



City of Cambridge
Department of Public Works

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TO: Planning Board

FROM: Katherine F. Watkins
City Engineer

RE: 195 & 211 Concord Turnpike:

We are in receipt of the Special Permit Application materials, dated January 19, 2017, for the redevelopment of the site at 195 & 211 Concord Turnpike and the Supplemental Information, dated 03/21/17. We have reviewed the materials and have presented below some comments related to the interests of the Department of Public Works.

The February 15, 2017 DPW letter highlighted the commitments required of the developer to meet the **20.70 Flood Plain Overlay District** requirements (Flood Storage Requirements); **Stormwater Management** (reduction in peak rate of runoff, 65% removal of phosphorous, increased permeable area, wet pond and rain garden, and deep sump catch basins); **Public Infrastructure** (removal of 66,420 gallons of inflow or infiltration into the sewer system to offset the new sanitary sewer flows); and **Climate Change / Resiliency** commitments.

Summarized below are additional comments based on the Supplemental Information and additional analysis of climate change / resiliency.

Climate Change / Resiliency:

Temperature:

In the future heat waves are projected to be more likely and frequent as a result of climate change. The number of days over 90 degrees will nearly triple by 2030 from the current annual average of 11 days.

Flooding:

In the future, the Alewife Area will be subject to two different types of flooding

- precipitation (rain event).
 - The frequency and of flooding associated with rain events will increase as a result of climate change.
- sea level rise / storm surge flooding (combination of rising sea level over time and high-severity storms will lead to overtopping of the current Amelia Earhart Dam during larger storm events).

- The current Amelia Earhart dam will be bypassed around 2045 during storm events.
- SLR / SS is a new type of flooding that the City has not experienced. SLR / SS is a regional problem.
- There are regional systems such as public transit and energy, which would be disrupted in neighboring communities and could significantly affect Cambridge.

The duration of flooding varies by the specific event. Some flooding events are associated with short duration intense storm events; while others are associated with longer duration events.

The City typically designs our infrastructure to provide flood protection up to the 10% storm event (10% chance of occurring in any given year / on average occurring once every 10 years). Portions of the Alewife area are located in the FEMA floodplain and are covered by FEMA regulations requiring that new structures be designed to be protected from the 1% storm event (1% chance of occurring in any given year / on average occurring once every 100 years). FEMA 1% Flood Elevation is 18.44 CCB / 6.8 NAVD88.

The Applicant has been asked to address flood level impacts and building resiliency associated with increased flood elevations presented in the November 2015 *Climate Change Vulnerability Assessment Part 1* and February 2017 *Climate Change Vulnerability Assessment Part 2*. The building has been designed above the 2030 1% flood elevation and designed to minimize damage and recover from the 2070 1% flood event. The Applicant has worked proactively with DPW to use the best available information in the design of the buildings and has committed to additional resiliency measures.

Anticipated Flood Elevations:

Flood Elevations associated with the 2030 (19.1 CCB / 7.46 NAVD88) and 2070 (22.8 CCB / 11.16 NAVD88) 1% storm events have been provided to the Applicant. The Applicant has provided visuals of the flooding elevations in Fig. 1.1 in the Supplemental Information. No areas of the building would be anticipated to flood in the 2030 1% storm event, as the ground elevation of the building will be located above the 2030 1% flood elevation. The first floor lobby and parking area would experience 2.6' of flooding in the 2070 1% flood event. Residents would need to evacuate or shelter in place.

Emergency Management / Response:

With increasing flooding projected in the area over time due to climate change, questions have been raised about emergency management and how floods affect residents and the operation of the building. DPW and CDD staff have met with the Fire Department and the Developer to identify elements that can be incorporated into the building operation and design to facilitate future emergency response and improve conditions for sheltering in place.

Effective emergency management begins long before an emergency. The Fire Department plans their response and participates in significant regional training and planning efforts to be able to

respond to both frequent events as well as more extreme / less frequent events. The Fire Department is continually modifying their operations and equipment to respond to changing conditions. The expectation is that the standard equipment used for emergency response will be modified in the future and may include high water vehicles, amphibious vehicles or additional boats. Residents and property owners must also prepare themselves for evacuation and sheltering in place. Sheltering in place for flood events is a new scenario for the City and brings new challenges. For example, residents should have a disaster supply kit including water, food and medicine. <https://www.ready.gov/shelter>

Building Design:

- The ***first floor elevation is approximately 1' above the anticipated 2030 100-year flood elevation.***
- ***All residential units are located on the second floor and higher;*** significantly above the 2070 1% flood elevation.
- All areas of the building located below the 2070 1% flood elevation are designed to recover from the 2070 1% flood event. The building materials will maximize use of non-porous materials and will be mold and mildew resistant. These areas are limited and include the lobby, bike storage room and a small bowling alley.
- All interior building mechanical rooms will be water proofed to resist damage due to potential inundation during more significant flooding events.
- The Applicant will work with Eversource to evaluate the options for elevating or waterproofing the exterior site electrical infrastructure.
- All residential units will have operational windows.

Site Action Plan: *The Applicant will develop a site Action Plan to allow for future building adaptation to flooding risks associated with climate change with an emphasis on providing safety and comfort to residents.* The plan will be reviewed and approved by DPW and Fire Department staff through the building permit process.

The Action Plan will:

- be reviewed by the site owner and property management team every 5 years through 2070 to confirm the effectiveness of existing adaptation measures and the need for additional measures. The reviews will be reviewed with DPW and the Fire Department.
- develop a notification regarding flooding risks that will be included in the leases to ensure residents are informed of the flood risk. This plan would be operational immediately upon occupancy of the building.
- develop a resident notification / evacuation plan. This plan would be operational immediately upon occupancy of the building.
- develop information, guidance and resources to assist residents sheltering in place; such as a disaster supply kit. This plan would be operational immediately upon occupancy of the building.

- identify emergency evacuation meeting points on an elevated courtyard in each building and develop evacuation routes for residents and access points for the Fire Department. This plan would be operational immediately upon occupancy of the building.
- detail an operations plan for sand bags / inflatable barriers on site to reduce flooding risks. This plan would be operational immediately upon occupancy of the building.
- develop the operation of the fire detection and suppression systems; to ensure that they remain operable during flood events or loss of power. This plan would be operational immediately upon occupancy of the building.
- address elevator operation and heated community space in each building in the event of loss of power. This plan would be operational immediately upon occupancy of the building.
- identify appropriate public spaces in each building to locate key emergency medical supplies and other emergency response supplies. This plan would be operational immediately upon occupancy of the building.
- develop a notification protocol to be utilized in the event of a flooding or other natural disaster. This plan would be operational immediately upon occupancy of the building.
- detail future adaptation measures that can be implemented at the site to reduce flooding risks.
- detail the design of the entrances to the parking garages to facilitate future flood control gate installation to protect the garage from flooding in the future.

A thorough review of the development during design and construction will be required by the DPW to ensure that the above items are implemented as described.

Please feel free to contact me with any questions or concerns related to the comments provided above.

Sincerely,



Katherine F. Watkins, P.E.
City Engineer