is provided. Also consider if construction of a sidewalk on the north side of Cate Street, connecting to the multi-use path and Bartlett Street would be a better option, allowing elimination of the south side sidewalk and associated crosswalk.**
- b. **See response to Comments #1 and #8 above. The Cate Street radius from Station 16+85 to Station 18+53 (R=110') only meets AASHTO requirements for a 20 mph design speed and it will be difficult for trucks to negotiate this curve without encroachment into the opposing lane.**

Additional refinements to the horizontal geometry should be explored to maximize the radius of this curve. However, given that it may not be possible to fully accommodate a design speed of 25 mph or greater, we recommend that horizontal alignment warning signs and warning speed plaques be proposed in advance of this curve (see MUTCD Table 2C-5). Further, while frequent truck traffic is not expected on this curve in the short term, given the railroad bridge constraint, travel lane and/or shoulder widening should be explored to accommodate trucks without encroachment. At some point the City will pursue replacement of the bridge, at which time they will work with abutting property owners to obtain additional right of way or easements.

- c. **Plans should show more existing detail beyond the match lines on Bartlett Street north and south.**

Vertical Alignment Review:

16. At Station 14+00, consider revising the sag vertical curve to have a minimum K value of 37 to reflect the 30 mph design speed accommodated by all other proposed vertical curves.

Fuss & O'Neill Response:

The K Values at all vertical curves will be re-evaluated to provide appropriate vertical curves for the design speed of 25 mph or better.

The sag vertical curves at Station 1+25, 15+08, and 18+78 still have K values less than the required 37 for a design speed of 30 mph. Applicant should revise the profile to provide K=37 min.

Pedestrian and Bicycle Accessibility Review:

17. Provide construction details for tip-downs / curb ramps with maximum slopes and minimum dimensions for ADA compliance.

Fuss & O'Neill Response:

Construction Details for tip-downs / curb ramps with maximum slopes and minimum dimensions for ADA Compliance will be added to the plans.

Additional detail should be added to the plans for the ramp tip downs:

- a. **The details on Sheet CD-550 should better match the ramp layout shown on the plans.**
- b. **Show all grade break lines at all ramps.**
- c. **Tip downs at Cate Street are still missing.**

d. TD and TDR (tip down ramp) notes and labels are inconsistent throughout the plans (e.g. some greyed, some dark, and some missing from sheets).

18. Consider adding a tip-down with ADA detectable warning panel to the southeast corner of the Cate Street Extension / US Route 1 Bypass intersection for future pedestrian accessibility.

Comment adequately addressed.

19. A call-out for the tip-down of the side path with detectable warning panels at the northeast terminus of the side path appears to be missing.

Comment adequately addressed.

Traffic Control Review:

20. Consider revising the proposed U-Haul egress to be a right-in / right-out only driveway. The proposed design presents a potential safety concern for left turns onto Cate Street Extension. Consider extending the proposed median island east to prohibit left turns onto Cate Street Extension (see Comment #10).

Comment adequately addressed.

21. The proposed painted median island on the westbound approach to US Route 1 Bypass, ending at Station 4+24, does not provide enough width for a turning vehicle to wait. Consider extending the raised median island to prohibit left turns into / out of the U-Haul driveway (see Comment #10).

Comment adequately addressed.

22. Consider whether a marked crosswalk is warranted across Cate Street Extension at the terminus of the side path at US Route 1 Bypass. Note that a crosswalk would be required if a tip-down is added per Comment #18. We would also recommend installation of pedestrian-actuated signals for this crosswalk. This would need to be coordinated with NHDOT.

Fuss & O'Neill Response:

As discussed in the response to comment #18, a tip down to the southeast of Cate Street Extension can be added at a future date. Currently there is no sidewalk on the southern portion of Route 1 Bypass. A pedestrian actuated signal will be added for a crosswalk that will be needed to cross Route 1 Bypass and the extension of the Side path to

Borthwick Avenue. The need for a tip down and pedestrian actuated signal will be addressed with NHDOT and revisions will be made to the plans accordingly.

Improvements to the signalized intersection, to be permitted through NHDOT, should be designed concurrently with the Cate Street Extension project.

23. Consider providing intersection approach warning signage or markings on the proposed 10' wide bituminous side path prior to roadway crossings.

Fuss & O'Neill Response:

Appropriate warning signage will be added for users of the side path at the approaches to intersections.

Plans do not currently show side path warning signs or markings.

24. Recommend providing pedestrian / bicycle crossing warning signs at (and possibly in advance of) all proposed mid-block crosswalks (Sheet CS-101, Station 4+35 and Sheet CS-103, Station 13+90). Also consider warning devices (e.g. rectangular rapid flashing beacons) at these locations, particularly Station 13+90, where the side path terminates.

Fuss & O'Neill Response:

Pedestrian / bicycle crossing warnings will be added ahead of all crosswalks crossing Cate Street Extension.

Plans do not currently show pedestrian / bicycle crossing warning signs. Further, the Applicant did not address the City's request to consider warning devices (e.g. rectangular rapid flashing beacons) at these locations, particularly Station 13+90, where the side path terminates.

25. Add stop lines on all driveway approaches to Cate Street / Cate Street Extension and consider a short length of double yellow line.

Fuss & O'Neill Response:

Stop lines and signage has been added at all driveway intersections with Cate Street Extension.

- a. Labels should be added for stop lines ("12 SL") and yellow markings ("4" DSLY") as appropriate.**
- b. Cate Street is still missing stop line and crosswalk markings.**
- c. Stop signs (R1-1) should be considered on major drives and on Cate Street.**

26. The centerline and edge line pavement markings do not appear to properly transition to meet the proposed pavement markings associated with the adjacent townhouse development modifications at Station 14+73.

Comment adequately addressed.

27. Consider signing and/or pavement markings to indicate that westbound bicyclists in the on-road bike lane should transition onto the sidewalk path at approximate Station 13+85.

Fuss & O'Neill Response:

Signage will be added to ensure safety of westbound bicyclists and to prepare them to transition to side path.

Plans do not currently show applicable signs or markings.

28. Impacts to the existing traffic signal at US Route 1 Bypass should be addressed in the plan set. This includes replacement of the loop detectors, adjustment or relocation of pullboxes, pedestrian signal equipment (see Comment #22) and any necessary timing or phasing modifications.

Fuss & O'Neill Response:

The Route 1 Bypass improvements are being treated as a separate project with NHDOT. Full plans for signal improvements, replacement of loop detectors and adjustments to pull boxes, and addition of pedestrian signal equipment will be prepared and provided to NHDOT for approval. The construction of the Route 1 Bypass improvements and intersection improvements will be incorporated into the plan set or referenced on the plan set as appropriate once completed.

Improvements to the signalized intersection, to be permitted through NHDOT, should be designed concurrently with the Cate Street Extension project.

Pavement Section Review:

29. The proposed pavement design shown on the Roadway Typical Sections of 5"-HBP, 12"-Crushed Gravel, and 12"-Gravel appears to be adequate for the class of roadway and anticipated volume and composition of traffic.

Comment adequately addressed.

30. Per Section VII of the City of Portsmouth Subdivision Rules & Regulations, sidewalk subbase shall consist of a minimum of 12" bank-run gravel. Current design for the side path of 6" processed aggregate base shown on Sheet CD-540 is not adequate.

Comment adequately addressed.

31. Per Section VII of the City of Portsmouth Subdivision Rules & Regulations, bituminous concrete for sidewalks shall be placed in two (2) courses consisting of 1-1/2" base and 1-1/2" top, for a total nominal thickness of 3". Current design for the side path of 2" bituminous concrete on Sheet CD-540 is not adequate.

Comment adequately addressed.

General Comments:

32. To improve plan readability, include street names on all plan sheets for all major roadways. (e.g. Cate Street, Cate Street Extension, Bartlett Street, Borthwick Avenue, US Route 1 Bypass.)

Fuss & O'Neill Response:

As plans are completed the Street names will be added to all major roadways where they are not already present.

For the most part the plans still do not have street names labeled. The plans should differentiate which segment is Cate Street Extension and which is Cate Street. Cate Street Extension appears to be from US Route 1 Bypass Station 1+00) to the existing Cate Street intersection at Station 9+00, where the roadway then becomes Cate Street (unless the City intends to rename roadways to facilitate emergency services). Please clarify.

33. The slope arrows for the multi-use trail on the Typical Sections, Sheet CS-001, are pointing in the wrong directions; revise as appropriate. The trail should drain toward the roadway rather than onto abutting properties.

Comment adequately addressed.

For Comments #34 through #45, please ensure content and drafting are addressed prior to final submittal.

34. Include dimensions of all lane and shoulder widths, where appropriate. Some seem to be missing at the Cate Street Extension intersection with US Route 1 Bypass. Dimensions along Cate Street / Cate Street Extension and parking lot driveway access points onto Cate Street / Cate Street Extension also appear to be missing.
35. On many plan sheets, the Graphic Scale within the border / title block is missing the number values indicating the plan scale (i.e. 20- or 30-scale).

36. Add additional relevant existing conditions survey information to site plans, specifically the existing guardrail and utility/signal infrastructure at the Cate Street Extension / US Route 1 Bypass intersection and Hodgson Brook bank limits.
37. Include match-line sheet continuation notes on all plan sheets (i.e. "See Sheet XXXX").
38. Include and label all proposed curbing tip downs on Site Plans.
39. Remove sewer text from roadway profile sheets (Sheet CS-102 & CS-103).
40. Label grades on profiles at intermediate 50-foot stations.
41. Consider expanding plan coverage to show Borthwick Avenue and the intersection with US Route 1 Bypass on the plans (e.g. Sheet CS-101).
42. On Sheet CU-100, add label to indicate "See Inset Above for Continuation".
43. On Sheet CD-511, proposed cast iron cover for Bioretention Inlet Structure Detail should be labeled "DRAIN". It currently shows "SEWER".
44. On Sheet CD-511, label inlet structure on Bioretention System Typical Section Detail.
45. Label all proposed drainage structures on Grading, Drainage & Erosion Control Plans, including subsurface infiltration basins (SSIBs).
46. The Applicant should provide an update on status of coordination with NHDOT District 6 regarding the Driveway Permit that will be required for work within the NHDOT Right-of-Way at US Route 1 Bypass.

Fuss & O'Neill Response:

Coordination with NHDOT is still on-going. The NHDOT is allowing the Offsite Improvements design and permitting to proceed separately from the Site and Cate Street project. As more information becomes available regarding the design of Route 1 Bypass improvements it will be provided to the City of Portsmouth.

Comment is adequately addressed. However, for completeness of the project as a whole, improvements to the signalized intersection, to be permitted through NHDOT, should be designed concurrently with the Cate Street Extension project.

Additional Plan Review Comments

Sheet CS-102

47. Label the two pairs of three squares on Cate Street, on either side of the brook crossing.

Sheet CG-101 to CG-104

48. CB #5 at U-Haul drive appears to be in the wrong location. It should be either on the pavement side of the curb or further into the grass area within a depressed/swale area for the inlet.

49. CB #7 and CB #8 should be located at the low point at Station 3+73.15.

50. A continuous silt sock should be shown on the north side of the site adjacent to Hodgson Brook.

51. A CB should be added near Station 11+80 on the right side as there is a 400' stretch of roadway without a CB.

52. The SMH at Station 11+90 RT and Station 12+90 RT appear to be in conflict with the proposed curbing. Consider shifting these north to eliminate the conflict.

53. Drainage structures/BMP's should be labeled (e.g. tipdown curb inlets to the PRETX curb outlet structures).

54. Add low point CB's at Station 21+40 LT & RT on Bartlett Street.

55. Plans should show proposed drainage system for the new Cate Street / Bartlett Street intersection design.

Sheet CD-511

56. Show the 6" underdrain on the Bioretention System detail.

57. Show Estimated Seasonal High Water Table (ESHWT) and/or ground water on Section A-A (approximate Elevation=12.4 from test pit info).

Sheet CD-513

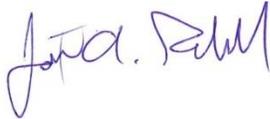
58. Correct/update the invert elevations shown on the Overflow Outlet Control Structure Detail.

Sheet CD-550

59. Pedestrian Ramp and ADA details should be consistent with the Plans. TD & TDR's (from legend) on plans should match these details and vice versa.

Upon the receipt of additional, revised, and/or new documentation for the project, TEC reserves the right to provide additional comments as needed. Please do not hesitate to contact us directly at 978-794-1792 if you should have any questions concerning this peer review. Thank you for your consideration.

Sincerely,
TEC, Inc.
"The **E**ngineering **C**orporation"



Jonathan A. Rockwell, P.E.
Director of Transportation Infrastructure Services
Ext. 1025



Anthony Ciolfi, P.E.
Senior Design Engineer
Ext. 1010