Robert E. Puff, Jr. P.E.
Consulting Civil Engineer
53 Cutts Island Lane
Kittery Point, ME 03905

June 15, 2022
VIA EMAIL

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

RE: 5-11 Washington Street
3rd Drainage and Stormwater Management Review (Task 3)

Mr. Ethan Parsons and Planning Board Members:

As requested, I have continued a drainage and stormwater management review of the above referenced project with respect to regulatory standards of the Planning Board and routine engineering design practice. In response to the May 18, 2022 (Task 2) review, I have received the following plans and documents as prepared by ASB Design Group LLC of Topsfield, MA (unless otherwise noted).

- Plan set entitled "Site Plan Review, 5-11 Washington Street…." consisting of six (6) sheets numbered C-1, and C-3 to C-7, all dated October 4, 2021 and revised to June 4, 2022.
- Copy of correspondence from ASB Design to the Ipswich Planning Board, dated June 2, 2022, regarding "Response to Comments…." consisting of eight (8) pages.
- Pre and Post Development Drainage Calculations and a routing diagram, both dated 6/5/22 and consisting of 57 pages.
- Pre and Post Construction Watershed Maps dated 6/4/22.

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

***Overview*:** In my opinion, the stormwater management design requires additional information relative to groundwater level (item 1), and the proximity of infiltration areas to property lines and building foundations remains to be resolved (item 2). Additional revision to the plans and calculations is requested to address items 3 to 6. Previously identified issues relating to the MA DEP Stormwater Management Standards remain unaddressed by the Applicant' response.

Stormwater Management & Drainage

1. Previous comment regarding the proximity of groundwater elevation to the bottom of the stormwater infiltration areas (refer to the 'Initial Review - Stormwater' item 4) has been partially resolved with the presentation of observation well information on plan sheet C-6, however, all of the groundwater observations are based on well locations in the center/southeastern part of the site. It is requested that groundwater observations from location GZ-3 be submitted, noting that this location is closest to infiltration areas BMP 4 and BMP 5 (on the northwesterly portion of the site) and that the submitted boring log for GZ-3 indicates groundwater at 1.1 feet below ground (i.e., groundwater would be higher than the proposed

bottom of BMPs 4 and 5). It is suggested that groundwater elevation adjacent to BMPs 4 and 5 be established based on observation well GZ-3.

2. It was noted in the 'Initial Review' (dated March 25, 2022) that infiltration systems and rain gardens were located too close to building foundations and property lines (reference the 'Initial Review -Stormwater' item 8), and that portions of BMPs 4 and 5 are within 1 to 2 feet of the adjacent building foundations. In the second review, it was noted that the engineer's response was not persuasive, and that additional discussion was warranted. The proposed revision does not address or resolve this concern, nor does it comply with MA DEP Stormwater Handbook recommendations. It is again requested that the design engineer consider the following:
    a. Provide measures that will limit the lateral movement of infiltrated runoff onto adjacent property or into the foundation drain system of adjacent buildings.
    b. Engage a geotechnical engineer to determine what measures should be taken to protect against the stated concerns.
    c. Modify the design to improve setbacks from buildings and property lines.
3. Several items are noted relative to technical aspects of the stormwater calculations and design intent which require further clarification and/or revision to the plans and calculations.
    a. The calculations assert that no runoff will be generated from the proposed site onto land of Tzizik. Additional contours, spot grades, and/or flow arrows should be provided on plan C-3 (along the property boundary of Tzizik) to specify this intent.
    b. The outlet structure used in the calculations for BMP 2 should be revised for consistency with the plans (or vice versa). The outlet is modelled as a pipe, however, the plan indicates that a grate will control the basin outflow.
    c. As noted in the 'Initial Review - Stormwater' items 5.a.i and 5.b, outlet characteristics (for BMPs 1 and 5) are based on 'free discharge.' In my opinion, this assumption does not account for tailwater impacts from the downstream piping and existing drainage works. Analysis should be based on dynamic tailwater, or the design engineer should demonstrate how a 'free discharge' analysis is appropriate at BMPs 1 and 5.
    d. The hydraulic model of 6 inch pipes at CBs 2 and 3 state that "a factor of 3.00 has been applied to the storage and discharge capacity." The design engineer should explain this part of the model as the plans indicate no reason for such an increase. It is also noted that the output generates a flow width greater than the pipe diameter, which would imply a modelling error.
    e. The transition from 12 inch pipe to 6 inch pipe entering BMP 1 creates a hydraulic restriction that is not accounted for in the calculations. It is suggested that the 12 inch pipe be connected directly to the NDS CB 1, or that calculations be revised to model the pipe reduction.
    f. At the modular retaining wall within BMP 1, identify measures that will be taken to prevent the lateral migration of runoff through the wall and onto the MBTA property.
4. Several coordination issues were identified between the plans and stormwater calculations. A comprehensive quality control check is suggested prior to submission of revised plans and calculations. Items include, but are not necessarily limited to the following.
    a. On the plans, identify spillway locations, dimensions, and crest elevations for BMPs 1, 2, 3, 4, and 6, consistent with the calculations.
        i. It should be noted that the spillway from BMP 1 is calculated to flow towards Washington Street, which does not appear to be feasible based on the proposed site grading. If the spillway is allowed to overflow onto MBTA property, it is anticipated that post development runoff onto MBTA property may be increased for high return storms.

ii. It is also noted that the spillway from BMP 3 is calculated to flow towards EBSCP property, however, it is not clear how this will occur, based on the proposed site grading.

b. On plan C-6, coordinate top/bottom of stone elevation for BMPs 1, 2, 3, 4, and 6 with the elevations used in the calculations.
c. Perimeter grading of BMPs 2, 4, and 6 should be supplemented on the plans to specify grading that will contain the calculated 100 year peak storm elevation.
d. Clarify the location of contours 28, 29, and 30 within BMP 1, and specify the top and bottom of the proposed retaining wall.
e. Provide contour 30 within BMP 3 to reflect the assumed area used in the calculations.
f. On plan C-3, call out permeable patio, walkway, and driveway apron areas to reflect the design intent and areas used in the calculations.
g. Coordinate the pipe sizes and invert elevations contained on the plans (Drainage Data table on Plan C-3) with the information used in the calculations. Several discrepancies were found.
h. Revise pre and post development watershed maps to identify all catchment areas and properly designate all design points, consistent with the calculations.
i. Add a note to plan C-3, specifying that 'all roof runoff shall be conveyed to the infiltration systems in accordance with the stormwater management calculations.'

5. BMP 2 is proposed to overflow into an existing catch basin located within the right of way near the southern corner of the property. Furthermore, the design engineer's 'response to comments' proposes that the future condominium association will be responsible for operation and maintenance of this structure. If this arrangement is acceptable to the Town, it is strongly suggested that the following notes be added to the plans and documents:
    a. During construction, the structure shall be inspected and repaired as needed to provide a sound structure containing a grease/oil trap and an appropriate sump depth.
    b. During construction, the pipe shall be inspected and cleaned (if needed), and the pipe outfall shall be located and repaired (if needed).
    c. Inspections and repairs shall be coordinated with the DPW Director.
    d. The 'Operation and Maintenance' plan for the stormwater system should include inspection and maintenance of this structure.
    e. The condominium documents should reflect the terms of the agreement with the Town.
6. Exception is again taken to the proposed use of 30 inch diameter drain manholes within the main drainage system. The proposed diameter does not enable reasonable access within the manhole for maintenance. Standardly, 48 inch diameter manholes are used for road and parking lot drainage systems. The 48 inch diameter structures are suggested for use here.

DEP Stormwater Management Standards: Comments 2, 3, 4, 5b, 6, and 7 as contained in the initial (Task 1) review dated March 25, 2022 and as also noted in the second (Task 2) review dated May 18, 2022, continue to remain unaddressed by the design engineer's responses.

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

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Robert E. Puff, Jr., PE

cc: Thad Berry, PE (via email at thadberry2@verizon.net)