
To: Justin DeMarco
Department of Public Works
Maynard, MA

From: Katie Chamberlain
Stantec Consulting Services Inc.
Burlington, MA

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Date: May 23, 2023

Reference: Maynard Water Capacity Memo – Update

The intent of this memo is to provide additional information related to the Town's drinking water supply capacity, water demands, and how development may impact the drinking water system. This memo was updated in May 2023 to account for changes in the Town's demands, development plans, and water supplies since December 2020, when this memo was originally issued.

DEVELOPMENT IN THE NEAR FUTURE

The Town of Maynard is experiencing an increase in housing developments and continued development is anticipated over the next decade. The major housing developments that are either currently under construction or in planning phases are summarized in the "White Pond Treatment and Transmission Study Report" (Section 3.2). Since the re-issuance of the White Pond Report in December 2021, additional developments have been further defined that may have significant impacts on the Town's future water demands. The following is a list of recent development projects that have been taken into consideration when defining future water demands for the Town:

- Maynard Crossing
- Maynard Point
- Maynard Square
- Beijing Royal School (BRS)
- Mill & Main Place
- Cutting Development

MAYNARD POINT

Maynard Point, located at 42 Summer Street, is a residential development that includes 20 residential units and is fully occupied at this time.

MAYNARD CROSSING

Maynard Crossing, located at 129 Parker Street, is a large mixed-use development. The nearly 300,000 square foot development includes 323 residential units. This project is constructed and almost nearly occupied. For the purposes of this analysis, it was assumed that 100% of the residences are occupied and 80% of the commercial space is occupied.

MAYNARD SQUARE

Maynard Square, located at 115 Main Street, is a mixed-use development with 2000 square feet of retail space and 29 residential units. This development is not yet constructed but is moving forward.

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BEIJING ROYAL SCHOOL

In May 2019, BRS purchased 111 Powder Mill Road, the former Stratus Technologies campus, with plans to create a campus for its students in kindergarten through grade 12 on the site. The BRS vision also includes hosting of joint educational conferences, hosting a day care center, and leasing space at the school for research and development. BRS originally planned that the Maynard, MA branch of the school would open its doors in the Fall of 2020, but the COVID-19 pandemic halted those plans. The school at full build out intends to host approximately 800 students. Dormitories will be provided for a large portion of the student body and school personnel.

Per 310 CMR 15.00: Septic Systems "Title 5", the average sewer flow is 65 gallons per day (GPD) per person for boarding schools. Water usage can be calculated from estimated sewer flows based off the assumption that 90% of water used ultimately ends up as sewage. For conservative water demand estimates, a boarding school population of 1,000 has been assumed. The estimated sewer production will be 65,000 GPD for 1000 people, and the corresponding average water demand will be 72,222 GPD or 0.072 million gallons per day (MGD).

MILL & MAIN PLACE

The Mill & Main Place development is a project being undertaken by Lincoln Property Company at the mill complex. The Mill is currently partially occupied as a mixed-use property, but it is zoned to allow for up to 500 residential units, which is a significantly different use than current with regards to water use impacts. In order to understand the impacts this sort of development may have on the Town's ability to provide drinking water, an estimate of potential maximum future water use demands was performed. Water demands for future Mill development were estimated assuming:

- 310 CMR 15.00: Septic Systems "Title 5" sewer flows associated with 2 and 3-bedroom residential units.
- 90% of water used ultimately ends up as sewage.
- 50% of the 500 residential units would be 2-bedroom apartments.
- 50% of the 500 units would be 3-bedroom apartments.

Based on these assumptions, the estimated average water usage at the Mill, with 500 residential units, will be 0.15 MGD.

CUTTING DEVELOPMENT

The Cutting Development is the most recently identified potential future development in Town. The proposed location for Cutting Development is Parker Road. It is assumed for the purposes of the Water Capacity analysis that this development would include 500 residential units. Water demands for this future development were estimated assuming:

- 310 CMR 15.00: Septic Systems "Title 5" sewer flows associated with 2 and 3-bedroom residential units.
- 90% of water used ultimately ends up as sewage.
- 50% of the 500 residential units would be 2-bedroom apartments.
- 50% of the 500 units would be 3-bedroom apartments.

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Based on these assumptions, the estimated average water usage at the Cutting Development, with 500 residential units, will be 0.15 MGD.

TOWN-WIDE WATER DEMANDS – CURRENT & FUTURE

Detailed documentation of the Town's historical, current, and estimated future annual water consumption is provided in the "White Pond Treatment and Transmission Study Report" (Section 3.0). ***In 2022, the average day demand was 0.748 MGD and the maximum day demand was 1.13 MGD.***

The water demand from the identified future planned developments are added to the future residential water demand estimated in the "White Pond Treatment and Transmission Study Report", resulting in new ***future water demand estimates: an average day water demand of 1.19 MGD and a maximum day demand of 1.97 MGD.*** This includes a 2% contingency for unknown future developments in Town and assumes that unaccounted for water decreases to 10% by 2045.

CURRENT WATER SUPPLY CAPACITY

Detailed documentation of the Town's water sources, and capacity of each source, is provided in the "White Pond Treatment and Transmission Study Report" (Section 2.0). Figure 1 shows the current capacity of each of the sources based on recent historical operational data (2017-2022). This figure also shows the average and maximum day water demands for the current and future scenario with all of the identified future development demands included.

There are four key takeaways from Figure 1:

1. The Town can meet average day demands currently, unless the largest WTP (Rockland Ave) is offline.
2. Under the estimated future demands scenario, the Town is not able to meet average day demands, even with all of their current wells and treatment facilities operational.
3. The Town is unable to meet current maximum demands with current water supplies. The Town will need to rely on the water storage tanks and increase pumping capacity of one or more wells in order to meet maximum demands under the current operational scenario. Although this is a feasible short-term solution, it is not advisable to take this approach in the long term due to the stress that this sort of operations can put on the Town's existing wells and WTPs.
4. The Town is unable to meet future maximum day demands with current water supplies. Additional sources need to be explored to meet future demands if development is to continue in Town.

Reference: [Maynard Water Capacity Memo – Update](#)

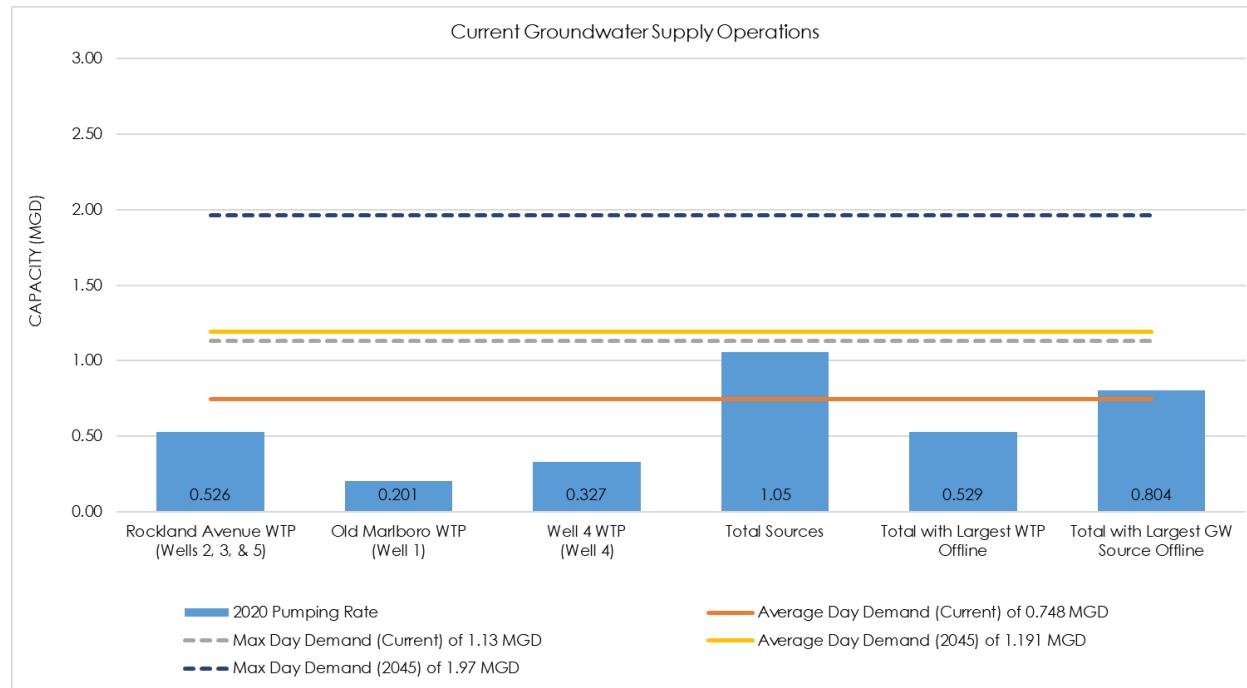


Figure 1 – Current Drinking Water Supply Capacity

OPTIONS TO MEET FUTURE WATER DEMANDS

Detailed documentation of the Town's options to increase water system capacity by exploring new sources and improving existing sources is provided in the "White Pond Treatment and Transmission Study Report" (Section 4.0). Figure 2 shows the estimated future capacity of each of the Town's existing WTPs, based on making the following improvements to the existing well fields and water treatment plants:

- **Well 4A WTP:**
 - New well sources at the Well 4A field are permitted and brought online (0.35 MGD). The permitting process is complete for these wells.
 - Implement filter backwash waste recycling, which will allow for an additional 10% capacity at the WTP.
 - Project to develop new wells and implement backwash waste recycling is currently under construction, it is anticipated that the new wells and backwash waste recycling will be online by December 2023.
- **Rockland Avenue WTP:**
 - New well source (Well #1) at Rockland Ave well field (0.22 MGD); this option has only been conceptually considered at this time. If this project is pursued immediately, it is anticipated that permitting, design and construction could be finished by Summer 2025.
 - Implement filter backwash waste recycling, which will allow for an additional 10% capacity at the WTP. If this project is pursued immediately, it is anticipated that permitting, design and construction could be finished by Summer 2024.

Reference: **Maynard Water Capacity Memo – Update**

- **Old Marlboro Road WTP:**
 - Bring Old Marlboro Road Well #3 back online and implement major treatment improvements at Old Marlboro Road WTP to adequately treat the Well #3 water (i.e., organics pretreatment), allowing an additional 0.5 MGD of capacity. If this project is pursued immediately, it is anticipated that permitting, design and construction could be finished by Summer 2026.

Figure 2 also shows the average and maximum day water demands for the current and future scenario with the identified future development demands included. The Town can significantly increase their ability to meet future water demands by implementing these well field source and WTP improvements. The only shortcoming is with regards to capacity if the largest individual source or largest water treatment facility were to go offline; in this case the Town would be able to meet average day demands but would not be able to meet future maximum day water demands.

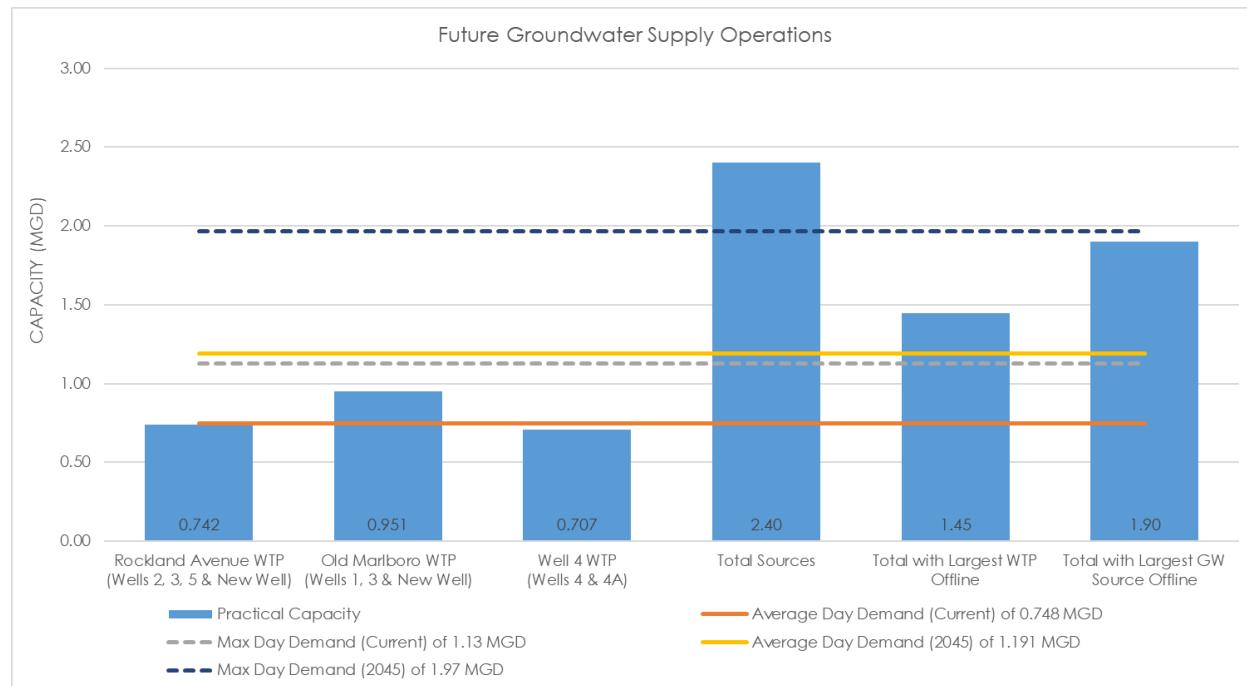


Figure 2 – Future Capacity with Groundwater Source Improvements & OMR WTP Treatment Upgrades

In Figure 3, the addition of a new source of water from Massachusetts Water Resources Authority (MWRA) is included, in addition to all the well source and WTP improvements/expansions included in Figure 2. This scenario assumes that an MWRA interconnection would provide a maximum of 1.7 MGD capacity. With a connection to MWRA's supply, the Town would be able to meet all average and maximum day demands under all operating circumstances well into the future. The Town has been engaged in meetings and a planning project with MWRA to develop a plan for expansion of the MWRA system into the Metro West communities. At this time, the project is in early planning stages and is not a certainty. If the MWRA Metro West expansion project proceeds, it is believed at this time that the best-case scenario would have MWRA supply accessible to the Town of Maynard in 7 years (i.e., 2030).

Reference: [Maynard Water Capacity Memo – Update](#)

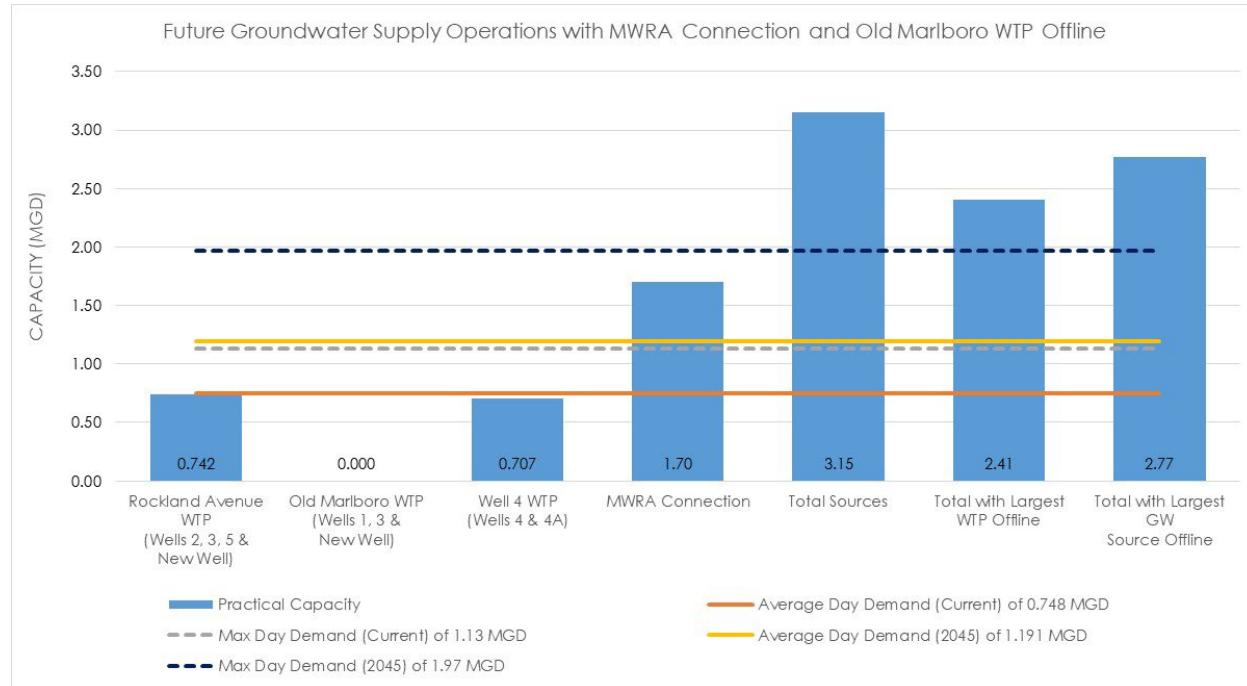


Figure 3 – Future Capacity with Groundwater Source Improvements (OMR WTP Treatment Offline & New MWRA Source)

STRATEGY TO INCREASE WATER SUPPLY

The Town has employed a 4-phased approach to increasing the water supply capacity in the water system, as follows:

Phase 1: Increase capacity at Well 4A water treatment facility by adding a new well supply (Well 4A) and adding backwash waste recycling at the WTP.

Phase 2: Increase capacity at Rockland Avenue water treatment facility by adding a new well supply and adding backwash waste recycling at the WTP.

Phase 3: Increase capacity at Old Marlboro Road water treatment facility by upgrading the treatment process, which will allow for Well 3 to be brought back online.

Phase 4: Connect to MWRA system.

The timeline for the 4-phased approach is outlined in Table 1.

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Table 1 – Proposed Timeline to Increase Water Supply

Phase	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1: Well 4 Improvements											
2: Rockland Ave Improvements											
3: OMR Improvements											
4: MWRA Connection											

PFAS REGULATORY CHANGES

On October 2, 2020, MassDEP published its PFAS public drinking water standard or Massachusetts Maximum Contaminant Level (MMCL) of 20 nanograms per liter (ng/L), or parts per trillion (ppt) applicable to community (COM) and non-transient non-community (NTNC) systems for the sum of the concentrations of six specific PFAS. The six PFAS are: PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA. MassDEP abbreviates this set of six PFAS as “PFAS6.” The Town’s well supplies are in compliance with the MassDEP PFAS6 MCL.

On March 14, 2023, EPA released proposed National Primary Drinking Water regulations for PFOA, PFOS and four other PFAS. EPA is proposing to set a Maximum Contaminant Level (MCL) of 4.0 parts per trillion (ppt) for PFOA and 4.0 ppt for PFOS and is proposing to address four additional PFAS (GenX, PFBS, PFNA, and PFHxS) as a mixture using a Hazard Index. A Hazard Index accounts for the increased risk from mixtures of PFAS. The proposed MCLs and HIs would be legally enforceable limits with which waterworks would be required to comply. It is anticipated that the draft MCLs posed by EPA will be promulgated as final MCLs at the end of 2023. At that point, water suppliers will have 3 years to comply with the new MCLs. The Town has been collecting samples for PFAS analysis at their groundwater wells and at the WTPs for nearly four years. Results of prior PFAS laboratory analysis indicate that concentrations of PFOA reported at the Town’s finished water entry points (e.g., sample tap location is representative of treated water entering the distribution system) are greater than the proposed draft EPA MCL. The Town will need to invest significantly in the near future to address the PFAS treatment needs of their water supplies.

The Town’s 4-Phase Strategy to Increase Water Supply was developed prior to the EPA PFAS MCLs being published, so this strategy does not take into consideration the need for PFAS treatment upgrades at the water treatment facilities.

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WATER USE ESTIMATES

For design purposes, it is typical to utilize the information provided in 310 CMR 15.00: Septic Systems "Title 5" to estimate sewer system flows. Section 15.203 of "Title 5" provides sewer system design flows for various types of establishments. Table 2 summarize the typical sewer and water flows associated with various types of establishments that may pursue development in the Town of Maynard.

Table 2 – Water and Sewer Flows for Various Types of Establishments

Type of Establishment	Unit	Gallons Per Day
RESIDENTIAL		
Single Family Dwelling (including condos)	per bedroom	110
Multiple Family Dwelling	per bedroom	110
Motel, Hotel, Boarding House	per bedroom	110
Housing for the Elderly	per two-bedroom unit	150
COMMERCIAL		
Barber Shop/Beauty Salon	per chair	100
Doctor Office	per doctor	250
Dentist Office	per dentist	200
Factory, Industrial Plant, Warehouse, or Dry Storage Space without Cafeteria	per person	15
Factory, Industrial Plant, Warehouse, or Dry Storage Space with Cafeteria	per person	20
Lounge/Tavern	per seat	20
Office Building	per 1000 square feet	75
Retail Store (except supermarkets)	per 1000 square feet	50
Restaurant	per seat	35
Restaurant, Fast Food	per seat	20
Supermarket	per 1000 square feet	97
INSTITUTIONAL		
Function Hall	per seat	15
Gymnasium	per participant	25
Nursing Home/Rest Home	per bed	150
Assisted Living Facilities	per bed	150
Day Care Facility	per person	10
SCHOOLS		
Elementary School, without Cafeteria, gym, or showers	per person	5
Elementary School, with Cafeteria but no gym or showers	per person	8
Elementary School, with cafeteria, gym, and showers	per person	10
Secondary School, without Cafeteria, gym, or showers	per person	10

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Type of Establishment	Unit	Gallons Per Day
Secondary School, with Cafeteria but no gym or showers	per person	15
Secondary School, with cafeteria, gym, and showers	per person	20
Boarding Schools, Colleges	per person	65

Stantec Consulting Services Inc.



Katie Chamberlain P.E.

Senior Associate

Phone: 781 221 1156

Katie.Chamberlain@stantec.com