

MY CITY

MY WATER

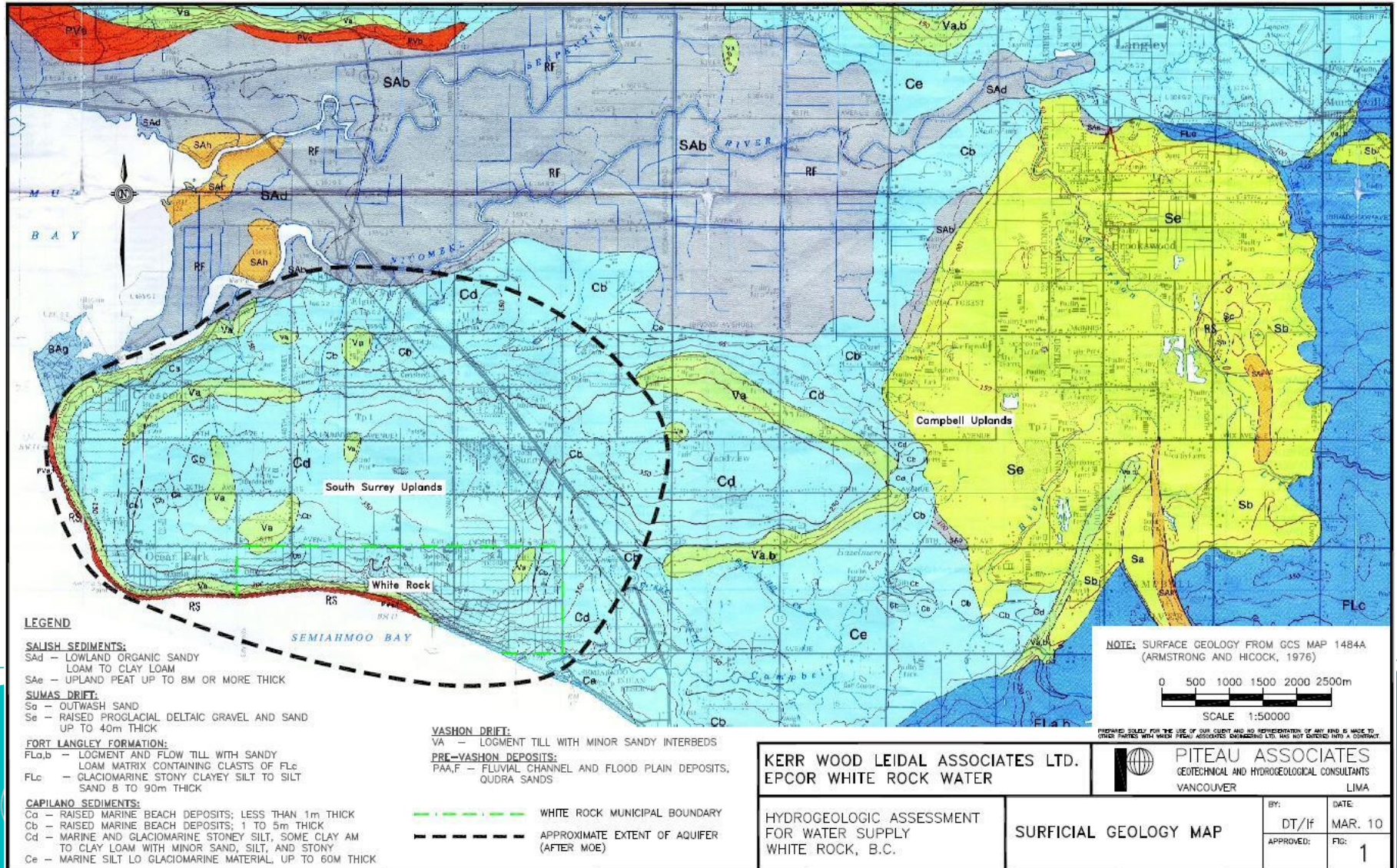
Water Quality Open House

Wednesday, December 7, 2016



Sunnyside Uplands Aquifer

Where our Water Supply Originates



Water Quality - Timeline

December 2016

- Water Quality Open House, December 7
- Continue ongoing work with:
 - ❖ RES'EAU-WaterNET
 - ❖ Annual Water Main Flushing Program
 - ❖ Chlorination of the distribution system

February 2017

- Continue ongoing work with:
 - ❖ RES'EAU-WaterNET

January 2017

- Completion of:
 - ❖ Water Main Flushing Program
 - ❖ Construction of Merklin Reservoir and pumping station
 - ❖ Chlorination of the distribution system
- Continue ongoing work with:
 - ❖ RES'EAU-WaterNET

March 2017

- Continue ongoing work with:
 - ❖ RES'EAU-WaterNET
- Open House on World Water Day



City of White Rock's Total Water Quality Management Project

1. Disinfection of distribution system

- IN PROGRESS - Fraser Health requires City to provide secondary disinfection by February 1, 2017

2. Increase storage capacity at Oxford and Merklin Sites to 6.05 million litres

- ✓ COMPLETED - The Oxford Site
- ✓ COMPLETED - Seismic upgrade at Merklin site/ removal of existing water tower
- IN PROGRESS – Construction of Merklin reservoir and pumping stations by January 2017
- IN PROGRESS - Additional supply to meet future demand in 2031

3. Arsenic removal if limit exceeds the Guideline for Canadian Drinking Water Quality (GCDWQ)

- Arsenic concentrations are within current limits which is 0.010 mg/L as set by Health Canada
- By December 31, 2018 Fraser Health requires City to provide treatment, if arsenic levels increase above existing levels

4. Manganese removal if GCDWQ establishes a limit for health effects in the future

- Currently GCDWQ only has an aesthetic limit which is 0.05 mg/L as set by Health Canada

DISINFECTION

Primary Disinfection

Primary Disinfection is a process or a series of processes intended to inactivate human pathogens such as viruses, bacteria and protozoa, potentially present in influent water before the water is delivered to the first consumer.

The entire process of primary disinfection must be completed within the water treatment plant, which may include a dedicated part of the piping upstream of the first consumer connection.

Chemical Disinfection

The selection of an appropriate disinfection process depends upon site-specific conditions and raw water characterization that is unique to each drinking-water system.

Process selection decisions must consider and balance the need to inactivate pathogens while minimizing the production of disinfection by-products .

Chlorination

Chlorination is the application of chlorine to water to produce a free chlorine residual (directly or through oxidation of any naturally present ammonia and/or other nitrogenous substances).

Free chlorine, in the form of hypochlorous acid, is considered a powerful disinfectant that is effective against a very broad range of pathogens.

SECONDARY DISINFECTION

The maintenance of a disinfectant residual in the distribution system (secondary disinfection) is intended to maintain (or introduce and maintain) a persistent disinfectant residual to protect the water from microbiological re-contamination, reduce bacterial re-growth, control biofilm formation, and serve as an indicator of distribution system integrity (loss of disinfectant residual indicating that the system integrity has been compromised).

DISINFECTANT RESIDUAL MAINTENANCE

- Only chlorine, chlorine dioxide and monochloramine provide a persistent disinfectant residual and can be used for the maintenance of a residual in the distribution system
- Chlorine is the most common Secondary Disinfectant world wide
 - ❖ Council approved the use of chlorine as a secondary disinfectant
- Ozone and UV are used during the water treatment processes only
- On October 4, 2016, City Staff began the phased approach towards full chlorination of the Oxford site, as mandated by the Fraser Health Authority
 - ❖ Chlorination must be completed by February 01, 2017
- Staff continue to sample and monitor the City's water quality. They will adjust the dosage over the next several months, in accordance with the Guidelines for Canadian Drinking Water Quality (GCDWQ)

PERMIT TO OPERATE

A Drinking Water System with
301-10000 Connections

Water Supplier: City of White Rock Water System
Facility Name: City of White Rock WS

**Chlorination as
mandated by the
Fraser Health
Authority**

Conditions of Permit

1. On or before February 1, 2017, the drinking water that you provide must be treated to provide an acceptable secondary disinfectant to the whole system that meets the requirements of the Guidelines for Canadian Drinking Water Quality and acceptable to Fraser Health Authority. As an interim measure, the addition of chlorine at wells #6 and #7 must continue until the above work has been completed in 2016.
2. Should arsenic levels exceed the Guidelines for Canadian Drinking Water Quality, the City must start operating a treatment system on or before December 31, 2018 to lower the arsenic level below the Guideline limit and to as low as reasonably achievable. Treatment requirements will be based on the results of the "Sampling and Reporting Protocol for the City of White Rock Water System, October 29, 2015."
3. Should the Guidelines for Canadian Drinking Water Quality deem manganese a health criteria, a treatment system must be operational one year after the date of the changes to the Guideline limits.
4. A written update on the status of your plan to meet these conditions shall be submitted to Fraser Health Authority by March 31st of each calendar year.

The Impact of Manganese

AN AESTHETIC OBJECTIVE ONLY

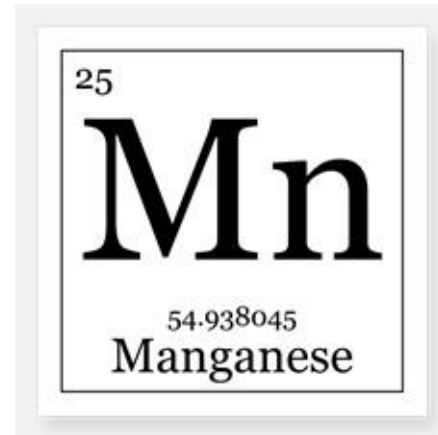
Manganese is an element that can be found in over 100 common salts, rocks and in the soils found on the floors of lakes and oceans. The aesthetic objective for manganese is 0.05 mg/L in the Guidelines for Canadian Drinking Water Quality set by Health Canada. There is currently no maximum allowable limit.

- Manganese is among the least toxic elements; only exposure to extremely high concentrations from human-made sources has resulted in adverse human health effects
- At levels exceeding 0.15 mg/L, manganese can stain plumbing fixtures and laundry and may cause an undesirable taste in beverages
- It is difficult to remove manganese to achieve concentrations below 0.05 mg/L. Therefore, for aesthetic purposes, the aesthetic guideline limit for manganese in drinking water is 0.05 mg/L

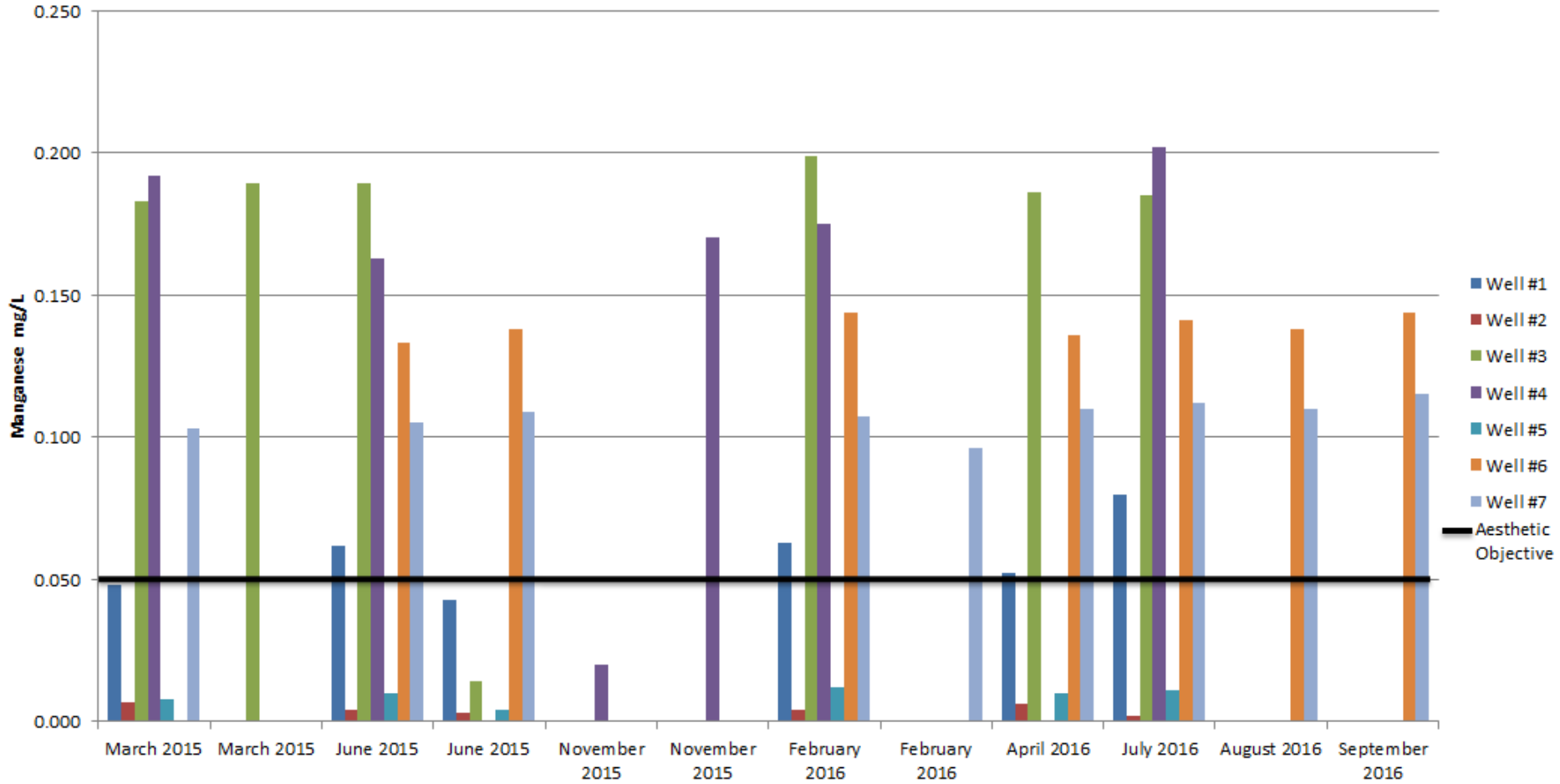
Source: *Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese*

- Should the Guidelines for Canadian Drinking Water Quality deem manganese a health criteria, a treatment system must be operational one year after the date of the changes to the Guideline Limits

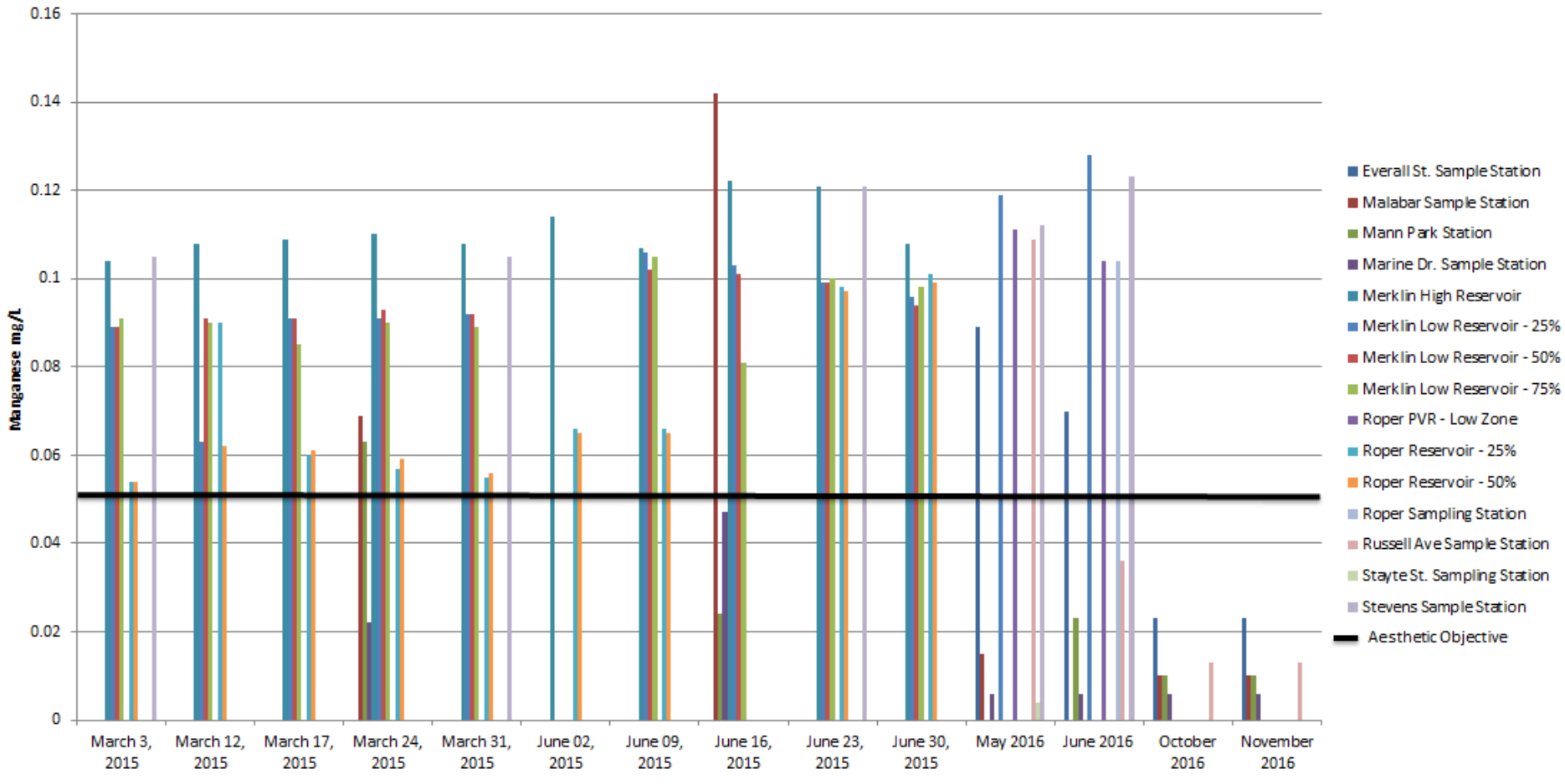
Source: *Permit to Operate from Fraser Health Authority*



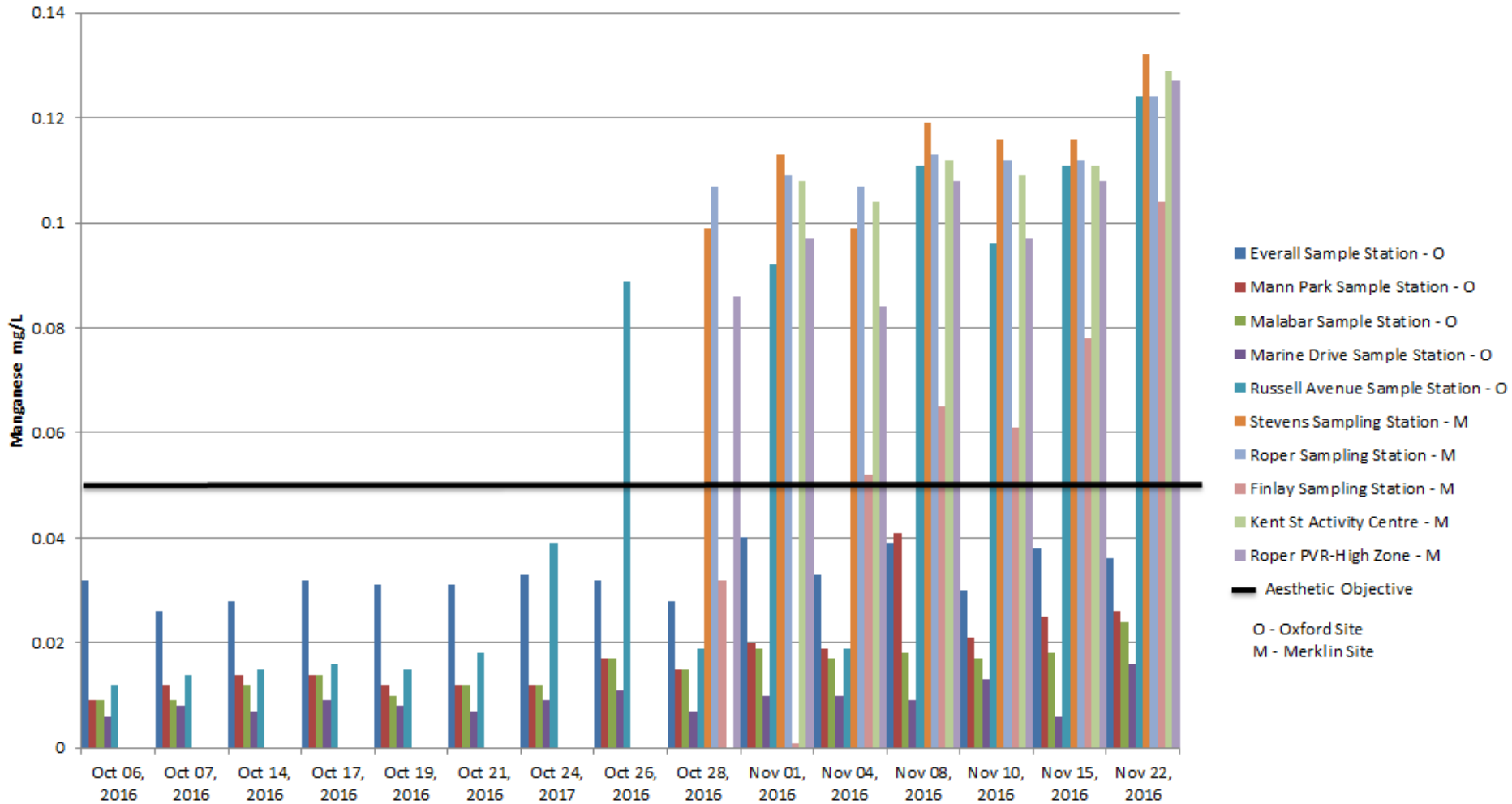
2015 - 2016 Manganese Levels for Wells 1 - 7



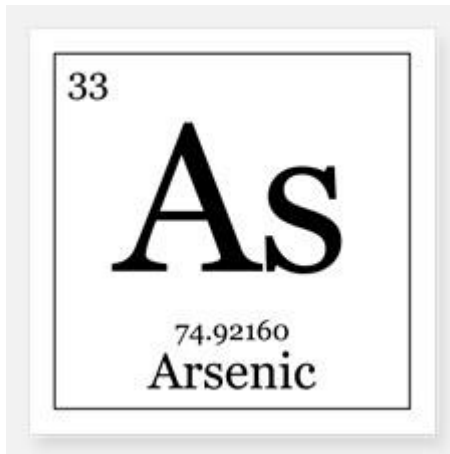
2015 & 2016 Manganese Levels for Reservoirs and Stations



Manganese Levels after Chlorination



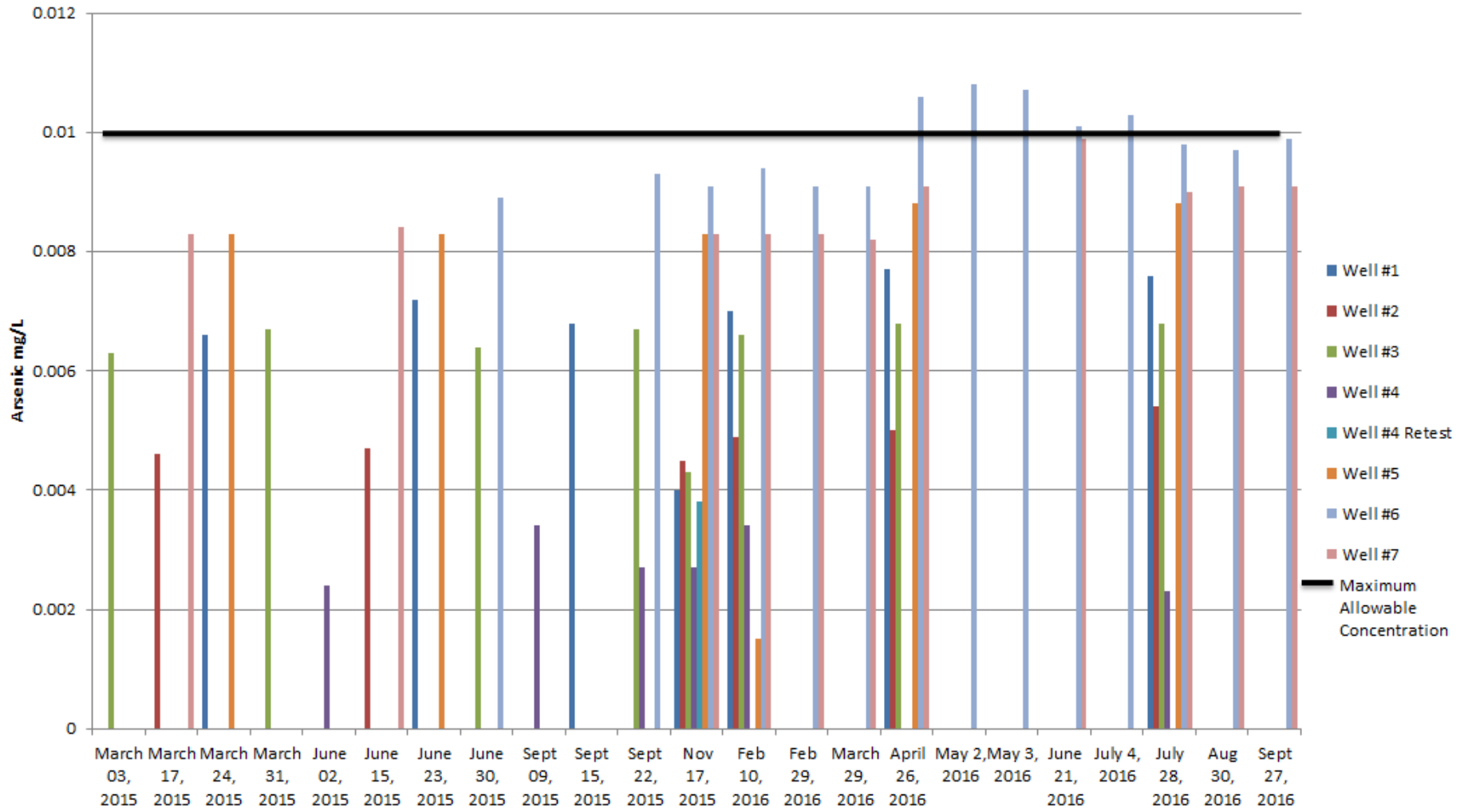
The Impact of Naturally Occurring Arsenic



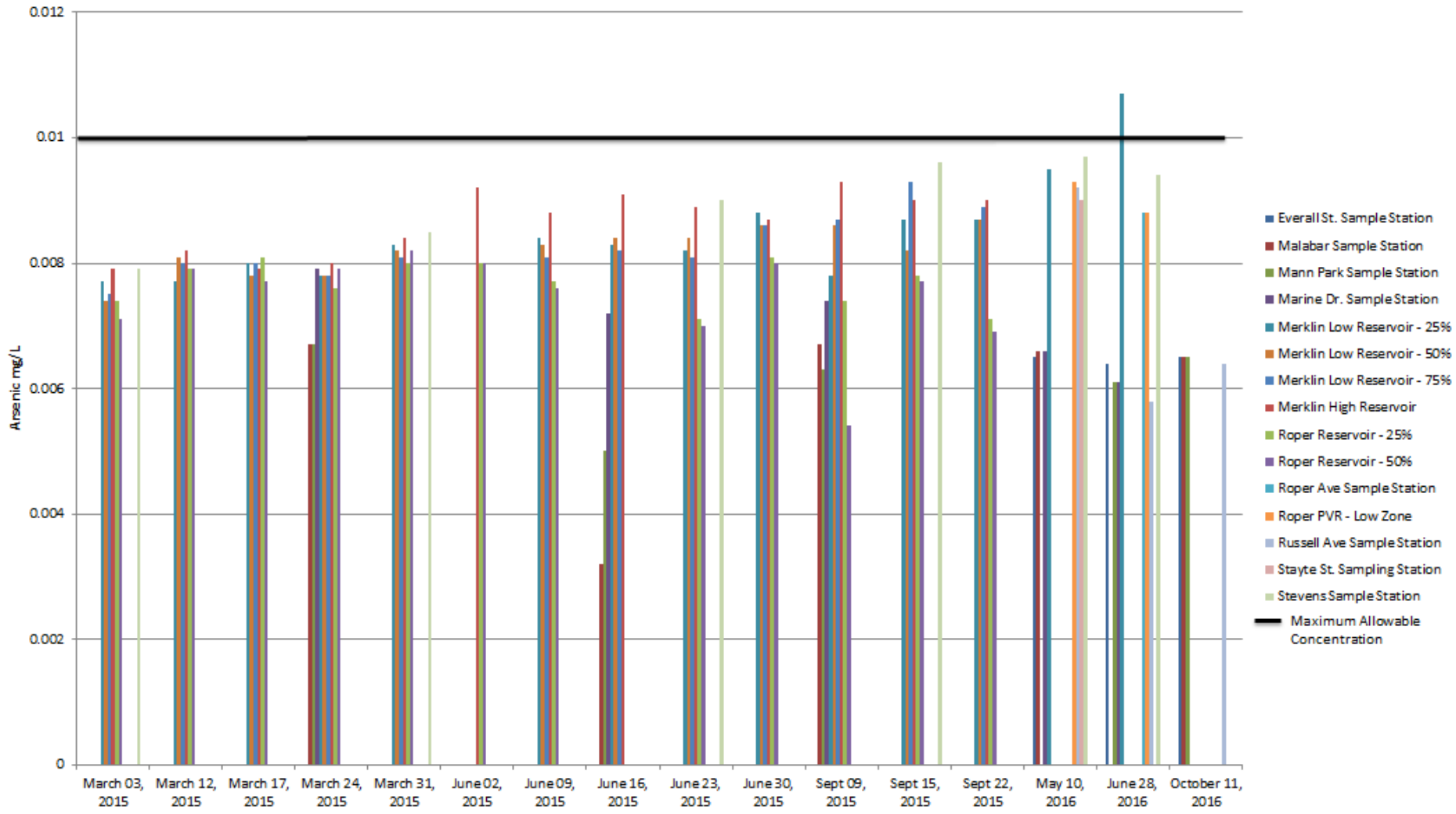
- Arsenic is a naturally occurring metal found in mineral deposits or rocks throughout the Earth's crust. Arsenic may enter lakes, rivers or underground water sources when the mineral deposits containing arsenic dissolve
- In 2007, the GCDWQ lowered the maximum allowable concentration (MAC) from 0.025 mg/L to 0.010 mg/L
- Although the MAC (Maximum Allowable Concentration) for arsenic is set at 0.010 mg/L, levels should be kept as low as reasonably achievable



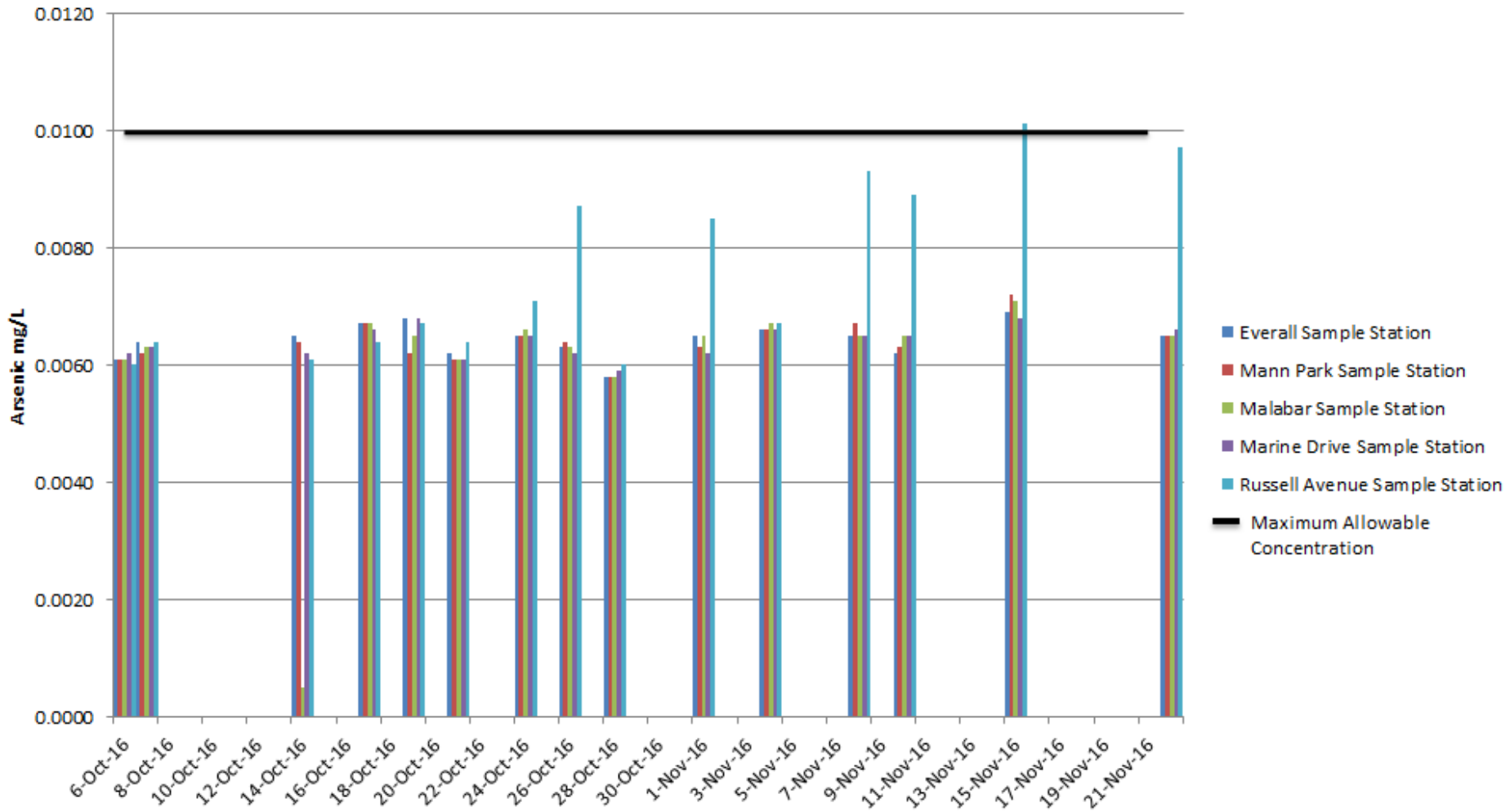
2015 & 2016 Arsenic Levels for Wells 1 - 7



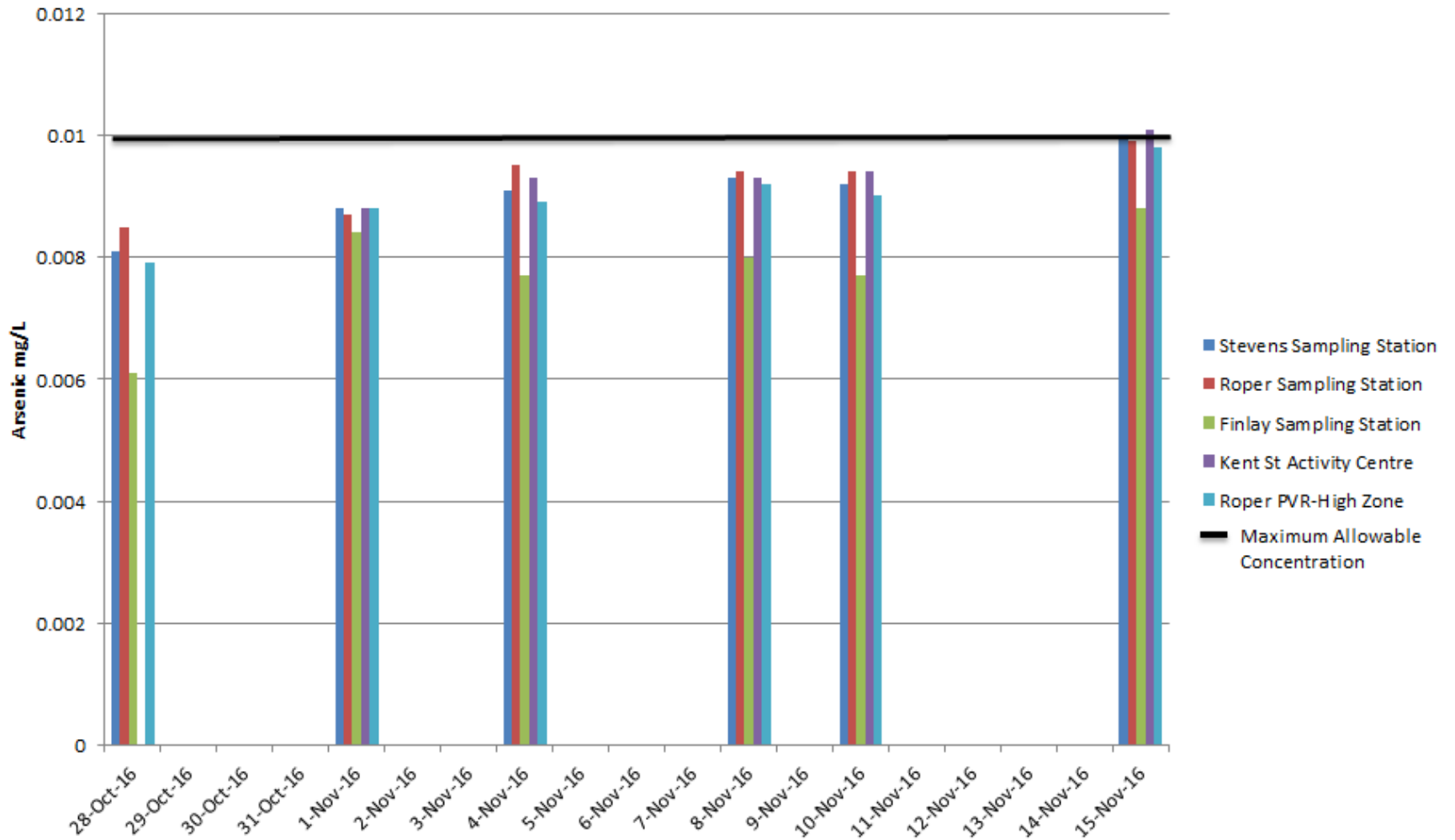
2015 - 2016 Arsenic Levels for Reservoirs and Sample Stations



Oxford Arsenic Levels after Chlorination



Merklin Arsenic Levels after Chlorination



Ways to Limit Arsenic Exposure

While arsenic is naturally occurring and currently below maximum allowable concentration limits, there are ways to limit exposure.

WHAT YOU CAN DO TO LIMIT ARSENIC AND MANGANESE EXPOSURE

Arsenic Treatment Options for Homeowners: Purchase an in-home water treatment device

- Look for treatment devices that have been certified by an accredited certification organization meeting the appropriate NSF International (NSF)/ American National Standards Institute (ANSI) drinking water treatment unit standards for removing arsenic
- Make sure you follow the manufacturer's instructions regarding their use and maintenance
- For more information about arsenic please visit the City's website > *My Water* (under quicklinks on homepage) > *Water Quality*



www.whiterockcity.ca/MyWater



What the City is doing to Reduce Arsenic and Manganese Exposure



(From left to right) Dr. Saad Jasim, Manager,, Utilities City of White Rock; Greg St. Louis, Director Engineering & Municipal Operations, City of White Rock; Dr. Benoit Barbeau, Ecole Polytechnique; Keyvan Malecki MSc, DIC, UBC; Adel Hajimalayeri, UBC; Irfan Gehlen B.A.Sc., P.Eng., Water Supply & Treatment Leader for Kerr Wood Leidal Associates Ltd.

- Researching technologies and solutions that best reduce the levels of naturally occurring arsenic and manganese:
 - ❖ To ensure the City implements the right technology to reach its water quality goals, it has partnered with RES'EAU-WaterNET, a research program funded by NSERC's Strategic Partnership Grants for Networks and hosted by the University of British Columbia.
 - ❖ NSERC Strategic Networks fund large-scale, multidisciplinary research projects in targeted research areas that require a network approach and that involve collaboration between academic researchers and Canadian-based organizations. The Network is governed by the NSERC Terms and Conditions of Award
- Taking steps towards building two treatment plants to treat arsenic and manganese



RES'EAU-WaterNET

Quick facts about RES'EAU-WaterNET:

- Research & Development team includes 22 world-class scientists from nine universities across Canada
- Supported by dozens of public and private partner organizations, including the Natural Sciences and Engineering Research Council (NSERC) Strategic Network
- Evaluating arsenic and manganese treatment options to determine the best technology for White Rock

MY CITY

MY WATER



RES'EAU-WaterNET



Research results will give City Staff vital scientific data and information needed on water treatment technologies to help the City reach its water quality goals

Stay up to date with their research at:
www.whiterockcity.ca/WaterResearch

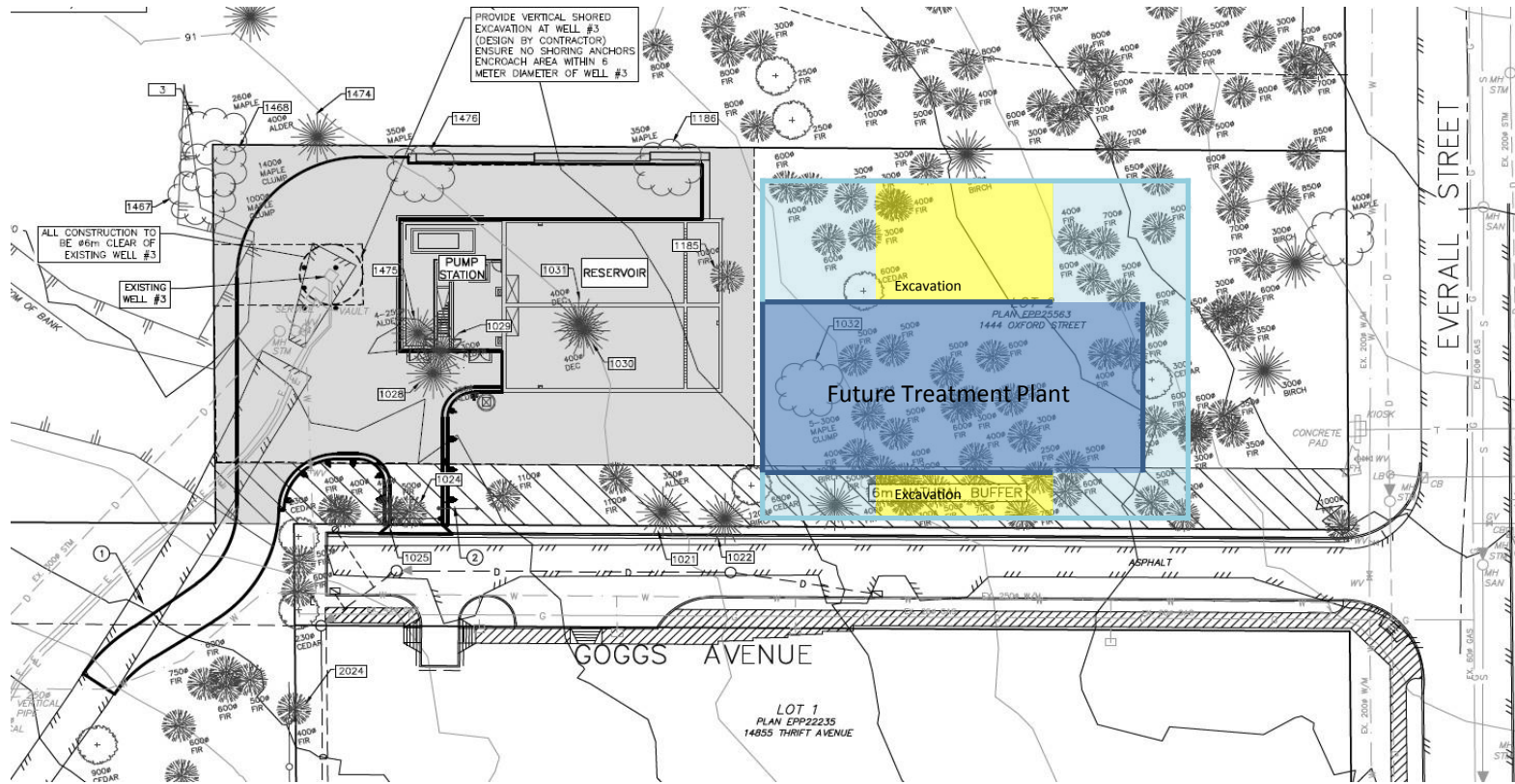
WHITE ROCK
City by the Sea!

MY CITY

MY WATER



Proposed Arsenic & Manganese Treatment Plant at Oxford



**Final layout to be determined*



How We Communicate Water Quality

Every month different water quality parameters are tested throughout the City:

- **Weekly laboratory testing**
 - ❖ In-house testing for conductivity, pH, turbidity, free chlorine, total chlorine and temperature
 - ❖ Microbiological testing for Total Coliforms and Escherichia Coli
- **Monthly laboratory testing**
 - ❖ Metal testing for arsenic at the Merklin Site only
- **Quarterly laboratory testing**
 - ❖ Metal testing for arsenic, copper, lead, iron and manganese
 - ❖ Organic testing for Trihalomethane (THM) and Haloacetic Acids (HAA)
- **Yearly laboratory testing**
 - ❖ Inorganics including: antimony, arsenic, barium, boron, bromate, cadmium, chloramines, chromium, cyanide, fluoride, lead, mercury, nitrate, nitrite, selenium, uranium, aluminum, ammonia, calcium, chloride, copper, hardness, iron, magnesium, silver, sodium, sulphate, sulphide, organic carbon, xylenes and zinc

Once these parameters are tested all of the test results are uploaded to the White Rock website for viewing. Please visit www.whiterockcity.ca/MyWater

Recognize this?

The City also communicates water quality through:

- Advertising in the local newspaper, *Peace Arch News*
- Digital advertising on *Peace Arch News* website
- Water Bill Inserts (sent with your water utility bill)
- Open Houses
- City Hall Insider (e-newsletter)
- City's website at www.whiterockcity.ca/mywater

MY CITY MY WATER



City of White Rock makes Progress Towards Secondary Disinfection

As part of the ongoing implementation of chlorination the Operations Team introduced a low dosage of chlorine (0.5mg/L) at the Oxford site on October 4, 2016.

This stage is required to meet the Feb 1, 2017 secondary disinfection implementation date by Fraser Health Authority. This is not a full implementation, but a phased approach as staff are doing their due diligence to see if there are any changes to the City's water quality. As a result, they are collecting samples of the water downstream in the distribution system and had notified the Fraser Health Authority (FHA) of the work.

Although the aesthetics of your water may change, the City's water is still safe to drink. The City's water contains naturally occurring manganese. When chlorine and manganese mix, the esthetics of the water may become cloudy. More information on this can be found at www.whiterockcity.ca/mywaterFAQs

Simple Ways to Reduce the Taste and Odour of Chlorine in Water

While chlorine helps make water safe to drink, there are ways to reduce its aesthetic effects in your water.



The easiest way to reduce the taste of chlorine in water is to let the water stand for a few hours. Chlorine will evaporate in about a day if the water is exposed to circulating air and sunlight. If the water is refrigerated, it will take about two days for the chlorine to evaporate.



Add fruits or vegetables such as lemons or limes to water. In about an hour, most of the chlorine will be removed. (Health Canada)



Store bought filters are an option to consider for those who find the taste and odour (or the aesthetic effects) caused by chlorine to be strong. Filters should be certified as per the NSF International/American National Standards Institute Standard 42.

Water Main Flushing Program



The City of White Rock's annual Water Main Flushing Program aims at maintaining the City's water system. The program takes place from November 7 to the middle of December.

You will receive a letter from the City notifying you of when flushing will occur in your area. During this time, we ask that you do not use any taps or flush your toilet as this can draw sediment into your water pipes.

Please note, if you do not receive a notice we will not be flushing in your area at this time.

During flushing, residents may experience a drop in pressure or discolouration of their water. Any disruption should be of a short duration and should only occur while mains in the area are being flushed.

The public are encouraged to report a disruption by calling 604.541.2181 in cases where loss of water or drop in pressure that lasts for an extended period of time (after two or three hours).

To learn more about this important program, please visit www.whiterockcity.ca/mywaterprojects

NEXT STEPS

