

February 21, 2023

Mr. Brian Antonioli, Director
Wrentham Department of Public Works
P.O. Box 658
Wrentham, MA 02093

RE: Eagle Dam Removal Project – Potential Effects on Town Water Supply Sources

Dear Brian,

Environmental Partners (EP) Group, LLC has prepared this letter report as requested by the Town of Wrentham, Massachusetts (Town) following our meeting on Wednesday, November 9, 2022. During this meeting, the Town hosted a presentation by Dr. Desheng Wang, PE, CWS, CSE of Creative Land & Water Engineering, LLC (CL&WE). Dr. Wang is representing Wrentham residents that live on both Gilmore Road and Pendleton Road, who's property also abuts Eagle Brook, also known as Old Mill Pond. The Town also invited representatives of the Charles River Watershed Association (CRWA) and Weston & Sampson Engineers Inc. to attend the meeting on their behalf.

Dr. Wang and several of the residents attended the meeting on November 9th to discuss their concerns about the potential removal of the Eagle Dam. The residents have engaged CL&WE and Dr. Wang to document and present these concerns.

On behalf of the residents, CL&WE prepared the "*Old Mill Pond (Eagle Dam) Study Report*", dated January 26, 2022, and updated October 28, 2022 (attached). Dr. Wang presented the report and requested clarification on the following questions/issues:

- What is the natural geological setting of the Old Mill Pond / Eagle Dam?
- What is the value of the pond to the public water supply, ecosystem, and public safety?
- What is the impact of the dam removal on this location?

EP has provided our understanding of the project below.

Project Understanding

For this project, the Town requested that EP provide assistance with the ongoing Eagle Dam project and to document potential concerns about impacts on water supply sources if the dam is removed. To better understand the ongoing project, we reviewed the Town's "*Eagle Dam Removal Technical Feasibility Study*", which was jointly funded with the CRWA. EP also reviewed the Town's 2012 Phase I Inspection/Evaluation report, which was prepared by Pare Corporation and rated the dam as a low hazard dam in poor condition. The Phase I report recommended either breaching/removing the dam or repairing the dam to eliminate risk of failure.

During public meetings while discussing the project, Town officials have voiced their concerns about past and potential future breaches of the dam. The Town wishes to remove the dam to restore the original, natural stream conditions while also mitigating the costs needed for repairs and future maintenance. Following these meetings, the abutting residents forwarded a letter of concern and petition to the Town requesting that the Eagle Dam be repaired and maintained while requesting a meeting with Town officials to further discuss the project.

While there were several issues presented during the November 9th meeting, EP is only responding to the assertions made regarding the potential impacts on the Town's groundwater supply sources near the Eagle Dam.

Review of CL&WE Report and Presentation

In the attached report, CL&WE references the Town's Wells 2 and 3, which are near the Eagle Dam and suggested impacts on the Town's permitted withdrawal capacities for these wells. The report also references the Town's Interim Wellhead Protection Areas (IWHPs), Zone I and Zone II areas. The Massachusetts Department of Environmental Protection (MassDEP) establishes drinking water regulations where public water supplies must be compliant with 310 Commonwealth of Massachusetts Regulations (CMR) 22.21 and these regulations provide the following definitions for groundwater supply protection.

- Interim Wellhead Protection Area (IWPA) is designated for public water systems using wells or wellfields that lack a Department-approved Zone II, the Department will apply an Interim Wellhead Protection Area. This Interim Wellhead Protection Area shall be a one half mile radius measured from the well or Wellfield for sources whose approved pumping rate is 100,000 gpd or greater.
- Zone I provides the protective radius around a public water supply well or Wellfield. For Public Water System wells with approved yields of 100,000 gpd or greater, the protective radius is 400 feet. Wellfields and infiltration galleries with approved yields of 10,000 gpd or greater require a 250-foot protective radius.
- Zone II delineates the area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). It is bounded by the groundwater divides that result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone II shall extend upgradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock, or a recharge boundary).

In their report, CL&WE implies that removing of the Eagle Dam will significantly impact the water supply capacity because the Zone I area and most of the Zone II (IWPA) overlaps the Old Mill Pond. As stated in the definitions above, the Zone I area is a protective radius around the well and the water supplier should own or control all property within the 400-foot radius established for wells yielding greater than 100,000 gpd. Figure 1 presents the extent of the Zone I area for both Well 2 and Well 3. CL&WE's reference and calculations regarding the Zone II/IWPA impact is misleading. The

IWPA is not applicable to Well 2 and Well 3, because the Town has a delineated Zone II. The Zone II and not the IWPA delineates the area of the aquifer that contributes water to Well 2 and Well 3.

While CL&WE suggests that the Zone I/IWPA areas and the Old Mill Pond provide a significant volume of water to Wells 1 and 2, the Zone II delineations encompass a much larger area, and defines the area of aquifer that contributes water to these wells. Figure 2 shows the approximate extent of the Zone II area for Wells 2 and 3 and shows that the area of contribution to the Town's main groundwater supply sources extends far beyond the Zone I areas.

During the November 9th meeting, EP presented information about the Town's ongoing project to replace Well 3 and documented that removal of the Eagle Dam will still allow Wells 2 and 3 to pump at or above their permitted withdrawal rates. We have provided more details on this project below.

Well 3 Replacement

In early November 2021, the Town informed EP that the screen in Well 3 failed during redevelopment. Maher Services was performing the redevelopment, so the Town extended their contract to perform emergency repairs on Well 3. Maher indicated that their repairs were only a temporary solution and that the Town should replace the well as soon as possible to avoid additional damage and potential total failure of the well. Well 3 has a MassDEP approved pumping rate of 472 gpm. Due to this emergency condition and the importance and high capacity of Well 3, EP recommended the replacement of Well 3 early in the first phase of the Capital Improvement Program of the Town's December 2021 Water System Master Plan (WSMP) report.

In June 2022, EP conducted exploration for a replacement well location for Well 3 and in September 2022, EP submitted the Well No. 3 Replacement Well and Pump Test Proposal Report, which was approved by MassDEP on January 9, 2023 (letter attached). We have summarized information from this report, which demonstrates the large capacity of the replacement well, and as such, minimal impact to the pumping capacity of the well with the removal of the Eagle Dam.

Proposed Replacement Well Location

Figure 3 shows Well 3 and the location of the proposed replacement well while also depicting the 400-foot Zone I radius for the proposed replacement well. The 400-foot Zone I for the replacement well complies with Zone I requirements except for Route 140, which a portion of the road remains within the Zone I. While a public roadway is not a consistent land use for public water supply protection, the proposed replacement well location allows for greater ownership and control of the Zone I. Property within the Zone I to the south of Route 140, with the exception of Old Mill Pond, is owned by the Town and is exclusively for public water supply protection.

EP contacted Ms. Michelle Regon with the MassDEP Southeast Region Office (SERO) Drinking Water program regarding permitting a replacement well for Well 3. The proposed replacement well will be located further from Route 140 than the existing production well and remove residential properties within the existing Well 3 Zone I. Eagle Brook and Old Mill Pond are located within the Zone I to the east of the existing Well 3 and proposed replacement well locations. Ms. Regon confirmed that this surface water feature is a compliant land use within the Zone I for water supply protection.

In this Well 3 replacement report, EP documented the work performed during the field program, including the installation, and testing of an observation well couplet, while assessing the feasibility of a replacement well installation. The proposed pumping rate for the replacement Well 3 is 472 gpm, which is the MassDEP approved pumping rate for Well 3.

Potential Well Yield

EP subcontracted Maher Services to conduct exploratory drilling with the goal of locating a replacement well for Well 3. Maher Services used a Geoprobe drilling rig to install a 2-inch diameter test well within 250-feet of Well 3. Suitable material for installing a test well was identified at the (TW-2) location and observation well was installed to monitor water levels during pumping. The total depth of TW-2 was 80 feet below ground surface (bgs). A two-hour pump test was conducted on TW-2 to determine an estimated specific capacity and potential well yield.

Table 1 presents the calculated potential well yield for TW-2. EP calculated the potential well yield using the same method used for calculating an approvable yield in *Chapter 4 Groundwater Supply Development and Source Approval Process Section 4.3.1.5*, which is a product of the available water, specific capacity and safety factor as presented below.

Table 1: Potential Well Yield

Depth of Pumping Well (feet bgs)	Length of Screen (feet)	Static Water Level (feet bgs)	End of Test Water Level (feet bgs)	Safety Factor (feet)	Available Water Less 5-foot safety factor (feet)
80.0	5.0	35.15	35.45	5.0	34.85

Pumping Rate (gpm)	Drawdown at 30 gpm (feet)	Specific Capacity (gpm/foot)	Safety Factor	Potential Well Yield (gpm)
30	0.3 feet	100	0.75	2,613.75

The existing Franklin Street Well 3 has a MassDEP approved pumping rate of 472 gpm. As indicated in the above table, the calculated potential well yield for TW-2 (with 0.75 safety factor) is 2,613.75 gpm or 3.764 MGD, which is significantly greater than the MassDEP approved pumping rate for Well 3 of 472 gpm.

Preliminary testing data at Well 3R indicate that removing the Eagle Dam will not impact the Town's water supply capacity. Based on the CL&WE, 2022 Report, the water depth of Old Mill Pond is approximately 10 feet deep. To be conservative and assuming the removal of the dam completely dries up Old Mill Pond, the static water level would drop 10 feet to a depth of 45.15 feet bgs. The available water above the well screen with a 5-foot safety factor would be 24.85 feet. Using the above calculations, the potential well yield at Well 3R would be 1,863 gpm, which is significantly greater than the approved well yield of 472 gpm. Based on a 10 foot lowering of water levels at Well 3R and the well pumping at the approved rate of 472 gpm, approximately 20 feet of water would remain above the well screen, including the 5-foot buffer.

Conclusion

Following review of the CL&WE report, EP does not believe that the removal of the Eagle Dam will have any measurable impact on the operation of the Town public water supply wells. Both Wells 2 and 3 have Zone II areas that extend well beyond the Old Mill Pond. Preliminary testing at the replacement well location Well 3R indicate that even if lowering of water levels in the water supply well were equal to the depth of Old Mill Pond drying up (assumed 10 feet), Well 3R would be able to pump at 1,863 gpm, which is significantly greater than the MassDEP approved well yield of 472 gpm.

EP trusts that this letter report confirms that removal of Eagle Dam will not limit the Town's permitted capacity at either Well 2 or Well 3. Please contact us if you have any questions.

Sincerely,



Environmental Partners Group, LLC
Ann Marie Petricca, C.P.G.
Director of Geosciences, Associate
O: 617.657.0299
E: amp@envpartners.com



Chuck Adelsberger, PE, BCEE
Senior Project Manager
O: 617.657.0255
E: ca@envpartners.com

cc: Kevin Sweet, MS, MPA, ICMA-CM, Wrentham Town Administrator
Rachel Benson, Wrentham Director of Planning and Economic Development

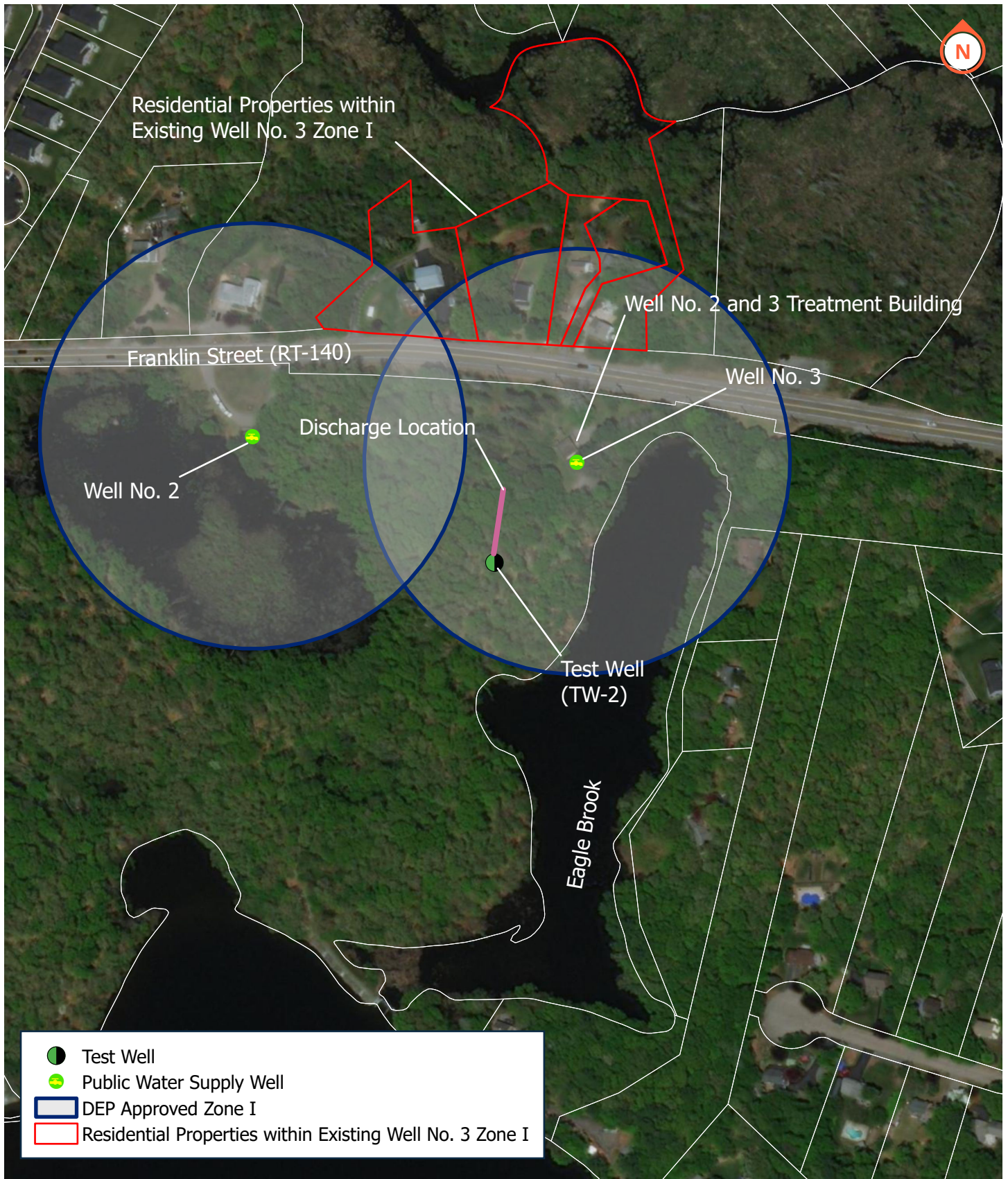


Figure 1
Existing Well 2 and Well 3 Zone I Areas

Wrentham, MA
 February 2023

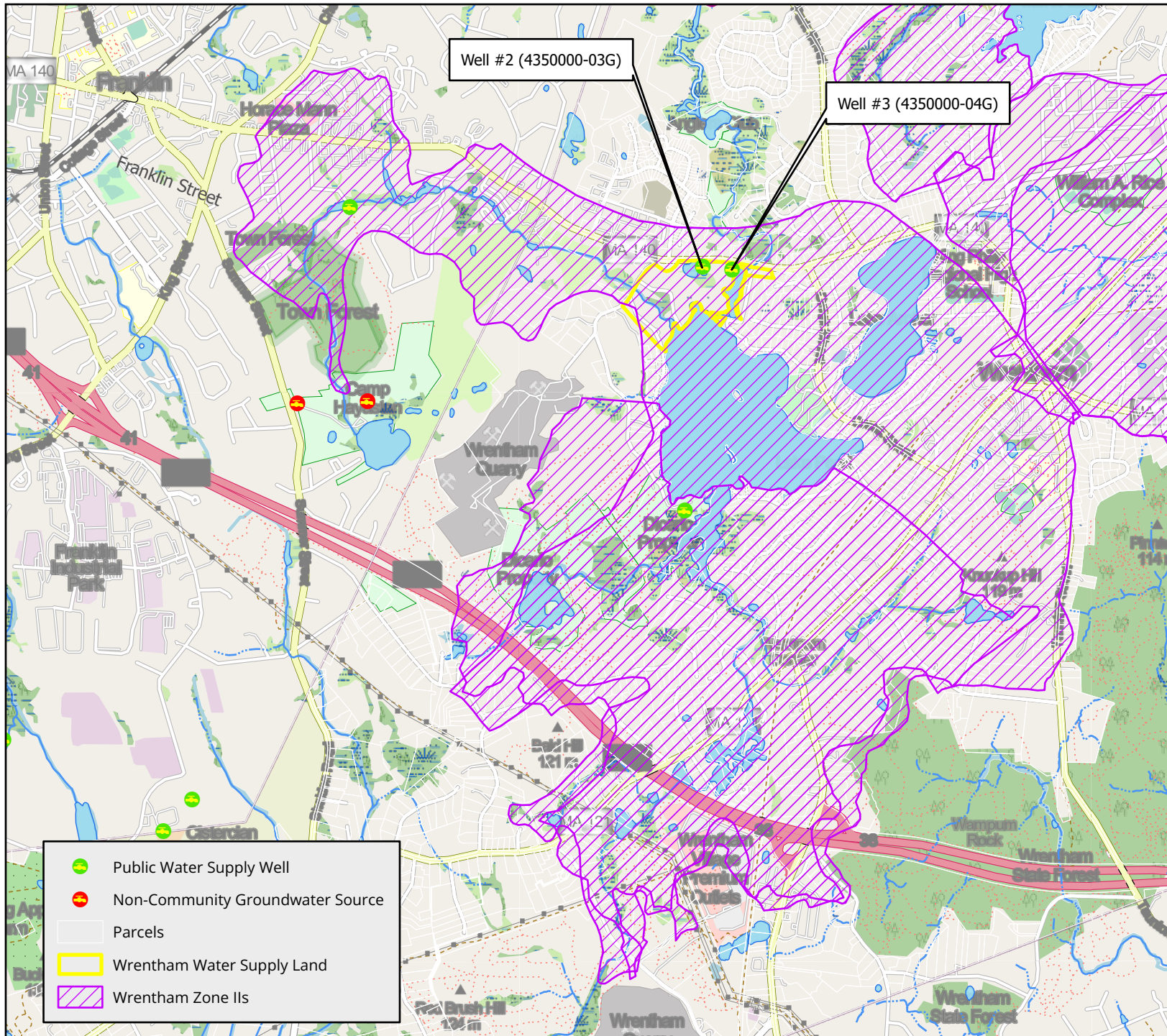


Figure 2 - Wrentham Well #2 and #3 Zone II

Wrentham, Massachusetts

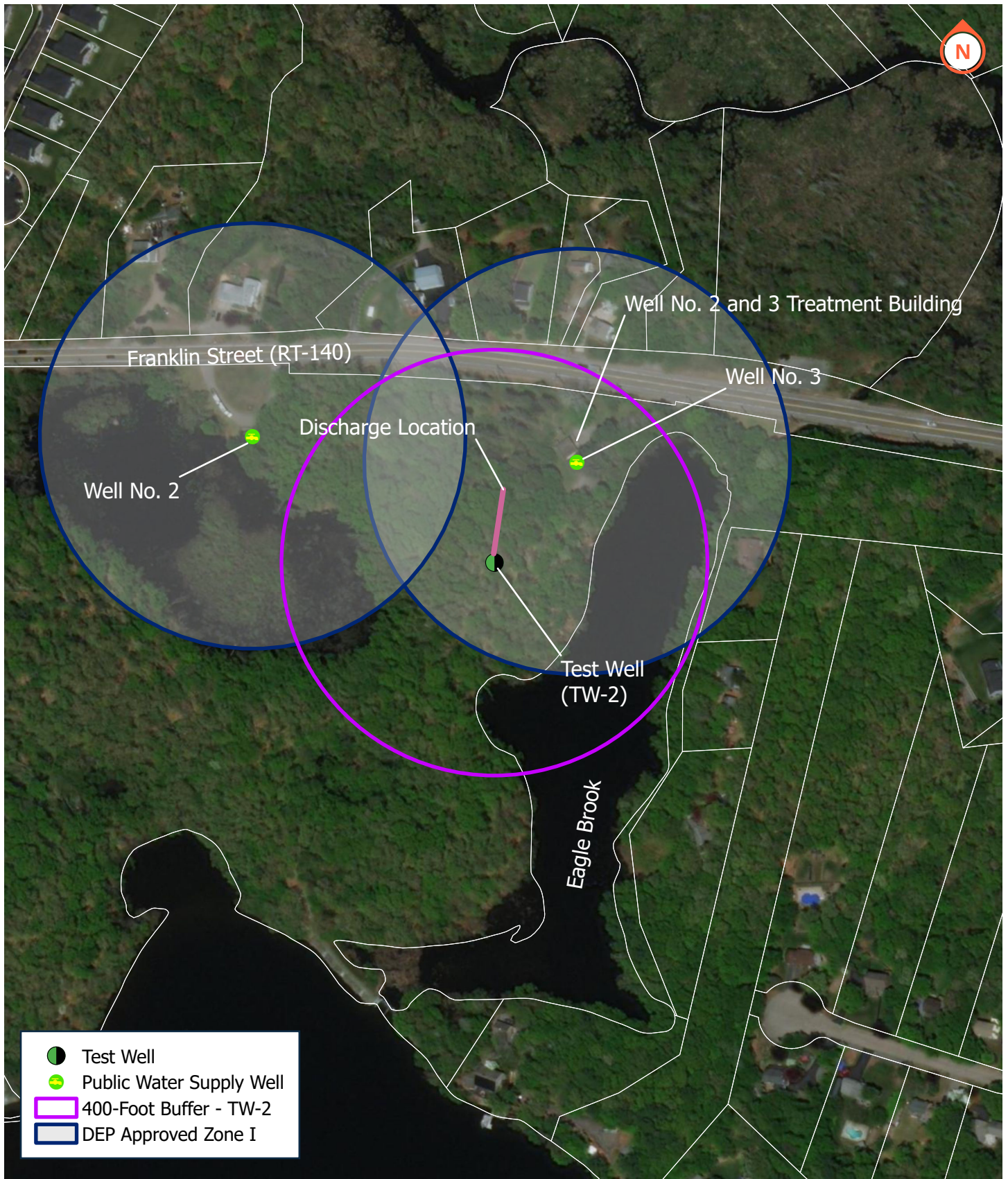


Figure 3
Well 3R (TW-2) Zone I Area

Wrentham, MA

February 2023

ENVIRONMENTAL
PARTNERS

— An Apex Company —





Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

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Governor

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Lieutenant Governor

Rebecca L. Tepper
Secretary

Gary Moran
Acting Commissioner

January 9, 2023

Brian Antonioli, Director
Wrentham Public Works Department
360 Taunton St.
Wrentham, MA 02093

RE: WRENTHAM—Public Water Supply
Wrentham Public Works Department
PWS ID #4350000
Pumping Test Proposal
Proposed Replacement Well - Well 3

Dear Mr. Antonioli:

Attached please find the Massachusetts Department of Environmental Protection's (the "Department") review of the pumping test proposal for the installation and testing of a replacement well at the Town of Wrentham's existing Well 3 site.

The signature on this cover letter indicates formal issuance of the attached document. If you have any questions concerning this document, please contact Michelle Regon at (508) 946-2836 or via email at michelle.regon@mass.gov.

Sincerely,

Jim McLaughlin, Chief
Drinking Water Program
Bureau of Water Resources

JM/MR

Y:\DWP Archive\SERO\Wrentham-4350000-System Modifications-2023-01-09

ec: Brian Antonioli, Wrentham PWD: bantonioli@wrentham.gov
Duane LeVangie, MassDEP-OWM: duane.levangie@mass.gov
Catherine Hamilton, MassDEP-DWP: catherine.sarafinas@mass.gov
Bruce Bouck, MassDEP-DWP: bruce.bouck@mass.gov
Giliane Tardieu, MassDEP-DWP: giliane.tardieu@mass.gov
Ann Marie Tuberville, Environmental Partners, INC: amp@envpartners.com
Chuck Adelsberger, Environmental Partners, INC: ca@envpartners.com
Keith Black, Environmental Partners, INC: ksb@envpartners.com
Town of Wrentham-BOH: ebugbee@wrentham.ma.us

Wrentham Public Works Department
Wrentham, Massachusetts
PWS ID #4350000
Proposed Replacement Well – Well 3
Pumping Test Proposal

The Massachusetts Department of Environmental Protection (the “Department”) received a Pumping Test Proposal on November 4, 2022, for the installation and testing of a proposed replacement well at the existing Well 3 (Department Source ID 4350000-04G) site in Wrentham, Massachusetts. The pumping test proposal, and supporting materials were prepared and submitted on behalf of the Town of Wrentham (“the PWS”) by its consultant, Ann Marie Tubeville, a hydrogeologist with Environmental Partners, Inc. The proposed replacement well will be located 250 feet southwest of the existing Well 3 off Franklin Road in Wrentham, Massachusetts. The Department approved the existing Well 3 with a pumping rate of 472 gallons per minute (GPM), or 0.68 million gallons per day (MGD) in 1993. The proposed replacement well will be operated to achieve the approved withdrawal rate for the existing well of 472 GPM or 0.68 MGD.

BACKGROUND

In November 2021, rehabilitation efforts were conducted on the existing Well 3. During this work it was determined that the well screen had failed. Temporary repairs were made at that time to enable the well’s continued operation. The PWS proposes to develop and construct a replacement production well to maintain capacity and water quality. A land use survey was also included in this pumping test proposal.

PRODUCTION/ REDUNDANT WELL DESIGN

The replacement well was sited 250 feet from the existing Well 3 due to Zone I compliance concerns. Existing Well 3 was a non-compliant source with private property and a roadway contained in its protection zone. Moving the replacement well 250 feet minimizes the roadway in the zone of protection and removes all of the private property. A 2-inch test well/observation well pair (TW-2, and OW-2) were installed at the site and developed. The test well was constructed with 5 feet of 40-slot stainless steel screen across an interval of 75-80 FT BLS. A natural gravel pack was utilized during construction. The well will utilize a submersible pump for testing.

ZONE I

The proposed replacement well site is not compliant with current Zone I requirements since Franklin Street (RT-140) bisects the northeast edge of the ZONE I. The PWS owns and controls the remainder of the land in the protection zone. As the existing Well 3 Zone I is non-compliant (31% out of compliance, including a roadway and private land), regulations require the replacement well Zone I to increase compliance (the replacement well will be 4% non-compliant with only the roadway within the Zone I). The replacement well does not include private property and crosses less of Franklin Street than that of the existing Well 3 Zone I. The PWS has a Department-approved Aquifer Protection Zoning by-law that meets the requirements of 310 CMR 22:21 and was drafted following the MassDEP Model Aquifer Protection By-law. There are no contamination or land use concerns.

PROPOSED PUMPING TESTS

48-hour pumping tests will be conducted at an anticipated rate of 472 GPM based upon the existing Well 3’s approved pumping rate. Discharged water will be directed 300 feet to the northeast and released into Eagle Brook. During the pumping tests, water levels will be recorded in the pumping well and observation wells. There will be no monitoring in the wetlands adjacent or in Eagle brook as this is a historically pumped well site and no increased capacity is being requested.

WATER QUALITY SAMPLING

During the replacement well pumping test, temperature, pH, and specific conductance will be measured in the field one hour after startup of the tests, at the midpoint, and just prior to shutdown of the tests. Water quality samples for laboratory analysis will be collected for secondary contaminants one hour after startup of the tests, at the midpoint, and just prior to shutdown of the tests. Samples for volatile organic compounds (EPA Method 524.2) and Per- and Polyfluoroalkyl Substances (PFAS) will also be collected at the end of the tests. Samples will be submitted to a State certified laboratory under a chain of custody for analysis.

Per- and polyfluoroalkyl substances (PFAS) sampling is required for all New Sources, including replacement sources, utilizing analytical methodology EPA Method 537 or 537.1 in accordance with 310 CMR 22.07G(12)(a) and (b). Laboratories used should be listed by EPA <https://www.epa.gov/sites/production/files/2016-10/documents/ucmr3-lab-approval.pdf> or approved by the Department. Method 537 can be used to analyze drinking water for fourteen (14) PFAS compounds. Method 537.1 can be used to analyze drinking water for (18) PFAS compounds. The PWS shall require reporting limits of 2 parts per trillion (ppt) or lower for each of the following (6) PFAS:

- Perfluorooctanoic acid (PFOA)
- Perfluorooctanesulfonate (PFOS)
- Perfluorononanoic acid (PFNA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorodecanoic acid (PFDA)

All other PFAS contaminants must be reported at this level or, if not achievable, at the lowest feasible Minimum Reporting Level (MRL).

GWUDI

The proposed production well is to be located over 150 feet from the nearest surface water feature, Eagle Brook. The wells will be constructed with a sanitary seal. The proposed location and construction meet the exemption criteria for Groundwater Under Direct Influence of Surface Water (GWUDI). The replacement well will not be subject to Microparticulate Analysis testing (MPA) or the Surface Water Treatment Rule (SWTR).

CONCLUSION

Following the completion of the pumping tests, a source final report shall be submitted to the Department. The report shall include a qualitative and quantitative evaluation of the data gathered during the pumping tests, and a surveyed site plan showing the location and elevation of the replacement well with a clear depiction of the Zone 1. Please submit one hard copy and a PDF copy of the report, figures, design plans and appendices to the Department at the SERO office. Specifications for construction of the finished well may be submitted electronically. The Department is currently updating its ePlace portal to include online submission of replacement well documents. Please contact Department staff prior to submitting the pumping test report for instructions on how to submit the materials. Please note, addition of a proposed replacement well may require a new Water Management Act (WMA) permit application.

Either following or simultaneously with the source final report, the PWS is required to submit an application for a BRP WS 20 – Approval to Construct a Source 70 Gallons per Minute or Greater. The application package shall include: a surveyed site plan showing the location and elevation of the wellfield and the extent of the Zone I;

Pumping Test Proposal

profile of each well; design plans and specifications for construction of the finished wellfield, any associated pumping station upgrades, and conveyance to a water treatment plant.

The replacement well may not be used for public water supply until the Department has granted its written final approval to do so. The Department will issue a public water supply source identification number upon final approval.

Please be reminded that the PWS is responsible to comply with all other Federal, State and local laws, regulations and/or ordinances applicable to this project.