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April 6, 2021

Michael Behrendt, Town Planner  
Town of Durham  
8 Newmarket Road  
Durham, NH 03824

RE: Response to third party engineering review Map 5, Lots 1-9, 1-10, 1-15, 1-16 19 & 21 Main St.

Dear Michael,

Pursuant to the engineering review letter dated February 22, 2021 by Altus Engineering, Inc. the following are our responses to the review comments.

1. From the grading on Sheet C-102, it appears that the ADA parking stalls exceed the required minimum slope. The designer should address this with spot grades where applicable.

*Spot grades have been added to the grading plan to clarify the grading at the ADA parking spaces.*

2. Two 8" drain basins are called for on Sheet C-102 on the west side of the entrance driveway. We are unable to find a detail for these structures in the plan set and suggest one be added.

*A detail of the Nyloplast pvc drainage basins have been added to sheet C 503*

3. One of these 8" drain basins is shown in conflict with underground utility services. We suggest that the UGE line be rerouted outside of the proposed stone retaining wall to avoid the basin.

*The proposed underground utilities have been relocated to avoid the conflict.*

4. Sheet C-102 shows two longitudinal islands running the length of the parking lot intended to provide surface drainage as well as space for landscaping. These islands are almost completely curbed with curb breaks appearing at intervals to allow runoff to escape to the swale on the interior of the island. The curb may be unnecessary from a stormwater

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standpoint and even problematic during snow removal operations where a plow will be apt to catch at the breaks. We suggest that the Designer review the need for curbing here.

*The curbing is needed to protect the islands and vehicles from entering or parking within. Tip downs have been added to the plan to avoid problems during snow removal. A detail has been added to sheet C502.*

5. As shown on Sheet C-102, there are no curb breaks where the longitudinal islands meet the landscape islands at the south end of the parking rows. This will result in a triangular area of ponded water up to 6" deep in four locations in the parking lot. We suggest that the Designer add curb breaks in the corners or remove the curb entirely.

*Curb breaks have been added.*

6. An outlet protection apron is shown on Sheet C-102. The Designer should include a level spreader at the downstream end of the apron to ensure that runoff is not concentrated and an appropriate detail added to the plan set.

*A level spreader has been added to the design and the detail has been added to sheet C503.*

7. Sheet C-502 shows a Stabilized Construction Entrance Detail but we are unable to locate where this BMP is intended to be used. The Design should specify an appropriate location.

*The stabilized construction entrance has been added to the plans set.*

8. This Retaining Wall Detail shown on Sheet C-503 calls out a "78" Recon block used as traffic barrier moment slab," but it is unclear if this is to be a continuous subterranean platform along the entire length of the wall. If so, the Designer should provide for some method to handle potential groundwater where the vertical wall meets the horizontal moment slab as well as at the wall foundation.

*This detail has been changed and a standard guardrail system will be used instead of the integrated block wall guardrail, therefore this comment is no longer valid. The Recon Wall construction installation standards will be strictly followed for the installation of the guardrail.*

9. Aside from the pavement selects, the fill material behind the wall is unspecified. The Designer should specify the bulk fill material.



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*The fill material has been specified on the wall design detail and will be updated per the geotech report if necessary.*

10. The retaining wall detail should also specify that a complete structural wall design stamped by a NH-licensed professional engineer be provided by the contractor prior to construction.

*The preliminary design detail has been added to the plans for this design, and upon completion of the geotech report, we will finalize the structural design and provide a stamped plan.*

11. The north edges of the landscape islands may create a ponding/freezing situation if not properly graded to direct runoff towards the drive aisles. The Designer should include spot grades or at least flow arrows in these locations to provide direction to the contractor.

*Curb breaks have been added and additional grading has been shown in the islands.*

12. The Drain Manhole DMH-100 Detail shown on Sheet C-504 calls for a trash rack on the outlet weir wall. Given that this structure is downstream of the Stormtech system isolator row and catch basins with sumps and grease hoods, there is little chance of debris impacting this structure. The Designer may want to consider removing it.

*We agree, there is no need for a trash rack in this design and it has been removed.*

13. The drainage analysis indicates that the Stormtech system will allow exfiltration. Given that this system is to be located in fill, the Designer should specify the fill material below the field in order to ensure that the system functions as designed.

*The specifications of the infiltration rate have been specified in the stormwater design and once the geotech report is finalized the fill material will be specified.*

14. Sections 1.1.1 and 1.1.5 of the Drainage Analysis both show a table indicating a comparison between pre- and post-development peak rates of runoff (Table 1.0 and 1.3 which is indicated to be a reprint of Table 1.0 respectively). However, the values shown do not match. The Designer should verify the correct pre- and post- peak rates.

*This has been corrected in the drainage report.*

15. The Drainage Analysis does not analyze the 8" drain basins discussed above. These should be included in the post-development drainage model to assess their functionality.

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*The 8" basin nearest to Main Street is intended to drain only a small areaway serving the adjacent building. Without a nearby location to daylight the drainage, a pipe run to the lower parking area is proposed. Within this run a turn is needed, and it is provided at the southern 8" basin. While this basin is to be fitted with a grate, the project grading does not direct large surface areas to the basin, and its function as a collection basin is less critical than its function as an access port to ensure a clean drainage pipe run. Any bypassing flow would still be conveyed to the treatment system. For this reason, the 8" basins were not analyzed in the drainage model.*

16. Table 1.5 of the Drainage Analysis shows a Water Quality Volume (WQV) of 3,230 cf that is required to be infiltrated per Section 15.5.2(i) of the Site Plan Regulations. The Designer has arrived at this by using the NHDES BMP General Calculations Worksheet for WQV and WQF. However, the Town regulation is not a mirror image of the NH Stormwater Manual and its intent is to calculate and infiltrate a Groundwater Recharge Volume (GRV) which requires a slightly different methodology. Semantics aside, we believe that this is not calculated correctly as shown and that the WQV (or GRV) should be 2,156 cf. Given that the design provides 5,310 cf of storage for infiltration, this system as designed meets the regulation, but the calculations should be verified.

*We have revised the calculation and we still get a small difference from the review engineer, however we are providing for twice the storage for infiltration so it is a mute point.*

17. The total areas shown in the pre- and post- drainage models do not match. Although the difference is only 785 sf, we suggest that the designer correct this issue.

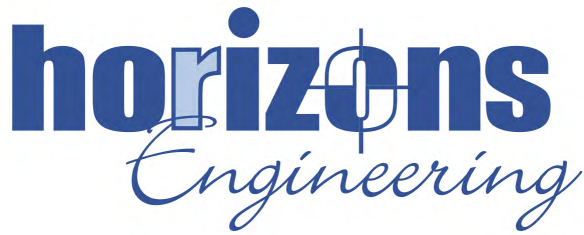
*We have reviewed this comment and the drainage analysis is correct. There is a change in the grading and a small areaway, walkway and bike rack were added which resulted in a small amount of additional drainage area being added to the post area analysis. This is the reason for the slight increase in the post area.*

18. The post-development drainage calculations of the Stormtech system utilize exfiltration as an outlet based on a very conservative rate of 3.3 in/hr x 0.25 but indicate that the groundwater is at elevation 48.67' which is above existing grade over half the field. The Designer should evaluate a test pit within the limits of the system to ascertain the seasonal high-water table elevation and infiltration rate of the native soil or provide justification for the value used in the analysis.

*Test pit have been evaluated and included on the plans. The estimated seasonal high groundwater table (ESHWT) is sloping the same as the existing grade, and the analysis software does not allow for a sloping groundwater table input, therefore, the average ESHWT has been*

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*used for the model. This is a conservative approach for the design. The ESHWT at the low side of the stormwater chamber system is approximately elevation 44.0, and the ESHWT at the high side of the stormwater chamber system is approximately elevation 50.0. The bed bottom of the stormwater chamber system is at elevation 53.5 which is a minimum of 3.5' above the ESHWT at only the high side.*

19. The outlet configuration shown in post- Pond MC45 (Stormtech) shows 18" and 12" outlet pipes. This does not match the configuration shown on Sheets C-102 and C-505 or the Drain Manhole DMH-100 Detail shown on Sheet C-504. The Designer should adjust the model and/or plans so that they match.

*The model has been adjusted to analyze the 18" outlet pipes.*

20. Sheet C3.3.1 of the Drainage Analysis does not show the limits of existing pavement. This should be included to aid in comparison between this plan and Sheet C3.3.2.

*The existing pavement has been added to sheet C3.3.1.*

21. The Inspection and Maintenance Plan contained in the Drainage Analysis does not list catch basins or manholes as items requiring inspection or maintenance in the initial table but goes on to discuss them later in the document. These should be included in the table.

*The catch basins have been added to the table.*

We have addressed the comments and made the required changes to the plans to comply with this review. If you have additional questions or comments please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Michael J. Sievert". The signature is written in a cursive style.

Michael J. Sievert PE  
VP Structural Engineering

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