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

# Plymouth Water Company

### 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

| | |
|---|---|
| ***PWS Name*** | Plymouth Water Company |
| ***PWS Address*** | 133 Raymond Road |
| ***City/Town*** | Plymouth |
| ***PWS ID Number*** | 4239045 |
| ***Local Contact*** | Don Rugg |
| ***Phone Number*** | (508) 888-7262 |

## 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.

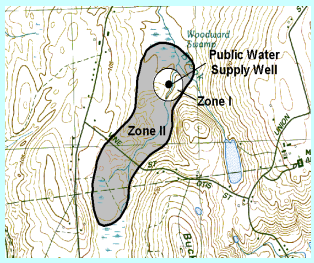
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

**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

### 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.

## Section 1: Description of the Water System

***Zone II #:*** 92 ***Susceptibility:*** High

| ***Well Names*** | ***Source IDs*** |
|---|---|
| Well No. 1 | 4239045-01G |

***Zone II #:*** 369 ***Susceptibility:*** High

| ***Well Names*** | ***Source IDs*** |
|---|---|
| Well No. 2 | 4239045-02G |

Plymouth Water Company receives its water from two groundwater sources. Well No. 1 is located on the eastern side Lunn's Way, between Kim Circle and Lynn Circle. Well No. 2 is located north of Well No. 1 and west of Lunn's Way. Each well has a Zone I radius 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.

Both wells have potassium hydroxide added for corrosion control. 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 land uses for the Zone IIs for Plymouth Water Company are predominantly residential with a minor amount of land used for cranberry growing and an elementary school (refer to attached map for details). Land uses and activities that are potential sources of contamination are listed in Table 2, with further detail provided in the Table of Regulated Facilities and Table of Underground Storage Tanks in Appendix A.

**Key Land Uses and Protection Issues include:**

1. Inappropriate activities in Zone I
2. Residential land uses
3. Roadways and transmission lines
4. Schools
5. Agricultural activities
6. Comprehensive wellhead protection planning

The overall ranking of susceptibility to contamination for the system is high, based on the presence of at least one high 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. Based upon the mapped well locations and the associated Zone I radii, it appears that the Zone Is are not entirely 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:

**Zone I: Well No. 1 4239045-01G** - This Zone I contains a two million gallon concrete water reservoir and the water treatment plant, both of which are activities that are allowed within the Zone I. Based upon a review of orthophotos it appears that gravel mining operations have occurred within the Zone I. Electric power transmission lines run through the Zone I. It also appears that portions of 3 homes fall within the Zone I.

**Well No. 2 4239045-02G** - Electric power transmission lines run through 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.
- ✓ If it's not feasible to purchase privately owned land within the Zone I at this time, consider a conservation restriction that would prohibit potentially threatening activities or a right of first refusal to purchase the property.
- ✓ Use BMPs for the storage, use, and disposal of hazardous materials such as water supply chemicals and maintenance chemicals.
- ✓ Do not use or store pesticides, fertilizers or road salt within the Zone I.
- ✓ Keep any new non water supply activities out of the Zone I.

**2. Residential Land Uses –** Approximately 25% of the Zone II areas consist of residential land use. None of the areas have public sewers, and so all 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.

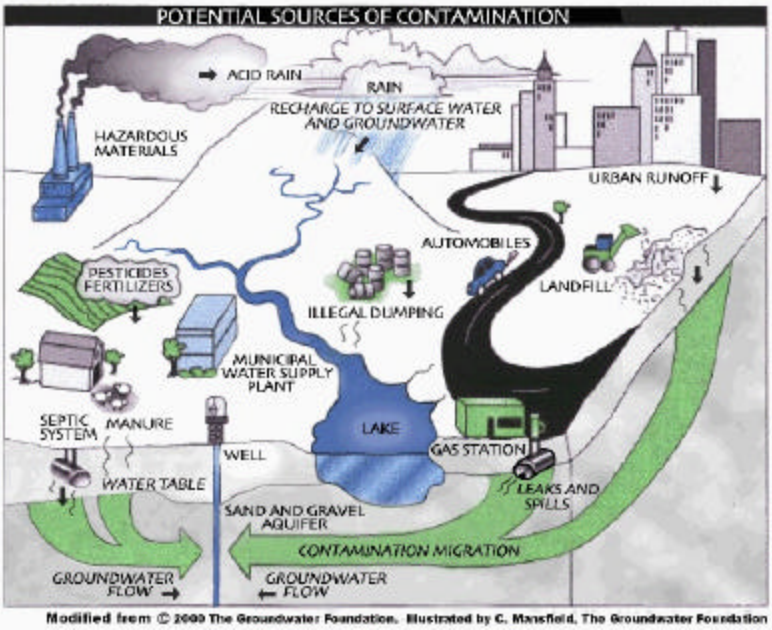
- **Household Hazardous Materials** - Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. Improper use, storage, and disposal of chemical products used in homes are potential sources of contamination.
- **Heating Oil Storage** - If managed 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

## 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.



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 C and on 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. Visit DEP's web site for additional information and assistance at http://www.state.ma.us/dep/brp/wm/nonpoint.htm.

**3. Roadways and Transmission Lines –** There are no major transportation corridors running through the Zone IIs. However, local roads are common throughout the Zone II. Roadway construction, maintenance, and typical 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 into catchbasins.

There are electric utility transmission lines running through both the Zone I and Zone II areas. Over-application or improper handling of herbicides used for clearing the right-of-way is a potential source of contamination.

**Roadways and Transmission Line Recommendations:**

- ✓ Wherever possible, ensure that drains discharge stormwater outside of the Zone I.
- ✓ Identify stormwater drains and the drainage system along roadways. 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.
- ✓ Work with local emergency response teams to ensure that any spills within the Zone II can be effectively contained. Review storm drainage maps with emergency response teams.
- ✓ Work with the Town and State to best manage stormwater in the Zone II. Best management practices include street sweeping, vegetative swales, and regular catch basin inspection, cleaning and maintenance.
- ✓ Work with local officials during their review of the railroad right of way Yearly Operating Plans to ensure that water supplies are protected during vegetation control.
- ✓ Contact your local utility company to ensure that pestcides and herbicides are not sprayed in the Zone Is or Zone IIs.

*(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 Isabel Collins in DEP's Lakeville Office at (508) 946-2726 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.

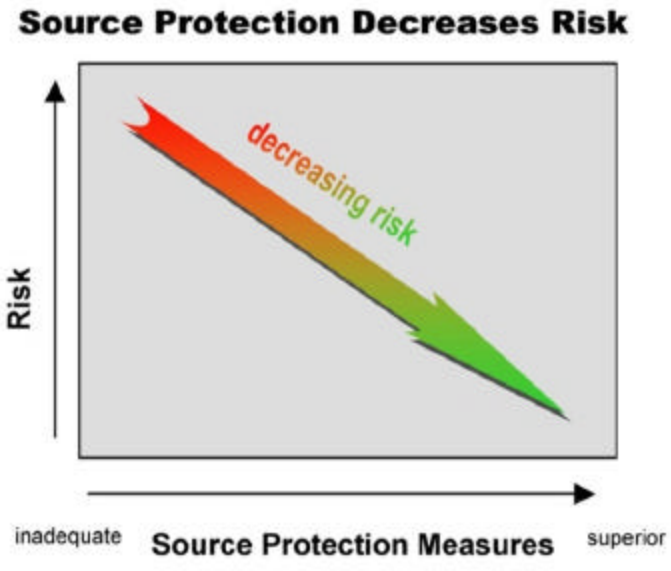



Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

**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 A: Regulated Facilities within the Water Supply Protection Area

| Activities | Quantity | Threat* | Zone II Number | Potential Source of Contamination |
|---|---|---|---|---|
| **Agricultural** | | | | |
| Fertilizer Storage or Use | some | Moderate | #92 & #369 | Fertilizers: leaks, spills, improper handling, or over-application (cranberry bogs) |
| Pesticide Storage or Use | some | High | #92 & #369 | Pesticides: leaks, spills, improper handling, or over-application (cranberry bogs) |
| **Residential** | | | | |
| Fuel Oil Storage (at residences) | numerous | Moderate | #92 & #369 | Fuel oil: spills, leaks, or improper handling |
| Lawn Care / Gardening | numerous | Moderate | #92 & #369 | Pesticides: over-application or improper storage and disposal |
| Septic Systems / Cesspools | numerous | Moderate | #92 & #369 | Hazardous chemicals: microbial contaminants, and improper disposal |
| **Miscellaneous** | | | | |
| Aboveground Storage Tanks | numerous | Moderate | #92 & #369 | Materials stored in tanks: spills, leaks, or improper handling (includes storage of water treatment chemicals at wellsites) |
| Schools | 1 | Moderate | #369 | Fuel oil, laboratory, art photographic, shop, and other chemicals: spills, leaks, or improper handling or storage |
| Transmission Line Right of Ways | 1 | Low | #92 & #369 | Corridor maintenance pesticides: over-application or improper handling (electrical line) |

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

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

**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 A: 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 B: 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. Schools** – A small area of the Zone II for Well No. 2 is used by Plymouth South Elementary School. Activities associated with schools commonly involve hazardous materials such as fuel oil, laboratory, art, photographic, machine shop, and other chemicals. These hazardous materials have the potential to impact drinking water supplies if they are improperly handled, stored, or materials are improperly disposed into septic systems.

**Schools Recommendations:**

- ✓ Contact schools in the Zone II to discuss source protection issues including BMPs that they can reduce the risk of contamination.
- ✓ Assist schools with source protection education for maintenance staff, food preparation staff, teachers and students.

**5. Agricultural Activities –** There are cranberry growing operations occurring in relatively small portions of each of the Zone IIs. Pesticides and fertilizers have the potential to contaminate a drinking water source if improperly stored, applied, or disposed.

**Agricultural Activities Recommendation:**

- ✓ Work with cranberry growers in your protection areas 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.
- ✓ Work with farmers to investigate grants and loans designed to protect surface and groundwater. See http://www.nrcs.usda.gov/programs/farmbill/2002/pdf/EQIPFct.pdf for more information on the USDA Environmental Quality Incentives Program (EQIP). Information on the MA Department of Food Agriculture's Agricultural Environmental Enhancement Program (AEEP) is available on the web at http://www.state.ma.us/dfa/programs/aeep/.

**6. Presence of Oil or Hazardous Material Contamination Sites –** At the time that this report was completed the Zone IIs did not contain any DEP Tier Classified Oil and/or Hazardous Material Release Sites. Refer to the attached map and Appendix B for more information.

**Oil or Hazardous Material Contamination Sites Recommendation:**

- ✓ If oil or hazardous material release sites are identified in the Zone IIs in the future, monitor progress on any ongoing remedial action conducted for these sites.

**7. Protection Planning –** Currently, the Town has water supply protection controls that meet DEP's Wellhead Protection regulations 310 CMR 22.21(2). The Town has also established a floor drain regulation. 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.

**Protection Planning Recommendations:**

- ✓ Work with the Town to incorporate the Zone IIs into the Aquifer Protection District.
- ✓ 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/.

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

- Posting the Zone I area with signs.
- Having a Wellhead Protection Plan.
- Having a formal Emergency Response Plan.
- Providing wellhead protection education

**Source Protection Recommendations:**
To better protect the sources for the future:

- ✓ Inspect the Zone I regularly, and when feasible, remove any non-water supply activities.

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

❶ Reduces Risk to Human Health

❷ 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

❸ Supports municipal bylaws, making them less likely to be challenged

❹ Ensures clean drinking water supplies for future generations

❺ 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.


- ✓ 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.
- ✓ Monitor progress on any future remedial action conducted for oil or hazardous waste contamination sites.
- ✓ Work with farmers 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.
- ✓ Incorporate groundwater education into school curriculum (K-6 and 7-12 curricula available; contact DEP for copies).

**Conclusions:**
These recommendations are only part of your ongoing local drinking water source protection. Additional source protection recommendations are listed in Table 3 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

*(Continued on page 9)*

## Table 3: Current Protection and Recommendations

| Protection Measures | Status | Recommendations |
|---|---|---|
| **Zone I** | | |
| Does the Public Water Supplier (PWS) own or control the entire Zone I? | **NO** | If it is not feasible to purchase the Zone I, consider a conservation restriction to prohibit potentially threatening activities and/or a right of first refusal to purchase. |
| Is the Zone I posted with "Public Drinking Water Supply" Signs? | **YES** | Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988. |
| Is Zone I regularly inspected? | **YES** | Continue daily inspections of drinking water protection areas. |
| Are water supply-related activities the only activities within the Zone I? | **NO** | Remove all non-water supply activities from the Zone I. |
| **Municipal Controls** (Zoning Bylaws, Health Regulations, and General Bylaws) | | |
| Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)? | **YES** | Continue working with the Town to have the Zone IIs included in the "Aquifer Protection District" . |
| **Planning** | | |
| Does the PWS have a Wellhead Protection Plan? | **YES** | Follow "Developing a Local Wellhead Protection Plan" available at: www.state.ma.us/dep/brp/dws/. |
| Does the PWS have a formal "Emergency Response Plan" to deal with spills or other emergencies? | **YES** | 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? | **NO** | Establish committee; include representatives from citizens' groups, neighboring communities, and the business community. |
| Does the PWS provide wellhead protection education? | **YES** | Aim additional efforts at school and agricultural uses within the Zone II. |

*(Continued from page 7)*
in your community. 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. Regulated Facilities within the Water Supply Protection Area
B. Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Areas
C. 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 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 A:
# REGULATED FACILITIES WITHIN THE WATER SUPPLY PROTECTION AREA

## DEP Permitted Facilities

| DEP Facility Number | Facility Name | Street Address | Town | Permitted Activity | Activity Class |
|---|---|---|---|---|---|
| At the time that this report was generated there were no DEP permitted facilities located within the Zone IIs. | | | | | |

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.

**APPENDIX B – Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Areas**

DEP's datalayer depicting oil and/or hazardous material (OHM) sites is a statewide point data set that contains the approximate location of known sources of contamination that have been both reported and classified under Chapter 21E of the Massachusetts General Laws. Location types presented in the layer include the approximate center of the site, the center of the building on the property where the release occurred, the source of contamination, or the location of an on-site monitoring well. Although this assessment identifies OHM sites near the source of your drinking water, the risks to the source posed by each site may be different. The kind of contaminant and the local geology may have an effect on whether the site poses an actual or potential threat to the source.

The DEP's Chapter 21E program relies on licensed site professionals (LSPs) to oversee cleanups at most sites, while the DEP's Bureau of Waste Site Cleanup (BWSC) program retains oversight at the most serious sites. This privatized program obliges potentially responsible parties and LSPs to comply with DEP regulations (the Massachusetts Contingency Plan – MCP), which require that sites within drinking water source protection areas be cleaned up to drinking water standards.

For more information about the state's OHM site cleanup process to which these sites are subject and how this complements the drinking water protection program, please visit the BWSC web page at http://www.state.ma.us/dep/bwsc. You may obtain site -specific information two ways: by using the BWSC Searchable Sites database at http://www.state.ma.us/dep/bwsc/sitelist.htm, or you may visit the DEP regional office and review the site file. These files contain more detailed information, including cleanup status, site history, contamination levels, maps, correspondence and investigation reports, however you must call the regional office in order to schedule an appointment to view the file.

The table below contains the list of Tier Classified oil and/or Hazardous Material Release Sites that are located within your drinking water source protection area.

**Table 1**: Bureau of Waste Site Cleanup Tier Classified Oil and/or Hazardous Material Release Sites (Chapter 21E Sites) - Listed by Release Tracking Number (RTN)

| RTN | Release Site Address | Town | Contaminant Type |
|---|---|---|---|
| At the time that this report was generated, no Tier Classified Oil and/or Hazardous Material Release Sites were | | | |
| located within the Zone IIs | | | |