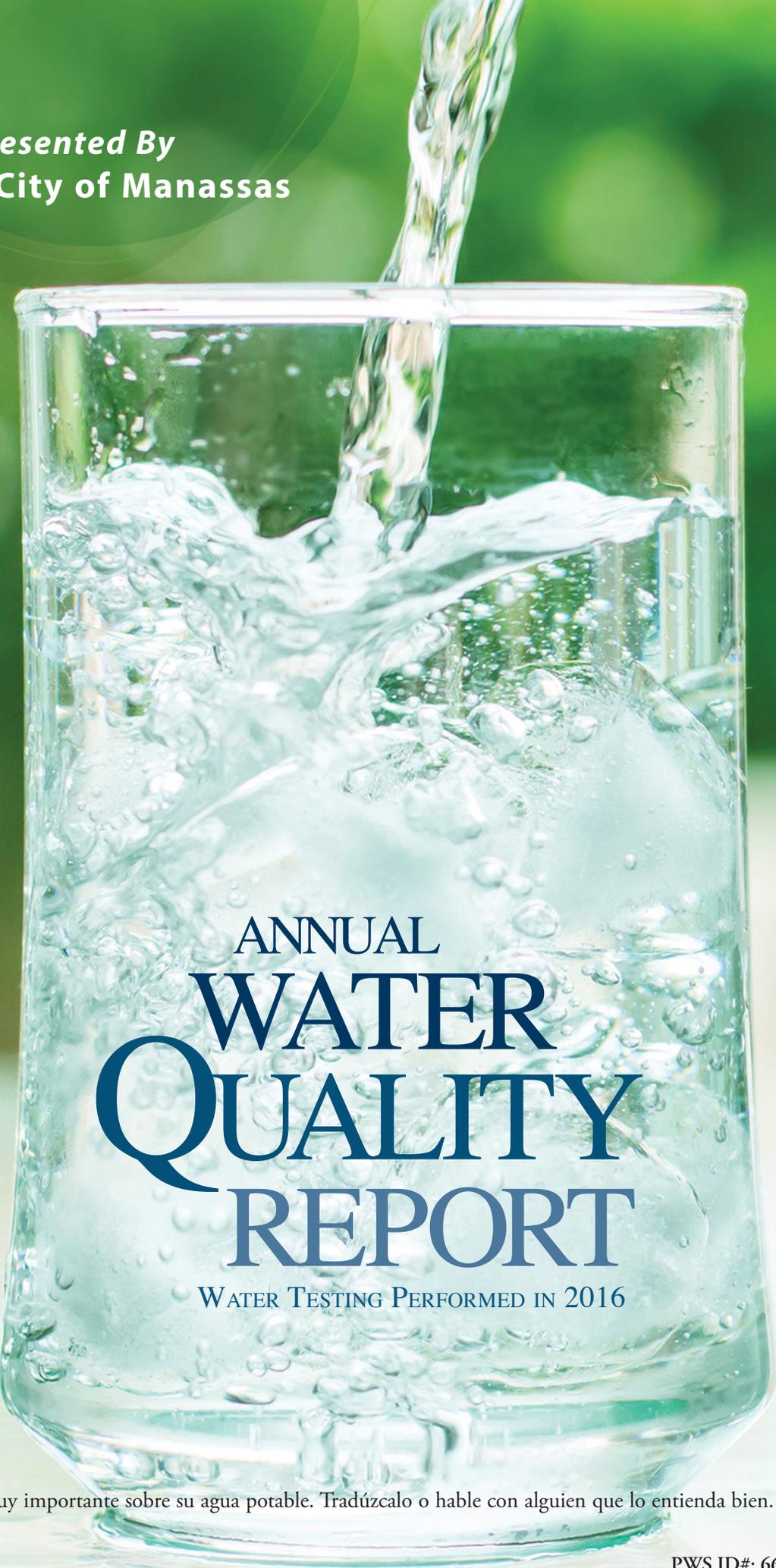




Presented By
City of Manassas



ANNUAL
**WATER
QUALITY
REPORT**

WATER TESTING PERFORMED IN 2016

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

PWS ID#: 6685100

We've Come a Long Way

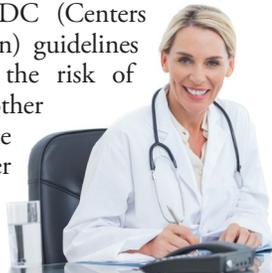
Once again, the City of Manassas is pleased to present our annual water quality report covering the period between January 1 and December 31, 2016. We are proud to report that your drinking water meets or exceeds state and federal standards. Our exceptional staff continues to work diligently twenty four hours a day, every day of the year, to deliver the highest-quality drinking water without interruption. We continually strive to adopt new methods for providing the best-quality drinking water to your homes and businesses. We are committed to the goals of source water protection, water conservation, and community education, while continuing to serve the needs of all of our customers. The City of Manassas remains dedicated to providing the highest-quality drinking water to you and your family.

Community 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, VA. If you would like to attend or have any questions, please contact the Utilities Department at (703) 257-8351.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or at <http://water.epa.gov/drink/hotline>.



Where Does My Water Come From?

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 online, go to the U.S. EPA's Search Your Watershed at www.epa.gov/surf.

Substances That Could Be in 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. U.S. Food and Drug Administration 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 dissolves 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.

Lead in Home Plumbing

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. We are 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 or at www.epa.gov/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. Because the City has demonstrated optimal results, we have been on a reduced monitoring schedule since 2012. The last set of lead and copper testing was performed in 2015 with outstanding results (see the Sampling Results table for more information). The next round of lead and copper testing will be performed in 2018.

Testing for Cryptosporidium

Cryptosporidium is a microbial parasite naturally found in surface water throughout the U.S. Although filtration removes Cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Monitoring of source water indicates the presence of these organisms. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease.

Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immunocompromised people are at greater risk of developing life-threatening illness. We encourage immunocompromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

In April 2015, the City of Manassas began additional monitoring for compliance under the U.S. EPA's Long Term 2 Enhanced Surface Water treatment rule (LT2ESWTR) Round 2. The EPA has developed this rule to provide increased source water protection against microbial pathogens, such as Cryptosporidium.

Under the LT2ESWTR Round 2, the average Cryptosporidium concentration determines if additional treatment measures are needed. A Cryptosporidium concentration of 0.075 oocysts/Liter triggers additional water treatment measures. The City of Manassas's source waters Cryptosporidium concentrations are well below this threshold. The results for 2016 are as follows:

The Lake Manassas Average Cryptosporidium concentration for 2016 was 0.042 (oocysts/Liter).



Benefits of Chlorination

Disinfection is one of the most important steps in drinking water treatment. Chlorination is the most common method of water disinfection in North America.

Before communities in the U.S. began treating drinking water with chlorine (starting with Chicago and Jersey City in 1908), thousands of people died each year due to illnesses from drinking water contamination. Drinking water chlorination and filtration have helped to virtually eliminate these diseases in the U.S. Significant strides in public health are directly linked to the adoption of drinking water chlorination. In fact, the filtration of drinking water plus the use of chlorine is probably the most significant public health advancement in human history.

How Chlorination Works:

- Elimination of many disease-causing microorganisms in drinking water.
- Reduction of many disagreeable tastes and odors.
- Biological growth elimination of slime bacteria, molds, and algae that can grow in water supply system.
- Chemical removal of hydrogen sulfide (which has a rotten egg odor), ammonia, and other nitrogenous compounds that have unpleasant tastes and hinder disinfection. It also helps to remove iron and manganese from raw water.



QUESTIONS?

For more information about this report, or for any questions relating to your drinking water, please call Rebecca Abel, Water Department Compliance Officer, at (703) 257-8342.

Source Water Assessment

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 Rebecca Abel, Water Department Compliance Officer, at (703) 257-8342. Another source water assessment will be conducted in the near future.

Spring Hydrant Flushing and Chlorine Change

Every spring, from early April to late June, the city of Manassas performs hydrant flushing and changes the type of chlorine disinfectant used. Distribution mains deliver water to homes, businesses, and hydrants in your neighborhood. Water main flushing is the process of cleaning the interior of water distribution mains by flushing hydrants and sending a rapid flow of water through the mains. During this time, the type of chlorine used is changed from chloramines to free chlorine. Free chlorine is a more aggressive disinfectant, and this temporary change in the water treatment process prevents bacteria from developing resistances to the usual disinfection treatment process. Flushing helps ensure that fresh, high-quality drinking water is always present.

Some customers may notice a slight chemical smell similar to that of water in a swimming pool. Each individual has his or her own sensitivity level to the taste and/or odor of free chlorine. Many detect no difference.

Flushing maintains water quality in several ways. Flushing removes sediments such as iron and manganese, which can affect the taste, clarity, and color of the water. Flushing helps remove stale water and ensures the presence of fresh water with sufficient dissolved oxygen, disinfectant levels, and an acceptable taste and smell.

Our number-one priority is providing safe drinking water for the citizens of and visitors to Manassas. Both free chlorine and chloramines are safe and effective. The Virginia Department of Health publishes guidelines on minimum and maximum concentrations for disinfectants in drinking water. The City of Manassas maintains the water it distributes within those guidelines. The water provided is safe for drinking, for cooking and bathing, watering the garden, and for all other common uses. For water that is used for certain special purposes, such as the kidney dialysis process, the preparation of water for fish tanks and ponds, and for business requiring highly processed water, precautions must be taken to remove or neutralize the chloramines and free chlorine.

The water main flushing schedule is posted on the City's website each year. Please contact us at (703) 257-8380 if you have any questions.

Water Treatment Process

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 producing pure, clean, high-quality drinking water from the source water. First, raw water from Lake Manassas enters the water treatment plant, where prefiltration chemicals are added. These prefiltration chemicals cause the particles contained in raw water to adhere to one another, making them heavy enough to settle out in the settling basins and be removed. 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, chlorine is added as a disinfectant to protect against any bacteria that may still be present. Chlorination is needed to deter the growth of bacteria while the water is flowing through the pipes and into your home. We carefully monitor the amount of chlorine, adding the lowest quantity necessary to protect the safety of your water without compromising taste. Following chlorination, ammonia is added to stabilize the chlorine, pH is adjusted, orthophosphate 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.

The City of Manassas Water Plant is proud to have won the Silver Award for "Water Treatment Plant Performance for Excellence in Filtration and Clarification" for the past three years in a row from the Virginia Department of Health, Office of Drinking Water. The Water Plant also received the Water Fluoridation Quality award from the U.S. Centers for Disease Control and Prevention, Division of Oral Health.

Test Results

Our water is monitored for a wide variety of components on a strict sampling schedule. The information below represents only those substances that were detected; our goal is to keep all detects below their respective maximum allowed levels. The State recommends monitoring for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES

| SUBSTANCE (UNIT OF MEASURE) | YEAR SAMPLED | MCL [MRDL] | MCLG [MRDLG] | AMOUNT DETECTED | RANGE LOW-HIGH | VIOLATION | TYPICAL SOURCE |
|---|--------------|---|--------------|---|----------------|-----------|--|
| Chlorine (ppm) | 2016 | [4] | [4] | Highest QRAA 2.9 | 0.3–3.8 | No | Water additive used to control microbes |
| Fluoride (ppm) | 2016 | 4 | 4 | Annual Average 0.74 | 0.70–0.77 | No | Water additive which promotes strong teeth |
| Haloacetic Acids [HAA] (ppb) | 2016 | 60 | NA | Highest LRAA 25 | 15–26 | No | By-product of drinking water disinfection |
| TTHMs [Total Trihalomethanes] (ppb) | 2016 | 80 | NA | Highest LRAA 39 | 19–54 | No | By-product of drinking water disinfection |
| Total Coliform Bacteria ¹ (% positive samples) | 2016 | Positive samples not to exceed 5% monthly total | 0 | Highest % Monthly Positive 2.22 | NA | No | Naturally present in the environment |
| Total Organic Carbon ² (TOC) | 2016 | TT | NA | NA | NA | No | Naturally present in the environment |
| Turbidity (NTU) | 2016 | TT | NA | Highest Reading=0.098 Annual Average=0.066 | 0.044–0.098 | No | Soil runoff |
| Turbidity (lowest monthly percent of samples meeting limit) | 2016 | TT = 95% of samples meet the limit | NA | 100 | NA | No | Soil runoff |

Tap Water Samples Collected for Lead and Copper Analyses from Sample Sites throughout the Community³

| SUBSTANCE (UNIT OF MEASURE) | YEAR SAMPLED | AL | MCLG | AMOUNT DETECTED (90TH% TILE) | SITES ABOVE AL/TOTAL SITES | VIOLATION | TYPICAL SOURCE |
|-----------------------------|--------------|-----|------|------------------------------|----------------------------|-----------|---|
| Copper (ppm) | 2015 | 1.3 | 1.3 | 0.123 | 0/30 | No | Corrosion of household plumbing systems |
| Lead (ppb) | 2015 | 15 | 0 | 0.51 | 0/30 | No | Corrosion of household plumbing systems |

OTHER SUBSTANCES

| SUBSTANCE (UNIT OF MEASURE) | YEAR SAMPLED | AMOUNT DETECTED | RANGE LOW-HIGH | TYPICAL SOURCE |
|-----------------------------|--------------|-----------------|----------------|---|
| Alkalinity (ppm) | 2016 | 42 | NA | Alkalinity is a measure of the capacity of water to neutralize acids |
| Conductivity (µS/cm) | 2016 | 247 | NA | Conductivity (or specific conductance) is a measure of the water's ability to conduct an electric current; is related to the number of ions in the water (water with higher conductivity contains more ions) |
| Total Hardness (ppm) | 2016 | 52 | NA | Total hardness is a measure of the amount of calcium and magnesium in the water and can cause mineral buildup in plumbing. Hardness contributes to the effectiveness of soaps and detergents (The City of Manassas's water is in the slightly hard range) |

¹ Immediate resampling confirmed Total Coliform absence in the distribution system.

² TOC removal ratio is a calculation of the monthly ratio of actual TOC removal versus the required TOC removal between source and treated waters.

³ Lead and copper results are based on testing completed in 2015. The next round of testing will be performed in 2018.

Definitions

µS/cm (microsiemens per centimeter): A unit expressing the amount of electrical conductivity of a solution.

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): The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters. Amount Detected values for TTHMs and HAAs are reported as LRAAs.

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 contaminants.

NA: Not applicable.

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

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).

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

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.