City of Wilmington

Volume 12 • Summer 2014
A newsletter published by the City of Wilmington,
Department of Public Works Water Division

Water Works

2013 Water Quality Report

To ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in public water systems.

The Environmental Protection Agency (EPA) requires the City of Wilmington, and all other water suppliers in the US, to report yearly on specific details about testing for a number of contaminants in our water. Chemical and biological monitoring provides the data that helps suppliers, such as the City of Wilmington, make key water quality management decisions to ensure freshness and purity.

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. To ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) regulates bottled water, which must provide the same protection to the public's health.

More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (**1-800-426-4791**).

(Continued on page 3)

Membrane Module Cross Section: The white "straws" in the middle are the membrane fibers.

First Membrane Plant in the First State

The City's oldest water treatment plant, the Brandywine Filter Plant (BFP), was originally built in the early 1900s at 303 East 16th Street and has undergone many upgrades over time. The majority of the primary treatment plant is well over 50 years old and, due to its age and evolving regulations, underwent a major treatment upgrade from conventional sand filtration to membrane treatment technology. The new membrane plant began producing water on June 26, 2013.

The purpose of membranes are the same as that of a conventional sand filter, which is to remove particulates, including pathogens and bacteria from a water source. However, instead of using multiple beds of packed

(Continued on page 8)

A Word from the Commissioner

The City of Wilmington continues its commitment of providing you with clean and reliable drinking water today and for future generations. Providing quality drinking water begins with ensuring that the source of your water, the Brandywine Creek, is the best quality possible. With our clean water partnerships, we continue to support our award winning Source Water Protection program which focuses on improving the quality of the Brandywine. 2013 was an exciting year! In this report you will read about our newly upgraded treatment technology at the Brandywine Plant, projects in the distribution network, and things we all can do protect and preserve water. Bringing clean water to our customers is a priority - making improvements to our treatment and storage facilities and distribution network are vital components to this mission.
I hope you enjoy this issue of WaterWorks and our 2013 Consumer Confidence Report.

Best Wishes,

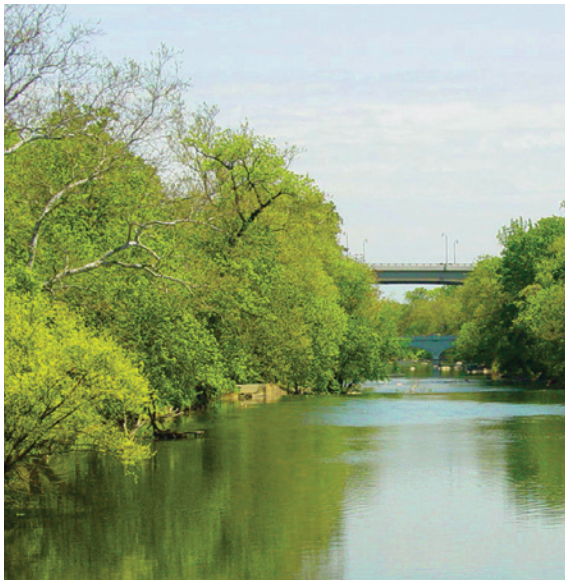
Jeff Starkey, Commissioner,
Department of Public Works

Source water...

The City of Wilmington developed the Source Water Protection Plan (SWP Plan) in order to better protect its water supply for future generations, reduce long term operating costs and carbon footprint, avoid future treatment requirements, improve planning and response to future spills and water quality events, and leverage upstream investments to protect its water supply.

Recognizing the efforts and input of the many dedicated stakeholders in the Brandywine Creek Watershed who have been involved with this SWP Plan is very important. The SWP Plan integrates a significant amount of information from their previous studies and plans. Without the involvement of these stakeholders and the benefit of their previous efforts, this plan would not have been possible.

You can download and read the SWP Plan at **www.WilmingtonDE.gov/government/sourcewater**. If you have any questions please contact Matthew Miller, Assistant Water Division Director, at **(302) 576-3017**.



Contact Us

You can help us ensure the safety of our water supply by reporting any unusual or suspicious activity either on our waterways, near our reservoirs, water filtration plants, water towers or pumping stations.

To report an incident or general water quality concerns, call the City Call Center, **(302) 576-3878**.

If you have questions about this report, call the Water Quality Laboratory at **(302) 573-5522** or **(302) 571-4158**.

Weekends or after 5 P.M. (302) 571-4150.

2013 Water Quality Report

City of Wilmington
800 French St.
Wilmington, DE 19801

PWSID# DE0000663

June 1, 2014

Report Covers
Calendar Year 2013

Water System Contact –
Matthew Miller,
Assistant Water Division Director
(302) 576-3017

Water Source:
Surface Water (Brandywine Creek & Hoopes Reservoir)

How We Test Our Drinking Water

The Wilmington Water Division monitors for over 100 contaminants, including herbicides, pesticides, *Cryptosporidia*, *Giardia* and coliform bacteria. We collect samples from the Brandywine Creek, Hoopes Reservoir, Porter Reservoir, Cool Spring Reservoir, the filtration plants and at customers' taps in the distribution system.

Last year, over 30,000 water samples were drawn from the City's fresh water supply treatment plants and distribution system. Our laboratory performed over 70,000 water analyses on those samples. This data supports the conclusion that Wilmington's water system complies with all applicable EPA drinking water regulations.

During disinfection, certain by-products form as a result of chemical reactions between chlorine and naturally occurring organic matter in water. These are carefully controlled to keep disinfection effective and by-product levels low.

The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old. If this is the case, the sample year will be noted in the report. If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Wilmington is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (**1-800-426-4791**), or at **www.epa.gov/safewater/lead**.

The Division of Public Health, in conjunction with the Department of Natural Resources and Environmental Control (DNREC), has conducted source water assessments for nearly all community water systems in the state. Contact the City at (**302) 573-5522** regarding the availability of the assessment and how you may obtain a copy. The assessment may also be viewed at this website: **www.delawaresourcewater.org**.

Protecting the Public from Disease

The 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 dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Microbiological testing of water helps protect the public from waterborne diseases such as polio, diphtheria, typhoid, and cholera. Chlorine is very effective at killing or disinfecting most of these organisms in drinking water. However, *Cryptosporidium*, a microbial pathogen found in surface waters throughout the US, is resistant to chlorine. Optimized water treatment, including filtration, provides an effective barrier against passage of *Cryptosporidium* into drinking water. One commonly used measure of this treatment effectiveness is turbidity removal. Turbidity is the cloudiness of the water that is caused by particles that are generally invisible to the naked eye. As shown in **Table 1** on ***page 7***, the City continues to provide water that is well within State and Federal turbidity requirements.

The most commonly-used filtration methods, such as those used by Wilmington, cannot guarantee 100% removal. The City of Wilmington began monitoring for *Cryptosporidium* in source water for its two plants beginning in November of 2005. Based on research conducted on the removal of *Cryptosporidium* by common filtration methods, the level detected in the source water should have been removed by the filters at the City's treatment plant. *Cryptosporidium* has never been detected in the treated water supply.

Important Health Note for "At Risk" Populations

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as those with cancer undergoing chemotherapy, organ transplant recipients, people with HIV/AIDS or other immune system disorders, the elderly, and infants can be particularly vulnerable to infections. These people should seek advice from their health care providers. EPA/CDC guidelines on appropriate ways to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (**1-800-426-4791**).

Regulating Contaminants

Contaminants that may be present in source water include: microbial contaminants, such as viruses and bacteria; inorganic contaminants, such as salts and metals, which can be naturally occurring; pesticides and herbicides; organic chemical contaminant; and radioactive contaminants. In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in drinking water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Table 1: Water Quality Results - Detected Primary[1] Parameters at ENTRY POINTS to Distribution System

				Brandywine Filter Plant				Porter Filter Plant				
Contaminant	**Units**	**MCLG[2]**	**MCL[3] or TT[4][5]**	**Average**	**Lowest Detected Level**	**Highest Detected Level**	**Violation**	**Average**	**Lowest Detected Level**	**Highest Detected Level**	**Violation**	**Likely Source**
Microbiological Indicators – (2013 unless noted)												
Turbidity - Percentile	% of samples below 0.3	N/A	95% of monthly samples must be less than 0.3	100	100	100	No	100	100	100	No	Soil runoff
Turbidity - Values	NTU		No sample must ever exceed 1.0	0.03	ND	0.08	No	0.05	0.03	0.08	No	Soil runoff
Inorganic Chemicals (Metals and Nutrients) – (2013 unless noted)												
Barium	ppm	2	2	0.033	0.033	0.033	No	0.033	0.033	0.033	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Nickel	ppb	N/A	100	0.9	0.9	0.9	No	1.8	1.8	1.8	No	Discharge from industrial sources; Erosion of natural deposits.
Arsenic	ppb	0	10	0.5	0.5	0.5	No	ND	ND	ND	ND	Mining runoff; Erosion of natural deposits; Emissions from glass & electronics processing; Wood preservatives & pesticides.
Chromium	ppm	0.1	0.1	0.002	0.002	0.002	No	0.002	0.002	0.002	No	Discharge from steel and pulp mills; Erosion of national deposits.
Fluoride	ppm	4	Delaware State MCL: 2 ppm[6] Federal MCL: 4 ppm[6]	0.71	0.41	0.9	No	0.75	0.57	0.98	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	ppm	10	10	1.8	2.0	2.0	No	1.7	1.2	2.1	No	Runoff from fertilizer use; Leaching from septic tanks; Sewage; Erosion of natural deposits.
Nitrite	ppm	1	1	0.005	0.01	0.01	No	0.002	0.002	0.002	No	Runoff from fertilizer use; Leaching from septic tanks; Sewage; Erosion of natural deposits.
Disinfectants – (2013 unless noted)												
Chlorine	ppm	N/A	At least 0.3 residual entering Distribution System	1.2	0.4	1.93	No	1.9	1.55	2.19	No	Water additive used to control microbes.
Disinfection Byproduct Precursors – (2013 unless noted)												
Total Organic Carbon	ppm	N/A		1.17	0.86	3.07	N/A	1.25	0.83	2.30	N/A	Naturally present in the environment. Total organic carbon (TOC) has no health effects. However, TOC provides a medium for the formation of disinfection byproducts.
Total Organic Carbon	% Removal (Raw to Treated)	N/A	Must exceed 35% (25% in certain instances)	37%	33%	71%	No	45%	6%	73%	No	
Total Organic Carbon	Compliance Ratio (rolling annual avg)	N/A	Ratio of Actual to Required Removal – must be greater than or equal to 1	1.4	1.0	2	No	1.4	1.0	1.6	No	

Table 2: Water Quality Results - Detected Primary[1] Parameters IN Distribution System

Contaminant	Units	MCLG[2]	MCL[3] or TT[4][5]	Average	Lowest Detected Level	Highest Detected Level	Violation	Likely Source
Microbiological Indicators								
Total Coliform	% of samples positive each month	0%	5.0%	1.3	0	5.2[14]	Yes[14]	Bacteria that are naturally present in the environment. Used as an indicator of the presence of other potentially harmful bacteria.
Lead and Copper (based on 2011 sampling – testing is done every 3 years)								
Lead	ppb	0	90% of tap water samples must be less than the Action Level of 15.	3.0[9]	<2	7	No	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems.
Copper	ppm	1.3	90% of tap water samples must be less than the Action Level of 1.3.	0.277[9]	<0.005	0.51	No	Erosion of natural deposits; Corrosion of household plumbing systems.
Disinfectants								
Chlorine	ppm	MRDLG = 4.0[11]	MRDL = 4.0[10]	1.20	0.75[12]	1.55[12]	No	Water additive used to control microbes.
Disinfection Byproducts								
Total Trihalomethanes	ppm	Not Applicable	0.080: Based on LOCATIONAL Running Annual Average of Quarterly Samples	0.043	0.018	0.077[13]	No	Byproduct of drinking water disinfection. Forms due to reaction of chlorine with total organic carbon. Health effects: Some people who drink water containing TTHMs in excess of the MCL over many years could experience problems with their liver, kidneys or central nervous systems, and may have an increased risk of getting cancer.
Haloacetic Acids	ppm	Not Applicable	0.060: Based on LOCATIONAL Running Annual Average of Quarterly Samples	0.028	0.010	0.045[13]	No	Byproduct of drinking water disinfection. Forms due to reaction of chlorine with total organic carbon.
Bromochloroacetic Acid	ppb	Not Applicable	None	3.5	2.2	5.4	No	Byproduct of drinking water disinfection. Forms due to reaction of chlorine with total organic carbon.

Potential Contaminants

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, which can occur naturally or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and Herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses.

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems.

Radioactive Contaminants, which can occur naturally or as a result of oil and gas production and mining activities.

Table 3: Secondary[15] Parameters and Other Parameters of Interest Detected in Water as it Enters Distribution System

			Brandywine Filter Plant			Porter Filter Plant			
Contaminant	**Units**	**SMCL[16]**	**Average**	**Lowest**	**Highest**	**Average**	**Lowest**	**Highest**	**Source**
Conventional Physical and Chemical Parameters									
pH	units	6.5 - 8.5	7.2	6.9	7.5	7.3	6.8	7.8	Waters with pH = 7.0 are neutral
Alkalinity	ppm as $CaCO_3$	N/A	55	44	64	52	35	60	Measure of buffering capacity of water or ability to neutralize an acid.
Hardness	ppm as $CaCO_3$	N/A	101	48	130	110	58	126	Naturally occurring; Measures Calcium and Magnesium.
Conductivity	mmhos/cm	N/A	364	233	796	385	304	721	General measure of mineral content.
Sodium	ppm	N/A	18	18	18	17	17	17	Naturally occurring; Chemical additive to treat the water; Road salt application and run-off.
Sulfate	ppm	250	17	17	17	16	16	16	Naturally occurring; Can cause objectionable taste and odor in water.
Total Dissolved Solids (TDS)	ppm	500	186	186	186	186	186	186	Metals and salts naturally occurring in the soil; Organic matter.
Chloride	ppm	250	57	37	178	67	43	160	Naturally occurring; Chemical additive to treat the water; Road salt application and run-off.
Metals									
Iron	ppb	300	14.0	ND	170	20.0	10.0	100	Naturally occurring; Chemical additive to treat the water; Corrosion of pipes; Can cause discoloration in water.
Manganese	ppb	50	30	10	50	10	10	20	Naturally occurring; Can cause discoloration and objectionable taste in water.
Zinc	ppm	5	0.1	0.1	0.2	0.1	ND	0.1	Naturally occurring; Chemical additive to treat the water.

Radioactive Contaminants – (2011 unless noted)				Highest Detected Level	Range of Levels Detected	Violation	
Beta/photon emitters	mrem/yr	0	4	3.5	3.5 - 3.5	No	Decay of natural and man-made deposits.
Combined Radium	pCi/L	0	5	0.12	0.12 - 0.12	No	Erosion of natural deposits.
Gross alpha excluding radon & uranium	pCi/L	0	15	0.44	0.44 - 0.44	No	Erosion of natural deposits.

Key to Tables

[1] Primary parameters are contaminants that are regulated by a maximum contaminant level (MCL), because above this level consumption may adversely affect the health of a consumer.

[2] MCLG - Maximum Contaminant Level Goal is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow no margin of safety.

[3] MCL - Maximum Contaminant Level is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

[4] TT - Treatment Technique refers to the required process intended to reduce the level of a comtaminant in drinking water. EPA's surface water treatment rules require systems to (1) disinfect their water and (2) filter their water such that the specific contaminant levels cited are met. Lead and copper are regulated by a Tretment Technique that requires systems to control the corrosiveness of their water. Total organic carbon is regulated by a Treatment Technique that requires systems operate with enhanced coagulation or enhanced softening to meet specifiefd percent removals.

[5] Unless otherwise indicated value given is a MCL.

[6] State limit is to not exceed 2.0 mg/L. Federal MCL is 4.0 mg/L.

[7] Cited average is the lowest running annual average calculated from monthly samples in 2013.

[8] Cited average is the highest running annual average calculated from quarterly samples in 2013.

[9] Value given is not an average, but the 90th percentile action level.

[10] MRDL - Maximum Residual Disinfectant Level is the highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disenfectant is necessary for control of microbial contaminents.

[11] MRDLG - Maximum Residual Disinfectant Level Goal is the level of drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

[12] Cited value is the lowest and/or highest average of a minimum of 120 routine samples per month.

[13] Cited value is the highest Locational Running Annual Average (LRAA). MCL is based on the LRAA.

[14] In July 2013, 5.2% (eight of 154 samples) were positive for total coliform. The exact cause of these results is unknown since all samples contained normal levels of chlorine indicating proper disinfection and there were no treatment upsets. The City is working to develop a unidirectional hydrant flushing program that will improve the effectiveness of our current program to flush water mains.

[15] Secondary parameters are contaminants that are regulated by non-enforceable guidelines because the contaminants may cause non-health related cosmetic effects, such as taste, odor, or color.

[16] SMCL: Secondary Maximum Contaminant Level is the level of a physical, chemcial or biological contaminant in drinking water above which the taste, odor, color or appearance (aesthetics) of the water may be adversely affected. This is a non-enforceable guideline which is not directly related to public health.

ppm: Milligrams per liter or parts per million - or one ounce in 7,350 gallons of water

ppb: Micrograms per liter or parts per billion - or one ounce in 7,350,000 gallons of water

ND: not detected

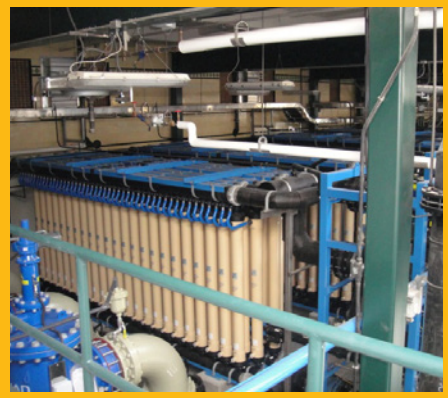
First Membrane Plant in the First State

(Continued from cover)

sand to filter out these contaminants, membrane systems use tiny hollow fibers to filter the water. The fiber is similar to a straw which has lots of little holes along the side. These holes are 10 times smaller than the diameter of the finest human hair! Filtration occurs as water is forced through the holes from outside the "straw" to the inside. Once inside, it can be collected, disinfected and delivered to the customer.

The new membrane plant is currently capable of producing, on average, 7 million gallons of water each day. Water produced by the BFP is available for distribution throughout the City in conjunction with the water produced at the Porter Filter Plant. Although the filtration process at each plant is different, customers will not notice a difference, as each plant produces high quality water that meets or exceeds all regulations. The membrane plant at the BFP is the first such facility in the State of Delaware and is another example of how the City continues to ensure safe and reliable drinking water for our customers.

The old filters.



Membrane Rack #1. Each rack contains 94 modules and the City has 4 racks.

2013 Water Main Replacement

Cast iron water mains usually have a long service life, but due to different soil conditions, working pressure and other factors, they need to be periodically replaced, and sometimes increased in size to provide for a growing demand.

During 2013, The City of Wilmington Water Division replaced over 8,800 linear feet of small sized main with 8-inch ductile iron pipe. This will increase flow and improve water quality for the communities of Pennrose Subdivision, Hillcrest, Edgewood Hills, Academy Place and 23rd street.

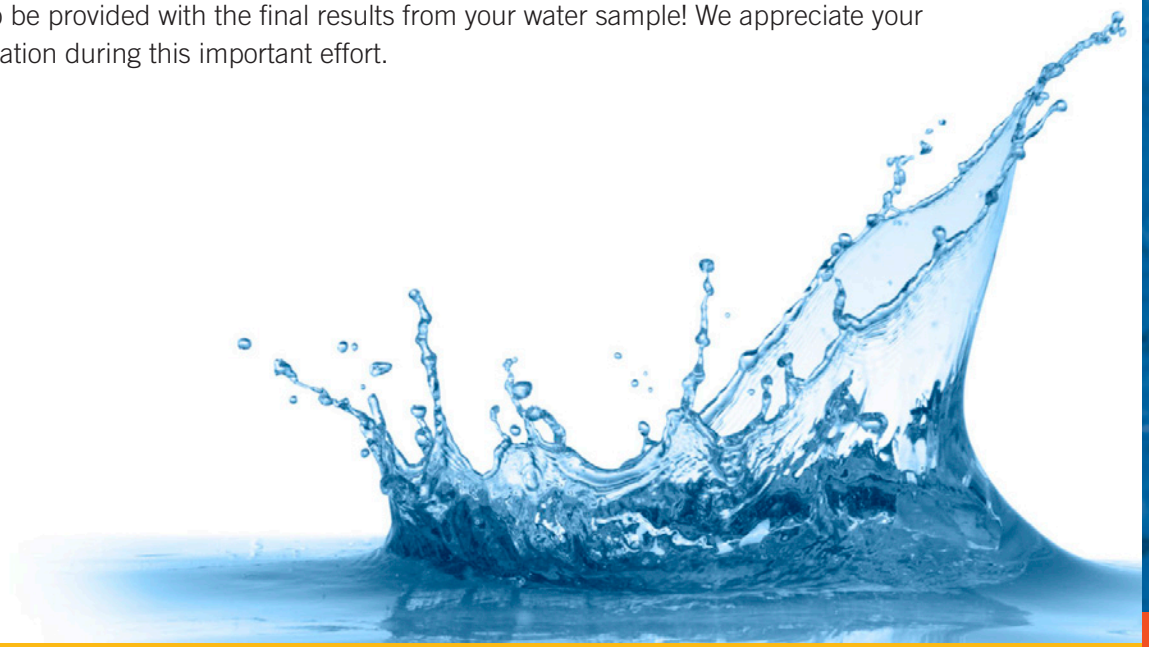
Similar work will continue to be performed in 2014 and affected customers will be notified prior to the start of work. Water main replacement is one of many ways Wilmington continues to work to supply our customers with the highest quality drinking water possible.

Important Lead and Copper Sampling

Triennial (recurring every three years) monitoring for lead and copper in drinking water will occur this summer 2014 between June and September. This sampling program is required by the Environmental Protection Agency's (EPA's) Lead and Copper Rule. Lead enters drinking water primarily by the corrosion of household plumbing materials. Since 1996, the City has implemented a Corrosion Control strategy with the use of a corrosion inhibitor to limit the occurrence of lead and copper in our tap water.

The City's lead and copper levels from previous testing have been in full compliance with the EPA and State action levels. However, we are required to test every three years to ensure that our program remains effective and that lead and copper results are below the action levels.

These tests are an important safeguard for your drinking water as they allow us to see whether there is a health risk in your water due to lead and copper. Please help us by allowing us to test your water. If you are a potential sample location, you will be receiving a letter in the mail that provides more details and information to schedule an appointment. Sampling is simple: fill a bottle in the morning, jot down the time, and give us a call and we will stop by to pick it up. You will also be provided with the final results from your water sample! We appreciate your participation during this important effort.



Report It/Resolve It

Since 2012, the City of Wilmington has hosted an online Report It/Resolve It program, which provides residents with the ability to submit non-emergency requests for service (ie: special pickups, water quality tests, potholes or logging a complaint to the department of Public Works).

Once a request/complaint has been submitted by the resident, a service request is automatically generated and will be routed to the responsible division within the Department of Public Works.

The online Report It/Resolve it platform provides a convenient, user-friendly experience for the customer while also providing the responsible department with all the information they need to get a request/complaint resolved quickly and effectively. If your request has not been resolved or acknowledged within two business days, or if you have feedback or suggestions for the Report It/Resolve It program, please contact the Public Works Customer Service Call Center at **(302)-576-3878**.

To make a request or log a complaint, please visit **www.reportitresolveit.wilmingtonde.gov**. Click on the "start new request" button and then follow the steps to submit your request. To check the status of a submitted request, please click "find existing request" and provide the necessary information.

Jr. Water Works featuring Walter Sprinkler

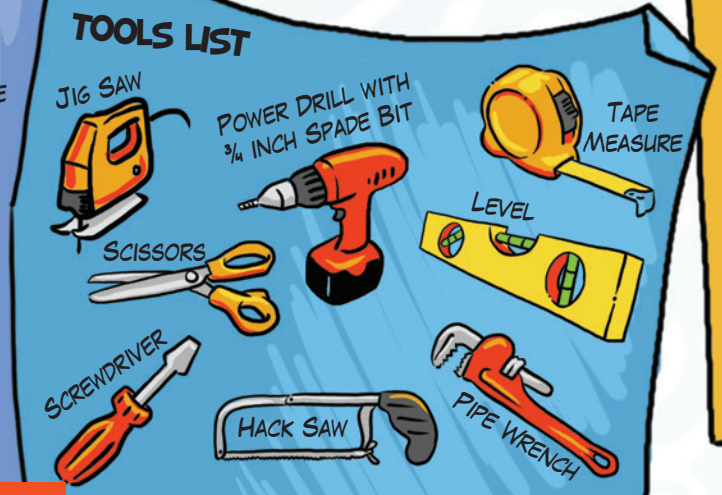
LET'S BUILD A... RAIN BARREL

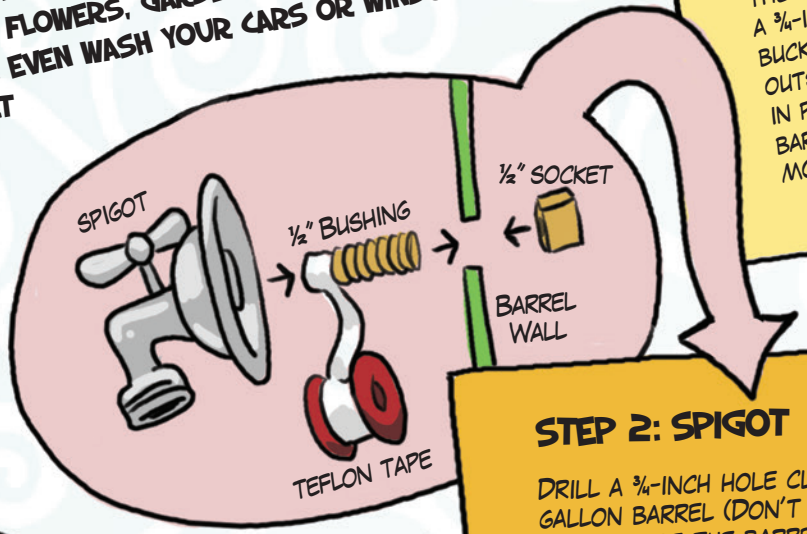
A RAIN BARREL IS A WAY TO CATCH AND STORE RAINWATER AS IT FLOWS FROM THE ROOF. THE WATER SAVED IN RAIN BARRELS CAN BE USED FOR WATERING FLOWERS, GARDENS AND LAWNS ALL THROUGH THE SUMMER, EVEN IN TIMES OF DROUGHT. YOU CAN EVEN WASH YOUR CARS OR WINDOWS WITH IT! IF YOU WANT TO BUILD ONE YOURSELF, GET AN ADULT TO HELP YOU AND FOLLOW THESE INSTRUCTIONS.

MATERIALS NEEDED

- 55 GALLON POLYETHYLENE PLASTIC BARREL (NOTE: CALL YOUR CITY'S ENGINEERING DEPARTMENT AND ASK IF THEY HAVE FREE BARRELS. PLASTIC BARRELS OR DRUMS MAY ALSO BE AVAILABLE FOR FREE OR LOW COST FROM CAR WASHES, BOTTLING COMPANIES OR OTHER FOOD BUSINESSES THAT USE LIQUIDS.)
- 10 FEET OF 2-INCH PVC PIPE
- 2-INCH PVC ELBOW
- 2-INCH FEMALE THREADED BY 2-INCH PVC ELBOW
- 2-INCH MALE THREADED BY 2-INCH PIPE ADAPTER TUBE
- SILICONE SEALER/CEMENT
- ½-INCH FEMALE THREADED SPIGOT (AKA OUTDOOR FAUCET OR HOSE BIB)
- ½-INCH THREADED BUSHING
- ½-INCH FEMALE THREADED SOCKET
- ROLL TEFLON TAPE
- 1 FOOT BY 2 FOOT PIECE OF SCREEN FABRIC
- 1 GALLON PLASTIC BUCKET
- CINDER BLOCKS

TOOLS LIST





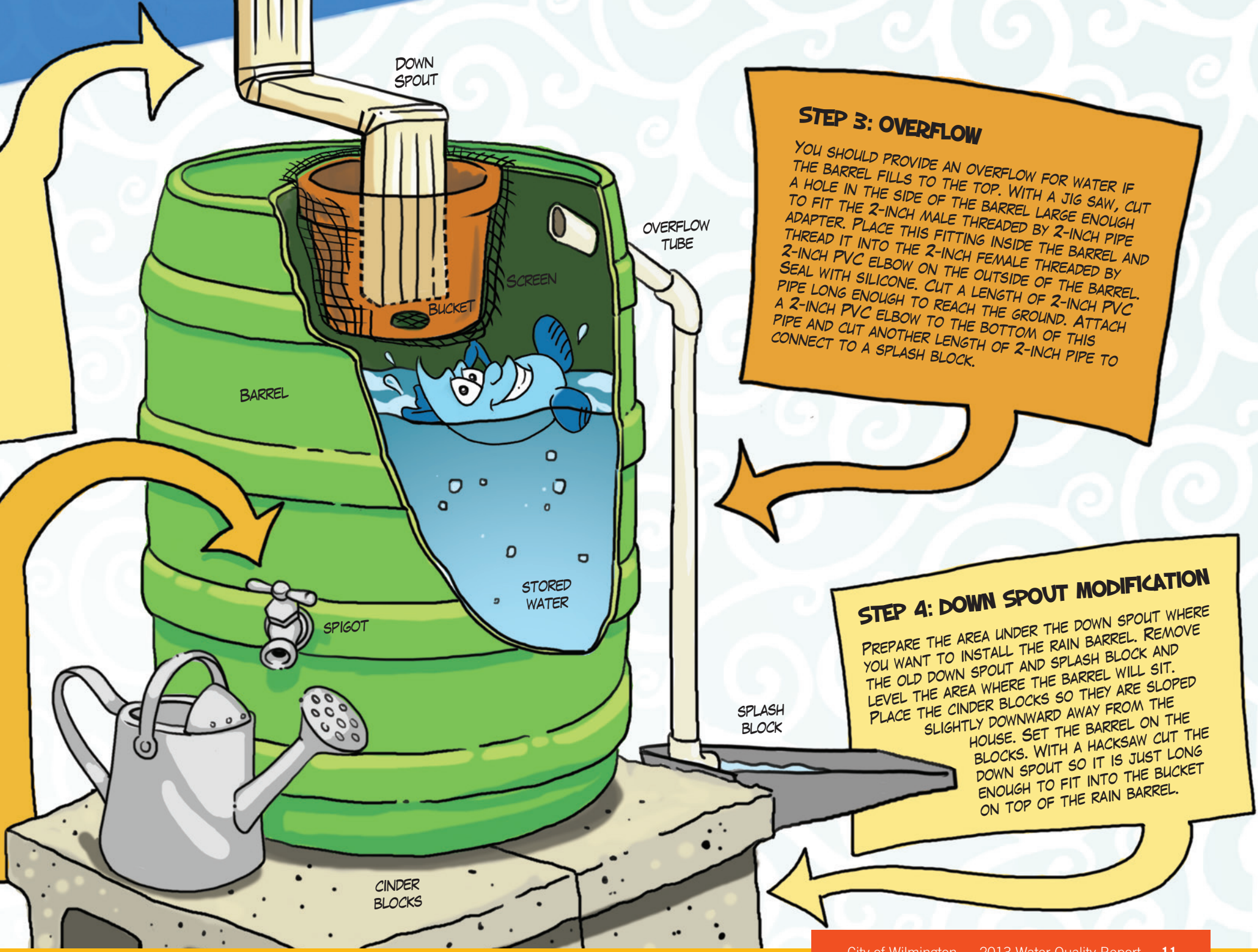
STEP 1: INFLOW

CUT A HOLE IN THE TOP OF BARREL, JUST LARGE ENOUGH TO SNUGLY FIT THE 1-GALLON PLASTIC BUCKET. CUT A ¾-INCH HOLE IN THE BOTTOM OF THE BUCKET. WRAP THE SCREEN AROUND OUTSIDE OF THE BUCKET, TRAPPING IT IN PLACE BETWEEN THE BUCKET AND BARREL. THE SCREEN WILL KEEP MOSQUITOES AND DEBRIS OUT.

STEP 2: SPIGOT

DRILL A ¾-INCH HOLE CLOSE TO BOTTOM OF THE 55 GALLON BARREL (DON'T DRILL THE HOLE TOO FAR DOWN INSIDE THE BARREL WHERE YOU CAN'T REACH IT FROM THE ACCESS HOLE ON TOP).

PUT TEFLON TAPE ON THE ½-INCH BUSHING AND THREAD IT INTO THE SPIGOT. NOW CAREFULLY THREAD THE OTHER END OF BUSHING INTO THE ¾ INCH HOLE IN BOTTOM OF BARREL. IT SHOULD FIT SNUGLY IN THE HOLE AND CUT THREADS IN THE PLASTIC AS YOU SCREW IT IN. NOW UNSCREW IT FROM THE BARREL, APPLY TEFLON TAPE TO THE THREADS OF THE BUSHING AND APPLY SILICONE TO THE OUTSIDE OF THE FLANGE ON THE SPIGOT. SCREW IT BACK INTO THE HOLE AND INTO A ½-INCH SOCKET ON THE INSIDE OF THE BARREL.



STEP 3: OVERFLOW

YOU SHOULD PROVIDE AN OVERFLOW FOR WATER IF THE BARREL FILLS TO THE TOP. WITH A JIG SAW, CUT A HOLE IN THE SIDE OF THE BARREL LARGE ENOUGH TO FIT THE 2-INCH MALE THREADED BY 2-INCH PIPE ADAPTER. PLACE THIS FITTING INSIDE THE BARREL AND THREAD IT INTO THE 2-INCH FEMALE THREADED BY 2-INCH PVC ELBOW ON THE OUTSIDE OF THE BARREL. SEAL WITH SILICONE. CUT A LENGTH OF 2-INCH PVC PIPE LONG ENOUGH TO REACH THE GROUND. ATTACH A 2-INCH PVC ELBOW TO THE BOTTOM OF THIS PIPE AND CUT ANOTHER LENGTH OF 2-INCH PIPE TO CONNECT TO A SPLASH BLOCK.

STEP 4: DOWN SPOUT MODIFICATION

PREPARE THE AREA UNDER THE DOWN SPOUT WHERE YOU WANT TO INSTALL THE RAIN BARREL. REMOVE THE OLD DOWN SPOUT AND SPLASH BLOCK AND LEVEL THE AREA WHERE THE BARREL WILL SIT. PLACE THE CINDER BLOCKS SO THEY ARE SLOPED SLIGHTLY DOWNWARD AWAY FROM THE HOUSE. SET THE BARREL ON THE BLOCKS. WITH A HACKSAW CUT THE DOWN SPOUT SO IT IS JUST LONG ENOUGH TO FIT INTO THE BUCKET ON TOP OF THE RAIN BARREL.

Dennis P. Williams, Mayor

CITY COUNCIL MEMBERS

The Honorable Theopalis K. Gregory, Sr.
President of City Council

The Honorable Nnamdi O. Chukwuocha
City Council Member, 1st District

The Honorable Ernest Congo II
City Council Member, 2nd District

The Honorable Darius J. Brown
City Council Member, 3rd District

The Honorable Hanifa G. N. Shabazz
City Council Member, 4th District

The Honorable Samuel Prado
City Council Member, 5th District

The Honorable Sherry Dorsey Walker
City Council Member, 6th District

The Honorable Robert A. Williams
City Council Member, 7th District

The Honorable Charles M. Freel
City Council Member, 8th District

The Honorable Michael A. Brown, Sr.
City Council Member-at-Large

The Honorable Maria D. Cabrera
City Council Member-at-Large

The Honorable Loretta Walsh
City Council Member-at-Large

The Honorable Justen A. Wright
City Council Member-at-Large

Jeffrey Starkey, Commissioner
Department of Public Works
Louis L. Redding City/County Bldg.
800 French Street
Wilmington, DE 19801-3537

Henry W. Supinski
City Treasurer

www.wilmingtonde.gov

An electronic version of this document is available at ccrwilmingtonde.com.

Una versión en español de este documento está disponible por correo, previa solicitud.

100% From well-managed forests

In accordance with Title VI of the Civil Rights Act of 1964, state and federal law, "no person or group shall be excluded from participation, denied any benefits, or subjected to discrimination on the basis of race, color, national origin, age, sex, religion, handicap, and/or disability." General complaints or inquiries should be directed to: Affirmative Action Officer (302) 576-2460, and persons with disabilities may contact 504 Coordinator (302) 576-2460, City of Wilmington, Personnel Department, 4th Floor, 800 French Street, Wilmington, Delaware 19801. TDD is available at (302) 571-4546.