CMA ENGINEERS, INC.
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May 16, 2018

Juliet T. H. Walker, AICP, Planning Director
Portsmouth Planning Department
City Hall, 1 Junkins Ave.
Portsmouth, NH 03801

Re: Review of Islington Commons Stormwater and Drainage
Developer: Islington Commons, LLC, Portsmouth, NH
CMA #1111

Dear Ms. Walker:

At the City's request, CMA Engineers has reviewed materials supporting the drainage analysis and design for the proposed development at 410, 420 & 430 Islington Street, known as the "Islington Commons" in Portsmouth.

For this evaluation, we reviewed the following information:

1. **Plans:** *Islington Commons, 410, 420, and 430 Islington Street, Permit Plans*, dated May 8, 2018, as prepared by Ambit Engineering, Inc.

2. **Stormwater Report & Analysis**: *Drainage Analysis, Site Development 410, 420, and 430 Islington Street, Portsmouth,* dated May 7, 2018, as prepared by Ambit Engineering, Inc.

We have reviewed the drainage plans and analysis for conformance with the City of Portsmouth's Site Plan Review Regulations and Ordinances.

REVIEW OF DRAINAGE ANALYSIS

The applicant proposes to redevelop 410, 420 & 430 Islington Street, to include: consolidation of the three lots into one; partial demolition and renovation of the existing structures; and the addition of three duplexes and one single-family house. These proposed new buildings and associated driveways and parking areas nearly double the percent of impervious area on the site (32.4% existing to 64.5% post development).

To mitigate the increased stormwater runoff from this additional impervious cover, the project includes porous paver driveways/parking areas and porous asphalt access drive/cul-de-sac with "infiltration beds," and a "Filtration Basin" designed for the center of the driveway cul-de-sac. As designed, very little runoff will get to the filtration basin. The porous pavement is designed with an impermeable liner and underdrain system at the bottom of the infiltration bed because of the shallow depth of groundwater on the site.

This impermeable liner prevents stormwater from infiltrating into the ground, so the volume of runoff leaving the site increases in the post-development condition (~35%).

The analysis reports that the peak flows discharging from the site are reduced in the post-development condition because of the time it takes the stormwater runoff to flow through the porous pavement infiltration bed, into the underdrains, and discharge through pipes to the City's stormwater system. This design parameter is based on a study conducted at the UNH Stormwater Center and prorated for the proposed infiltration bed section. CMA Engineers has not confirmed its applicability to the proposed porous pavement system with an impervious liner.

Based on our review, we offer the following comments, for consideration:

Site Plan Review Regulations

For items for which we had comments, we have included the applicable sections of the Site Plan Review Regulations in italics with our comments below.

1. **Section 7.4.1.1**: *Adequate provisions shall be made for the collection, treatment and/or disposal of all stormwater that runs off the site.*

   Areas of the proposed development (subcatchment PS1c and PS1d) appear to discharge stormwater onto adjacent lots with no collection or treatment. This discharge does not match historic drainage patterns; adjacent lots (145/25, 26 & 41) to the south and west of the development may experience an increase in stormwater runoff from this development. The applicant should describe how the increased runoff from these subcatchment will be managed to not impact adjacent properties.

2. **Section 7.4.2.4**: *Snow storage areas shall be located such that no direct discharges to receiving waters are possible from the storage site. Runoff from snow storage areas shall enter treatment areas to remove suspended solids and other contaminants before being discharged to receiving waters or preferably be allowed to infiltrate into the groundwater.*

   For the snow storage areas identified on the Site Plan, there does not appear to be treatment areas for snow storage runoff.

City Ordinances, Chapter 16, Article II, Regulation of Discharges into Storm Water Drainage System

Under this ordinance, Section 16.207.A, the applicant is required to obtain a permit from the City to connect to the Stormwater drainage system.

General Comments

1. The surface slope of porous pavement should be 5% or less to capture stormwater runoff. A section of the driveway appears to exceed this slope.

2. The infiltration bed bottom should be nearly level (less than 1% slope). If too steep, runoff will flow along the surface of the lower permeability courses (bank run gravel) and "break out" in areas where the infiltration bed flattens out. For sloped infiltration beds, the subgrade should be terraced, or soil or fabric barriers should be constructed for every 6-12" of grade changes to act as internal check dams (UNHSC Design Spec 2/14).

3. The applicant should confirm the normal 2-foot separation requirements between the bottom of the infiltration bed and seasonal high groundwater can be waived with the use of the impervious liner.

4. To provide frost protection, the total porous pavement system thickness should exceed 32" (UNHSC Design Spec 2/14). The total thickness of the porous paver (driveway/parking areas) section is only 18".

5. To function properly and prolong its lifespan, this porous pavement system must be maintained (vacuum sweeper) to prevent the pavement surface and underlying infiltration bed from being clogged with fine sediments. *If the system fails, peak flow rates to offsite areas will significantly increase*. A full system O&M plan should be developed that addresses this and other stormwater system issues. The maintenance requirements of the porous pavement system should be included in the site plan approval.

6. The applicant should consider reconfiguring DMH#4 to be a catch basin with drainage grate as a backup drainage outlet to the porous pavement system.

7. To maintain a self-cleaning, storm drains should be designed to maintain full-flow pipe velocities of 3.0 feet per second or greater to prevent the deposition of sediments and loss of capacity. The 8" diameter HDPE drain pipes connecting DMH 1, DMH 2 and DMH 3 are designed at 0.005 ft/ft. The minimum slope should be equal or greater than 0.0075 ft/ft to provide self-cleaning velocities in an 8" HDPE pipe.

Should you have any questions, please do not hesitate to contact us.

Very truly yours,

CMA ENGINEERS, INC.

Philip A. Corbett

Philip A. Corbett, P.E.
Project Manager

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