



# LIMITED DESKTOP SITE SCREENING REPORT

**Town of Hopedale, MA**

October 22, 2020

**ENVIRONMENTAL**  
 **PARTNERS**

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# 1.0 INTRODUCTION

The Town of Hopedale is considering purchasing one privately held parcel at the north end of Town known as 364 West Street (Parcel 2-5-0)(herein referred to as the “Chapter 61 Parcel”). The Chapter 61 Parcel is currently owned by the One Hundred Forty Reality Trust and a portion of the parcel is currently managed as forest lands under M.G.L. c. 61 (herein referred to as the Chapter 61 Forest Land). The landowner provided a Notice of Intent to sell 364 West Street to the Town of Hudson on July 9, 2020. Pursuant to M.G.L. c. 61, the Town has the right of first refusal to purchase the chapter 61 Forest Land portion of the Chapter 61 Parcel. Environmental Partners Group, Inc. (EP) on behalf of the Town and Mackie Shea Durning PC (MSD) conducted a limited desktop evaluation of the Chapter 61 Parcel as a potential new public water supply source. Figure 1 is a topographic map showing the location of the Chapter 61 Parcel.

## 1.1 Background

The 364 West Street parcel is 155.24 acres in area, including 25.06 acres of wetlands that are excluded from the Chapter 61 Forest Land designation (Figure 2). Thus, the Chapter 61 Forest Land covers 130.18 acres. The Town is currently evaluating whether to exercise its right of first refusal for the Chapter 61 Forest Land, and it may seek to include the 25.06 acre “excluded wetland parcel” in the acquisition. For purposes of this desktop evaluation, EP has assumed that this wetland parcel is included in the purchase and can also be utilized for water supply protection purposes.

The Chapter 61 Parcel abuts the northern end of a 279.7 acre parcel owned by the Town of Hopedale Parks Commission (herein referred to as the Town Parcel) and is situated just north of Hopedale Pond (Figure 1). The Mill River runs north to south through the eastern portion of the Chapter 61 Parcel. Wetland Resource Areas (as mapped by Massachusetts Department of Environmental Protection) cover a section of the parcel’s eastern portion that contains the Mill River. The Grafton-Upton Railroad (GUR) right-of-way crosses north-south through the Chapter 61 Parcel and the Town Parcel. Additionally, a gas line easement runs through the western edge of both parcels.

There are currently no public water supply wells located on the Town Parcel; however, the Zone II for the Town’s public water supply wells extends onto the Town Parcel as shown on Figure 3. The Chapter 61 Parcel and Town Parcel are both located hydraulically upgradient of all of the Town’s public water supply sources and these parcels provide an important buffer for protection of the Town’s public water supply wells.

The existing public water supply wells in the Town of Hopedale consist of 33 wells within the Mill Street Wellfield, 3 gravel pack wells at Green Street, and 2 bedrock wells at Green Street (Figure 3). The combined permitted capacity of these three sources is 307.67 million gallons per year (MGY) or a combined pumping rate capacity of approximately 582 gallons per minute (gpm). The actual combined current capacity of these three sources is 136.91 MGY or approximately 260 gpm.

The Town has conducted limited desktop and field water supply exploration on both the Chapter 61 Parcel and Town Parcel in the past, but the two test borings did not identify productive well sites (Figure 4) and access to the larger portion of the parcels is a limiting factor. The combined addition of the Chapter 61 Parcel with the Town Parcel will provide a much larger available area for water supply exploration and development.

Based on existing service connections and water demands, the current water supply sources are pumping at full capacity and the Town is limited on any future development without a new or expanded water supply source.

The Town has interconnections with the water distribution system of neighboring communities for emergency service or to help meet high demand periods. A new water supply source would provide the Town with the additional capacity and add redundancy and resilience to the water system.

## 1.2 Desktop Study Area

As discussed above, the Town is considering acquiring all of 364 West Street for public water supply protection and possible development of a new public water supply source. The Chapter 61 Parcel is a 155.24 acre, undeveloped property consisting primarily of forestland and wetland and abuts the north end of a 279.7 acre undeveloped Town Parcel.

If the Town would like to develop a new public water supply source, then Massachusetts Department of Environmental Protection (MassDEP) Water Supply Regulations 310 CMR 22.21 require that the Town own or control a Zone I protective radius around the well or wellfield. Current and/or future land uses within the Zone I must be limited to those directly related to the provision of public drinking water or have no significant adverse impact on water quality. For public water supplies pumping greater than 100,000 gpd, the Zone I protective radius for a single well is 400 feet and for a wellfield is 250 feet.

The potential area for development of a new source public water supply well was determined by mapping the potential land area where the Town could own a Zone I protective radius. A 400-foot buffer for a single well and 250-foot buffer for a wellfield was mapped around the perimeter of the parcel boundaries and land within those buffers could be used for development of a public water supply well or wellfield, provided suitable aquifer material is present.

Figure 5 shows the 400-foot and 250-foot Zone I buffers on the Town Parcel and Figure 6 shows these buffers with the addition of the Chapter 61 Parcel. As shown, addition of the Chapter 61 land would significantly expand the potential area for public water supply development. Both the Chapter 61 Parcel and Town Parcel and are the focus of this desktop study.

This report presents the results of the potential water supply development desktop screening study. This desktop study evaluates the Chapter 61 Parcel in conjunction with the Town Parcel against a defined set of criteria to assist the Town in determining whether these parcels individually or combined may be suitable for further exploration for a potential public water supply source or as water supply protection for the Town's existing sources.

## 2.0 METHODOLOGY

The physical characteristics of the Chapter 61 Parcel and Town Parcel were compiled and evaluated based on criteria described in Massachusetts Department of Environmental Protection (MassDEP) guidance for siting new public water supplies (*MassDEP Chapter 4 – Groundwater Supply Development and Source Approval Process – Section 4.3*). The following information was developed:

1. The location of the Chapter 61 Parcel was displayed over a topographic map (Figure 1), Town of Hopedale parcel data (Figure 2), and aerial photograph (Figure 3).
2. A map was prepared showing the 400-foot Zone I areas for a single well and 250-foot Zone I area for a wellfield for both the Chapter 61 Parcel and the Town Parcel. Hydrologic constrains, including a 100-foot wetlands and 150-foot surface water buffer were also mapped (Figures 5 and 6).
3. Mapped USGS Surficial Geology was examined and mapped in relation to potential Zone I areas (Figure 7).
4. The following features within the parcel of study and within a 0.5-mile radius of the parcel were mapped using data from Massachusetts Bureau of Geographic Information (MassGIS), United States Geologic Service (USGS), and Environmental Data Resources (EDR) Record Search, and other readily available public information.
  - Areas of Critical Environmental Concern
  - Priority habitats for rare and endangered species
  - Proximity to surface water bodies (lakes and ponds) and certified vernal pools
  - Wellhead protection areas
  - Private water supplies
  - NPDES permit sites
  - Hazardous waste (21E) sites, as listed in the Department of Environmental Protection data base
  - Stocked trout streams and cold water fisheries
  - Automobile graveyards and junkyards
  - Petroleum and oil bulk stations and terminals
  - Agricultural uses
  - Proximity to industrial parks
  - Parcels with conservation restrictions
  - Proximity to landfill disposal sites
  - Proximity to wastewater treatment and effluent disposal facilities
  - Municipal Zoning

This information is shown in Figures 8 and 9.

5. A map was prepared showing land uses within the 0.5-mile radius of each site. Land uses within the Zone I of the well site that are not consistent with MassDEP regulations, or land uses within a 0.5 mile radius that could potentially impact water quality (i.e., industrial properties, multifamily residential properties with onsite septic, etc.) were identified. The land uses are shown on Figure 9.

6. The Sustainable Water Management Initiatives (SWMI) Basins were evaluated and mapped to determine the percent groundwater depletion, to determine if the basin is potentially suitable for permitting a new groundwater public water supply source (Figure 10).
7. The Chapter 61 Parcel was also mapped in relation to existing water supply protection areas, being existing Zone IIs (Figure 3).
8. A review was performed of MassDEP's Waste Site and Reportable Releases Database for oil and/or hazardous materials releases on or near the parcel of study.
9. An EDR report was reviewed to inventory underground storage tanks, Superfund, Brownfield, RCRA, and NPDES-permitted sites within 0.5 miles from the parcel of study, as well as environmental records for various other nearby sites that could generate hazardous waste (included in Appendix A).
10. A review of a previous fracture trace analysis (FTA) and exploratory borings was performed and results compared with finding from this study (Figure 4).

It should be noted that this desktop screening evaluation is based solely on database searches of readily available public information. Prior to property acquisition or initiating additional water supply development activities at the potential site, the results of this desktop evaluation should be assessed further and/or verified in the field.

## 3.0 SITE EVALUATION RESULTS

The information collected for the Chapter 61 Parcel and Town Parcel combined are described below and include the criteria discussed in Section 2.

### Land Ownership

The Land Ownership criteria evaluates what land is available for groundwater supply exploration, and is based on ownership and control of the MassDEP required Zone I area.

- The parcel of study, the Chapter 16 Parcel, is owned by the One Hundred Forty Realty Trust and is currently partially managed as forest lands under Chapter 61. The Town has the right of first refusal to acquire the forestry lands subject to M.G.L. c. 61.
- Figure 6 shows the land area within the Chapter 61 Parcel where the Town could site a public water supply well. As shown, the potential area for exploration could extend southward onto existing Town Parcel and combined there is significantly larger, than either the Town Parcel or Chapter 61 Parcel individually.
- As shown on Figure 5, there is sufficient area on the Town Parcel to the south to locate a public water supply well or wellfield. However, should someone else acquire the Chapter 61 Parcel and the property developed use is not consistent with public water supply protection or Zone II land uses, then portions of the Town Parcel may no longer be suitable for public water supply development.
- The parcel of study includes 25.06 acres of wetland resource areas that are excluded from the Chapter 61 Forest Lands designation. If the Town acquires the Chapter 61 land, but does not acquire the excluded wetlands portion of the parcel, the potential land area to site a water supply well within this parcel is significantly reduced. The development potential of the wetland resource area was not evaluated as part of this study.

### Hydrogeology

The MassGIS database for public water supply wells, water supply protection areas, and aquifers was reviewed to determine if existing water supply information indicate the area may be suitable for development of a new source water supply. The MassGIS layers indicate that the Chapter 61 Parcel is:

- Not within a MassGIS mapped high or medium yield aquifer.
- Not within a Wellhead Protection Area.
- Located approximately 4,000 feet from the northernmost edge of a previously permitted Zone II aquifer protection area for the Hopedale Public Water Supply Wells.

### Surficial Geology (from MassGIS Surficial Geology Data)

Figure 7 shows the USGS mapped surficial geology in the vicinity of the Chapter 61 Parcel and the Town Parcel. The surficial geology is reviewed to determine if there is mapped potential aquifer material for development of an overburden water supply source. Surficial geology does not preclude the potential development of a bedrock water supply source.



- The Chapter 61 Parcel geology consists of coarse glacial stratified deposits, swamp deposits, thin till, and thick till. The Town Parcel contains the same surficial geology deposits. Glacial till and swamp deposits are not typically suitable material for water supply development. The areas mapped as coarse glacial stratified deposits could potentially provide suitable aquifer material for development of an overburden public water supply. Subsurface exploration would be required to determine if there is potential aquifer material at potential sites.
- The coarse glacial stratified deposits (potential aquifer material) are located within the Mill River valley and the surrounding area is mapped as thin and thick till. The Town's current overburden water supply sources are located within the Mill River valley coarse glacial stratified deposits.
- As shown on Figure 7, the Town Parcel has limited areas of surficial geology potentially suitable for water supply development. Purchasing the Chapter 61 Parcel provides a much larger area with potentially suitable surficial geology for exploration.

### **Sensitive Receptors (Within 0.5 miles of parcel)**

Figure 8 is a map showing potential environment concerns within the vicinity of the Chapter 61 Parcel and the Town Parcel. This map shows potential environmental receptors that should be evaluated to determine if development of a public water supply well could have an adverse impact to the receptor.

- Areas of Critical Environmental Concern (ACEC) – No ACEC within 0.5 miles of the subject parcel.
- Priority Habitats – No Natural Heritage and Endangered Species Program (NHESP) Priority Habitats of Rare Species and NHESP Estimated Habitats of Rare Wetland Species mapped within 0.5 miles of the subject parcel.
- Vernal Pools – Two potential vernal pools are within 0.5 miles of the subject parcel.
- Lakes and Ponds – Mill Pond and Hopedale Pond are both within 0.5 miles of the subject parcel. Hopedale Pond extends into the southeastern corner of the parcel itself and Mill Pond is within 250 feet of the parcel. Mill Pond has been identified as a Category 5 water body on the 2016 Integrated List of Waters, meaning its impairments require a Total Daily Maximum Load (TMDL) for related to the impairments from non-native aquatic plants, macrophytes, PCB in fish tissue, and other unidentified impairment(s). Potential impacts from a public water supply source to these surface water features would need to be evaluated further.
- Protected Open Space – To the south, the subject parcel abuts Town-owned parkland, a protected open space. The Town has noted that the protected open space restrictions on the Town Parcel can be modified to allow development of a public water supply well. To the west, the subject parcel abuts DCR protected open space. Additionally, Town of Milford-owned and privately owned protected open spaces are located within 0.5 miles of the parcel, to the north and northeast.
- Stocked Trout Streams and Cold Water Fisheries – There are none within 0.5 miles of the subject parcel.

### **Potential Threats (Within 0.5 miles of parcel)**

Figure 7 shows potential areas or sites of concern that could adversely impact water quality at the Chapter 61 Parcel or the Town Parcel. Figure 8 is a map showing land uses on these parcels or in the surrounding area.

- NPDES Permit/Discharge Sites – None within 0.5 miles of the subject parcel.
- 21E Release Sites – A parcel 2,000 feet away from the Chapter 61 Parcel is listed as having had a 17-gallon transmission oil spill. A permanent solution (Class A2 Response Action Outcome) was submitted in 1996, indicating that a condition of No Signification Risk has been achieved, but the contamination was not reduced to background.
- Automobile Graveyards and Bulk Oil Stations – None within 0.5 miles of the subject parcel.
- Active or Inactive Landfills – None within 0.5 miles of the subject parcel. The nearest landfill is the Draper Landfill, 4,100 feet south of the subject parcel. The Draper Landfill (a closed landfill) is listed as a Massachusetts state hazardous waste site with chlorinated solvents detected in surface water and groundwater. Although the Draper Landfill is located greater than ½ mile from the Chapter 61 Parcel, the landfill abuts the Town Parcel to the west and southwest and based on proximity could potentially adversely impact water quality on the Town Parcel. The Chapter 61 Parcel would be more advantageous.
- Wastewater Treatment Facility – None within 0.5 miles of the subject parcel.
- Other Non-Open Land Uses Present
  - Industrial land, including a nursing home, a removal and salvage company, and a landscaping supply store.
  - Commercial land, including auto repair shops, car dealerships, and a storage company.
  - Residential land.

### **Fracture Trace Analysis and Previous Borings Findings**

Figure 4 summarizes existing borings that have been drilled on the Chapter 61 Parcel or the Town Parcel or within Town, as well as areas previously recommended for water supply exploratory drilling.

- The Town of Hopedale has previously conducted a bedrock exploratory boring in 2008. The test well was located in the southern portion of the Town Parcel and drilled to 600 feet below ground surface. This well did not produce any viable amount of water.
- Shallow test wells were drilled across town over the past 30 years. In 1988, the Town conducted an exploratory boring in the south of the Town. In the 1990s, additional test wells were drilled in the Chapter 61 Parcel, to the east of the Mill River; the drilling location was selected based on ease of access. Test wells were drilled in 2019 in the center of Town. All these test wells found material too fine to be suitable aquifer material.
- The results of the exploratory borings completed since 1988 indicate that potential water supply sources within the Town may be limited.

- A Fracture Trance Analysis (FTA) was completed in September 2019 and identified three locations on the Chapter 61 Parcel that contain a high concentration of photolinears (fracture traces) in the bedrock of a significant length. Two of the locations identified are within 100 feet of wetlands. The proximity to wetlands does not preclude water supply well development; however, additional steps need to be taken, including approval from the Hopedale Conservation Commission and MassDEP. The third potential bedrock well location is on the boundary between the Chapter 61 Parcel and the Town Parcel.

### **Sustainable Water Management Initiatives (SWMI) Basins**

SWMI Groundwater Withdrawal maps show the level of groundwater depletion within a drainage basin to determine the extent of impact from groundwater withdrawal sources. SWMI Basin Groundwater Withdrawal categories are ranked from 1 to 5 with Category 5 having the highest level of groundwater depletion.

- As shown on Figure 10, the Chapter 61 Parcel and Town Parcel are located within a SWMI Basin that is Category 4: 25 to <55% depleted. Based on a Category 4, the basin has some depletion, but the MassDEP could consider permitting a new public water supply source.

### **New Source Capacity Estimation**

A rough estimation of potential well capacity was performed based on the following steps.

- The area of aquifer material present up-gradient of the Chapter 61 Parcel that approximates the Zone II area was estimated to be 16 million square feet (367 acres).
- Average annual rainfall in the Hopedale area is 45 inches per year. USGS estimates of recharge to the aquifer in Massachusetts is approximately 24 inches annually.
- Assuming two feet of recharge per year, the total recharge to the aquifer would be 650,000 gallons per day.
- Assuming that the whole area mapped by USGS as coarse sand deposits is a potentially productive aquifer and that a well could effectively produce 40 percent of the available water in the aquifer, a well could produce up to 260,000 gallons per day. This well capacity is within the range of the permitted capacity of the existing water supply sources in the Town of Hopedale.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

EP performed a limited evaluation of the Chapter 61 Parcel as the site for a potential new public water supply source. The goals of the evaluation were to provide the Town with a preliminary assessment of water supply viability, identify potential site constraints, and evaluate related factors concerning suitability of the subject parcels. The objective of the evaluation was to develop recommendations as to whether the Chapter 61 Parcel should be considered further for public water supply exploration or if identified site constraints may preclude development of a new public water supply source. In addition, the Chapter 61 Parcel was evaluated to determine if the Town should consider ownership of the parcel for protection of their existing public water supply sources.

The desktop study also included the adjacent Town Parcel to the south, because if combined the two parcels could provide a significantly larger area for potential water supply exploration and reduce potential site constraints associated with property boundaries. Following is a summary of the key conclusions of the limited desktop study.

1. Limited areas for public water supply exploration are identified on the Town Parcel. The Chapter 61 Parcel significantly increases the potential area for public water supply exploration.

Figure 11 shows the potential area identified for potential water supply exploration. This mapped area only includes:

- Land where the Town could own and control a 250-foot or 400-foot Zone I protective radius;
- Land outside the 100-foot wetlands and 150-foot surface water buffers; and,
- Land with mapped potential aquifer material.

The parcel of study, the Chapter 61 Parcel, is located in the northern section of the Town of Hopedale. The optimal location for siting a new water supply source within this parcel is just west of the wetlands buffer in the eastern portion of this parcel. The potential well site location is on undeveloped forested and non-forested land.

As shown on Figure 11, the Town currently owns approximately 1.67 acres of land within the northern portion of the Town Parcel that could be suitable for a single well source and approximately 2.82 acres for a wellfield. If the Town acquires the Chapter 61 Parcel, then combined the suitable land within this area is increased to approximately 16.72 acres for a single well and approximately 21.09 acres for a wellfield.

2. Potential sensitive environmental receptors are identified within a ½-mile radius that would need to be evaluated further.

Mill Pond and Hopedale Pond are both within 0.5 miles of the Chapter 61 Parcel. Hopedale Pond extends into the southeastern corner of the parcel itself and Mill Pond is within 250 feet of the parcel. Hopedale Pond is located within the Town Parcel. In addition, two potential vernal pools are located within a ½-mile radius of the Chapter 61 Parcel. Potential water supply pumping impacts to these surface water features would need to be evaluated further.

3. No obvious potential areas of concern are identified that would preclude development of a public water supply source on the Chapter 61 Parcel with the exception of the existing Grafton-

Upton railway. Further expansion of the railway operations on the parcel could lead to additional site constraints on both the Chapter 61 Parcel and the Town Parcel.

The Draper Landfill is a closed landfill and is located over ½ mile to the south and downgradient of the Chapter 61 parcel, and as such is not anticipated to impact water quality. However, the Draper Landfill abuts the Town Parcel and could be a potential source of contamination to groundwater near the central or south portions of the Town Parcel.

4. Potential bedrock water supply locations identified are on or require portions of the Chapter 61 Parcel for the MassDEP required Zone I.

The Town had a fracture trace analysis conducted in September 2019 to identify potential areas for bedrock groundwater exploration. Three potential locations were identified, of which two are located on the Chapter 61 Parcel and one location is located along the parcel boundary, which would require ownership or control of part of the Chapter 61 Parcel for a 400-foot Zone I.

5. The Chapter 61 Parcel provides additional protection for the Town's existing public water supply sources.

The Chapter 61 Parcel is located within the Mill River valley, upstream and upgradient of the Town's three existing public water supply sources. Ownership or control of this parcel would provide additional water quality protection. In addition, ownership of the Chapter 61 Parcel would ensure that future land uses on the parcel are consistent with water supply protection and would not adversely impact groundwater quality.

Based on the preliminary desktop study the Chapter 61 Parcel should be considered for further groundwater supply exploration and to provide additional water quality protection for the Town's three existing public water supply sources.

## DEFINITIONS

**NHESP Priority Habitats of Rare Species** – The Priority Habitats of Rare Species data layer contains polygons representing the geographic extent of Habitat of state-listed rare species in Massachusetts based on observations documented within the last 25 years in the database of the Natural Heritage & Endangered Species Program (NHESP). Priority Habitat polygons are the filing trigger for project proponents, municipalities, and all others for determining whether or not a proposed project or activity must be reviewed by the NHESP for compliance with the (MESA) and its implementing regulations. Areas delineated as Priority Habitats can include wetlands, uplands, and marine habitats.

**NHESP Estimated Habitats of Rare Wetland Wildlife** – The Estimated Habitats of Rare Wildlife data layer contains polygons that are a subset of the Priority Habitats of Rare Species. They are based on occurrences of rare wetland wildlife observed within the last 25 years and documented in the NHESP database. They do not include those areas delineated as Priority Habitat for rare plants or for rare wildlife with strictly upland habitat requirements.

**Zone I** – Zone I means the protective radius required around a public water supply well or wellfield. For Public Water System wells with approved yields of 100,000 gallons per day (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. Protective radii for all other Public Water System wells, wellfields, and infiltration galleries are determined by the following equation: Zone I radius in feet =  $(150 \times \log \text{ of pumping rate in gpd}) - 350$ .

**Zone II** – Zone II means that 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). The Zone II must include the entire Zone I area.

## FIGURES



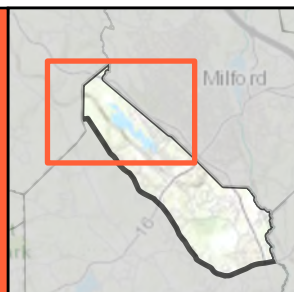
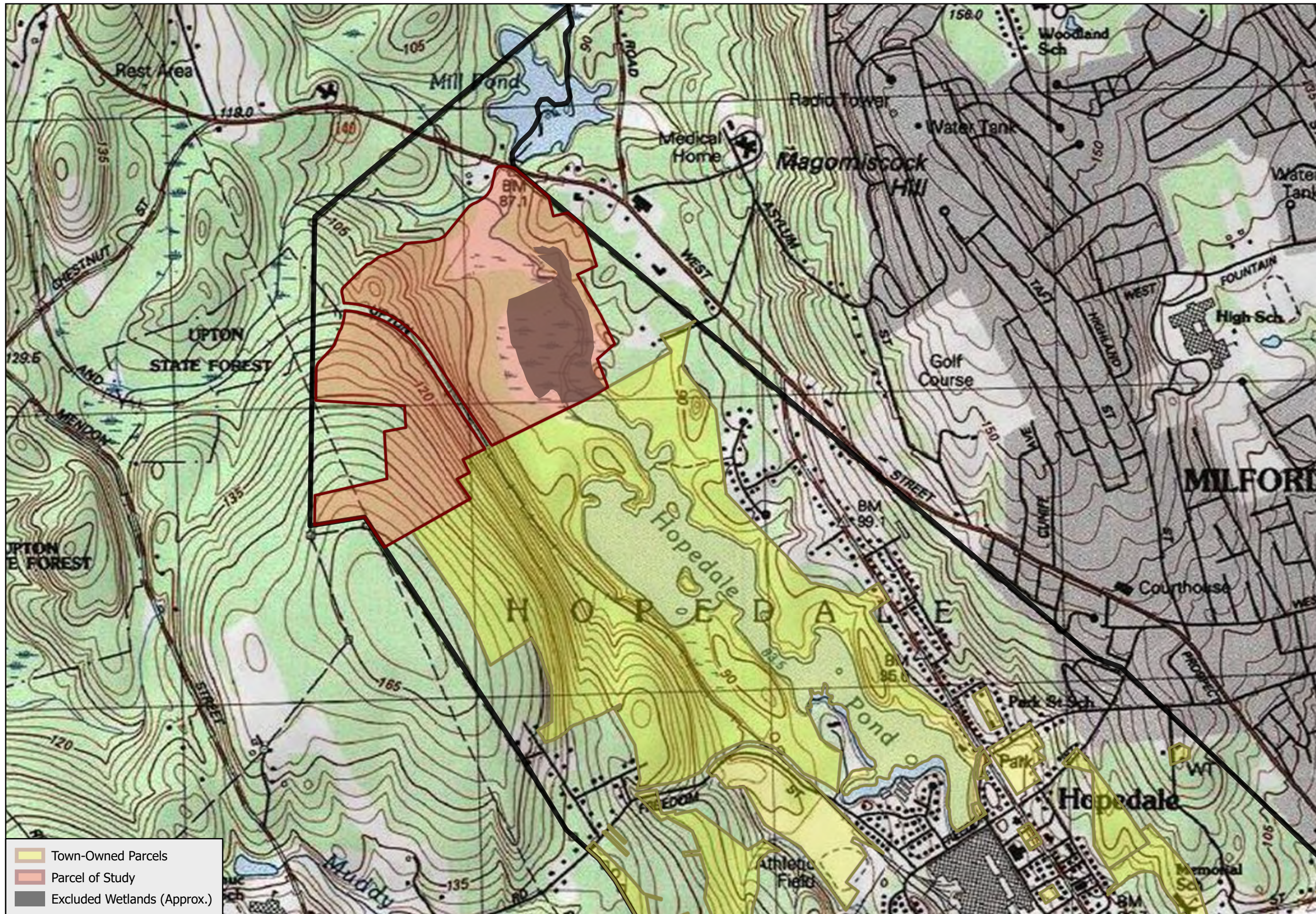


Figure 1: Chapter 61 Parcel and Town-Owned Parklands Topographic Map  
 Hopedale, Massachusetts



0 500 1,000  
 Feet

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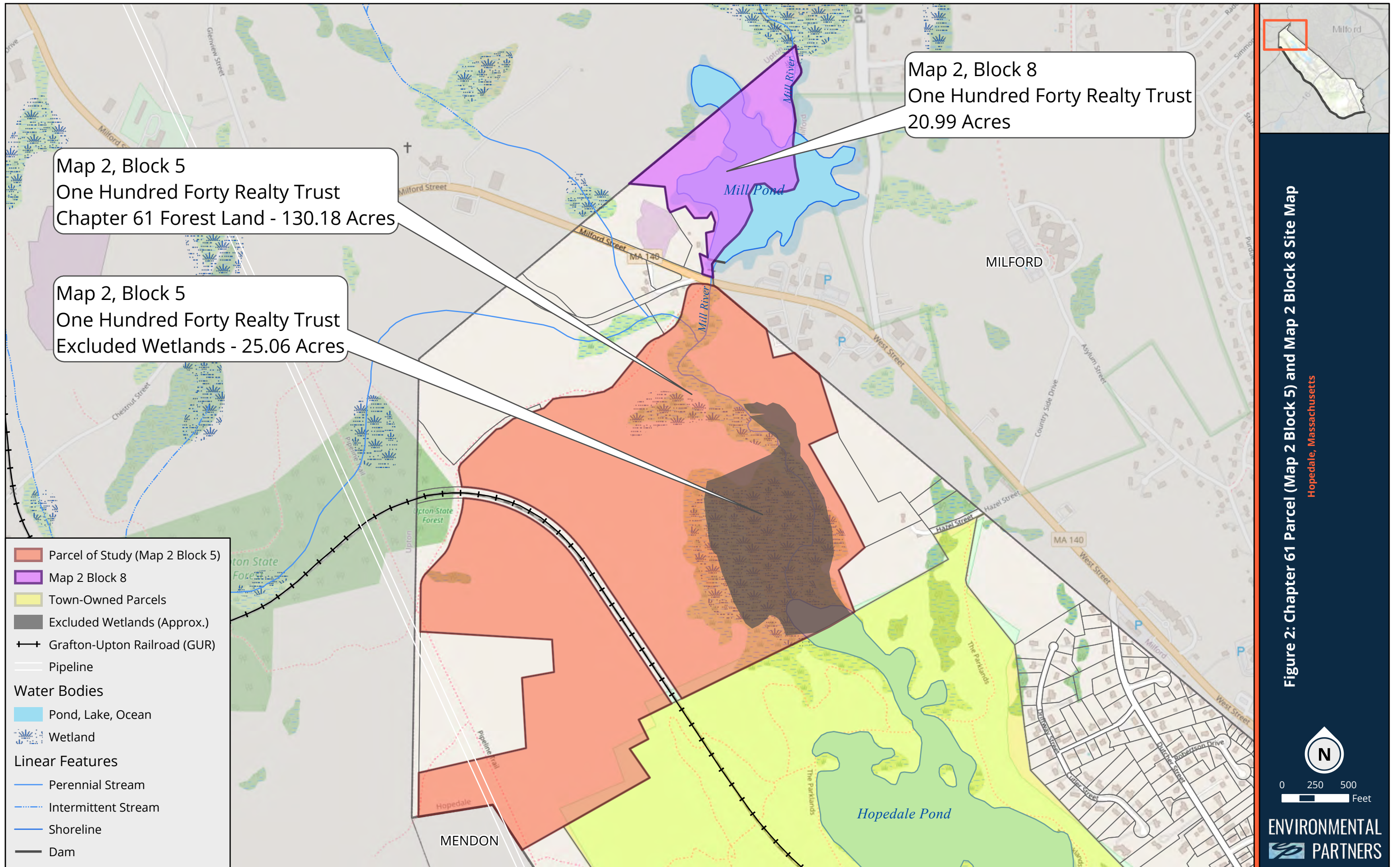


Figure 2: Chapter 61 Parcel (Map 2 Block 5) and Map 2 Block 8 Site Map  
 Hopedale, Massachusetts



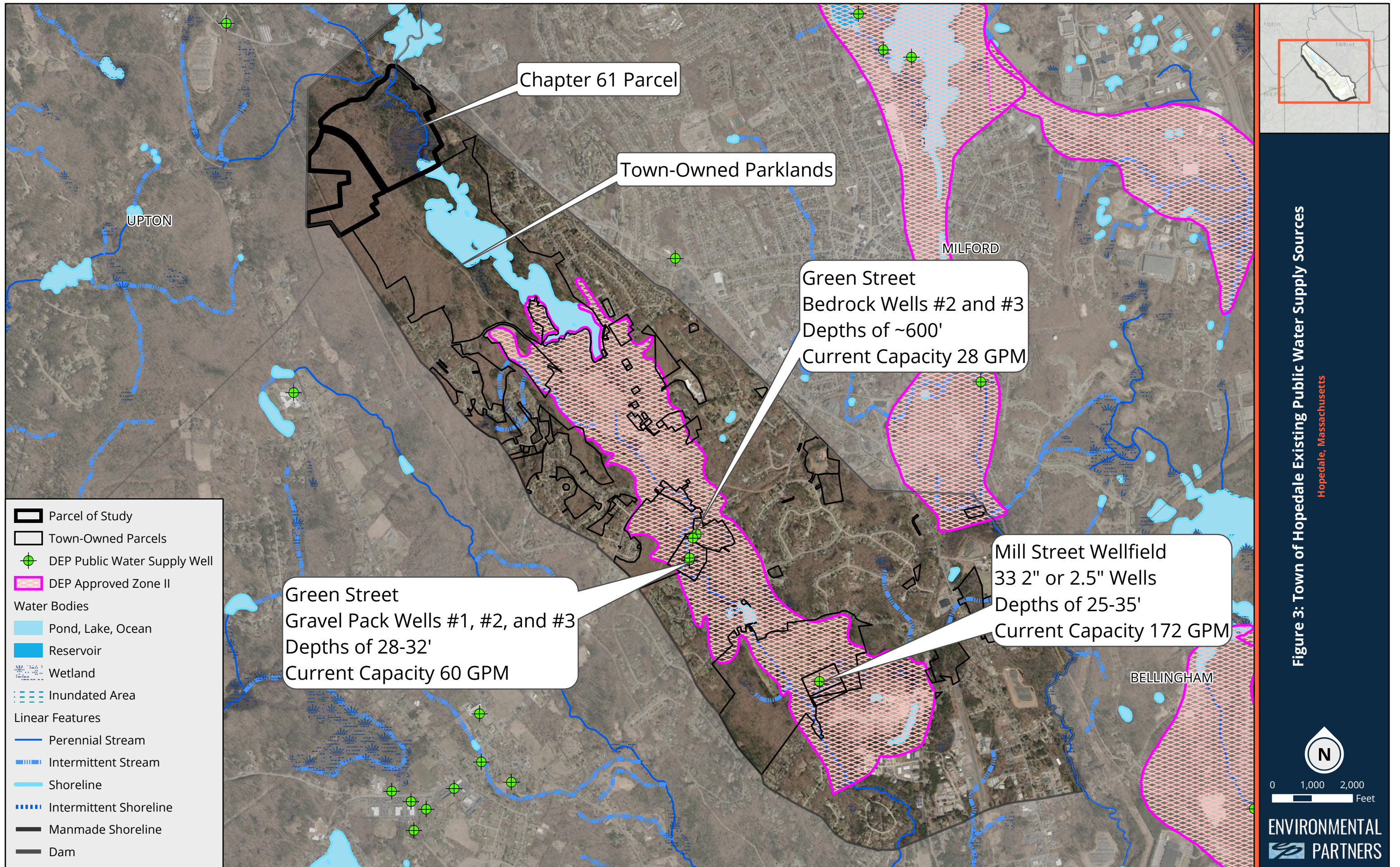


Figure 3: Town of Hopedale Existing Public Water Supply Sources  
 Hopedale, Massachusetts



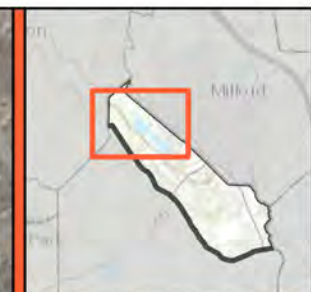
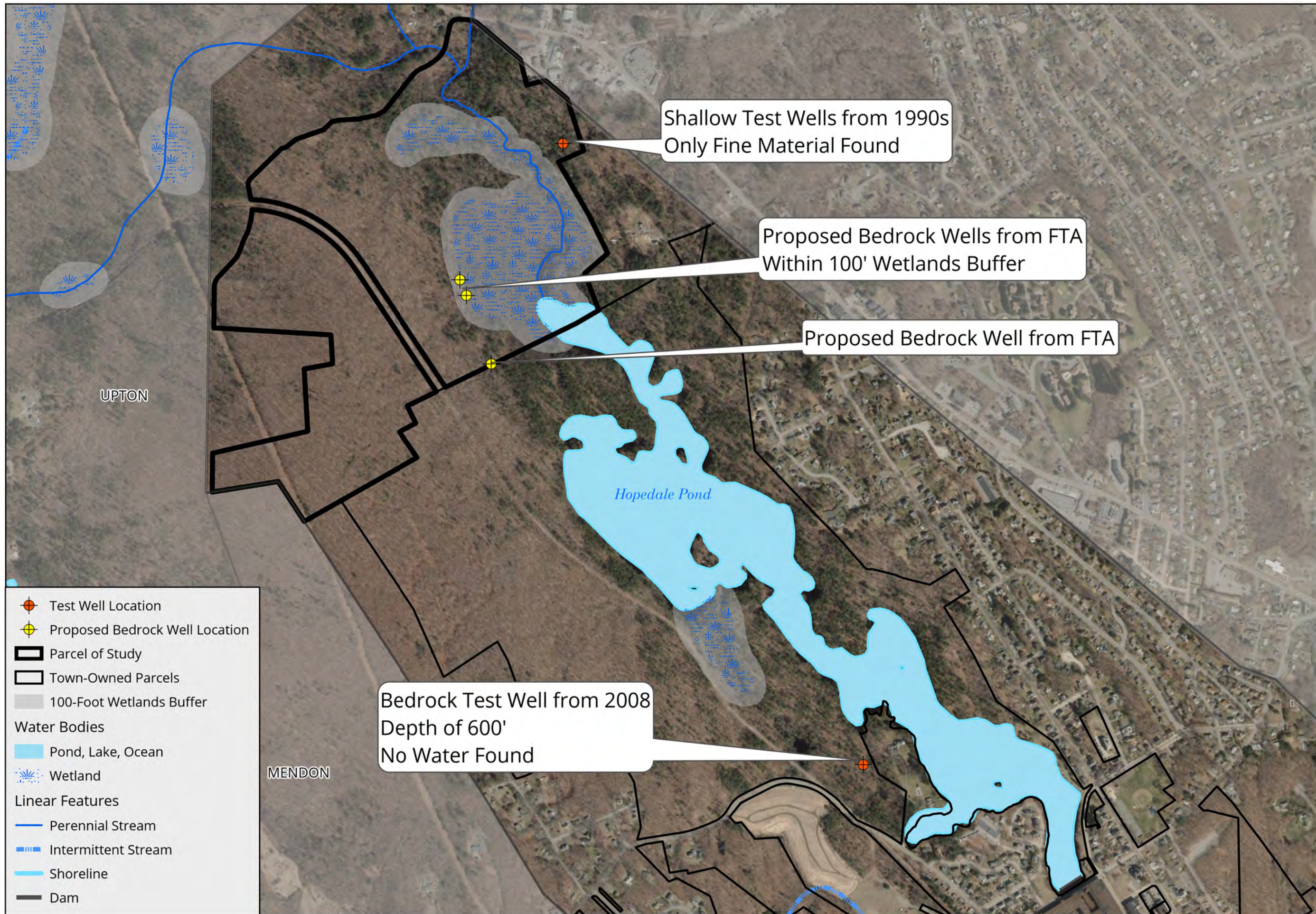
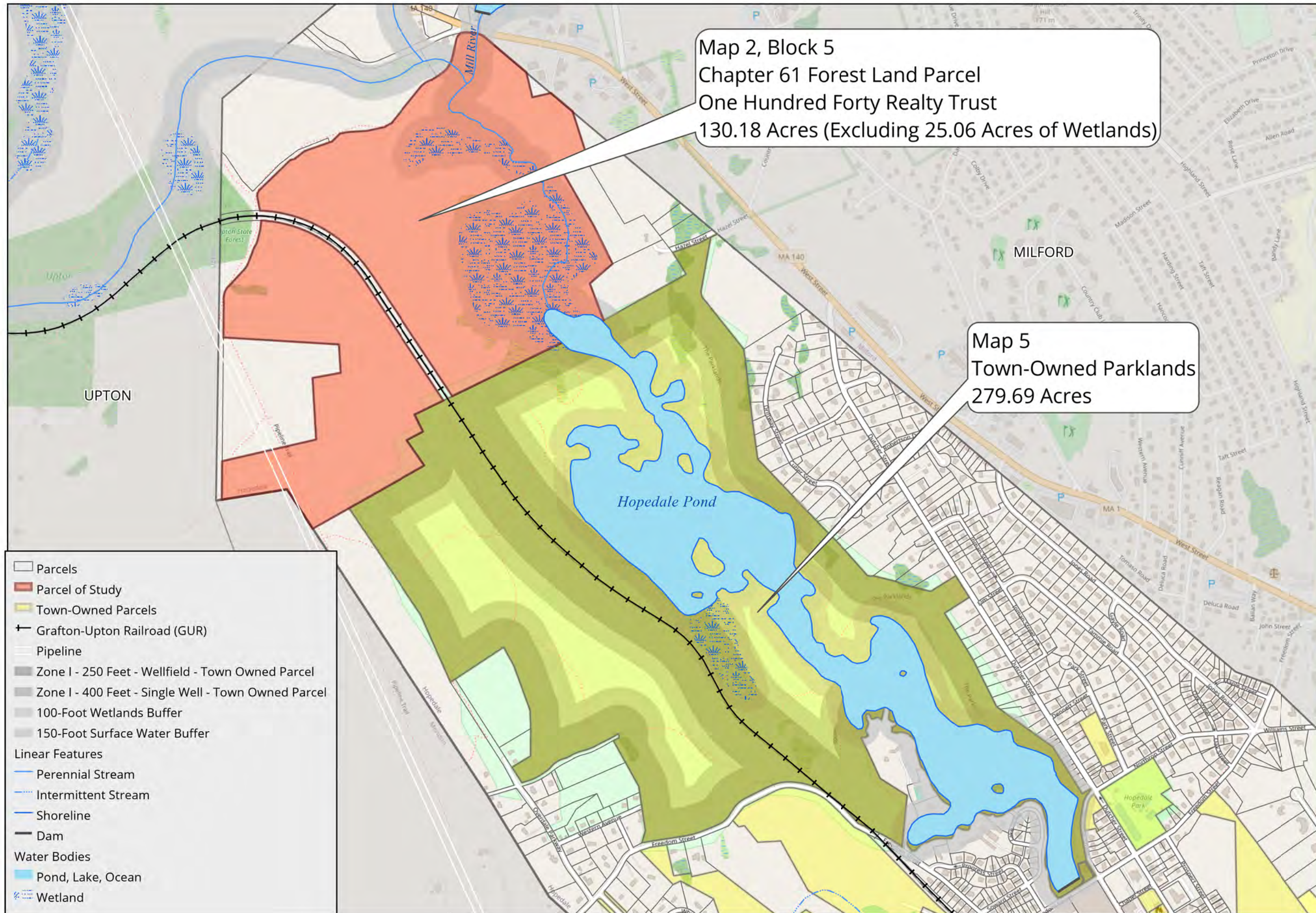


Figure 4: Town of Hopedale Previous Proposed and Test Well Locations  
Hopedale, Massachusetts





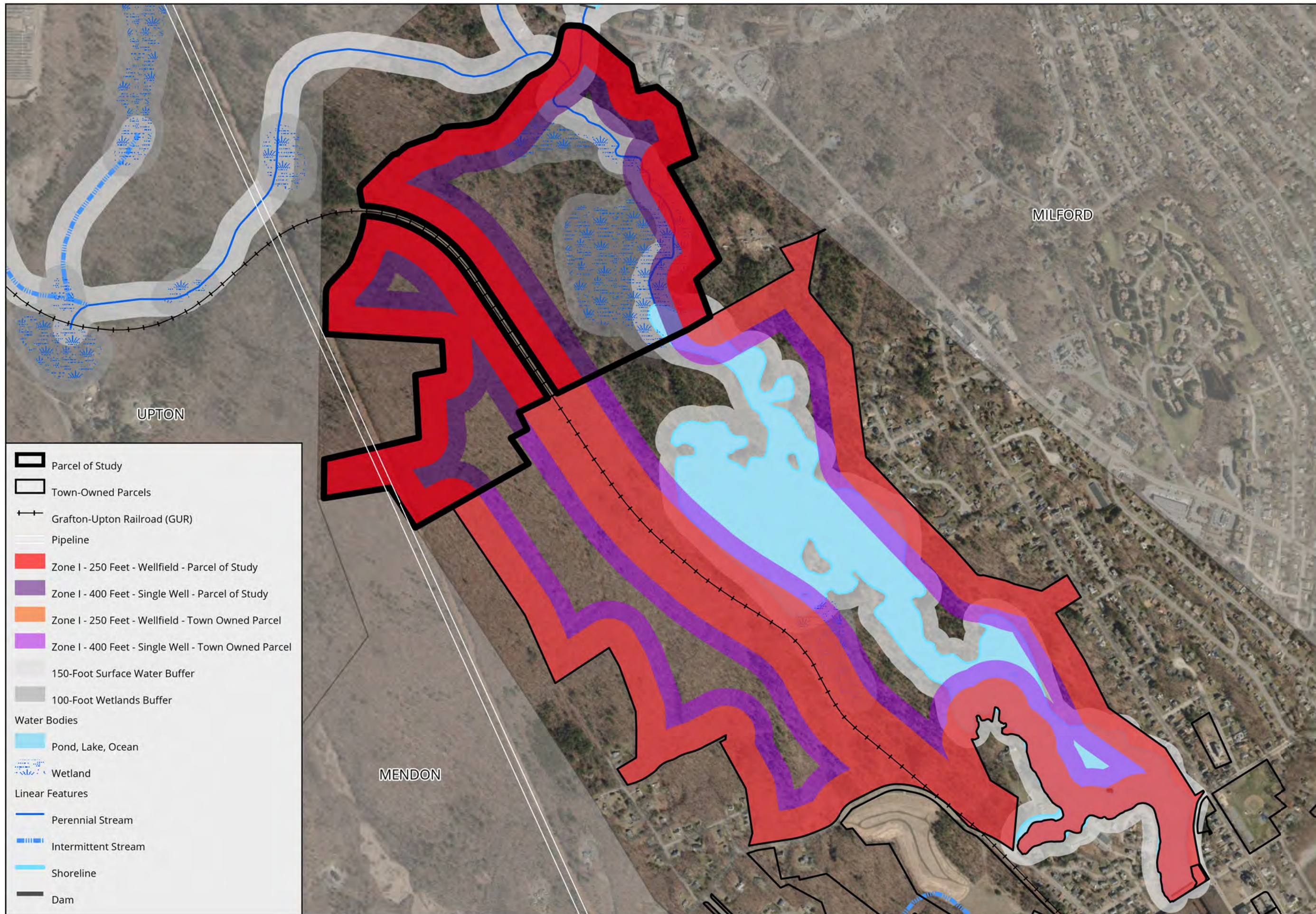


**Figure 5: Chapter 61 Parcel and Town-Owned Parklands Site Map**  
 Hopedale, Massachusetts

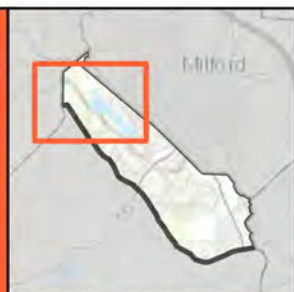
0 300 600 Feet

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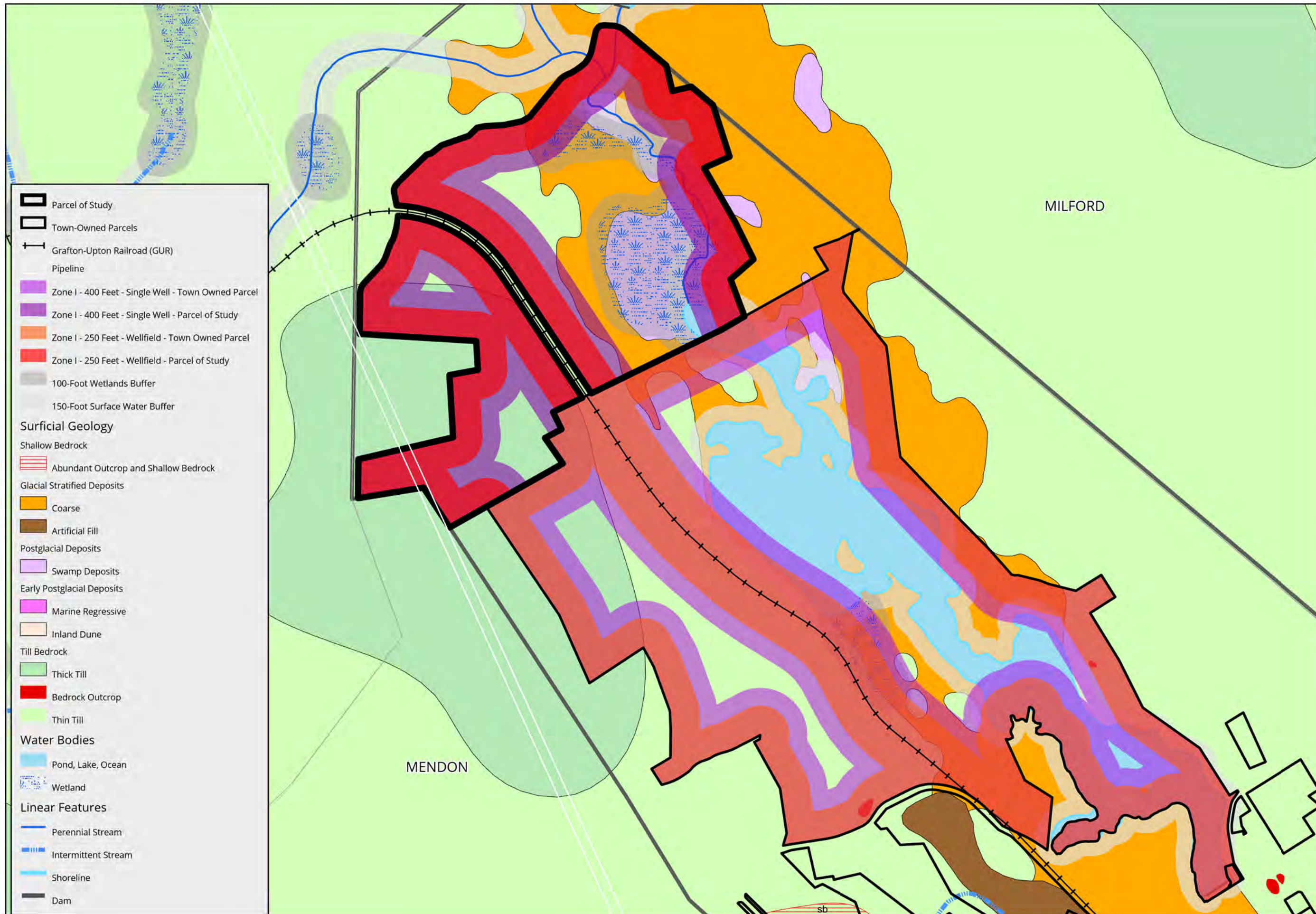
- Parcel of Study
- Town-Owned Parcels
- Grafton-Upton Railroad (GUR)
- Pipeline
- Zone I - 250 Feet - Wellfield - Parcel of Study
- Zone I - 400 Feet - Single Well - Parcel of Study
- Zone I - 250 Feet - Wellfield - Town Owned Parcel
- Zone I - 400 Feet - Single Well - Town Owned Parcel
- 150-Foot Surface Water Buffer
- 100-Foot Wetlands Buffer
- Water Bodies**
- Pond, Lake, Ocean
- Wetland
- Linear Features**
- Perennial Stream
- Intermittent Stream
- Shoreline
- Dam



**Figure 6: Chapter 61 Parcel and Town-Owned Parklands Zone I with Hydrology Constraints**  
 Hopedale, Massachusetts

0 300 600 Feet  
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- Parcel of Study
  - Town-Owned Parcels
  - Grafton-Upton Railroad (GUR)
  - Pipeline
  - Zone I - 400 Feet - Single Well - Town Owned Parcel
  - Zone I - 400 Feet - Single Well - Parcel of Study
  - Zone I - 250 Feet - Wellfield - Town Owned Parcel
  - Zone I - 250 Feet - Wellfield - Parcel of Study
  - 100-Foot Wetlands Buffer
  - 150-Foot Surface Water Buffer
- Surficial Geology**
- Shallow Bedrock**
- Abundant Outcrop and Shallow Bedrock
- Glacial Stratified Deposits**
- Coarse
  - Artificial Fill
- Postglacial Deposits**
- Swamp Deposits
- Early Postglacial Deposits**
- Marine Regressive
  - Inland Dune
- Till Bedrock**
- Thick Till
  - Bedrock Outcrop
  - Thin Till
- Water Bodies**
- Pond, Lake, Ocean
  - Wetland
- Linear Features**
- Perennial Stream
  - Intermittent Stream
  - Shoreline
  - Dam



Figure 7: Chapter 61 Parcel and Town-Owned Parklands Zone I with USGS Surficial Geology  
Hopedale, Massachusetts

N

0 300 600  
Feet

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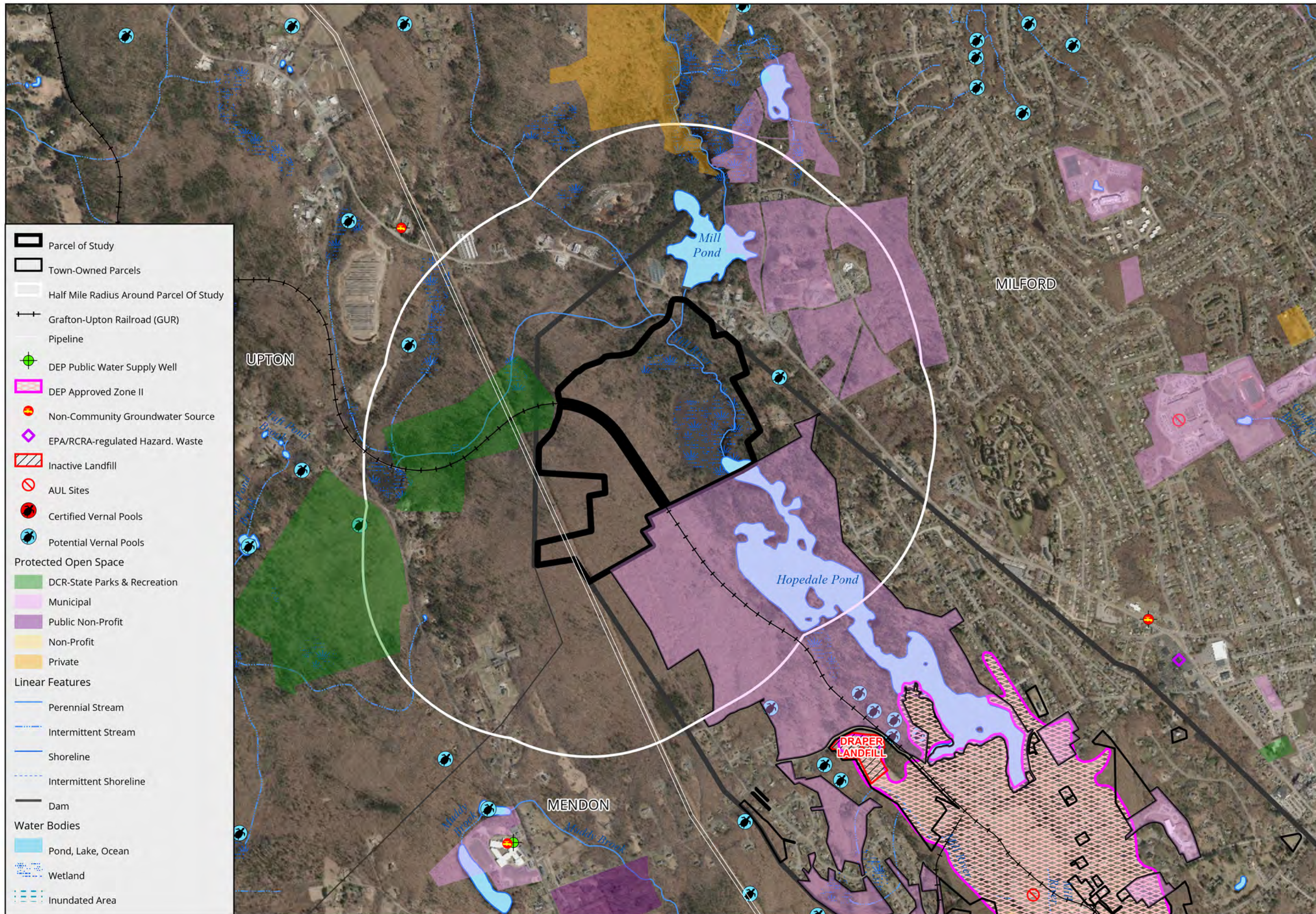


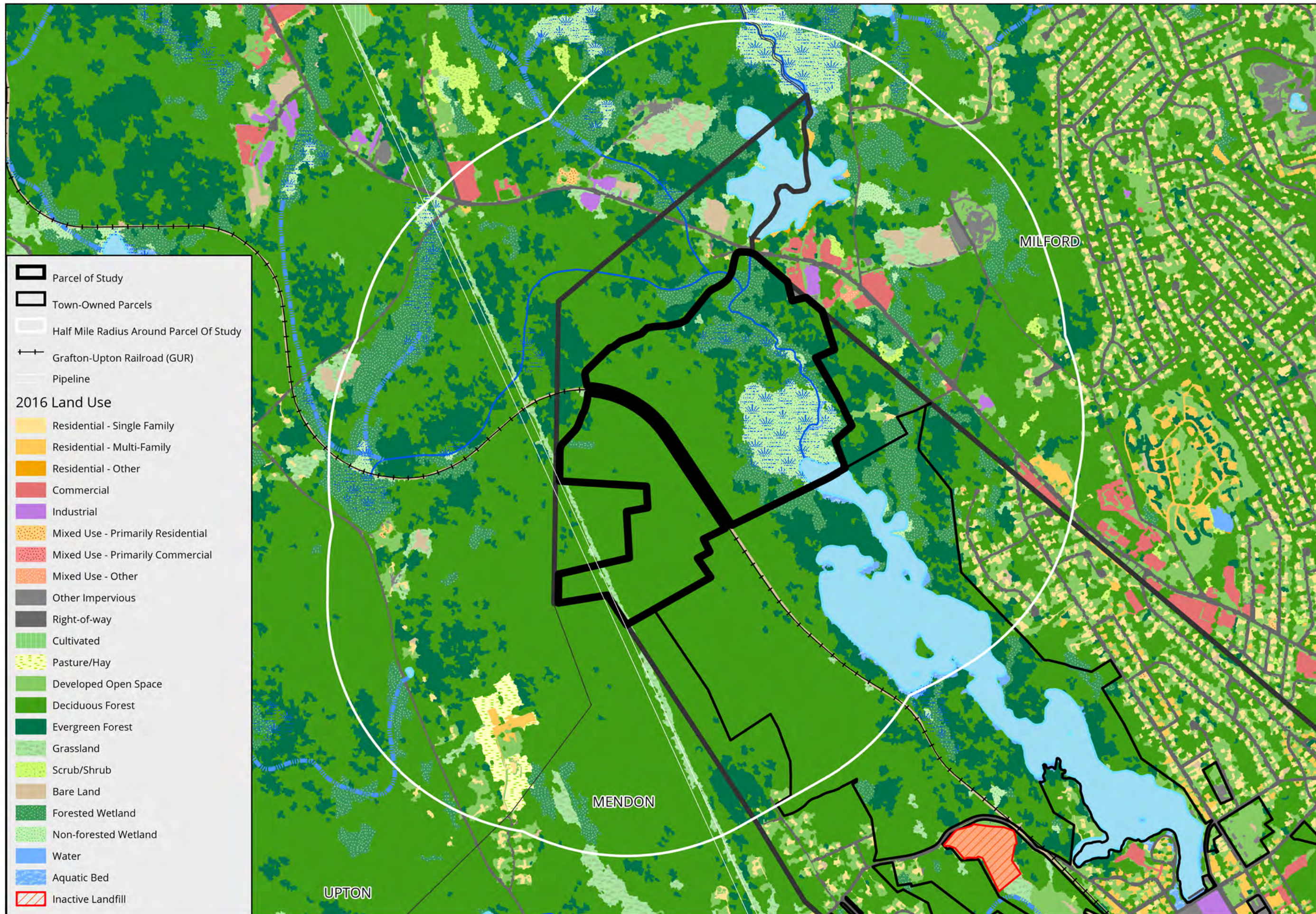
Figure 8: Chapter 61 Parcel with Environmental Concerns and 0.5 Mile Buffer

Hopedale, Massachusetts

0 500 1,000 Feet

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- Parcel of Study
- Town-Owned Parcels
- Half Mile Radius Around Parcel Of Study
- Grafton-Upton Railroad (GUR)
- Pipeline
- 2016 Land Use**
- Residential - Single Family
- Residential - Multi-Family
- Residential - Other
- Commercial
- Industrial
- Mixed Use - Primarily Residential
- Mixed Use - Primarily Commercial
- Mixed Use - Other
- Other Impervious
- Right-of-way
- Cultivated
- Pasture/Hay
- Developed Open Space
- Deciduous Forest
- Evergreen Forest
- Grassland
- Scrub/Shrub
- Bare Land
- Forested Wetland
- Non-forested Wetland
- Water
- Aquatic Bed
- Inactive Landfill



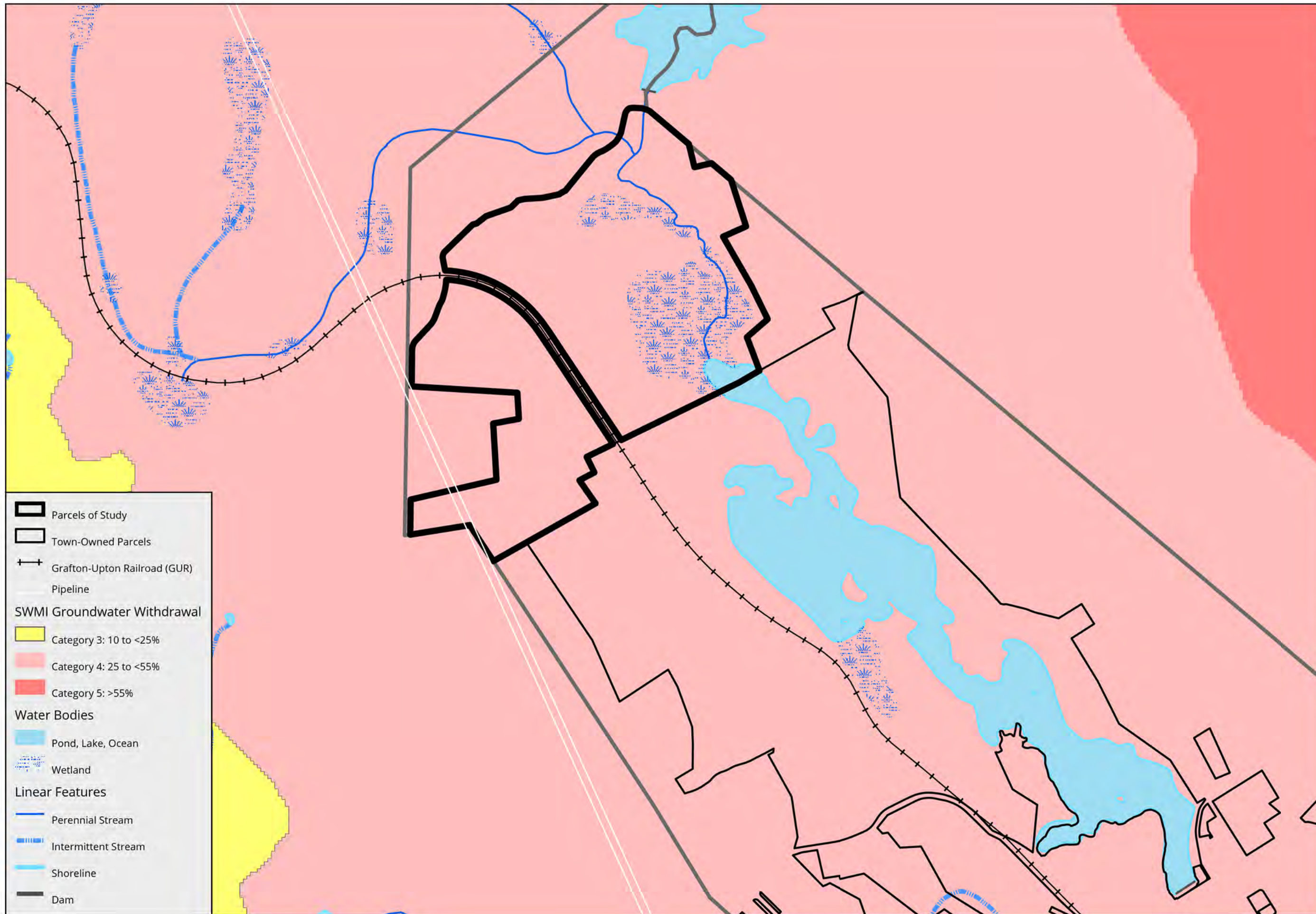
Figure 9: Chapter 61 Parcel with Land Uses and 0.5 Mile Buffer

Hopedale, Massachusetts



ENVIRONMENTAL PARTNERS



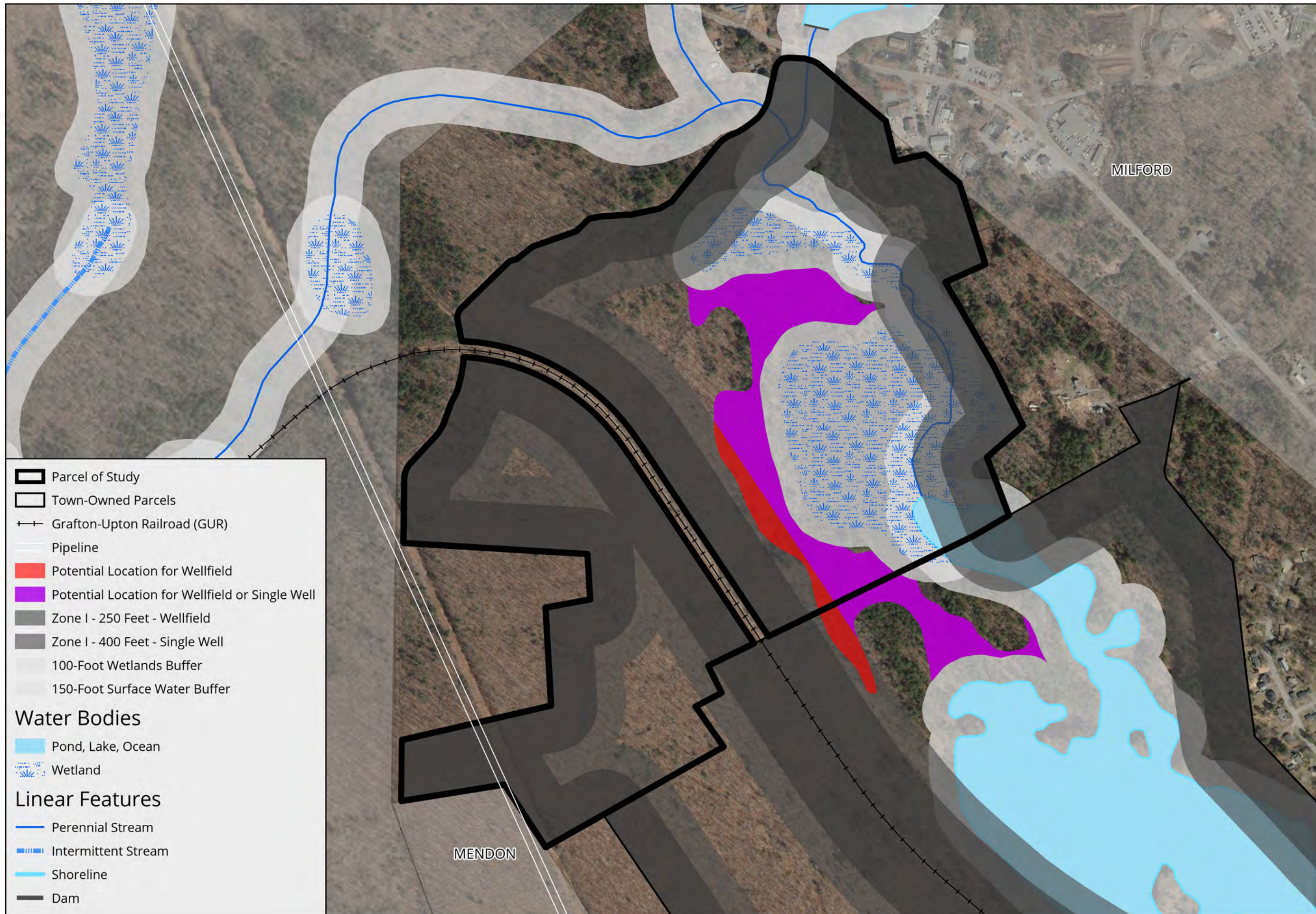


**Figure 10: Chapter 61 Parcel and Town-Owned Parklands with SWMI Basins**  
 Hopedale, Massachusetts

0 300 600 Feet

ENVIRONMENTAL PARTNERS





- Parcel of Study
- Town-Owned Parcels
- Grafton-Upton Railroad (GUR)
- Pipeline
- Potential Location for Wellfield
- Potential Location for Wellfield or Single Well
- Zone I - 250 Feet - Wellfield
- Zone I - 400 Feet - Single Well
- 100-Foot Wetlands Buffer
- 150-Foot Surface Water Buffer

**Water Bodies**

- Pond, Lake, Ocean
- Wetland

**Linear Features**

- Perennial Stream
- Intermittent Stream
- Shoreline
- Dam

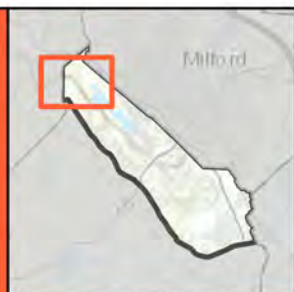


Figure 11: Chapter 61 Parcel Potential Single Well and Wellfield Locations  
Hopedale, Massachusetts

0    250    500  
Feet

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# APPENDIX A

(provided as separate file)



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The logo consists of a blue square containing a white stylized 'e' and 'p' intertwined.

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