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VIA EMAIL

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

RE: 55 Waldingfield Road – Phases 2 and 3
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 2/3 (to accompany a Great Estate Preservation Development Special Permit) 55 Waldingfield Road...” consisting of thirteen (13) sheets; plans 2A through 2F being dated July 1, 2021, and plans 1 and 3 to 8 being dated March 28, 2022.
- “Stormwater Report in Support of A Great Estate Preservation Development (GEPD) Special Permit Phase 2-3 for 55 Waldingfield Road...” dated March 2022, including Appendices A-K.

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

Overview:

As detailed below, certain elements of the stormwater management design require revision, supplemental information, or clarification. Of particular concern are:

- The catch basin/surface runoff design approach for the new area of peastone parking (refer to ‘Stormwater Management & Drainage’ item 2).
- The potential for runoff along the westerly side of the site (i.e., at the permeable paver patio and the infiltration field beneath the deck) to be intercepted by building foundation drains, to seep through the retaining wall joints, and/or break out along the adjacent steep slope (refer to ‘Stormwater Management & Drainage items 7.a and 8.c.iii).
- The steep slope down gradient of the proposed drainage swale should be further evaluated for potential erosion resulting from concentrated flows from the swale (refer to ‘Stormwater Management & Drainage item 3).

Stormwater Management & Drainage:

1. All plans and calculations should be signed and stamped by the Engineer of Record.
2. The ability of the proposed catch basin to collect runoff within the new peastone parking field is questioned. The design assumes that surface runoff will be collected by this catch basin and piped to a water treatment device, and from there, the runoff is designed to be piped to a subsurface infiltration chamber. From a practical standpoint, these are improper design assumptions. Unlike a conventionally paved parking field, the peastone parking field will not generate substantial quantities surface runoff (particularly during smaller rainfall events). Hence, the runoff within this drainage area will not enter the catch basin, will not receive treatment, and will not be conveyed to the infiltration chamber. Contrary to the calculations, rainfall will pass through the peastone surface and flow underneath the surface along the stone base material until it breaks out into the proposed swale located adjacent to the parking field. Such a scenario will have the peastone parking field contributing runoff to Design Point 1 (to the west) rather than to Design Point 2A (as assumed in the calculations). A revised approach to this portion of the stormwater management design is strongly suggested.
3. The proposed swale along the easterly and northerly side of the parking field should be further analyzed or modified. The swale concentrates runoff from upgradient areas and conveys the runoff onto the slope at the westerly side of the site. While erosion is not a concern for small/routine rainfall events, higher intensity storms (or periods of large snow pack melt) may create erosion problems.
 - a. The stability of the slope should be checked, and the swale should be widened as it approaches the slope (to disperse flow along the slope). In addition, check dams along the swale should be considered to reduce velocity and encourage infiltration.
4. Additional soil test pits should be conducted within the limits of the permeable paver patio, the infiltration field below the deck, the rain garden, and the subsurface infiltration system, in order to confirm the presence of suitable soils and adequate depth to groundwater in all of these locations. At present, no soils tests are indicated within these four infiltration areas.
5. Add plan notes that more specifically address design intent with respect to roof runoff.
 - a. All proposed Phase 2 and 3 roof runoff shall be conveyed to Infiltration System PS2.
 - b. All roof runoff from buildings approved as part of Phase 1A, and roof runoff from the pre development (existing) garage, shall be conveyed to the Rain Garden.
6. Notes should be added to the plans to incorporate the requirements of the Stormwater Pollution Prevention Plan (SWPPP), Construction Period Pollution Prevention Plan (CPPPP), Long Term Pollution Prevention Plan (LTPPP), and the Operation and Maintenance Plan (O&M Plan).
7. Additional grading and a cross sections should be specified to indicate the design intent of the infiltration field located below the proposed deck. Surface grading, material to be placed, and thickness of material should be indicated.
 - a. The design engineer should address the potential for stormwater breakout and/or stormwater entering the building foundation drain system (as a result of the infiltration field being located directly adjacent both the building and a steep slope).
8. It is noted that a retaining wall is proposed to the west of the 'Collaboration Center.' The grading plan should be revised to better describe the intended elevation relationship between the permeable paver patio, the adjacent deck, and the existing grade.
 - a. Given the location of the retaining wall (directly adjacent to a 'conservation restriction' and '200 foot riverfront area' boundary), the Planning Board may wish to consider the general design aesthetic of the wall and the materials proposed for construction. Presently, no information is provided regarding the retaining wall.
 - b. The Planning Board may wish to require physical monumentation along the boundary lines of the conservation restriction and riverfront zone boundaries in this area.

- c. If the patio is proposed to be at the elevation of the building floor, the retaining wall height will be approximately five (5) to seven (7) feet in height.
 - i. Top and bottom of retaining wall should be specified.
 - ii. The design engineer should better define the grading transition between the patio and existing grade at the northerly end of the patio as well as the area between the southerly end of the patio and the crushed stone infiltration area beneath the deck.
 - iii. The design engineer should address potential for stormwater breakout along the adjacent steep slope, along the face of the retaining wall, and runoff entering the building foundation drain system (as a result of the patio being designed as a permeable paver system adjacent to these areas).
 - d. If the patio is not at the elevation of the building floor, the finished grade should be specified, along with top and bottom of retaining wall and grading transition to the crushed stone infiltration area beneath the adjacent deck. In any event, item 8.c.iii above, should still be addressed by the design engineer.
9. In the course of conducting this review, the following drafting items were noted on the plan set and should be addressed in a subsequent revision.
- a. On the grading plan (sheet 5), specify a high point elevation along the easterly side of the parking field.
 - b. On the grading plan, provide flow arrows to specify a drainage path to the south and show where runoff from the northerly portion of Subcatchment P-2 will flow across the main driveway and into the pasture (as assumed in the calculations).
 - c. On the grading plan, specify the 'proposed patio' to be a 'permeable paver patio' consistent with the design intent and other plan sheets.
 - d. On the utility plan (sheet 6), coordinate the drainage pipe invert elevations with the 'Drainage Pipe Schedule' information.
 - e. On the utility plan, replace the clean out at the junction of pipe segments D3, D4, and D5 with a drain manhole.
 - f. On the utility plan, clarify the design intent at the drain manhole adjacent to infiltration system PS2. The pipe header outlet is specified at a higher elevation than the inlet and a specified 12 inch outlet pipe is not apparent (note similar comment exists for the detail on sheet 7).
 - g. Redraw the 'SC-740 Chamber Plan' (on sheet 7) such that the detail graphically shows the correct number of units specified elsewhere on the plans and calculations. Currently the detail indicates 56 total units, whereas the calculations (and other plan specifications) show that 48 units are required.
 - h. On plan sheet 7, combine the 'Soil Stabilizer for Peastone' detail and the 'Section for Peastone' into one detail. It is my understanding that the soil stabilizer is intended to be utilized in all areas where peastone is proposed. As such, a single detail will eliminate any confusion regarding how the peastone areas are to be built and whether or not there are areas where the 'Soil Stabilizer' may not be required.
 - i. The 'Rain Garden Detail' is insufficient as presented. Additional information should be provided relative to soil preparation and thickness, landscape plantings, and surface treatments to be implemented.
 - i. The rain garden outlet control structure along with the proposed grate should be detailed on the plans consistent with assumptions made in the calculations.
 - j. The 'Yard Drain' detail does not appear to be relevant to any of the plan information. The design engineer should clarify where this item is proposed or delete the detail from the plan set.
 - k. Provide a detail of the proposed 'permeable paver' to be used in the patio area.

10. In the course of conducting this review, the following housekeeping items were noted in the ‘Stormwater Report’ and should be addressed in a subsequent revision.
- a. On page 8, correct the description of ‘Design Points’ DP2A and DP2B. They should be properly described as being located to the southeast and southwest of the site, rather than the northeast and northwest.
 - b. On page 9, correct typographical errors contained in the description of the ‘Natural Recharge Areas 3P and 8P.
 - c. On page 10, correct the orientation of ‘Proposed Subcatchment P1’ as being west of the Phase 2 and 3 building addition, rather than east of it. Also, revise the narrative describing the collection of roof runoff to be discharged via pipe outlet in the Ipswich River embankment slope (this condition is not reflected on the site plans).
 - d. The ‘Checklist for Stormwater Report’ should be signed and sealed by the Engineer of Record.
 - e. The ‘Illicit Discharge Compliance Statement’ should be signed and dated.

MA DEP Stormwater Standards:

1. Standard 4 – Long Term Pollution Prevention Plan (LTPPP):
 - a. ‘Party Responsible for Maintenance’ should be revised to ‘Party Responsible for Compliance.’
 - b. ‘Spill Prevention and Control Plan’ should include suitable requirements for notification of local, State, and/or Federal officials in the event of a spill.
 - c. ‘Winter Road Salt and/or Sand use and storage restrictions’ stipulates that salt storage piles be located outside of the 100 year buffer zone and shall be covered. It is strongly suggested that permanent on-site salt storage piles be discouraged by the Planning Board unless a building enclosure is provided.
 - d. To avoid confusion with respect to stormwater inspection and maintenance, it is suggested that the section entitled ‘Requirements for Routine Inspections and Maintenance of Stormwater BMPs’ be significantly reduced, but that reference to the requirements of the ‘Operation and Maintenance Plan’ for the stormwater/drainage system be added.
2. Standard 8 – Construction Period Pollution Prevention Plan (CPPPP):
 - a. ‘Party Responsible for Maintenance’ should be revised to ‘Party Responsible for Compliance.’
 - b. Coordinate inspection timing between the narrative description contained in ‘Inspection Schedule and Procedures’ and that contained in the ‘Inspection Schedule and Evaluation Checklist.’ Conflicting information is indicated regarding what amount of precipitation triggers and inspection.
 - c. Include reference to project requirements contained in the Stormwater Pollution Prevention Plan (SWPPP).
3. Standard 8 – Provision for additional erosion control information:
 - a. The proposed Collaboration Center, patio and deck create a significant encroachment on the top of slope located westerly of the development area. As such, it is strongly suggested that a more elaborate erosion/sediment control program be provided for this area, specifically addressing erosion and slope protection during the course of earthwork, grading, and building construction. The single erosion control barrier is not anticipated to be adequate.
4. Standard 9 – Operation and Maintenance Plan (O&M): The O&M Plan is inadequate as presented. A more comprehensive presentation of the overall drainage and stormwater

management system inspection and maintenance requirements is warranted. At a minimum, the following specific items should be addressed.

- a. If utilized in the final design, catch basin inspection and maintenance requirements should be added to the O&M Plan.
- b. Inspection and maintenance of drain manholes should be added to the O&M Plan.
- c. The Rain Garden narrative should include inspection of the outlet control structure and grate.
- d. Inspection and maintenance of the permeable paver patio area (and the adjacent steep slope) should be added to the O&M Plan.
- e. Inspection and maintenance of the infiltration bed underneath the proposed deck (and the adjacent steep slope) should be added to the O&M Plan. The area should also be identified on the plans.
- f. Inspection and maintenance of the drainage swale and the steep slope below the swale should be added to the O&M Plan.
- g. Inspection and maintenance of the three infiltration areas located within the pasture should be added to the O&M Plan and routinely checked for vegetative cover, infiltration capacity, and stability/condition of the overflow berm. The areas should also be identified on the design plans and included as part of the as-built plan requirements.
- h. The Stormceptor Water Quality Device only specifies inspection requirements for the first year. Minimum inspection requirements for subsequent years should be added to the narrative. Also, manufacturer's literature should be included in the O&M Plan for easy reference.
- i. The design engineer should clarify the location of outlet protection. None were noted on the design plans.
- j. The Peastone Driveway narrative should be expanded to require inspection and maintenance of both the main driveway and the parking fields. Inspection and maintenance should specifically be required after winter operations are completed to rake out any stone which has migrated into the adjacent grass shoulder.
- k. The 'Inspection Schedule and Evaluation Checklist' should be revised to incorporate the additions and modifications noted above.

Additional Planning Board Considerations:

The Planning Board is reminded that stormwater impacts associated with the initial 500 linear feet of driveway widening (as proposed in Phase 1A) are proposed to be mitigated in conjunction with Phase 1B development. As of this writing (and to the best of my knowledge), the Phase 1B stormwater management plan is still under consideration by the Planning Board. As such, additional temporary mitigation should be provided if Phases 1A, 2 or 3 are to be constructed significantly in advance of Phase 1B.

Please feel free to contact me if you have any questions regarding the above comments and opinions.

Very truly yours,

R.E. Puff

Robert E. Puff, Jr., PE

cc: C Wear, PE (via email)