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EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF RESOURCE PROTECTION
Drinking Water Program

Developing a Local Wellhead Protection Plan

NOVEMBER 2001

Developing A Local Wellhead Protection Plan

**A GUIDANCE DOCUMENT FOR COMMUNITIES
AND PUBLIC WATER SUPPLIERS**

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INTRODUCTION

This document was developed to assist communities and water suppliers in developing a local wellhead protection plan. Wellhead protection is a strategy aimed at protecting a drinking water well by managing the land area that replenishes the water supply. Wellhead protection plans are not a DEP requirement; however protection planning is an integral component of many programs within the DEP Drinking Water Program. The New Source Approval process, Water Withdrawal Permitting Program, and Monitoring Waiver Program all require water suppliers to demonstrate enforceable wellhead protection measures. DEP's Source Water Assessment Program (SWAP) strongly focuses on protecting drinking water supplies through local planning. Many of the assessments that DEP will be providing to communities, will include a recommendation for developing a local protection plan. Wellhead Protection Plans are also an eligible project under DEP's Wellhead Protection Grant Program. Communities and water suppliers developing protection plans with grant funds should use this document as guidance.

The benefits of developing a local protection plan are numerous. In particular; a plan will help a community focus and coordinate their protection efforts; establish a method and a timeframe for implementing protection strategies, and provide a forum for public support and participation. This document outlines the basic steps that comprise a local wellhead protection plan:

- Step 1. Establish a protection committee or team**
- Step 2. Define the wellhead protection area**
- Step 3. Identify potential sources of contamination**
- Step 4. Protect and manage the wellhead protection area**
- Step 5. Conduct ongoing public education and outreach**

To effectively use this document, we suggest you become familiar with the wellhead protection terms and requirements by referring to the *Wellhead Protection Basics* in *Attachment A*. For information on SWAP, DEP grant programs, and other source water protection topics, you can contact the Drinking Water Program at 617-292-5770, or visit www.state.ma.us/dep.

Water suppliers required to meet DEP's Wellhead Protection Regulations, 310 CMR 22.21(2), should also obtain a copy of *Making Source Protection Work in Massachusetts*. Communities with surface water supplies should obtain a copy of 'Developing a Local Protection Plan for Surface Water.'



TOP 5 REASONS TO DEVELOP A LOCAL WELLHEAD PROTECTION PLAN

1 REDUCES RISK TO HUMAN HEALTH

2 COST EFFECTIVE! REDUCES OR ELIMINATES COSTS ASSOCIATED WITH:

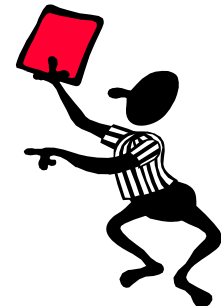
- INCREASED GROUNDWATER MONITORING AND TREATMENT
- WATER SUPPLY CLEAN UP AND REMEDIATION
- REPLACING A WATER SUPPLY
- PURCHASING WATER

3 SUPPORTS MUNICIPAL BYLAWS/ORDINANCES, MAKING THEM LESS LIKELY TO BE CHALLENGED

4 ENSURES CLEAN DRINKING WATER SUPPLIES FOR FUTURE GENERATIONS

5 ENHANCES REAL ESTATE VALUES! - CLEAN DRINKING WATER IS A LOCAL AMENITY, A COMMUNITY KNOWN FOR ITS GREAT DRINKING WATER IS A PLACE PEOPLE WILL WANT TO LIVE AND BUSINESSES WILL WANT TO LOCATE

The Drinking Water Program encourages communities or water suppliers to submit local Wellhead Protection Plans to the DEP Drinking Water Program. Refer to the Wellhead Protection Plan Checklist on Page B3.



STEP 1. ESTABLISH A PROTECTION COMMITTEE/TEAM

Establishing a protection committee or team is the first step towards generating support for a local wellhead protection plan. Committees can be established informally or through a municipal bylaw in which committee membership, frequency of meetings and responsibilities are clearly identified.



Protection committees often participate in reviewing proposed developments, assisting with drafting local protection controls, and working with neighboring communities and watersheds to protect shared resources.

A protection committee should represent the diverse interests of the community. **At least one member of the committee should represent the municipality.** If water supplies are shared by more than one community, those municipalities should also be represented. Including the water supplier, a committee could include members from:

- Municipal officials or staff such as; board of selectmen/city council - planning board - board of health - conservation commission - public works department - finance committee - community development department
- Local civic and environmental organizations; neighborhood associations, senior citizen groups, historical society
- Residents, business owners, farmers, land developers, college students
- Town Meeting members
- Other public water suppliers in the community
- Neighboring municipalities (if applicable)

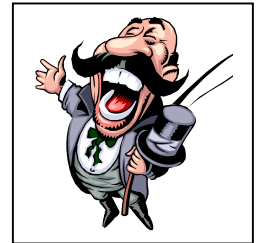
If forming a new committee is impractical, an alternative option may be to merge with an existing community organization or group. For instance, a local watershed association or environmental group, that meets regularly, may be interested in developing a sub- committee to address drinking water protection

Small water systems

Suppliers operating wells that withdraw *less than* 100,000 gallons per day **should** establish a protection team of 2-5 people. Team membership should include the certified water operator, interested employees, residents of the establishment served by the system, or representation from residents, business, farmers or schools located in the wellhead protection area. If there are municipal water supplies in the community, small system suppliers should also consider joining the community's water supply protection committee. This will ensure that the municipality is aware of the well's location and its need for protection.

Assign a lead person

Protecting drinking water supplies will be an on-going task for the committee or team. A wellhead protection plan can take a year or more to complete and will need to be updated regularly. Once developed, the initial protection plan can be augmented to include new information and community efforts; such as new drinking water sources, land acquisitions, and the establishment of community programs, projects and events aimed at drinking water protection.



In order that tasks are carried out and that the plan is kept current, it is a good idea to assign a lead person. The lead person should:

- track the group's progress and schedule meetings;
- assign tasks to committee/team members;
- develop a timetable for meeting protection goals;
- meet with local boards/departments for advice and information;
- organize public meetings or events to generate support for the plan;
- distribute the plan to local entities; and
- up-date the timetable annually.

STEP 2. DEFINE THE WELLHEAD PROTECTION AREA

Mapping the recharge area for each public supply well is critical to protecting water quality. Protection efforts based on inaccurate recharge boundaries can result in leaving recharge areas vulnerable to improperly managed activities and land uses. DEP has mapped the recharge areas, Zone IIs and IWPA's for most of the state's public water supply wells; see definitions in *Attachment A*.

The Zone I

New Wells The Zone I is the area closest to the well (100-400' radius) and requires the most stringent protection. Only land uses and activities directly related to the water supply are allowed in the Zone I. DEP requires water suppliers to own the Zone I. If the Zone I land is not available for purchase, the water supplier is required to control land uses and activities through a Zone I conservation restriction. Conservation restrictions must be reviewed and approved by DEP. A Model Zone I Conservation Restriction is available on the DEP's website, or by contacting the Drinking Water Program.

Existing Wells Some of the state's older wells do not meet the Zone I ownership requirement. In these instances the Zone I land may be owned by residents, businesses, farmers and schools. Among the most significant threats found in these Zone Is are septic systems, fertilizer application, storm water runoff, and underground storage tanks. DEP strongly encourages water suppliers to pursue ownership of the Zone I, or control the land through a conservation restriction. Water suppliers should also provide information to land owners on good housekeeping practices such as; maintaining septic systems, fertilizer applications, and hazardous materials storage. If possible, water suppliers should also attempt to obtain a 'Memorandum of Understanding' and a 'Right of First Refusal'; see examples in *Attachment C*.

- A **Memorandum of Understanding** is an agreement between the landowner and public water supplier in which the landowner agrees not to engage in specific threatening activities. The MOU should be specific to the land use or activity. For instance, if the land is agricultural the owner could agree not to use or store fertilizers, pesticides and manure. Understanding how an activity threatens drinking water quality is an important component in developing an effective MOU.

- A **Right of First Refusal** is a legal document which gives the water supplier the first chance to purchase land when it becomes available. Since the land may unexpectedly become available for purchase or acquisition, water systems should plan accordingly for possible land purchases.

The Zone II

The Zone II is the land area that contributes water to a well. The well's water supply is replenished when precipitation or stormwater percolates through the soil and reaches the water table. A Zone II delineation is required by DEP for all new wells yielding >100,000 gallons of water per day (gpd), and for existing wells increasing water withdrawals by >100,000 gpd. The Zone II is the area a community should focus its protection efforts on; see Zone II example in *Attachment B*.

Because high risk land uses and activities in the Zone II have the potential to impact drinking water quality, DEP recommends all communities adopt local protection controls that meet DEP Wellhead Protection Regulations, 310 CMR 22.21(2). These regulations specify the land uses and activities that DEP has determined present the greatest threat to groundwater quality. Water systems required to delineate a Zone II, must work with their local boards to adopt these controls; see *Wellhead Protection Requirements* in *Attachment B*.

Interim Wellhead Protection Areas

Large Wells (>100,000 gpd) The Interim Wellhead Protection Area (IWPA) is used as the protection area only until the Zone II is approved. All public drinking water wells without a Zone II have an IWPA. Under the Source Water Assessment Program, DEP has de-lined most of the Zone IIs for existing large wells. The IWPA is a one half- mile radius around the well and includes the Zone I. If a Zone II delineation is currently in progress, wellhead protection should be based on the Zone II rather than the IWPA. The reason for this is that, once the Zone II is delineated, the Zone II boundaries may exclude portions of the existing IWPA, and include land area beyond the IWPA. Wellhead protection should always be based on the well's actual recharge area whenever possible.

Small Wells (<100,000 gpd) The IWPA ranges from 400 ft to one half -mile and is proportional to the well's pumping rate. For small wells, the IWPA is the designated wellhead recharge area that should be protected. An example of an IWPA is in *Attachment B*.

The Zone III

The Zone III is the land area up-gradient of the Zone II and represents the well's drainage basin. Unless the Zone II delineation requirement is waived, DEP's Wellhead Protection Regulations do not require municipalities to adopt controls in the Zone III. In an effort to minimize threats to the Zone II however; many communities choose to provide protection for the Zone III. Commonly implemented in the Zone III are restrictions on impervious surfaces, floor drains, and facilities that generate, dispose, or store hazardous waste.

Identify All Public Wells

Communities often have numerous wells serving various populations. Large wells, such as those operated by a municipal water department or water district, may provide water to all or just part of a community.



Smaller wells typically serve schools; mobile park homes; restaurants; hotels; nursing homes; recreation sites; public buildings; and work places. Communities should know the location of all the public water supply wells in their community and make an effort to include these sources into local protection efforts.

Provide Maps

It's important that all public water suppliers provide a copy of the Zone II or IWPA map to municipal entities. In particular, the planning board and board of health need to know the location of the recharge areas in order to develop and adopt protection controls, plan for community development, establish local protection programs, and protect public health. Other local entities that should also be aware of the recharge location include the Board of Selectmen/City Council, Building Inspector, Conservation Commission, Fire Department and Police Department. If the recharge area extends into a neighboring municipality, those local officials should also be provided with a copy.



A map showing the location of the wells and their recharge areas can be posted in accessible locations for public view, such as the town hall, schools, and libraries. The map will generate awareness and lay the foundation for future public educational and outreach efforts. The map should be colorful and easy to read, such as a GIS* map, local Land Use Map, or Aquifer Protection District Map. Small systems should post a copy of their well and recharge area in the establishment they provide water. Municipalities and public water suppliers can obtain a GIS map of their public water supply by contacting MassGIS at 617-727-5227.

* Geographic Information System

STEP 3. IDENTIFY POTENTIAL THREATS



To effectively protect drinking water supplies, threats located in the recharge area must be identified. Threats include both existing and future land uses and activities that could affect the quality of drinking water if not managed properly. Existing threats can be identified by inspecting and inventorying the recharge area. Future potential threats can be determined by identifying the land uses and activities that could developed or occur in the recharge areas under the current zoning.

DEP's assessments under SWAP should not take the place of local inspections and inventories. The assessments are intended to complement local inventories and will rely on communities and public water suppliers to supplement and verify information. Local inventories and inspection are significant components to protection and can assist communities in:

- Providing reliable justification for local protection controls
- Identifying gaps in local protection controls and strategies
- Strengthening public awareness, education, and outreach efforts
- Encouraging community participation in protection efforts
- Promoting inter-municipal cooperation for protecting shared resources

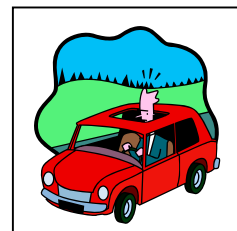
Review Existing Information



Information on existing threats may also be found in Zone II reports, local emergency plans, and community and regional planning studies. The local Board of Health, Fire Department, and Public Works Department may be able to provide information on the location of underground storage tanks, illegal dump sites, septic systems, sewer lines, and facilities that generate or store hazardous waste.

Conduct a Walk or Drive Through Inventory

The following pages identify the types of land uses and activities that pose potential threats to groundwater sources. Threats in the recharge areas should be identified on a 'local base inventory map'. For inventory purposes, the committee or team can use any local map that is easy to read and locate information onto; see *Attachment B* for a description of *Local Maps and Their Use for Wellhead Protection*.



If the water supplier does not already own the Zone I, the Zone I should be inventoried and the landowners identified. Recharge areas that extend into neighboring communities should also be inventoried.

Potential Land Use Threats to Groundwater Sources

(based on DEP's SWAP Land Use Pollution Potential Matrix)

AGRICULTURAL (farming and livestock)

Manure application/storage
Dairy farms/Livestock operations
Forestry operations
Slaughterhouses

Pesticide storage/use
Fertilizer storage/use
Landscaping/Nurseries
Sewage/sludge land application

COMMERCIAL (trades and services)

Airports
Boat yards/builders
Dry cleaners
Junk yards and Salvage yards
Golf courses/Cemeteries
Photo processors
Rust proofers
Medical facilities
Research laboratories

Auto repair shops/Gas Stations
Bus and Truck terminals
Furniture Stripping/ Refinishing
Railroad tracks and Yards
Paint shops
Repair shops (engine, appliances),
Laundromats
Printer and Blueprint shops
Sand and Gravel Operations

INDUSTRIAL (manufacturing and processing)

Chemical manufacture/storage
Foundries/Metal fabricators
Hazardous waste/materials storage
Industrial lagoons and pits
Industrial parks
Machine/metalworking shops
Nuclear power plants
Pharmaceutical manufacture
Petroleum/Chemical storage facilities
Textile manufacture
Gasification plants (oil/coal)

Electroplaters/electrical manufacture
Fuel oil distributors
Hazardous waste treatment/recycling
Hazardous waste generators
Jewelry/ Metal plating
Metal and Drum cleaning /reconditioning
Paper and plastic manufactures
RCRA TSD facilities
Wood preserving facilities
Tanneries
Asphalt, Coal tar and Concrete plants

RESIDENTIAL

Lawn care/Gardening
Auto maintenance

Septic systems/Cesspools
Fuel Oil Storage Tanks

MUNICIPAL, INSTITUTIONAL, UTILITIES

Military facilities (past and present)
Sewer/Oil Pipe Lines
Prisons, Schools, Colleges
Road/Maintenance depots
Snow dumps containing deicing chemicals
Storm water drains
Wastewater treatment plants

Landfills and Dumps
Fire training facilities
Transmission line right of ways
Utility substation transformers
Transportation corridors
Waste incinerators
Waste transfer stations

MISCELLANEOUS

Water treatment sludge lagoon
Illegal dumping
Dredge disposal facilities

Underground storage tanks
Tire dumps
Retention basins

Activities That Threaten Drinking Water Quality

Residential Uses (*viruses, bacteria, nitrates, chemical compounds*)

- Failing Septic Systems, chemical septic system cleaners
 - Improper storage and application of fertilizers, pesticides and lawn care chemicals
 - Disposal of household cleaners, automotive products, poisons, waste oil, paint thinners, gasoline, pet waste into septic systems, backyard pits and storm drains.
 - Driveway runoff of oils, gasoline, heavy metals, deicing chemicals
 - Leaking underground heating oil tanks
-

Schools and Institutions (*chemical compounds, solvents, nitrates*)

- Disposal of oil, paints, chemicals into floor drains, sinks or directly to the ground
 - Contaminated runoff from parking areas
 - Improper fertilization of recreation fields
 - Equipment wash waste water
-

Municipal Uses (*sodium chloride, heavy metals, petroleum*)

- Improper storage and application of deicing chemicals
 - Street sweeping into open storm drains
 - Public works garages; auto maintenance, equipment wash waste water
 - Uncapped/Unlined landfills, open dumps
 - Leaking sewer lines/oil lines
 - Improper storage/application of pesticides and fertilizers
 - Contaminated runoff from roads, parking lots
-

Commercial and Industrial Uses (*heavy metals, petroleum, sodium chloride*)

- Improper storage, disposal and management of hazardous materials/waste
 - Abandoned or leaking underground storage tanks
 - Spills and releases that go unattended
 - Floor drains which discharge directly to the ground
 - Exposed bodies of water from mining, sand and gravel operations,
 - Waste storage lagoons
 - Transportation spills and releases
-

Agricultural Uses (*nitrates, bacteria, viruses*)

- Improper use/storage of pesticides, herbicides, animal manure, fertilizers
- Improper irrigation methods
- Animal burial
- Storage lagoons
- Contaminated runoff and equipment wash waste water

Potential Threats at the Well Site Small Systems Checklist

In addition to potential threats posed by high risk land uses and activities in the recharge area, **small water suppliers** in particular need to routinely inspect for threats that occur at the well site. This component of the inventory should be conducted by the certified operator. Look for:



- Cracks in sanitary seals, grouting, casing, and concrete pads
- Concrete pads that do not slope away from the well
- Unscreened openings in vents and water level ports
- Cross connections
- Vents and valves that aren't pointed to the ground
- Unprotected chemical feeders that aren't tamper proof
- Unapproved well cleaning chemicals
- Old oil-drip lubricated pumps
- Well casing that doesn't extend above ground
- Back flow prevention valves which do not operate properly

STEP 4. PROTECT AND MANAGE THE RECHARGE AREAS

Protecting and managing the water supply recharge areas involves evaluating and implementing regulatory and non-regulatory strategies. When used in conjunction, regulatory strategies and non-regulatory strategies are highly effective in protecting water supplies from existing and potential threats. A brief description of the various regulatory and non-regulatory strategies is on pages 15 and 16.

Regulatory Strategies

To determine if a community's local controls are adequate to protect drinking water supplies, it is recommended they are compared to the minimum requirements established by DEP in MA Wellhead Protection Regulations, 310CMR 22.21(2). To generate a review of local controls, the protection committee/team should meet with the local planning board and board of health to discuss the wellhead protection plan, and the need for drafting amendments to local controls.

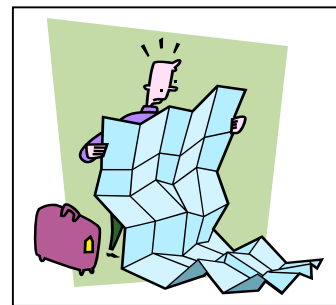


When reviewing controls, it is useful to refer to the 'land use inventory'. Communities with many existing threats may want to manage these activities through health regulations or general bylaws. While existing land uses cannot be prohibited, health regulations and general bylaws are excellent tools for managing activities. For instance, a health regulation can require that hazardous materials are stored and disposed of properly, stormwater is diverted away from the wellhead, and that floor-drains discharging to the groundwater are properly sealed. Recharge areas that have little or no existing threats can effectively be protected from future land uses through zoning controls. For more information on adopting local protection controls pursuant to DEP requirements; see *'Making Source Protection Work in Massachusetts'*.

If your town does not have water supply protection bylaws or health regulations, DEP's 'Model Groundwater Protection District Bylaw' or 'Model Groundwater Board of Health Regulation' can be adopted in its entirety. Communities with existing controls can also adopt these Models; however it is important to review local controls first to ensure that existing controls are not duplicated or inconsistent.

Review the protection district map

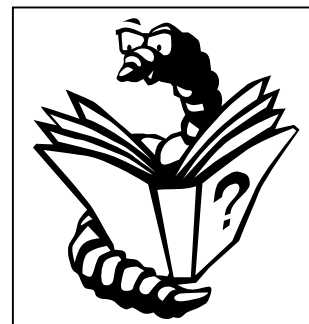
If a town has an overlay protection district bylaw, the protection district map should be reviewed. The boundaries of the district should encompass the boundaries of the recharge areas. If recharge areas are not completely covered, the district map should be re-delineated. Recharge areas not covered by the district map, are not protected by the district bylaws.



Recharge areas sometimes extend into adjacent municipalities. In these instances, it is recommended that the community is contacted to discuss inter-municipal protection strategies. A number of communities in Massachusetts protect neighboring supplies by incorporating the recharge area into their local protection district bylaw. Such action promotes goodwill and generates awareness for inter-municipal and regional water supply protection needs.

Evaluate and identify non-regulatory protection strategies

Non-regulatory strategies, such as hazardous waste collection days, best management practices and land acquisition, rely on voluntary efforts and public support and participation. To evaluate the types of non-regulatory strategies that are best applicable to your water supplies, it is a good idea to discuss the various options with local boards and community groups.



Public outreach and awareness events are often the best way to educate and encourage residents and businesses to implement non-regulatory strategies. Some non-regulatory strategies can be implemented in conjunction with a local board or department. For instance, the board of health could establish an inspection program in which information on best management practice along with technical assistance is provided to commercial and industrial establishments. A community development department, which often works directly with residents, could provide informational assistance on septic system maintenance, lawn care, and disposal of household hazardous wastes.

SUMMARY OF REGULATORY PROTECTION STRATEGIES

Zoning Bylaws

Prohibit or restrict specific land uses. Bylaws require municipal adoption and approval by the Attorney General's Office. The most commonly used zoning techniques for wellhead protection are Aquifer Overlay Protection Districts and Site Review Requirements.

Aquifer Overlay Protection Districts

Superimposed on the underlying zoned districts (commercial, residential, etc), the overlay protection district covers the water supply recharge areas. The land area covered by the overlay is then subject to both the underlying and overlying requirements.

Subdivision/Site Review Requirements

Used by planning boards when reviewing proposed development plans. Requirements are usually standards, which must be met prior to site development. Water Quality Standards require that development does not affect the groundwater quality, and may require the developer to assess the impact of the development prior to construction. Performance Standards, such as *Zero Net Runoff*, require no storm water runoff increases during or after development. Water Quality Standards and Performance Standards are also types of Best Management Practices. DEP's *Storm Water Management Handbook* should be used as a guidance for controlling storm water in the Zone II.

Board of Health Regulations

Boards of Health are required under MGL Chapter 111 to adopt local regulations to protect public health. Health regulations can apply town-wide and address existing and future uses. Regulations are most commonly used to protect residential wells, regulate the use and management of hazardous and toxic materials, and prohibit floor drains that discharge to the ground in commercial and industrial storage areas. Health regulations can also apply just to the aquifer overlay protection district.

General Bylaws

Can address existing and future activities and are usually applied town wide; can also be applied to an overlay district. Often used to control earth removal activities.

Growth Controls

Used to time the occurrence and intensity of development within the recharge area, growth controls slow down development and give communities time to evaluate existing uses and plan for future growth. To mitigate challenges, growth controls must be rationally linked to the protection of the recharge area and the community's growth management efforts. Poorly planned growth can result in potential sources of contamination located in water supply recharge areas. A local build-out analysis can assist a community in determining its need for growth control. Build-out analyses for all communities will be completed by EOEA* by 2002. See *Attachment C* for contact listing.

Examples of growth controls include:

- Subdivision Phasing; creates timelines for development
- Transfer of Development Rights; relocates proposed development to locations outside the recharge area
- Building Caps; reduce the number of building permits per year
- Down Zoning; amends zoned districts to less intensive land uses, i.e. industrial to commercial, commercial to residential
- Moratoriums; ban new building permits for a specified period of time
- Cluster Zoning; decreases minimum lot size, increases open space, reduces impact from storm water runoff

* MA Executive Office of Environmental Affairs

SUMMARY OF NON REGULATORY PROTECTION STRATEGIES

Best Management Practices

BMPs are effective methods for addressing existing threats in water supply recharge areas. Considered to be the most feasible and cost effective actions, BMPs are designed to prevent or mitigate contamination threats. Structural BMPs are often used to meet a municipal performance standard.

Structural BMPs

vegetative swales and strips; water quality inlets; oil and grease trap catch basins; berms constructed wetlands; porous pavement; retention and detention ponds

Non Structural BMPs

stenciling storm water drains; hazardous waste collection days; recycling programs; regulatory controls; public education; herbicide, pesticide and fertilizer management.

Inspection Programs

Inspection Programs are usually developed by local Boards of Health to prevent hazardous substances from entering water supplies. Inspections target facilities that generate, use, store, or dispose of hazardous/toxic materials. Programs can also include floor drain and underground storage tank inspections. Local programs can provide educational material and technical assistance on Best Management Practices. Building Inspectors and Fire Departments are often involved in local inspection programs.

Monitoring Programs

DEP requires water suppliers to submit a groundwater monitoring 'plan' when a new (large) well is developed. The plan involves installing monitoring wells to detect

contaminants before reaching the water supply. A groundwater monitoring 'Program' is more comprehensive because it incorporates the information and data into local protection plans. A local program may use the data to prioritize local inspections, provide information to facilities on Best Management Practices, update local emergency and contingency plans, and adopt additional protection controls to address existing potential threats.

Land Acquisition

Land acquisition protects water supplies by limiting the land's development potential. Acquisitions can be accomplished by municipal and non-municipal water systems through conservation restrictions, land banking, land purchases and land donation.

Acquisition Requirements

- Zone I land must be acquired (owned or controlled) by the water supplier
- Conservation Restrictions must be approved by DEP and EOEA
- Land acquired for water supply purposes must be approved by DEP
- Land acquired for water supply protection cannot be released for other uses without DEP approval (may also require legislative approval)

Acquisition Recommendations

- Zone I land (if not owned or controlled by the water supplier)
- Zone II land closest to the Zone I
- Zone II land subject to high risk development
- Zone II land abutting protected land
- Land needed for future well sites
- Land in the IWPA, wells <100,000 gpd
- Any land located in the Zone II

ZONE I BEST MANAGEMENT PRACTICES

DEP requires that activities within the Zone I be limited to those directly related to the provision of water. Many small water systems have grand-fathered land uses in the Zone I. For such systems, Best Management Practices (BMPs) are often the primary tool for protecting the Zone I. In the Zone I, BMPs focus on good housekeeping, spill prevention, and operational practices to reduce the use and release of hazardous materials.

Zone I BMPs

- ➔ Keep non water supply activities out of the Zone I
- ➔ Do not establish parking areas in the Zone I
- ➔ Do not store or use lawn chemicals, road salt/deicers, motor oil, gasoline or paints in the Zone I or pump house
- ➔ Remove or relocate underground storage tanks, hazardous materials, and septic systems from the Zone I, if possible.
- ➔ Store hazardous materials in a secure building on an impermeable surface with adequate spill containment.
- ➔ Use propane or natural gas for power pumps.
- ➔ Seal floor drains in the Zone I.
- ➔ Properly label, store and dispose of hazardous substances.
- ➔ Restrict access to the well and post water supply protection signs.

STEP 5. PROVIDE ONGOING PUBLIC EDUCATION AND OUTREACH

Public education and community outreach are effective approaches for ensuring the long-term protection of drinking water supplies. The purpose is to inform the community of the relationship between land use activities and drinking water quality. This awareness often generates community cooperation and support. Residents and business owners are more likely to change their behavior if they know:



- ❶ Where the wellhead protection recharge area is located
- ❷ What types of land uses and activities pose threats
- ❸ How their efforts can enhance protection.

Public Outreach and Educational Efforts

- Post 'Drinking Water Protection Signs' to notify the public they are entering a water supply recharge area
- Work with local schools to introduce drinking water protection curriculum, see publications in *Attachment C* for educational curriculum.
- Publish articles or weekly tips on groundwater protection in the local newspaper - **Small systems** should send letters to residents, schools and businesses located in the recharge area and include informational material and tips on maintaining good groundwater quality, see *Sample Notification* and *Clean Water Fact Sheet* in *Attachment C*.
- If your establishment has a septic system located in the Zone I - post signs or posters instructing staff, residents or students of the types of substances that should never be poured down the drain.
- Initiate a hazardous waste collection day, storm water drain stenciling program, or other source water protection activity.
- Produce local public service announcements; get students or youth associations involved in the production.
- Distribute water supply protection information in newsletters, brochures or flyers or provide them in public buildings - **Small systems** should post notices informing employees, residents/students that the establishment provides water to them; and, train staff on water supply protection techniques.
- Hold public informational meetings, or speak at already scheduled meetings of local groups.

Wellhead Protection Basics

ATTACHMENT A

WELLHEAD PROTECTION TERMS

➤ Massachusetts Public Water Systems

Community Water Systems provide water to 25 or more year round residents and have 15 or more service connections. Community water systems range from Very Small Systems to Very Large Systems depending upon the number of people served. **Large Community Systems** are usually municipal water departments, water districts, or privately owned water companies and have water withdrawals greater than 100,000 gallons per day (gpd). **Small Community Water Systems** serve small populations, such as nursing homes, mobile parks, condominiums, and apartment complexes. While some small community systems have water withdrawals greater than 100,000 gpd, most have less.

Non-Community Systems have water withdrawals less than 100,000 gpd. **Non-Transient Non-Community Water Systems (NTNCs)** provide water to at least 25 of the same people per day for at least 180 days a year, such as schools and work places. **Transient Non-Community Systems (TNCs)** provide water to visiting populations of at least 25 different people a day for 60 or more days/year, such as restaurants, hotels, campgrounds, golf courses, and bottled water vendors.

➤ The Recharge Areas

The **wellhead protection area** is the surface and subsurface land area that a well draws water from. The wellhead protection recharge area can be smaller than, or as large as the aquifer in which it is located. DEP divides the wellhead protection recharge area into Zones I, II and III.

Zone I is the immediate land area around a well. It is defined as a 400' radius for wells >100,000 gpd and 100' to 400' radius for wells <100,000 gpd, depending upon the pumping rate. The Zone I must be owned or controlled by the water supplier.

Zone II is the land area over an aquifer that contributes water to a well. The boundaries of the Zone II are determined by hydro-geologic study in which the well is pumped for 180 days with no precipitation. Zone II's include the Zone I and must be approved by DEP.

The **Interim Wellhead Protection Area (IWPA)** is used as the protection area in the absence of a Zone II. For wells >100,000 gpd, the IWPA is a one half mile radius. For wells <100,000 gpd, the IWPA radius is determined from the pumping rate and ranges from 400' to a one half mile radius.

Zone III is the land area beyond the Zone II from which surface and groundwater drain into the Zone II. Zone III boundaries are determined by identifying the topographic surface water drainage divides. The surface water drainage area commonly coincides with the groundwater drainage; however, in areas where they are not coincident, the Zone III encompasses both the surface and groundwater drainage area.

WELLHEAD PROTECTION REQUIREMENTS

- **MA Drinking Water Regulations 310 CMR 22.00** require public water suppliers to define the **Zone II** for all new wells that withdraw >100,000 (gpd) and for wells increasing water withdrawals by >100,000 gpd. The Zone II must be approved by DEP and protected by municipal controls that meet **MA Wellhead Protection Regulations 310 CMR 22.21(2)**.
- **MA Wellhead Protection Regulations 310 CMR 22.21(2)** require municipal water systems (putting new wells on line or increasing withdrawals) to adopt local zoning/non-zoning controls which meet the language in 310 CMR 22.21(2). Non municipal water systems must meet the **Best Effort Requirement** under **310 CMR 22.21(1)d**.
- **Best Effort 310 CMR 22.21(1)d** requires non-municipal water systems to demonstrate that they have used their *Best Efforts* to encourage the municipality (in which the Zone II is located) to adopt controls which meet MA Wellhead Protection Regulations 310 CMR 22.21(2). In instances where the Zone II extends into adjacent communities, both non-municipal and municipal systems must meet the Best Effort requirement.
- **MA Wellhead Protection Regulation 310 CMR 22.21(1)** requires public water suppliers to own the **Zone I**, or control it through a conservation restriction. Only water supply activities are allowed in the Zone I.
- **Water Management Act 310 CMR 36.00** regulates water withdrawals >100,000 gpd. DEP's **Water Withdrawal Permitting Program** requires water suppliers to obtain a permit to develop new wells or increase water withdrawals by >100,000 gpd. Water Withdrawal Permits require approved Zone II delineations and compliance with 310 CMR 22.21(2) prior to the operation of a new well, or within two years for an existing well.
- **DEP Monitoring Waivers** reduce the monitoring requirements for a specific water supply. Waivers save water systems a significant amount of money. Among the waiver requirements for SOCs and VOCs, the water supplier must meet specific protection criteria.

Small water systems (<100,000 gpd) must:

- (a) inventory the land uses in the Zone I and IWPA;
- (b) submit a land use map of the Zone I and IWPA;
- (c) post protection signs around the Zone I; and
- (d) notify residents and business owners located in the Zone I.

Large water systems (>100,000 gpd) must demonstrate that the Zone II is protected by a municipal bylaw/ordinance or health regulation that meets 310 CMR 22.21(2), and that IWPA's are protected (at a minimum) by a hazardous materials regulation or bylaw.

Annotated

MA Wellhead Protection Regulations 310 CMR 22.21(2):

(a) Wellhead protection zoning and non-zoning controls submitted to the Department in accordance with 310 CMR 22.21(1), shall collectively prohibit the siting of the following land uses within the Zone II, or Zone III if the criteria of 310 CMR 22.21(1)(f) have been met, of the proposed well or wellfield, whichever is applicable:

1. **landfills and open dumps**, as defined in 310 CMR 19.006;
2. **landfills receiving only wastewater residuals** and/or septage (wastewater residuals "monofills") approved by the Department pursuant to MGL. c. 21, § 26 through 53; MGL. c. 111, § 17; MGL. c. 83, § § 6 and 7, and any regulations promulgated thereunder;
3. **automobile graveyards and junkyards**, as defined in MGL. c. 140B, § 1;
4. **stockpiling and disposal of snow or ice** removed from highways and streets located outside of Zone II that contains sodium chloride, chemically treated abrasives or other chemicals used for snow and ice removal;
5. **petroleum, fuel oil and heating oil bulk stations and terminals**, including, but not limited to, those listed under Standard Industrial Classification (SIC) Codes 5171 and 5983, not including liquefied petroleum gas. SIC Codes are established by the U.S Office of Management and Budget and may be determined by referring to the publication, Standard Industrial Classification Manual and any subsequent amendments thereto.
6. **treatment or disposal works subject to 314 CMR 5.00, for wastewater other than sanitary sewage**. This prohibition includes, but is not limited to, treatment or disposal works related to activities under the Standard Industrial Classification (SIC) Codes set forth in 310 CMR 15.004(6) (Title 5), except the following:
 - a. the replacement or repair of an existing system(s) that will not result in a design capacity greater than the design capacity of the existing system(s); and
 - b. treatment works approved by the Department designed for the treatment of contaminated ground or surface waters and operated in compliance with 314 CMR 5.05(3) or 5.05(13); and
 - c. publicly owned treatment works, or POTW's.
7. **facilities that generate, treat, store or dispose of hazardous waste** that are subject to MGL. c. 21C and 310 CMR 30.000, except for the following:
 - a. very small quantity generators, as defined by 310 CMR 30.00;
 - b. household hazardous waste collection centers or events operated pursuant to 310 CMR 30.390;
 - c. waste oil retention facilities required by MGL. c. 21, § 52A; and
 - d. treatment works approved by the Department designed in accordance with 314 CMR 5.00 for the treatment of contaminated ground or surface waters.
8. **any floor drainage systems in existing facilities in industrial or commercial hazardous material** and/or hazardous waste process areas or storage areas, which discharge to the ground without a DEP permit or authorization. Any existing facility with such a drainage system shall be required to either seal the floor drain (in accordance with the state plumbing code, 248 CMR 2.00), connect the drain to a municipal sewer system (with all appropriate permits and pre-treatment), or connect the drain to a holding tank meeting the requirements of all appropriate DEP regulations and policies.

b) Wellhead protection zoning and non-zoning controls submitted to the Department in accordance with 310 CMR 22.21(1), shall collectively **prohibit the siting of the following land uses** within the Zone II, or Zone III if the criteria of 310 CMR 22.21(1)(f) have been met, of the proposed well or wellfield, whichever is applicable, **unless designed in accordance with the specified performance standards:**

1. **storage of sludge and septage**, as defined in 310 CMR 32.05, unless such storage is in compliance with 310 CMR 32.30 and 310 CMR 32.31;
2. **storage of sodium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads**, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
3. **storage of commercial fertilizers**; as defined in MGL. c 128 § 64 unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
4. **storage of animal manure**, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
5. **storage of liquid hazardous materials**, as defined in MGL. c. 21E, and/or **liquid petroleum products** unless such storage is:
 - a. above ground level; and
 - b. on an impervious surface; and
 - c. either:
 - (i) in container(s) or above ground tank(s) within a building; or
 - (ii) outdoors in covered container(s) or above ground tank(s) in an area that has a containment system designed and operated to hold either 10% of the total possible storage capacity of all containers, or 110% of the largest container's storage capacity, whichever is greater;however, these storage requirements shall not apply to the replacement of existing tanks or systems for the keeping, dispensing or storing of gasoline provided the replacement is performed in a manner consistent with state and local requirements.
6. **the removal of soil, loam, sand, gravel or any other mineral substances within four feet of the historical high groundwater table elevation** (as determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey), unless the substances removed are re-deposited within 45 days of removal on site to achieve a final grading greater than four feet above the historical high water mark, and except for excavations for the construction of building foundations or the installation of utilities.
7. **land uses that result in the rendering impervious any lot or parcel more than 15% or 2500 square feet, whichever is greater**, unless a system for artificial recharge of precipitation is provided that will not result in the degradation of groundwater quality proposed well or wellfield on-line.

Water Suppliers required to meet these regulations should obtain a copy of *Making Source Protection Work in Massachusetts (formerly Making Wellhead Protection Work in Massachusetts)*. This manual details the source protection compliance process for both groundwater and surface drinking water supplies

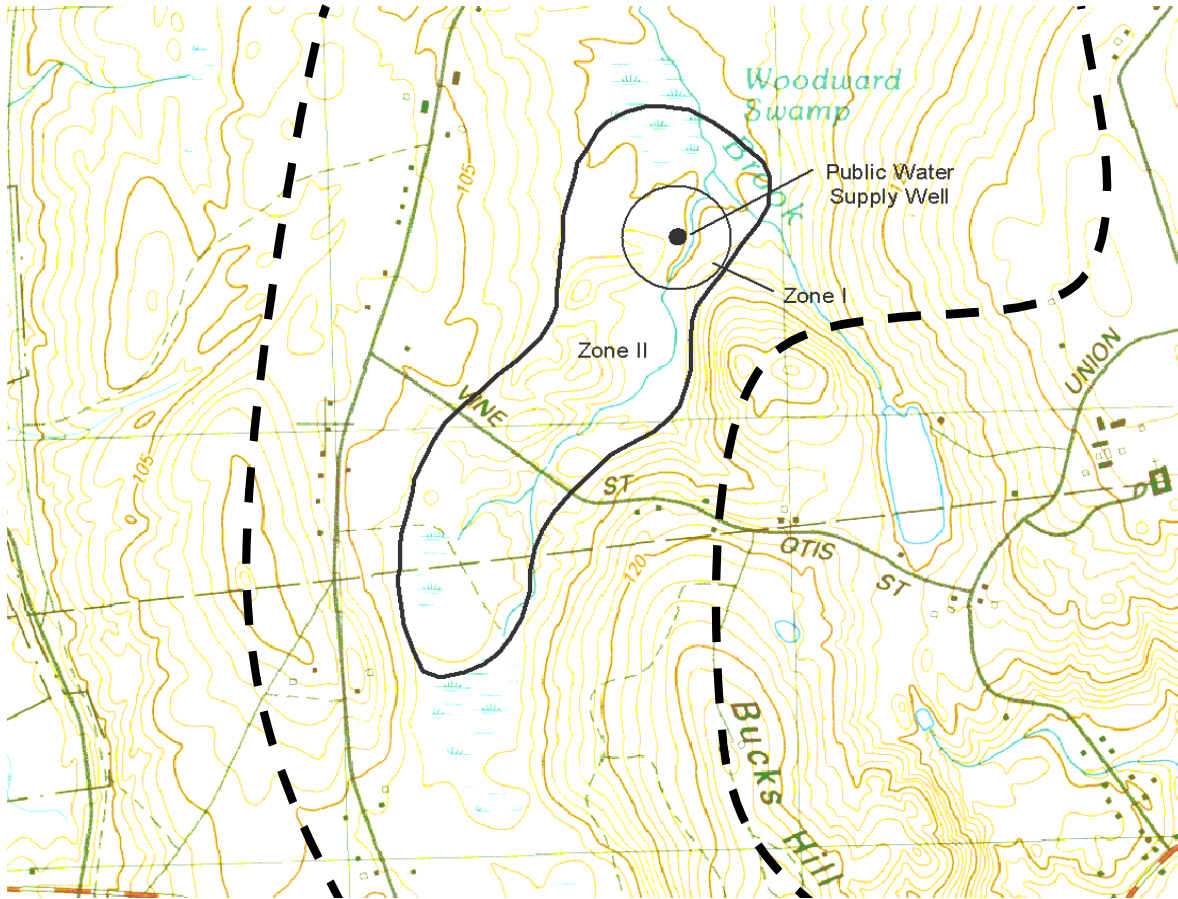


Figure 1. Zone II Map Example
Also Shows Zone I and Zone III (---) boundaries

Zone IIs are delineated on topographic maps by the consultant and provided to the public water supplier. Uncontrolled land uses and activities in the Zone II may impact the quality of drinking water. Local municipal controls that prohibit and restrict high risk activities and land uses are the primary tool for protecting the Zone II.

SAMPLE Zone I/IWPA Land Use Map

PWS ID#: 0000000

PWS Name: Willow Avenue Well #1

Average Daily Pumping Rate: 10,000 gpd

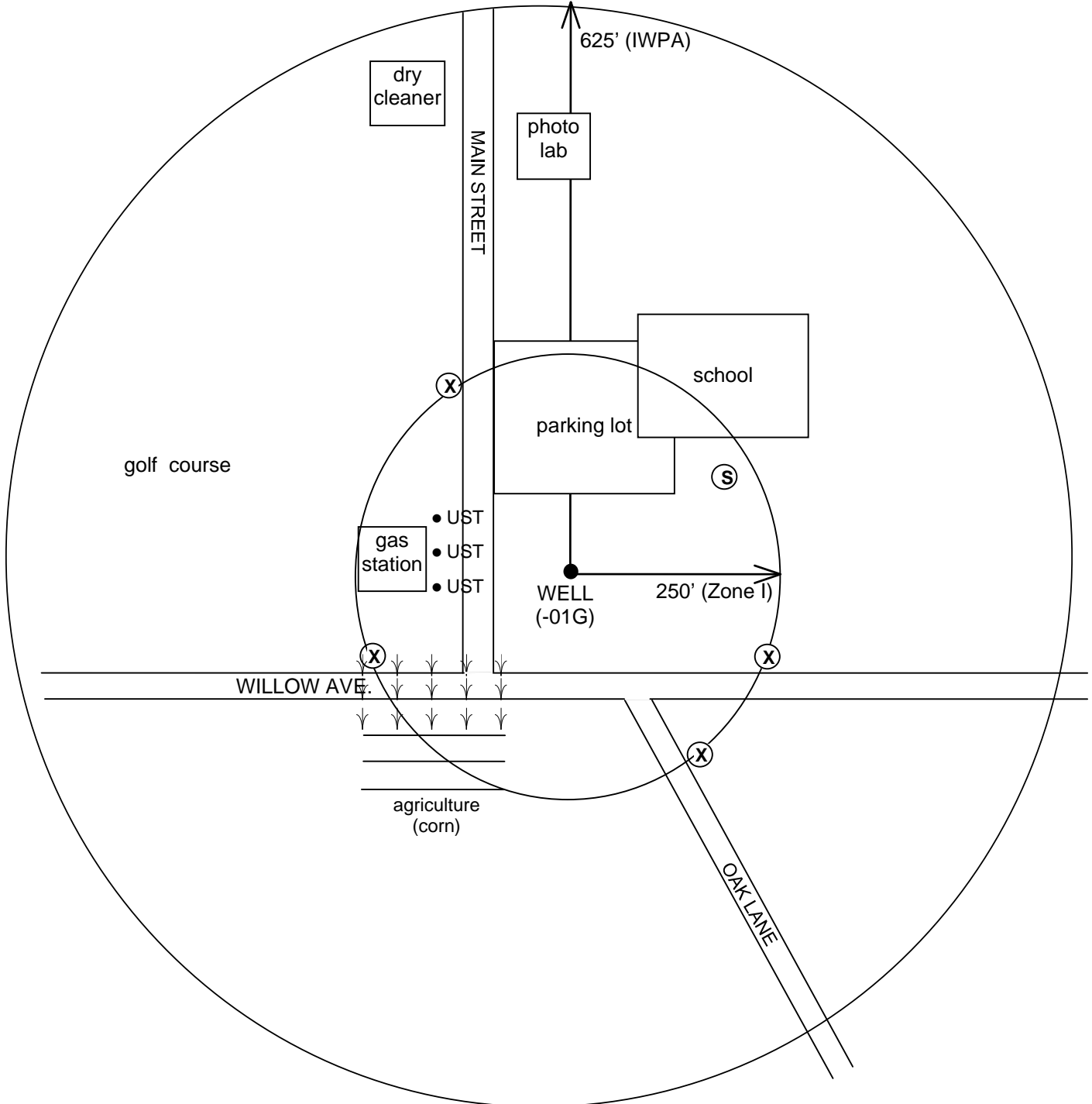
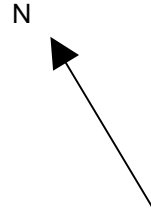
Date: October X, 1998

(X) = location of posted signs

(S) = septic system

Scale: 1" = 175'

UST = Underground Storage Tank



Wellhead Protection Tools

ATTACHMENT B

SUMMARY OF RECOMMENDED SOURCE WATER PROTECTION MEASURES

WATER SUPPLY PROTECTION COMMITTEE OR TEAM	A local protection committee comprised of the public water supplier, municipal board members and community members should be established to meet regularly to discuss protection issues and develop protection plans. Committees should also review and comment on development proposals; develop educational initiatives and work with neighboring communities on protecting shared water resources.
MUNICIPAL CONTROLS Zoning Bylaws	Zoning bylaws/ordinances prohibit or restrict future land uses that have the potential to contaminate drinking water. DEP regulation, 310 CMR 22.21(2) specifies the prohibited activities in Zone II recharge areas.
Health Regulations, General Bylaws	Health regulations and general bylaws/ordinances can address existing potential contamination sources. Widely used for addressing the storage and management of hazardous/toxic materials, floor drain discharges, underground storage tanks and earth removal activities.
Subdivision Requirements, Site Plan Reviews, Performance Standards	Subdivision and site plan reviews provide opportunities to address water supply concerns at the initial stage of development. Regulations can also establish design and performance standards for new development.
EDUCATION AND OUTREACH PARTNERSHIPS	Education and outreach programs for the public, business owners and schools should be part of a local Drinking Water Protection plan or program. Post protection signs to alert the public when they are entering water supply recharge areas. Post maps of water supply recharge locations in the town hall and library. Develop partnerships with businesses, schools, and other towns to further public awareness and protection efforts.
INSPECTION PROGRAMS	DEP regulations require regular inspection of drinking water protection areas. Water suppliers should also work with their local boards to develop inspection programs for hazardous materials/waste management and floor drain discharges in commercial and industrial areas. Inspection programs should incorporate education and technical assistance.
BEST MANAGEMENT PRACTICES (BMPs)	BMPs are an effective way of controlling existing high-risk land uses, non point sources of pollution, and development impacts. BMPs employ the best available practices to prevent or mitigate a contaminant release to the environment. Double-walled tanks, Integrated Pest Management, household hazardous waste collection days, stenciling storm drains and storm water control devices are examples of BMPs.
LAND ACQUISITION	Land acquisition provides absolute control of the land's use. Acquisition can be accomplished through outright purchases, land donations and land banking. Conservation Restrictions can also be employed to protect land for water supply purposes.
CONTINGENCY PLANS	Water suppliers should have a current plan for providing adequate water in the event of temporary shortages and for determining future water supply needs.
EMERGENCY PLANS	Water suppliers should have a current plan for responding to emergency events. Assess the potential for releases at various points; develop communication protocols; specify spill response measures; train staff.

Types of Maps and Their Use For Wellhead Protection

Type of Map	Information and Use
Zoning Map Land Use Map	<p>These maps show land uses by color or code; eg. Zoning: RS40 = single residential, 40,000 sq. ft lots eg. Land Use: light yellow = low density residential</p> <p>Zoning maps show current allowed land uses and may not reflect grand-fathered uses; map may be busy and difficult to read.</p> <p>Land Use map, if current, shows actual use of the land. Colorful, good for display. Easy to use as a base map for conducting inventories.</p>
Aquifer/Water Resource Protection Overlay District Map	<p>Shows existing protected areas. Boundaries of the Zone II/IWPA must be covered by the district's boundaries for the protection district bylaws to apply. Maps vary among communities, may be an overlay mylar, GIS, or districts may be delineated directly onto the zoning map. If not too detailed, may be useful for inventories.</p>
USGS Topographic Quadrangle Map	<p>Best used for identifying natural features that may require protection, e.g. watersheds, surface water bodies, wetlands, floodplains. Also shows major roadways, municipal boundaries, residential developments, municipal facilities, cemeteries, and sand and gravel operations. May be difficult to use as a base map, scale is small, more than one map may be needed, and map might not show the most recent developments.</p>
General Town Map	<p>Identifies streets, surface water bodies, neighborhood features and municipal facilities. Usually large scale of the map with identified local features, easy to use as a base map for conducting an inventory.</p>
Tax Assessor's Map	<p>Identifies streets, land by lots, parcels, and ownership. Easy to use for conducting an inventory and very useful for identifying possible land acquisitions.</p>
GIS Map	<p>Colorful and easy to read. Best used to display collected information. Also good for a base map if the scale is large. Maps show various features from databases; i.e. recharge boundaries, regulated sources of contamination, natural features. Contact MassGIS at 617-727-5227 or DEP at 617-574-6802 for more information .</p>

WELLHEAD PROTECTION PLAN CHECKLIST

Use this Checklist to describe your Wellhead Protection Plan.

1. **Identify the public water system(s) and wells for which the Wellhead Protection Plan is targeted:** e.g. Town-wide, all wells; Municipal water department, Wells 01, 02, 06; Non-Transient Non Community System, Well 01.
2. **List the committee or team members and key sub-committees, and how often the group meets:** e.g. advisory committee meets twice a month, voluntary team meet once a month, etc.
3. **Identify all municipal protection controls and other enforceable mechanisms that currently protect the recharge areas:**
 - i. Board of Health Regulation; date of adoption
 - ii. Zoning Bylaw/Ordinance, date of adoption/amendment
 - iii. General Bylaw/Ordinance, date of adoption/amendment
 - iv. Other: e.g. Water System Rules and Regulations, Conservation Restriction, Ownership of Land
4. **Based on the potential threats identified from the local inventory, Zone II reports, regional planning studies, SWAP reports and other information; what regulatory and non-regulatory protection strategies are needed to protect drinking water supplies?**
5. **Using a timeline, what is the schedule for pursuing these protection strategies?** ie. drafting and adopting municipal protection controls, re-delineating the protection district map, posting protection signs, notifying and providing informational material to land owners in the Zone I etc.
6. **Who is the contact person/board for implementing these strategies?** ie. planning board, board of health, building inspector, water supplier etc.
7. **What type of wellhead protection education or outreach does the community or committee/team plan to conduct? What is the schedule for future outreach efforts?** (ie. twice a year, once a month)

Large Systems Only:

8. Do municipal controls meet all the requirements cited in MA Wellhead Protection Regulation 310 CMR 22.21(2)? If YES, but you have not received a **Letter of Compliance**; please submit copies of relevant bylaws, health regulations, and the protection district map (if applicable) to DEP. If controls do not meet, draft amendments and submit them to DEP for review and comment, and develop a schedule for municipal adoption.

Submit your Wellhead Protection Plan to: DEP 6th floor - Wellhead Protection Program - One Winter St. Boston, MA 02108

Sample Water Supply Protection Checklist

-A tool for local official for coordinating project reviews in water supply areas -

Protecting drinking water supplies is an ongoing task for municipal officials. Once a community establishes water supply protection measures such as bylaws, health regulations and protection plans, proposed land uses and activities must be evaluated in conjunction with the established protection.

Reviewing proposed projects, however, can be challenging. Proposed developments and projects often require permitting/reviewing officials to obtain information from other local boards and entities. For instance, a building inspector reviewing an permit application for an industrial facility expansion that stores hazardous materials, must know at a minimum:

- Is the project located in a water supply area?;
- Is the water supply area protected by local controls?;
- What condition or performance standards must the project meet to ensure protection?;
- Does the project have secondary/accessory uses that pose a threat to water supplies?;
- What other local controls are applicable to the project?;
- Which local officials and entities need to be informed of this project (fire department, public water supplier, board of health, board of selectmen, etc.)?

The Sample Water Supply Protection Checklist was developed to provide local officials with a method for reviewing and commenting on projects prior to permitting them in water supply areas. By coordinating information and efforts among the multiple entities that play a role in water supply protection, local officials can:

- ensure that potential sources of contamination are not inadvertently permitted in water supply protected areas;
- identify and mitigate potential threats posed by existing land uses;
- identify and strengthen inadequate protection controls; and
- enhance the protection of inter-municipal water supplies and recharge areas.

The water supply checklist can be initiated and circulated by any individual responsible for reviewing or permitting projects. The attached Sample should be modified to identify the initiating authority, such as 'Building Inspector Water Supply Protection Checklist'.

Modifications should also be made to reflect the community's water supply sources, local boards and entities, and local water supply protection measures.

TOWN/AUTHORITY: _____

THIS INFORMATION IS NECESSARY TO PROTECT DRINKING WATER SUPPLIES

I. Property Owner/Developer

Name _____

Mailing Address _____

Telephone _____

II. Location of Proposed Project

1. Site Address _____ Assessors map-lot/parcel# _____

2. Current zoning _____

3. The proposed project is in an Aquifer/Watershed Protection District (y/n) _____,

4. The proposed project is in a DEP designated water supply Zone (y/n) _____,

4(a). If yes, specify source and recharge area:

Groundwater Source(s): _____

Zone I _____ Zone II _____ IWPA _____

Surface Water Source: _____

Zone A _____ Zone B _____ Zone C _____

III. Description of the Proposed Project

1. The Type of proposed use or activity is considered: (check all that apply)

___ new development or structure

___ a change in use

___ expansion of an existing use

___ a secondary or accessory use

___ replacement of an existing structure

___ a non-conforming use

___ other _____

2. Describe the proposed project:

3. The proposed project includes the following uses or activities in the **Zone II** OR **Zone A** of a drinking water source:

a) storage of:

- liquid petroleum products
- liquid hazardous materials
- deicing chemicals
- animal manure
- commercial fertilizers

- b) generation, treatment, storage, or disposal of hazardous waste
- c) non-sanitary wastewater treatment or disposal works
- d) stockpiling of snow/ice containing deicing chemicals
- e) construction of impervious surfaces
- f) junkyards, automobile graveyards, salvage yards
- g) excavation of earth material

In the Zone II

In the Zones A

- h) storage of sludge/septage
- i) landfills, dumps, monofills
- j) floor drains discharging to the groundwater
- k) petroleum, fuel or heating oil bulk stations or terminals

- l) solid waste facilities
- m) motor vehicle repair operations
- n) cemeteries
- o) animal standing, stabling or grazing
- p) commercial car washes and outdoor commercial vehicle washing

4. These activities or uses are controlled through:

Zoning Bylaws/Ordinances _____
Board of Health Regulations _____
General Bylaws/Ordinances _____ Other _____
Not Controlled _____

5. The proposed project is consistent with the local regulatory control (y/n) ____
(comment) _____

6. Sensitive features on the project site include:

- erodible soils/steep slopes
- wetlands
- flood plains
- shallow depth to groundwater
- highly permeable soils
- rivers/streams
- private (homeowner) wells
- shallow fractured bedrock
- other _____

7. The project site/facility has existing threats (or violations) to drinking water supplies:

- improperly abandoned well
- unsealed floor drains
- leaking under/above ground storage tanks
- hazardous waste disposal/storage
- improper hazardous materials storage
- stormwater/flooding
- other _____

IV. Attachments

site plan/design _____ map _____ other _____

V. Comments/Additional Information:

This information has been received/reviewed by:

	Date	Approval Required (y/n)	Comments Attached (y/n)
___ Building Inspector	_____	_____	_____
___ Zoning Officer	_____	_____	_____
___ Planning Board	_____	_____	_____
___ Board of Health	_____	_____	_____
___ Public Water Supplier	_____	_____	_____
___ Protection Committee	_____	_____	_____
___ Zoning Board of Appeals	_____	_____	_____
___ Conservation Commission	_____	_____	_____
___ Fire Chief/Department	_____	_____	_____
___ Adjacent Municipality (Town/City _____)	_____	_____	_____

Please return to the _____ by _____

**Technical Assistance, Fact Sheets,
Publications**

ATTACHMENT C

Contingency and Emergency Plans – A Brief Overview

Contingency and Emergency plans are usually developed by the water supplier in conjunction with local safety, health, and planning officials. Contingency and Emergency Plans should be reviewed annually for consistency with local wellhead protection plans. The local Wellhead Protection Plan should reference the contingency/emergency plans.

Contingency Plans ensure that drinking water needs are met by addressing short term water shortages and long term water demands. A short-term water shortage may result from periods of drought, miscalculation of water demand, well operation malfunctions, and contamination. The identification of short-term storage, temporary and permanent alternative sources, interconnections and measures for treating a water supply should contamination occur, are significant components of a Contingency Plan.

Planning for long-term water demand requires knowing the development potential of the community and the location of potential future well sites. Components include conducting a build out analysis to determine the projected demand based on the maximum amount of development a community will attain; and identifying and protecting potential future well sites. It is critical that local boards are aware of future water demands in order that growth can be planned. DEP Water Withdrawal Permits require public water suppliers to project water demand.

Emergency Plans anticipate emergency events, such as hazardous waste spills and natural disasters. Significant to a local emergency plan is: an assessment of potential threats, the events that would require an emergency response, and identifying the type of response needed to prevent a release from reaching drinking water supplies. Emergency plans rely on responses by local police and fire department, local health officials, and state agencies. Plans should identify the emergency response team and phone numbers; procedures to communicate with the appropriate officials and the public; availability and access of equipment and materials; emergency response measures for various event scenarios. Staff must be trained on the procedures outlined in the plan.

'Guidelines For Preparing an Emergency Response Plan'

A good Emergency Response Plan (ERP) is an essential component of a well-managed water system. The ERP will contain detailed procedures to allow the water system to respond quickly and effectively to water supply emergencies. The ERP will help the water system provide a continuous supply of safe drinking water to its customers and ensure a safe working environment for its employees. The process of developing an ERP can contribute greatly to meeting these goals.

The level of effort that should be put into the development of an ERP depends on the size and complexity of the system as well as the hazards identified and the vulnerability of critical elements of the water system. Hazard identification and vulnerability assessment is simply a matter of identifying vital components of the water system and considering incidents that could impact them.

Components that might be vulnerable and could result in diminished availability or quality of water, and therefore should be considered in an Emergency Response Plan, include:

- Watersheds and Aquifers
- Sources (including emergency supplies and interconnections)
- Dams
- Transmission Systems (especially if there is no redundancy)
- Distribution Systems
- Treatment Systems
- Water Storage Tanks
- Chemical Storage Tanks
- Personnel
- Power systems
- Pumping Systems
- Transportation and Communication Systems
- Computer and Control Systems

In the development of an Emergency Response Plan, the water system should consider the impacts that the following incidents could have on the above components:

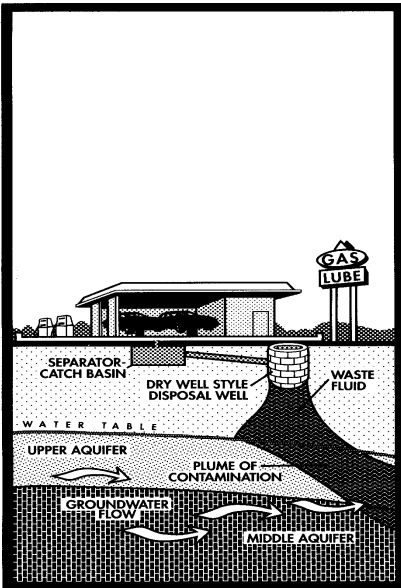
Bacterial Contamination • Chemical Contamination • Equipment Failures
Water main breaks • Fires/Explosions • Fuel or Chemical Spills/Leaks
Transportation Spills • Power Outages • Vandalism /Terrorism
Floods • Droughts • Hurricanes • Ice storms • Tornadoes • Earthquakes.

For the complete guidelines see the 'Handbook for Water Supply Emergencies'. Copies are available by contacting the Drinking Water Program or at www.state.ma.us/dep

The Floor Drain Requirement Wellhead Protection Regulation

Why are floor drains a concern?

Industrial floor drain discharges to the ground are suspected sources of contamination of several public drinking water supplies in Massachusetts. There are many cases where floor drain discharges have caused soil and/or groundwater contamination. Costs associated with clean up of public water supply contamination can run into the millions of dollars. The most common types of unauthorized systems are floor drains and/or sump sinks that lead to dry wells, septic systems, or subsurface leaching pits.



Local Requirements*

MA Wellhead Protection Regulation, 310 CMR 22.21(2)(a)(8), requires that existing and future floor drains that discharge to the ground be prohibited through a local municipal control. Zoning bylaws only address future uses; a board of health regulation or general bylaw must be adopted in order to meet this requirement. A floor drain control could also be incorporated into an existing local hazardous material regulation.

Why a floor drain control is beneficial

Industrial discharges to the ground are easily preventable. Discharges from floor drains occur more frequently at smaller facilities like dry cleaners, auto repair, body shops, and machine shops. In many instances, floor drains frequently continue to discharge to old dry wells or septic systems after a facility's sanitary wastes are redirected to public sewers. The DEP recommends local Boards of Health establish a local floor drain program. Such a program could include regular inspections and technical assistance to businesses. DEP recommends prioritizing implementation of a local program as follows:

- Work with the building and plumbing inspectors to ensure that all new building and plumbing permits are issued to reflect the DEP's floor drain requirements.
- Target local inspection programs to facilities located in Zone I I s and Interim Wellhead Protection Areas.

Plumbing Code limitations

DEP's regulation, 310 CMR 22.21(2)(a)(8) applies to facilities that store hazardous material/waste as well as facilities where oily and/or hazardous liquid wastes are produced. The Plumbing Code applies to the latter type of business only.

* Applies to water suppliers putting new wells on line approved to pump >100,000 gallons/day or water suppliers increasing water withdrawal under the Water Management Act.

SAMPLE MOU

MEMORANDUM OF UNDERSTANDING
FOR (name of water system)

This memorandum is agreed to by (name of landowner) and (name of water system) for the purpose of protecting the drinking water quality of the (name of well(s)). The area affected by this agreement is the DEP approved Zone I land area as shown on the (name of map).

Activities of concern in the Zone I include: (specify concern, e.g. septic system, agricultural activities, equipment maintenance, hazardous materials storage, etc).

To ensure the protection of the water quality for the (residents/staff) of (name of community/facility) Best Management Practices will be used by (name of land owner) to the extent feasible and include:

Note: Cite applicable BMPs, include whatever practices are needed to ensure water quality and which the landowner will agree to in the Memorandum, for example:

Agriculture; no storage or application of fertilizers, pesticides, animal manure (or) storage of fertilizer, pesticides, animal manure will be located (specify location) and contained in a manner that will not allow contaminants to reach the groundwater

Septic systems; no chemicals, petroleum products, or other hazardous or toxic substances, including septic system cleaners, will be placed into the septic system and system will be pumped (specify frequency).

This Memorandum will become effective when it is signed by participating parties.

public water supplier signature/date_____.

land owner signature/date_____.

(submit to DEP for review prior to signing and notarization)

**ZONE I
RIGHT OF FIRST REFUSAL AGREEMENT**

A Right of First Refusal is a legal document that requires a landowner to offer a specific parcel of land to a specific buyer before the landowner may offer that parcel to anyone else. As a tool for water supply protection, a Right of First Refusal ensures that the landowner gives the water supplier first opportunity to acquire the property when the property becomes available for purchase.

In order for a Right of First Refusal to be useful and protect the rights of all parties, the terms and conditions must be carefully drafted. The requirements for notifying the water supplier that the property is for sale, and the time limits for responding to the notice must be clearly defined.

The document must also contain a legal description of the property. This can be obtained from the Plan of Land recorded with the Registry of Deeds. A title search (Certificate of Title) must also be conducted in order to identify all property owners and the presence of any liens or encumbrances affecting the title. The valuation method which will be used to determine the value of the property at the time of sale should be clearly stipulated in the Right of First Refusal.

Water suppliers should discuss the details of Rights of First Refusals with DEP regional staff and with their attorneys or town counsel prior to executing the agreement. A copy of the document should be provided to the DEP Drinking Water Program.

Sample Notification Letter For Residences or Businesses

To be effective, the letter should address the specific threats to your well. When writing to a business, it is important to tailor the recommendations and enclosed material to that business.

Dear (Resident/Business):

I am writing to advise you of the location of the (name of public water supply system) which serves (number of people). Your property is located within the area from which water flows to the (name of well). This area needs protection from land uses that threaten the water supply.

Groundwater comes from rain and snowmelt percolating through the ground, and flows through the spaces between soil particles and through fractures in rock. Groundwater is vulnerable to contamination from many types of land uses and activities, including road salt, septic systems, and improper disposal of hazardous materials. If the groundwater becomes contaminated, it may be impossible to eliminate the contamination so the well can be used for drinking water.

I am contacting you to request your assistance and cooperation in protecting this supply. There are a number of ways in which you can help reduce the possibility of contamination of this water supply. For example:

- If your house/business is served by a septic system: pump out the tank every two to three years; do not use commercial septic tank cleaners or put hazardous materials down the sink, toilet, or floor drain. These materials reduce the effectiveness of the system by killing necessary microorganisms, and they can pass through the system and contaminate the groundwater.
- Avoid applying hazardous or toxic materials to lawns or other areas of your property.
- Never dispose of used motor oil or other hazardous materials on your property or in storm sewers.

Enclosed is a fact sheet that I urge you to read. If you have any questions, please contact (your name and phone number) or DEP/Drinking Water Program at (617) 292-5770.

The management and customers of the (name of community served) appreciate your cooperation in protecting this important source of drinking water.

Sincerely,

Water Supplier, Small Community System

CLEAN DRINKING WATER IS UP TO YOU!

Where does my drinking water come from? Your drinking water comes from groundwater. Groundwater is the water that flows through the spaces between soil particles and through fractures in rock. It comes from rain and snowmelt percolating through the ground.

Why should I be concerned? Contaminants (such as pathogens, oils, and toxic chemical compounds) can reach your water supply through direct discharges above and below the land surface and through storm water leachate and runoff.

DO	DON'T
Use non-toxic and less-toxic alternatives to household chemicals.	<i>Don't</i> buy more hazardous chemicals than you need.
Follow package directions on pesticides, fertilizers, and other household chemicals. Take leftover household chemicals to your community's household hazardous waste collection day.	<i>Don't</i> over-use household chemicals. More is <i>not</i> better. <i>Don't</i> use pesticides, fertilizers or herbicides near the well.
<p>Inspect your heating tank</p> <ul style="list-style-type: none"> • Check your heating oil tank frequently for leaks • Remove a deteriorating underground storage tank (UST) • Replace USTs with above-ground storage that has secondary containment and a cover over it 	<p><i>Don't</i> dispose of hazardous chemicals by pouring them down household drains, into the storm drain, or onto the ground.</p> <p><i>Don't</i> locate new fuel storage tanks in the Zone I.</p> <p><i>Don't</i> have your tank removed by a contractor who is not familiar with state guidelines for UST removal.</p>
<p>Take care of your septic system.</p> <ul style="list-style-type: none"> • Keep records of septic system maintenance • Inspect septic tank every year. • Have tank pumped out every two to three years • Avoid damage to your leach field and distribution lines by keeping vehicles, livestock, and other heavy objects off the leach field 	<p><i>Don't</i> overload your septic system with solids by using a garbage grinder (unless the septic system was specifically designed for a grinder).</p> <p><i>Don't</i> pour grease or cooking oil down the drain; it will clog the soil and leaching system.</p> <p><i>Don't</i> pour chemicals, including bleach, down the sink or toilet.</p> <p><i>Don't</i> use septic system cleaners or additives.</p>

Source Protection Publications

Making Wellhead Protection Work in Massachusetts* - Guidance document to assist water suppliers in complying with MA Wellhead Protection Regulations 310 CMR 22.21(2); 1997, DEP

Developing a Surface Water Supply Protection Plan* - Guidance document outlining the components of a surface water supply protection plan; revised 2000, DEP

Hazardous Materials Management Guide* - Guidance manual providing recommendations for developing Board of Health regulations and establishing a local inspection program; 1998, DEP

Public Water Supply Guidelines* - Guidelines and policies for new source development, well installation, and water system operation; DEP Revised, 1996

Wellhead Protection Tips For Small Public Water Systems* - Brochure for protecting small public water supplies; DEP

TNC Manual* - Guidance manual for assisting Transient Non Community Water Systems in protecting groundwater supplies and meeting DEP requirements; 1999, DEP

DEP Worldwide Web Site - Home page for state regulations, model bylaws, program information, and source protection fact sheets; www.state.ma.us/dep

Best Management Practices to Protect Groundwater - Guidance for small business located in recharge areas; 1999 Pioneer Valley Planning Commission, Barnes River Protection Advisory Committee

Storm Water Management Handbook, Vol. 1 and 2* - Recommendations for storm water management; 1997, DEP, MA Office of Coastal Zone Management

Citizen's Guide to Ground-Water Protection* - An overview of groundwater contamination and strategies for local protection; Rev. 1999 EPA, Office of Groundwater Protection; www.epa.gov/safewater/protect/citguide.html

The Local Decision Maker's Guide to Groundwater and Wellhead Protection - Guidance for municipalities to protect small public water systems; Rural Community Assistance Program, Inc.,

Non Point Source Management Mega Manual - Guidance on controlling non point sources of pollution, mailed to all MA Boards of Health in 1994; DEP, USDA

Artificial Recharge Evaluation and Guidance to Municipalities - A guide to storm water infiltration practices in water supply areas; 1996, DEP, Pioneer Valley Planning Commission, USEPA

Private Well Guidelines/Model Private Well Board of Health Regulation* - Regulations and guidelines to protect private wells; 1998, DEP

Certified Operator Compliance Handbook* - Requirements and responsibilities for MA Certified Public Water Operators; 1998, DEP

That Magnificent Groundwater Connection: Resource book for grades K-6 (1996) and 7-12 (1998); New England Interstate Water Pollution Control Commission, available for loan by DEP or for purchase through NEI WPCC

* Publications available through the MA Department of Environmental Protection

Contacts and Technical Assistance

DEP Drinking Water Program - Boston 617-292-5770

WERO/Springfield Office 413-784-1100; CERO/Worcester Office 508-792-7650;

NERO/Wilmington Office 978-661-7760; SERO/Lakeville Office 508-946-2769

DEP Regional Service Centers - Contact for general information on all programs, Springfield 413-784-1100, Worcester 508-792-7683, Wilmington 978-661-7600, Lakeville 508-946-2714

Massachusetts Geographic Information Systems (MASSGIS) - Contact for information and datalayers; 617-727-5227, also see website at www.state.ma.us/mgis

Northeast Rural Community Assistance Program - Contact for water supply protection, waivers, small systems; www.neruralwater.org 978-297-5300

Natural Resources Conservation Service (formerly US Soil Conservation Services) - Contact for soil conservation, erosion, animal manure storage assistance, and maps. Central MA 413-253-4350, Western MA 413-443-6867, Southeast MA 508-295-7962

Zoning Hotline, MA Executive Office of Communities and Development (EOCD) - Contact for zoning questions and procedural issues; 800-392-6445 or 617-727-3197

National Drinking Water Clearing House - Drinking water information, "On Tap" newsletter, low cost educational products and training, www.nesc.wvu.edu 800-624-8301

New England Interstate Water Pollution Control Commission - Water supply protection publications, training, management and education 978-323-7929, www.neiwppcc.org

New England Interstate Educational Training Center - Contact for Groundwater Curriculum, "*That Magnificent Ground Water Connection*," ; 207-767-2539

MA Water Works Association - Contact for educational materials, operator training, source protection, workshops, newsletter; 508-692-0199

New England Water Works Association - Contact for training programs for operator certification, public relations and educational materials; 508-478-6996

University of Massachusetts Extension - Contact for watershed protection, public education, wastewater management, capacity building, and non-point source pollution; 413-545-2188

Northeast Rural Water Association - Serves water and wastewater systems with a population under 10,000, monitoring waivers, workshops, drinking water protection signs; 802-660-4988

Safe Drinking Water Act Hot Line - Information on drinking water, technical and public education materials, and source protection; 800-426-4791

U.S. Environmental Protection Agency Region 1 - Source Water Protection Program
Contact for New England resource protection issues, inter-state resource protection, educational materials, and national legislation; 617-918-1578

Executive Office of Environmental Affairs - Information on community preservation and build-out analysis; 617-626-1154

Massachusetts Regional Planning Agencies

Barnstable County Health and Environment Dept. (BCHED)
Barnstable 508-362-2511

Berkshire County Regional Planning Commission (BCRPC)
Pittsfield 413-442-1521

Cape Cod Commission (CCC)
Barnstable 508-362-3828, www.vsa.cape.com/~cccom

Central Massachusetts Regional Planning Commission (CMRPC)
www.ultranet.com/~cmrpc
Worcester 508-756-7717

Franklin Regional Council of Governments Planning Commission
Greenfield 413-774-3167, www.frcog.org

Martha's Vineyard Commission (MVC)
Oak Bluffs 508-693-3453

Merrimack Valley Planning Commission (MVPC)
Haverhill 978-374-0519, www.mvpc.org

Metropolitan Area Planning Council (MAPC)
Boston 617-451-2770, www.mapc.org

Montachusett Regional Planning Commission (MRPC)
Fitchburg 978-345-7376 www.mrpc.org

Nantucket Planning and Economic Development Comm. (NP&EDC)
Nantucket 508-228-7237

Northern Middlesex Council of Governments (NMCOG)
Lowell 978-454-8021

Old Colony Planning Council (OCPC)
Brockton 508-583-1833

Pioneer Valley Planning Commission (PVPC)
West Springfield 413-781-6045, www.pvpc.org

Southeastern Regional Planning and Economic Development District (SRPEDD)
Taunton 508-824-1367, www.srpedd.org