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# Town of Billerica Department of Public Works, Water Division

## 2005 Water Quality Report (January 1, 2005 – December 31, 2005)



The Town of Billerica, Water Division is pleased to present you once again with our Annual Water Quality Report. This report will inform you about the quality of your drinking water and the processes used to treat and deliver drinking water to your home. Inside this report you will learn about analysis performed on drinking water from January through December 2005 and what compounds were found. The tables inside list the specific compounds found, where they are derived from and what it means to you, the consumer. Current issues that are affecting drinking water will also be discussed. The Water Division is committed to providing the best quality of drinking water possible and remains vigilant in meeting all state and federal drinking water regulations. We continue to increase our efforts at source water protection, water conservation and community education.

2005 was a year of challenges for the Water Division. We were faced with a Water Emergency in March (2005), ongoing construction of the new treatment facility and added drinking water regulations to comply with. Water Conservation was and remains a key topic of discussion in our day to day activities and future planning. The addition of Fluoride to drinking water was a problem as Fluoride suppliers were unable to keep up with the demand for this chemical. This was and continues to be a nationwide problem.

The Water Division was pleased to receive funding in 2004 to be used for Water Conservation Education. With this funding the Water Division was able to purchase materials for consumer education for both residential and commercial applications. Check out our Water Conservation News for more information.

The Massachusetts Department of Environmental Protection completed their Source Water Protection Assessment (SWAP) and has reported their results, read all about this inside the report.

It is imperative that we all join together as a community to protect our water source and our drinking water system. If you see suspicious activity, please report it, it is up to all of us to keep our resources safe. If you have any questions about this report or your drinking water please contact, John McGovern, Water Superintendent at 978-671-0957.

### **Residential Water System Pressure**

The water tanks on Boston Road near Billerica Center are called Standpipes. These standpipes are used for storage as well as maintaining the water pressure in the Distribution System. In some areas of Billerica, this pressure may be as high as 120 pounds per square inch (psi). If you find this pressure presents a problem in your home, you may hire a plumber at your expense to install a pressure reducing valve after your meter.

### **What Is the Hardness of Billerica's Drinking Water?**

The hardness of the drinking water varies, but on average test results are 40-71 milligrams per liter (mg/l) or 4.3 grains per gallon.

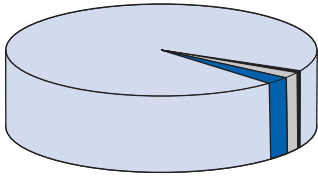
To our non English speaking customers: This report contains important information regarding the quality of your drinking water. Please have this report translated.

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# Water Conservation – A Way of Life!

## Global Tap Water



- Salt Water 97%
- Ice Caps and Glaciers 2%
- Rivers, Lakes and Reservoirs 0.10%
- Underground and Atmosphere 0.90%

## Tips to Save Water

The Department of Environmental Protection recommends all residential homes only use between 65 and 80 gallons a day per person.

- Take a five minute shower instead of a bath, **Save up to 15 gallons per shower.**
- Don't use toilets as trash cans, **Save up to 12 gallons per day.**
- Use a basin when washing dishes, don't let the water run, **Save up to 20 gallons.**
- For cold drinking water, keep a pitcher in the refrigerator, **Save 2 gallons per drink.**
- Water your lawn only when it needs it, **1" a week is recommended for a healthy lawn.**
- Don't run the hose when washing your vehicle. **Use a hose with a shut off nozzle.**
- Plant drought- resistant trees, plants and lawns. **They are engineered to use less water.**
- Use a broom, not a hose to clean patios and driveways. **Don't waste water.**
- Install a rain sensor on your automatic sprinkler. **Place it only where needed.**

## Water Conservation News:

Water Conservation Kits are available free of charge to all Billerica Water Customers. There are two kits, one for indoor use and one for outdoor use. These kits contain several elements that will allow you to conserve water and save money. The kits are available at the Water the Billing Office at Town Hall and at the Water Treatment Facility.

### The Indoor Conservation Kit contains:

An Adjustable Showerhead, Kitchen Faucet Aerator, Bathroom Sink Aerator, Adjustable Flush Flapper, Leak Detection Tablets, Flow Meter Bag and a Water Conservation Wheel.

### The Outdoor Conservation Kit contains:

Multiple Flow Adjustment Garden Nozzle, Garden Hose Repair Ends Female/Male, Outdoor Water Gage/Rain Cup and Garden Nozzle Seal & Screen Washers.

**Billerica Access Television – Be sure to tune into B.A.T.V. for Water Conservation Tips and short clips!**

## TIPS FOR REDUCING STORMWATER POLLUTION

Storm water is the runoff water from rain and snowmelt. Storm water picks up litter, sand, bacteria and chemicals from developed land and carries these pollutants to our streams, ponds, rivers, wetlands and the ocean. Storm water pollution is one of the most difficult sources of water pollution to control. Runoff from paved or impervious surfaces, such as roads, parking lots, driveways and rooftops can contribute large amounts of polluted storm water. To prevent flooding, parking lots and streets are often lined with storm drains to quickly move storm water directly to a nearby water body, usually with little or no treatment. Whatever flows down a storm drain will come out in a nearby water body.

### Tips for taking care of storm drains include:

- Never put anything down a storm drain, including pet waste, motor oil, paint, litter, leaves or sand.
- Don't block storm drains with refuse or debris.

Cleaning up storm water pollution is a task the whole community can take part in. There are many things that residents can do to clean up storm water quality.

Lawns can contribute storm water pollutants through fertilizers, pesticides, and herbicides. Steps that homeowners can take to reduce storm water pollution from lawns include:

- Use fertilizer, pesticides, and herbicides sparingly.
- Try using organic methods.
- Mow 2 to 3 inches high to encourage dense growth and reduce weeds.
- Mulch lawn clippings and leaves.

Cars can pollute storm water with gas, oil, antifreeze, metals and detergents. Steps that car owners can take to reduce storm water pollution from cars include:

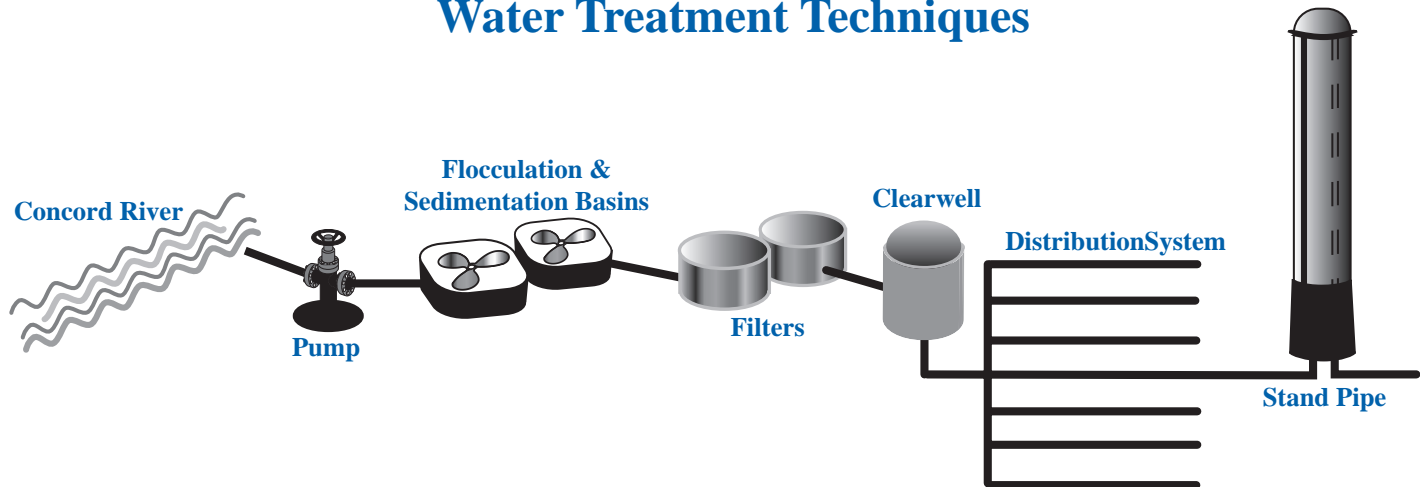
- Keep your car well maintained to prevent fluid leaks.
- Recycle motor oil, antifreeze, tires and batteries.
- Use a commercial car wash or wash your car on the lawn using small amounts of low phosphate detergents.

### Other tips to clean up storm water include:

- Pick up after pets and dispose of droppings in the trash.
- Aim roof downspouts away from paved surfaces or into a rain barrel.
- Dispose of paint, oil, and other household chemicals at a local hazardous waste collection day.
- Don't litter – instead recycle paper, cardboard, cans, plastic, and glass.
- Support community efforts to keep storm water clean.

Cleaning up pollutants on the land and taking good care of storm drains results in cleaner storm water, and cleaner storm water means cleaner water for drinking, swimming, fishing, boating and wildlife. For further information please visit the Town of Billerica homepage at [www.town.billerica.ma.us](http://www.town.billerica.ma.us) and follow the links to Department of Public Works.

# Water Treatment Techniques



## Water Treatment Techniques and Distribution

Water is pumped from the Concord River through the Intake Building. It then enters the Flocculation/Sedimentation Building where Ozone is added to oxidize natural materials in the river water. The water then flows into Flocculation basins, where Aluminum Sulfate is added. This causes the particles in the water to coagulate or stick together. The water then enters the Sedimentation Basins, where these particles settle to the bottom of the basin. The cleaner water then flows to the Filters, which are comprised of several layers of sand, gravel and granulated carbon. The filters trap small particles which did not previously settle out. The water then flows into the Clearwell, where it is disinfected with Chlorine, and Potassium Hydroxide is added for corrosion control. The water flows out of the Clearwell, where Ammonia gets added to the Chlorinated water to form Chloramines\* as a disinfectant for the Distribution System.

\* Fish owners must remove Chloramines from the water to avoid fish kill as ammonia is toxic to fish. Please consult with your pet supplier for more information on what product to use for de-chlorinating the water.

## Back Flow/ Cross Connection

Water suppliers spend millions of dollars to purify and treat water before it is delivered to the consumer. The water supplier also expends great effort to protect the water from the possibility of contamination or pollution while it flows through the distribution system. This can occur when a water supply line is connected to equipment containing a non-potable (unfit to drink) substance. These connections are called cross-connections.

Water distribution systems are designed with the intention of the water flowing in a certain direction; from the distribution system to the consumer. Hydraulic conditions within the system can deviate from “normal” conditions, causing the water to flow in the opposite direction. When the water flows in the opposite direction in an unprotected system, it is called a backflow. Backflow can occur when the pressure in the distribution system drops, siphoning water from the consumer’s system into the distribution system. Because of these potential dangers to the water consumers, it is necessary to control cross connections. There are several types of mechanical devices designed to serve as backflow preventers.

The Town of Billerica has a program in place to ensure that back flow prevention devices are installed where they are needed to protect the safety of Billerica’s water supply. For more information, please call 978-671-0957.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer under going chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

*Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling EPA’s Safe Drinking Water Hotline (1-800-426-4791).*

In order to ensure that tap water is safe to drink EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water suppliers. FDA regulations establish limits for contaminants in bottled water that must provide the same protection for public health.



## BillERICA Water Division Water Quality Data – Public Water Supplier ID # 3031000

The following tables list all of the compounds detected in drinking water through the 2005 calendar year. Each year the Water Division conducts extensive testing on drinking water as required by both Federal and State regulations. After the tables you will find the abbreviation definitions and notes.

Turbidity	TT	Lowest Monthly % of Samples	Highest Detected Daily Value	Violation Y/N	Source of Contaminant
Daily Compliance (NTU)	1	98 -----	.84	N	Soil runoff.

Monthly Compliance*	at least 95%	-----	N
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\*Monthly turbidity compliance is related to specific treatment technique (TT). Our system filters the water so at least 95% of our samples each month must be below the turbidity limits specified in the regulations.

	MCL	MCLG	Range Detected		Violation Y/N	Possible Source(s) of Contaminant
			Lowest	Highest		
Nitrate ppm	10	10	0.15	1.1	N	Runoff from fertilizer use; leaching from septic tanks, sewage, erosion of natural deposits.
Nitrite ppm	1	1	ND	0.041	N	Runoff from fertilizer use; leaching from septic tanks, sewage, erosion of natural deposits.

Fluoride ppm	MCL	MCLG	Range Detected		Violation Y/N	Possible Source(s) of Contaminant
			Lowest	Highest		
	4	4	0.9	1.5	N	Erosion of natural deposits; water additive, which promotes strong teeth, discharge from fertilizer and aluminum factories.

Methyl Tertiary Butyl Ether ppb	MCL	MCLG	Range Detected		Violation Y/N	Possible Source(s) of Contaminant
			Lowest	Highest		
	20-40	70	ND	0.02	N	Fuel additive

Radionuclides* Gross Alpha Activity (pCi/L)	MCL	Test Result	Violation Y/N	Possible Source(s) of Contaminant

\*MA DEP has reduced the monitoring requirements for Radionuclides to less often than once per year because the source is not at risk of contamination. The last sample collected was on 2/20/03, and was found to be free of this contaminant.

Total Organic Carbon	MCL	Annual Average % Removed	Violation Y/N	Possible Source(s) of Contaminant

Total organic carbon (TOC) has no health effects. However, TOC provides a medium for the formation of disinfection by-products. We monitor TOC removal to ensure that our Treatment Technique is working properly.

Unregulated Contaminant	SMCL	ORSG	Test Result	Violation	Possible Source(s) of Contaminant
Sulfate ppm	250	----	34	N	Natural sources.
Sodium ppm	----	20	61	N	Natural sources; runoff from use of salt on roadways; by-product of treatment process.

Sodium sensitive individuals, such as those experiencing hypertension, kidney failure, or congestive heart failure, should be aware of the sodium levels where exposures are being carefully controlled.

Unregulated Volatile Organics*	MCLG	Range Detected		Violation Y/N	Possible Source(s) of Contaminant
		Lowest	Highest		
Chloroform ppb	0	2	4	N	By-product of drinking water chlorination.
Bromodichloromethane ppb	0	5	13	N	By-product of drinking water chlorination.
Chlorodibromomethane ppb	0	3	17	N	By-product of drinking water chlorination.
Bromoform ppb	0	.6	6	N	By-product of drinking water chlorination.

\*Unregulated Contaminants have no MCL. Unregulated Contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining their occurrence in drinking water and whether future regulation is warranted.

	Date(s) Collected	90th Percentile	Action Level	MCLG	# of Sites Sampled	# of Sites Above Action Level	Source of Contaminant
Copper ppb	9/04	21	1300	1-3	31	0	Corrosion of household plumbing, erosion of natural deposits; leaching from wood preservatives

Lead and Copper 90th Percentile - Out of every 10 homes sampled, 9 were at or below this level.



## Billerica Water Division Water Quality Data – Public Water Supplier ID # 3031000

### Trihalomethanes

	MCL 80 ppb	1st Quarter 2005	2nd Quarter 2005	3rd Quarter 2005	4th Quarter 2005
Site A		22	34.7	35	25
Site B		22.5	36.7	42	28
Site C		19	42.8	39	26
Site D		23	42.8	42	25
<b>Quarterly Average</b>		21.6	39.3	39.5	26

**Running Annual Average = 31.6**

**Highest Annual Average = 41.3**

**Range Detected = 19 - 42.8**

**Possible Source(s) of Contaminant:**

By-product of drinking water disinfection.

### Haloacetic Acids

	MCL 60 ppb	1st Quarter 2005	2nd Quarter 2005	3rd Quarter 2005	4th Quarter 2005
Site A		6.9	14.4	8	6
Site B		8.4	14.3	8.3	7.8
Site C		7.2	15.9	8.8	5.9
Site D		10.1	15.8	8.9	6.1
<b>Quarterly Average</b>		8.2	15	8.4	6.5

**Running Annual Average = 9.5**

**Highest Annual Average = 16.7**

**Range Detected = 5.9 - 15.9**

**Possible Source(s) of Contaminant:**

By-product of drinking water disinfection.

	MRDL	MRDLG	Range Detected Lowest Highest	Highest Level Detected	Violation Y/N	Possible Source(s) of Contaminant
<b>Chlorine (ppm)</b>	4	4	0.53 3.5	3.5	N	Water additive used to control microbes.

### Abbreviations and Notes

**Maximum Contaminant Level (MCL)** – The highest level of contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible, using the best available treatment technology.

**Maximum Contaminant Level Goal (MCLG)** – The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**Action Level (AL)** – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

**Treatment Technique** – A required process intended to reduce the level of a contaminant in drinking water.

**Secondary Maximum Contaminant Level (SMCL)** – These standards are developed to protect the aesthetic qualities of drinking water.

**Massachusetts Office of Research and Standards Guideline (ORSG)** – This is the concentration of a chemical in drinking water, at or below which, adverse health effects are unlikely to occur after chronic (lifetime) exposure. If exceeded, it serves as an indicator of the potential need for further action.

**Maximum Residual Disinfectant Level (MRDL)** – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

**Maximum Residual Disinfectant Level Goal (MRDLG)** – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.

**ppm** = parts per million, or milligrams per liter (mg/l)

**ppb** = parts per billion, or micrograms per liter (ug/l)

**pCi/l** = picocuries per liter ( a measure of radioactivity)

**NTU** = Nephelometric Turbidity Units

**ND** = Not Detected

### Contaminants that may be present in source water include:

**Microbial Contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

**Inorganic Contaminants**, such as salts and metals, can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, farming and mining.

**Pesticides and Herbicides**, may come from a variety of sources such as agriculture, urban storm water runoff and residential uses.

**Organic Chemical Contaminants**, include synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff and septic systems.

**Radioactive Contaminants**, can be naturally occurring or be the result of oil and gas production and mining activities.

## Temporary Loss of Electric Power

On March 15, 2005 Billerica suffered a complete loss of electric power at its Water Treatment Plant, which caused a complete loss of production of drinking water at the plant.

In the late afternoon a standby generator was delivered to the Plant. During the early morning of March 16, 2005, Billerica made an attempt to start up the emergency water pump located at the plant, using the standby generator in order to initiate production of water for delivery to customers of the system. The pump did not operate due to a faulty relay switch. Subsequently, the emergency generator was used to initiate operation of a one (1) million gallon per day (MGD) emergency pump.

On March 16, 2005 the Massachusetts Department of Environmental Protection (DEP) issued a Boil Water Order to Billerica, which required the Town to issue notice to all customers of the water system to boil the water prior to use for all potable purposes.

On March 16, 2005, the water level in the two (2) Billerica water storage tanks dropped to extremely low levels which caused the dislodgement of large ice caps which had formed on top of the water in each tank. As the dislodged ice dropped in the tanks, it damaged hatches located on the side of each tank, causing water to pour from the damaged hatches and further exacerbating the water problem in the Town.

Water supply interconnections were made between Billerica and the Towns of Bedford, Wilmington and Tewksbury.

Emergency temporary repairs were made to the storage tanks and after being disinfected, were placed back in service. After extensive analysis showed no bacterial contamination, the Boil Water Order was lifted.

The Billerica Water Division would like to thank all of our customers for their support and cooperation through out this emergency. We would also like to acknowledge the outstanding efforts of our employees. It took people from Operations, Distribution, Maintenance and Laboratory Personnel, long, often round the clock hours, and hard work, but through out the whole incident their number one concern was to restore safe, quality drinking water to the customers of Billerica.

Several things went wrong as this emergency situation transpired and after review the Massachusetts Department of Environmental Protection (DEP) issued an Administrative Consent Order (ACO) to the Town of Billerica. This ACO has several measures that have been identified to be implemented as necessary conditions for the successful equipping and operation of the Water Treatment Facility currently under construction and for bringing the Public Water Supply into compliance with the Drinking Water Regulations.



Amongst these conditions are:

A “lessons learned report”, outlining changes to its facilities, operation and management of the water system that Billerica will make to prevent a reoccurrence of water outages.

Develop and submit a report that evaluates the funding needs of the water system to assure sufficient funding for staffing and capital improvements necessary to carry out improvements required by the ACO and to remain in compliance with all Drinking Water Regulations.

Initiate a study of the distribution system to include a plan and schedule for exercising Billerica’s interconnections with adjacent water systems. A revised Emergency Response Plan prepared by a Registered Professional Engineer, and an Operation and Maintenance Plan for its storage tanks.

Develop a hydraulic study of the distribution system by a Registered Professional Engineer to determine if the system provides adequate pressures under all design flows as required by the DEP’s Regulations and Guidelines.

Submit a list of Backflow/Cross Connection devices if any, that have not been tested as required under 310 CMR 22.22. If any devices are on this list, a plan will be included for having these devices tested as required.

Develop a plan and schedule for developing and implementing a valve exercising program. This plan will be reviewed by the DEP for its approval.

The Town of Billerica Water Division is cooperating fully with the DEP on all aspects of the Administrative Consent Order.

# Where Does Our Drinking Water Come From?

The Town of Billerica, Water Division has been supplying drinking water for over 100 years. The source for Billerica's drinking water is the Concord River. This source is considered a surface water. The Concord River begins in Concord, Massachusetts, by the joining of the Sudbury and Assabet Rivers. The Concord River flows through Bedford and enters Billerica through Carlisle. The Town of Billerica draws its water directly from the Concord River into the Treatment Facility. Our Massachusetts Source ID number is 3031000-01S.

*The sources of drinking water, both tap and bottled water, includes rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of land or through the ground, it dissolves naturally occurring minerals, and in some cases, radioactive materials and can pick up substances resulting from the presence of animals or from human activity.*

## Source Water Assessment Report (SWAP) 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 lands uses;
- and publicize the results to provide support for improved protection.

### What Is My System's Ranking?

A susceptibility ranking of high was assigned to this system using the information collected during the assessment by DEP. 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.

The watershed above our point of water intake is over 400 square miles and lies in all or part of 27 cities and towns in Massachusetts. Within that watershed area there are several land use types that have been identified as potential sources of contamination in the source water.

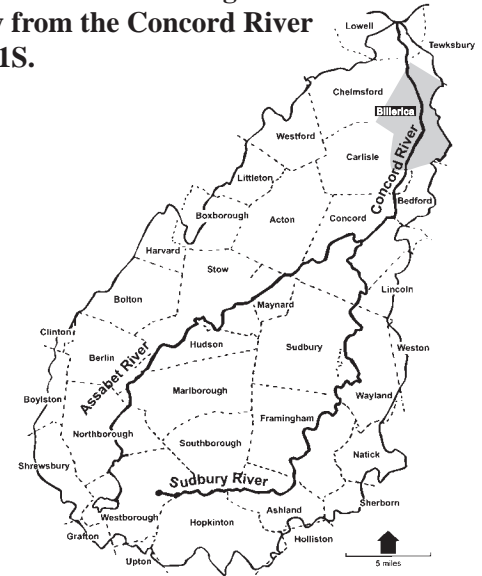
**Agricultural Land Uses include:** Fertilizer Storage or Use, Landscaping, Nurseries, Pesticide Storage or Use.

**Commercial Land Uses include:** Airports, Service Stations, Bus & Truck Terminals, Dry Cleaners, Medical Facilities, Printing Shops and Research Laboratories.

**Industrial Land Uses include:** Electronics Manufacturers, Hazardous Materials Storage, and Machine/Metal Working Shops.

**Residential Land Uses include:** Fuel Oil Storage, Lawn Care/Gardens and Septic Systems/Cesspools.

**Miscellaneous Land Uses include:** Above Ground Storage Tanks, Oil or Hazardous Materials Sites, Large, Small and Very Small Hazardous Waste Generators, Industrial Wastewater Treatment Facilities and Transportation Corridors.



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, please refer to the tables in this report.

### Where Can I See The SWAP Report?

The complete SWAP is available at the Water Division and online at [www.state.ma.us/dep/brp/dws/](http://www.state.ma.us/dep/brp/dws/). For more information call John McGovern at 978-671-0957.

### Residents can help protect sources by:

- Practicing good septic system maintenance.
- Taking hazardous household chemicals to hazardous materials collection days.
- Limiting Pesticide and fertilizer use.

### On the Web!

For more information on drinking water, fun activities for children and education for everyone, try these web sites:

#### Town of Billerica Web site

[www.town.billerica.ma.us](http://www.town.billerica.ma.us)

#### USEPA Safe Drinking Water Act Hotline

[www.epa.gov/ogwdw/hotline/index.html](http://www.epa.gov/ogwdw/hotline/index.html)

#### WATERWISER (Conservation)

[www.awwa.org/waterwiser/](http://www.awwa.org/waterwiser/)

#### New England Water Works Association

[www.newwa.org](http://www.newwa.org)

POSTAL CUSTOMER

## Our New Treatment Facility Located at 270 Treble Cove Road



Main entrance for new facility and administrative offices.

