



November 27, 2019

Ms. Marcia Gasses
Town Planner and Land Use Administrator
Town of Barrington
P.O. Box 660
Barrington, New Hampshire 03825

Subject: Turbocam International – Tax Map 233, Lot77 / Tax Map 233, Lots 1.2 & 1.4
Stormwater Engineering Review

Dear Ms. Gasses:

As requested, we have completed our review of the following plans and materials submitted for the above referenced project:

- Plan set consisting of 16 sheets, produced by Emmanuel Engineering, with a date of November 5, 2019.
 - Drainage Analysis, produced by Emmanuel Engineering, dated September 13, 2019.
1. Sheet C4. Grading and Drainage Plan. Due to the reduced strength of pavement associated with the porous pavement, we recommend that porous pavement is not used in areas subject to heavy vehicle loads, including the WB-65 truck turning/backing movement areas, as referenced in the design considerations for porous asphalt in the NH Stormwater Manual Volume 2.
 2. Sheet C4. Grading and Drainage Plan. We recommend that the applicant revise the plan to depict all of the proposed underdrain for the porous pavement sections to be consistent with the porous pavement detail provided on sheet D3, which shows underdrain spaced at 25' on-center,
 3. Sheet C4. Grading and Drainage Plan. Based on the elevations provided, it appears that the proposed grade at the proposed locations of the accessible spaces is approximately 4%. We recommend that the applicant revise the grading in this area and provide spot grades at the limits of the proposed accessible spaces to provide a maximum slope in all directions of 1:48 (2.08%), in accordance with ADA requirements. Additionally, it appears that one additional ADA accessible space is needed to meet the minimum number of accessible spaces based on the total number of parking spaces provided for the facility.
 4. Sheet C4. Grading and Drainage Plan. The plan shows proposed solid drainage pipes with a diameter of 12 inches. We recommend that the applicant revise the proposed solid drainage pipes to have a minimum diameter of 15 inches in accordance with Barrington Site Plan Review Regulations 4.7.7(1).
 5. Sheet C4. Grading and Drainage Plan. There are portions of the site where erosion control is not depicted at the toe of slope of the proposed limits of grading. We recommend that the applicant revise the plans to provide erosion control measures in all areas at the toe of slope of the proposed limits of grading.
 6. We recommend that the applicant provide a storm drain trench detail that meets the requirements of Barrington Site Plan Review Regulations 4.7.7(4).

7. Sheet C4. Grading and Drainage Plan. For the proposed catchbasins, proposed invert elevations are not shown for all of the stormwater pipes. We recommend that for each catch basin structure, the applicant indicate the proposed inlet and outlet elevations for all stormwater pipes including the underdrains.
8. Sheet C4. Grading and Drainage Plan. The proposed bioswale adjacent to Redemption Road is within the right-of-way. We recommend that the proposed location is relocated to be entirely outside of the ROW.
9. Drainage Analysis. Detailed Node summaries for the post-development model were not provided. We were not able to verify the model results for many of the nodes. We recommend that the applicant provide this information.
10. Drainage Analysis. Several nodes in the post-development model have high time-of-concentration (TOC) values. For example, Subcatchment PS15 has a value of 790.5 minutes. It appears these values are incorrect. We recommend that the applicant provide supporting documentation to justify the TOC values chosen for the pervious pavement sections in the post-development model.
11. Drainage Analysis. Riprap outlet protection. We recommend that the applicant provide riprap apron and stone sizing calculations for each outlet in the drainage analysis in accordance with Site Plan Review Regulations 4.7.2(11), and that the required dimensions and stone size are clearly defined on the drawings.
12. Drainage Analysis. Inspection and Maintenance Plan. The document uses general terms to describe maintenance of BMP's and does not specifically state what is required for this project. For example, under the porous asphalt section, it states "provision of signs is recommended". We recommend that the applicant revise the document to specifically state the required maintenance activities and the frequencies required.
13. Drainage Analysis. Infiltration Feasibility Report. The applicant has used default infiltration rates based on soil types and an assumed factor of safety. The infiltration rates used in the porous asphalt its likely to have a substantial effect on the runoff peak flow rates and volumes. We recommend that the field-measured infiltration rate tests for each porous asphalt BMP area are performed and/or supervised by a qualified professional in accordance with the requirements defined in the NH Stormwater Manual Volume II.
14. Drainage Analysis. We recommend that the applicant provide a copy of the extreme precipitation tables used in the analysis.

If you have any questions or comments, please do not hesitate to contact us.

Very truly yours,

DuBOIS & KING, Inc.



Jeffrey A. Adler, P.E.
Sr. Project Manager