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January 21, 2022
VIA EMAIL

Ipswich Planning Board
Town Hall
25 Green Street
Ipswich, MA 01938

RE: 55 Waldingfield Road – Phase 1B
Site Plan Review & Special Permit Applications
Initial Drainage and Stormwater Management Review (Task 1)

Mr. Ethan Parsons and Planning Board Members:

As requested, I have conducted an initial drainage and stormwater management review of the above referenced project with respect to regulatory standards of the Planning Board and routine engineering design practice for drainage and stormwater management facilities similar to that being proposed by the Applicant. Pertinent technical material received includes the following plans and documents as prepared by Hancock Associates of Danvers, MA (unless otherwise noted).

- “Permit Site Plan Phase 1B (to accompany a Great Estate Preservation Development Special Permit) 55 Waldingfield Road...” consisting of eleven (11) sheets, all dated October 21, 2021.
- “Stormwater Report in Support of A Great Estate Preservation Development (GEPD) Special Permit for 55 Waldingfield Road Phase 1B...” dated October 2021, including appendices for a Long Term Pollution Prevention Plan, a Construction Period Pollution Prevention Plan, and an Operation and Maintenance Plan.

At this time, the following comments and opinions are offered for your consideration relative to the proposed drainage and stormwater management design.

Overview: The proposed stormwater management design utilizes a proposed Rain Garden and an existing on-site low area for mitigation of stormwater impacts. In general, this is an acceptable approach, subject to resolution of the various items identified below. It should be noted that a majority of these items relate to clarification and refinement of the plans, details, and design intent. As such, significant changes to the overall design intent are not anticipated, however, reconfiguration of the Rain Garden may be required to address exfiltration rate and pre-treatment concerns.

Also note that the reviewed plan set did not contain a Professional Engineering seal. Future plan submittals should include the stamp of the Professional Registered Engineer of record.

Stormwater Management, Drainage, and Grading:

1. Proposed Rain Garden – Revise the design and calculations as needed to address the following:
 - a. The assumed infiltration rate of the Rain Garden (8.27 in/hr) is excessively high. While this value may reflect the capacity of the native soil material, the two foot thick ‘soil

mix' placed within the Rain Garden will introduce a restrictive soil layer with an infiltration rate significantly less than that used in the calculations. A reduced value, reflective of the proposed 'soil mix' characteristics, should be utilized in a revised calculation. It is anticipated that this revision may require geometric changes to the Rain Garden.

- b. Grading within and around the proposed Rain Garden should be revised/coordinated with the assumptions made in the hydrologic/hydraulic calculations of the 'Stormwater Report.' Conflicting information is presented within the various documents.
 - c. The DEP Handbook (Volume 2, Chapter 2) stipulates that adequate pretreatment of runoff must be provided prior to the Rain Garden. No pretreatment is proposed for runoff from the proposed peastone area (i.e., runoff is conveyed directly into the Rain Garden via stone swale). It can be reasonably anticipated that the concentrated runoff from the proposed peastone surface will contain sediment. Hence, suitable pretreatment should be provided for surface runoff into the Rain Garden.
 - d. A landscape plan and/or planting schedule should be provided for the Rain Garden.
2. It is noted that a majority of the peastone parking and driveway area will not be conveyed to the Rain Garden. To improve the quality of this runoff, it is strongly suggested that additional water quality treatment be provided in the lower portion (southeasterly section) of the peastone/gravel area (i.e., where a majority of the runoff is flowing off of the peastone/gravel). Viable options would include a pea gravel diaphragm in areas where the parking surface is level and/or down gradient pervious berm below steeper segments of the entrance driveway adjacent to and below the proposed gate (refer to DEP Handbook Volume 2, Chapter 2).
 3. Consistent with the calculations, the Site Plan should include a note specifying that all roof runoff shall be conveyed to the rain garden.
 4. The proposed peastone parking area located between the two proposed buildings requires additional grading information to convey design intent. Provide supplemental spot grades or contours.
 - a. In addition to the above, a note on plan sheet 9 states that the peastone area between the two proposed buildings "...drains under proposed barn." The plans should clarify how this is intended to be achieved (i.e., no architectural plans or sections were received, and it is not obvious that the existing/proposed barn construction provides an accessible area below the floor level to facilitate storm flowage). Note that if this intent is accurate, a pretreatment water quality element should be provided for this tributary area.
 5. Proposed grading and hydrologic calculations imply that a drainage swale will be located along the southerly side of the barn, flowing in an east-west direction (to the Rain Garden). It is strongly suggested that this swale be better defined on the plan, and that an alternative construction material be considered. The proposed peastone will be unstable when subjected to concentrated flow. Material such as cobblestone, rip rap stone, or pavement would be more durable and stable than the proposed peastone.
 - a. In addition to the above, the Applicant may wish to consider relocating the parking space adjacent to the barn so that it is not positioned within the path of the drainage swale.
 6. Grading and surface treatment for the patio area (between the two proposed buildings) is not specified. Stormwater management calculations assume this area to be a grass surface which is graded to direct runoff in a northerly direction. Supplemental grading and material specification should be on the plans for this area.
 7. A note is included on plan sheet 10 that states "Rooftop stormwater to be collected in underground cistern, to be used for garden irrigation. Location and sizing of cistern to be determined." The detailed Site Plan (plan sheet 9) does not reflect this intent. While no engineering exception is taken to the intent, the design engineer should clarify the intent by coordinating the two plan sheets. Furthermore, the plans should stipulate that any cistern

- overflow is required to be conveyed to the rain garden with the conveyance methods specified on the plans.
8. Storm drains are shown on both the northerly and southerly sides of the proposed buildings, however, no inlets are indicated. The intended purpose of these pipes should be explained and inlets for the proposed pipe lines specified on the plans.
 - a. Pipe size, invert elevations, and slopes should be indicated for the pipe lines.
 - b. Drain manholes should be utilized at changes in pipe direction, rather than the cleanouts indicated on the plans.
 9. Coordinate the storage volumes stated in Section 2.0 of the Stormwater Report narrative and the volume calculations in Appendix D with the site grading plans and stormwater calculations for the rain garden. Contradictory information is provided.
 10. Provide more detailed topographic information on plan sheet 10 to address the following:
 - a. Clarify the limits of elevation 35.5 to document the area/volume of storage assumed in calculations for the existing on-site low area.
 - b. Specify the location, size, and elevation of the on-site low area overflow point.
 - c. Provide additional grading in the southeasterly corner of the property to document that the entirety of subcatchments EB-1 and PB-1 will flow to the existing on-site low area.
 11. Construction details should be provided for the following drainage/stormwater elements indicated on the site plan:
 - a. Pipe cleanout detail.
 - b. Drain manhole detail.
 - c. Drainage swale (adjacent to barn).
 - d. Earthen embankment cross section and material specifications for Rain Garden.
 - e. Spillway cross section and material specification for Rain Garden. Note that care should be given to the design of the spillway crest to ensure that the detail reflects assumptions made in the calculations.
 12. The following drafting and typographical errors should be addressed:
 - a. The proposed 'Soil Stabilizer' detail should include manufacturer product information and/or material specifications. In addition, the intended use of the product should be indicated on the plans and in the 'Section for Pea Stone' detail.
 - b. Specify the required minimum stone size and gradation in the 'Drain Outlet' detail.
 - c. In the stormwater report narrative Section 1.0 (page 1) stormwater runoff is stated to flow to the west. As mapped, stormwater flow at the locus is to the east.
 - d. In the stormwater report narrative Section 1.0 (page 1) and in Appendix G (the CPPPP), the proposed site description refers to Phase 1B buildings on the western side of the property. As mapped, Phase 1B is on the eastern side of the property.
 - e. In the General Notes on plan sheet 1, indicate the correct municipality in note 4, and the correct FIRM Panel in note 11.
 - f. On plan sheet 9, coordinate the ESHWT elevation with the estimated depth to ESHWT and test pit surface elevation as indicated in the Soil Testing data.
 - g. Provide the correct graphic and bar scale on plan sheet 10.

DEP Stormwater Management Standards:

1. Standards 4 and 8 – The Long Term Pollution Prevention Plan (LTPPP) and the Construction Period Pollution Prevention Plan (CPPPP) should both be revised and reformatted to address all topics contained in the 'Checklist for Stormwater Report.'
 - a. The LTPPP is written largely with respect to construction, but does not contain substantial instruction with respect to long term operation at the site. The document

- should be revised to address all topics contained in the ‘Checklist for Stormwater Report.’
- b. Include a note on the Site Plan referencing the requirements of the LTPPP.
 - c. Include reference to the requirements of the CPPPP and the SWPPP in the ‘Erosion Control Notes’ on plan sheet 11.
 - d. Specify additional erosion control barriers on the site plan to be located upgradient of the Rain Garden (i.e., to intercept surface runoff from the adjacent fill area southwesterly of the Rain Garden) and also at the toe of the Rain Garden slope to protect finished work until the site is fully vegetated and stable.
 - e. The CPPPP contains various items that are more applicable to the LTPPP and should be included therein. The document should be revised accordingly.
 - f. The CPPPP should also be revised to provide the following:
 - i. A location for the stabilized construction entrance should be indicated on the plans.
 - ii. Identify the person/entity responsible for CPPPP implementation and compliance.
 - iii. Include reference to the requirements of the Stormwater Pollution Prevention Plan (SWPPP) in the CPPPP.
2. Standard 9 – Address and coordinate the following items in the Operation and Maintenance Plan (O&M Plan):
- a. Include a note on the Site Plan referencing the requirements of the O&M Plan.
 - b. The narrative and Inspection Checklist should be revised to include the following items:
 - i. Recovery and inspection of drainage system cleanouts shown on the plans.
 - ii. Inspection and maintenance of the proposed swale and rip rap channel located on the southerly side of the barn.
 - iii. Modify the ‘Rain Garden’ narrative relative to the outlet control structure. There is no outlet control structure per se. The only outlet is the proposed spillway. Inspection and maintenance protocols for the spillway should be specified in the narrative and included in the ‘Inspection Checklist.’
 - iv. Add a narrative description and ‘Inspection Checklist’ item for inspection of the existing on-site low area being used for stormwater mitigation. Specifically, inspect/maintain the discharge/overflow location for alteration, erosion, etc. Stipulate that future alteration of the overall low area and the discharge/overflow should not be conducted without appropriate hydrologic/hydraulic evaluation and regulatory approval. Include a similar note on the plans.

Please feel free to contact me if you have any questions or require any additional clarification of the above comments and opinions.

Very truly yours,

R.E. Puff

Robert E. Puff, Jr., PE

cc: C Wear, PE (via email)