Medfield Well Water Project

Medfield Department of Public Works

Medfield Board of Water and Sewerage

Environmental Partners Group

Medfield Board of Selectman Meeting

16 March 2021

Outline

- Our water resources
- Why the filter project is needed
- Alternatives investigated
- Historical timeline
- Method of treatment
- Scope of project
- Project funding and financials

Water Resources

- Well waters drawn from the Neponset and Charles River watersheds
- Currently no treatment of the water other than:
  - Minor pH adjustment to reduce pipe corrosion, a typical approach
  - Addition of low level of chlorine to reduce microbial growth, a typical method
- The MA DEP regulates our wells:
  - Permitting
  - Location
  - Design
  - Annual and instantaneous pumping volume
  - Imposition of drought restrictions
  - Overall system performance metrics, like consumption per capita
  - Drinking water quality

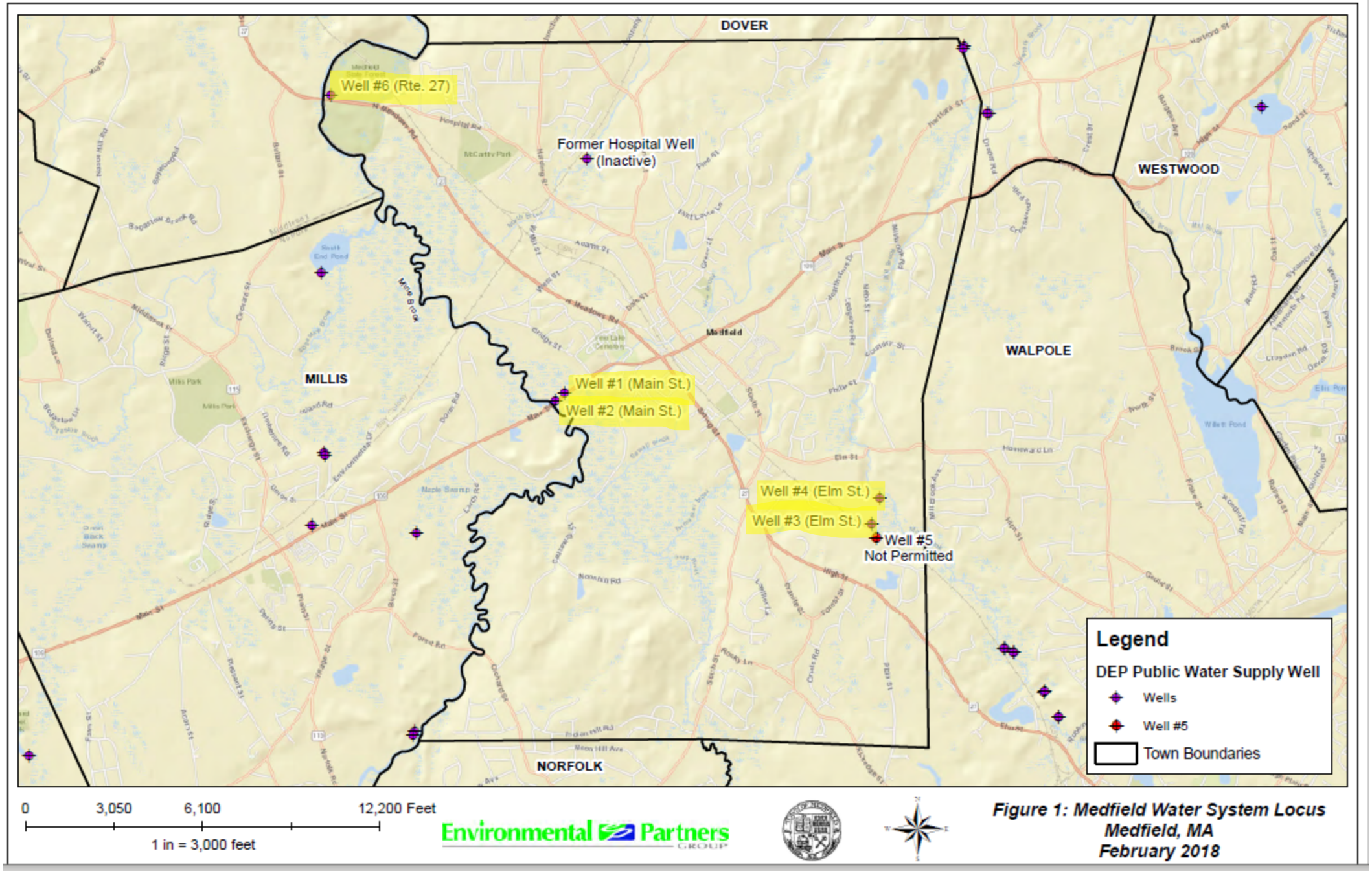


Figure 1: Medfield Water System Locus
Medfield, MA
February 2018

Why the Filter Project is Needed

- **Manganese** is a naturally occurring metal that is found in the mineral geology of many parts of New England, including the area around Wells 3 and 4.
- As water percolates through underground aquifers, manganese is leached from the underground strata along with other minerals.

- Manganese concentration in water:
  - MA DEP enforceable limit is 0.3 mg/l
  - Medfield Well 3 is 0.3 to 0.4 mg/l
  - The MA DEP Secondary Maximum Contaminant Level (SMCL) is 0.05 mg/l
  - Medfield filter design target is less than 0.05 mg/l

- There is no Federal Maximum Contaminant Level for manganese
- There are aesthetic reasons for removing manganese (mineral deposits on faucets, metallic taste, etc.)

Other Project Rationale

- Wells 3 and 4 needs rehabilitation to bring production back to permitted design levels
- Expansion of instantaneous capacity of Well 3 provides backup to our largest producer, Well 6
- Investment in infrastructure is the lowest cost to produce water
- Medfield retains its water independence

Alternatives to Filtration Project Investigated

- Other sources
  - Investigated 16 other locations in Medfield
  - No other locations had sufficient quantity
- MWRA
  - Town met with MWRA (in 2020)
  - Costs estimates for this option
    - 2X to 3X up front capital cost compared to filter project
    - Then the cost of water itself would be 2x filter project finished water
    - Execution depends on cooperation of neighboring towns
    - Medfield would not be compliant with DEP water quality for many years (7+)

Timeline (FY)

Town Investigates Well 3&4 Treatment

Treatment Field Pilot Study 1

Treatment Field Pilot Study 2

Preliminary Filtration Plant Design

Final Design

Construction

2012 **2013** **2014** **2015** **2016** **2017** **2018** **2019** **2020** **2021** **2022** **2023**

MA DEP Issues Manganese Enforceable Guidelines

Treatment Project Appears on CAPEX Plan

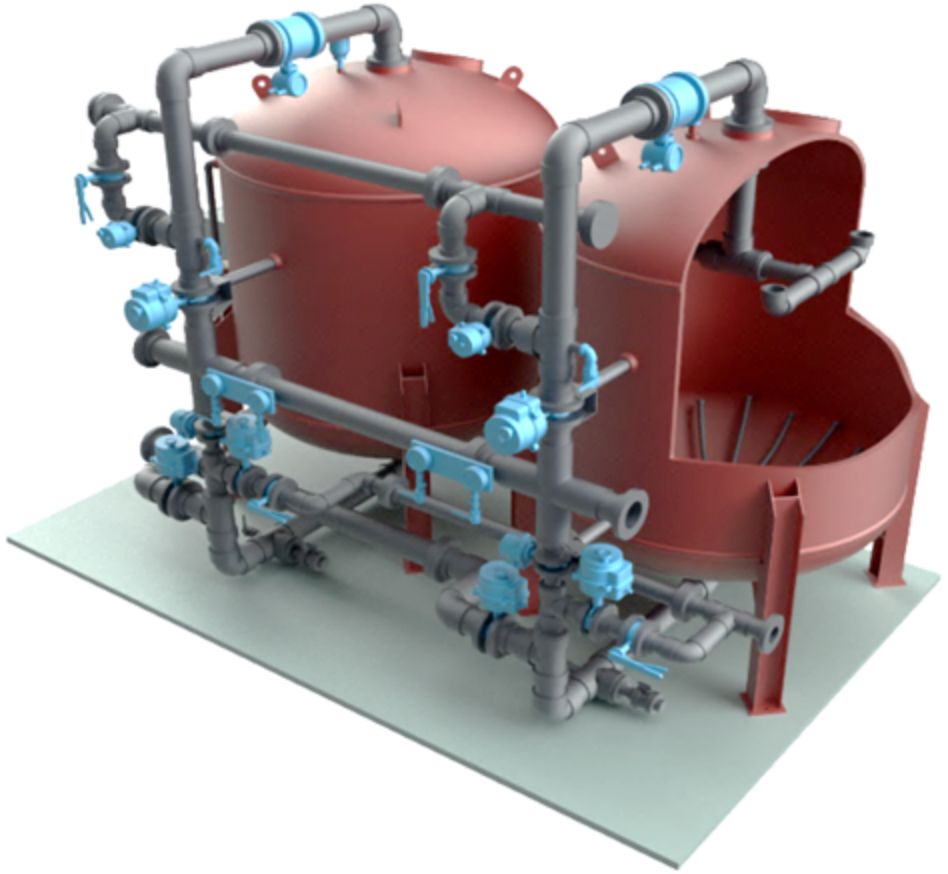
Investigation For Other Sources

Application for MA SRF 2.0% Loan

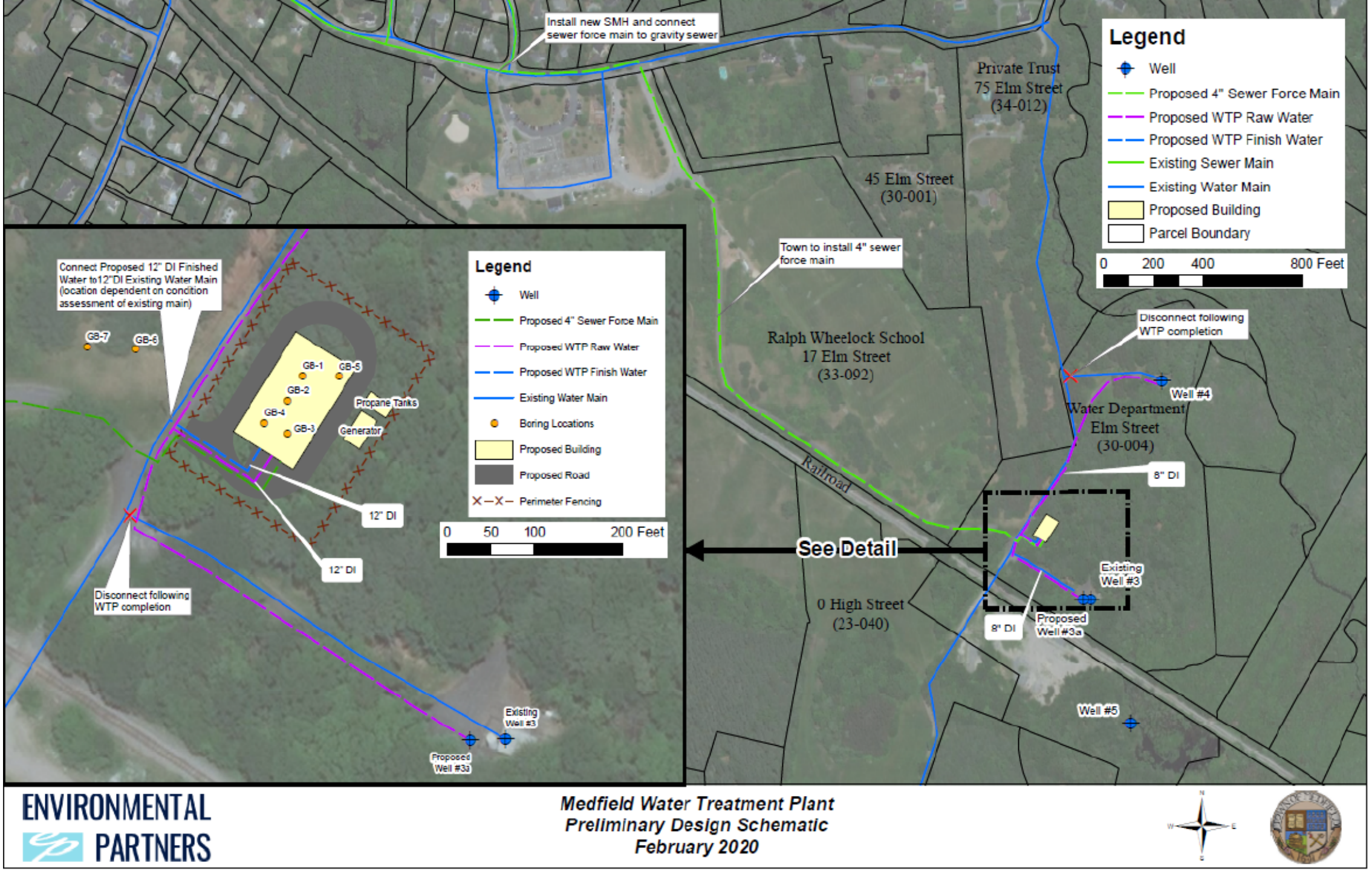
Plant Online (Jan. 2023)

Method of Treatment

- “Classic” filtration
- Uses a specific type of sand. In use for over 50 years.
- Turns the manganese from dissolved to a suspended particle
- Then the sand filters the suspended manganese particle
- Chlorine and pH adjustment is used, similar to today
- This is a type of problem and solution currently in use at several MA communities
  - Webster, Plymouth, Shrewsbury, Kingston, Topsfield, Stoughton, Harwich



Example of manganese removal filters
Hungerford & Terry, Inc.



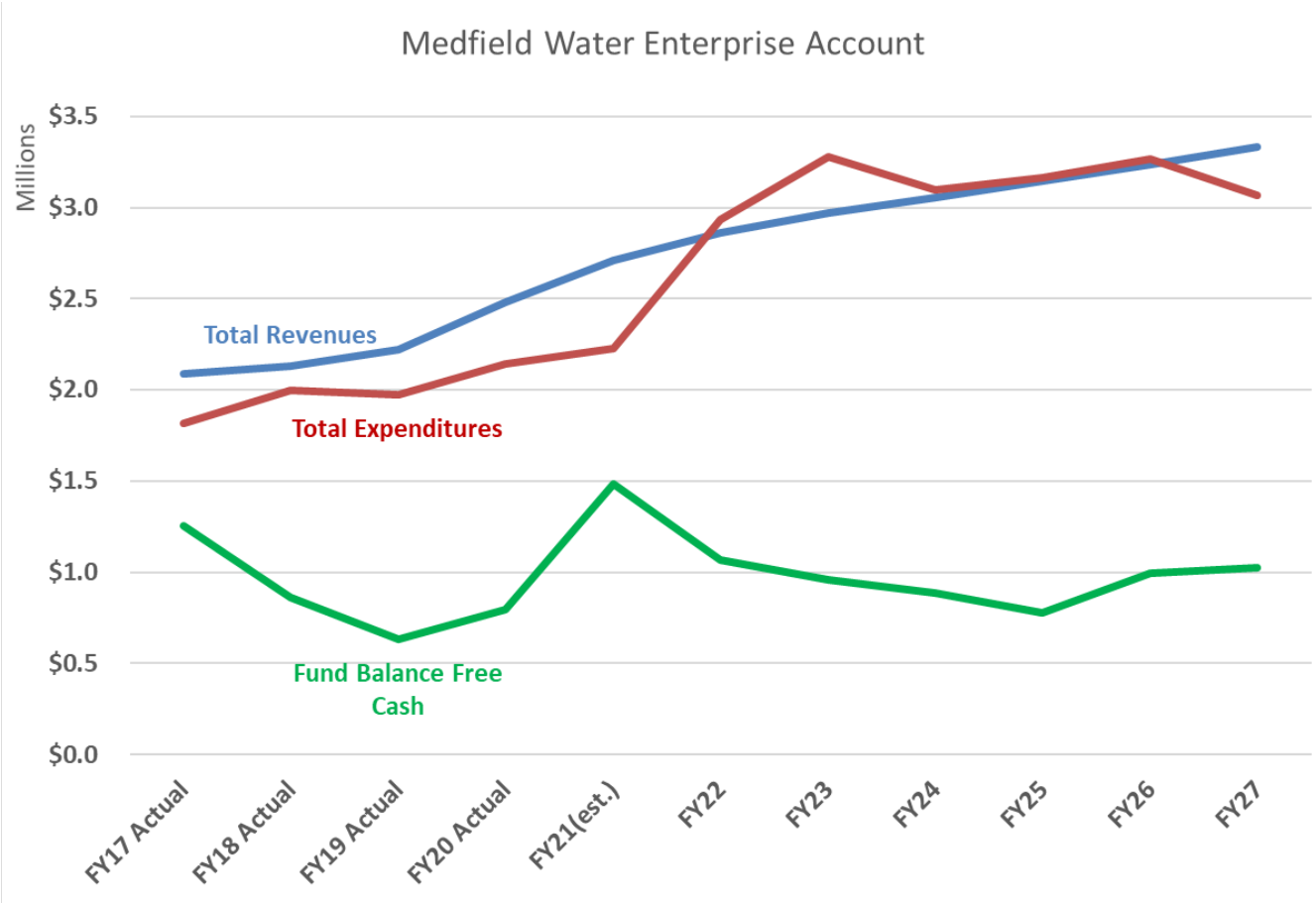
ENVIRONMENTAL PARTNERS

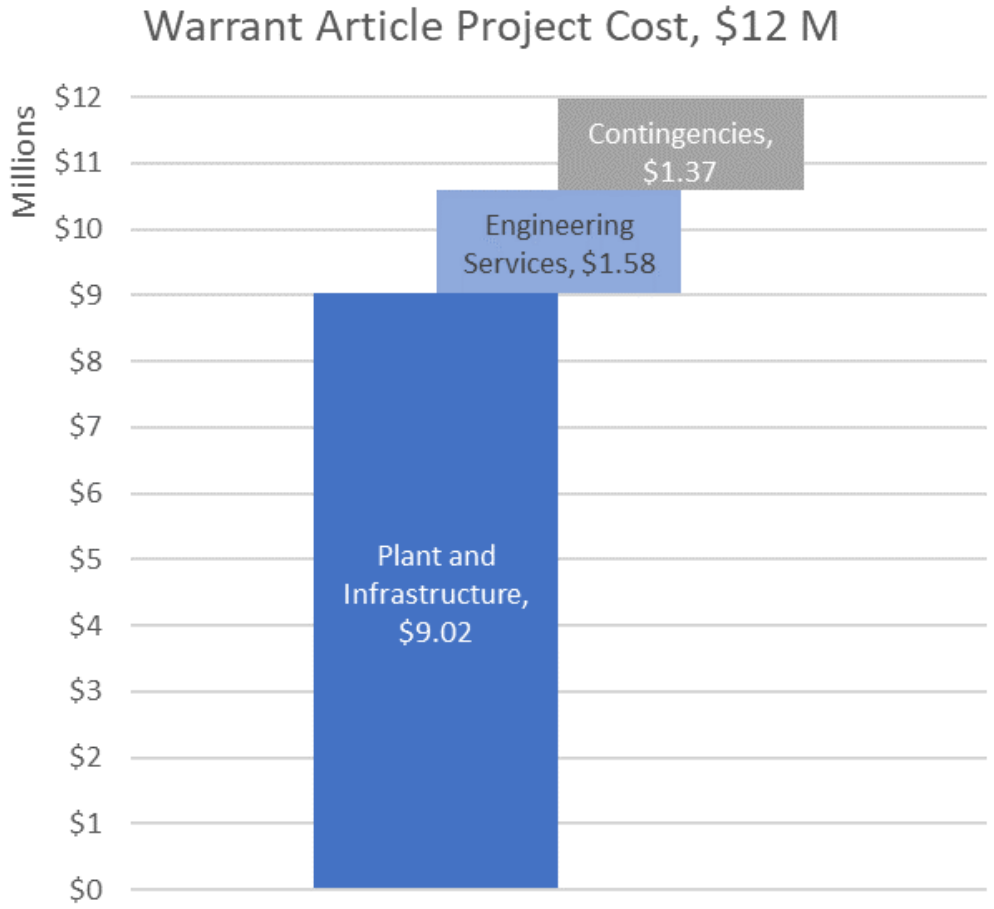
Medfield Water Treatment Plant
Preliminary Design Schematic
February 2020

Scope of Project

- Permit applications and approvals (last one is Town BOH)
- Well 3 replacement
- Well 4 refurbishment
- Building construction
- Filtration process equipment construction and commissioning
- New water main and pipeline for filter backwash water

Project Funding and Financials





- Water Rates
  - Increased FY20 by 5%, FY21 by 12%
  - Expect +3-4%/ year going forward
- Borrowing
  - 20 year bond, 3% assumed
  - MA State Revolving Fund 2% possible

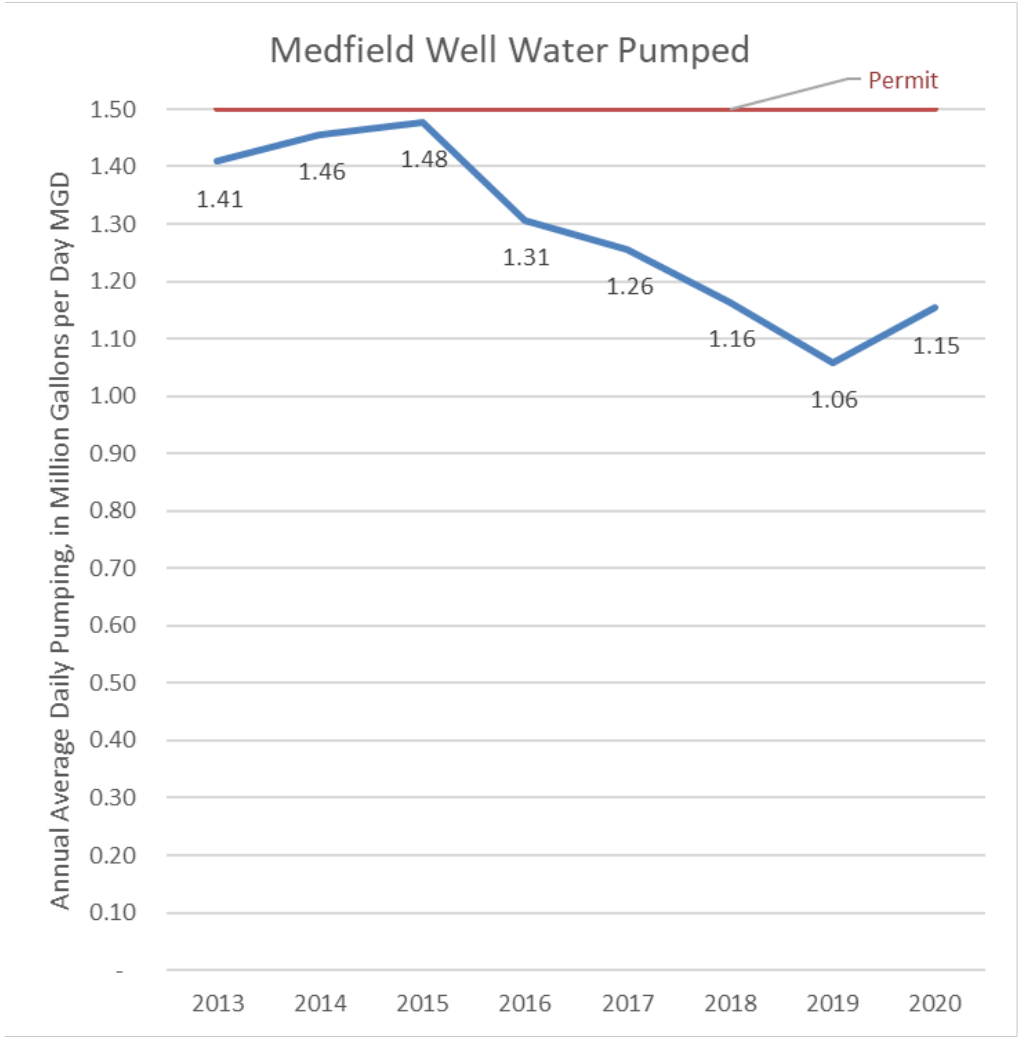
Backup Material

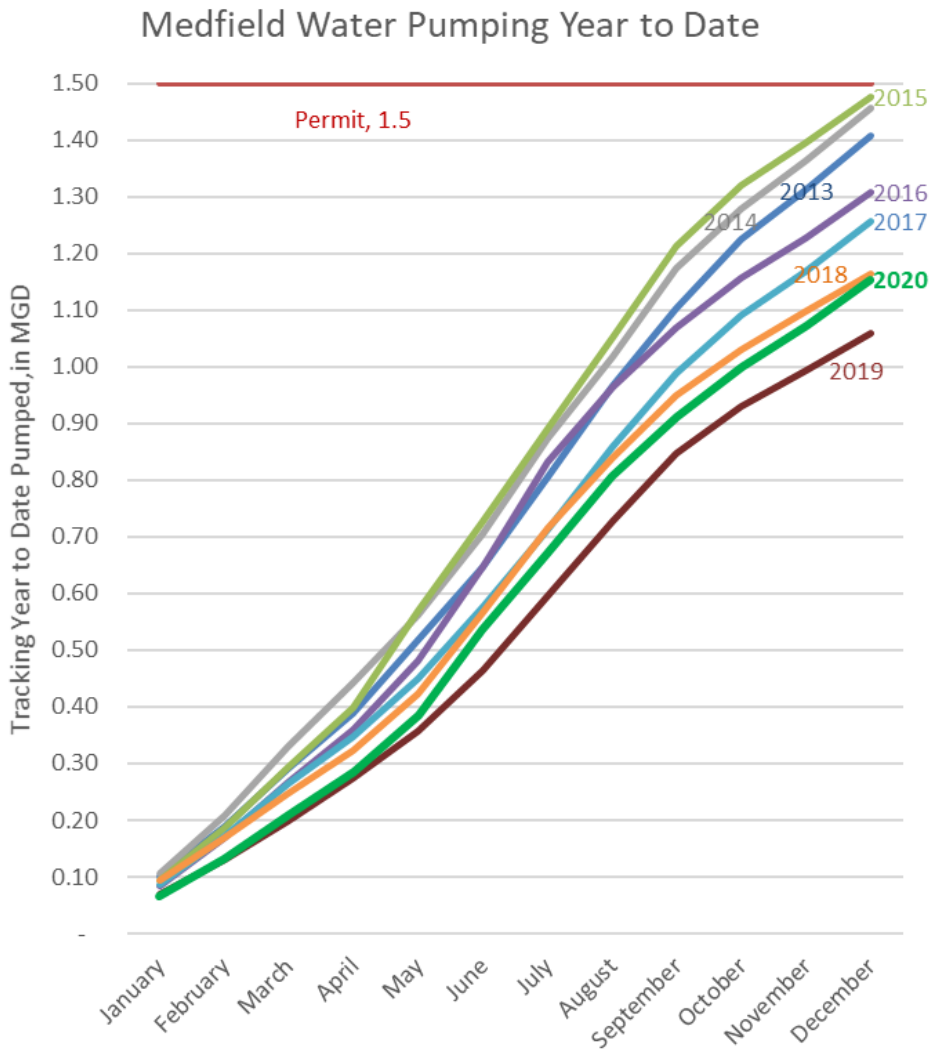
Filtration Project Appropriated/Spent to Date

Warrant Articles:

2016	$150,000
2017	$275,000
2018	$610,000
Total	$1,035,000

Historical Water Pumped from Wells



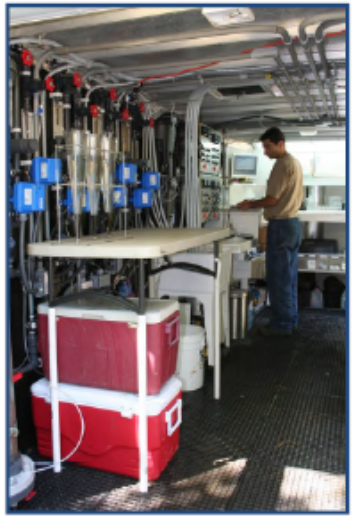


Treatment Field Pilot

- Use to verify treatment
- Optimize design
  - Size of filters
  - Fine-tune of chemical addition required

Figure 7: Exterior View of Pilot Trailer

Figure 8: Interior View of Pilot Trailer



neponset river
WATERSHED ASSOCIATION

December 1, 2020

Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900 (9th Floor)
Attn: MEPA Office
Boston, MA 02114

Via email to Eva.Murray@state.ma.us

RE: EEA No. 16293 Medfield Water Treatment Plant

Dear Secretary Theoharides:

The Neponset River Watershed Association (NepRWA) submits the following comments on the environmental notification form under review for the proposed Water Treatment Plant for Wells 3 & 4 in Medfield. NepRWA is a nonprofit conservation organization working to clean up and protect the Neponset River, its tributaries and surrounding watershed lands.

NepRWA has been fortunate to closely partner with Medfield on a number of key issues, including stormwater management, water conservation, and climate change resiliency. Indeed, Medfield has been a leader on these issues and it is rare for our organization and the Town to conflict on environmental issues. While we understand the need to ensure adequate clean drinking water for a growing town, we have a couple of concerns about this project.

First, we appreciate that the proposed site plan generally seems to protect against stormwater pollution and increases recharge in an area that needs it. However, the construction of a new water treatment plant and increase in pumping capacity at Well 3 (replaced by Well 3A) and Well 4 is likely to negatively impact streamflow in this area, presenting a significant hazard to environmental habitat in the Mill-Mine Brook sub-basin.

We understand that Medfield is not planning to increase withdrawals from these sources over the volume authorized to through their registrations. Nevertheless, under the current withdrawal volumes (which are less than that authorized), groundwater depletion in this sub-basin is significant and the stream experiences extended periods of zero flow during dry weather. This is important because the sub-basin includes a coldwater fishery (CFR). While the designated CFR is located upstream of Wells 3 and 4, past assessments by MassDEP have indicated that coldwater species were formerly found throughout this system.

2173 Washington Street, Canton, MA 02021
781.575.0354 | staff@neponset.org | www.neponset.org

Based on this assessment, we would advocate that Medfield optimize its water sourcing by reducing the use of the Mill-Mine Brook sub-basin in order to protect or restore CFR resources. Medfield could do this by reducing pumping from Wells 3 & 4 during the critical summer season. Understandably, this is unlikely to be economically feasible once Medfield invests significant resources in a new water treatment facility. An alternative to the project could include establishing an interconnection with MWRA sources through Westwood. Such an alternative would significantly reduce the stress on critical Neponset River watershed resources while providing Medfield with the safe drinking water it needs.

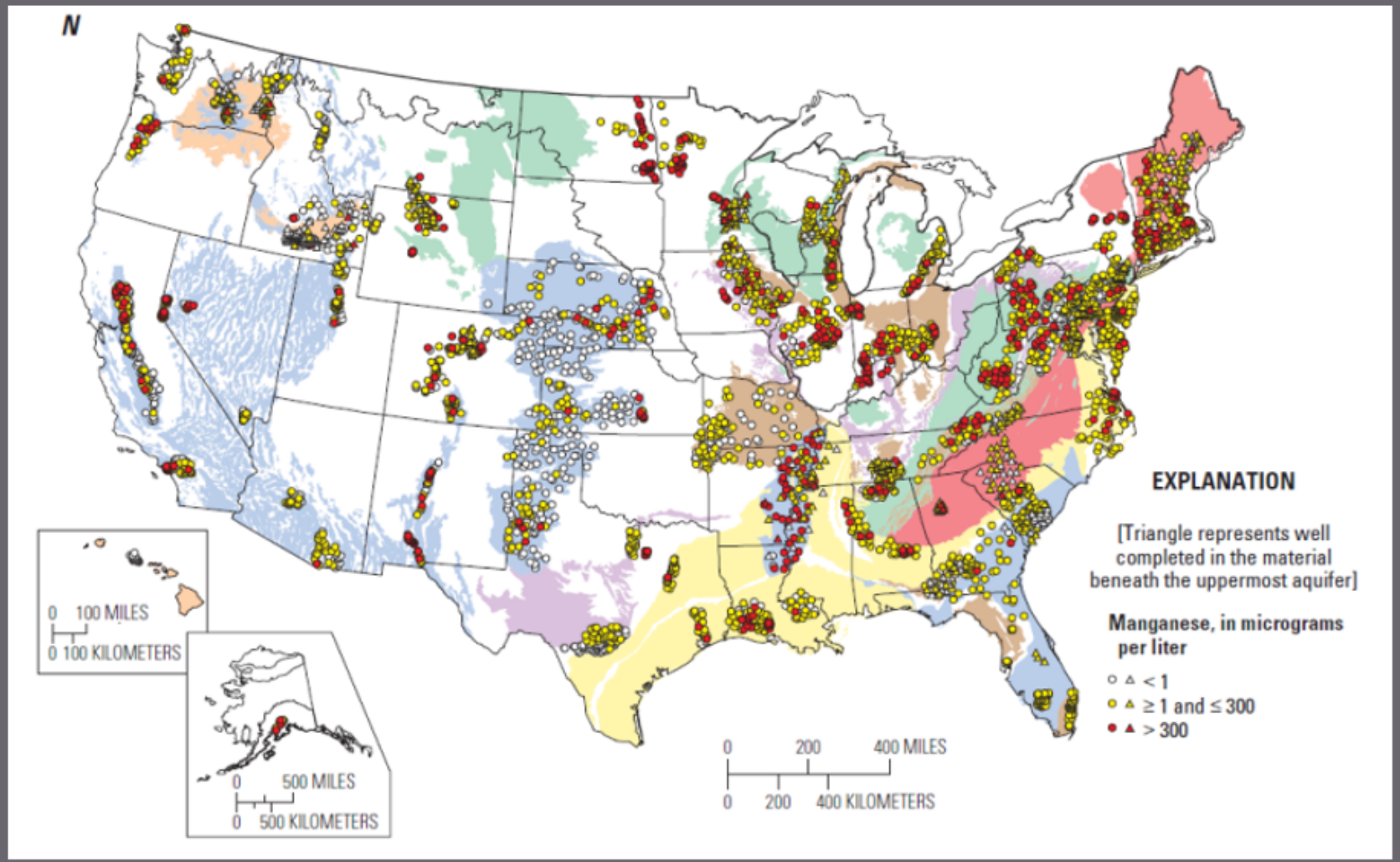
We understand that our concern would generally be more appropriately addressed through Water Management Act registration and permitting reviews, but recognize it is unlikely that alternatives could seriously be considered once this project moves forward. Thus we ask that MassDEP and Medfield consider alternatives to this project that would both provide the necessary water resources and source redundancy for Medfield in an economically feasible way, while also preserving and protecting water resources and habitat.

Thank you very much for your consideration. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Kerry Snyder
Advocacy Director

Where is Manganese found?



USGS Map of Mn in groundwater in the US