



Massachusetts Department of Environmental Protection
Source Water Assessment and Protection (SWAP) Report
for
Orleans 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>	Orleans Water Department
<i>PWS Address</i>	19 School Road
<i>City/Town</i>	Orleans, Massachusetts 02653
<i>PWS ID Number</i>	4224000
<i>Local Contact</i>	Charles Medchill
<i>Phone Number</i>	(508) 255-1200

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 #: 161

Susceptibility: High

Well Names	Source IDs
Gould Pond Well #1	4224000-01G
Gould Pond Well #2	4224000-02G
Gould Pond Well #3	4224000-03G
Cliff Pond Well #4	4224000-04G
Cliff Pond Well #5	4224000-05G
Cliff Pond Well #6	4224000-06G
Well #7	4224000-07G

The Town of Orleans has seven groundwater wells located in one Zone II that extends into the Town of Brewster. Wells 1-6 are located on approximately 500 acres of town-owned land off Route 28 and Well #7 is located on approximately 38 acres of town-owned land off Quanset Road. 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 locations of the wells, extent of the Zone Is and the boundaries of the Zone II.

All the wells have potassium hydroxide added for corrosion control. To learn more about water quality, 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 II for Orleans is predominantly forested, residential and recreational land uses with small areas of commercial, light industrial, mining and waste disposal land uses (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 B.

Key Land Uses and Protection Issues include:

1. Inappropriate activities in Zone I
2. Residential land uses
3. Transportation corridors
4. Hazardous Materials Storage and Use

The overall ranking of susceptibility to contamination for the system is high, based on the presence of 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. The seven

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:

Zone I: Gould Pond Well #1 4224000-01G– The Zone I area acts as a water department parking and includes office activities associated with water supply operations. The building has a wastewater disposal system that includes a septic tank and leachfield.

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 storage, use, and disposal of hazardous materials such as water supply chemicals and maintenance chemicals.
- ✓ Avoid parking of vehicles within the Zone Is.
- ✓ Ensure that pesticides, fertilizers and road salt are never stored or used within the Zone Is.
- ✓ Keep any new non water supply activities out of the Zone Is.

2. Residential Land Uses – Approximately 25% of the Zone II consists of residential areas. 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 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:

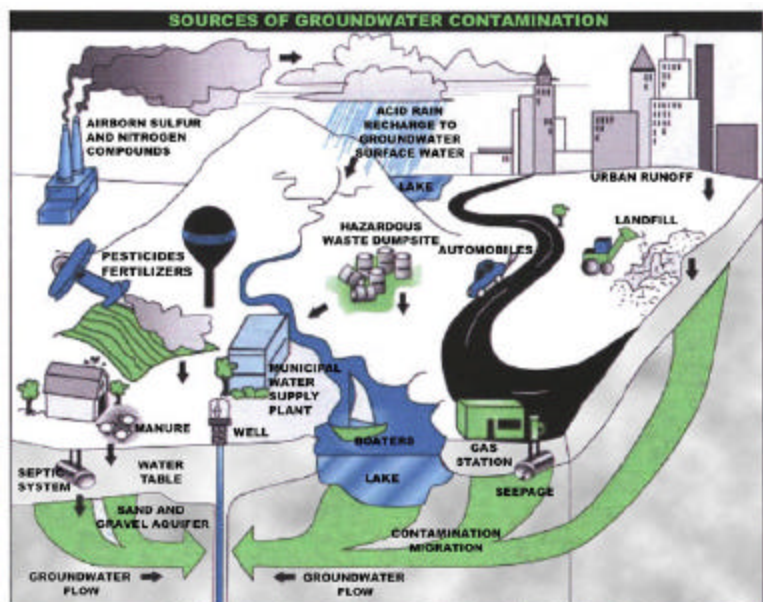
- ✓ Educate residents on best management practices (BMPs) for protecting water supplies. Distribute the fact sheet

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.



“Residents Protect Drinking Water” available in Appendix A 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.

3. Transportation Corridors - Route 28 intersects the Zone II to the east of the wells, while Route 6 runs through the Zone II along the west side of the wells. Local roads are common throughout the Zone II. 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 if possible.
- ✓ Work with the Town and Massachusetts Highway Department 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.
- ✓ Work with the Massachusetts Highway Department and Town to locate accurate storm drainage maps, 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.

4. Hazardous Materials Storage and Use – Although only about one percent of the land area within the Zone II is commercial or industrial land use the

activities associated with this land use can have significant impacts on water supplies. Many small businesses and industries use hazardous materials, produce hazardous waste products, and/or store quantities of hazardous materials in UST/AST. If hazardous materials are improperly stored, used, or disposed, they become potential sources of contamination. Hazardous materials should never be disposed of to a septic system or floor drain leading directly to the ground.

Hazardous Materials Storage and Use Recommendations:

- ✓ Educate local businesses on best management practices for protecting water supplies. Distribute the fact sheet “Businesses Protect Drinking Water” available in Appendix A and on www.mass.gov/dep/brp/dws/protect.htm, which provides BMP’s for common business issues.
- ✓ Work with local businesses to register those facilities that are unregistered generators of hazardous waste or waste oil. Partnerships

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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.

Source Protection Decreases Risk

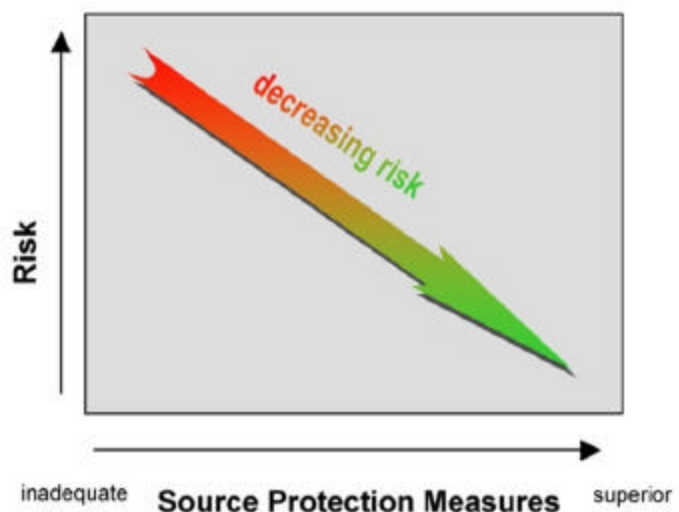


Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

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	Threat*	Potential Source of Contamination
Agricultural			
Fertilizer Use (no storage)	1	M	Fertilizers: leaks, spills, improper handling, or over-application (Playing fields in Brewster)
Pesticide Use (no storage)	1	M	Pesticides: leaks, spills, improper handling, or over-application (Playing fields in Brewster)
Commercial			
Gas Stations/ Service Stations	1	H	Automotive fluids and fuels: spills, leaks, or improper handling or storage
Sand And Gravel Mining/Washing	1	M	Heavy equipment, fuel storage, clandestine dumping: spills or leaks
Residential			
Fuel Oil Storage (at residences)	Many	M	Fuel oil: spills, leaks, or improper handling
Lawn Care / Gardening	Many	M	Pesticides: over-application or improper storage and disposal
Septic Systems / Cesspools	Many	M	Hazardous chemicals: microbial contaminants, and improper disposal
Miscellaneous			
Clandestine Dumping	Infrequent	M	Debris containing hazardous materials or wastes
Transportation Corridors	Many	M	Fuels and other hazardous materials: accidental leaks or spills; pesticides: over-application or improper handling
Landfills and Dumps	1	M	Untreated tree stumps.

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, environ-

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between businesses, water suppliers, and communities enhance successful public drinking water protection practices.

- ✓ Educate local businesses on Massachusetts floordrain requirements. See brochure “Industrial Floor Drains” for more information.

Other land uses and activities within the Zone II are listed in Table 2. Refer to Table 2 and Appendix 2 for more information about these land uses.

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 Zone II for Orleans contains potential sources of contamination. However, source protection measures reduce the risk of actual contamination, as illustrated in Figure 2. The town is commended for taking an active role in promoting source protection measures in the Water Supply Protection Area through:

- Purchases of significant parcels of land for water supply protection, which compliments protected open space in Brewster to total 63% protected open space within the Zone II.
- Educating the community about water supply issues through school programs, newsletters, open houses, inserts to water bills and local media.
- The implementation of a proactive Watershed Management Plan.
- Cooperation between local residents and the Water Department to control access and illegal dumping within the protected Zone II areas.

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.



Source Protection Recommendations:

To better protect the sources for the future:

- ✓ Work with Massachusetts Highway Department to erect water supply protection area signs and accurately map stormwater drainage flows along Route 6 within the Zone II.
- ✓ Continue regular Zone I inspections, and when feasible, remove any non-water supply activities.
- ✓ Continue to 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.
- ✓ Partner with local businesses to ensure the proper storage, handling, and disposal of hazardous materials.
- ✓ Continue to implement a Wellhead Protection Plan.

Conclusions:

These recommendations are only part of your ongoing local drinking water

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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?	YES	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?	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?	YES	Continue to limit the activities within Zone Is to essential water supply activities, when possible remove any threatening activities to other locations.
Municipal Controls (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	YES	The Town "Aquifer Protection District" bylaw meets DEP's requirements. Refer to www.state.ma.us/dep/brp/dws/ for model bylaws and health regulations, and current regulations.
Do neighboring communities protect the Zone II areas extending into their communities?	YES	Continue cooperation with neighboring communities on source protection issues.
Planning		
Does the PWS have a Wellhead Protection Plan?	YES	Continue implementing wellhead protection plan. 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	Periodically update 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?	YES	Include representatives from citizens' groups, neighboring communities, and the business community.
Does the Board of Health conduct inspections of commercial and industrial activities?	YES	For more guidance see "Hazardous Materials Management: A Community's Guide" at www.state.ma.us/dep/brp/dws/files/hazmat.doc
Does the PWS provide wellhead protection education?	YES	Target additional efforts at commercial, industrial and municipal uses within the Zone II.

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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. Regulated Facilities within the Water Supply Protection Area
- 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: Standard Protection Recommendations

Land Use	Potential Contaminant Sources*	Recommendation
Agricultural		
Fertilizer Storage or Use	Fertilizers: leaks, spills, improper handling, or over-application	Facility owners/operators to ensure BMPs are in place for proper storage, and application of fertilizers.
Pesticide Storage or Use	Pesticides: leaks, spills, improper handling, or over-application	Facility owners/operators to ensure that BMPs are in place for proper storage, handling, and application of pesticides.
Commercial		
Gas Stations	Automotive fluids and fuels: spills, leaks, or improper handling or storage	Gas stations to ensure BMPs are in place for the proper storage and handling of fuel and automotive fluids.
Sand And Gravel Mining/Washing	Heavy equipment, fuel storage, clandestine dumping: spills or leaks	Sand and gravel operations to ensure that BMPs are in place for fuel storage and the prevention of clandestine dumping.
Residential		
Fuel Oil Storage (at residences)	Fuel oil: spills, leaks, or improper handling	Residents to encourage proper maintenance and upgrades to fuel oil tanks.
Lawn Care / Gardening	Pesticides: over-application or improper storage and disposal	Residents to encourage proper storage, disposal, and application of pesticides.
Septic Systems / Cesspools	Hazardous chemicals: microbial contaminants, and improper disposal	Residents to encourage maintenance and inspection of septic systems and proper disposal of household hazardous waste.
Miscellaneous		
Clandestine Dumping	Debris containing hazardous materials or wastes	Property owners to ensure that BMPs are in place for the inspection of areas prone to clandestine dumping, securing the areas in question, and proper disposal of debris.
Transportation Corridors	Fuels and other hazardous materials: accidental leaks or spills; pesticides: over-application or improper handling	Fire department to ensure that emergency response plans consider the water supply protection area.
Stormwater Drains/ Retention Basins	Debris, pet waste, and chemicals in stormwater from roads, parking lots, and lawns	Department of Public Works to ensure that BMPs are in place for the disposal of sludge and maintenance of storm drains and detention basins.

APPENDIX B: REGULATED FACILITIES WITHIN THE WATER SUPPLY PROTECTION AREA

Massachusetts Department of Fire Services - Underground Storage Tanks

Facility Name	Address	Town	Description	Tank Type	Tank Leak Detection	Capacity (gal)	Contents
None on record. One Gas Station is located in the Zone II near Cliff Pond Well #5							

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.