

2017 ANNUAL DRINKING WATER QUALITY REPORT

CITY OF GLOUCESTER - MASSDEP PWS ID # 3107000
SEFATIA ROMEO THEKEN, MAYOR
MICHAEL HALE, DIRECTOR OF PUBLIC WORKS

This report is a snapshot of drinking water quality that the Department of Public Works provided last year. In 2017 there were no state or federal drinking water violations. Included are details about where your water comes from, what it contains, and how it compares to state and federal standards. We are committed to providing you with information as informed customers are our best allies.

1. PUBLIC WATER SYSTEM INFORMATION

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GLOUCESTER PUBLIC WATER SYSTEM

Our water system is routinely inspected by the Massachusetts Department of Environmental Protection (MassDEP). MassDEP inspects our system for its technical, financial, and managerial capacity to provide safe drinking water to you. To ensure that we provide the highest quality of water available, your water system is operated by Massachusetts certified operators who oversee the routine operation of our systems.

The Gloucester Public Water System consists of the following:

- East Gloucester System: Babson Water Treatment Plant; Babson & Goose Cove Reservoirs; and Klondike Water Treatment Plant & Reservoir (provides a lesser supplemental water supply).
- West Gloucester System: West Gloucester Water Treatment Plant; Dykes, Haskell, and Wallace Reservoirs; and Wallace & Haskell Pump Stations transfer water to Dykes Reservoir.
- Distribution System: 125 miles of water main with the majority older unlined cast iron pipe; Water Storage Facilities at Bond Hill Tank 6 million gallon (MG), Plum Cove Tank 0.75 MG, and Blackburn Tank 0.6 MG (supplies the high service area fed from the Fuller Pump Station).

Neither the East (island side) nor the West Gloucester systems have the capacity alone to supply the city's water needs continuously, thus we alternate operation between the Babson and West Gloucester plants. The operation of the water treatment plants, pump stations, and distribution system sampling is performed by Veolia Water North America (Veolia), the city's contract operator since November 1, 2009, under the supervision of the Environmental Engineer. The Department of Public Works (DPW) operates the distribution system under the supervision of the DPW Operations Manager – Joe Lucido, the Environmental Engineer, and the Director.

Since 2009, the city has performed numerous Public Water System improvements as a part of MassDEP's Drinking Water State Revolving Fund (DWSRF) program with low interest loans, and other state and federal grants & low interest loans. These improvements have been at water treatment plants, pumping stations, water storage facilities, the Babson & Haskell water supply dams, and key water mains. With proper maintenance and plans for smaller scale improvements, a distribution system pipeline upgrade program, emergency preparations, and guidance from the Public Water System Master Plan, Gloucester has a sustainable water future road map.

OPPORTUNITIES FOR PUBLIC PARTICIPATION

Questions can ask by contacting the Office of Water Compliance by phone, fax, e-mail, or using the citizen request on the city's website <http://gloucester-ma.gov/>. The Water Compliance Office is partnering with Police, Fire, and Community Development Departments as well as the Open Space Committee, Dogtown Advisory Committee and numerous user groups and landowners in the city towards overall protection & management of city and private watershed and open spaces. If you are interested in helping safeguard your water supply and forest cover, contact us at 978-325-5680.

2. YOUR DRINKING WATER SOURCE

WHERE DOES MY DRINKING WATER COME FROM? Your water is provided by the following sources:

Source Name	Source ID#	Source Type	Location of Source
Babson Reservoir	3107000-01S	Surface Water	Russell Avenue (Easter Gloucester)
Goose Cove Reservoir	3107000-07S	Surface Water	Goose Cove (East Gloucester)
Dykes Reservoir	3107000-04S	Surface Water	Laurel Lane (West Gloucester)
Haskell Reservoir	3107000-02S	Surface Water	Forest Lane (West Gloucester)
Wallace Reservoir	3107000-03S	Surface Water	Magnolia Avenue (West Gloucester)
Klondike Reservoir	3107000-05S	Surface Water	Quarry Street (East Gloucester)

IS MY WATER TREATED? **Yes:** Our water system provides you with safe and adequate supply of drinking water. To improve the quality of the water delivered to you, we treat it to remove iron, manganese, organic matter, fine particles, algae, protozoa, viruses, and bacteria. Reservoir water is treated at the Babson, West Gloucester, and Klondike Water Treatment Plants (WTPs) before being pumped to the distribution system, storage facilities, and to you. Originally constructed circa 1970, Babson and West Gloucester WTPs have had significant modernization improvements that began in 2009, and these plants alternate operation on six month intervals from the islands side and West Gloucester reservoirs, respectively. The Klondike WTP in Lanesville was constructed in 2007 and provides a supplemental water supply for peak summer demand and emergencies. Page 4 provides water treatment process flow diagrams for each plant and after that is a written description of the water treatment process for Babson and West Gloucester WTPs. The Klondike WTP has a similar treatment process as detailed in its process flow diagram.

Water Treatment Process at Babson & West Gloucester:

Raw Water Supply to the Water Treatment Plants:

- o Raw Water Intake: At Babson gravity flow and low lift pumps and West Gloucester gravity flow is used to bring water into the plants.

Pretreatment: The following processes are used to remove iron, manganese, organic matter, fine particles, algae, protozoa, viruses, and bacteria from source waters

- o **Iron & Manganese Oxidization & Removal:** Sodium Hydroxide and Potassium Permanganate are added before raw water enters the plants to optimize removal in the sedimentation tanks
- o **Rapid Mix Coagulation:** Chemicals added to clump fine particles into larger floc particles
 - Polyaluminum Chloride (PACl): Positive charges used to collect negatively charged fines
 - Polymer: Used to bind smaller particles into larger settleable floc (Babson only)
- o **Flocculation:** Gentle mixing for creation of larger floc particles (an aggregation of suspended particles)
- o **Sedimentation:** Settling, collection, and removal of floc particles
 - Large tanks slow the water velocity down allowing floc particles (sludge) to settle out
 - Flights connected by chains are used to scrape sludge that is discharged to the sanitary sewer

Pre-filter Chlorination: Sodium Hypochlorite is added for additional iron & manganese removal

Filtration: Sand beds are used to filter out any remaining particles and clarify water

- o Filter backwashing is used to clean out accumulated particles in the filters that are discharged to a sludge lagoon at Babson and to the sanitary sewer at West Gloucester

Water Treatment: Post filter water enters the clearwell tank and the following chemicals are added:

- o Disinfection: Sodium Hypochlorite is added to kill micro-organisms
- o Fluoride: Sodium Fluoride is added for oral health
- o Corrosion Control: Sodium Hydroxide is added for pH Adjustment to a target pH of 8; Sodium Bicarbonate is added for alkalinity to buffer pH making the water more stable and less susceptible to

pH changes in the distribution system; and Orthophosphate is added that creates a very thin coating on the walls of distribution pipes and house plumbing that protects the metal in the pipes from corrosion

High Lift Water Pumps & Flow Meter: Water is pumped and metered into the distribution system

Secondary Distribution System Disinfectant: After the high lift water pumps and before exiting the plant

- o Secondary distribution system disinfection: Dilute Ammonia Sulfate is added as water is leaving all plants to create monochloramine, a long lasting disinfectant that produce less disinfection by products. A routine switch back to chlorine alone distribution system disinfectant may be necessary especially each fall as system demand drops and water temperatures remain elevated through October. This was especially an issue with elevated reservoir water temperatures that were experienced in 2012. In the fall of 2013 this switch to chlorine occurred for approximately one month and then back to monochloramine.

Treated Water: Pumped from Water Treatment Plants to distribution system

The water quality of our system is constantly monitored by the DPW, the DPW Environmental Engineer, the contract operator Veolia, and MassDEP at the water treatment plants and in the distribution system to determine the effectiveness of existing water treatment and to determine if any additional treatment or actions are required.

HOW ARE THESE SOURCES PROTECTED?

MassDEP has prepared a Source Water Assessment Program (SWAP) Report for the water supply sources serving this water system. The complete SWAP report is available at the Office of Water Compliance located at 50 Essex Avenue Gloucester, MA and online at <http://www.mass.gov/dep/water/drinking/3107000.pdf>. For more information, call 978-325-5680. The SWAP Report assesses the susceptibility of public water supplies. Drinking water may be threatened by many potential contaminant sources including storm runoff, road salting, animal wastes, and improper disposal of hazardous materials. The city is also updating and the 2005 Surface Water Supply Protection Plan to protect reservoirs & watersheds.

WHAT CAN BE DONE TO IMPROVE PROTECTION?

- Review railroad right of way yearly operating plans and maintaining contact with the railroad
- Keeping prohibited activities out of the watersheds to minimize potential waste impact to the reservoirs
- Stay active in the watershed and address potential waste impacts
- Practicing good septic system maintenance & limit pesticide and fertilizer use
- Supporting water supply protection initiatives by citizen user groups and at city council meetings
- Taking hazardous household chemicals to hazardous materials collection days

3. SUBSTANCES FOUND IN TAP WATER

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. Contaminants that may be present in source water include:

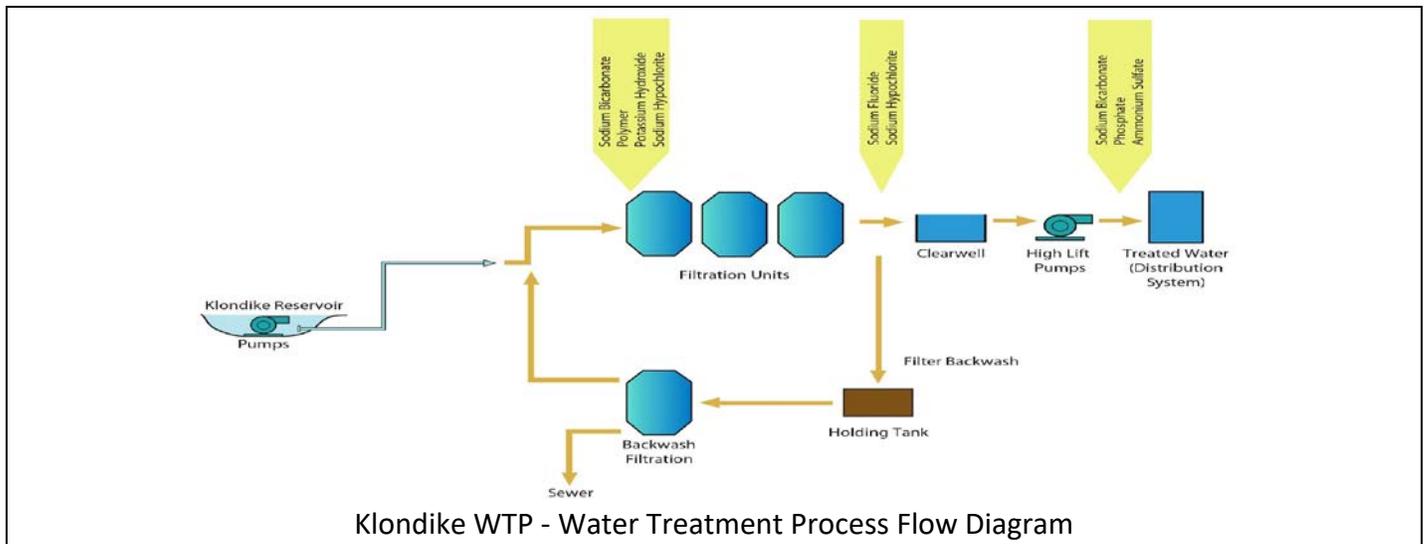
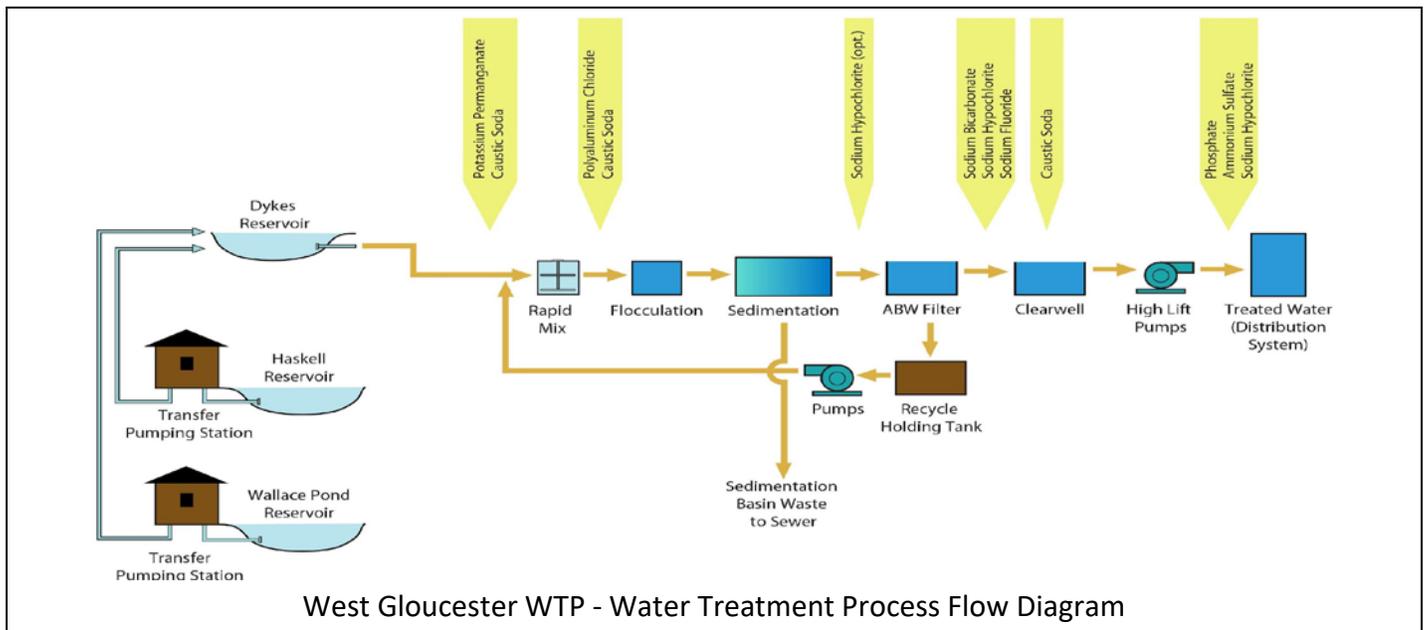
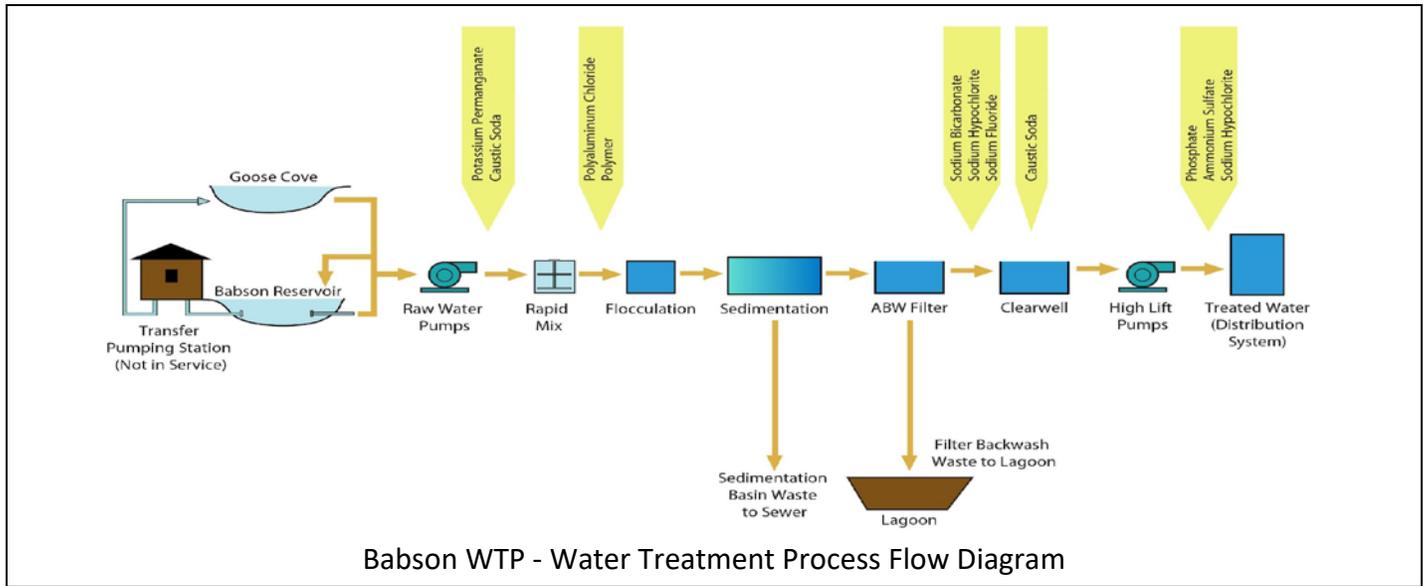
Microbial contaminants -such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants -such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, and 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 be naturally occurring or be the result of oil and gas production and mining activities.



3. SUBSTANCES FOUND IN TAP WATER (Continued)

In order to ensure that tap water is safe to drink, MassDEP and U.S. Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA’s Safe Drinking Water Hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised 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 some infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control guidelines on lowering the risk of infection by microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

4. IMPORTANT DEFINITIONS

Maximum Contaminant Level (MCL) – 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.

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

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

Maximum Residual Disinfectant Level Goal (MRDLG) -- The level of a drinking water disinfectant (chlorine, chloramines, chlorine dioxide) below which there is no known of expected risk to health.

MRDLG’s do not reflect the benefits of the use of disinfectants to control microbial contaminants.

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

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

90th Percentile – Out of every 10 homes sampled, 9 were at or below this level.

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

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

ppt = parts per trillion, or nanograms per liter

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

NTU = Nephelometric Turbidity Units

ND = Not Detected

N/A = Not Applicable

mrem/year = milliremms per year (a measure of radiation absorbed by the body)

Secondary Maximum Contaminant Level (SMCL) – These standards are developed to protect the aesthetic qualities of drinking water and are not health based.

5. WATER QUALITY TESTING RESULTS

WHAT DOES THIS DATA REPRESENT?

The water quality information presented in the following tables is from the most recent round of testing, performed in accordance with the regulations. All data shown was collected during the last calendar year unless otherwise noted in the tables. MassDEP has reduced the monitoring requirements for inorganic contaminants at Babson and synthetic organic contaminants because the source is not at risk of contamination.

	Date(s) Collected	90 TH percentile	Action Level	MCLG	# of sites sampled	# of sites above Action Level	Possible Source of Contamination
Lead* (ppb)	9/2017	3.3	15	0	33	1	Corrosion of household plumbing systems
Copper* (ppm)	9/2017	0.060	1.3	1.3	33	0	Corrosion of household plumbing systems

*Analysis is required every three years by MassDEP and next again in 2020.

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	Highest % Positive in a month	Total # Positive	MCL	MCLG	Violation (Y/N)	Possible Source of Contamination
Total Coliform	0	0	>5%	0	N	Naturally present in the environment
Fecal Coliform or <i>E.coli</i>	-----	0	*	0	N	Human and animal fecal waste

* Compliance with the fecal coliform/*E.coli* MCL is determined upon additional repeat testing. This is the second year in a row that no Total Coliform or *E. Coli* Bacteria were detected in the distribution system.

Turbidity	TT	Lowest Monthly % of Samples	Highest Detected Daily Value	Violation (Y/N)	Possible Source of Contamination
Daily Compliance (NTU)	1	-----	0.113	N	Soil runoff
Monthly Compliance*	At least 95%	100%	-----	N	

Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of water quality.

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

Regulated Contaminant	Date(s) Collected	Highest Result or Highest Running Average Detected	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation (Y/N)	Possible Source(s) of Contamination
Inorganic Contaminants: Note W = West Gloucester WTP/Dykes Reservoir, B Babson WTP/Babson Reservoir, and K = Klondike WTP/Klondike Reservoir							
Barium (ppm)	2/22B, 7/17WG, 9/21K	0.016	0.011 - 0.016	2	2	N	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Fluoride (ppm) ■	2/22B, 7/17WG, 9/21K	0.69	0.20 - 0.69	4	4	N	Added for oral health at WTPs, naturally from erosion of natural deposits
Sodium (ppm)	2/22B, 7/17WG, 9/21K	44	23.0 - 48.0	----	20	N	Natural sources; runoff from use as salt on roadways; by-product of treatment process

Radioactive Contaminants							
Regulated Contaminant	Date(s) Collected	Highest Result or Highest Running Average Detected	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation (Y/N)	Possible Source(s) of Contamination
Gross Alpha (pCi/l) (minus uranium)	3/6/14 B 9/23/14 W 9/30/14 K	1.95	0.05-1.95	15	0	N	Erosion of natural deposits
GrossBeta/photon emmitters (pCi/L) ▲	6/21/07 9/24/07 12/14/07	Not Detected	<0.2-5.1	50	0	N	Decay of natural and man-made deposits
Radium 226 & 228 (pCi/L) (combined values)	3/10/11 B	0.55	0.55	5	0	N	Erosion of natural deposits
Radium 226 & 228 (pCi/L) (combined values)	10/15/15K	0.94	0.94	5	0	N	Erosion of natural deposits
Radium 226 & 228 (pCi/L) (combined values)	8/1/17WG	1.01	1.01	5	0	N	Erosion of natural deposits

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Disinfectants and Disinfection By-Products							
Regulated Contaminant	Date(s) Collected	Highest Result or Highest Running Average Detected	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation (Y/N)	Possible Source(s) of Contamination
Total Trihalomethanes (TTHMs) (ppb)	Quarterly	42.0	19.9 – 42.0	80	----	N	Byproduct of drinking water chlorination
Haloacetic Acids (HAA5) (ppb)	Quarterly	38.7	13.8 – 35.4	60	----	N	Byproduct of drinking water disinfection
Chlorine (ppm) (total)	Monthly in (year)	2.1	1.0 – 2.1	4	4	N	Water additive used to control microbes

■ Fluoride also has a secondary contaminant level (SMCL) of 2 ppm.

▲ The MCL for beta particles is 4 mrem/year. EPA considers 50 pCi/L to be the level of concern for beta particles.

Unregulated contaminants are those for which there are no established drinking water standards. The purpose of unregulated contaminant monitoring is to assist regulatory agencies in determining their occurrence in drinking water and whether future regulation is warranted.

Other Organic Contaminants - When detected at treatment plant as VOC residuals, not TTHM compliance						
Contaminant	Date(s) Collected	Average Detected	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation (Y/N)
Bromodichloromethane (ppb)	12/26/17B, 7/17/17WG 9/21/17K	5.3	4.5 – 6.9	---	---	By-product of drinking water chlorination
Chloroform (ppb)	12/26/17B, 7/17/17WG 9/21/17K	11	4.9-16.9	---	---	By-product of drinking water chlorination
Chlorodibromomethene (ppb)	12/26/17B, 7/17/17WG 9/21/17K	1.8	1.4-2.0			
Chlorate (ppb)	7/21/16W, 10/13/16K, 11/18/16B	1640.48	223.34-1640.48	---	---	By-product of drinking water chlorination

6. COMPLIANCE WITH DRINKING WATER REGULATIONS

DOES MY DRINKING WATER MEET CURRENT HEALTH STANDARDS? Yes: We are committed to providing you with the best water quality available.

DRINKING WATER VIOLATIONS

In 2017 there were no state or federal drinking water violations or coliform bacteria water system detections.

Compliance is indicative of the Public Water System improvements made since 2009 that have been made through the efforts of Mayor Romeo Theken, previous Administrations, the City Council, Michael Hale DPW Director, Lawrence Durkin DPW Environmental Engineer, Contract Operator Veolia Water, Engineering Consultants, and MassDEP.

7. EDUCATIONAL INFORMATON

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contamination. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791) or at: <https://www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-hotline>

DO I NEED TO BE CONCERNED ABOUT CERTAIN CONTAMINANTS DETECTED IN MY WATER?

Lead is not contained in the water provided by the city; however, it can leach from household and business water lines and plumbing fixtures. 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 Gloucester DPW Water Department 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 or at <http://www.epa.gov/safewater/lead> or MassDEP at <https://www.mass.gov/lists/lead-in-drinking-water>

Sodium sensitive individuals, such as those experiencing hypertension, kidney failure, or congestive heart failure, should be aware of the sodium levels where exposures are being carefully controlled. Sodium levels are elevated and come from natural sources; runoff from use as salt on roadways; by-product of treatment processes.

Chlorate: EPA's Third Unregulated Contaminant Monitoring Rule (UCMR3) required all public water systems (PWS) serving more than 10,000 persons to conduct assessment monitoring in their drinking water sources for 21 chemical contaminants, including chlorate. Chlorate is an inorganic compound that is a known byproduct of the drinking water disinfection process, forming when sodium hypochlorite (chlorine) is used in the disinfection process. MassDEP has issued a "Best Management Practices (BMPs) for the Control of Chlorate" (<https://www.mass.gov/files/documents/2018/01/23/chloratebmp.pdf>) which is largely concerned with keeping the chlorine as fresh as possible used for drinking water disinfection. The City has adopted the MassDEP BMPs and submitted a plan to MassDEP. The City will perform follow up voluntary Chlorate testing in 2018