Stantec

Memo

To:	Ms. Yali Wang, Managing Director Head of U.S. Real Estate Development Manulife Investment Management	From:	George Ryan, P.E. Associate, Civil Engineer
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File:	210801684	Date:	December 15, 2022

Reference: Wellesley Park – Infrastructure Assessment for Zoning Amendment

Stantec Consulting Services (Stantec) has completed a preliminary assessment of the water and sewer demand impacts associated with a proposed amendment to the Wellesely Park Smart Growth Overlay District, an overlay zoning district approved pursuant to M.G.L. c. 40R and accompanying regulations at 760 CMR 59.00.

Pursuant to the zoning amendment, the refined development program will entail replacing the 175 hotel rooms with 250 multifamily residential units, resulting in the overall program density allowed by zoning to consist of the following:

Multifamily Dwellings – no more than 850 Dwelling Units

Small-Scale Retail – not to exceed 19,500 Gross Square Feet

Office and Office-High Tech – not to exceed a total of 700,000 Gross Square Feet

Table 1 below summarizes the sanitary generation of the 175-room hotel and 250-unit multifamily residential components based on Title V, 310 CMR 15.00, generation rates. The Hotel sanitary generation is reported as a negative number to represent the substitution proposed as part of the zoning amendment.

Table 1 – Sanitary Sewage Generation Comparison

Use	Gross Square Footage (GSF) / Number of Units	Bedrooms / Persons	Sewer Generation Rate (Per Title 5)	Peak Sewage Generation (GPD)	Average Sewage Generation (GPD)
Residential	250	375	110 GPD PER BR	41,250	20,625
Hotel	175	175	110 GPD PER ROOM	-19,250	-9,625
*Note: Assumes 1.5 bedrooms per residential unit					
Total				+22,000	**+11,000**

As Table 1 shows, the 250-unit multifamily residential development comprised of 375 total bedrooms is expected to generate an average sewer generation of 20,625 gallons per day (GPD), an increase of 11,000 gallons per day (GPD) compared to the previous expected use of a 175-room hotel.

Existing Sanitary Infrastructure

Pursuant to the Development Agreement entered into with the Town of Wellesley, for the first phase of residential development at Wellesley Park required significant water and sewer infrastructure improvements that have now been completed. Wellesley Park is now serviced by a six (6) inch diameter force main that conveys wastewater from a duplex 400 gpm pump station located on the southwest portion of the site. After leaving the site, the force main crosses Interstate 128 before connecting to a municipal gravity system on the west side of Route 128 located within an easement on the #93 Worcester Ave property. Wastewater continues through the municipal gravity system before entering the Boulevard Road pump station, which is operated and maintained by the City of Newton and utilized by the Town of Wellesley permitted by annual agreement.

Performance of Pump Station

In order to determine if the existing 400 GPM pump station will perform to specification at the maximum density contemplated by the zoning amendment, the total expected sanitary generation is required and the pump station peaking factor with the revied flows will be calculated. The sewer generation is summarized in table 2 below:

Table 2 – Projected Sanitary Sewage Generation – Maximum Allowed by Zoning Amendment

Use	Gross Square Footage (GSF) / Number of Units	Bedrooms	Sewer Generation Rate (Per Title 5)	Peak Sewage Generation (GPD)	Average Sewage Generation (GPD)
Residential	850	1275	110 GPD PER BR	140,250	70,125
Retail	19,500	-	50 GPD PER 1,000 SF	975	488
Office / Office-High Tech	700,000	-	75 GPD PER 1,000 SF	52,500	26,250
*Note: Assumes average of 1.5 bedrooms per unit					
Total				193,726	**96,863**

Using the Average Sewage Generation of **96,863 GPD**, the peaking factor of the pump station running at a full capacity of 400gpm is calculated and summarized in table 3 below.

Table 3 –400 GPM Pump Station Analysis – Maximum Allowed by Zoning Amendment

Pump Configuration	Max Pump Rate (GPM)	Inflow (GPD)	Inflow (GPM)	Peaking Factor	Peak Inflow (GPM)	Pump Run time (Hrs)
Duplex	400	96,863	67.2	5	336	4.0

The results of the analysis indicate that under full-flow conditions, the existing pump station will operate as designed with a peaking factor of 5, which is within the typical design range of 4-5.

Existing Water Infrastructure

Wellesley Park is currently supplied from the Wellesley water distribution system through two (2) 12-inch water mains under Interstate 95 and a 6-inch water main on Route 9 and William Street. In 2019, prior to the installation of the second 12" water main, Stantec and Town of Wellesley personnel

conducted a flow test to determine available flow at the Wellesley Park. Table 4 below shows the results of the hydrant flow test and available fire flow while maintaining 20 psi residual at the location.

Table 4 – Hydrant Flow Test Results #80 William Street

Location	Static Pressure (psi)	Residual Pressure (psi)	Discharge Pressure (psi)	Calculated Discharge (gpm)	Calculated Discharge at 20psi (gpm)
Wellesley Park	116	100	80	1,501	3,950

Adequacy of water supply for mixed use developments is governed by Massachusetts Department of Environmental Protection (MassDEP) regulations (310 CMR). Under these regulations, any public water system must provide 35 pounds per square inch (psi) to all homes and businesses under normal conditions of flow. Furthermore, 310 CMR 22.19 requires that public water system shall provide 20-psi pressure during fire flow events. Flow test results summarized above indicate that the water pressure will be able to meet the fire flow requirements on the property.

Conclusion

Based on the preliminary analysis conducted, it is likely that while the proposed zoning amendment to replace 175 hotel rooms with 250 units of multifamily residential will increase sewer and water demand by approximately 11,000 gallons per day, the existing water and sewer infrastructure at Wellesley Park will be able to support the proposed zoning amendment.

It is recommended that through the course of site plan review, each phase of development is reviewed for conformance with the assumptions made regarding program area (i.e., gross square footage), quantity of bedrooms and building height for fire suppression requirements.

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