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To:	Aaron Miklosko Town of Maynard, MA	From:	Yogesh Jitoo, P.E. Burlington, MA
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**Reference: Maynard Square and Maynard Point Proposed Buildings – Water System Evaluation**

As requested, Stantec has completed the agreed scope of services for the water system evaluation of the proposed buildings:

1. Maynard Square building located at 115 Main Street, and
2. Maynard Point building located at 42 Summer Street.

The proposed buildings' water services will be obtained from the 12-inch cast iron water main in Main Street (Maynard Square) and 10-inch cast iron water main in Summer Street (Maynard Point). The purpose of this evaluation was to determine if the proposed buildings would receive adequate water service (pressure and flows), and if they would have an adverse impact on the Town's water distribution system. The Town's computer based hydraulic model was used to evaluate the capabilities of the water distribution system in the area of the proposed development.

#### REGULATIONS & EVALUATION CRITERIA

Massachusetts Department of Environmental Protection (DEP) regulations were used as the basis for this developer review. DEP Guidelines and Policies for Public Water Systems and Massachusetts General law (310 CMR 22.04) require that any public water system must provide 35 pounds per square inch (psi) pressure to all homes and businesses, under all normal conditions of flow. Normal conditions include peak hour demands, usually the most severe demand condition that occurs during the hottest summer days.

DEP Guidelines and Policies for Public Water Systems and Massachusetts General Law (310 CMR 22.19) require that any public water system shall provide 20-psi pressure under fire flow situations. System adequacy to meet this condition was evaluated under a fire flow situation occurring during a maximum day domestic demand condition.

#### SERVICE AREA & MODEL DEVELOPMENT

InfoWater Suite version 12.4 (update 4) hydraulic modeling software was used to model the impact of the proposed buildings on the water distribution system. Stantec currently maintains a hydraulic model of the Town's water distribution system in this software package, making it possible to add the proposed buildings and model the effects on the water system.

The plans showing the site layout for the proposed buildings were provided by the Town. Using these plans, the proposed buildings were located in the existing hydraulic model. The available fire flow to the proposed buildings were modeled at the high point in the development. This is representative of the worst-case scenario.

The additional water demands for the Maynard Square development were determined utilizing Title 5 wastewater design estimates of 110 gallons per day (gpd) per bedroom, multiplied by 44 bedrooms (14 1-bedroom units and 15 2-bedroom units). Retail space demand was estimated at 50 gpd per 1000 square feet (retail space is 2000 sf). The Title 5 domestic wastewater flow estimates are used as the baseline for

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estimating the maximum day water demands. A 15 percent un-accounted-for water increase and a 15 percent consumptive increase was added to the calculated Title 5 flows to estimate the residential maximum day demand for the proposed developments. A 15 percent un-accounted-for water increase was added to the calculated Title 5 commercial flows to estimate the commercial maximum day demand. Peak hour demand was obtained by multiplying the maximum day demand by 1.5. The Title 5 demand was divided by a peaking factor of 2 (Title 5 flows are considered to be 200% of average day flows) and then adding 15 percent un-accounted-for water increase and 15 percent consumptive increase to obtain average day demand.

Similarly, the additional water demands for the Maynard Point development were determined utilizing Title 5 wastewater design estimates of 110 gpd per bedroom, multiplied by 30 bedrooms (10 1-bedroom units and 10 2-bedroom units).

Table 1 shows the estimated water demands for the proposed buildings.

**TABLE 1**  
**Estimated Water Demands**

<b>Demand Condition</b>	<b>Maynard Square</b>	<b>Maynard Point</b>
Average Day (gpm)	2.2	1.5
Maximum Day (gpm)	4.3	3.0
Peak Hour (gpm)	6.5	4.5

It should be noted that the demands shown in Table 1 are only to be used for planning purposes. The demand does not represent the true peak demand, which should be based on actual fixture count and will be used for sizing the water service and meter to the building.

## **MODELING RESULTS**

The model was run under two worst-case demand conditions:

- Peak hour demand: The Town’s water system is required to maintain a minimum working pressure of 35 psi under this demand condition.
- Fire flow demand: The available fire flow at the hydrants near the building during maximum day demand must be greater than the anticipated required Insurance Services Office (ISO) fire flow of 20 psi.

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## **CONCLUSIONS**

### Peak Hour

The hydraulic model indicates that the Town's water distribution system (with both of the proposed buildings) maintains pressures above 35 psi during all peak demand periods. During peak hour demands the minimum pressure at the proposed Maynard Square building is expected to be approximately 95 to 100 psi. The minimum pressure at the proposed Maynard Point building is expected to be approximately 80 to 85 psi.

### Fire Flow

The ISO determines required fire flows based on factors including building size, type of use, material of construction, building densities, and presence of sprinklers. Using ISO guidelines, the estimated required fire flow demand for the Maynard Square and Maynard Point is approximately 1,750 gpm and 1,250 gpm, respectively, for two hours at a residual pressure of 20 psi.

The model demonstrates the available fire flow at the proposed Maynard Square building (115 Main Street) during maximum day demands is greater than required 1,750 gpm at 20 psi with the existing water main layout. The model demonstrates the available fire flow at the proposed Maynard Point building (42 Summer Street) during maximum day demands is greater than required 1,250 gpm at 20 psi with the existing water main layout.

### **Stantec Consulting Services**



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