



# Water Quality

## ANNUAL REPORT

### To our Customers

I encourage you to take a moment and leaf through the information enclosed within Concord Public Works' Annual Water Quality Report. You will find a wealth of information regarding our water system, including sources of supply, water treatment processes and drinking water quality test results. Additionally, you will also find helpful tips and recommendations to assist you in using water as efficiently as possible.

I am very pleased to report that we have successfully designed, bid and will be awarding a contract for the full-scale iron and manganese filtration plant to be located at the Deaconess Well site. Construction will begin this spring with completion anticipated within 18 months. This facility will house treatment equipment for both the Deaconess and the White Pond well sites. When completed, this facility will provide immediate and direct improvement to the drinking water for the entire community.

Concord Public Works continues to provide safe and reliable drinking water to you and your family. We are fortunate that residents and businesses alike continue to express an interest in and appreciation for their public water system. On behalf of all of the staff and operations personnel who work hard to serve you, we appreciate this support and interest. Should you have any comments or questions regarding this report or the water system in general, do not hesitate to contact us.

Respectfully,

Alan H. Cathcart,  
Superintendent, Water/Sewer Division  
Concord Public Works

### 2005 HIGHLIGHTS

- **Treatment system pilot was completed** for reducing iron and manganese at the White Pond Well.
- Completed Design and Bid the **Deaconess Treatment facility**.
- **Completed tri-annual Lead and Copper testing** in accordance with State and Federal regulations. Our results were lower than the previous sampling round in 2002. This reflects the effectiveness of our ongoing corrosion control program.
- **Replaced approximately 5,015 feet of water main.**
- Received recognition in 2005 for successfully **maintaining optimal fluoride levels and meeting monitoring requirements** for the 2003 and 2004 calendar years by the Centers for Disease Control.
- Participated in the **Healthy Lawns for Healthy Families** campaign raising awareness of chemical use on lawns to protect water resources and reduce water use.

## Water Supply

Concord's water system consists of six groundwater supply wells and one surface water supply, pumping stations, two storage reservoirs with a 7.5 million gallon total capacity, and approximately 121 miles of water main. Depending on the season, all available production facilities may be called upon to satisfy system demands which may fluctuate between 1.5 million gallons per day (MGD) during the winter months to over 5 MGD in the summer. Concord's public water system is interconnected with Acton and Bedford for emergency backup, if ever needed.

## Potential Sources of Contaminants

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it will dissolve naturally occurring minerals and, in some cases, radioactive material, and can pick up other substances resulting from the presence of animals or human activities. Contaminants that might be expected in untreated water include: biological contaminants such as viruses and bacteria; inorganic contaminants, such as metals and salts; pesticides and herbicides; organic chemicals from industrial or petroleum use; and radioactive materials.

Drinking water, including bottled water, may reasonably be expected to contain at least some small amounts of certain substances which the EPA calls "contaminants". The presence of these substances does not necessarily indicate that the water poses a health risk. For example, naturally occurring dissolved minerals are commonly found in well water. More information about the substances found in drinking water and their potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

## Water Treatment

In accordance with state and federal drinking water requirements, Concord water is treated before it gets to your tap. Treatment includes: disinfection—via the addition of liquid chlorine at all groundwater supplies and ozone/UV light plus chlorine gas at the Nagog Pond water supply; corrosion control—via the addition of potassium hydroxide to raise the natural pH of the water and reduce its corrosiveness to household



plumbing; fluoridation—via the addition of sodium fluoride to help in the prevention of tooth decay; and iron sequestration—performed by adding polyphosphate or sodium silicate to reduce the frequency of discoloration events.

## Drinking Water and People with Weakened Immune Systems

Some people may be more vulnerable to contaminants in drinking water than the general population. People with weakened immune systems such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly people, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

## Questions?

For more information about Concord's drinking water and its supply system contact Matthew Mostoller, Environmental Analyst at Concord Public Works 1-978-318-3250 or visit our website at [www.concordnet.org/cpw](http://www.concordnet.org/cpw). For more information on federal and state drinking water regulations call the EPA's Safe Drinking Water Hotline at 1-800-426-4791 or the Massachusetts Drinking Water Program at 1-617-292-5770.

## SOURCE TREATMENT

	Nagog Pond Acton, MA	Second Division Well	Deaconess Well	Robinson Well	Jennie Dugan Well	White Pond Well	Hugh Cargill Well
pH Adjustment for Corrosion Control	•	•	•	•	•	•	•
Ultra Violet Light for Disinfection	•						
Chlorine for Disinfection	•	•	•	•	•	•	•
Ozone for Disinfection	•						
Fluoride to Promote Strong Teeth	•	•	•	•	•	•	•
Polyphosphate for Iron & Manganese Treatment	•	•	•	•	•	•	•
Sodium Silicate for Iron & Manganese Treatment & Corrosion Control			•				

# Water Quality Summary

Listed below are the substances detected in Concord's drinking water in 2005. The presence of these substances does not necessarily indicate that the water poses a health risk. These substances are divided into three categories, Primary, Secondary, and Lead & Copper Parameters. Primary parameters protect drinking water quality by limiting the levels of contaminants that can adversely affect public health and are known or anticipated to occur in public water systems. Secondary parameters are set for aesthetic purposes and are designed to assist the EPA in determining their occurrence in drinking water and whether future regulation is warranted. Not listed are over 130 substances we tested for but did not detect. All substances listed below are in units of ppm (parts per million) unless otherwise noted.

## PRIMARY PARAMETERS

Substance	Highest Level Detected	Range of Levels Found	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Major Sources in Drinking Water
Barium	0.022	0.01-0.022	2	2	Erosion of Natural Deposits
Chlorine	1.26	0.02-1.26	4 (MRDL)	No Standard (MRDLG)	Water treatment for disinfection
Fluoride <sup>a</sup>	1.35	0.56-1.35	4	4	Water treatment for tooth decay prevention
Haloacetic Acids (ppb)	1.7 <sup>b</sup>	ND-5.1	60	No Standard	By-product of drinking water disinfection
Nitrate	1.8	0.13-1.8	10	10	Runoff from fertilizer use; Erosion of natural deposits
Trihalomethanes (ppb)	10.4 <sup>b</sup>	0.6-26	80	No Standard	By-product of drinking water disinfection

## SECONDARY PARAMETERS

Aluminum	0.03	ND-0.03	No Standard	No standard	Erosion of natural deposits
Calcium	24.4	10.2-24.4	No Standard	No Standard	Erosion of natural deposits
Chloride	93	19.6-93	250	250	Naturally present in the environment
Hardness	82	35-82	No Standard	No Standard	Erosion of natural deposits
Iron	1.2	ND-1.2	0.3	No Standard	Erosion of natural deposits
Magnesium	5.7	2.3-5.7	No Standard	No Standard	Erosion of natural deposits
Manganese	0.27	ND-0.27	0.05	No Standard	Erosion of natural deposits
Nickel	0.007	ND-0.007	No Standard	No Standard	Erosion of natural deposits
Potassium	33.1	18.9-27.4	No Standard	No Standard	Naturally present in the environment
Sodium	50.6	10.3-50.6	No Standard	No Standard	By-product of drinking water treatment; Naturally present in the environment
Sulfate	38.4	12-38.4	250	No Standard	Naturally present in the environment
Total Dissolved Solids	270	100-270	500	500	Naturally present in the environment
Zinc	0.07	0.02-0.07	5	No Standard	Naturally present in the environment

## LEAD & COPPER PARAMETERS<sup>c</sup>

Substance	90th Percentile Level Detected	Range of Levels Found	90th Percentile Action Level (EPA's MCL)	Ideal Goal (EPA's MCLG)	Major Sources in Drinking Water
Lead (ppb)	2	ND-31	15	0	Household plumbing, see statement below
Copper	0.31	0.04-0.35	1.3	1.3	Household plumbing, see statement below

### TERMS & ABBREVIATIONS

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

**MCL:** (Maximum contaminant Level) The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.

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

**MRDL:** (Maximum Residual Disinfectant Level) 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.

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

**ppb:** parts per billion or micrograms per liter

**ppm:** parts per million or milligrams per liter

**pCi/L:** picocuries per liter

**ND:** none detected

**NTU:** nephelometric turbidity units

### FOOTNOTES

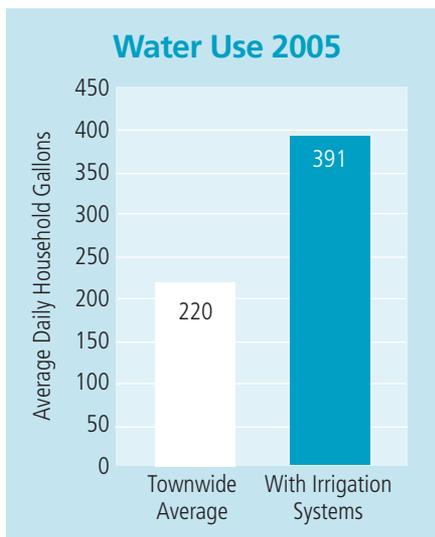
- a **Fluoride:** The Department of Public Health's ideal goal for fluoride is 1 ppm.
- b **Haloacetic Acids and Trihalomethanes:** The highest level detected represents the highest running annual average for these contaminants. The range of levels found may have results in excess of the MCL but the running annual average of all sample locations is used to determine compliance.
- c **Lead and Copper:** In accordance with EPA regulations, Concord Public Works tests the tap water of 30 homes in Concord for lead and copper every 3 years. Testing was last done in 2005 and is next scheduled to be done during the summer of 2008. EPA determines whether the protection against corrosion is sufficient by requiring that at least 90% of the sampled homes have lead levels under 15 parts per billion (ppb). This is called the Action Level.

**Important Information From EPA About Lead:** Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. Additional information is available from the Safe Drinking Water Hotline (800-426-4791).

# Water Conservation

In 2005, water use was up approximately 3 percent over 2004. That's to be expected, since the summer of 2005 was warmer and drier than normal and extended into September, when we received half the normal rainfall and had 21 days of above-average temperatures.

As we enter the "peak" water season of 2006, we again remind our customers to use water efficiently. All six groundwater supply wells and Nagog Pond are often required to operate at maximum levels during the summer. When this occurs, there is more wear and tear on town pumps, water quality is subjected to greater variation and production costs are increased. And besides, it makes little sense to pump water (a finite resource) from the ground, treat it, send it through miles of pipeline, only to waste it. Being "water-efficient" means using less water to provide the same benefit.



There are many ways to enhance your water efficiency—detecting and fixing leaks, installing high-efficiency clothes washers and toilets, and watering lawns and gardens with the minimum amount of water needed.

You are encouraged to take advantage of these opportunities to conserve water and reduce water bills. Contact Water Conservation Coordinator, Joanne Bissetta, at 978-318-3259 for further information or visit our website, [www.concordnet.org/cpw](http://www.concordnet.org/cpw).

## Seasonal Rates Start May 1

Concord's Water Conservation Rate is in effect each year between May 1 and October 31 for residential customers. Water customers using more than 2,400 cubic feet of water bimonthly (more than 300 gallons daily) pay higher rates for their extra consumption, reflecting the higher cost of meeting peak water demand. Below are proposed rates, effective June 1, subject to Public Works Commission approval. One hundred cubic feet = 748 gallons.

- Base Rate:** \$3.44 per 100 cubic feet (ccf) bimonthly.
- Step 2:** \$6.29 per ccf for 2,500 – 4,800 cubic feet bimonthly May 1 through October 31.
- Step 3:** \$8.24 per ccf over 4,800 cubic feet bimonthly May 1 through October 31

## Improve Your Irrigation IQ

We understand that many residents find automatic irrigation systems attractive and convenient. You don't need to remember to turn it on and shut it off, you don't need to drag hoses across the lawn, and it will operate when you're on vacation. CPW wants to make sure your irrigation water is used as efficiently as possible. Consider the following:

- Households with irrigation systems use a lot of water. Last year, the average household with an irrigation system used 77% more water than the townwide average. In some cases, these households use four to five times more water than those without irrigation systems.
- Every year we receive abatement requests from residents who discover costly leaks in their irrigation systems.
- Every summer we receive phone calls from residents who are shocked when they receive a \$700 water bill after installing an irrigation system.
- In 2005 the top 10% of highest water-using households used 27% of all water billed to 4,500+ homes.

## Install a rain sensor on your irrigation system

Why pay good money watering your lawn when it's raining? If you have a rain sensor, make sure it's located in an area accessible to rain and not obstructed by trees, shrubs, or parts of your house. The In-Ground Irrigation System Bylaw requires the installation of rain sensors and that they are operating properly.

## Learn about the tuna can plan

A simple way to calculate how much water your sprinkler is applying to your lawn. Place four to six tuna or cat food cans around your lawn (or more if you have a larger property) and run the sprinkler for 15 minutes. Measure the depth of water in each can and calculate the average depth. Then, figure out how long each week to run your sprinkler to apply one inch of water. Healthy lawns typically need one inch of water a week, including rain.

## Limit lawn watering to once or twice a week

Infrequent, deep watering, promotes deep roots that will allow the plant to survive on less water. Frequent lawn watering often encourages shallow roots that could make the lawn more susceptible to pests and disease.

### High Water Bills Get You Down? Ten Easy Ways to Save Water this Summer

1. **Watch the weather** - Watering habits should change with the weather. If the weather is cool, humid or rainy you should decrease watering time and/or skip scheduled watering. Make sure you adjust your irrigation system with the changing weather.
2. **Let nature take its course** - The cool-season grasses in Concord lawns naturally go dormant in the heat of summer. When cooler temperatures arrive they will green up again. If you spend the month of August away at your summer home, why pay high water bills to artificially keep a lawn green that you're not around to enjoy?
3. **Consider drip irrigation or soaker hoses** - Because it applies water directly onto the ground drip irrigation is much more efficient than traditional sprinklers, particularly in flower and shrub beds. Evaporation is greatly reduced and the water is applied right where the plant needs it.
4. **Wash your car on your lawn** - Water is absorbed into your lawn instead of running down your driveway into the nearest catch basin.
5. **Check your toilets for leaks** - Put a little food coloring in the toilet tank and wait 10 to 15 minutes. If the color appears in the bowl, you have a leak that should be repaired. It is estimated that 25 percent of all toilets leak.
6. **Cover your pool** - The average outdoor pool loses an inch of water a week in the heat of the summer.
7. **Go native** - Native plants have evolved over time to thrive in Concord's climate. Once established, they require little or no supplemental water and are practically maintenance-free. Visit the New England Wildflower Society's website for more information at [www.newfs.org](http://www.newfs.org).
8. **Check for and repair leaks** - Irrigation systems often wear down over time and are damaged by low winter temperatures. Overly green or soggy areas may indicate sources of leaks. If your system is maintained by a contractor, make sure they replace broken or malfunctioning heads and valves.
9. **Get swept away** - Use a broom, not a hose, to clean driveways and sidewalks.
10. **Mulch it** - Applying mulch around plants keeps the soil underneath cool and moist, reducing watering needs.

### “Water-Smart” Landscape Plans

Thanks to grants from The Garden Club of Concord and the Massachusetts Department of Environmental Protection, four landscape templates have been developed by local landscape designers that create easy-to-maintain landscapes requiring little or no supplemental water.

**Garden for Hot Spots**, designed by Dori Smith of Gardens for Life. This design was created for full-sun properties using drought and salt-tolerant trees and shrubs. Full of color, this landscape will also attract birds and butterflies.

**Wildlife Attracting Landscape**, designed by Sue Spicer of Sue Spicer Landscape Design. By providing food, water and shelter, this design creates a natural habitat setting for local and migrating animals with native trees, shrubs and ground covers.

**Woodland Garden**, designed by Lina Formichelli of Pumpkin Brook Organic Gardening. This design is perfect for homeowners with properties bordering on wooded areas. Utilizing shade-loving plants, this garden provides year-round color and interest.

**Rain-Catching Garden**, designed by Angela Kearney of Minglewood Design. This design features a garden of flowering plants, shrubs and groundcovers that retains rainwater and allows it to seep back into the ground, recharging ground water supplies, instead of running off into storm drains.

These templates are posted on our website [www.concordnet.org/cpw](http://www.concordnet.org/cpw) and are available as handouts at our office at 135 Keyes Road.

## Frequently Asked Questions

### I bought a new dishwasher and the manufacturer wants to know what the hardness of the water is?

The 2005 system wide average for hardness was 63.2 parts per million. More commonly this would be considered a relatively soft water. This translates to 3.7 grains per gallon, a unit of measure often used by manufacturers.

### What is the pH of my water?

The pH of Concord's water was approximately 7.3 units in 2005. We strive to keep the pH between 7.0 and 7.8 units for water treatment purposes. The main reason for adjusting pH is to prevent water from being corrosive and leaching metals into your drinking water from household plumbing.

### What do I do if my water bill seems high?

First, you want to check for leaks (see right). The "usual suspects" for leaks are toilets and in-ground irrigation systems. If no leaks are detected, then you can do some sleuthing by using your water meter. Most water meters are located in basements near the wall closest to the

street. They can also be in a utility closet, mechanical room or out-side in a pit in the ground. In Concord, the meters measure water use in cubic feet (CF). One cubic foot equals 7.48 gallons.

You can use your meter to track water usage throughout the day or week to determine when a lot of water is being used. Are evening baths the culprit? Daily loads of laundry? Or morning lawn watering? Still baffled? CPW offers free water use audits to residential customers. Call 1-888-772-4242 to schedule an audit.

### How can I check to see if I have leaks in my house?

Make sure all water using appliances in your home are shut off. Most water meters have a low-flow detector, often displayed as a small red or black triangle. You have a leak if you see this triangle move. Also, CPW has dye tablets available to determine if your toilet is leaking.

### Sometimes my water smells like a pool, what causes this?

Concord adds a small amount of liquid chlorine to its groundwater supplies.

This prevents bacterial re-growth once water is put into the distribution system. Showers and warm weather can bring out the odor more easily.

### Why does my water appear cloudy or milky?

Tiny air bubbles much like the ones found in carbonated beverages cause this appearance. These bubbles do not make the water unsafe to drink. In fact, they will rise to the top within a few minutes and your glass of water will be clear again! This tends to happen more in cold weather months or after service has been performed on the water system.

### Where can I pay my water and sewer bill?

Payments can be mailed to: Town House, P.O. Box 535, Concord, MA 01742-0535. Payments can also be made in person at the Town House, located in Monument Square. We cannot accept payment at the Water and Sewer Division office. Online bill payment should be available to customers later this spring.

For Concord Residents

## Rain Barrel Only \$40

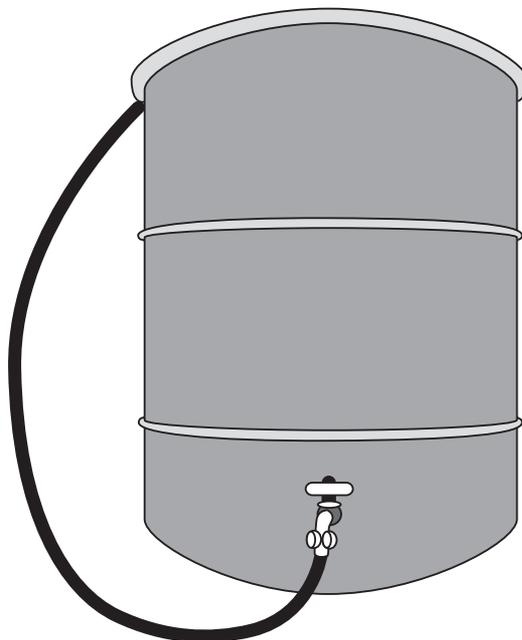
Additional barrels \$62 each

Collect rainwater for your  
garden and plants

To order, contact the New England  
Rain Barrel Company at 877-977-3135  
(toll free) or order online at  
[www.nerainbarrel.com](http://www.nerainbarrel.com).

**Order by May 19**

Pick up rain barrels at CPW, 135 Keyes Rd.  
on Wednesday, May 24



## In-ground Irrigation Bylaw

Town bylaw requires that all in-ground irrigation systems connected to the public water supply be registered with the Town and equipped with automatic timers, rain sensors and back-flow prevention devices. Call 978-318-3250 or go to [www.concordnet.org/cpw](http://www.concordnet.org/cpw) for registration forms

## Quality Control

To ensure that tap water is safe to drink, the EPA enforces regulations that require stringent monitoring of specific contaminants within public water supply systems. Within Concord's system, over 500 tests are run each year to assess approximately 145 potential contaminants. We are proud to report that Concord's water quality testing program not only meets EPA's requirements for drinking water but goes above and beyond those requirements to satisfy the higher standards we have set for ourselves.

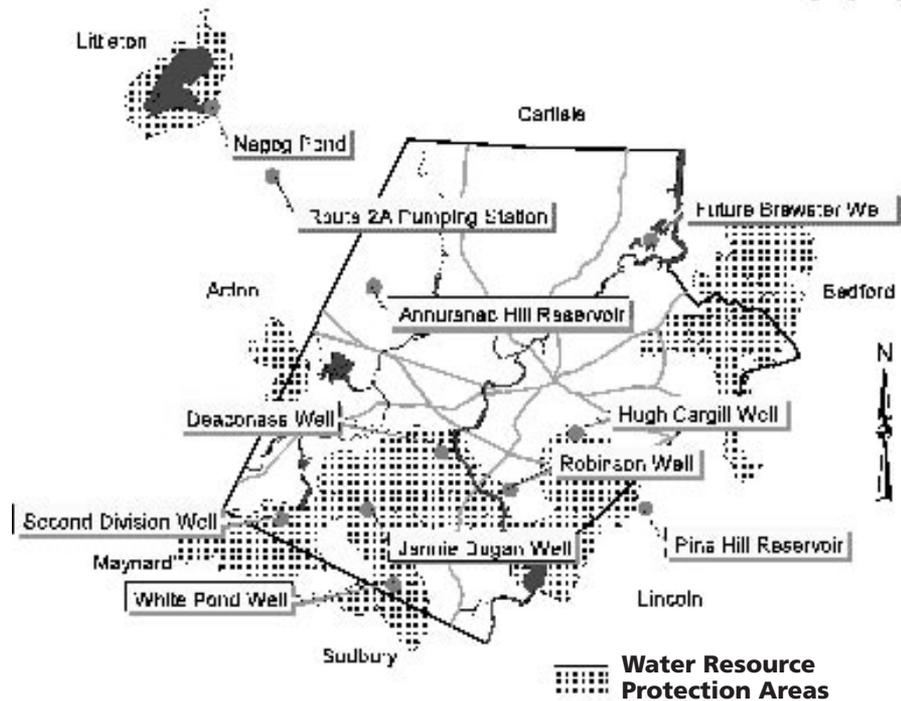
## Discolored Water

Have you ever noticed a change in the color of your water? Throughout the year, discoloration events can occur ranging from a slight tea color to a dark brown or black. Although this creates an undesirable appearance, it is not unsafe to use. The discoloration is from the presence of naturally occurring iron and manganese found in the groundwater supplies used to serve the water system. Events such as fires, water main breaks, seasonal flushing, and changes in well operation can cause these occurrences. When the cold water is discolored, it can usually be cleared up by running a faucet and purging the service line. Remove the aeration screens from your faucets to make sure no sediment has built up on them as well.

If you experience discoloration in the hot water only, we recommend flushing out your hot water tank. Currently, iron and manganese are treated chemically to sequester the metals and keep the cold water running clear. When heated, especially in large tanks and above 125 degrees Fahrenheit, the chemical bonds break down quickly and particles settle out. Over time, a layer of sediment can buildup in the tank and when high demand is placed on the tank, the sediment becomes stirred up. This situation can typically be remedied by turning down the hot water tank temperature if it is high and flushing your tank twice a year. Tank manufacturers rec-



## Town of Concord Water Supply



ommend doing this once a year for general maintenance but twice a year (when you switch your clocks as an easy way to remember) will help keep it nice and clean as well as improve the efficiency and useful life of the unit.

Over the past several years, Concord Public Works has implemented various approaches to mitigate iron and manganese issues. We are excited to announce the construction of a water filtration plant designed to serve two of our ground water sources. The facility will be located at the existing Deaconess Well site (see photo below) and will treat combined flows of water from the Deaconess and White Pond Wells. This will result in higher quality water being delivered to our customers, especially to those living in close proximity to these water sources. A new technology, called LayneOx™, utilizes a combination of filtration and adsorption under pressure to decrease the levels of iron and manganese before the water leaves the treatment plant.

## Get Involved

Do you live or play near any of our water supplies depicted on the map? If so, you could be part of CPW's efforts to protect and preserve our water resources. To participate, we would ask that you be able to attend a kick-off meeting and be willing to communicate with Division Staff regularly. The Public Works Commission is the overseeing body of CPW and you can attend their meetings to become more involved in issues relating to the water system. For more information regarding water quality and resource protection initiatives, please contact Matthew Mostoller, Environmental Analyst at 978-318-3250 or [mmostoller@concordnet.org](mailto:mmostoller@concordnet.org).

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Concord, MA 01742



## Opportunities for Learning

**Free Workshop: Save Money, Energy and Water**, 10 a.m., Wednesday, April 26, at the Harvey Wheeler Building, 1276 Main Street. Learn the easy tricks to save on your utility bills during this 90 minute seminar. John Odell of the Light Plant will talk about how you can save on your electric, oil and/or gas bills and Joanne Bissetta from Concord Public Works will talk about water conservation. Bring your questions!

**Free Workshop: Organic Lawn Care**, 7 p.m., Wednesday, May 3, at CCHS. Tips and tools to help you care for your lawn without using chemical pesticides and fertilizers. Please call 978-318-3259 to register.

**CCTV Channel 8: Your Own Backyard: A Xeriscape Primer**, Learn how to design an attractive, water-conserving landscape right in your own backyard. A colorful, inviting "water-smart" landscape can reduce outdoor water use by 30 to 80 percent by incorporating native and adapted plants suited to a region's soil and climate. Check local listings for broadcast times this spring.



## CONCORD ONSERVES

### A Month-Long Celebration of the Environment in Concord and Beyond

From April 21 through May 20, a series of community-wide events will be held to highlight opportunities that Concord residents and business owners to improve the environment through conservation. Activities range from green building workshops, rebates for purchasing energy-saving lightbulbs, home composting workshops, organic lawn care seminars and more. Visit [www.concordnet.org](http://www.concordnet.org) and look for Concord Conserves on the Town's main page to find out what's going on.