



Massachusetts Department of Environmental Protection  
Source Water Assessment and Protection (SWAP) Report  
for  
**Pepperell Water Department**

### What is SWAP?

The Source Water Assessment and Protection (SWAP) program, established under the federal Safe Drinking Water Act, requires every state to:

- inventory land uses within the recharge areas of all public water supply sources;
- assess the susceptibility of drinking water sources to contamination from these land uses; and
- publicize the results to provide support for improved protection.

### Susceptibility and Water Quality

Susceptibility is a measure of a water supply's potential to become contaminated due to land uses and activities within its recharge area.

A source's susceptibility to contamination does *not* imply poor water quality.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, disinfecting, filtering, or treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Actual water quality is best reflected by the results of regular water tests. To learn more about your water quality, refer to your water supplier's annual Consumer Confidence Reports.

**Table 1: Public Water System Information**

<i>PWS Name</i>	Pepperell Water Department
<i>PWS Address</i>	15 Canal Street
<i>City/Town</i>	Pepperell, Massachusetts
<i>PWS ID Number</i>	2232000
<i>Local Contact</i>	Randall Troupe
<i>Phone Number</i>	(978) 433-5591

### Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential contaminant sources, including storm runoff, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

#### Purpose of this report:

This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate Best Management Practices (BMPs) and drinking water source protection measures.

Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

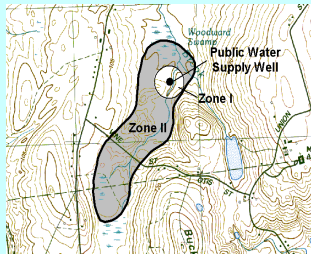
#### This report includes the following sections:

1. Description of the Water System
2. Land Uses within Protection Areas
3. Source Water Protection Conclusions and Recommendations
4. Appendices

## Section 1: Description of the Water System

### What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and a Zone II protection area.



### Glossary

**Aquifer:** An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

**Hydrogeologic Barrier:** An underground layer of impermeable material (i.e. clay) that resists penetration by water.

**Recharge Area:** The surface area that contributes water to a well.

**Zone I:** The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. This area should be owned or controlled by the water supplier and limited to water supply activities.

**Zone II:** The primary recharge area for the aquifer. This area is defined by hydrogeologic studies that must be approved by DEP. Refer to the attached map to determine the land within your Zone II.

#### Zone II #: 11

*Susceptibility:* Moderate

Well Names	Source IDs
Bemis Road Well #1	2232000-01G

#### Zone II #: 242

*Susceptibility:* Moderate

Well Names	Source IDs
Jersey Street Well #2	2232000-02G
Jersey Street Well #3	2232000-03G

Pepperell Water Department obtains its water supply from three (3) wells, one Bemis Road well and the two Jersey Street wells. The Bemis Road well is a gravel packed well located off of Bemis Road, in the northwestern corner of Pepperell. The Jersey Street wells are gravel packed wells located approximately one thousand feet west of Jersey Street in the Town of Pepperell. The Zone II for the Jersey Street wells extend into the Town of Groton. Each well has a Zone I of 400 feet. The wells are located in an aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barriers (i.e. clay) that can prevent contaminant migration. Please refer to the attached map to view the boundaries of the Zone II.

The pH of the water is adjusted for corrosion control. The Jersey Street wells have an air-stripping tower to remove dissolved carbon dioxide, which also raises the pH, primarily to prevent carbonate precipitation. Sodium hypochlorite is added following the air-stripper for disinfection. Water from the Bemis Road well is chlorinated. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1 for a copy of the most recent Consumer Confidence Report. Drinking water monitoring reporting data are also available on the web at <http://www.epa.gov/safewater/ccr1.html>.

## Section 2: Land Uses in the Protection Areas

The Zone IIs for Pepperell are a mixture of forest, residential, and open space land uses (refer to attached map for details). Land uses and activities that are potential sources of contamination are listed in Table 2.

### Key Land Uses and Protection Issues include:

1. Inappropriate activities in Zone I
2. Residential land uses
3. Transportation Corridor
4. Agricultural activities
5. Comprehensive wellhead protection planning

The overall ranking of susceptibility to contamination for the system is moderate, based on the presence of at least one moderate threat land use within the water supply protection areas, as seen in Table 2.

**1. Inappropriate Activities in Zone Is** – The Zone I for each of the wells is a 400 foot radius around the wellhead. Massachusetts drinking water regulations (310 CMR 22.00 Drinking Water) requires public water suppliers to own the Zone I, or control the Zone I through a conservation restriction. The three (3) Zone Is for the wells are owned or controlled by the public water system. Only water supply activities are allowed in the Zone I. However, many public water supplies were developed prior to the Department's regulations and contain non water supply activities such as homes and public roads. The following non water supply activities occur in the Zone Is of the system wells:

**Bemis Road well** – A local road comes up to 100 feet from the wellhead. The road was moved from approximately 30 feet from the well to further away (100 feet) from the wellhead to protect the source. As additional protection, a fence was erected in the year 2000.

**Jersey Street wells** – A building used to house two trucks used by the Department of parks and recreations is located in the Zone I of the Jersey Street wells. Occasionally, there is unauthorized access by children riding dirt bikes in the Zone I.

#### **Zone I Recommendations:**

- ✓ To the extent possible, remove all non water supply activities from the Zone Is to comply with DEP's Zone I requirements.
- ✓ Use BMPs for the use, and disposal of hazardous materials such as maintenance chemicals.
- ✓ Do not use road salt within the Zone I.
- ✓ Keep any new non water supply activities out of the Zone I.

### **Benefits of Source Protection**

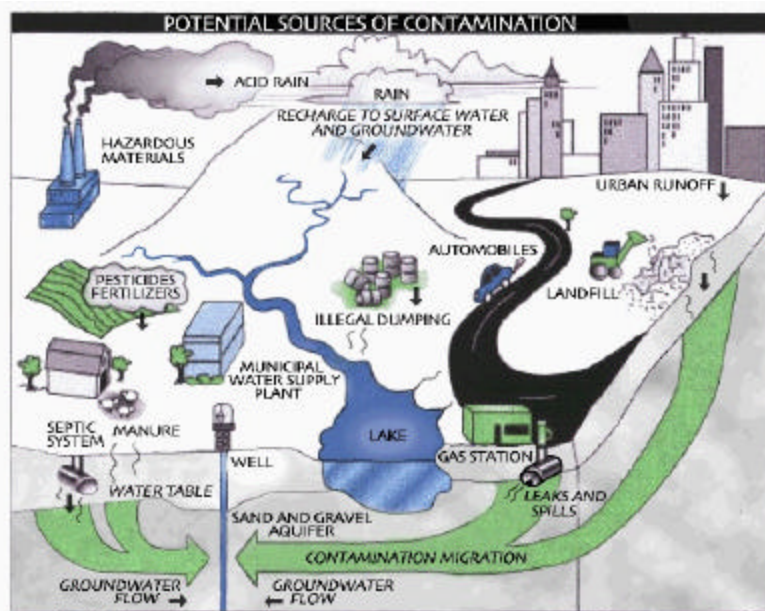
Source Protection helps protect public health and is also good for fiscal fitness:

- Protects drinking water quality at the source
- Reduces monitoring costs through the DEP Waiver Program
- Treatment can be reduced or avoided entirely, saving treatment costs
- Prevents costly contamination clean-up
- Preventing contamination saves costs on water purchases, and expensive new source development

Contact your regional DEP office for more information on Source Protection and the Waiver Program.

**2. Residential Land Uses** – Approximately 24% of the Zone IIs consists of residential areas. Approximately 20% of the areas have public sewers, and so the remaining areas use septic systems. If managed improperly, activities associated with residential areas can contribute to drinking water contamination. Common potential sources of contamination include:

- **Septic Systems** – Improper disposal of household hazardous chemicals to septic systems is a potential source of contamination to the groundwater because septic systems lead to the ground. If septic systems fail or are not properly maintained they can be a potential source of microbial contamination.



- **Household Hazardous Materials** - Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. Improper use, storage, and disposal of chemical products used in homes are potential sources of contamination.
- **Heating Oil Storage** - If managed improperly, Underground and Aboveground Storage Tanks (UST and AST) can be potential sources of contamination due to leaks or spills of the fuel oil they store.
- **Stormwater** – Catch basins transport stormwater from roadways and adjacent properties to the ground. As flowing stormwater travels, it picks up debris and contaminants from streets and lawns. Common potential contaminants include lawn chemicals, pet waste, and contaminants from automotive leaks, maintenance, washing, or accidents.

#### **Residential Land Use Recommendations:**

- ✓ Educate residents on best management practices (BMPs) for protecting water supplies. Distribute the fact sheet “Residents Protect Drinking Water” available in Appendix A and on [www.mass.gov/dep/brp/dws/protect.htm](http://www.mass.gov/dep/brp/dws/protect.htm), which provides BMPs for common residential issues.
- ✓ Work with planners to control new residential developments in the water supply protection areas.
- ✓ Promote BMPs for stormwater management and pollution controls.

**3. Transportation Corridors** – Nashua Road in Groton, which is a heavily traveled road, is located within the Zone II of the Jersey Street wells. Local roads are common throughout the Zone IIs. Roadway construction, maintenance, and typical highway use can all be potential sources of contamination. Accidents can lead to spills of gasoline and other potentially dangerous transported chemicals. Roadways are frequent sites for illegal dumping of hazardous or other potentially harmful wastes. De-icing salt, automotive chemicals and other debris on roads are picked up by stormwater and wash in to catchbasins.

#### **Transportation Corridor Recommendations:**

- ✓ Identify stormwater drains and the drainage system along transportation corridors. Wherever possible, ensure that drains discharge stormwater outside of the Zone II.
- ✓ Work with the Town and State to have catch basins inspected, maintained, and cleaned on a regular schedule. Street sweeping reduces the amount of potential contaminants in runoff.
- ✓ Work with local emergency response teams to ensure that any spills within the Zone II can be effectively contained.
- ✓ If storm drainage maps are available, review the maps with emergency response teams. If maps aren’t yet available, work with town officials to investigate mapping options such as the upcoming Phase II Stormwater Rule requiring some communities to complete stormwater mapping.

(Continued on page 6)

#### **What are "BMPs?"**

Best Management Practices (BMPs) are measures that are used to protect and improve surface water and groundwater quality. BMPs can be structural, such as oil & grease trap catch basins, nonstructural, such as hazardous waste collection days or managerial, such as employee training on proper disposal procedures.

#### **For More Information**

Contact Josephine Yemoh-Ndi in DEP's Worcester Office at (508) 849-4030 for more information and assistance on improving current protection measures.

Copies of this report have been provided to the public water supplier, board of health, and the town.

#### **Source Protection Decreases Risk**

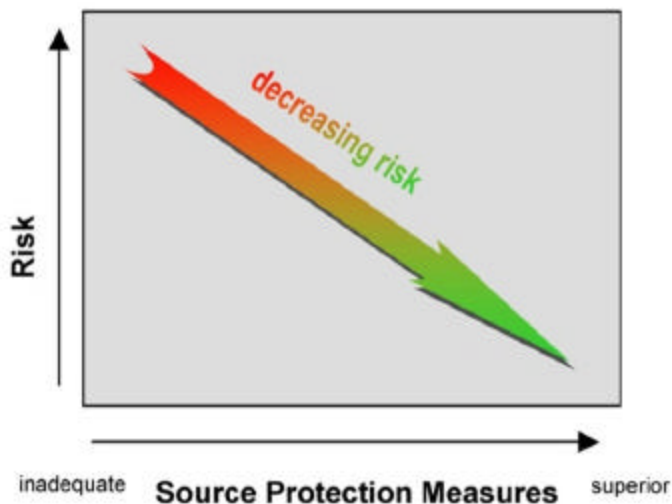


Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

### Potential Source of Contamination vs. Actual Contamination

The activities listed in Table 2 are those that typically use, produce, or store contaminants of concern, which, if managed improperly, are potential sources of contamination (PSC).

It is important to understand that a release may never occur from the potential source of contamination provided facilities are using best management practices (BMPs). If BMPs are in place, the actual risk may be lower than the threat ranking identified in Table 2. Many potential sources of contamination are regulated at the federal, state and/or local levels, to further reduce the risk.

**Table 2: Land Use in the Protection Areas (Zones I and II)**

For more information, refer to Appendix B: Regulated Facilities within the Water Supply Protection Area

Activities	Quantity	Zone II #	Threat*	Potential Source of Contamination
<b>Agricultural</b>				
Livestock Operations	Few	Both	M	Manure (microbial contaminants): improper handling
<b>Commercial</b>				
Cemeteries	1	242	M	Over-application of pesticides: leaks, spills, improper handling; historic embalming fluids
<b>Residential</b>				
Fuel Oil Storage (at residences)	Several	Both	M	Fuel oil: spills, leaks, or improper handling
Lawn Care / Gardening	Several	Both	M	Pesticides: over-application or improper storage and disposal
Septic Systems / Cesspools	Several	Both	M	Hazardous chemicals: microbial contaminants, and improper disposal
<b>Miscellaneous</b>				
Aboveground Storage Tanks	1	242	M	Materials stored in tanks: spills, leaks, or improper handling
Aquatic Wildlife	3	Both	L	Microbial contaminants
Road And Maintenance Depots	1	242	M	Deicing materials, automotive fluids, fuel storage, and other chemicals: spills, leaks, or improper handling or storage
Snow Dump	1	242	M	Melt water containing de-icing and other chemicals from roads and parking lots: improper handling
Stormwater Drains/ Retention Basins	9	Both	L	Debris, pet waste, and chemicals in stormwater from roads, parking lots, and lawns

#### Notes:

1. When specific potential contaminants are not known, typical potential contaminants or activities for that type of land use are listed. Facilities within the watershed may not contain all of these potential contaminant sources, may contain other potential contaminant sources, or may use Best Management Practices to prevent contaminants from reaching drinking water supplies.
2. For more information on regulated facilities, refer to Appendix B: Regulated Facilities within the Water Supply Protection Area information about these potential sources of contamination.
3. For information about Oil or Hazardous Materials Sites in your protection areas, refer to Appendix C: Tier Classified Oil and/ or Hazardous Material Sites.

\* **THREAT RANKING** - The rankings (high, moderate or low) represent the relative threat of each land use compared to other PSCs. The ranking of a particular PSC is based on a number of factors, including: the type and quantity of chemicals typically used or generated by the PSC; the characteristics of the contaminants (such as toxicity, environmental fate and transport); and the behavior and mobility of the pollutants in soils and groundwater.



(Continued from page 4)

**4. Agricultural Activities** – There are some residents within the Zone II that own horses. If not contained or applied properly, animal waste from barnyards, manure pits and field application are potential sources of contamination to ground and surface water.

**Agricultural Activities Recommendation:**

- ✓ Work with horse owners to make them aware of your water supply and to encourage the use of a US Natural Resources Conservation Service farm plan to protect water supplies.

**5. Protection Planning** – Currently, the Town of Pepperell has water supply protection controls that meet DEP's Wellhead Protection regulations 310 CMR 22.21(2). Protection planning protects drinking water by managing the land area that supplies water to a well. A Wellhead Protection Plan coordinates community efforts, identifies protection strategies, establishes a timeframe for implementation, and provides a forum for public participation. There are resources available to help communities develop a plan for protecting drinking water supply wells.

**Protection Planning Recommendations:**

- ✓ Work with town boards to review and provide recommendations on proposed development within your water supply protection areas. To obtain information on build-out analyses for the town, see the Executive Office of Environmental Affairs' community preservation web site, <http://commpres.env.state.ma.us/>.

Other land uses and activities within the Zone IIs include the Town's Department of Public Works. Refer to Table 2 and Appendix 2 for more information about the land uses within the Zone IIs.

Identifying potential sources of contamination is an important initial step in protecting your drinking water sources. Further local investigation will provide

**Top 5 Reasons to Develop a Local Wellhead Protection Plan**

- ➊ Reduces Risk to Human Health
- ➋ Cost Effective! Reduces or Eliminates Costs Associated With:
  - ♦ Increased groundwater monitoring and treatment
  - ♦ Water supply clean up and remediation
  - ♦ Replacing a water supply
  - ♦ Purchasing water
- ➌ Supports municipal bylaws, making them less likely to be challenged
- ➍ Ensures clean drinking water supplies for future generations
- ➎ Enhances real estate values – clean drinking water is a local amenity. A community known for its great drinking water in a place people want to live and businesses want to locate.



more in-depth information and may identify new land uses and activities that are potential sources of contamination. Once potential sources of contamination are identified, specific recommendations like those below should be used to better protect your water supply.

**Section 3: Source Water Protection Conclusions and Recommendations**

**Current Land Uses and Source Protection:**

As with many water supply protection areas, the system Zone IIs contain potential sources of contamination. However, source protection measures reduce the risk of actual contamination, as illustrated in Figure 2. The water supplier is commended for taking an active role in promoting source protection measures in the Water Supply Protection Areas through:

- The acquisition of 19.93 acres in the protection of the Bemis Road well.

(Continued on page 8)

**Table 3: Current Protection and Recommendations**

<b>Protection Measures</b>	<b>Status</b>	<b>Recommendations</b>
<b>Zone I</b>		
Does the Public Water Supplier (PWS) own or control the entire Zone I?	<b>YES</b>	Follow Best Management Practices (BMP's) that focus on good housekeeping, spill prevention, and operational practices to reduce the use and release of hazardous materials.
Is the Zone I posted with "Public Drinking Water Supply" Signs?	<b>YES</b>	Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988.
Is Zone I regularly inspected?	<b>YES</b>	Continue daily inspections of drinking water protection areas.
Are water supply-related activities the only activities within the Zone I?	<b>NO</b>	Continue monitoring non-water supply activities in Zone Is and remove when feasible.
<b>Municipal Controls</b> (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	<b>YES</b>	The Town "Aquifer Protection District" bylaw currently meets DEP's requirements for wellhead protection. Refer to <a href="http://www.state.ma.us/dep/brp/dws/">www.state.ma.us/dep/brp/dws/</a> for model bylaws and health regulations, and current regulations.
Do neighboring communities protect the Zone II areas extending into their communities?	<b>YES</b>	Work with neighboring municipalities to include Zone IIs in their wellhead protection controls.
<b>Planning</b>		
Does the PWS have a Wellhead Protection Plan?	<b>NO</b>	Develop a wellhead protection plan. Follow "Developing a Local Wellhead Protection Plan" available at: <a href="http://www.state.ma.us/dep/brp/dws/">www.state.ma.us/dep/brp/dws/</a> .
Does the PWS have a formal "Emergency Response Plan" to deal with spills or other emergencies?	<b>YES</b>	Augment plan by developing a joint emergency response plan with fire department, Board of Health, DPW, and local and state emergency officials. Coordinate emergency response drills with local teams.
Does the municipality have a wellhead protection committee?	<b>NO</b>	Establish committee; include representatives from citizens' groups, neighboring communities, and the business community.
Does the Board of Health conduct inspections of commercial and industrial activities?	<b>YES</b>	For more guidance see "Hazardous Materials Management: A Community's Guide" at <a href="http://www.state.ma.us/dep/brp/dws/files/hazmat.doc">www.state.ma.us/dep/brp/dws/files/hazmat.doc</a>
Does the PWS provide wellhead protection education?	<b>YES</b>	Aim additional efforts at commercial, industrial and municipal uses within the Zone II.

(Continued from page 6)

- Erecting a fence after moving the road away from the Bemis Road well.
- Working with Town to review proposed development within the Zone IIs.

#### **Source Protection Recommendations:**

To better protect the sources for the future:

- ✓ Continue to inspect the Zone I regularly, and when feasible, remove any non-water supply activities.
- ✓ Educate residents on ways they can help you to protect drinking water sources.
- ✓ Work with emergency response teams to ensure that they are aware of the stormwater drainage in your Zone II and to cooperate on responding to spills or accidents.
- ✓ Work with horse owners in your protection areas to make them aware of your water supply and to encourage the use of a NRCS farm plan to protect water supplies.
- ✓ Develop and implement a Wellhead Protection Plan.

#### **Conclusions:**

These recommendations are only part of your ongoing local drinking water source protection. Additional source protection recommendations are listed in Table 3, the Key Issues above and Appendix A.

DEP staff, informational documents, and resources are available to help you build on this SWAP report as you continue to improve drinking water protection in your community. The Department's Wellhead Protection Grant Program and Source Protection Grant Program provide funds to assist public water suppliers in addressing water supply source protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the Grant Program. Please note: each spring DEP posts a new Request for Response for the grant program (RFR).

Other grants and loans are available through the Drinking Water State Revolving Loan Fund, the Clean Water State Revolving Fund, and other sources. For more information on grants and loans, visit the Bureau of Resource Protection's Municipal Services web site at: <http://mass.gov/dep/brp/mf/mfpubs.htm>.

The assessment and protection recommendations in this SWAP report are provided as a tool to encourage community discussion, support ongoing source protection efforts, and help set local drinking water protection priorities. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures. The water supplier should supplement this SWAP report with local information on potential sources of contamination and land uses. Local information should be maintained and updated periodically to reflect land use changes in the Zone II. Use this information to set priorities, target inspections, focus education efforts, and to develop a long-term drinking water source protection plan.

## **Section 4: Appendices**

- A. Protection Recommendations
- B. Additional Documents on Source Protection

### **What is a Zone III?**

A Zone III (the secondary recharge area) is the land beyond the Zone II from which surface and ground water drain to the Zone II and is often coincident with a watershed boundary.

The Zone III is defined as a secondary recharge area for one or both of the following reasons:

1. The low permeability of underground water bearing materials in this area significantly reduces the rate of groundwater and potential contaminant flow into the Zone II.
2. The groundwater in this area discharges to a surface water feature such as a river, rather than discharging directly into the aquifer.

The land uses within the Zone III are assessed only for sources that are shown to be groundwater under the direct influence of surface water.

### **Additional Documents:**

To help with source protection efforts, more information is available by request or online at [mass.gov/dep/brp/dws](http://mass.gov/dep/brp/dws) including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix



## APPENDIX B:

### REGULATED FACILITIES WITHIN THE WATER SUPPLY PROTECTION AREA

#### DEP Permitted Facilities

DEP Facility Number	Facility Name	Street Address	Town	Permitted Activity	Activity Class
182001	CUMBERLAND FARMS INC #2153	115 MENDON ST & HOPEDALE	HOPEDALE	Fuel Dispenser	Fuel Dispenser
182001	CUMBERLAND FARMS INC #2153	115 MENDON ST	HOPEDALE	Generator of Hazardous Waste	BELOW HW REGULATED THRESHOLDS
182001	CUMBERLAND FARMS INC #2153	115 MENDON ST	HOPEDALE	Sewer connection or groundwater discharge	BELOW IWW REGULATED
182001	CUMBERLAND FARMS INC #2153	115 MENDON ST	HOPEDALE	Toxic Use Reduction Filer	BELOW TUR REGULATED THRESHOLDS
824	FILFAST CORP.	P O BOX 139 BOYD ST	HOPEDALE	Ground Water Facility	Groundwater Discharge
981	HOPEDALE STP	OFF MENDON ST	HOPEDALE	Surface Water Facility	Surfacewater Discharge
36676	HOPEDALE HIGHWAY DEPT	DEPOT ST	HOPEDALE	Generator of Hazardous Waste	Small Quantity Generator of Hazardous Waste
981	HOPEDALE WWTF	MENDON ST RTE 16	HOPEDALE	Generator of Hazardous Waste	Very Small Quantity Generator of Waste oil or PCBs
130902	ROSENFELD CONCRETE	75 PLAIN ST	HOPEDALE	Plant	Air Quality Permit
130902	ROSENFELD CONCRETE	75 PLAIN ST	HOPEDALE	Fuel Dispenser	Fuel Dispenser

130902	ROSENFELD CONCRETE	75 PLAIN ST	HOPEDALE	Generator of Hazardous Waste	Small Quantity Generator
130902	ROSENFELD CONCRETE	75 PLAIN ST	HOPEDALE	Generator of Hazardous Waste	Small Quantity Generator
130902	ROSENFELD CONCRETE	75 PLAIN ST	HOPEDALE	Sewer connection or groundwater discharge	Very Small Quantity Generator
304260	RUSCITTI CHIROPRACTIC	54 HOPEDALE ST	HOPEDALE	Generator of Hazardous Waste	Very Small Quantity Generator

## Underground Storage Tanks

Facility Name	Address	Town	Description	Tank Type	Tank Leak Detection	Capacity (gal)	Contents
CUMBERLAND FARMS INC #2153	115 MENDON ST & HOPEDALE	HOPEDALE	Gas Station	1 Wall	Approved In- Tank Monitor	8000	Gasoline
HOPEDALE HIGHWAY DEPT	DEPOT ST	HOPEDALE	Municipal	2 Wall	Interstitial Space Monitor	4000	Gasoline
ROSENFELD CONCRETE	75 PLAIN ST	HOPEDALE	Truck/Transport	2 Wall	Interstitial Space Monitor	20000	Gasoline

For more information on underground storage tanks, visit the Massachusetts Department of Fire Services web site: <http://www.state.ma.us/dfs/ust/ustHome.htm>

Note: This appendix includes only those facilities within the water supply protection area(s) that meet state reporting requirements and report to the appropriate agencies. Additional facilities may be located within the water supply protection area(s) that should be considered in local drinking water source protection planning.