



City West Water™

# Drinking Water Quality Report 2020



# Glossary of Terms

ADWG 2011	Australian Drinking Water Guidelines 6, 2011. Published by the National Health & Medical Research Council of Australia, version 3.5, August 2018.
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore, is a health risk.
'False Positive' <i>E. coli</i> result	<i>E. coli</i> detection in a routine water quality sample considered non representative of the water supplied to customers. A 'false positive' result is not considered a failure of the water quality standards in the <i>Safe Drinking Water Regulations 2015</i> .
HACCP	Hazard Analysis and Critical Control Points risk management certification for protecting drinking water quality.
mg/L	Unit of measure milligrams per litre.
NTU	Unit of measure Nephelometric Turbidity Units.
orgs/100mL	Unit of measure organisms per 100 millilitres.
<	"less than" mathematical symbol.
>	"greater than" mathematical symbol.

## Acknowledgement of Country

City West Water respectfully acknowledges the Traditional Custodians of the lands and waters upon which we work and operate, the Bunurong, Boon Wurrung, Wurundjeri/Woiwurrung, and Wadawurrung people of the Kulin Nations. We pay our deepest respects to the Traditional Custodians past, present and emerging. We acknowledge the continued cultural and spiritual connections to the land and water, and we recognise and value their continued knowledge and values in protecting country. We value and continue to strengthen our partnership with the Traditional Custodians and the First Nations Community, and we hope to share our journey together in water management and implementing First Nations values.

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# From our Managing Director

On behalf of City West Water, I am pleased and proud to present our annual Drinking Water Quality Report 2020. It provides comprehensive information on the quality of drinking water we have provided to our customers and community throughout City West Water's service area, which encompasses the inner and western suburbs of Melbourne, including Melbourne's central business district. The report highlights all the test results from our water quality monitoring program and outlines the processes we have in place to continue delivering safe, clean drinking water to all.

Specifically, the information provided in this report includes:

- details of the quality of the water that we supplied to our customers and community in our service area between 1 July 2019 and 30 June 2020;
- an overview of our water supply system and sources of our water supply;
- a summary of water treatment and disinfection processes;
- an outline of how we arrange collection and testing of water samples;
- details of customer feedback; and
- a summary of the independent auditing processes used to verify our management of drinking water quality.

Our corporate strategy is to be an exceptional service provider that puts customers first and benefits the community. The safety of our people and of the community we serve is our highest priority. We are committed to ensuring that our water is clean and safe to drink. We strive to deliver our services in a reliable and affordable way that is accessible to everyone in our community.

Throughout 2019-2020, we routinely tested over 3,000 water samples, most of which were obtained from customer premises. I am pleased to report that this independent chemical and microbial testing showed that the quality of our drinking water supply continued to meet the standards in Victoria's *Safe Drinking Water Act 2003* and associated *Safe Drinking Water Regulations 2015*, as well as Australian Drinking Water Guidelines 2011. Details of the testing undertaken, and results obtained, form a major part of this report. Regarding the coronavirus (COVID-19) pandemic, there is no evidence that drinking water will be affected by coronavirus or that it is transmitted by drinking water.

During 2019-2020 drinking water from the Victorian Desalination Plant was, for the first time, included as a blend in City West Water's water supply. The introduction of desalinated water to Melbourne is a Victorian Government initiative designed to meet challenges from population growth and climate change.

Further to monitoring the supplied water quality, we also rely upon feedback from customers to assist in advising of local issues that may arise. Such feedback is recorded as water quality related customer complaints. During 2019-2020 we received 153 complaints per 100,000 customers. Most of the complaints were of discoloured water from resuspension of natural sediments in our pipe network, resulting from the unfiltered nature of much of our water supply. This discolouration does not impact on the safety of the water. Nevertheless, we continue to manage this at a customer level and look for opportunities to improve our service to customers.

Our Annual Customer Satisfaction survey for 2019-2020 indicated a water quality satisfaction level of 93% and 84% respectively, among our residential and non-residential customers. Such feedback provided is used to drive continuous improvement initiatives.

Our drinking water quality management processes are endorsed through a consistent history of successfully retaining drinking water risk management certification and compliance of our water quality 'Risk Management Plan' with Victoria's *Safe Drinking Water Act 2003*.

City West Water is committed to continuing its record of reliably providing high quality, safe drinking water to all our customers and community. I am confident that you will find the information contained in this report helpful in better understanding the great quality of our drinking water supply.

**Maree Lang**  
Managing Director

# 1. Introduction

City West Water is one of three metropolitan water retailers established under Section 85(1A) of the *Water Act 1989* (Vic). Our Board of Directors is appointed by the Victorian Government and is responsible for setting and overseeing the implementation of the policies, objectives and strategies of the business. We provide drinking water, trade waste, recycled water, stormwater and sewerage services to approximately 488,000 residential and non-residential properties in Melbourne's inner and western suburbs and central business district.

Melbourne Water provides City West Water with a bulk water supply and a sewage treatment service. Melbourne Water manages the water catchments, dams and primary treatment, as well as a network of large water mains that interconnect with our own water supply network. This interconnection means that risks associated with water supply are shared between the wholesaler, Melbourne Water, and retailer, City West Water. To manage these risks and to clearly assign the rights and obligations of both parties, we have a contractual arrangement, Bulk Water Supply Agreement, with Melbourne Water, as well as cross business contingency plans and operational arrangements.

Our management of the water supply system and drinking water quality is afforded the highest priority to reflect public health considerations and community expectations. In this regard, we closely follow the risk management principles outlined in Victoria's *Safe Drinking Water Act 2003* and associated *Safe Drinking Water Regulations 2015*. This commitment to safeguarding drinking water quality has continued to be independently recognised through our consistent retention of the internationally recognised HACCP certification.

With this publicly available report, City West Water complies with Section 26 of the *Safe Drinking Water Act 2003*, which requires public disclosure of all water quality monitoring information.

## 1.1 Characterisation of the system

### 1.1.1 Source water system

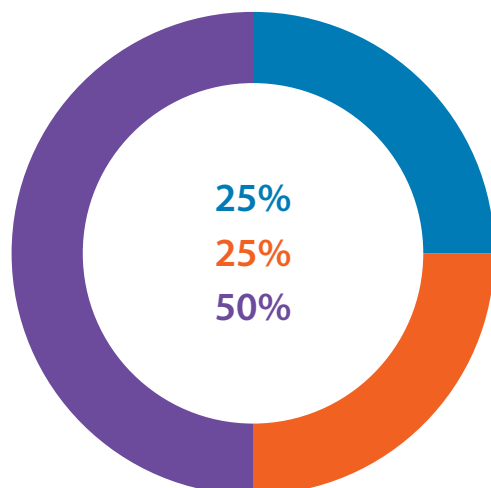
Our water supply originates from Melbourne's well-established water supply catchment and reservoir system, which provided the city and outer suburbs high quality water supply. This extensive system, managed by Melbourne Water, lies primarily to the east of Melbourne and extends as far as Thomson Reservoir, approximately 120 kilometres from our service area.

Drinking water is supplied to City West Water from three major storages within the system. Two of the storages, Silvan Reservoir (near Mount Dandenong) and Sugarloaf Reservoir (near Yarra Glen), are east of Melbourne. The third, Greenvale Reservoir, is north, near Somerton. The relative proportion of water supplied from the three reservoirs can vary, depending on factors such as local water demands, weather conditions, maintenance works and longer-term population changes (refer [Figure 1](#)).

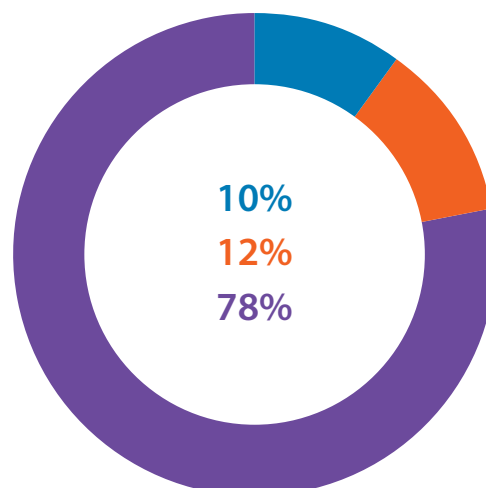


**Figure 1: Reservoir source of water supplied to City West Water's service area over the last decade and during the 2019–2020 financial year.**

Reservoir source supplied to City West Water over the last decade



Reservoir source supplied to City West Water over 2019–2020



■ Silvan Reservoir    ■ Greenvale Reservoir    ■ Sugarloaf Reservoir

The supply from Silvan Reservoir comes from protected, natural catchments (including the Thomson and Upper Yarra catchments) where activities such as industry, farming, urbanisation and tourism (which could pollute the water supply) are highly restricted. Greenvale Reservoir, which does not have a catchment, receives its water supply from Silvan Reservoir. Long storage periods (ranging between months and years) in these pristine reservoirs enhance water quality. As a result, the only active water treatment process that is applied to this water is chlorination (chlorine gas at Silvan; sodium hypochlorite at Greenvale) and pH correction with lime.

Sugarloaf Reservoir draws most of its water from the mid-point of the Yarra River where the catchment is unprotected, containing urban areas, light industry and agricultural activities. A smaller proportion also comes from Maroondah Reservoir via the Maroondah Aqueduct. On average, the source waters pumped into Sugarloaf Reservoir are stored for months before being treated (via aluminium-based coagulation and flocculation, sand filtration, sodium hypochlorite chlorination and pH correction with lime) at Melbourne Water's Winneke water treatment plant.

Melbourne Water adds fluoride to all of City West Water's bulk water in line with the requirements of the *Victorian Health (Fluoridation) Act 1973*. This is in the form of fluorosilicic acid at both the Silvan Reservoir supply and Winneke water treatment plant.

The quality of the bulk water supply is monitored by Melbourne Water before it enters City West Water's distribution system. This monitoring has two components:

- Sites upstream of treatment, comprising rivers, streams, aqueducts and reservoirs. These sites are monitored at varying frequencies, largely to characterise overall long-term background water quality and to monitor for seasonal and possible longer-term changes. Parameters tested include organic chemicals, nutrients and microbes.
- Sites downstream of water treatment, where the monitoring is more intense than at upstream sites and is largely focussed on verifying the quality of post-treatment product water. Frequencies of this monitoring range between continuous at chlorine dosing points and daily or weekly, depending on the sites and parameters measured (for example, testing for water clarity and purity, as well as microbial levels).

Between December 2019 and April 2020, a blend of desalinated water from the Victorian Desalination Plant and water from Melbourne Water's Cardinia Reservoir was pumped into Silvan Reservoir. The proportion of desalinated water in Silvan Reservoir reached 20% in April, decreasing to 6% by June. In turn, the percentage of desalinated water in Greenvale Reservoir

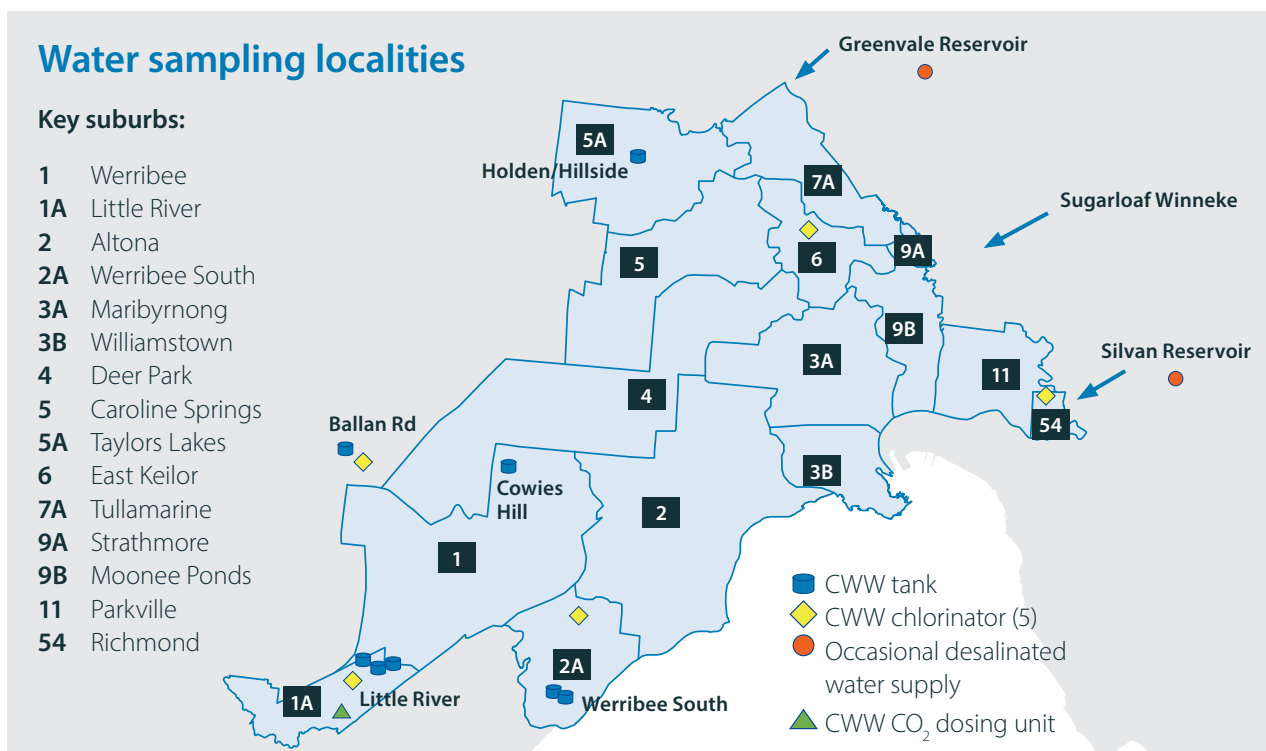
reached approximately 6% in June. Information on the Desalination Plant's purpose, location and operation is available at Melbourne Water's website (<https://www.melbournewater.com.au/water/water-facts-and-history/why-melbournes-water-tastes-great-tap/water-treatment/desalination>).

### 1.1.2 City West Water system

We distribute water to over 950,000 people and to businesses across over 488,000 properties. The water is distributed through an extensive network of over 5,000 kilometres of water mains, 10 pumping stations,

8 holding tanks (or service tanks), 5 secondary chlorinators and a carbon dioxide dosing unit. This network encompasses central and western Melbourne, including inner suburbs such as Fitzroy, Collingwood, Richmond and the central business district, to outer western suburbs as far west as Little River. The network is fully enclosed, protecting the water from possible contamination during its delivery to customers. For the purpose of water quality monitoring, our 714 square kilometre service area is divided into 15 water sampling localities (refer Figure 2) based on sources of water supply and similar pressure.

**Figure 2: City West Water's water service area, including 15 water sampling localities and sources of bulk water supply.**



During 2019, modifications were made to four of City West Water's water sampling localities, largely to accommodate a westerly expansion of our service area from its previous 580 square kilometres. The changes (which are included in Figure 2) were:

- expansion of the south-west corner of Taylors Lakes water sampling locality to include an extra population of some 2,500. The resultant increase in the minimum, annual, population-based *E. coli* testing quota from 208 to 220 was accommodated in our existing monitoring program.
- westerly expansion of Deer Park water sampling locality. Locality population change impact was insignificant.
- transfer of a southern portion of Caroline Springs water sampling locality into Deer Park water sampling locality. Locality population change impact was insignificant.
- westerly expansion of Werribee water sampling locality. Locality population change impact was insignificant.

The water supply source(s) for each of our 15 water sampling localities are shown in Table 1. The bulk water transfer arrangements with Melbourne Water are routinely varied for supply purposes.

**Table 1: 2019-2020 supply sources for our water sampling localities**

<b>Water sampling locality</b>	<b>Source water</b>	<b>Treatment plant</b>	<b>Population supplied (2016 census)</b>
Altona	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	117,900
Caroline Springs	Yarra River; Maroondah & Greenvale Reservoirs	Winneke Greenvale	103,800
Deer Park	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	58,000
East Keilor	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	41,300
Little River	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	670
Maribyrnong	Yarra River; Maroondah & Silvan Reservoirs	Winneke Silvan	120,900
Moonee Ponds	Yarra River; Maroondah & Silvan Reservoirs	Winneke Silvan	73,500
Parkville	Yarra River; Maroondah & Silvan Reservoirs	Winneke Silvan	157,600
Richmond	Yarra River; Maroondah & Silvan Reservoirs	Winneke Silvan	24,900
Strathmore	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	8,100
Taylors Lakes	Yarra River; Maroondah & Greenvale Reservoirs	Winneke Greenvale	67,800
Tullamarine	Yarra River; Maroondah & Greenvale Reservoirs	Winneke Greenvale	10,500
Werribee	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	136,700
Werribee South	Yarra River; Maroondah, Silvan & Greenvale Reservoirs	Winneke Silvan Greenvale	2,000
Williamstown	Yarra River; Maroondah & Silvan Reservoirs	Winneke Silvan	50,000



## 2. Water treatment and quality management system

### 2.1 Water treatment

The water quality treatment processes used for City West Water's source or bulk water supply are outlined in [section 1.1.1](#).

Notwithstanding Melbourne Water's source or bulk water disinfection by chlorination, additional secondary chlorination (using liquid sodium hypochlorite) is undertaken within our service area by:

- Melbourne Water, with four secondary chlorination plants servicing the water sampling localities of Werribee, Deer Park, Caroline Springs and Altona; and
- City West Water, with a further five secondary chlorination plants servicing the water sampling localities of East Keilor, Little River, Richmond, Werribee and Werribee South.

In addition, the local water supply at Little River is dosed with gaseous carbon dioxide in order to assist with maintaining neutral pH levels.

Melbourne Water provides treated water as a bulk supply to City West Water to store and distribute to customers. [Table 2](#) summarises the water treatment processes used on the bulk water source by Melbourne Water that is supplied to City West Water. Refer to Melbourne Water's annual water quality report<sup>1</sup> for further details.

<sup>1</sup> Melbourne Water's Annual Water Quality Report can be found on their website at <https://www.melbournewater.com.au/about/strategies-and-reports/water-quality-annual-report>

**Table 2: Drinking water treatment processes provided by Melbourne Water's treatment plants**

<b>Water Sampling Locality</b>	<b>Treatment Plant</b>	<b>Treatment Process</b>	<b>Added substance/s</b>	<b>Comments</b>
Altona Caroline Springs Deer Park East Keilor Little River Strathmore Taylors Lakes Tullamarine Werribee Werribee South	Greenvale (transfer from treatment plant at Silvan to Greenvale Reservoir)	Disinfection • Chlorination	Sodium Hypochlorite Refer to Silvan information below	No additional fluoridation at Greenvale as it receives fluoridated water from Silvan (refer Section 1.1.1).
Altona Deer Park East Keilor Little River Maribyrnong Moonee Ponds Parkville Richmond Werribee Werribee South Williamstown	Silvan	Disinfection • Chlorination Other • pH correction • Fluoridation	Chlorine gas  Lime Fluorosilicic acid	
Altona Caroline Springs Deer Park East Keilor Little River Maribyrnong Moonee Ponds Parkville Richmond Strathmore Taylors Lakes Tullamarine Werribee Werribee South Williamstown	Winneke	Clarification • Coagulation & flocculation • Filtration • Sand filtration • Disinfection • Chlorination Other • pH correction • Fluoridation	Alum  Sodium hypochlorite Lime Fluorosilicic acid	During 2019-2020 Melbourne Water changed the chemical used to disinfect from chlorine gas to sodium hypochlorite

## 2.2 Issues

No adverse water treatment issues originated within City West Water's service area during 2019-2020.

### 3. Emergency, incident and event management

This section of the document is for reporting emergencies, incidents and events related to drinking water quality. Water quality information is also reported quarterly to City West Water Board's Health, Environment and Safety subcommittee. This includes events that may have led to known or suspected contamination of the drinking water supply, including those that were reported to Department of Health and Human Services in line with Section 22 of the *Safe Drinking Water Act 2003*. No such reports were required to be made to Department of Health and Human Services in 2019-2020.

Our 2019 Annual Drinking Water Quality report referred to an event in early 2019 in which customers in large parts of our supply area reported elevated instances of discoloured water. This contributed to a considerable increase in the 2018-19 annual number of water quality complaints. The cause was identified as the withdrawal of discoloured water from lower depths of Greenvale Reservoir via a partially open, low level withdrawal gate at the outlet tower. It appears that this event may have deposited significant sediment material in the distribution network, resulting in on-going relatively elevated reports of discoloured water (refer [Section 9](#)).

The current coronavirus (COVID-19) pandemic and its management have impacted a variety of services and activities throughout Victoria. However, our management and monitoring of drinking water quality have not been affected and continue to be undertaken to our usual, highest standards. Furthermore, there is no evidence that drinking water will be affected by COVID-19 or that it is transmitted by drinking water.

## 4. Drinking water quality monitoring

A significant part of our water supply activities involves monitoring the quality of the water being supplied to customers. We have a water monitoring program of day-to-day sampling and testing from many locations throughout the distribution network of 15 water sampling localities. This includes 450 purpose-built sampling fittings (referred to as “customer taps”) located at the point of supply, adjacent to water meters at properties across our service area. The number of customer taps sites in each water sampling locality is distributed in proportion to locality populations.

We also have a program of regular sampling and testing of water quality in each of our 8 service tanks. In addition, Melbourne Water monitors the quality of bulk water supplies at points upstream of delivery points to City West Water. The results of all these tests are reviewed as part of the Bulk Water Supply Agreement between the two water businesses.

Between 1 July 2019 and 30 June 2020, we routinely collected and tested over 3,000 microbiological and 900 physical and chemical water samples, predominantly from customer taps sites, but also from mains and service tanks. Monitoring was undertaken under contract by a government approved, specialised and quality-certified laboratory. The extent of this monitoring is based on requirements of *Safe Drinking Water Regulations 2015* as well as guidance from Australian Drinking Water Guidelines

2011, including consideration of locality population numbers for bacterial monitoring.

In addition to guiding the design of monitoring programs, Australian Drinking Water Guidelines 2011 provides a basis for assessing the quality of drinking water. Microbiological assessment is based principally on the bacterium *E. coli*, which is considered to indicate the presence of faecal contamination and, therefore, a health risk.

Physical and chemical assessment and monitoring is based on a combination of parameters that indicate physical and aesthetic characteristics, such as pH, colour and turbidity (water clarity), as well as the chemical quality of the water (i.e. levels of chlorine, iron, fluoride, dissolved salts, aluminium, copper and other heavy metals). Contact information for obtaining further details of all water quality testing outlined in this report is contained in [section 15](#).

In line with *Safe Drinking Water Regulations 2015*, sample results from reticulation sites such as water mains and service tanks both spatially and hydraulically within individual water sampling localities, are added to the associated customer tap data.

City West Water’s sampling sites (other than customer taps), and the water sampling locality to which they are associated for water quality performance reporting purposes, are listed below in [Table 3](#).

**Table 3: City West Water’s sampling sites (other than customer taps) and associated water sampling localities**

Sampling site	Sampling site location and water sampling locality to which water quality data are included
Little River elevated tank	Little River
Little River ground level tank no. 1	Little River
Little River ground level tank no. 2	Little River
Hillside elevated tank	Taylors Lakes
Cowies Hill elevated tank	Werribee
Ballan Road tank	Werribee
Werribee South elevated tank	Werribee South
Werribee South ground level tank	Werribee South
Werribee South main at Maltby bypass (water supply main)	Werribee South

## 5. Drinking water quality standards

Since 1 July 2004, the management of drinking water in Victoria has been governed by the *Safe Drinking Water Act 2003*. Under this Act, the drinking water must comply with quality standards. *Safe Drinking Water Regulations 2015* specifies scheduled water quality standards for several water quality parameters. The standards currently in place are listed in [Table 4](#):

**Table 4: Water quality parameters, standards and frequency of sampling**

Water quality parameter	Standard ( <i>Safe Drinking Water Regulations 2015</i> )	Relevant sampling frequency for each locality
<i>Escherichia coli</i> ( <i>E. coli</i> )	No <i>E. coli</i> per 100mL of drinking water	one sample per week
Total Trihalomethanes (Total THMs)	Less than or equal to 0.25 mg/L of drinking water	one sample per month
Turbidity	The 95th percentile of results for samples in any 12-month period must be $\leq 5.0$ NTU	one sample per week

The tables in sections [5.1](#) to [5.3](#) of this report outline the 2019-2020 compliance of water quality parameters against the water quality scheduled standards specified in *Safe Drinking Water Regulations 2015*.

## 5.1 *E. coli*

Standard: All samples of drinking water collected are found to contain no *E. coli* per 100 millilitres of drinking water

**Table 5: *E. coli* summary results in drinking water samples obtained from reticulation system sampling sites (customer taps, water mains, service tanks) tested between 1 July 2019 and 30 June 2020**

Water sampling locality (locality number)	Sampling frequency	Number of samples	Maximum detected (orgs/100mL)	Average	Number of detections & investigations conducted (s.22 <sup>#</sup> )	Number of samples where standard was not met (s.18 <sup>##</sup> )
Altona (2)	>weekly	352	0	0	0	0
Caroline Springs (5)	>weekly	341	0	0	0	0
Deer Park (4)	>weekly	196	0	0	0	0
East Keilor (6)	>weekly	157	0	0	0	0
Little River (1A)	>weekly	117	0	0	0	0
Maribyrnong (3A)	>weekly	366	0	0	0	0
Moonee Ponds (9B)	>weekly	235	0	0	0	0
Parkville (11)	>weekly	406	0	0	0	0
Richmond (54)	>weekly	105	0	0	0	0
Strathmore (9A)	>weekly	80	0	0	0	0
Taylors Lakes (5A)	>weekly	262	0	0	0	0
Tullamarine (7A)	>weekly	91	0	0	0	0
Werribee (1)	>weekly	457	0	0	0	0
Werribee South (2A)	>weekly	109	0	0	0	0
Williamstown (3B)	>weekly	170	0	0	0	0

# s.22: as per Section 22 of the *Safe Drinking Water Act 2003*

## s.18: as per Section 18 of the *Safe Drinking Water Act 2003*

The reticulation system results for *E. coli* monitoring demonstrate compliance with the standard (100% of samples with no *E. coli*) in each of City West Water's 15 water sampling localities, between 1 July 2019 and 30 June 2020.

Sampling frequencies in each locality exceeded that prescribed by *Safe Drinking Water Regulations 2015* (i.e. one sample per week in each locality; refer [Table 4](#)). This was done in order to meet the more intensive surveillance of internationally recognised population-based frequencies, as advocated in *Australian Drinking Water Guidelines 2011*.



## 5.2 Total trihalomethanes

Standard: Total trihalomethanes less than or equal to 0.25 milligrams per litre of drinking water.

**Table 6: Total trihalomethanes summary results in drinking water samples obtained from reticulation system sampling sites (customer taps, water mains, service tanks) tested between 1 July 2019 and 30 June 2020**

Water sampling locality (locality number)	Frequency of Sampling	Number of samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18 <sup>#</sup> )
Altona (2)	>monthly	14	0.25	0.060	0.047	0
Caroline Springs (5)	>monthly	14	0.25	0.048	0.031	0
Deer Park (4)	>monthly	14	0.25	0.050	0.039	0
East Keilor (6)	>monthly	14	0.25	0.044	0.035	0
Little River (1A)	>monthly	52	0.25	0.079	0.053	0
Maribyrnong (3A)	>monthly	14	0.25	0.056	0.045	0
Moonee Ponds (9B)	>monthly	14	0.25	0.052	0.043	0
Parkville (11)	>monthly	14	0.25	0.050	0.041	0
Richmond (54)	>monthly	14	0.25	0.076	0.062	0
Strathmore (9A)	>monthly	14	0.25	0.061	0.051	0
Taylors Lakes (5A)	>monthly	27	0.25	0.039	0.024	0
Tullamarine (7A)	>monthly	13	0.25	0.039	0.026	0
Werribee (1)	>monthly	40	0.25	0.073	0.051	0
Werribee South (2A)	>monthly	47	0.25	0.063	0.029	0
Williamstown (3B)	>monthly	14	0.25	0.056	0.044	0

<sup>#</sup> s.18: as per Section 18 of the *Safe Drinking Water Act 2003*

Total trihalomethanes data demonstrate compliance with the standard (0.25 mg/L) in each of City West Water's 15 water sampling localities between 1 July 2019 and 30 June 2020.

## 5.3 Turbidity

Standard: The 95<sup>th</sup> percentile of results for samples in any given 12-month period must be less than or equal to 5.0 Nephelometric Turbidity Units (NTU).

**Table 7: Turbidity summary results in drinking water samples obtained from reticulation system sampling sites (customer taps, water mains, service tanks) tested between 1 July 2019 and 30 June 2020**

Water sampling locality (locality number)	Frequency of Sampling	Number of samples	Maximum turbidity in a sample (NTU)	95th percentile of turbidity results in any 12 months (NTU)	Number of 95th percentile results in any 12 months above standard (s.18#)
Altona (2)	weekly	53	0.6	0.3	0
Caroline Springs (5)	weekly	53	1.5	1.0	0
Deer Park (4)	weekly	53	1.0	0.4	0
East Keilor (6)	weekly	53	1.2	0.7	0
Little River (1A)	> weekly	91	0.7	0.4	0
Maribyrnong (3A)	weekly	53	0.7	0.5	0
Moonee Ponds (9B)	weekly	53	0.8	0.6	0
Parkville (11)	weekly	53	0.8	0.4	0
Richmond (54)	weekly	53	0.9	0.9	0
Strathmore (9A)	weekly	53	0.9	0.8	0
Taylors Lakes (5A)	> weekly	66	1.3	1.2	0
Tullamarine (7A)	weekly	52	1.6	1.1	0
Werribee (1)	> weekly	82	0.6	0.5	0
Werribee South (2A)	> weekly	87	0.9	0.5	0
Williamstown (3B)	weekly	53	0.6	0.3	0

Turbidity data demonstrate compliance with the standard (95th percentile  $\leq 5$  NTU) in each of City West Water's 15 water sampling localities between 1 July 2019 and 30 June 2020.

## 5.4 Summary performance against water quality standards

During 2019-2020, City West Water met the monitoring and water quality requirements of *Safe Drinking Water Regulations 2015* for drinking water samples obtained from reticulation system sampling sites (water mains, customer taps, service tanks).

## 6. Other water quality standards (algae toxin, pathogen, chemical or substance that may pose a risk to human health)

In addition to the water quality parameters designated as standards by *Safe Drinking Water Regulations 2015*, we also monitored a range of other chemical parameters that provide further information on the overall quality of our drinking water supply. Among such other parameters that were monitored in 2019-2020, those for which there

is a health-related Australian Drinking Water Guidelines 2011 guideline are listed in [Table 8](#). Furthermore, data on aesthetic and other parameters that provide an additional comprehensive characterisation of the water, are contained in [Section 7](#) and [Appendix A](#) and [Appendix B](#) of this report.

**Table 8: Other water quality standards (chemical or substance that may pose a risk to human health) monitored in drinking water samples obtained from reticulation system sampling sites (water mains, customer taps, service tanks) and tested between 1 July 2019 and 30 June 2020**

Parameter	ADWG 2011 guideline (mg/L unless specified)		Frequency of testing*	Met the guideline Yes/No
	Health	Aesthetic		
Arsenic	0.01		annually per locality	Yes
Cadmium	0.002		annually per locality	Yes
Chlorine	5	0.6	>weekly per locality	Yes
Chromium	0.05		annually per locality	Yes
Copper	2	1	annually per locality	Yes
Cyanide	0.08		annually per locality	Yes
Fluoride	1.5		fortnightly per locality	Yes
Lead	0.01		annually per locality	Yes
Manganese	0.5	0.1	fortnightly per locality	Yes
Mercury	0.001		annually per locality	Yes
Nitrate	50		annually per locality	Yes
Sulphate	<sup>c</sup>	250	annually per locality	Yes
Zinc	<sup>c</sup>	3	annually per locality	Yes

\* sample numbers, maximum/average/minimum levels and compliance details for each sampling locality are shown in Appendix A tables.

<sup>c</sup> Australian Drinking Water Guidelines (ADWG)2011 notes that there is insufficient data to set a health guideline value

Since levels of all health-related parameters tested satisfied Australian Drinking Water Guidelines 2011 guideline values for samples from reticulation system sampling sites, no related remedial water quality actions were necessary.

As our water supply distribution network is completely enclosed, any monitoring for organic chemicals (including pesticides) and radioactive substances is undertaken at

locations upstream of this network. Melbourne Water tests for these substances with respect to its major storage reservoirs such as Silvan and Sugarloaf, where the potential for contamination is greater. Results of this monitoring are provided to City West Water. No significant detections (with respect to Australian Drinking Water Guidelines 2011) in the bulk water supply were reported (by Melbourne Water) during 2019-2020.

## 7. Aesthetic characteristics

Australian Drinking Water Guidelines 2011 outlines aesthetic water quality guideline values, that are associated with customer acceptability of drinking water in terms of issues such as appearance, taste and odour. Monitoring results for aesthetic water quality parameters comprising pH, colour, hardness, alkalinity and iron are shown in [Table 9](#).

Note that our colour tests are reported as apparent colour, which is representative of colour visible to our customers. The results are expressed as platinum/cobalt (Pt/Co) units.

Australian Drinking Water Guidelines 2011 has an aesthetic guideline value for true colour of 15 Hazen Units (HU). Note that Pt/Co units and HU are interchangeable and equivalent in value. True colour tests require the water sample to be filtered to remove suspended particles, while the apparent colour test is done without filtration. As a result, an apparent colour result of 25Pt/Co (or HU) units is equivalent to a true colour result of 15HU (or Pt/Co) units. We therefore have analysed and reviewed our apparent colour results against a value of 25Pt/Co units, as shown in [Table 9](#).

**Table 9: Detailed monitoring results for pH, apparent colour, hardness, alkalinity and iron in drinking water samples obtained from reticulation system sampling sites (water mains, customer taps, service tanks) and tested between 1 July 2019 and 30 June 2020**

Water Sampling Locality (locality number)	Parameter	Frequency of Sampling	Number of samples	Minimum*	Maximum*	Aesthetic operating range (ADWG)
Altona (2)	pH <sup>#</sup>	fortnightly	27	7.1	8.8	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	6	<25Pt/Co**
	hardness	annually	1	25	25	<200mg/L
	alkalinity	annually	1	14	14	NA
	Iron	fortnightly	27	0.01	0.09	<0.3mg/L
Caroline Springs (5)	pH	fortnightly	27	7.3	8.8	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	12	<25Pt/Co**
	hardness	annually	1	29	29	<200mg/L
	alkalinity	annually	1	14	14	NA
	Iron	fortnightly	27	<0.01	0.12	<0.3mg/L
Deer Park (4)	pH	fortnightly	27	7.2	8.3	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	8	<25Pt/Co**
	hardness	annually	1	26	26	<200mg/L
	alkalinity	annually	1	15	15	NA
	Iron	fortnightly	27	<0.01	0.14	<0.3mg/L
East Keilor (6)	pH	fortnightly	27	7.2	7.7	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	6	<25Pt/Co**
	hardness	annually	1	27	27	<200mg/L
	alkalinity	annually	1	13	13	NA
	Iron	fortnightly	26	<0.01	0.11	<0.3mg/L
Little River (1A)	pH	>fortnightly	65	6.4	9.2	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	>fortnightly	65	<2	6	<25Pt/Co**
	hardness	annually	1	27	27	<200mg/L
	alkalinity	annually	1	22	22	NA
	Iron	>fortnightly	65	<0.01	0.08	<0.3mg/L

**Table 9: Detailed monitoring results for pH, apparent colour, hardness, alkalinity and iron in drinking water samples obtained from reticulation system sampling sites (water mains, customer taps, service tanks) and tested between 1 July 2019 and 30 June 2020 (continued)**

Water Sampling Locality (locality number)	Parameter	Frequency of Sampling	Number of samples	Minimum*	Maximum*	Aesthetic operating range (ADWG)
Maribyrnong (3A)	pH	fortnightly	27	7.1	7.4	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	8.0	<25Pt/Co <sup>**</sup>
	hardness	annually	1	23.0	23.0	<200mg/L
	alkalinity	annually	1	14.0	14.0	NA
	Iron	fortnightly	26	0.01	0.09	<0.3mg/L
Moonee Ponds (9B)	pH	fortnightly	27	7.0	7.5	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	10	<25Pt/Co <sup>**</sup>
	hardness	annually	1	18	18	<200mg/L
	alkalinity	annually	1	15	15	NA
	Iron	fortnightly	26	<0.01	0.12	<0.3mg/L
Parkville (11)	pH	fortnightly	27	7.0	7.4	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	8	<25Pt/Co <sup>**</sup>
	hardness	annually	1	21	21	<200mg/L
	alkalinity	annually	1	13	13	NA
	Iron	fortnightly	27	<0.01	0.08	<0.3mg/L
Richmond (54)	pH	fortnightly	27	7.1	7.6	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	4	8	<25Pt/Co <sup>**</sup>
	hardness	annually	1	16	16	<200mg/L
	alkalinity	annually	1	13	13	NA
	Iron	fortnightly	26	0.05	0.09	<0.3mg/L
Strathmore (9A)	pH	fortnightly	27	7.1	8.6	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	8	<25Pt/Co <sup>**</sup>
	hardness	annually	1	17	17	<200mg/L
	alkalinity	annually	1	16	16	NA
	Iron	fortnightly	26	0.01	0.11	<0.3mg/L
Taylors Lakes (5A)	pH	>fortnightly	40	7.2	8.0	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	>fortnightly	40	2	10	<25Pt/Co <sup>**</sup>
	hardness	Annually	1	16	16	<200mg/L
	alkalinity	Annually	1	15	15	NA
	Iron	>fortnightly	39	0.04	0.14	<0.3mg/L
Tullamarine (7A)	pH	fortnightly	26	7.1	8.8	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	26	<2	12	<25Pt/Co <sup>**</sup>
	hardness	Annually	1	26	26	<200mg/L
	alkalinity	Annually	1	12	12	NA
	Iron	fortnightly	26	<0.01	0.19	<0.3mg/L

**Table 9: Detailed monitoring results for pH, apparent colour, hardness, alkalinity and iron in drinking water samples obtained from reticulation system sampling sites (water mains, customer taps, service tanks) and tested between 1 July 2019 and 30 June 2020 (continued)**

Water Sampling Locality (locality number)	Parameter	Frequency of Sampling	Number of samples	Minimum*	Maximum*	Aesthetic operating range (ADWG)
Werribee (1)	pH	>fortnightly	54	7.1	8.0	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	>fortnightly	54	<2	6	<25Pt/Co <sup>**</sup>
	hardness	Annually	1	21	21	<200mg/L
	alkalinity	Annually	1	14	14	NA
	Iron	>fortnightly	54	<0.01	0.08	<0.3mg/L
Werribee South (2A)	pH	>fortnightly	61	7.3	8.5	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	>fortnightly	61	<2	10	<25Pt/Co <sup>**</sup>
	hardness	Annually	1	22	22	<200mg/L
	alkalinity	Annually	1	15	15	NA
	Iron	>fortnightly	61	<0.01	0.21	<0.3mg/L
Williamstown (3B)	pH	fortnightly	27	7.1	7.4	6.5-8.5 or 6.5-9.2 <sup>#</sup>
	apparent colour	fortnightly	27	<2	6	<25Pt/Co <sup>**</sup>
	hardness	Annually	1	23	23	<200mg/L
	alkalinity	Annually	1	11	11	NA
	Iron	fortnightly	26	0.01	0.06	<0.3mg/L

\* Units: pH (units); apparent colour (platinum cobalt units); hardness (mg/L as calcium carbonate); alkalinity (mg/L as calcium carbonate); iron (mg/L).

<sup>#</sup> tolerable upper value of 9.2 where there are cement lined water mains.

<sup>\*\*</sup> Guideline set for "True Colour" (15 HU) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co units).

All 2019-2020 water colour, hardness and iron monitoring data complied with the respective aesthetic operating ranges of 25 Pt/Co units, 200 mg/L and 0.3 mg/L. There is no guideline value for alkalinity. Of the 516 samples tested for pH, there were eight instances where pH readings were not within the Australian Drinking Water Guidelines 2011 guideline range of 6.5 to 8.5. Two instances of such readings were in each of Caroline Springs, Tullamarine and Little River; and one instance in each of Strathmore and Altona. Only one of the eight results were below 6.5

and that was measured in Little River. Occasionally we observe pH levels above 8.5. These are caused by the presence of corrosion-preventative cement linings within metal water pipes. Australian Drinking Water Guidelines 2011 makes an allowance for such cases by having a tolerable upper limit of 9.2 for water supplied by cement lined pipe. Adverse health effects may occur at pH levels less than 4 or greater than 11. City West Water did not have any results outside those limits. Average pH levels observed in all localities are within guideline levels.



## 8. Analysis of results – trends

This section of the report examines:

- Trends over time (three years) of water quality parameters tested that are designated as standards in *Regulations 2015* are shown in [Section 8.1](#).
- Trends over time (three years) and between localities, of parameters listed in Appendix A tables that have a corresponding Victorian standard or Australian Drinking Water Guidelines 2011 guideline are shown in [Section 8.2](#).

Data analysed in this section is based on drinking water samples obtained from reticulation system sampling sites (customer taps, water mains, and service tanks).

### 8.1 Historical compliance of standard parameters

Trends for the previous two financial years and the current reporting period (and extent of compliance) of water quality parameters that are scheduled standards in *Safe Drinking Water Regulations 2015* are summarised in [Table 10](#). The trend shows consistent 100% compliance with the standards.

**Table 10: Compliance trends over time of scheduled standard parameters at our 15 water sampling localities**

Parameter	Standard ( <i>Safe Drinking Water Regulations 2015</i> )	Localities compliant (% of customers supplied with compliant water)		
		2019-2020	2018-2019	2017-2018
<i>E. coli</i>	0 per 100mL	15 / 15 (100%)	15 / 15 (100%)	15 / 15 (100%)
Trihalomethanes	≤0.25 mg/L	15 / 15 (100%)	15 / 15 (100%)	15 / 15 (100%)
Turbidity	95th percentile ≤5.0 NTU	15 / 15 (100%)	15 / 15 (100%)	15 / 15 (100%)

Details of our monitoring data for individual localities, together with monitoring frequencies, *Safe Drinking Water Regulations 2015* standards and Australian Drinking Water Guidelines 2011 guidelines for both health-related and aesthetic water quality data, are contained in [Appendix A](#) tables. Contact information for obtaining further details of all water quality testing outlined in this report is contained in [Section 15](#).

## 8.2 Parameter trends over time and between localities

Analysis of parameter trends over three years and between localities is used to better understand and highlight water quality issues that may occur throughout our service area. This section of the report looks at such trends over the past three years in terms of the key parameters listed in [Appendix A](#) tables. Graphical representations of trends are contained in [Appendix B](#) and briefly discussed below:

### **Arsenic, cadmium, chromium, cyanide, lead, mercury, zinc**

These substances have been monitored on an annual basis. As shown in the [Appendix A](#) tables, test results have consistently been either well within guideline levels or below analytical detection limits.

### ***E. coli*** (refer [Figure B.1](#) in [Appendix B](#))

*E. coli* performance in our drinking water has consistently complied with Safe Drinking Water Regulations 2015 in all water sampling localities.

### **Free chlorine** (refer [Figure B.2](#) in [Appendix B](#))

All of our drinking water supply is disinfected with chlorine. The more active form, free chlorine is present in all water sampling localities, with levels well within the maximum Australian Drinking Water Guidelines 2011 health guideline of 5mg/L. Nevertheless, average levels amongst individual localities can be markedly different; this being largely due to relative proximity to chlorine dosing points. For example, the Taylors Lakes and Tullamarine localities are situated near primary chlorination facilities at Greenvale Reservoir, while the Little River, East Keilor and Werribee South localities are served by secondary re-chlorination plants. Year-to-year variations within water sampling localities reflect changes to chlorine dosing rates and bulk water sources.

### **Aluminium** (refer [Figure B.3](#) in [Appendix B](#))

Aluminium levels in the water supply are low and within the Australian Drinking Water Guidelines 2011 guideline of 0.2mg/L. Some variations at these levels are related to natural differences in the catchments rather than from artificial treatment dosing. For example, aluminium is only used in water treatment at the Winneke Treatment Plant, yet the water sampling localities more likely to receive water from this source, Moonee Ponds, Parkville, Altona, Werribee do not exhibit markedly higher aluminium levels, as compared with other localities.

### **Chloride** (refer [Figure B.4](#) in [Appendix B](#))

Chloride levels are quite low, well within guideline levels and relatively consistent amongst the water sampling localities.

### **Colour** (refer [Figure B.5](#) in [Appendix B](#))

The apparent colour results continue to be below the benchmark guideline. Higher colour levels in the Richmond locality are associated with its traditional bulk supply source from Silvan Reservoir. Generally higher average colour levels in 2018-19 reflect the Greenvale Reservoir discoloured water event in early 2019 (refer [Section 9](#)).

### **Copper** (refer [Figure B.6](#) in [Appendix B](#))

Copper levels in the water supply are low and consistently well within the Australian Drinking Water Guidelines 2011 health and aesthetic guidelines.

### **Electrical conductivity (EC)** – (refer [Figure B.7](#) in [Appendix B](#))

We measure EC as a surrogate for total dissolved solids. Australian Drinking Water Guidelines 2011 advises that its total dissolved solids guideline level of 600mg/L can be substituted by an EC level of approximately 900µs/cm. EC levels monitored by City West Water continue to be well below the guideline value and relatively consistent within each water sampling locality.

### **Fluoride** (refer [Figure B.8](#) in [Appendix B](#))

Fluoride levels in the water supply are the result of fluoridation of the bulk water supply (refer report [section 1.1.1](#)). Dosing is normally controlled such that levels are generally maintained between approximately 0.9 and 1.0 mg/L. The results show that the fluoride levels were within the guideline value of 1.5 mg/L.

### **Hardness** (refer [Figure B.9](#) in [Appendix B](#))

Water hardness levels are well below the guideline value of 200mg/L and relatively consistent within each water sampling locality.

### **Iron** (refer [Figure B.10](#) in [Appendix B](#))

Overall, slightly higher iron levels in the Taylors Lakes and Richmond water sampling localities are consistent with their source water comprising more of the relatively greater iron containing water from Silvan and Greenvale Reservoirs. Nevertheless, variations occur due to changes in bulk water sources. Generally higher iron levels in

2018-19 (and to a lesser extent, 2019-2020) when compared with 2017-18 may be related to the Greenvale Reservoir discoloured water event in early 2019 (refer Section 9). All results were well within the guideline value.

#### **Manganese** (refer [Figure B.11](#) in [Appendix B](#))

Manganese levels in the water supply are low and consistently well within the guideline value. As with colour and iron, higher levels in 2018-19 may be related to the Greenvale Reservoir discoloured water event in early 2019 (refer [Section 9](#)). All results were well within the guideline value.

#### **Nitrate** (refer [Figure B.12](#) in [Appendix B](#))

Nitrate levels in the water supply are low and consistently well within the guideline value.

#### **pH** (refer [Figure B.13](#) in [Appendix B](#))

Average pH levels in all localities are within guideline levels. The slightly higher levels in Werribee South are consistent with the presence of cement lined mains. The minor variation in pH levels at Little River are attributable to it being managed by dosing the local water supply with carbon dioxide gas.

#### **Sodium** (refer [Figure B.14](#) in [Appendix B](#))

Sodium levels are quite low and relatively consistent among the water sampling localities and consistently well within the guideline value.

#### **Sulphate** (refer [Figure B.15](#) in [Appendix B](#))

Sulphate levels are quite low and relatively consistent within each water quality locality and consistently well within the guideline value.

#### **Total trihalomethanes** (refer [Figure B.16](#) in [Appendix B](#))

Total trihalomethanes concentrations are relatively low (in comparison with the Victorian standard) and consistent among water sampling localities. Localities with higher levels tend to be more remote from primary or secondary chlorination.

#### **Turbidity** (refer [Figure B.17](#) in [Appendix B](#))

Turbidity levels measured in all localities continue to be within the standard. Variations between individual water sampling localities are a reflection of their source waters. For example, localities with lower turbidity tend to be supplied more from Sugarloaf/Winneke, while higher turbidity localities tend to be supplied to a greater extent from Silvan and Greenvale reservoirs. As with colour, iron and manganese, higher levels in 2018-19 may be related to the Greenvale Reservoir discoloured water event in early 2019 (refer [Section 9](#)).

## 9. Complaints relating to water quality

During 2019-2020, City West Water received a total of 745 complaints related to water supply quality; this compares with 555 in 2018-19 and 330 in 2017-18. This increasing trend in complaint numbers has been associated with an increase in the proportion of discoloured water complaints over the same period (from 64% to 80%).

Our 2018-19 Annual Drinking Water Quality report referred to an event in early 2019 in which customers in large parts of our supply area reported elevated instances of discoloured water. This contributed to the considerably increased number of water quality complaints in 2018-19. The cause was identified as the withdrawal of discoloured water from lower depths of Greenvale Reservoir via a partially open, low level withdrawal gate at the outlet tower. It subsequently appears that this event deposited significant sediment material in the distribution network, resulting in on-going relatively elevated reports of discoloured water in 2019-2020.

We flushed water mains in response to the complaints. However, due to many of the complaints being largely widespread and non-localised, broad-scale mains flushing (including air-scouring) has been restricted due to consideration of water conservation and low remedial efficiency. In the coming year our focus will be on moving to proactive mains cleaning in targeted smaller areas showing a history of elevated discoloured water complaints.

The categories of overall complaints received over the past three years were distributed as shown in [Table 11](#).

Table 11: Water quality related customer complaints received over the last three years

Type of complaints	Number of complaints			Comparison with previous reporting periods	Comments
	2019-2020	2018-2019	2017-2018		
Discoloured water	593	426	210	Increase of 167 from previous reporting period.	Increased number due to the Greenvale Reservoir discoloured water event of early 2019 that deposited sediments throughout the distribution network. The continued presence of this material continues to cause discoloured water and associated complaints.
Taste/odour	76 (25 chlorine)*	83 (29 chlorine)*	92 (21 chlorine)*	Decrease of 7 from previous reporting period.	Small variation in line with normal variations.
Air in water	60	27	11	Increase of 33 from previous reporting period.	Tends to be associated with maintenance/repair works, of which there was a higher number.
Other	16	19	17	No significant change (decrease of 3).	Nil.
(alleged illness)	(2)	(2)	(2)		
(blocked filter)	(4)	(4)	(3)		
(blue-green water)	(5)	(6)	(6)		
(staining)	(5)	(7)	(6)		
<b>Total</b>	<b>745</b>	<b>555</b>	<b>330</b>	Increase of 190 from previous reporting period.	Actions taken to address and minimise water quality complaints include: <ul style="list-style-type: none"> <li>personalised contact with customers,</li> <li>targeted mains flushing,</li> <li>visits to customer properties,</li> <li>addressing customer concerns,</li> <li>continuous monitoring of complaint numbers and locations,</li> <li>analysis of likely causes and solutions.</li> </ul>
No. of properties	488,000	473,000	459,000	-	-
Complaints per 100 properties	0.153	0.117	0.072	-	-

\* Number of complaints received of chlorine taste or odour.

The water quality complaints received during 2019-2020 in each water sampling locality are shown in [Table 12](#).

**Table 12: Water quality related customer complaints received during 2019-2020 per water sampling locality.**

Water sampling locality (Locality number)	Numbers received				Total complaints
	Discoloured water	Taste/odour	Air in water	Other (alleged illness) (blocked filter) (blue-green water) (staining)	
Altona (2)	69	10	5	2 (1 blue-green water) (1 staining)	86
Caroline Springs (5)	69	16	4	1 (1 blue-green water)	90
Deer Park (4)	38	5	4	2 (1 blocked filter) (1 staining)	49
East Keilor (6)	29	1	3	0	33
Little River (1A)	0	0	0	0	0
Maribyrnong (3A)	63	6	8	2 (1 alleged illness) (1 staining)	79
Moonee Ponds (9B)	44	5	7	1 (1 alleged illness)	57
Parkville (11)	49	6	4	3 (2 blocked filter) (1 blue-green water)	62
Richmond (54)	10	1	1	0	12
Strathmore (9A)	5	0	1	0	6
Taylors Lakes (5A)	86	12	7	3 (1 blue-green water) (1 blocked filter) (1 staining)	108
Tullamarine (7A)	19	0	3	1 (1 staining)	23
Werribee (1)	93	10	10	1 (1 blue-green water)	114
Werribee South (2A)	3	0	0	0	3
Williamstown (3B)	16	4	3	0	23



Our Annual Customer Satisfaction survey for 2019-2020 indicated a water quality satisfaction level of 93% among our residential customer, representing a 3-percentage point rise on the previous year. Satisfaction among our non-residential customers was 84%, down from 93% the previous year. Reasons given for dissatisfaction included issues around odour, colour and taste for residential customers and chlorine taste for non-residential customers. The feedback provided in the survey will be used to drive continuous improvement initiatives.

## Complaints and responses

We provide individual responses to water quality related complaints. If customers are experiencing water quality concerns, they can contact City West Water on 132 642 for further information and advice. Responses to complaints can range between verbal clarification of perceived issues to onsite investigations and remedial action. In terms of the major complaint categories, our responses are as follows:

### Discoloured (e.g. brown) water

Discoloured water is generally caused by the suspension of accumulated natural sediments in water mains. It can be triggered by the opening or closing of valves and reinstatement of mains into service following repairs. Discoloured water can also result from older, rusting internal galvanised iron pipes. Calls to City West Water are assessed by trained staff and, where the discoloured water is deemed to be originating from the water main, targeted mains flushing is generally undertaken.

### Alleged illness

Complaints of water related illness are analysed and investigated. Customers may be advised to seek medical advice.

### White water (air in water)

White water is water with a cloudy appearance that clarifies within a few minutes and indicates the presence of tiny, harmless air bubbles. It tends to be associated with maintenance and repair works, when air can enter water pipes when the supply mains are recharged. As the aerated water is used by customers, the appearance returns to normal.

### Blue-green water

Blue-green water is water that has a cloudy to blue-green appearance, possibly containing blue-green particles, and having an unpleasant bitter taste. This is caused by accelerated corrosion of customers' internal copper water pipes and appears to be restricted to cold water pipes.

Blue-green water must not be consumed (by drinking or in the preparation of food) because it can cause nausea and vomiting. The prolonged consumption of water containing elevated copper levels can have adverse health effects.

As blue-green water originates from a property's internal copper pipes, customers can manage the problem by flushing their tap with fresh mains water. This means running their tap until the water becomes clear. A permanent solution to such blue-green water instances would involve the replacement of the property's internal copper pipes.

In certain cases, corrosion of copper pipes can lead to perforation and leakage. Neither the cause(s) of, nor solution to this international and Australia-wide copper corrosion phenomenon are well known (apart from replacement of corroding pipes).

We assist customers experiencing copper pipe corrosion by testing copper levels in their water and providing advice on how to best manage the issue of blue-green water.

### Taste or odour

A change in taste or odour of tap water can occur occasionally and is generally apparent as a chlorine-like or earthy, musty taste or odour. Fluctuations in chlorine levels (and hence, the perception of chlorine taste or odour) occurs from time to time, largely due to changed water demands and flow rates. Our response to customers reporting chlorine taste and odour involves providing an explanation, as well as considering changes to chlorine dosing.

Other tastes and odours can result when water flows are slower and during flow reversals in large pipes. In such cases the cause is identified and, where appropriate, a combination of targeted flushing and/or changes to flow regimes are implemented.

## 10. Risk management plan audit results

Pursuant to the *Safe Drinking Water Act 2003*, we have a documented water quality 'Risk Management Plan' that is subject to independent audit (at approximately two-year intervals) in terms of its content and implementation. On 16 March 2020 a state of emergency was declared in Victoria in response to the COVID-19 pandemic. The Department of Health and Human Services on 18 March 2020, notified Victorian water agencies of an extension to the risk management plan audit period from 31 May 2020 until the 28 August 2020. City West Water's plan was scheduled for audit during March 2020. However, due to travel restrictions imposed as part of the COVID-19 response, the audit was started in March and rescheduled for completion in July 2020. Outcomes from the 2019-2020 audit of the plan will be provided in next year's drinking water quality report. City West Water continued to operate within the requirements of our risk management plan throughout the 2019-2020 reporting period. The following information in this section provides an update of the actions City West Water completed during 2019-2020 with respect to the sixth audit of our risk management plan undertaken in March 2018.

The purpose of the audits is to assess City West Water's compliance with obligations imposed by Section 7(1)

of the *Safe Drinking Water Act 2003*. In this regard, the audits:

- determine whether City West Water meets all the requirements described under Section 7(1);
- determine whether the Risk Management Plan meets all the specifications in the Act (Section 9) and its Regulations in an effective manner;
- inspect all documents specified in the Risk Management Plan ; and
- determine whether the identified water quality control measures and control measure combinations are in place operationally and are adequate to control water safety risks.

The March 2018 audit concluded that the water quality Risk Management Plan complied with the obligations imposed by Section 7(1) of the *Safe Drinking Water Act 2003* during the audit period March 2016 to April 2018. Notwithstanding the plan's compliance with the Act, the audit identified several opportunities for improvement; an outline of these, together with the status of responsive actions can be found below in [Table 13](#). A copy of the certificate is available at the City West Water website and in the 2019 Annual Drinking Water Quality Report.

**Table 13: City West Water 2018 Drinking Water Risk Management Plan audit response progress summary**

No.	Opportunity for Improvement	Status of opportunities for improvement 2020
1	Drone or camera on rafts could be used to assist with, for example, tank inspections. There are many advances in technology which may be now more viable for implementation.	Completed in 2019. In 2019 City West Water acquired a flying drone which has been used to assist with condition inspections of service reservoirs. In addition to this, in 2020 City West Water purchased a Remotely Operated Vehicle to further assist with condition inspections of service reservoir.
2	With storage tanks it may be worth considering the latest industry best practice. For example, investigate if solid steel roofs may increase reliability and simplify ongoing maintenance.	Completed in 2019. City West Water undertook a review and gap analysis of our current practice for tank design and construction to determine whether best practice was considered in the materials selected. Recommendations will be adopted in the Risk Management Plan for future tank construction projects.
3	For sampling taps, a yearly audit, and replacement where required.	Completed in 2018. Our current practice involves regular inspection of water sampling taps during water sampling activities by our laboratory contractor. On average, individual sampling taps are checked six times annually. We also maintain a register to track tap conditions, and the condition of taps is reported on a weekly basis by the laboratory to City West Water for rectification. We believe that the intent of this audit finding is being met and do not intend to take any further action.

**Table 13: City West Water 2018 Drinking Water Risk Management Plan audit response progress summary (continued)**

No.	Opportunity for Improvement	Status of opportunities for improvement 2020
4	Further updating website to highlight drinking water quality with advice from HACCP technical team.	Completed in 2018. City West Water's website has been reviewed and enhanced with regard to providing information on drinking water quality. HACCP team members are consulted to provide technical accuracy.
5	The HACCP team to integrate especially closely, for example common work areas. This will help to reduce the chances of technical 'silos' developing.	Completed in 2018. In 2018 water quality staff joined the Network Services Team (operations). This has facilitated closer communication with the rest of the HACCP team and operational staff. This is in addition to the regular HACCP team meetings.
6	CTech are managing the chlorine dosing system. CTech to graph both pH and free active chlorine residual. Other parameters could also be considered to optimize water chemistry. A yearly chemistry performance review with suggestion for upgrades and Key Performance Indicators.	Completed in 2018. A review of monitoring improvement opportunities was completed in 2018. This review supported the upgrade of CTech dosing systems to include SCADA for on-line monitoring and control as an opportunity for improvement. This project is intended to be delivered during 2020/2021. Information on overall water quality is provided by City West Water's routine monitoring program.

Significant portions of the Risk Management Plan are based on our pre-existing HACCP plan which itself is audited internally on a quarterly basis, as well as annually by an external, independent auditor. The HACCP plan specifically addresses issues such as employee training and development, calibration of equipment, and maintenance and inspections of assets. Each of these is examined during the independent annual audits. The HACCP system is highly regarded in the food industry for protecting the welfare and safety of consumers. It is based on the identification and management of risks (to drinking

water quality) at key points within a production or product delivery process.

The HACCP certification demonstrates that City West Water attends to those parts of our network and operations that have an impact on water quality. Maintenance of HACCP certification requires continual vigilance and improvements to our water quality management operations. We aim to continue meeting the HACCP risk management framework requirements.

## 11. Undertakings under Section 30 of the *Safe Drinking Water Act 2003*

City West Water has not entered into any undertakings with the Department of Health and Human Services, pursuant to Section 30 of the *Safe Drinking Water Act 2003*.

## 12. Exemptions from water quality standards under Section 20 and conditions imposed under Section 21 of the *Safe Drinking Water Act 2003*

City West Water did not have any Section 20 or Section 21 exemptions in place.

## 13. Variation to aesthetic standards under Section 19 of the act and conditions imposed under Section 21 of the *Safe Drinking Water Act 2003*

City West Water did not have any Section 19 variations.

## 14. Regulated water

'Regulated water' is water that is the subject of a declaration made by the Minister for Health concerning water that is not drinking water. We do not manage any water supplies that have been declared as regulated water.

In certain cases, however, we supply water from our water distribution mains to customers with privately owned offtakes. Such supplies are provided under a private agreement between City West Water and the customer. The agreement does not guarantee the pressure or quality of the supply downstream of the offtake point, albeit that we endeavour to maintain these. City West Water has embarked on a program to reduce the number of such private supplies.

## 15. Further information

This report is available on City West Water's website: [citywestwater.com.au](http://citywestwater.com.au)

For further information on this report please email: [enquiries@citywestwater.com.au](mailto:enquiries@citywestwater.com.au)

For water quality issues please contact 132 642

Written enquiries can be addressed to: City West Water, Locked Bag 350, Sunshine, Victoria, 3020

# Appendix A. Water quality data by locality

Based on results of tests on drinking water samples obtained from reticulation system sampling sites (water mains, customer taps, service tanks) tested between 1 July 2019 and 30 June 2020 (population is based on 2016 census)

Water sampling locality			Locality		
Altona			No. 2		
For period			Population		
1 July 2019 to 30 June 2020			117,900 (2016 Census)		

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>g</sup>	45	>weekly	352	352	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>g</sup>	140	>weekly	352	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	352	352	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.14	0.46	>weekly	352	352	100%
<b>Total Chlorine</b>	mg/L	5	0.05	0.24	0.58	>weekly	352	352	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	14	14	14	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.03	0.04	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	7.0	7.0	7.0	annually	1	N	N
<b>Chloride</b>	mg/L	250	16	16	16	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	3	6	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	79	113	130	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.003	0.003	0.003	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.32	0.80	0.90	>fortnightly	29	29	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	25	25	25	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	0.01	0.03	0.09	fortnightly	27	27	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.7	1.7	1.7	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.001	0.002	fortnightly	27	27	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.51	1.51	1.51	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.4	8.8	fortnightly	27	26	96.3%
<b>pH</b>	units	6.5-9.2	7.1	7.4	8.8	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.1	1.1	1.1	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.7	5.7	5.7	annually	1	1	100%
<b>Sodium</b>	mg/L	180	8.1	8.1	8.1	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	8.1	8.1	8.1	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.7	1.7	1.7	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	65	65	65	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.3 <sup>2</sup>	0.6	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	<0.001	<0.001	<0.001	annually	1	1	100%



<b>Water sampling locality</b>	Altona
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 2
<b>Population</b>	117,900 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
Disinfection Biproducts									
Total Trihalomethanes	mg/L	0.25	0.038	0.047	0.060	>monthly	14	14	100%
Chloroform	mg/L	N	0.020	0.029	0.046	>monthly	14	N	N
Dichlorobromomethane	mg/L	N	0.010	0.013	0.016	>monthly	14	N	N
Dibromochloromethane	mg/L	N	0.002	0.005	0.006	>monthly	14	N	N
Bromoform	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
Chloroacetic acids									
Chloroacetic acid	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
Dichloroacetic aci	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
Trichloroacetic acid	mg/L	0.1	0.015	0.015	0.015	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>6</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Caroline Springs
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 5
<b>Population</b>	103,800 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	290	>weekly	341	341	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	27	>weekly	341	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	341	341	100%
<b>Free Chlorine</b>	mg/L	5	<0.01	0.22	0.74	>weekly	341	341	100%
<b>Total Chlorine</b>	mg/L	5	<0.05	0.34	0.98	>weekly	341	341	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	14	14	14	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	<0.01	0.02	0.03	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	8.7	8.7	8.7	annually	1	N	N
<b>Chloride</b>	mg/L	250	19	19	19	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	4	12	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	59	92	140	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.66	0.79	0.92	>fortnightly	29	29	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	29	29	29	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.05	0.12	fortnightly	27	27	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.8	1.8	1.8	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.003	0.011	fortnightly	27	27	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.95	1.95	1.95	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.3	7.5	8.8	fortnightly	27	25	92.59%
<b>pH</b>	units	6.5-9.2	7.3	7.5	8.8	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.2	1.2	1.2	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.4	5.4	5.4	annually	1	1	100%
<b>Sodium</b>	mg/L	180	9.8	9.8	9.8	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	9.8	9.8	9.8	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.2	1.2	1.2	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	80	80	80	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	1.0 <sup>2</sup>	1.5	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.017	0.031	0.048	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.012	0.019	0.030	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.003	0.009	0.015	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.003	0.006	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.006	0.006	0.006	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Deer Park
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 4
<b>Population</b>	58,000 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	170	>weekly	196	196	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	25	>weekly	196	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	196	196	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.25	0.47	>weekly	196	196	100%
<b>Total Chlorine</b>	mg/L	5	0.10	0.38	0.62	>weekly	196	196	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	15	15	15	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.01	0.02	0.03	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	7.2	7.2	7.2	annually	1	N	N
<b>Chloride</b>	mg/L	250	19	19	19	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	2	8	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	72	118	140	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.10	0.80	0.92	>fortnightly	29	29	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	26	26	26	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.02	0.14	fortnightly	27	27	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	2.0	2.0	2.0	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	<0.001	0.004	fortnightly	27	27	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.64	1.64	1.64	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.2	7.4	8.3	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.2	7.4	8.3	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.6	5.6	5.6	annually	1	1	100%
<b>Sodium</b>	mg/L	180	11.0	11.0	11.0	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	11.0	11.0	11.0	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.0	1.0	1.0	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	75	75	75	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.4 <sup>2</sup>	1.0	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.023	0.039	0.050	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.016	0.021	0.032	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.005	0.012	0.016	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	0.001	0.005	0.007	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.013	0.013	0.013	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	East Keilor
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 6
<b>Population</b>	41,300 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	130	>weekly	157	157	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	1,200	>weekly	157	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	157	157	100%
<b>Free Chlorine</b>	mg/L	5	0.07	0.30	0.68	>weekly	157	157	100%
<b>Total Chlorine</b>	mg/L	5	0.16	0.43	0.88	>weekly	157	157	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	13	13	13	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.02	0.03	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	7.5	7.5	7.5	annually	1	N	N
<b>Chloride</b>	mg/L	250	19	19	19	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	2	6	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	63	123	140	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.002	0.002	0.002	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.06	0.79	0.93	>fortnightly	28	28	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	27	27	27	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.01	0.11	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.9	1.9	1.9	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.001	0.002	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.82	1.82	1.82	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.2	7.4	7.7	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.2	7.4	7.7	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.2	1.2	1.2	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.2	5.2	5.2	annually	1	1	100%
<b>Sodium</b>	mg/L	180	9.6	9.6	9.6	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	12.0	12.0	12.0	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.006	0.006	0.006	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	75	75	75	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.7 <sup>2</sup>	1.2	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.025	0.035	0.044	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.011	0.019	0.026	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.005	0.011	0.015	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.005	0.007	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.006	0.006	0.006	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Little River
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 1A
<b>Population</b>	670 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	2	>weekly	117	117	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	43	>weekly	117	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	117	117	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.27	0.67	>weekly	117	117	100%
<b>Total Chlorine</b>	mg/L	5	<0.05	0.37	0.89	>weekly	117	117	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	22	22	22	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	<0.01	0.02	0.06	>monthly	52	52	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	8.6	8.6	8.6	annually	1	N	N
<b>Chloride</b>	mg/L	250	15	15	15	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	2	6	fortnightly	65	65	100%
<b>Conductivity</b>	µs/cm	~900	83	130	170	fortnightly	65	65	100%
<b>Copper</b>	mg/L	1	0.033	0.033	0.033	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.65	0.82	0.98	>fortnightly	67	67	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	27	27	27	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.03	0.08	fortnightly	65	65	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.001	0.003	fortnightly	65	65	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.06	1.06	1.06	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	6.4	7.2	9.2	fortnightly	65	63	96.9%
<b>pH</b>	units	6.5-9.2	6.4	7.2	9.2	fortnightly	65	65	100%
<b>Potassium</b>	mg/L	N	1.1	1.1	1.1	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.5	5.5	5.5	annually	1	1	100%
<b>Sodium</b>	mg/L	180	8.3	8.3	8.3	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	5.9	5.9	5.9	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.6	1.6	1.6	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	70	70	70	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.4 <sup>2</sup>	0.7	weekly	91	N	within standard
<b>Zinc</b>	mg/L	3	0.005	0.005	0.005	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.036	0.053	0.079	>monthly	52	52	100%
<b>Chloroform</b>	mg/L	N	0.019	0.031	0.055	>monthly	52	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.010	0.016	0.022	>monthly	52	N	N
<b>Dibromochloromethane</b>	mg/L	N	0.002	0.006	0.009	>monthly	52	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	52	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.013	0.013	0.013	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Maribyrnong
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 3A
<b>Population</b>	120,900 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	60	>weekly	366	366	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	230	>weekly	366	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	366	366	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.22	0.48	>weekly	366	366	100%
<b>Total Chlorine</b>	mg/L	5	0.10	0.33	0.86	>weekly	366	366	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	14	14	14	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.02	0.04	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	6.4	6.4	6.4	annually	1	N	N
<b>Chloride</b>	mg/L	250	15	15	15	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	3	8	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	71	103	130	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.004	0.004	0.004	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.53	0.77	0.92	>fortnightly	29	29	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	23	23	23	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	0.01	0.03	0.09	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.8	1.8	1.8	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.002	0.004	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.33	1.33	1.33	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.3	7.4	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.1	7.3	7.4	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.0	1.0	1.0	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.6	5.6	5.6	annually	1	1	100%
<b>Sodium</b>	mg/L	180	7.9	7.9	7.9	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	7.3	7.3	7.3	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.7	1.7	1.7	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.020	0.020	0.020	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	65	65	65	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.5 <sup>2</sup>	0.7	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.030	0.045	0.056	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.015	0.030	0.041	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.007	0.011	0.014	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	0.001	0.004	0.005	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.015	0.015	0.015	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Moonee Ponds
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 9B
<b>Population</b>	73,500 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	200	>weekly	235	235	100%
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	19	>weekly	235	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	235	235	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.20	0.65	>weekly	235	235	100%
<b>Total Chlorine</b>	mg/L	5	0.07	0.30	0.93	>weekly	235	235	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	15	15	15	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.03	0.06	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	5.0	5.0	5.0	annually	1	N	N
<b>Chloride</b>	mg/L	250	8	8	8	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	4	10	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	54	93	140	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.010	0.010	0.010	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.26	0.75	0.91	>fortnightly	28	28	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	18	18	18	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.05	0.12	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.003	0.011	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	0.75	0.75	0.75	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.0	7.2	7.5	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.0	7.2	7.5	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	0.7	0.7	0.7	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.2	5.2	5.2	annually	1	1	100%
<b>Sodium</b>	mg/L	180	4.8	4.8	4.8	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	2.2	2.2	2.2	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.006	0.006	0.006	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	40	40	40	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.6 <sup>2</sup>	0.8	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.003	0.003	0.003	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.029	0.043	0.052	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.020	0.030	0.040	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.005	0.010	0.015	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.003	0.006	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.022	0.022	0.022	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Parkville
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 11
<b>Population</b>	157,600 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	200	>weekly	406	406	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	21	>weekly	406	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	406	406	100%
<b>Free Chlorine</b>	mg/L	5	<0.01	0.23	0.56	>weekly	406	406	100%
<b>Total Chlorine</b>	mg/L	5	<0.05	0.34	0.85	>weekly	406	406	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	13	13	13	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.02	0.04	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	5.6	5.6	5.6	annually	1	N	N
<b>Chloride</b>	mg/L	250	14	14	14	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	3	8	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	58	114	130	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.013	0.013	0.013	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.28	0.78	0.90	>fortnightly	29	29	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	21	21	21	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.02	0.08	fortnightly	27	27	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.7	1.7	1.7	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.002	0.006	fortnightly	27	27	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.42	1.42	1.42	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.0	7.2	7.4	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.0	7.2	7.4	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.0	1.0	1.0	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.6	5.6	5.6	annually	1	1	100%
<b>Sodium</b>	mg/L	180	7.4	7.4	7.4	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	7.7	7.7	7.7	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	58	58	58	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.4 <sup>2</sup>	0.8	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.003	0.003	0.003	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.031	0.041	0.050	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.017	0.025	0.040	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.008	0.011	0.015	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	0.001	0.004	0.006	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.015	0.015	0.015	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.



<b>Water sampling locality</b>	Richmond
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 54
<b>Population</b>	24,900 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	29	>weekly	105	105	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	<1	>weekly	105	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	105	105	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.31	0.73	>weekly	105	105	100%
<b>Total Chlorine</b>	mg/L	5	<0.05	0.42	0.83	>weekly	105	105	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	13	13	13	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.03	0.04	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	4.2	4.2	4.2	annually	1	N	N
<b>Chloride</b>	mg/L	250	8	8	8	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	4	6	8	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	56	62	71	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.009	0.009	0.009	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.36	0.69	0.84	>fortnightly	28	28	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	16	16	16	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	0.05	0.07	0.09	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.2	1.2	1.2	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	0.003	0.005	0.008	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	0.84	0.84	0.84	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.3	7.6	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.1	7.3	7.6	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	0.6	0.6	0.6	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.7	5.7	5.7	annually	1	1	100%
<b>Sodium</b>	mg/L	180	4.6	4.6	4.6	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	1.5	1.5	1.5	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.3	1.3	1.3	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	35	35	35	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	0.3	0.9 <sup>2</sup>	0.9	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.043	0.062	0.076	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.033	0.052	0.063	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.008	0.009	0.012	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	<0.001	0.001	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	0.006	0.006	0.006	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.037	0.037	0.037	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Strathmore
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 9A
<b>Population</b>	8,100 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	180	>weekly	80	80	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	36	>weekly	80	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	80	80	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.09	0.29	>weekly	80	80	100%
<b>Total Chlorine</b>	mg/L	5	0.05	0.18	0.46	>weekly	80	80	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	16	16	16	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.02	0.03	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	4.9	4.9	4.9	annually	1	N	N
<b>Chloride</b>	mg/L	250	8	8	8	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	4	8	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	56	86	130	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.008	0.008	0.008	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.27	0.75	0.91	>fortnightly	28	28	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	17	17	17	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	0.01	0.05	0.11	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.2	1.2	1.2	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.003	0.006	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	0.71	0.71	0.71	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.4	8.6	fortnightly	27	26	96.3%
<b>pH</b>	units	6.5-9.2	7.1	7.4	8.6	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	0.6	0.6	0.6	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.2	5.2	5.2	annually	1	1	100%
<b>Sodium</b>	mg/L	180	4.2	4.2	4.2	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	1.5	1.5	1.5	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.7	1.7	1.7	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	25	25	25	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.8 <sup>2</sup>	0.9	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.003	0.003	0.003	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.028	0.051	0.061	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.022	0.038	0.051	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.005	0.010	0.014	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.002	0.005	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.019	0.019	0.019	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Taylors Lakes
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 5A
<b>Population</b>	67,800 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	2 <sup>G</sup>	10000	>weekly	262	260	99.24% <sup>†</sup>
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	200	>weekly	262	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	262	262	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.37	0.87	>weekly	262	262	100%
<b>Total Chlorine</b>	mg/L	5	<0.05	0.50	1.00	>weekly	262	262	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	15	15	15	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	<0.01	0.02	0.03	>monthly	27	27	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	4.2	4.2	4.2	annually	1	N	N
<b>Chloride</b>	mg/L	250	10	10	10	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	2	5	10	fortnightly	40	40	100%
<b>Conductivity</b>	µs/cm	~900	63	67	72	fortnightly	40	40	100%
<b>Copper</b>	mg/L	1	0.002	0.002	0.002	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.71	0.75	0.87	>fortnightly	42	42	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	16	16	16	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	0.04	0.09	0.14	fortnightly	39	39	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.4	1.4	1.4	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	0.001	0.005	0.018	fortnightly	39	39	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	0.38	0.38	0.38	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.2	7.5	8.0	fortnightly	40	40	100%
<b>pH</b>	units	6.5-9.2	7.2	7.5	8.0	fortnightly	40	40	100%
<b>Potassium</b>	mg/L	N	0.7	0.7	0.7	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	4.0	4.0	4.0	annually	1	1	100%
<b>Sodium</b>	mg/L	180	5.3	5.3	5.3	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	1.6	1.6	1.6	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.4	1.4	1.4	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.006	0.006	0.006	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	42	42	42	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>†</sup>	0.4	1.2 <sup>‡</sup>	1.3	weekly	66	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.010	0.024	0.039	>monthly	27	27	100%
<b>Chloroform</b>	mg/L	N	0.006	0.017	0.029	>monthly	27	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.002	0.005	0.007	>monthly	27	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.001	0.002	>monthly	27	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	27	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>†</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>‡</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Tullamarine
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 7A
<b>Population</b>	10,500 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	1 <sup>G</sup>	1,800	>weekly	91	90	98.9%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	200	>weekly	91	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	91	91	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.40	0.75	>weekly	91	91	100%
<b>Total Chlorine</b>	mg/L	5	0.06	0.51	0.81	>weekly	91	91	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	12	12	12	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	<0.01	0.03	0.04	>monthly	13	13	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	6.9	6.9	6.9	annually	1	N	N
<b>Chloride</b>	mg/L	250	19	19	19	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	4	12	fortnightly	26	26	100%
<b>Conductivity</b>	µs/cm	~900	63	82	130	fortnightly	26	26	100%
<b>Copper</b>	mg/L	1	0.007	0.007	0.007	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.71	0.79	0.92	>fortnightly	27	27	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	26	26	26	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.06	0.19	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	2.2	2.2	2.2	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.003	0.013	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.68	1.68	1.68	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.6	8.8	fortnightly	26	24	92.31%
<b>pH</b>	units	6.5-9.2	7.1	7.6	8.8	fortnightly	26	26	100%
<b>Potassium</b>	mg/L	N	1.4	1.4	1.4	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.8	5.8	5.8	annually	1	1	100%
<b>Sodium</b>	mg/L	180	10.0	10.0	10.0	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	13.0	13.0	13.0	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.6	1.6	1.6	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	<0.005	<0.005	<0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	70	70	70	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	1.1 <sup>2</sup>	1.6	weekly	52	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.014	0.026	0.039	>monthly	13	13	100%
<b>Chloroform</b>	mg/L	N	0.009	0.018	0.027	>monthly	13	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.003	0.006	0.009	>monthly	13	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.001	0.004	>monthly	13	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	13	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Werribee
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 1
<b>Population</b>	136,700 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1	240	>weekly	456	456	100%
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1	16	>weekly	457	N	N
<b>E. coli</b>	orgs/100mL	100%<1 <sup>#</sup>	<1	<1	<1	>weekly	457	457	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.29	0.56	>weekly	457	457	100%
<b>Total Chlorine</b>	mg/L	5	0.05	0.41	0.74	>weekly	457	457	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	14	14	14	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.03	0.04	>monthly	40	40	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	5.6	5.6	5.6	annually	1	N	N
<b>Chloride</b>	mg/L	250	15	15	15	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	2	6	fortnightly	54	54	100%
<b>Conductivity</b>	µs/cm	~900	72	118	140	fortnightly	54	54	100%
<b>Copper</b>	mg/L	1	0.001	0.001	0.001	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.36	0.80	0.95	>fortnightly	57	57	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	21	21	21	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.02	0.08	fortnightly	54	54	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.7	1.7	1.7	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.002	0.004	fortnightly	54	54	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.11	1.11	1.11	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.4	8.0	fortnightly	54	54	100%
<b>pH</b>	units	6.5-9.2	7.1	7.4	8.0	fortnightly	54	54	100%
<b>Potassium</b>	mg/L	N	1.0	1.0	1.0	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	4.9	4.9	4.9	annually	1	1	100%
<b>Sodium</b>	mg/L	180	7.6	7.6	7.6	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	7.1	7.1	7.1	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.5	1.5	1.5	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.007	0.007	0.007	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	35	35	35	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.5 <sup>1</sup>	0.6	weekly	82	N	within standard
<b>Zinc</b>	mg/L	3	0.002	0.002	0.002	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.037	0.051	0.073	>monthly	40	40	100%
<b>Chloroform</b>	mg/L	N	0.018	0.030	0.047	>monthly	40	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.009	0.015	0.022	>monthly	40	N	N
<b>Dibromochloromethane</b>	mg/L	N	0.002	0.005	0.008	>monthly	40	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	40	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.013	0.013	0.013	annually	1	1	100%

\* Internal City West Water guideline.

\*\* Guideline set for "True Colour" (15 PCU) however "Apparent Colour" is measured (with a benchmark guideline of 25 PCU).

N No guideline/standard set for this parameter.

<sup>#</sup> Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile (shown) less than or equal to 5 NTU.

<sup>2</sup> 95th percentile results for turbidity<sup>2</sup> is missing in the table footnotes.

<b>Water sampling locality</b>	Werribee South
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 2A
<b>Population</b>	2000 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	1 <sup>G</sup>	4200	>weekly	109	106	97.25% <sup>1</sup>
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	2	>weekly	109	N	N
<b><i>E. coli</i></b>	orgs/100mL	Zero (0)	0	0	0	>weekly	109	109	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.35	0.98	>weekly	109	109	100%
<b>Total Chlorine</b>	mg/L	5	<0.05	0.46	1.10	>weekly	109	109	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	15	15	15	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	<0.01	0.02	0.05	>monthly	48	48	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	6.1	6.1	6.1	annually	1	N	N
<b>Chloride</b>	mg/L	250	13	13	13	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	4	10	fortnightly	61	61	100%
<b>Conductivity</b>	µs/cm	~900	89	124	140	fortnightly	61	61	100%
<b>Copper</b>	mg/L	1	0.001	0.001	0.001	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.52	0.84	0.93	>fortnightly	63	63	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	22	22	22	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	<0.01	0.08	0.21	fortnightly	61	61	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.5	1.5	1.5	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.002	0.010	fortnightly	61	61	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	0.93	0.93	0.93	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.3	7.6	8.5	fortnightly	61	61	100%
<b>pH</b>	units	6.5-9.2	7.3	7.6	8.5	fortnightly	61	61	100%
<b>Potassium</b>	mg/L	N	1.0	1.0	1.0	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.0	5.0	5.0	annually	1	1	100%
<b>Sodium</b>	mg/L	180	7.4	7.4	7.4	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	6.3	6.3	6.3	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.0	1.0	1.0	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.005	0.005	0.005	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	52	52	52	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.5 <sup>2</sup>	0.9	weekly	87	N	within standard
<b>Zinc</b>	mg/L	3	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.002	0.029	0.063	>monthly	47	47	100%
<b>Chloroform</b>	mg/L	N	<0.001	0.017	0.039	>monthly	47	N	N
<b>Dichlorobromomethane</b>	mg/L	N	<0.001	0.008	0.020	>monthly	47	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.003	0.008	>monthly	47	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	47	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.011	0.011	0.011	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

<b>Water sampling locality</b>	Williamstown
<b>For period</b>	1 July 2019 to 30 June 2020

<b>Locality</b>	No. 3B
<b>Population</b>	50,000 (2016 Census)

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			Sampling frequency	No. of Samples		Performance against standard / guideline
			Min	Mean	Max		Total	Passing	
<b>Total Plate Count (37°C)</b>	orgs/mL	1000*	<1	<1 <sup>G</sup>	33	>weekly	170	170	100%*
<b>Total Coliforms</b>	orgs/100mL	N	<1	<1 <sup>G</sup>	150	>weekly	170	N	N
<b>E. coli</b>	orgs/100mL	Zero (0)	0	0	0	>weekly	170	170	100%
<b>Free Chlorine</b>	mg/L	5	<0.05	0.20	0.45	>weekly	170	170	100%
<b>Total Chlorine</b>	mg/L	5	0.07	0.31	0.56	>weekly	170	170	100%
<b>Alkalinity (as CaCO<sub>3</sub>)</b>	mg/L	N	11	11	11	annually	1	N	N
<b>Aluminium (acid soluble)</b>	mg/L	0.2	0.02	0.03	0.04	>monthly	14	14	100%
<b>Arsenic</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Cadmium</b>	mg/L	0.002	<0.0002	<0.0002	<0.0002	annually	1	1	100%
<b>Calcium</b>	mg/L	N	6.1	6.1	6.1	annually	1	N	N
<b>Chloride</b>	mg/L	250	16	16	16	annually	1	1	100%
<b>Chromium</b>	mg/L	0.05	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Colour</b>	Pt/Co	25**	<2	3	6	fortnightly	27	27	100%
<b>Conductivity</b>	µs/cm	~900	78	111	130	fortnightly	27	27	100%
<b>Copper</b>	mg/L	1	0.007	0.007	0.007	annually	1	1	100%
<b>Cyanide</b>	mg/L	0.08	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Fluoride</b>	mg/L	1.5	0.30	0.78	0.97	>fortnightly	29	29	100%
<b>Hardness (as CaCO<sub>3</sub>)</b>	mg/L	200	23	23	23	annually	1	1	100%
<b>Iron</b>	mg/L	0.3	0.01	0.02	0.06	fortnightly	26	26	100%
<b>Lead</b>	mg/L	0.01	<0.001	<0.001	<0.001	annually	1	1	100%
<b>Magnesium</b>	mg/L	N	1.9	1.9	1.9	annually	1	N	N
<b>Manganese</b>	mg/L	0.1	<0.001	0.002	0.003	fortnightly	26	26	100%
<b>Mercury</b>	mg/L	0.001	<0.0001	<0.0001	<0.0001	annually	1	1	100%
<b>Nitrate (NO<sub>3</sub>)</b>	mg/L	50	1.55	1.55	1.55	annually	1	1	100%
<b>pH</b>	units	6.5-8.5	7.1	7.3	7.4	fortnightly	27	27	100%
<b>pH</b>	units	6.5-9.2	7.1	7.3	7.4	fortnightly	27	27	100%
<b>Potassium</b>	mg/L	N	1.2	1.2	1.2	annually	1	N	N
<b>Silica (SiO<sub>2</sub>)</b>	mg/L	80	5.7	5.7	5.7	annually	1	1	100%
<b>Sodium</b>	mg/L	180	8.7	8.7	8.7	annually	1	1	100%
<b>Sulphate</b>	mg/L	250	10.0	10.0	10.0	annually	1	1	100%
<b>Total Organic Carbon</b>	mg/L	N	1.1	1.1	1.1	annually	1	N	N
<b>Total Phosphorus</b>	mg/L	N	0.007	0.007	0.007	annually	1	N	N
<b>Total Dissolved Solids</b>	mg/L	600	60	60	60	annually	1	1	100%
<b>Turbidity</b>	NTU	5 <sup>1</sup>	<0.1	0.3 <sup>2</sup>	0.6	weekly	53	N	within standard
<b>Zinc</b>	mg/L	3	0.005	0.005	0.005	annually	1	1	100%
<b>Disinfection Byproducts</b>									
<b>Total Trihalomethanes</b>	mg/L	0.25	0.036	0.044	0.056	>monthly	14	14	100%
<b>Chloroform</b>	mg/L	N	0.020	0.026	0.038	>monthly	14	N	N
<b>Dichlorobromomethane</b>	mg/L	N	0.009	0.012	0.017	>monthly	14	N	N
<b>Dibromochloromethane</b>	mg/L	N	0.002	0.004	0.006	>monthly	14	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	>monthly	14	N	N
<b>Chloroacetic acids</b>									
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	<0.005	<0.005	annually	1	1	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	0.012	0.012	0.012	annually	1	1	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

## All water sampling localities

For period		1 July 2019 to 30 June 2020		Population		973,670 (2016 Census)		
Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			No. of Samples		Performance against standard / guideline
			Min	Mean	Max	Total	Passing	
Total Plate Count (37°C)	orgs/mL	1000*	<1	<1 <sup>G</sup>	10000	3443	3437	99.83%*
Total Coliforms	orgs/100mL	N	<1	<1 <sup>G</sup>	1200	3444	N	N
E. coli	orgs/100mL	Zero (0)	0	0	0	>weekly	3444	100%
Free Chlorine	mg/L	5	<0.01	0.25	0.98	3444	3444	100%
Total Chlorine	mg/L	5	<0.05	0.36	1.10	3444	3444	100%
Alkalinity (as CaCO <sub>3</sub> )	mg/L	N	11	14	22	15	N	N
Aluminium (acid soluble)	mg/L	0.2	<0.01	0.02	0.06	320	320	100%
Arsenic	mg/L	0.01	<0.001	<0.001	<0.001	15	15	100%
Cadmium	mg/L	0.002	<0.0002	<0.0002	<0.0002	15	15	100%
Calcium	mg/L	N	4.2	6.3	8.7	15	N	N
Chloride	mg/L	250	8	14	19	15	15	100%
Chromium	mg/L	0.05	<0.001	<0.001	<0.001	15	15	100%
Colour	Pt/Co	25**	<2	3	12	516	516	100%
Conductivity	µs/cm	~900	54	106	170	516	516	100%
Copper	mg/L	1	<0.001	0.007	0.033	15	15	100%
Cyanide	mg/L	0.08	<0.005	<0.005	<0.005	15	15	100%
Dissolved Oxygen	mg/L	N	7.6	9.7	11.7	27	N	N
Fluoride	mg/L	1.5	0.06	0.79	0.98	542	542	100%
Hardness (as CaCO <sub>3</sub> )	mg/L	200	16	22	29	15	15	100%
Iron	mg/L	0.3	<0.01	0.04	0.21	509	509	100%
Lead	mg/L	0.01	<0.001	<0.001	<0.001	15	15	100%
Magnesium	mg/L	N	1.2	1.6	2.2	15	N	N
Manganese	mg/L	0.1	<0.001	0.002	0.018	509	509	100%
Mercury	mg/L	0.001	<0.0001	<0.0001	<0.0001	15	15	100%
Nitrate (NO <sub>3</sub> )	mg/L	50	0.38	1.24	1.95	15	15	100%
pH	units	6.5-8.5	6.4	7.4	9.2	516	508	98.45%
pH	units	6.5-9.2	6.4	7.4	9.2	516	516	100%
Potassium	mg/L	N	0.6	1.0	1.4	15	N	N
Silica (SiO <sub>2</sub> )	mg/L	80	4.0	5.3	5.8	15	15	100%
Sodium	mg/L	180	4.2	7.6	11.0	15	15	100%
Sulphate	mg/L	250	1.5	7.0	13.0	15	15	100%
Temperature	°C	N	11.0	16.6	25.4	27	N	N
Total Organic Carbon	mg/L	N	1.0	1.4	1.7	15	N	N
Total Phosphorus	mg/L	N	<0.005	0.005	0.020	15	N	N
Total Dissolved Solids	mg/L	600	7.6	9.7	11.7	27	27	100%
Turbidity	NTU	5 <sup>I</sup>	<0.1	0.9 <sup>2</sup>	1.6	908	N	within standard



Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples)			No. of Samples		Performance against standard / guideline
			Min	Mean	Max	Total	Passing	
<b>Zinc</b>	mg/L	3	0.001	0.002	0.005	15	15	100%
<b>Disinfection Byproducts</b>								
<b>Total Trihalomethanes</b>	mg/L	0.25	0.002	0.042	0.079	319	319	100%
<b>Chloroform</b>	mg/L	N	<0.001	0.026	0.063	319	N	N
<b>Dichlorobromomethane</b>	mg/L	N	<0.001	0.011	0.022	319	N	N
<b>Dibromochloromethane</b>	mg/L	N	<0.001	0.004	0.009	319	N	N
<b>Bromoform</b>	mg/L	N	<0.001	<0.001	<0.001	319	N	N
<b>Chloroacetic acids</b>								
<b>Chloroacetic acid</b>	mg/L	0.15	<0.005	<0.005	<0.005	15	15	100%
<b>Dichloroacetic acid</b>	mg/L	0.1	<0.005	0.003	0.006	15	15	100%
<b>Trichloroacetic acid</b>	mg/L	0.1	<0.005	0.013	0.037	15	15	100%

\* Internal City West Water target.

\*\* Guideline set for "True Colour" (15 Pt/Co) however "Apparent Colour" is measured (with a benchmark guideline of 25 Pt/Co).

N No guideline/standard set for this parameter.

# Victorian standard: 100% of samples must not contain any *E.coli*/100mL.

<sup>G</sup> Geometric means shown for bacterial parameters.

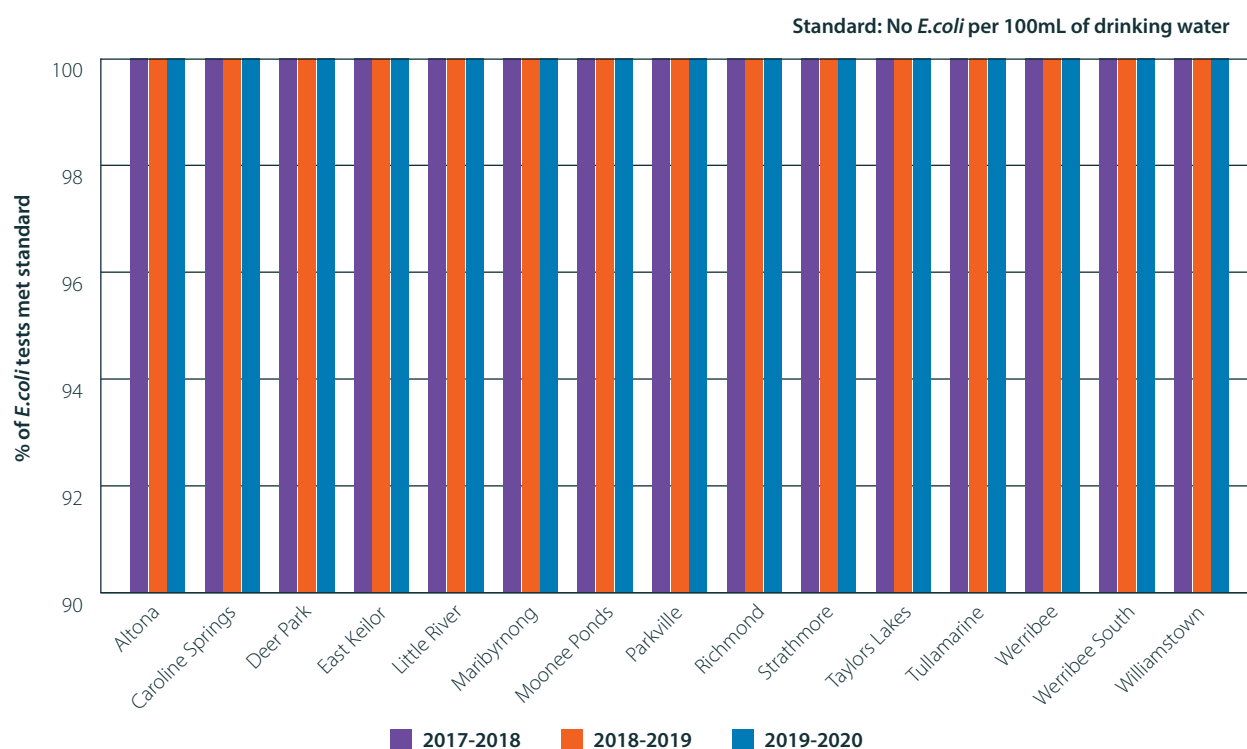
<sup>1</sup> Victorian standard: 95th percentile less than or equal to 5 NTU.

<sup>2</sup> 95th percentile result shown for turbidity.

## Appendix B. Spatial and time-based water quality summaries

A comparison of water quality results from the reticulation system sampling sites (water mains, customer taps, service tanks) obtained from the previous two financial years and the reporting period (2019-2020)

**Figure B.1: *E. coli* performance in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)**



**Figure B.2: Annual average free chlorine concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)**

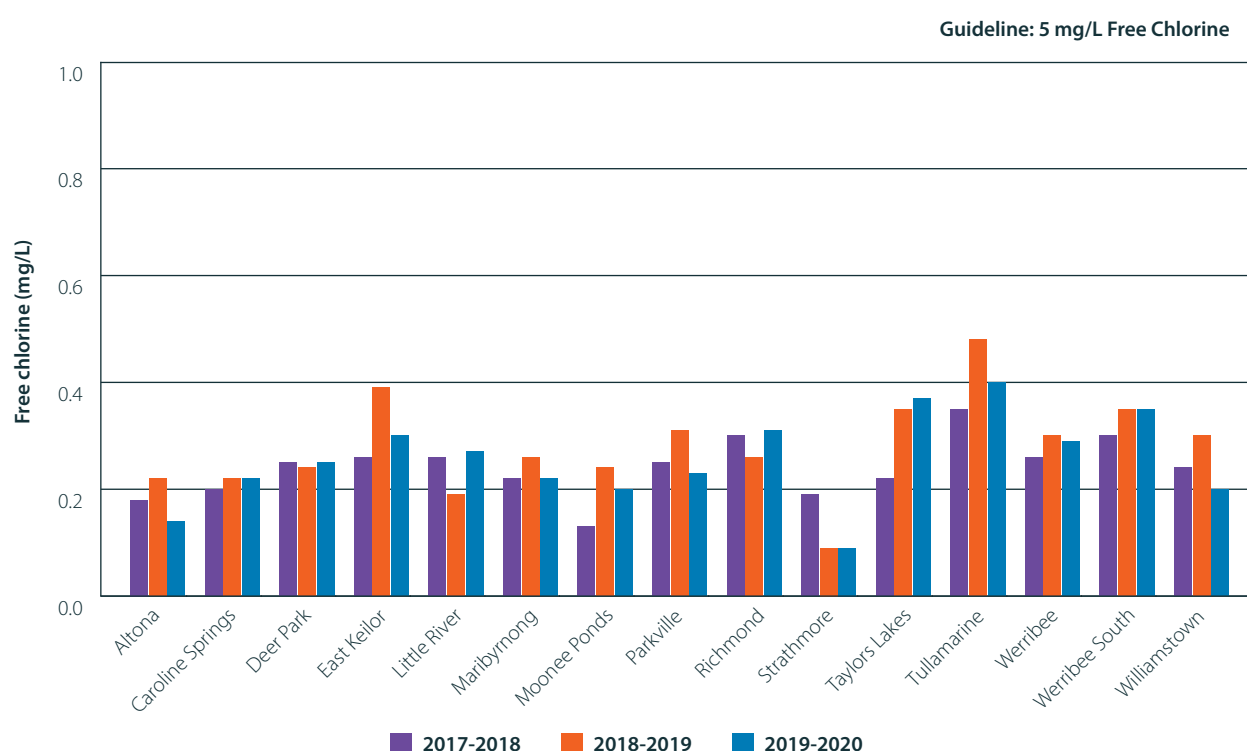


Figure B.3: Aluminium concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

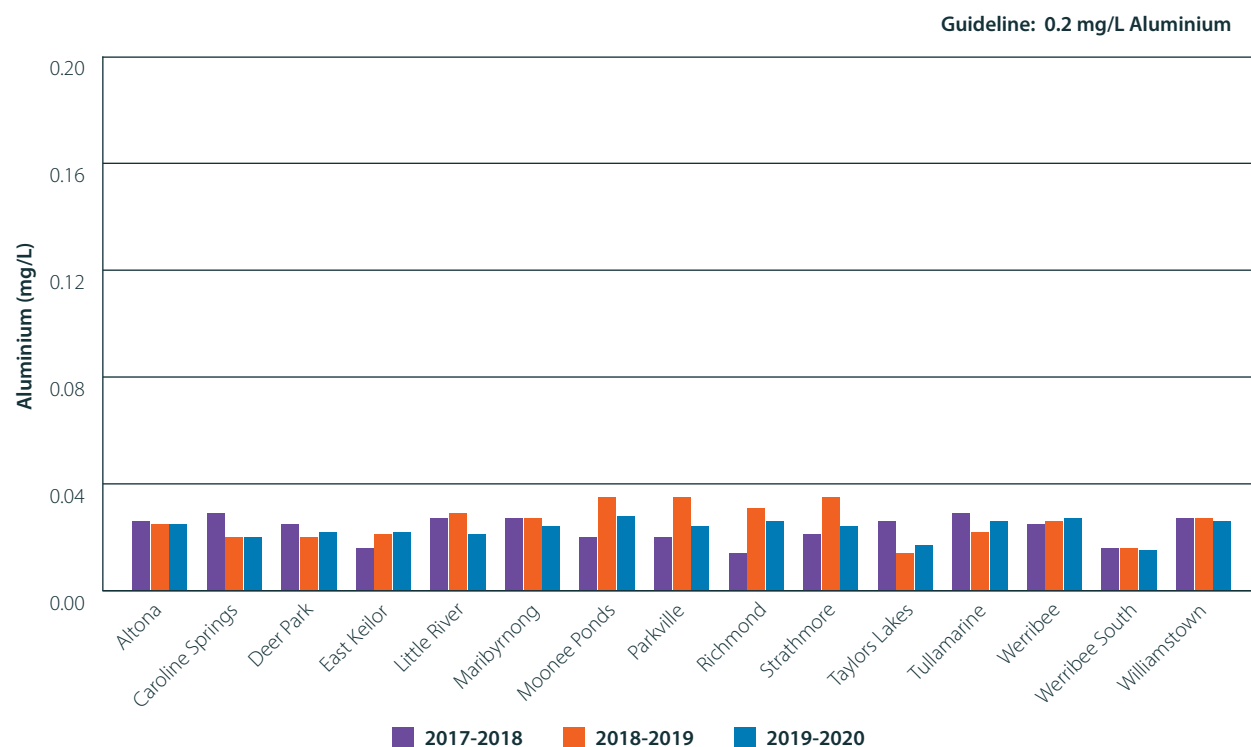


Figure B.4: Chloride concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

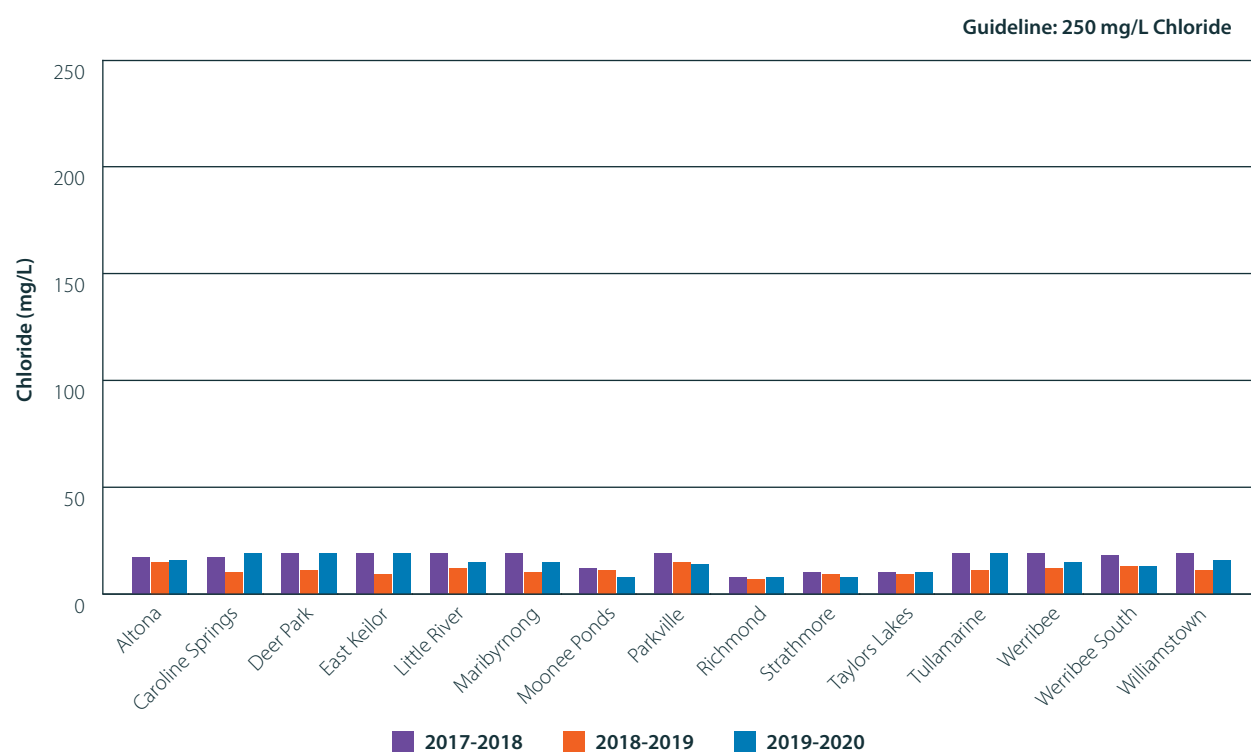


Figure B.5: Average apparent colour levels in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

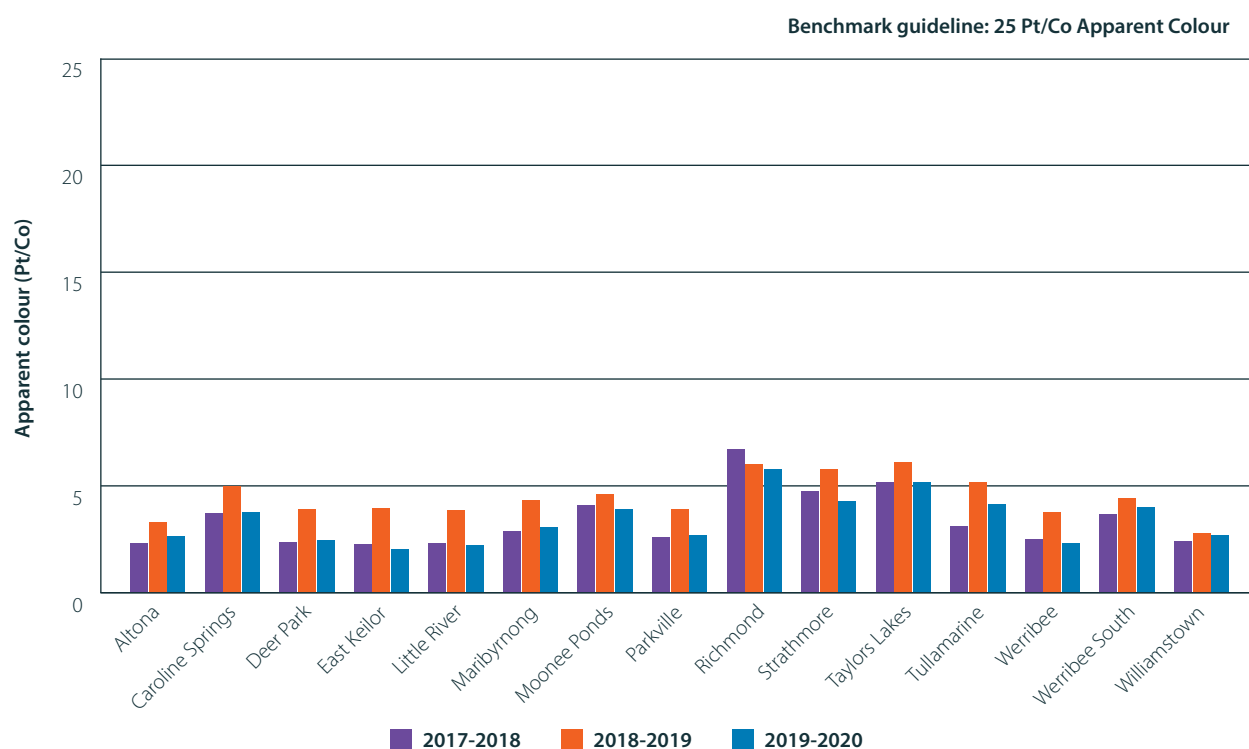
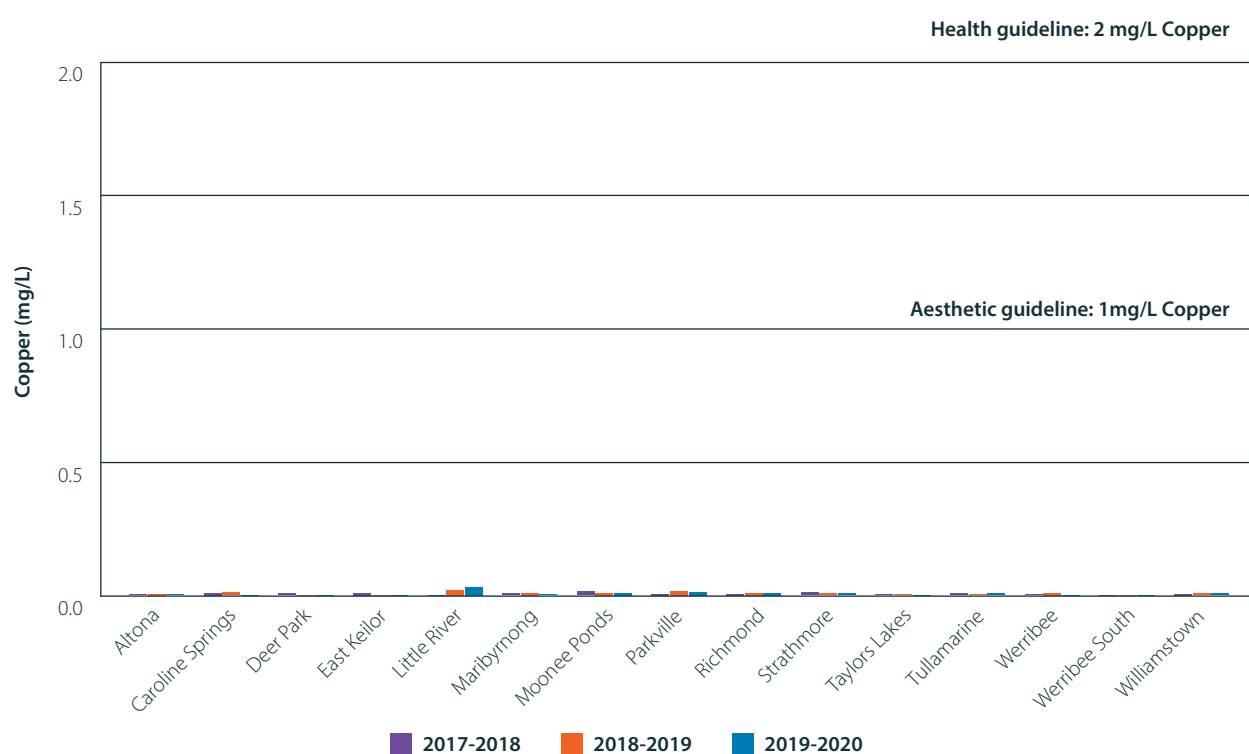
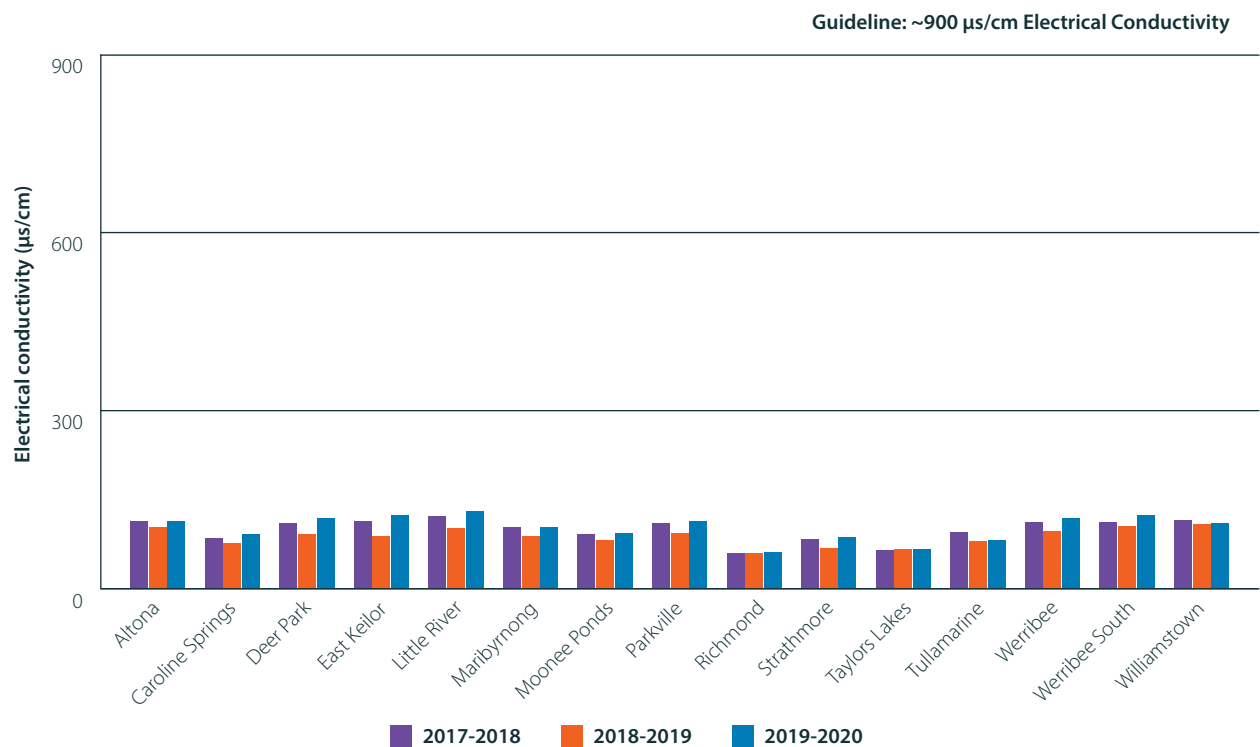


Figure B.6: Copper concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)



**Figure B.7: Average electrical conductivity levels in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)**



**Figure B.8: Average fluoride concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)**

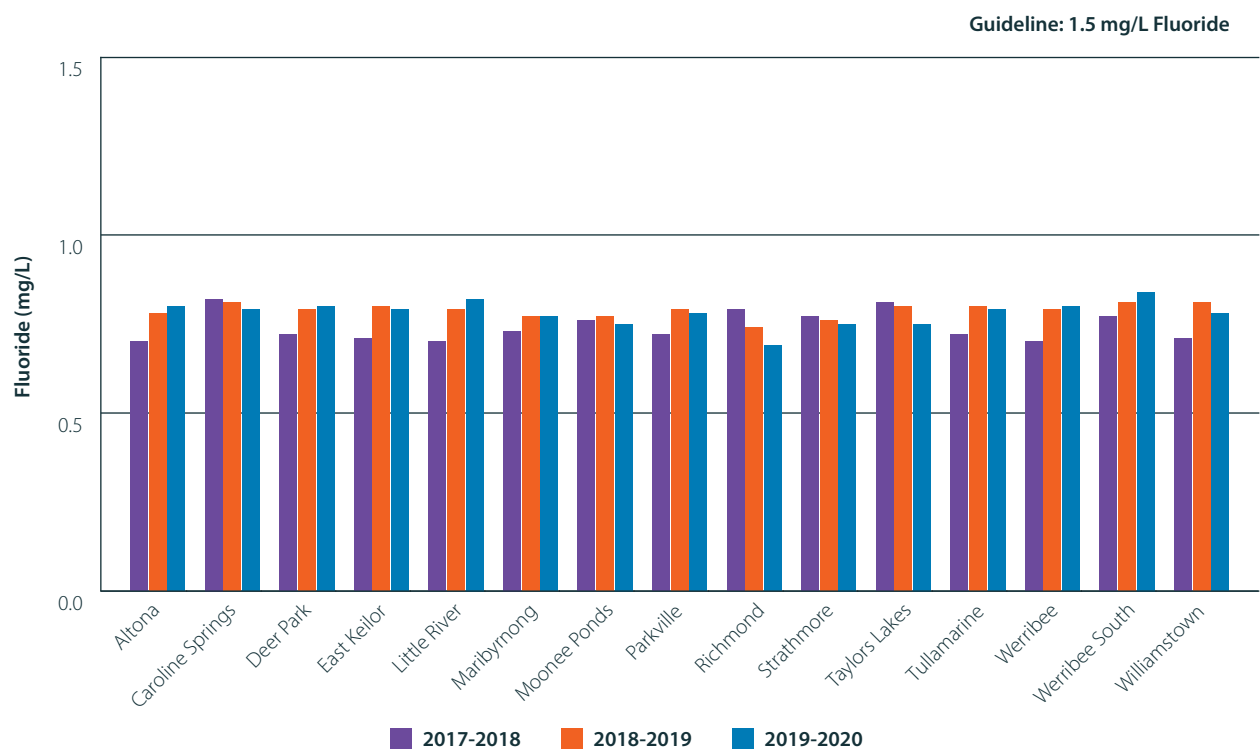


Figure B.9: Hardness concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

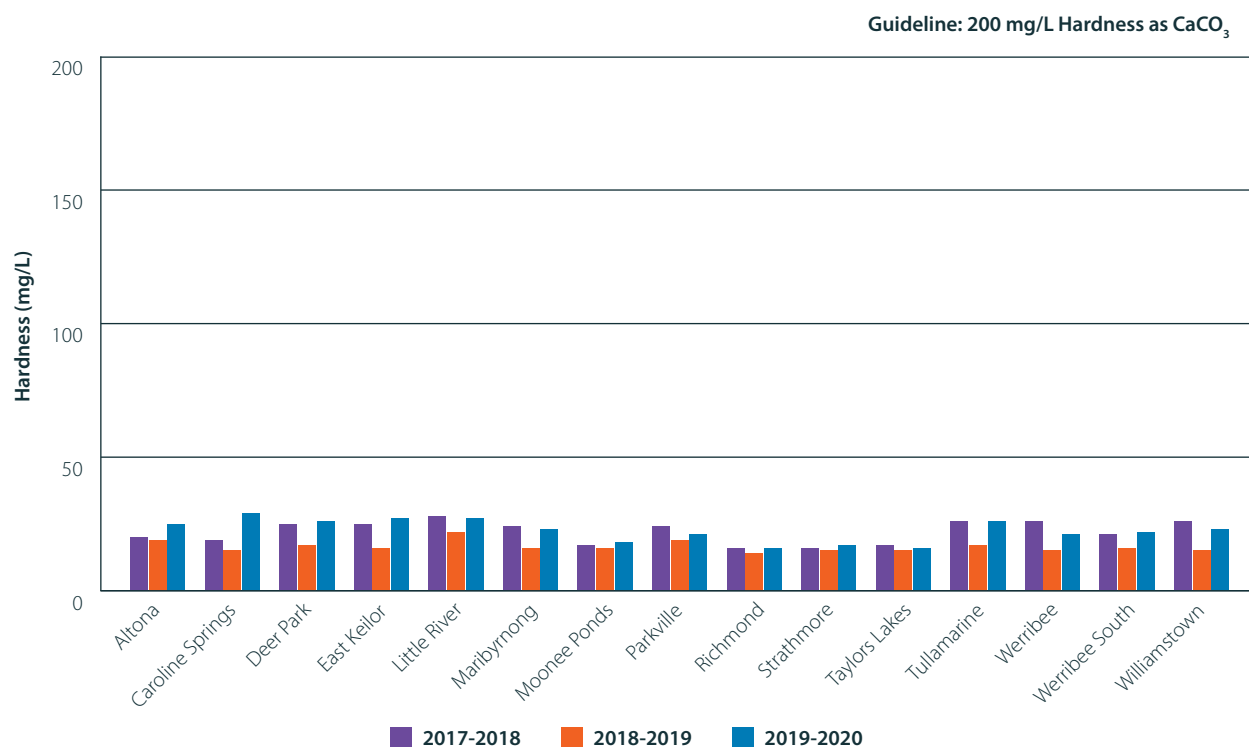


Figure B.10: Average iron concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

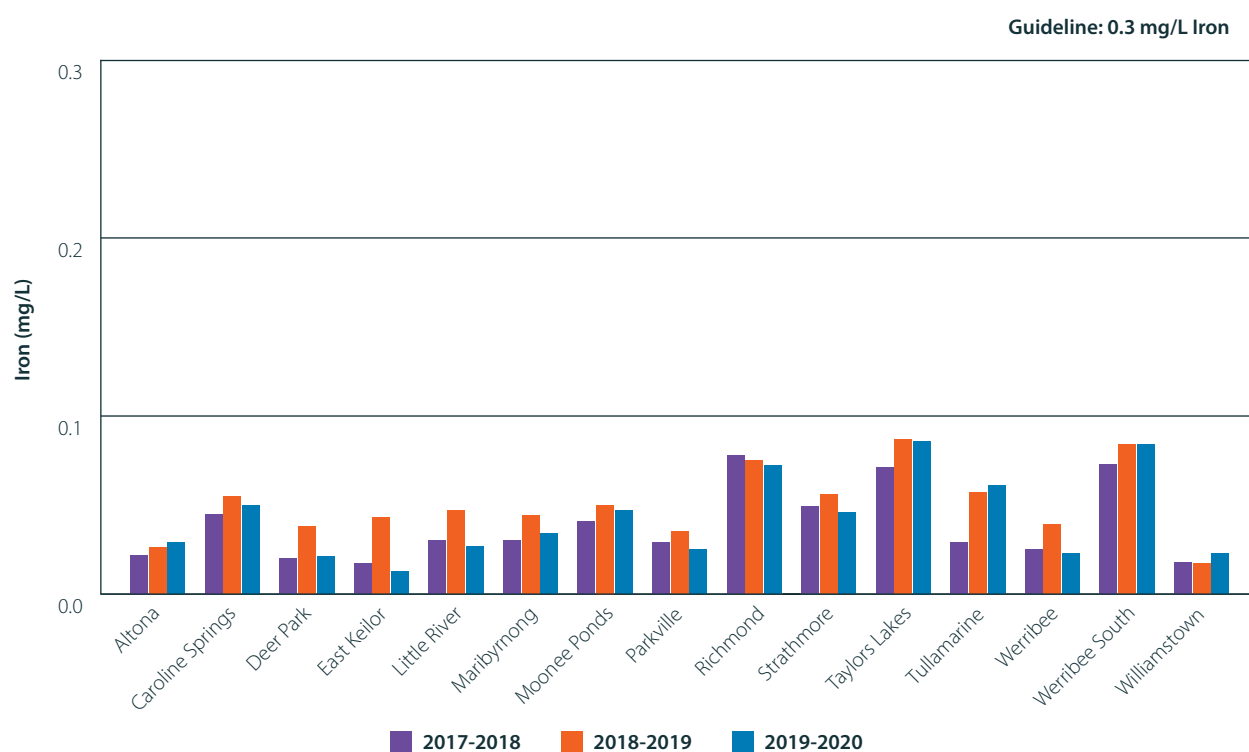


Figure B.11: Average manganese concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

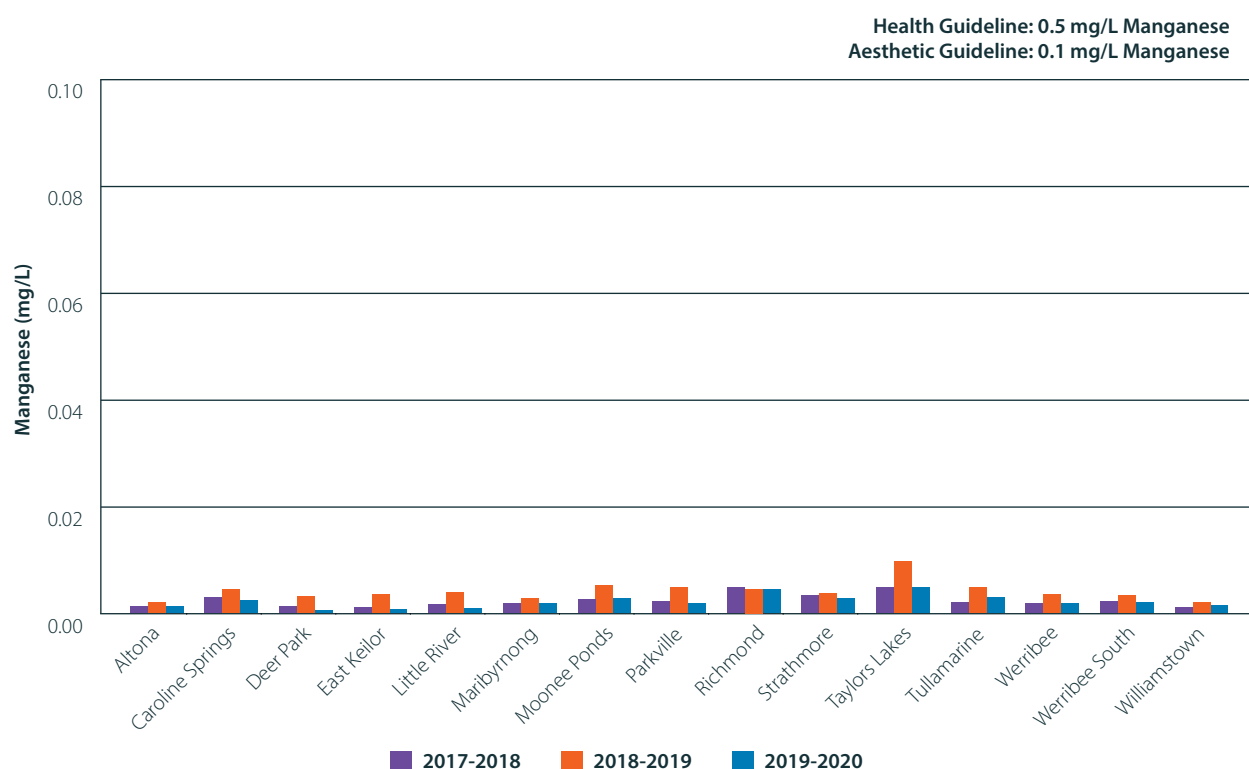


Figure B.12: Nitrate concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

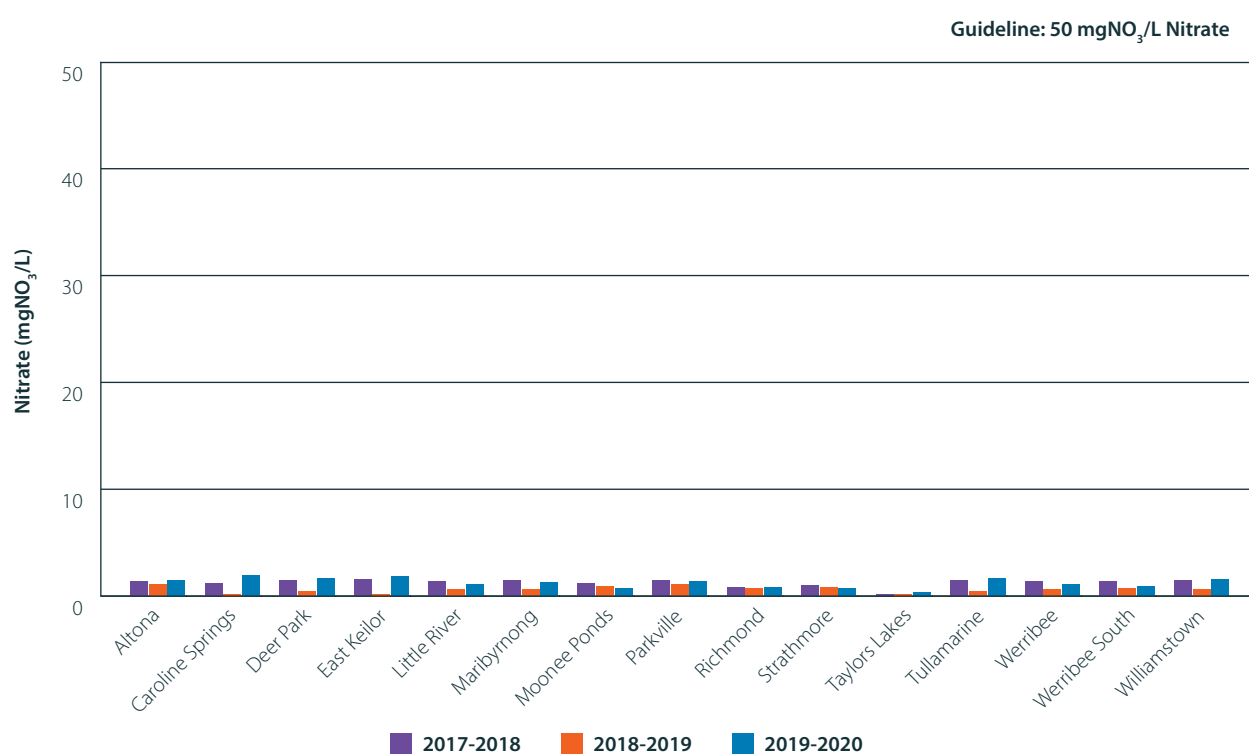


Figure B.13: Average pH values in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

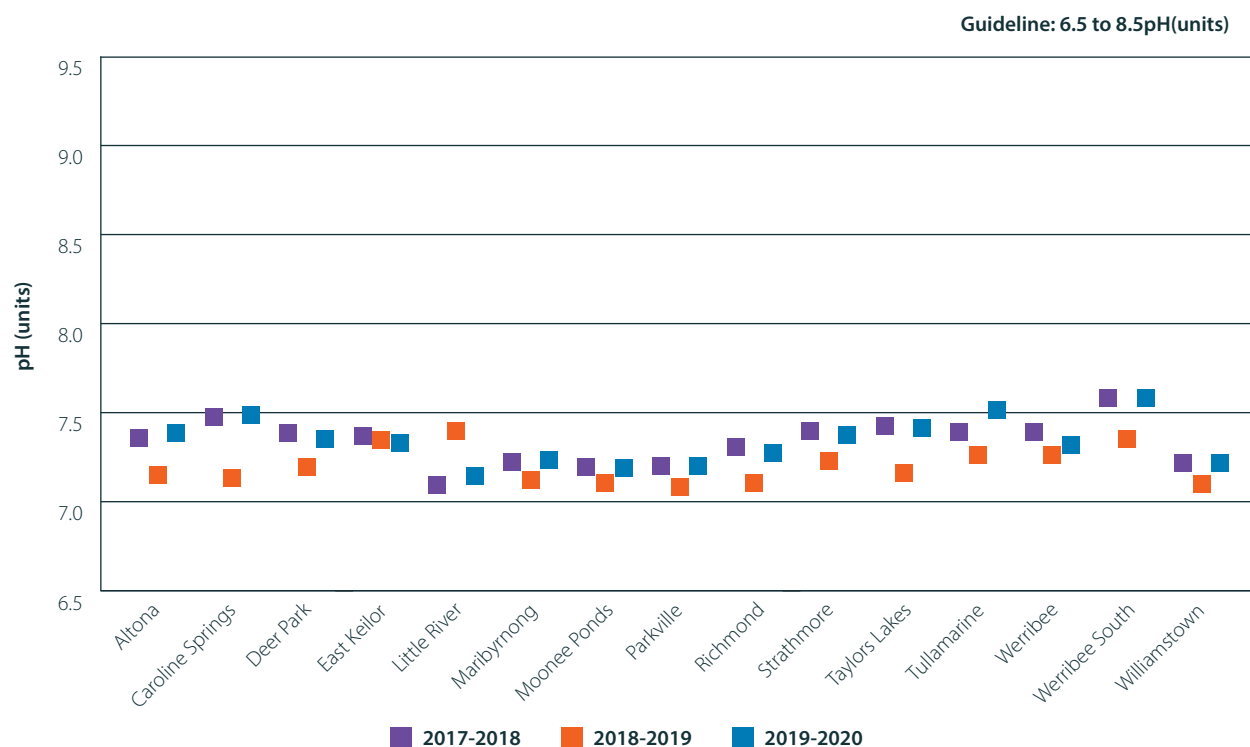


Figure B.14: Sodium concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

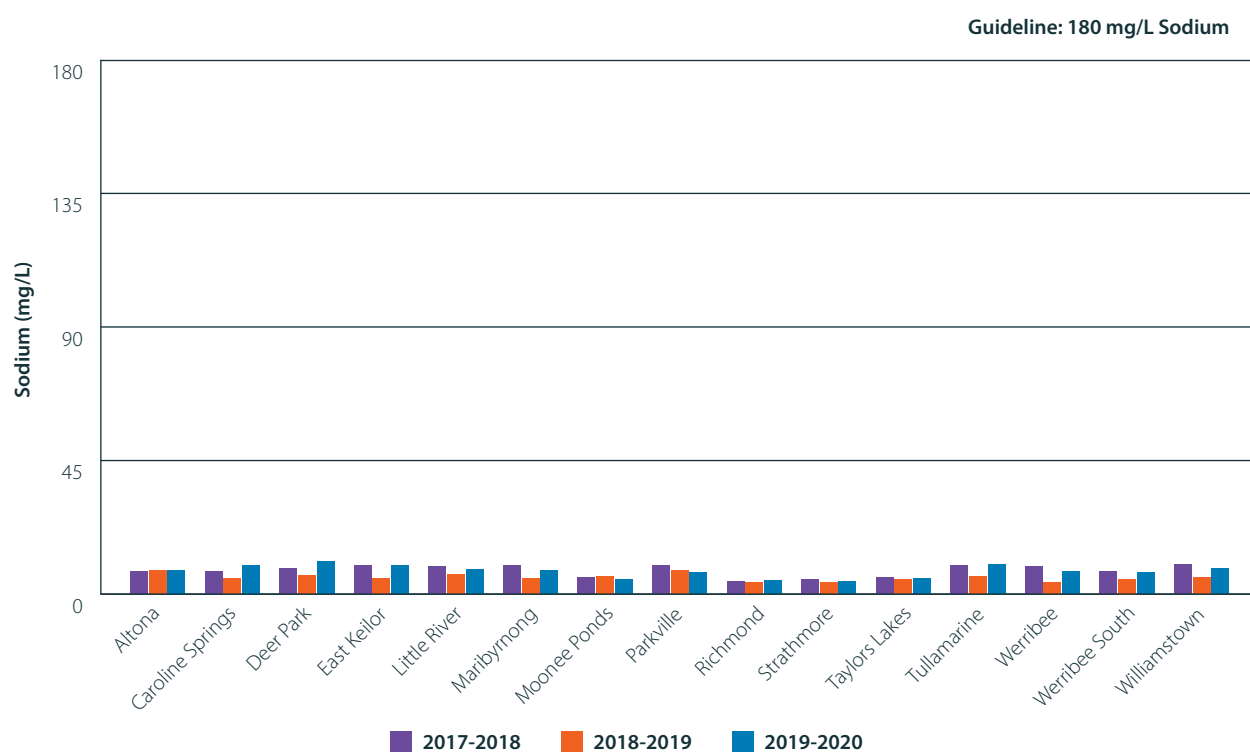




Figure B.15: Sulphate concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

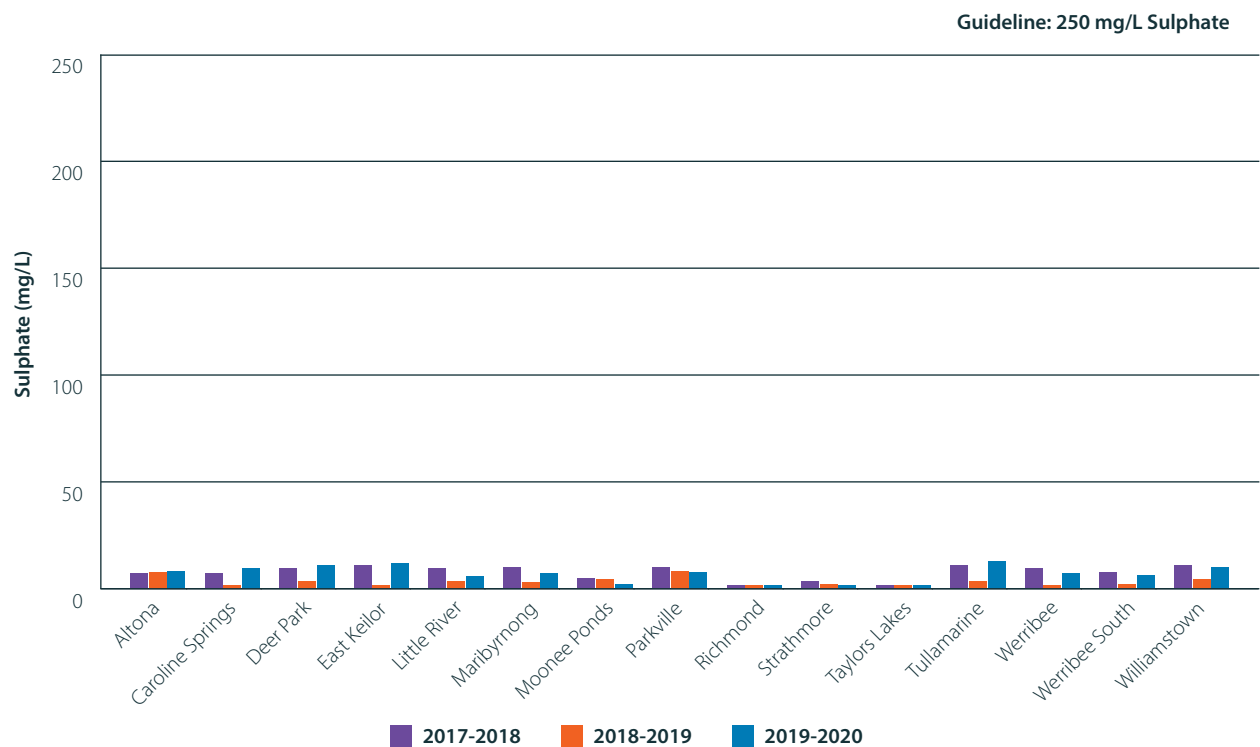


Figure B.16: Average total trihalomethane concentrations in water sampling localities (between 2017-18 and 2019-2020, from left to right within each locality)

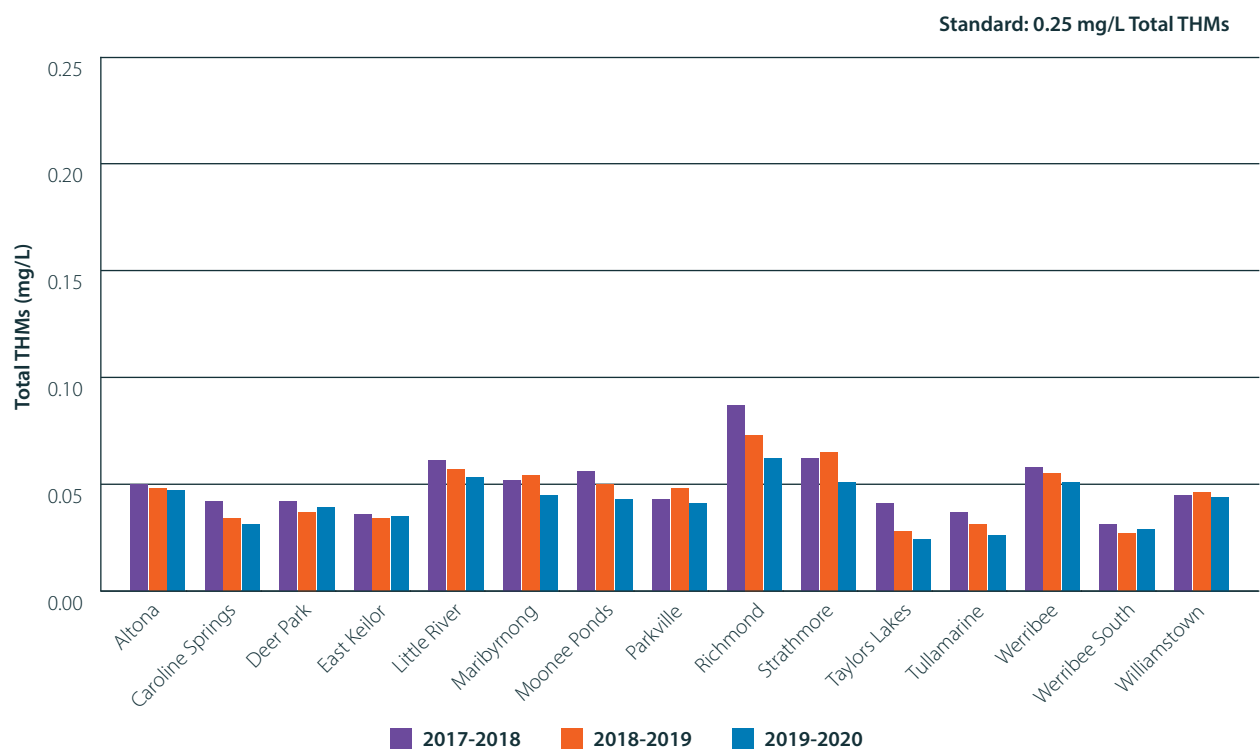
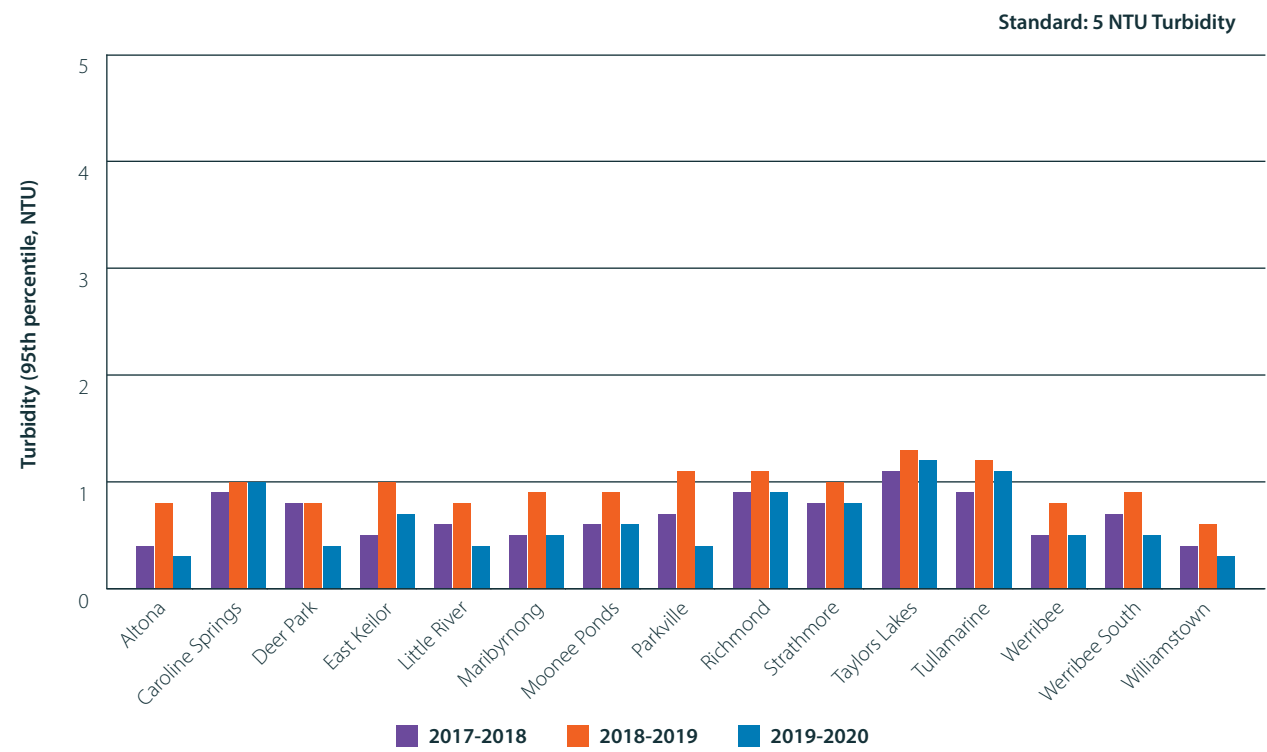


Figure B.17: Turbidity levels in water sampling zones between 2017-18 and 2019-2020, from left to right within each locality)







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