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ALLEN & MAJOR ASSOCIATES, INC.

April 26, 2021

To: Mr. Richard S. Novak, Chair
Zoning Board of Appeals
Town of Sherborn
19 Washington Street
Sherborn, MA 01770

A&M Project #: 2513-02

Re: Response to Peer Review of Stormwater Management System & Stormwater Report
Apple Hill Estates – Hunting Lane
Sherborn, Massachusetts

Copy:

Dear Chair Novak and Members of the Zoning Board of Appeals:

Please find Allen & Major Associates, Inc. (A&M) responses to the Stormwater Peer Review dated April 15, 2021 as prepared by Professional Services Corporation, PC (PSC) in reference to their review of Apple Hill multifamily residential community to be located at 33 Hunting Land in Sherborn, Massachusetts (hereafter referred to as the "Project". Listed below are the non-traffic related comments from the PSC peer review letter followed by our response on behalf of the Applicant. For ease of review, comments indicated as "Resolved" have been omitted from this response letter. Responses to the remaining comments will be provided by others under separate cover.

PART II – THE APPLE HILL STORMWATER
APPLE HILL – STORMWATER COLLECTION SYSTEM

Comment 22. Analyze and map the municipal stormdrain system in Hunting Lane and determine if it is a catchbasin-to-catchbasin system.

1st Response: The municipal storm drain system in Hunting Lane is catch basin-to-catch basin and is shown on the site plans.

PSC: The municipal drain system in Hunting Lane is a catchbasin-to-catchbasin system which inherently contributes to water pollution.

Response: See response to comment #23 below.

Comment 23. If the municipal stormdrain system in Hunting Lane is a catchbasin-to-catchbasin system, revise the design of the on-site stormwater management system to eliminate or severely restrict any additional discharge.

1st Response: As mentioned above, the municipal storm drain system in Hunting Lane is catch basin-to-catch basin. As is acknowledged in the letter provided by PSC, the Project drainage system has been designed such that additional discharge is already restricted, since peak discharges are slightly reduced for each of the design storm events. In order to alleviate concerns of re-suspending material within the sump of the connected catch basin, we are proposing to install a new drain manhole, upstream of said catch basin. By doing this, in combination with reducing peak flow rates for each design storm event, we believe that any concern of re-suspending materials within the catch basins can be eliminated.

PSC: Adding a drain manhole at the point of connection will lessen churning the sump at the point of connection. However, as soon as flow reaches the next downgradient catchbasin churning of the sump and dissipation of contaminants will occur. The catchbasin-to-catchbasin system downgradient of the point of connection should be upgraded with a catchbasin-to-manhole system.

Response: As previously stated, the project proposes to install a drain manhole to alleviate concerns of re-suspending material within the sump of the connected catch basin. The project also reduces

peak flow rates for all design storm events. Additionally, the development team will review the option to clean the catch basins within Hunting Lane, downstream of the project connection, prior to completion of construction.

Comment 24. Determine the use to capacity ratio based on total system flow in the municipal drain system at the point of connection and limit the site discharge to the available capacity based on the hydrograph for the municipal system.

1st Response: As mentioned above, the project reduces the peak rate of runoff for each design storm event. For the 25-year event, which is the typical storm event used for sizing pipes, the Project reduces the peak flow rate directed to the connection point by over 26%. We are not aware of any existing problems with the municipal drainage system and therefore see no reason to reduce the flow rates any further.

PSC: While peak rate attenuation is provided from on-site, this is achieved by detaining stormwater runoff and therefore delaying the time of peak flow. As the municipal system is likely to have a longer time of concentration, delaying the peak flow from the site is likely to decrease the offset between the time of peak flow of the on-site and off-site hydrographs and thus increase the peak rate of the combined off-site and on-site hydrographs within the municipal system. The use to capacity ratio in the Hunting Lane drain system must be determined as a prerequisite to an informed decision as to whether a direct connection can be allowed.

Response: **The HydroCAD model indicates that the peak rate of runoff occurs earlier in the storm event for both the 10 and 100 year storm events. Therefore the above suggestion that "***peak flow from the site is likely to decrease the offset between the time of peak flow of the on-site and off-site hydrographs"* **is incorrect for these two storm events. The peak rate of runoff does occur later during the 2 year storm event, but by less than two minutes. Since this is the smallest storm design storm event, this offset is irrelevant. The offset for the 25 year storm event is barley over one minute, which is insignificant, given that the peak rate of runoff during the 25 year storm event is decreased by 25%, compared to the existing conditions. We therefore posit that any further analysis of the municipal system is unnecessary, seeing that it will not be adversely affected by the proposed site work.**

APPLE HILL – BMPs

Partial Exfiltration Basin

Comment 28. Provide the logs of all 4 test pits taken to date. Ensure that a minimum of three test pits are located within the footprint of Basin DB2, are logged by a Massachusetts soil evaluator, and are witnessed by the Town.

1st Response: Test pits were performed in the locations of DB-1 and DB-2, the locations of which are shown on the Grading & Drainage Plan. Test pit logs are provided in the Appendix of the revised Drainage Report. The estimated seasonal high ground water within the test pits was found to be too shallow to provide the separation necessary to allow for infiltration. Therefore both DB-1 and DB-2 will be lined and infiltration has been provided elsewhere onsite. The two basins have been revised to include a bioretention/filtration layer and underdrains. This provides additional storage and treatment for TSS and phosphorus.

PSC: The elevation of estimated seasonal high groundwater is given in the test pits in inches referenced to the top of the test pit but is not shown in terms of an elevation referenced to the datum. By scale, ESHGW is actually 3± feet above the bottom of DB-1 and DB-2 causing buoyancy and likely damage to the liners. Please label the elevation of ESHGW at each basin and address buoyancy as required. Further, basin DB2 is labeled "retention basin" which should be corrected to avoid confusion.

Response: **The ESHGW for each test pit was labeled on the plan and the label for DB-2 was corrected. Modifications have been made to the design of DB-1 and DB-2 in order to address buoyancy concerns. The liner in both basins was changed to a clay liner for additional weight and ease of installation (12" of clay for DB-1 and 4" of clay for DB-2). Another 12" of filter media was added to DB-1 to provide additional buoyancy resistance. The outlet controls for DB-1 were**

modified slightly to maintain peak rates of runoff. A figure has been added to the end of the appendix of the Drainage Report to illustrate that the liner will be maintained in position.

Comment 32. Provide a sediment forebay.

1st Response: A sediment forebay is not necessary as pretreatment is provided by the hydrodynamic separator style water quality devices.

PSC: The hydrodynamic separator is not shown.

Response: DMH-4 and DMH-11 are indicated on the Grading & Drainage plan as "Water Quality" devices.

Infiltration Trench IS-1

An infiltration trench and house drywells have replaced the infiltration function of the Partial Exfiltration Basin and serve to accommodate the required recharge volume.

37A. Provide 3 test pits establishing soil texture at the interface between the fill and the in-situ soils. Although the bottom of trench is 2± ft. above existing grade, establish ESHGW (SWHB V. 2: C. 2: P. 97).

Response: We respectfully request that it be made a condition of approval to perform the requested test pits prior to construction. We believe this is a reasonable request seeing that the bottom of the trench is above existing grade. A note regarding these test pits have been added to the plan.

37B. Remove A and B horizon soils beneath and extending at 1/1 from the outside edge of the trench outward.

Response: This has been noted on the Perforated Corrugated Metal Pipe detail, see sheet C-505.

37C. The setback between the residential buildings and the trench is 10± ft. The required setback is 20 ft (SWHB V. 2: C. 2: P. 97).

Response: In lieu of a 20 foot buffer, an impermeable liner will be placed on the side of the trench to direct infiltration downward, to eliminate impacts to the residential buildings. See the Corrugated Metal Pipe detail on sheet C-505.

37D. The setback between the slope of greater than 20% is 0 to 10 ft. the required setback is 100 ft (SWHB V. 2: C. 2: P. 97).

Response: In lieu of a 100 foot buffer, an impermeable liner will be placed on the side of the trench to direct infiltration downward, to eliminate potential bleed-out from the side of the slope. This liner will extend all the way down below the level of the A and B horizon soils, to be removed. See the Corrugated Metal Pipe detail on sheet C-505. Extending the liner below the existing grade results in the system effectively being separated from the 20% slope so that the above requirement no longer applies.

37E. The setback between the Zone 1 and the trench is 140± ft. The required setback is 150 ft (SWHB V. 2: C. 2: P. 97).

Response: The infiltration trench is located outside the Zone 1 radius, as required, per SWHB V.2:C.2:P.97. This requirement is met.

37F. Modify the IS-1 detail to show the inverts and outlet controls for runoff to enter the infiltration trench (SWHB V. 2: C. 2: P. 97).

Response: The inlet and outlet connections to the Corrugated Metal Pipe infiltration system will be made by standard corrugated metal pipe stubs and risers. The outlet is controlled by one 12" stub, located approximately halfway up the side of the pipe. Detail information for the infiltration system is provided on sheet C-505. Additional detail will be provided on the shop drawings which will be required prior to construction to verify compliance with the design drawings.

37G. Prevent runoff from entering the trench until the site if fully stabilized (SWHB V. 2: C. 2: P. 98).

Response: A note has been added to sheet C-103 to address this comment.

Dry Detention Basin

Comment 38. Provide at least one test pit to determine soils, depth to bedrock, and depth to water table.

1st Response: Test pits have been performed. Locations are depicted on the Grading & Drainage Plan and test pit logs are included in the Appendix of the revised Drainage Report.

PSC: The elevation of estimated seasonal high groundwater (ESHGW) is shown in the test pit logs in inches referenced to the top of the test pit but is not shown in terms of an elevation referenced to the datum. By scale, ESHGW is actually 3± feet above the bottom of DB-1 causing buoyancy and likely damage to the liner. Please label the elevation of ESHGW at the basin and address buoyancy as required.

Response: See response to comment #28

Proprietary Interceptors

Calculations are provided for three Stormceptor 450i catchbasin units (catchbasins CB-02, CB-03, and CB-05) and one inline unit (DMH-08). However, total suspended solids removal must be provided for systems and the site as a whole.

Comment 44. Provide TSS removal spreadsheets for each compete treatment train.

1st Response: The TSS removal spreadsheets for each treatment train have been provided as requested in the revised Drainage Report.

PSC: The treatment trains for DB2 to IS-1 and DB1 to Jellyfish include TSS removal for a hydrodynamic separator but the hydrodynamic separator is not shown on the plans.

Response: DMH-4 and DMH-11 are indicated on the Grading & Drainage plan as "Water Quality" devices.

APPLE HILL – MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS
APPLE HILL – MS4

Comment 52 Recompute infiltration of the required recharge volume per Comments 28 through 31.

PSC: No response provided. However, infiltration calculations are provided. Test pits are required to substantiate the infiltration calculations for IS-1. See comments 37A through 37G.

Response: The infiltration system will be placed in free draining material and the existing A and B horizons are to be removed and replaced with additional free draining material. This results in the bottom of the system being between 2 and 6 feet above native material. An infiltration rate of 1.02 inches per hour was assumed, based on soils found elsewhere onsite. This is a conservative assumption, considering the amount of separation to native material, and the backfill material will be free draining. We therefore, as mentioned above, respectfully request that these test pits be required as a condition of approval, to be performed prior to construction.

APPLE HILL – STORMWATER MANAGEMENT PROGRAM

The Stormwater Management Program incorporates as a post-construction ordinance the Rules and Regulations off the Planning Board Part 2.3.6.a.ii, §3.4.2.16 and §4.4 and §12 of the Board of Health Regulations.

The Planning Board Regulations require that all runoff be held on-site unless otherwise approved (RRPB §3.4.2.16) (Comments 22 to 25).

1st Response: Pre vs post reduction achieved, which concludes that the net difference of the runoff is held on-site.

PSC: Attenuation of peak rates is not functionally equivalent to retention of all runoff.

Response: The RRPB Section 3.4.2.16 does not state that all *runoff* must be held on site, as suggested in the comment above. The referenced section states "All storm water drainage shall be

contained on site unless otherwise approved by the Planning Board." We understand the intent of this statement to be that all drainage *infrastructure* shall be contained on site, not runoff. In the proposed design, all drainage infrastructure is contained on site until the standard overflow connection to the municipal system. This interpretation is much more in keeping with the standard expectations of development. If it were the case that all runoff volume was expected to remain on site, a great more detail would likely be provided, outlining for which storms this is expected and for which overflow is permitted. Further support for this argument is provided in the Drainage Design section of the RRPB. Section 4.4.1 states that "Drainage design shall provide groundwater recharge to the maximum extent practicable." Section 4.4.2 of the RRPB states that "Lots should be laid out and graded in a manner that ensures development of one shall not cause detrimental drainage onto another and with the intent that such drainage shall maximize local groundwater recharge." The project provides groundwater recharge to the maximum extent practicable and it reduces peak rates of runoff at all Study Points for all design storm events and will therefore not "cause detrimental drainage onto another" property. Based on the above information we believe the spirit and intent of the RRPB is met.

Soil percolation and/or permeability tests are required to document the capacity of the soil to accommodate the discharge design (RRPB §3.4.2.16) (Comments 28 and 38).

1st Response: The test pits indicated that shallow soils onsite are predominantly loamy sand with sandy loam at deeper depths. A design infiltration rate of 1.02 inches per hour was used, which is the Rawls infiltration rate for sandy loam, the lower of the two soils found.

PSC: Test pits are required for IS-1. See Comment 37A.

Response: As mentioned above, we are requesting that these test pits be required as a condition of approval, to be performed prior to construction.

Impacts to adjacent properties caused by discharge of runoff must be authorized by ownership, i.e., drainage easements (RRPB §4.4.3.b.3) (Comment 3).

1st Response: Adjacent property owner is also the applicant who is satisfied with the anticipated discharges.

PSC: The Applicant's team states that the well site is in separate ownership. The owner should provide easements to address future changes in ownership. It is anticipated that ownership will change with the well site transferred to a corporation or comparable legal entity who will license and operate the public water company serving The Pines Residences and Apple Hill Estates.

Response: The sites are, and will remain, under the same ownership

Comment 55. Evaluate the option of holding all runoff on-site.

1st Response: As exists today, stormwater runoff exits the subject parcel and it is unrealistic to presume that this runoff would be required to be held solely within the parcel limits ahead of any development. The intent of RRPB 3.4.2.16 is for the protection of adjacent properties or natural resources. Through the use of currently accepted methods (TR-55 Urban Hydrology for Small Watersheds, developed by the U.S. Department of Commerce, Engineering Division and the HydroCAD 10.00)an estimation of the peak rate of runoff from various rainfall events has been provided for both existing and proposed conditions. Through the implementation of a stormwater management system, the analysis indicates that the proposed site development reduces the rate of runoff during all storm events at the identified points of analysis. In our professional opinion, the spirit and intent of RRPB 3.4.2.16 is met as the difference in runoff (pre vs post) from the site is illustrated to be held on-site.

PSC: While peak rate attenuation is provided from on-site, this is achieved by detaining stormwater runoff and therefore delaying the time of peak flow. As the municipal system is likely to have a longer time of concentration, delaying the

peak flow from the site is likely to make the time of peak flow of the on-site and off-site hydrographs more coincident and thus increase the peak rate of the combined off-site and on-site hydrographs within the municipal system. The use to capacity ratio in the Hunting Lane drain system must be determined in order to identify the potential impacts of allowing connection of the on-site system to the Hunting Lane system.

Response: See response to comment 24 above.

APPLE HILL – STORMWATER MANAGEMENT BYLAW REGULATIONS

The Stormwater Management Bylaw Regulations apply as disturbance exceeds 40,000 sq.-ft. The Regulations require compliance with the stormwater management standards. Neither the rate or volume of stormwater runoff leaving the site shall increase nor shall nor shall runoff be discharged to any adjoining properties, public ways, or any wetland resource areas, unless otherwise permitted based on improvement over existing conditions. The Regulations require application of fertilizers and pesticides sparingly and encourage use of slow-release nitrogen and low phosphorus fertilizers (Comments 48, 49, and 50).

1st Response: The project reduces the rate of runoff for all design storm events, for all Study Points, which is an improvement over existing conditions. As mentioned above, the Operation & Maintenance Plan includes limitations on fertilizers and pesticides.

PSC: The volume of runoff leaving the site increases violating the Stormwater Management Bylaw Regulations.

Response: See response above to Apple Hill – Stormwater Management Program comment.

We trust that this information is responsive to the comments that were raised in the April 15, 2021 *Peer Review of Stormwater Managements Systems and Stormwater Reports* prepared by PSC. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact our office.

Very Truly Yours,
ALLEN & MAJOR ASSOCIATES, INC.

Michael A. Malynowski, PE
Senior Project Manager

Professional Engineer in MA, ME, and NH

Attachments
1. Revised Drainage Report
2. Revised Grading & Drainage Plan and detail sheets C-503 and C-505

cc: G. Barsky - Barsky Estate Realty Trust (via email)
L. Sweet – LDS Consulting Group (via email)
P. Haverty – Blatman, Bobrowski & Haverty, LLC (via email)