



January 7, 2020

Jeffrey A. Adler, P.E.
Sr. Project Manager
DuBois & King, Inc.
18 Constitution Drive
Bedford, NH 03110

RE: Turbocam International - Tax Map 233, Lot77 I Tax Map 233, Lots 1.2 & 1.4
Stormwater Engineering Review

Dear Mr. Adler,

In regards to your review letter on the behalf of the Town of Barrington concerning TurboCAM International located at Route 9/Redemption Road, Barrington, NH, Tax Map 233 Lot 77 & Tax Map 234 Lots 1.2 & 1.4, we offer the following responses. Below you will find your letter in regular text and our response to your comments in ***italics***.

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.

All porous pavement has been replaced with traditional pavement. Stormwater from the traditional pavement will now be treated two bioswale-ISR systems. From there, treated stormwater is directed to a subsurface infiltration area where the majority is infiltrated into the groundwater. For the location of the systems, see sheet C3 or C4. For details, see sheet D2.

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.

Porous pavement is not longer proposed for this project, therefore this comment no longer applies.

civil & structural consultants, land planner

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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.

Spot grades have been added to sheet C4 to demonstrate that the grading in the area of the accessible spaces does not exceed the maximum slope of 1:48 (2.08%).

As specified on sheet C3, 75 parking spaces are proposed (3 of which are accessible spaces). Per the ADA standards, 2 standard spaces and 1 van accessible space are required when 51-75 parking spaces are provided. We believe we meet this requirement.

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).

Where possible, we have revised drain pipes to be 15 inches in diameter rather than 12 inches. However, due to the requirements of the proposed drainage systems, this was not always possible, therefore a waiver has been submitted to the town.

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.

Areas of silt soxx have been added to sheet C4.

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).

A Drain Pipe Bedding Detail has been added to sheet D3. Additionally, a waiver has been submitted to the town to address this requirement in areas where this layout is not feasible.

7. Sheet C4. Grading and Drainage Plan . For the proposed catch basins, 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.

The pipe listing on sheet C4 and C5 have been revised to show the inverts of all proposed pipes.

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.

The proposed bioswale has been relocated outside of the Redemption Road 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.

Detailed Node summaries have been provided in the resubmission.

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.

Per the recommendation of HydroCAD, TOC values around 790 minutes were used for infiltrating through the porous pavement sections. Since porous pavement is no longer proposed, this comment no longer applies.

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.

Riprap apron calculations have been provided in the resubmission. The required dimensions and stone sizes have been specified on sheet C4.

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 .

Porous pavement is not longer proposed for this project, therefore this comment no longer applies.

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.

Porous pavement is not longer proposed for this project, therefore this comment no longer applies.

14. Drainage Analysis. We recommend that the applicant provide a copy of the extreme precipitation tables used in the analysis.

The extreme precipitation table for the area of the site has been provided in the resubmission.

Thank you,



Bruce Scamman P.E.

Copy to: Town of Barrington
Elliot Wilkins
Clint Forrest
File