LANGAN

Memorandum

Langan Engineering & Environmental Services, Inc
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To: Steven W. Reichert P.E., Fuss &O'Neill

From: Timothy O'Neill, PE
Nathan L. Kirschner

Cc: Brian Groth AICP, Town of Hudson
Elvis Dhima P.E., Town of Hudson
Brian Kutz, Hillwood

Date: February 24th, 2020

Re: **Town of Hudson Planning Board Review – Response to Stormwater Design Review**
Hudson Logistics Center, Lowell Road
Tax Map 239, Lot 1, Acct.#1350-949
Reference No. 03-0249.1930
Langan Project No.: 151010101

Enclosed please find our responses to the Fuss & O'Neil Stormwater Design Review letter, dated December 17, 2020. Below please find each comment from the December 17, 2020 letter, followed by our response in bold.

7. **Drainage Design/Stormwater Management**

Subdivision Plan and Master Plan – Green Meadow Drive Plan Sets Prepared By Hayner/Swanson. Inc.

a. *Former Fuss & O'Neill Comment: Hudson Regulation HR 289-18.B.4. We note that the creation of the cul-de-sac is creating what appears to be a "land-locked" wetland pocket. The applicant should review the need for an outlet structure from the center of the cul-de-sac and/or describe the intent of this design. / The applicant has added CB102 and CB103 to two low points within the cul-de-sac. With rim elevations at approximately 130±, and the existing grade of the wetland at an approximate elevation of 128±, this will potentially result in impounding water of up to 2' over a wetland.*

Current Fuss & O'Neill Comment: We note that the applicant has reconfigured the round-about relating to layout, grading, and drainage (design and labels/identification numbers). We request the applicant providing the Hayner and Swanson plans for review, and recommend coordination of plans be implemented for design and labeling/identifying drainage structures/pipes.

Comment Response: The formerly proposed Green Meadow Drive right of way, now proposed as a private driveway, includes an entrance drive design which has been reconfigured and incorporated into the Langan design documents. Additionally, the project no longer proposes a subdivision and the Applicant's subdivision application is being withdrawn. As such, the Hayner and Swanson ROW subdivision drawings are no longer required.

i. *Former Fuss & O'Neill Comment: It appears the drainage analysis treats this location as only a subcatchment, and does not treat this area as a pond. In this modeling the volume of the wetland is consistently filled with stormwater, and stormwater in will equal stormwater out. Given that very poorly drained and poorly drained soils of wetlands have minimal infiltration rates, infiltration is unlikely to occur at a practical rate. The applicant should clarify if infiltration is intended to occur, or is this area intended to be 2' deep standing water at all times.*

Current Fuss & O'Neill Comment: The redesign has reduced the design "low point" within the round-about from 2' to 0.5' depth below the closest proximity catch basin CLCB-2 (A1-7). Please provide additional design intent with potential standing water.

Comment Response: A catch basin has been included in the center area of the cul-de-sac to provide drainage and eliminate the potential ponding condition.

iii. Former/Current Fuss & O'Neill Comment: The applicant should clarify if underdrains are proposed and if so, how will installation of underdrains effect the wetland.

Comment Response: A sub-slab drainage system is proposed as shown on the Grading and Drainage CG200 plan series. The Sub-sub system was installed in all areas where hardscape proposed finished grade is within 4 feet of the existing groundwater elevation. The volume of groundwater being collect and diverted to the stormwater system is nominal as compared to the overall watershed contributing to the Limit Brook wetland system. Limit Brook, from the point of leaving the project site, has an upstream contributing area of over 650 acres. This upstream area not only conveys stormwater runoff to the brook and adjacent wetlands but groundwater flow as well. As a result, and due to the limited collection and diversion to the stormwater system, no impacts to the wetlands or Limit Brook are anticipated.

iv. Former/Current Fuss & O'Neill Comment: Stormwater consistently at an elevation above the roadway gravels will have potential negative effects on the structural longevity of the roadway, related to both freeze/thaw as well as overall inability for the free-draining of the gravels. The applicant

should provide additional information on this design, and review this design with the Town Engineer.

Comment Response: In areas that hardscaped finished grades are located within 4 feet of the existing groundwater elevation, a sub-grade drainage system has been proposed which will keep stormwater out of the sub base materials.
While the HGL line of the modeled stormwater conveyance system does rise into the road way sub base materials under the design storm, it is a temporary condition that does not occur frequently, and therefore, does not result in the potential for negative effects on the structural longevity of the driveway. Stormwater will have the opportunity to drain between storms; meaning the sub grade will not be in a long term saturated condition. The sub grade will have the ability to drain and therefore should not have a negative effect on the roadway longevity. The Town Engineer has been consulted and understanding that all stormwater management components are private, is comfortable with the proposed pipe coverage.

g. Former Fuss & O'Neill Comment: HR 290-10.A & B. Due to the multiple plan sets concurrently submitted, the applicant should list all related required Town, State, or Federal permits as well as related plan sets (as references) within the plan. This will ensure that if a contractor acquires only one of the multiple plan sets, they are fully aware of the connectivity of the plan sets. /The applicant has updated the plan to state the Langan Set as a plan reference. We recommend the applicant adding a permits/approvals list, or refer directly to the page within the Langan set for associated permits/approvals.

Current Fuss & O'Neill Comment: The applicant should provide the Hayner and Swanson plans for review, and coordinate the plans to be implemented for design and labeling/identifying drainage structures/pipes.

Comment Response: All roadway design plans previously developed by Hayner Swanson, Inc. have been incorporated in the Langan design documents and are included in a single set. HR 290-10.A & B reference both a NHDES Alteration of Terrain Permit and EPA's Construction General Permit for Stormwater Discharges Associated With Construction Activity (CGP), and the ordinance states that copies of those permits shall be required if applicable, and both of these permits will be obtained for the project.

Site Plan & Wetlands Conditional Use Applications Plan Set Prepared By Langan Engineering & Environmental Services, Inc.

x. Former Fuss & O'Neill Comment: HR 290-7.A.6. We note that the provided Infiltration Feasibility Report states "To be completed during construction". To ensure infiltration is an acceptable treatment upon this project, the applicant should update the Infiltration Feasibility Report as per Env-Wq 1504.13./ The

applicant has updated the report with the initial findings. We note that the applicant should continue to keep the Town informed of any further findings that may alter the drainage design.

Current Fuss & O'Neill Comment: The Infiltration Feasibility Report continues to state "additional testing to be completed during construction" in relation to the calculated infiltration rates, while concurrently utilizing anticipated Ksat values achieved from the Ksat Values for New Hampshire SSSNNE tables.

Comment Response: The Infiltration Feasibility Report is being reviewed by the NHDES as part of the Alteration of Terrain Permit Application review process. As noted above, a NHDES Alteration of Terrain Permit is required for the project.

i. Please provide TP existing surface elevations to the Feasibility Report.

Comment Response: Test Pit elevations at infiltration test locations are currently provided in the Infiltration Feasibility Report section entitled "Infiltration Tests Reports" as Appendix F of the Sotrmwater management report. An infiltration test location plan has been recently added to this appendix.

ii. Please provide information as to the use of the "Ksat high" infiltration rates rather than the NHDES and engineering standard "Ksat low" infiltration rates.

Comment Response: Based on the infiltration tested performed by Langan at 11 separate locations across the project site, high rates of infiltration have been observed. In most cases, the infiltration rate observed exceeds the Ksat-high classification. Based on field collected data, the upper end Ksat-high design criteria were chosen to more accurately represent the soils present at the site.

iii. Please provide information as to the use of the utilization of the "Ksat C-horizon" over the typical "Ksat B-horizon" infiltration rates.

Comment Response: Field observed infiltration rates more closely match rates identified in the Ksat C-horizon. Boring and soil profile information reflect a C-horizon type soil in the location of the proposed infiltration basins. To most accurately reflect the true conditions of the proposed site, the Ksat C-horizon values were chosen as the design criteria.

iv. Utilization of 100 in/hr for basins A1-3 and A1-4 exceeds the 10 in/hr rate required by Env-1508.06(b). An infiltration rate exceeding 10 in/hr does not allow for proper required NHDES full treatment and requires soil amendments to occur. We request the applicant review this infiltration rate with NHDES to ensure proper treatment is achieved within these practices or if a soil amendment will be required.

Comment Response: The stormwater model and report have been updated to reflect a maximum design infiltration rate of 10 inches per hour for both infiltration pond A1-3 and A1-4. Should future infield testing during construction result in higher rates of infiltration, and engineered soil with a specific infiltrative capacity will be explored and installed in accordance with the NHDES guidelines.

v. The above noted comments, as well as the current applicant-proposed field testing verification after approval, could result in revisions to infiltration rates down to the 310 iph range. Such a significant difference to the infiltration rate has a potential "ripple effect" to the dynamically interconnected drainage features as well as downstream drainage calculations on such a large scale project. We request the applicant coordinate with both NHDES AoT and the Town to allow field verification of infiltration rates after approval is granted.

Comment Response: The applicant will coordinate with both NHDES AoT and the Town to allow field verification of infiltration rates after approval is granted. Based upon the extensive field testing performed to date, a significant difference to the infiltration rate is not anticipated.

ab. Former Fuss & O'Neill Comment: HR 290-10.A. The applicant should keep the Town informed of all communication with NHDES in relation to the required Alteration of Terrain, Shoreland, and Wetlands Permits to ensure NHDES comments do not alter drainage design/calculations. / The applicant provided a "concurrent plan sets and permit applications" note on sheet CS001. We also suggest all approved project permits be provided in a similar table or manner as to list easily accessible appropriate permit numbers for easy reference.

Current Fuss & O'Neill Comment: We recommend the Town require the NHDES AoT permit be a condition of the requested Site Plan Approval.

Comment Response: The applicant has been made aware of the comment.

aj. New Fuss & O'Neill Comment: HR 290.7.A.5. Comparing the May and December project submittals, there is an increase in A soils of 3.2 acres, B soils of 5.07 acres, and a decrease in D soils of the combined 8.24 acres. The applicant should provide additional information as to the reasoning behind the significant soil reclassification within the stormwater calculations.

Comment Response: A section of the original watershed A1-2 was misclassified in the original submission. The designation was corrected in the future submission when the revised pond locations were implemented into the design. As a result, there was no significant soil reclassification within the stormwater calculations.

ak. New Fuss & O'Neill Comment: HR 290.7.A.6. The applicant should provide additional information on the constant groundwater flow rate calculations utilized in Table 6 of the Stormwater Management Report, including but not limited to: where is this information

from; why was a constant rate utilized; and why was the same constant rate utilized in the 2, 10, 25, and 50 year storm analysis.

Comment Response: The sub-grade drainage system is mostly located below impervious cover areas mainly found in higher elevation areas than the surrounding topography. These two conditions lead to a negligible fluctuation in flow to the sub-grade drainage system when factoring in larger rain events and surface infiltration. In addition, the model performed to obtain the contributing flows was performed in a very conservative manner to ensure the appropriate volumes were accounted for with an abundance of capacity provided. Additional information on the groundwater modeling procedure has been included in Appendix K of the Stormwater Management report.

al. New Fuss & O'Neill Comment: HR 290.13. Although this is not a roadway cut section, due to some areas of significant cut upon the site, the applicant should review the need for underdrain to help prolong the life of the pavement, drainage system, and building structures.

Comment Response: A sub-grade drainage system has been proposed where existing groundwater elevations were found to be within 4 feet of the proposed finished grade to ensure the prolonged life of the pavement, drainage system, and building structures.

am. New Fuss & O'Neill Comment: HR 290-1. We note that the EPA has finalized the MS4 permit modifications for New Hampshire communities and they will go into effect on January 6, 2021. The applicant shall ensure they are in compliance with all aspects of the MS4 permit in the project design, during construction and post-construction. The Town of Hudson shall enforce the terms of the permit, including performing compliance inspections and initiating enforcement actions as required.

Comment Response: The project will be in compliance with the 2017 NH Small MS4 General Permit including modifications to the same made on December 7, 2020, and which became effective on January 6, 2021.

The following items require Town evaluation or input:

Subdivision Plan and Master Plan – Green Meadow Drive Plan Sets Prepared By Hayner/Swanson. Inc.

h. Former Fuss & O'Neill Comment: Hudson Engineering Technical Guidelines and Typical Details (HETGTD) Section 930.1. The applicant should review the design on Plan Sheet 4 of 22, and note that CB 117 and CB 118 are illustrated to have less than 4.0' feet of cover. We note the design does not match the detail on Plan Sheet 15 of 22, illustrating a minimum of 4' of cover.

Current Fuss & O'Neill Comment: The applicant has stated that they will seek approval of this deviation from the Town Engineer. The Town should confirm that they have reviewed this item and are comfortable with this design deviation.

Comment Response: The applicant has been made aware of the comment. The Town Engineer has been consulted and understanding that all stormwater management components are private, is comfortable with the proposed pipe coverage.

i. Former Fuss & O'Neill Comment: HETGTD Section 930.4. We note that the majority of the stormwater design utilizes pipe slopes of less than the required 2.0%. The applicant should review these pipe slopes with the Town Engineer to determine if these are adequate. Fuss & O'Neill would take no exception to the applicant requesting a waiver for these slopes if deemed necessary, as long as the applicant can illustrate that the drain line velocities are self-cleaning.

Current Fuss & O'Neill Comment: The applicant has stated that they will seek approval of this deviation from the Town Engineer. The Town should confirm that they have reviewed this item and are comfortable with this design deviation.

Comment Response: The applicant has been made aware of the comment. The Town Engineer has been consulted and comfortable with proposed reduced slopes.

Site Plan & Wetlands Conditional Use Applications Plan Set Prepared By Langan Engineering & Environmental Services, Inc.

m. Former Fuss & O'Neill Comment: HR 290-5.A.10. Due to the proximity of wetlands and other buffer zones to the proposed locations for installation of erosion control practices, the applicant should review the need for relief from this requirement by the Planning Board.

Current Fuss & O'Neill Comment: The applicant has stated that discussions regarding the wetlands and other buffer zone impacts are part of an ongoing discussion with the Planning Board.

Comment Response: The applicant has been made aware of the comment. The applicant has received a positive referral from the Town of Hudson Inland Wetlands Commission with respect to the condition use permit (CUP) related to wetlands impacts. The CUP application will be discussed at an upcoming Planning Board hearing and the waiver for the unavoidable impacts to the buffers will be requested and discussed.

ah. Former Fuss & O'Neill Comment: HETGTD Section 920.3.12. We note that there are storm drains that exceed the listed maximum velocity of 10.0 fps. The applicant should review these velocities with the Town Engineer for acceptance. Fuss & O'Neill takes no exception if a waiver from this requirement is deemed necessary.

Current Fuss & O'Neill Comment: The applicant has stated that a waiver has been requested from the Town.

Comment Response: The applicant has been made aware of this comment. All conveyance velocities in the stormwater management report appendix D reflect speed of less than 10 fps.

ai. Former Fuss & O'Neill Comment: HETGTD Section 920.3.13. We note that there are storm drains that exceed the listed minimum velocity of 2.0fps. We request the applicant review these velocities with the Town Engineer for acceptance. Fuss & O'Neill takes no exception if a waiver from this requirement is deemed necessary.

Current Fuss & O'Neill Comment: The applicant has stated that a waiver has been requested from the Town.

Comment Response: The applicant has been made aware of the comment. The Town Engineer has been consulted and confirmed that pipe capacity will not be used as storage and is comfortable with the proposed velocities lower than 2 cfs.

The following items are resolved or have no further Fuss & O'Neill input:

7. **Drainage Design/Stormwater Management**

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b.

ii. Former Fuss & O'Neill Comment: The applicant should review with the project wetland scientist and/or NHDES to ensure impounding up to an additional 2' of water over a wetland does not constitute an additional wetland impact.

Current Fuss & O'Neill Comment: The roundabout was relocated to reduce wetland impacts. No Further Fuss & O'Neill comment.

Comment Response: The applicant has been made aware of the comment.

We trust these responses adequately address your comments and concerns at this time. Please feel free to contact us at (203) 562-5771 or nkirschner@langan with any questions or should you require additional information.