

**City of Manassas**  
**2014 Water Quality Report**  
**PWS ID#: VA6685100**

**Introduction:**

The City of Manassas is pleased to present you with the 2014 Water Quality Report. We continue to be dedicated to providing our customers with the highest quality drinking water for consumption and fire protection twenty-four hours every day of the year. We are proud to report that your drinking water meets or exceeds State and Federal drinking water standards that are administered by the Virginia Department of Health (VDH). This Annual Report on Water Quality is to inform you, the customer, about the quality of your drinking water. This edition covers water quality testing completed from January through December 2014. The City is committed to providing our customers with information about their water supply, because well-informed customers are our best allies in supporting improvements necessary to maintain the highest drinking water quality standards. For more information about this report, or for any other questions related to your drinking water, please call Rebecca Abel, Compliance Officer, Water and Sewer at (703) 257-8342.

**Water Sources:**

The City of Manassas is fortunate, because we have two reliable water supply sources for our customers. The primary source is the City of Manassas Water Treatment Plant, which draws water from Lake Manassas, an impoundment on Broad Run in Western Prince William County. The watershed for Lake Manassas covers approximately 74.5 square miles, with the reservoir covering over 790 acres, and holding approximately 5.3 billion gallons of water at full capacity. The second source of water, if needed during peak consumption periods or emergencies, is water supplied from the Prince William County Service Authority (PWCSA). The water supplied to us from PWCSA is treated at Fairfax Water's Northern Treatment Facility the James J. Corbalis Plant, which withdraws water from the Potomac River. To learn more about our watershed on the Internet, go to U.S. EPA's Search Your Watershed at [www.epa.gov/surf](http://www.epa.gov/surf).

Under provisions of the Safe Drinking Water Act, states are required to develop comprehensive Source Water Assessment Programs to identify the watersheds that supply public tap water, provide an inventory of contaminants present in the watershed, and assess susceptibility to contamination in the watershed. The Virginia Department of Health (VDH) conducted a Source Water Assessment of the Lake Manassas Reservoir in 2002, and found it to be of high susceptibility to contamination using the criteria developed by the state in its approved Source Water Assessment Program. The VDH assessment report consists of maps showing the source water assessment area, an inventory of known land use activities of concern in Prince William County, and documentation of any known contamination within the five year study period. The report is available by contacting our water system representative at the phone number given at the beginning of this water quality report.

## **Water Quality and Treatment:**

The City of Manassas Water Treatment Plant's state licensed operators use multiple processes to remove microbial, organic, inorganic and particulate contaminants from our source waters during water treatment. Water treatment is the process of making potable water for human consumption and consists of a series of processes. First, raw water from Lake Manassas enters the water treatment plant, where pre-filtration chemicals are added. These pre-filtration chemicals cause the particles contained in raw water to adhere to one another, making them heavy enough to settle out in the settling basins. After settling, water is filtered through layers of anthracite, gravel, and silicate sand. As smaller suspended particles are filtered out, clear water emerges. After filtration, the water is disinfected with sodium hypochlorite, which is the primary disinfectant. It is important to the treatment process because it helps to kill harmful bacteria, viruses, and other microbial contaminants. Sufficient disinfection is needed to deter the growth of these harmful bacteria while the water is flowing through the pipes and into your home. Following disinfection, ammonia is added to stabilize the disinfectant residual, pH is adjusted, ortho-phosphate is added to prevent corrosion, and fluoride is added to prevent tooth decay. After the treatment process, the water is pumped to the water distribution system via underground piping to customers in the City of Manassas, Manassas Park and Prince William County.

## **Contaminants That Might Be in Drinking Water:**

To ensure that tap water is safe to drink, the U.S. EPA prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk. 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 can acquire naturally occurring minerals, in some cases, radioactive material; and substances resulting from the presence of animals or from human activity. Substances 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, or wildlife;

**Inorganic Contaminants**, such as salts and metals, which can be naturally occurring or may result from urban storm water 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 storm water runoff, and residential uses;

**Organic Chemical Contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and may also come from gas stations, urban storm water runoff, and septic systems;

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

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

**Health Information:**

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as individuals with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune systems disorders, and some elderly and infants, may be particularly at risk from infections. The U.S. EPA and Centers for Disease Control and Prevention (CDC) provide guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants, and are available from the Safe Drinking Water Hotline at 1 (800) 426-4791.

**Lead in Drinking Water:**

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 Manassas 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 15 to 30 seconds or until it becomes cold or reaches a steady temperature 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 at <http://www.epa.gov/safewater/lead>.

The City of Manassas has regularly been testing for lead in accordance with the EPA's Lead and Copper Rule which was established in 1991. The lead and copper results from our last testing completed in 2012 were well below the established action level. Since the waterworks has demonstrated optimal results, the City is now on a reduced monitoring schedule. The next round of lead and copper testing will be performed in 2015.

**Cryptosporidium:**

The City of Manassas monitored Lake Manassas for compliance under the U.S. Environmental Protection Agency's (EPA) Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The EPA has developed this rule to provide increased source water protection against microbial pathogens, such as Cryptosporidium. The City of Manassas completed a two-year monitoring period under LT2ESWTR in September 2008. The data collected during the 2008 period is summarized in the table below:

<b>Source (before Treatment)</b>	<b>Average Cryptosporidium Concentration (oocysts/Liter)</b>
<b>Lake Manassas</b>	<b>0.016</b>

**Table 1: 2008 Cryptosporidium Results**

Under the LT2ESWTR, the average Cryptosporidium concentration determines if additional treatment measures are needed. A Cryptosporidium concentration of 0.075 oocysts/Liter triggers additional water treatment measures. Our primary and secondary source waters Cryptosporidium concentrations are well below this threshold.

In April 2015 the City of Manassas will begin additional monitoring for compliance under EPA's Long Term 2 Enhanced Surface Water treatment rule (LT2ESWTR) round 2. This testing will be completed in April 2017.

### **Unregulated Contamination Monitoring Rule:**

Unregulated contaminants are those for which EPA has not established drinking water quality standards. Monitoring helps EPA to determine where certain contaminants occur and whether they need to be regulating those contaminants. Back in October of 2009 and ending in 2010, the City of Manassas monitored quarterly for unregulated contaminants under the Second Unregulated Contaminant Monitoring Rule (UCMR2). All of the City's results for the UCMR2 contaminants during this period were undetected. You can find a list of all the contaminants that were tested for under the UCMR2 by visiting the EPA's website at <http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/>

In April 2012 the Third Unregulated Contamination Monitoring Rule (UCMR3) was passed by the EPA. The City of Manassas monitored quarterly for UCMR3 in 2014. Detected Components for UCMR3 are summarized in the table at the end of this report. For more information on this round of sampling and what parameters were tested, please visit the EPA's website at <http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/basicinformation.cfm>

### **Contamination from Cross-Connections:**

Cross-connections are links through which contamination can flow back into the City's water system if low pressure occurs as a result of water main breaks, water main flushing, and other unusual situations. The City of Manassas has an aggressive Cross Connection and Backflow Program to ensure that these cross-connections are controlled through installation of backflow prevention devices. Your lawn irrigation system is an example of a location where plumbing may be improperly connected and susceptible to these conditions. Even a garden hose can present a cross connection. City of Manassas and Virginia Department of Health regulations require the water purveyor to take measures to prevent backflow and cross connection events, and to reduce the threats to water quality and health. Please visit the following link, <http://www.manassascity.org/index.aspx?NID=842> to learn more about this serious concern and how you can help. If you should have any questions about the City of Manassas Cross Connection and Backflow Program, please call 703-257-8204.

### **Participation:**

You are invited to participate in our Utility Commission Meetings and voice your concerns about your drinking water. The Utility Commission meets on the second

Thursday of each month, beginning at 5:30 P.M. in the large conference room at the City of Manassas Public Works Building, 8500 Public Works Drive, Manassas, Virginia 20110. If you desire to attend or have questions please contact the Utilities Department at (703) 257-8351.

### **Sampling Results:**

During the past year, we have taken hundreds of water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic or synthetic organic contaminants. **The table below shows only those contaminants that were detected in the water.** Although all of the substances listed here are under the Maximum Contaminant Level (MCL) stipulated by the U.S. EPA, we feel it is important that you know exactly what was detected and how much of the substance was present in the water. The state requires us to monitor for certain substances less than once per year due to concentrations of these substances that do not change frequently. In these cases, the most recent sample data is included, along with the year in which the sample was taken.

### **Emerging Water Quality Concerns:**

Protecting the health of our customers is of great concern to the City of Manassas. As water quality concerns rise in the public, it is our responsibility to ensure that our customers have the most up-to-date information available concerning possible contaminants in the drinking water. Some concerns to the public that have arisen in the past year are perchlorate, hexavalent chromium (chromium-6), and fluoride.

#### ***Perchlorate***

Perchlorate is a chemical that can be found naturally and is also man-made. It is used to produce rocket fuel, fireworks, flares and explosives. When ingested, scientific research indicates that the chemical perchlorate may have harmful effects on the thyroid gland, disrupting its ability to produce crucial hormones. Currently, this chemical is not regulated in drinking water systems and is therefore not required as part of our annual water quality testing. However, since 2009 the City of Manassas has been voluntarily monitoring for perchlorate and has been continuously receiving results less than the detectable limit. To find out more on perchlorate please visit the EPA's website at: <http://water.epa.gov/drink/contaminants/unregulated/perchlorate.cfm>

#### ***Chromium***

Chromium is an odorless, tasteless metallic element found naturally in the environment. Chromium is used for chrome plating, dyes and pigments, leather tanning, wood preservation and to produce steel and other alloys.

Chromium in drinking water is typically present in two forms: trivalent chromium (chromium-3) and hexavalent chromium (chromium-6). Chromium-3 is an essential human dietary nutrient and occurs naturally in many foods. Hexavalent chromium (chromium-6) is a more toxic form which can cause cancer.

Hexavalent chromium (chromium-6) is not currently regulated in drinking water by the EPA. Hexavalent chromium was tested for by the City of Manassas in 2014 as part of

The EPA's Third Unregulated Contamination Monitoring Rule (UCMR3). Results are summarized in the table below.

The City of Manassas regularly monitors for total chromium in its water (including chromium-3 and chromium-6.) The EPA maximum contaminant level (MCL) for total chromium is 0.1 mg/L. The City's annual water quality monitoring for total chromium levels have been significantly below the MCL, with readings of less than 0.005 mg/L. For more information about hexavalent chromium and its health effects please visit the EPA's website at:

<http://water.epa.gov/drink/contaminants/basicinformation/chromium.cfm>

### ***Fluoride***

Fluoride has been added to public drinking water supplies in the United States since 1945, when it was added to the drinking water supply in Grand Rapids, Michigan, as a way to combat tooth decay in children. Currently, almost three quarters of Americans receive drinking water that is fluoridated. The City adds fluoride to our water supply at a level of 0.7 mg/L, as recommended by the U.S. Public Health Service and American Dental Association as a safe, effective way to prevent tooth decay. For more information about drinking water fluoridation and its benefits, please visit the CDC's website on drinking water fluoridation at: <http://www.cdc.gov/fluoridation/index.htm>

## 2014 SUMMARY OF WATER CHARACTERISTICS FOR CUSTOMERS UTILIZING CITY OF MANASSAS FINISHED WATER

UCMR3 – Unregulated Detected Components	Water Treatment Plant			Distribution System			Use or Environmental Source
	Average	Minimum	Maximum	Average	Minimum	Maximum	
Chlorate (ppb)	298	115	387	298	117	402	Agricultural Defoliant or desiccant; used in production of chlorine dioxide; disinfection by-product.
Chromium- 6 (ppb) (or Hexavalent Chromium)	0.03	ND	0.07	0.06	0.03	0.11	Naturally occurring element; used in making steel and other alloys. Chromium -3 or -6 forms used for chrome plating, dyes, and pigments, leather tanning, and wood preservation.
Strontium (ppb)	43	40	46	43	39	46	Naturally Occurring element; historically, commercial use of strontium has been in the faceplate glass of cathode ray tube televisions to block x-ray emissions.

Components	MCL	MCLG	Level Detected	Minimum	Maximum	Violation	Major Source in Drinking Water
Fluoride (ppm)	4	4	0.66	0.59	0.76	No	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories.

Other Water Quality Components	MCL	Level Detected	Definition
Alkalinity (ppm)	N/A	38	Alkalinity is a measure of the capacity of water to neutralize acids.
Total Hardness as CaCO <sub>3</sub> (ppm)	N/A	51	Total Hardness is a measure of the amount of calcium and magnesium in the water. Hard water can cause mineral buildup in plumbing. Hardness contributes to the effectiveness of soaps and detergents. The City of Manassas' water is in the slightly hard range.

Lead and Copper Results	AL	MCLG	90th Percentile	Number of Sites Tested	Number of Sites above the Action Level	Violation	Typical Source
Copper (ppm)	1.3	1.3	0.16	33	0	No	Corrosion of household plumbing systems; erosion of natural deposits.
Lead (ppb)	15	0	ND	33	0	No	Corrosion of household plumbing systems; erosion of natural deposits.

Lead and copper results are based on testing completed in 2012. Since the 2012 lead and copper results were well below the established action level, the City of Manassas is on a reduced monitoring schedule. The next round of lead and copper testing will be performed in 2015.

Total Organic Carbon	MCL	MCLG	Quarterly Running Annual Average	Minimum	Maximum	Violation	Major Source in Drinking Water
	TT (ratio)	N/A	1.49	1.34	1.68	No	Naturally present in the environment

Total Organic Carbon has no health effects. However, it provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes and haloacetic acids. Compliance with the treatment technique(TT) reduces the formation of these disinfection byproducts. Quarterly running annual average (QRAA) refers to the monthly ratio of actual Total Organic Carbon removal versus required Total Organic Carbon removal between source and treated waters. QRAA must be greater than or equal to 1 to be in compliance.

Turbidity	MCL	MCLG	Average Annual Turbidity	Highest Single Measurement	Lowest Monthly % Samples Meeting Treatment Technique Turbidity Limit	Violation	Major Source in Drinking Water
	TT(NTU)	N/A	0.07	0.10	100%	No	Soil runoff

Turbidity levels are measured during the treatment process after the water has been filtered, but before disinfection. The turbidity level of filtered water shall be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, and shall at no time exceed 1 NTU.

Disinfectant	MRDL	MRDLG	Highest QRAA	Minimum	Maximum	Violation	Major Source in Drinking Water
Chlorine (ppm)	4	4	2.6	0.2	4.1	No	Water additive used to control microbes.
Disinfection By-Products Results	MCL	MCLG	Highest LRAA	Minimum	Maximum	Violation	Major Source in Drinking Water
Haloacetic Acids (ppb)	60	N/A	24	10	30	No	By-product of drinking water disinfection.
Trihalomethanes (ppb)	80	N/A	39	16	45	No	By-product of drinking water disinfection.

Microbiological Results	MCLG	MCL	Result (Highest % Monthly Positive)	Violation	Typical Source of Contamination
Total Coliform Bacteria	0	Positives samples not to exceed 5% of monthly total	2.22%	No	Naturally present in the environment.
Fecal Coliform Bacteria	0	MCL is exceeded when routine sample and a repeat sample are total Coliform positive, and one is also fecal positive.	0	No	Human and animal fecal wastes.

## Table Definitions:

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

**LRAA (Locational Running Annual average)** - An ongoing annual average of data for the most recent four quarters for a specific location.

**MCL (Maximum Contaminant Level)** - 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.

**MCLG (Maximum Contaminant Level Goal)** - 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.

**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 or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

**ppb (parts per billion)** - One part substance per billion parts water (or micrograms per liter).

**ppm (parts per million)** - One part substance per million parts water (or milligrams per liter).

**N/A** - Not applicable.

**NTU (Nephelometric Turbidity Units)** - Measurements of the clarity, or turbidity of water.

**QRAA (Quarterly Running Annual Average)** - An ongoing annual average of data from the most recent four quarters.

**90th Percentile** - The highest value found out of 90 percent of the samples taken.