Appendix K

KPMG Opex Benchmarking Report

SA Water NPR Cost Benchmarking Study

1 April 2019

Contents

Appendices

Disclaimer

Inherent Limitations

This report has been prepared as outlined in the Scope Section. The services provided in connection with this engagement comprise an advisory engagement, which is not subject to assurance or other standards issued by the Australian Auditing and Assurance Standards Board and, consequently no opinions or conclusions intended to convey assurance have been expressed.

No warranty of completeness, accuracy or reliability is given in relation to the statements and representations made by, and the information and documentation provided by, South Australian Water Corporation (SA Water) and its personnel consulted as part of the process.

KPMG have indicated within this report the sources of the information provided. We have not sought to independently verify those sources unless otherwise noted within the report.

KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

The findings in this report have been formed on the above basis.

Third Party Reliance

This report is solely for the purpose set out in the Scope Section and for SA Water's information, and is not to be used for any other purpose or distributed to any other party without KPMG's prior written consent. KPMG consent to the release of the report to ESCOSA and their Customer Negotiation Committee (CNC).

This report has been prepared at the request of SA Water in accordance with the terms of KPMG's engagement letter/contract dated 20 November 2018 Other than our responsibility to SA Water, neither KPMG nor any member or employee of KPMG undertakes responsibility arising in any way from reliance placed by a third party on this report. Any reliance placed is that party's sole responsibility.

1.0 Executive Summary

1.1 Executive Summary

1.1.1 Background

The Essential Services Commission of South Australia ('ESCOSA') made its first revenue determination for South Australian Water Corporation ('SA Water') in 2013. As a regulator, ESCOSA has taken a consistent approach towards SA Water's Regulatory Business Proposals and assessing its efficiency. For the Regulatory Determination 2020 to assess SA Water's Regulatory Business Proposal 2020 ('RBP2020'), ESCOSA has challenged SA Water to:

- provide water and sewerage services at **the lowest sustainable price** for the quality and reliability levels valued by customers, and
- have in place sound long-term asset management, operating and financing strategies, which support the provision of those services for customers of today and tomorrow.[1]

ESCOSA released its *Framework and Approach* for SA Water Regulatory Determination 2020 in July 2018. This paper requires SA Water to adhere to similar principles to those in its previous determinations. SA Water has therefore requested KPMG to undertake an independent operating cost benchmarking analysis similar to that undertaken for SA Water's Regulatory Business Proposal 2016-2020 (RBP2016).

1.1.2 Purpose

The purpose of this independent report is to enable SA Water to better understand its relative operating efficiency in comparison to its own historical performance and that of other regulated water and sewerage utilities across Australia.

SA Water may utilise the findings of this report in its regulatory business proposal to ESCOSA and its Customer Negotiation Committee ('CNC') for RBP2020 to inform its analysis of its relative efficiency.

1.1.3 Process

We undertook a three staged approach to measure the relative operating efficiency of SA Water against other Australian water and sewerage utilities:

1. Data collection – KPMG has used publicly available data sourced from the Bureau of Meteorology's ('BOM') National Performance Report ('NPR') 2017-18 to ensure the benchmarking exercise is transparent and replicable and can be easily understood and linked back to source data
2. Plan and undertake benchmarking – in line with the previous report submitted RBP2016, KPMG used a combination of partial performance and multi-factor productivity analysis[2], and
3. Analysis and qualitative assessment – the results were analysed with inputs from a qualitative assessment of the environmental factors to provide more meaningful conclusions.

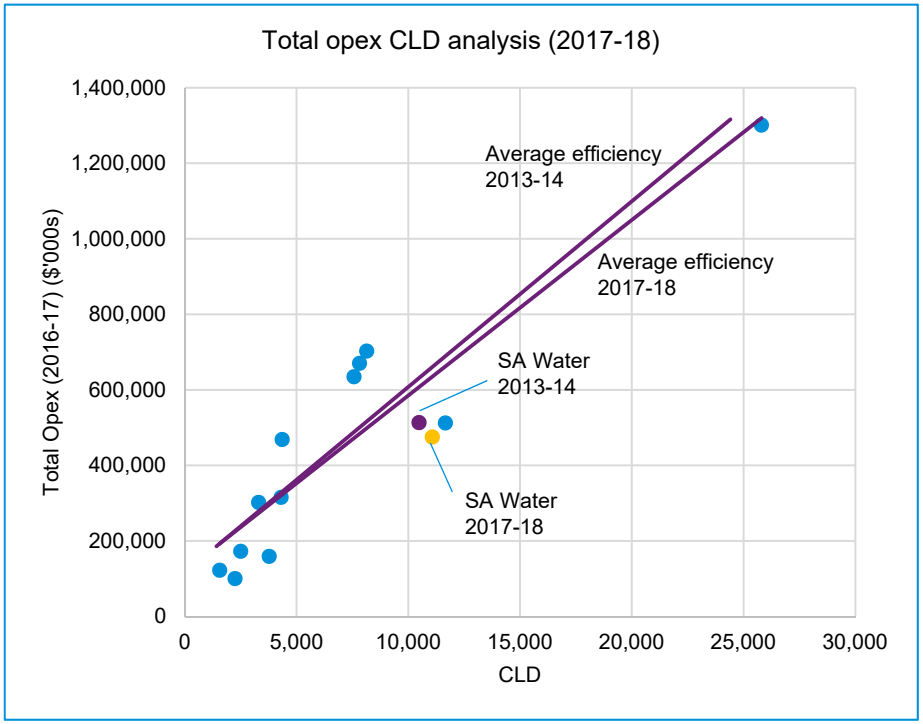
The benchmarking considered a range of water utilities that have responded to the NPR data request, but more specifically, a set of water utilities defined as "**Major Water Peers**". These utilities are considered the most comparable to SA Water. They are identified and highlighted in *Section 3.3.1 Major Water Peers* and explained in detail in *Appendix Section A1.4 Major Water Peers.*

[1] *SA Water Regulatory Determination 2020 – Framework and Approach, Jul 2018*
[2] *Refer Appendix Section A1.2*

1.1 Executive Summary (continued)

1.1.4 Results

Multi factor productivity analysis suggests SA Water's combined water and sewerage business is one of the best performing utilities among the Major Water Peers. This is despite being exposed to a number of unfavourable environmental conditions such as its large geographic footprint, low rainfall and unfavourable topography.



**CLD is further defined in Section 4.1 Total opex CLD analysis*

The figure above measures productivity based on 2017-18 operating expenditure ('opex') for the Major Water Peers, applying the methodology used in SA Water's previous business proposals to ESCOSA.

In addition to an industry wide efficiency improvement between 2013-14 and 2017-18 as indicated by a downward movement in the average efficiency line, the chart also demonstrates that SA Water has:

- improved its performance since the 2013/14 benchmarking (indicated by the downward movement of SA Water's position on the chart); and
- established itself as one of the front runners in Australia in this measure being on or close to the efficiency frontier.

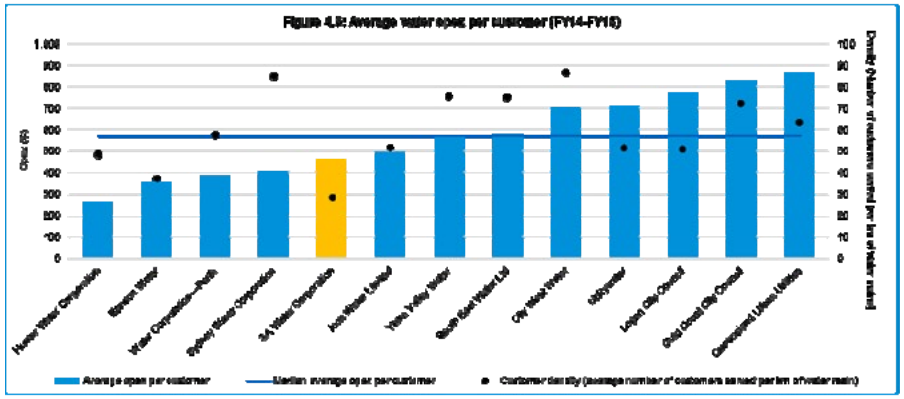
1.1 Executive Summary (continued)

1.1.4 Results (continued)

SA Water has relatively modest access to rainfall/catchment storages as a source of water, and therefore sources much of its water from the River Murray especially in drought years. As a result of this supply issue, we would expect that it would incur higher operating costs relative to its peers, everything else being equal, through having to pump water significant distances to its customers.

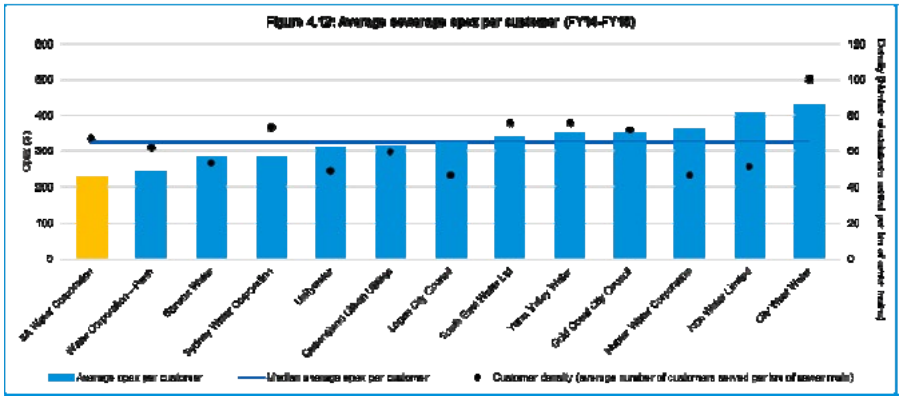
Having the lowest water customer density (number of customers or connections per km of mains) would also be expected to increase the cost per customer as a greater length of pipe is required (on average) to be maintained for each connection.

Opex per Customer (Water)



For the period FY14 to FY18, SA Water's average operating cost per customer for its water business is below the median average for its peers which is notable given it has the lowest customer density of the group.

Opex per Customer (Sewerage)



SA Water has a customer density for its waste water business that is around the average of its peer group, but has the lowest operating cost per customer of the group over the FY14 to FY18 financial years.

KPMG

2.0 Scope and Purpose

2.1 Scope and purpose

KPMG has been engaged to prepare an independent benchmarking report that provides analysis of operating expenditure data for SA Water's operations in line with the methodology applied in KPMG's previous report for SA Water's Regulatory Business Proposal 2016-2020 ('RBP2016').

The purpose of this independent report is to inform SA Water's analysis of its relative efficiency in developing its 2020 Regulatory Business Proposal ('RBP2020') to the Essential Services Commission of South Australia ('ESCOSA') and its Customer Negotiation Committee ('CNC') through the provision of high-level benchmarking activities based on historical costs and outputs. This report will also enable SA Water to better understand its relative operating efficiency in comparison to its own historical performance and that of other regulated water and sewerage utilities across Australia.

The scope of the report includes:

- Analysis of historical results – comparison of SA Water's operating expenditure over time, and
- Peer analysis – comparison of SA Water's operating expenditure with a set of comparable major water utilities (the '**Major Water Peers**').

Within the scope of this analysis, KPMG predominantly relied on publicly available data to ensure that it is generally replicable in a regulatory process. To that extent, we have relied on the water industry data provided by the Bureau of Meteorology ('BOM'), "National Performance Report ('NPR') 2017-18". Further details on the use of data and approach are provided in *Section 3.3 Approach and Methodology.*

For the purpose of this report, analysis of **capital expenditure is considered out of scope** and has not therefore been considered.

KPMG

3.0 Background

3.1 Background

3.1.1 Introduction

SA Water is the major water utility in South Australia. According to the 2017-18 NPR data it provides water services to 785,000 customers and sewerage services to 611,000 customers (customers are defined as 'connections' in the NPR data). The difference in customer numbers between the two services occurs as SA Water provides potable water to the majority of South Australian businesses and households, but it does not provide sewerage services to the same broad customer base, particularly in regional South Australia.

Since ESCOSA made its first revenue determination in 2013 for SA Water, as a regulator, ESCOSA has taken a consistent approach in assessing SA Water's Regulatory Business Proposals and its efficiency. In the Regulatory Determination 2020, the ESCOSA is looking to challenge SA Water to:

- provide water and sewerage services at the lowest sustainable price at the quality and reliability levels valued by customers, and
- have in place sound long-term asset management, operating and financing strategies, which support the provision of those services for customers of today and tomorrow. [3]

ESCOSA released its *Framework and Approach* for SA Water Regulatory Determination 2020 in July 2018. This paper is less prescriptive than previously released papers, but nevertheless requires SA Water to adhere to similar principles from its previous determinations. SA Water is therefore providing a similar benchmarking analysis to that provided for RBP2016, to support its RBP2020 expenditure proposal to address the needs of ESCOSA and the CNC for comparability to help determine the relative efficiency of SA Water based on expenditure and productivity.

3.1.2 Efficiency in water utilities

In the context of water utilities, efficiency can be very difficult to quantify on an absolute scale due to differences in, for example, customer density, topography, climate and breadth of service provision. Accordingly, we have measured efficiency by considering technical efficiency and productivity in the context of the environment in which the entity operates relative to its comparable peers. Productivity is measured by comparing the ratio of outputs (services) to inputs (expenditure) after adjusting for environmental factors as cost drivers which influence the output to input ratio. This adjustment attempts to make a more valid comparison.

There are three main factors which impact the efficiency of a water provider:

1. Use of technology – improvements in technology enable providers to reduce the inputs required to produce given quantity of output;
2. Allocation of inputs (productivity) – optimising the mix of inputs to produce a given output based on the respective input prices;
3. Operating environment – changes to the operating environment – including climate, political, social, economic and legal/regulatory – may impact inputs or outputs.

[3] *Source: SA Water Regulatory Determination 2020 – Framework and Approach, Jul 2018*

3.1 Background (continued)

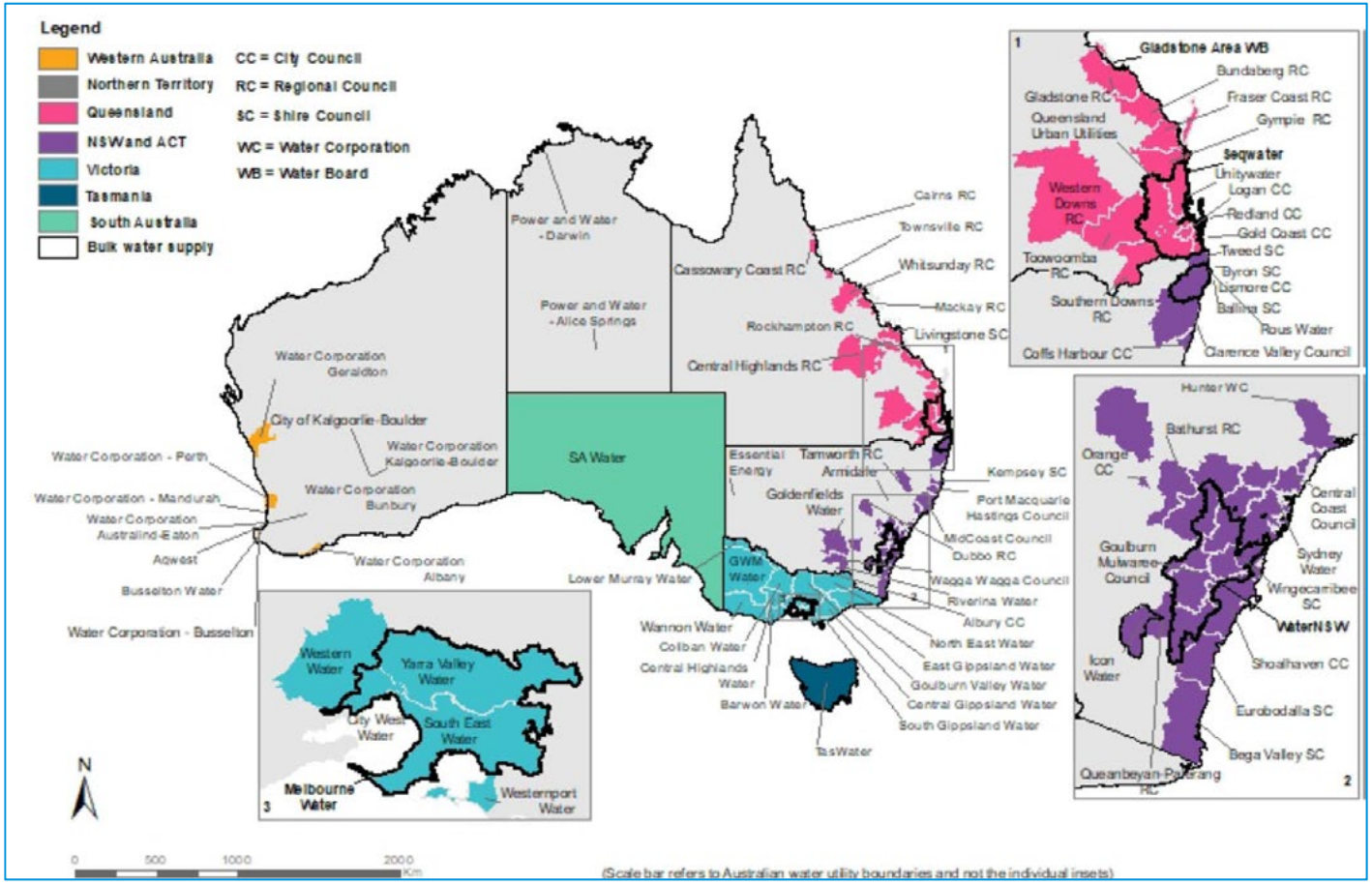
3.1.3 Environmental factors

SA Water operates in a unique environment that it can neither control nor improve on when compared to other Major Water Peers. This is different to consideration of its use of technology or productivity, which SA Water has a far greater degree of control over. These environmental factors require SA Water to operate in certain ways and generally increase its operating costs. The environmental factors affecting SA Water include the following:

- Adelaide has a **smaller water storage** compared to other metropolitan cities. If storage is full, based on its annual water demand, Adelaide will have approximately 1.3 years of supply available for consumption. This is compared to approximately 8.6 years for Brisbane, 5.1 years for Canberra and 4 years for Sydney. This requires SA Water to source some of its needs from the River Murray and potentially desalinated water, at a generally higher cost. Refer to *Appendix Section A1.6 Water supply in storage,* for details.
- SA Water provides its water service across a **large area with relatively low density of customers**. Refer to the following page for details on SA Water's water service area.
- SA Water has a relatively **flat geographic landscape** around the River Murray that requires significant and expensive pumping compared to states that can exploit gravity based systems for movement of water.
- Many large metropolitan water service providers in Australia, including SA Water, discharge treated sewerage to the ocean. However, **Adelaide's access to an ocean receiving environment is via a relatively shallow gulf** that requires it to treat the sewerage to a high level.
- In response to a number of factors and regulatory obligations surrounding SA Water such as the **SA Government's Adelaide Coastal Waters Improvement Plan and Legislated EPA requirements** for discharge of treated sewerage to the marine environment, some areas cannot discharge into a receiving environment and must supply reusable quality water. Refer to *Appendix Sections A1.8 Major Water Peers – Key Differences* and *A1.9 Percentage of tertiary or advanced treatment of sewer* for more details.

3.2 Service area

Figure 3.1: Map of Australian water service providers (2017-18)

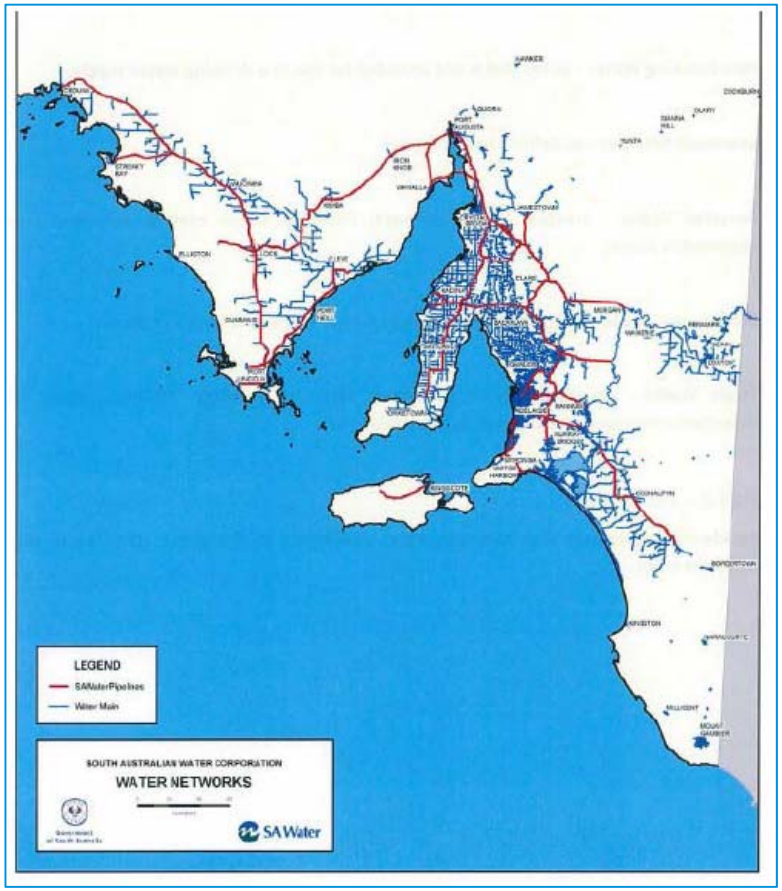


Source: NPR 2017-18

- Figure 3.1 shows the geographic size of Australian water utilities. SA Water serves a large area compared to many of the utilities and is the only utility responsible for providing water services to almost an entire state.

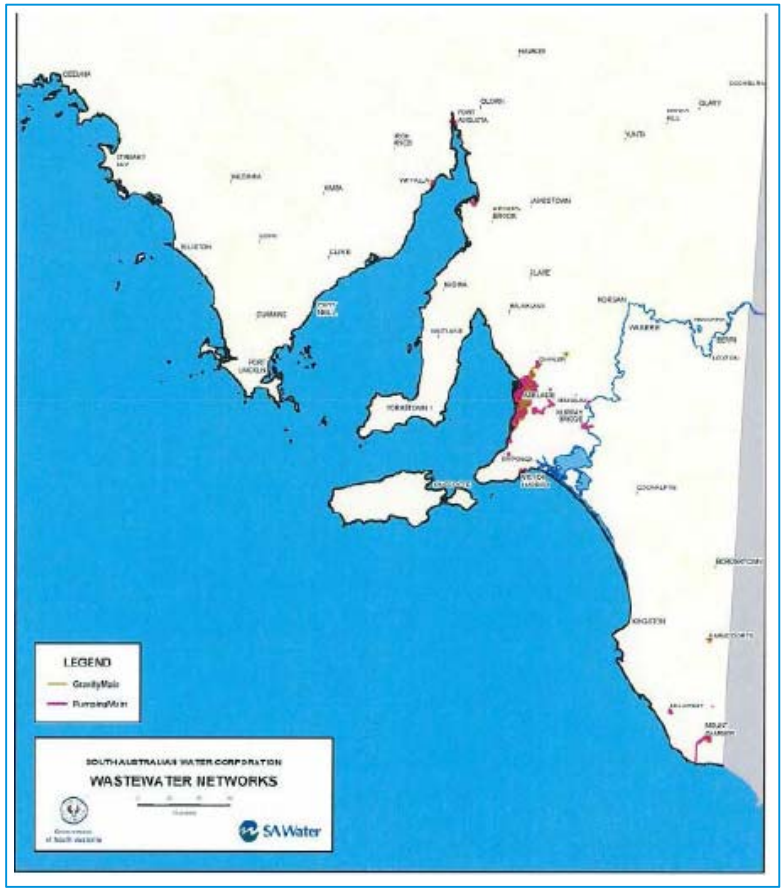
3.2 Service area (continued)

Figure 3.2: Map of SA Water's water service area



Source: SA Water Retail Licence to ESCOSA

Figure 3.3: Map of SA Water's sewerage service area



Source: SA Water Retail Licence to ESCOSA

- Figures 3.2 and 3.3 illustrate SA Water's water and sewerage service areas respectively. SA Water's water mains extend across a large area as shown by the blue lines in figure 3.2, fed by the major water pipes in red. The sewerage service area, on the other hand, is confined to metropolitan Adelaide and a small number of rural locations.

3.3 Approach and methodology

In line with the previous report, KPMG predominantly relied on publicly available data to ensure replicability of the analysis in a regulatory process. The analysis relied on the water industry data from the **National Performance Report ('NPR') 2017-18** prepared by the Bureau of Meteorology's ('BOM'). In this NPR, **the historical values for all financial indicators have been adjusted to real values** using the consumer price index (CPI) to enable more effective comparison.

Where data was incomplete or required adjustment due to clear indication of error, one of the following steps were taken in the order of preference to ensure reliability:

1. **Deduce**, if data can be readily calculated using other available data (from public sources and/or from the other data available in the NPR published data source);
2. **Estimate**, if there are corresponding or other consistent data allowing for reliable estimate; or
3. **Omit**, if the above two steps cannot be taken and omission will not materially impact the result of the analysis. To that extent, the population size of some analyses may be different to others.

The report discloses and describes adjustments where they have been made.

The following steps have been taken for the benchmarking exercise:

1. Data collection;
2. Plan and undertake benchmarking; and
3. Analysis and qualitative assessment.

The reason for using benchmarking, its limitations and what to consider in reading the report, are further explained in *Appendix Section A1.2 Benchmarking*.

3.3.1 Major Water Peers

Due to the diverse nature of water utilities, 12 Major Water Peers have been identified and used where appropriate to allow for a more valid comparison of performance with SA Water. These peers are consistent with those used in the previous report. The Major Water Peers are:

- Barwon Water;
- City West Water;
- Gold Coast City Council;
- Hunter Water Corporation;
- Icon Water Limited (former ACTEW);
- Logan City Council;
- Queensland Urban Utilities;
- South East Water;
- Sydney Water Corporation;
- Unity Water;
- Yarra Valley Water; and
- Water Corporation – Perth.

Refer to *Appendix Section A1.4 Major Water Peers* for more details.

KPMG

4.0 NPR Operating Expenditure Results

4.0 Efficiency summary

The results of the benchmarking analysis provided in the following pages shows that SA Water has increased its level of efficiency since the RBP2016 analysis and that it continues to be more efficient than its peers.

In particular:

- The CLD, or multi-factor productivity, analysis shows SA Water to be at the efficiency frontier of its peers and to have improved its efficiency since 2013/14 for water and overall operating costs.
- SA Water has the lowest customer density (number of customers per km of pipe) of its peers yet maintains an average water opex per customer almost 20% below the peer group average.
- SA Water's average water opex per km of mains is amongst the lowest of its peer group.
- SA Water's average sewerage opex per customer for the period FY14 to FY18 is the lowest of its peer group whilst its sewerage customer density was around the mean for the group.
- Between FY14 and FY18, SA Water's water opex per customer has fallen approximately 17% from $522m to $434m p.a. (Real FY18).

Customer, Length and Demand (CLD)

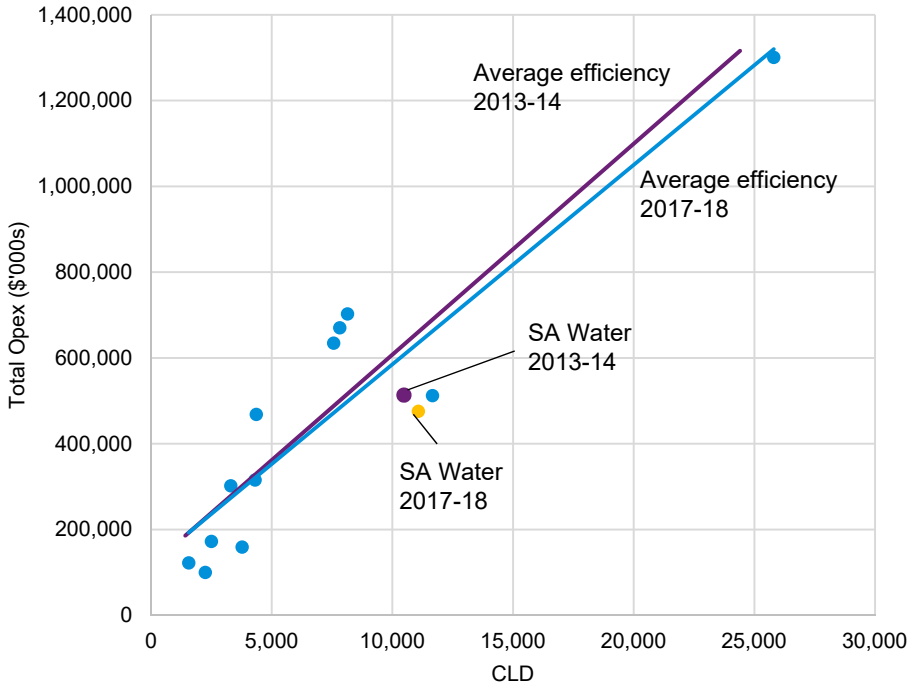
- In KPMG's previous report,[4] it was shown that there was a **reasonable positive correlation** between opex and the combination of: number of customers (C), length of infrastructure (i.e. water mains and sewer mains and channels) (L) and customer demands (D) (**collectively 'CLD'**). A similar analysis was undertaken with the current NPR dataset with the results showing a consistent positive correlation (refer to *Appendix 3.0 Multi factor productivity*).
- The formula used in our RBP2016 benchmarking report has therefore been used to calculate each Major Water Peer's CLD size for RBP2020 (refer to *Appendix 3.0 Multi factor productivity* for further details)

$$CLD = C^{0.5} \times L^{0.3} \times D^{0.2}$$

[4] *NPR Cost Benchmarking Study: A benchmarking study of the operating and capital costs of SA Water in support of a regulatory business proposal – RBP2016, using NPR data.*

4.1 Total opex CLD (multi-factor) analysis

Figure 4.1: Total opex CLD analysis (2017-18)

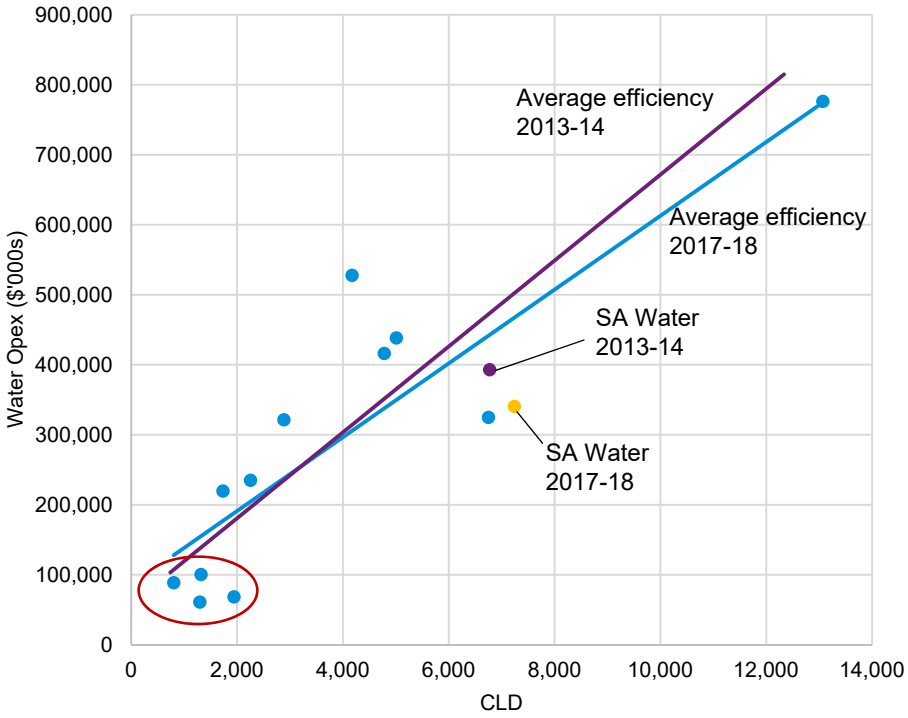


**For the 2013-14 CLD analysis, the volume of sewage treated effluent by Water Corporation – Perth has been estimated using corresponding figures in 2017-18 NPR data as it was missing from the dataset.*

- Figure 4.1 shows the CLD analysis undertaken for **combination of water and sewerage supply operations.**
- The result suggests the **average efficiency of Major Water Peers has improved between 2013-14 and 2017-18**. SA Water is well positioned, being **one of the frontier organisations** with a **greater downward shift in its position since 2013-14 than the peer group.**

4.2 Water opex CLD analysis

Figure 4.2: Water opex CLD analysis (2017-18)



- Figure 4.2 shows the CLD analysis undertaken for **water supply operations** only.
- Overall, SA Water is performing **well below the average opex efficiency line for 2017-18**. Over the period, with similar CLD size, SA Water's water opex decreased significantly.
- The Major Water Peers with a smaller CLD appear to have become slightly less efficient (see ⬭ above). This is indicated by the average lines crossing at a CLD of approximately 3,200.

4.3 Water opex overview

Figure 4.3: Water opex and number of customers (2017-18)

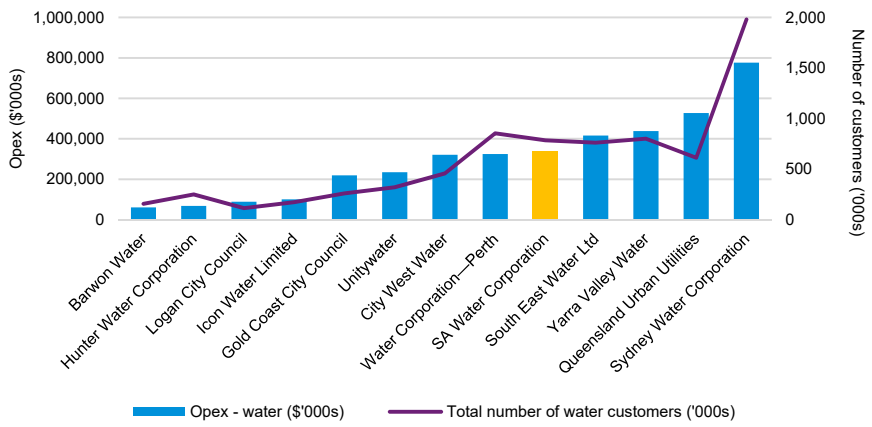
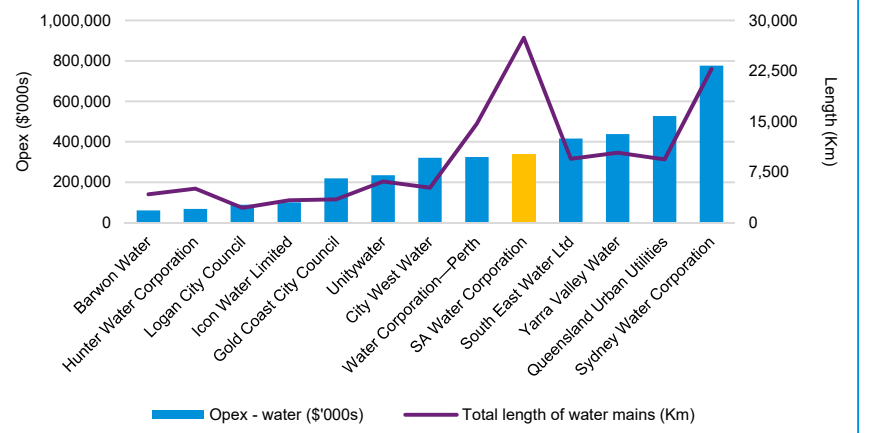
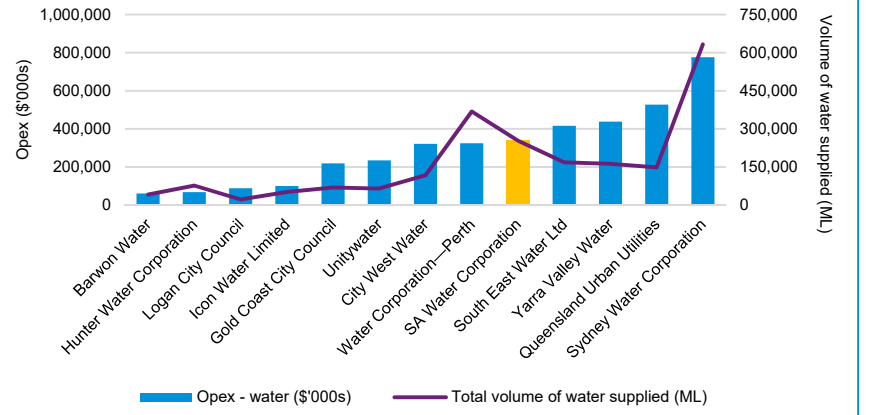


Figure 4.4: Water opex and length of water mains (Km) (2017-18)



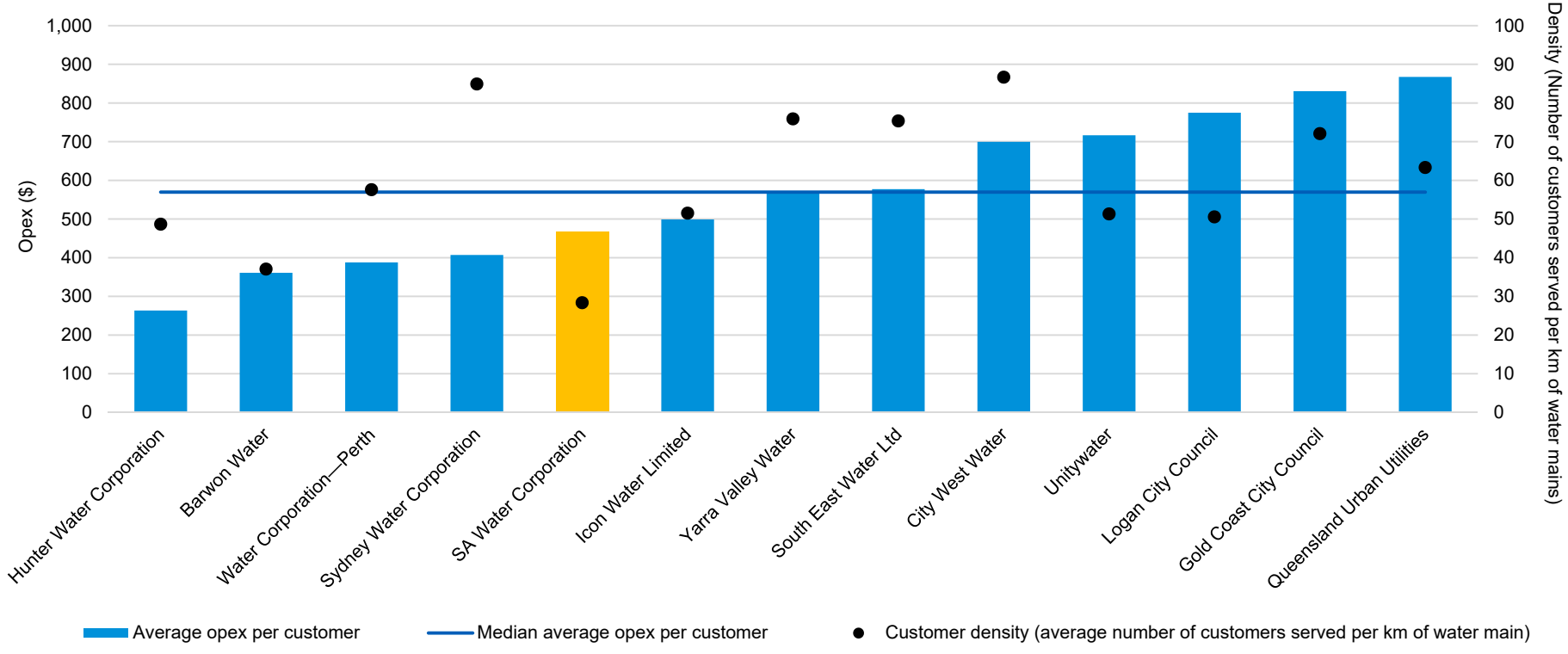
- The figures show 2017-18 water opex against the number of customers, length of water mains and water demand of SA Water and its Major Water Peers.
- SA Water's **water opex in FY18 was the 5th highest** at approximately $340.6m among Major Water Peers.
- SA Water served **more customers than two of its peers with higher water opex**.
- SA Water **had the longest water mains to maintain** among the Major Water Peers.
- SA Water supplied **more water than three peers with higher water opex**.

Figure 4.5: Water opex and water demand (ML) (20117-18)



4.4 Average water opex per customer

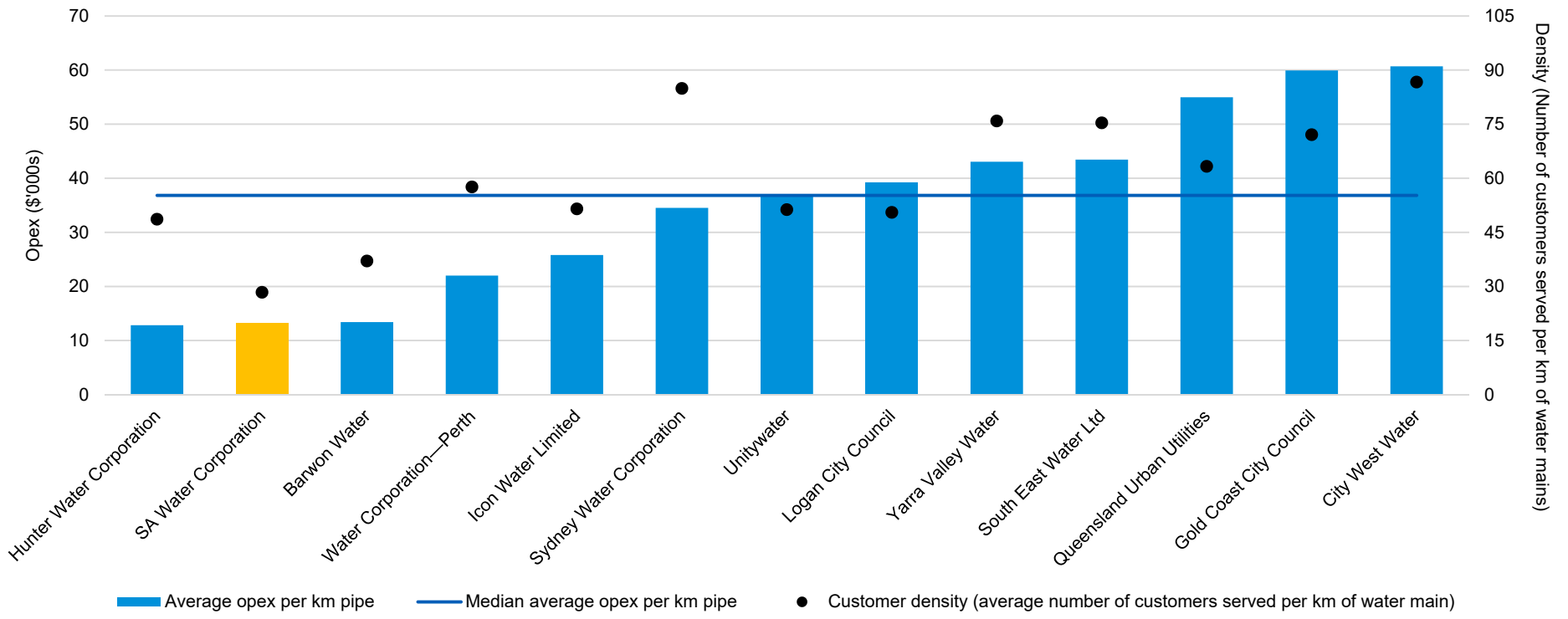
Figure 4.6: Average water opex per customer (FY14-FY18)



- Figure 4.6 shows average water opex per customer of SA Water and the Major Water Peers over the period FY14-FY18 against customer density (average number of customers served per km of water main).
- SA Water had the **lowest average customer density over the period** at 28 customers per km.
- Despite the low density which typically drives higher costs, SA Water's average opex per customer was **well below the median average** opex per customer of Major Water Peers at $570.

4.5 Average water opex per km of water mains

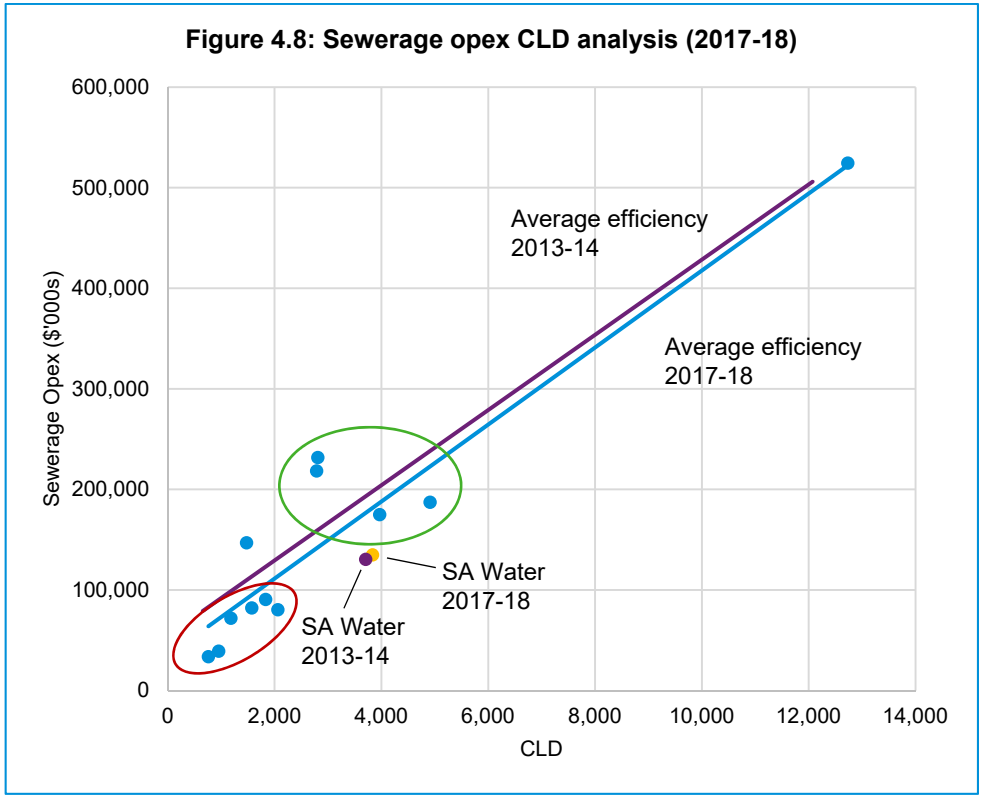
Figure 4.7: Average water opex per km of water main (FY14-18)



- Figure 4.7 shows average water opex per km of water mains of SA Water and Major Water Peers over FY14-FY18 against customer density (average number of customers served per km of water main).
- SA Water's average water opex per km of water main was **one of the lowest among its peers at $13,260 per km** with the median average being at $36,848 per km.
- SA Water had the lowest customer density, including those with lower average opex per km of pipe.

4.6 Sewerage opex CLD analysis

Figure 4.8: Sewerage opex CLD analysis (2017-18)



**For the 2013-14 CLD analysis, the volume of sewage treated effluent by Water Corporation – Perth has been estimated using corresponding figures in 2017-18 NPR data as it was missing.*

- Figure 4.8 shows the CLD analysis undertaken for sewerage operations only.
- SA Water has a smaller CLD size for sewerage operations compared to its water supply operations.
- Overall, the results suggest **SA Water's efficiency remained relatively consistent between 2013-14 and 2017-18** with a small increase in both CLD size and sewerage opex. This is still well below the 2017-18 average efficiency line. The results show that SA Water's Major Water Peers with a similar sewer CLD size all have a higher sewerage opex (See ⬭ above).
- The Major Water Peers with smaller CLD appear to have improved their efficiency for sewerage operations over the period (see ⬭ above), while the efficiency of its larger peers remained relatively consistent.

4.7 Sewerage opex overview

Figure 4.9: Sewerage opex and number of customers (2017-18)

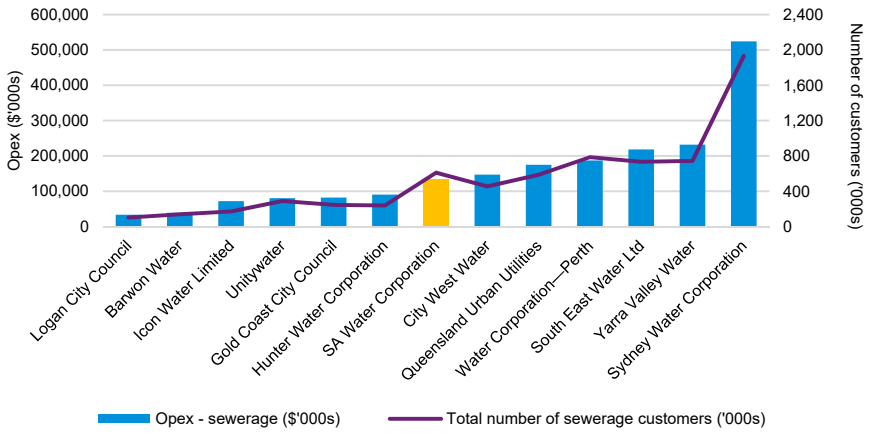
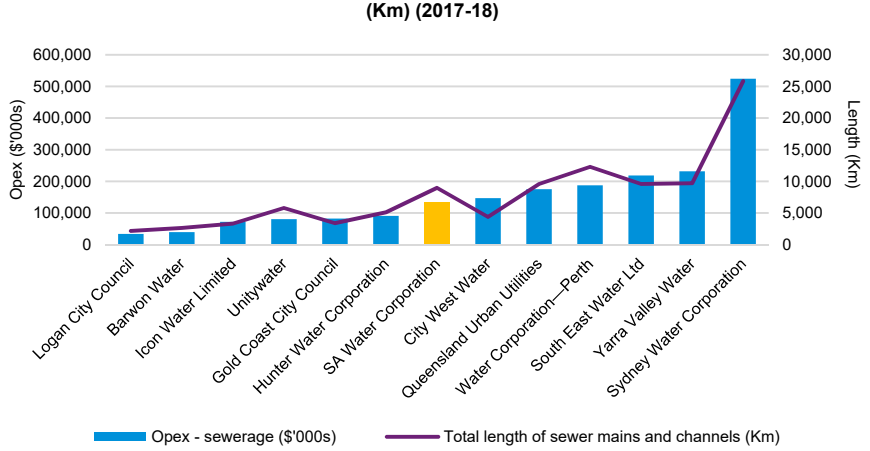
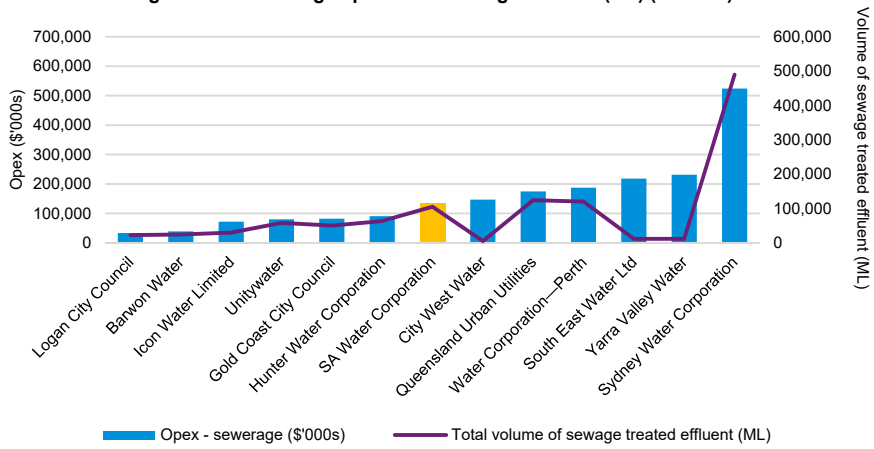


Figure 4.10: Sewerage opex and length of sewer mains and channels (Km) (2017-18)



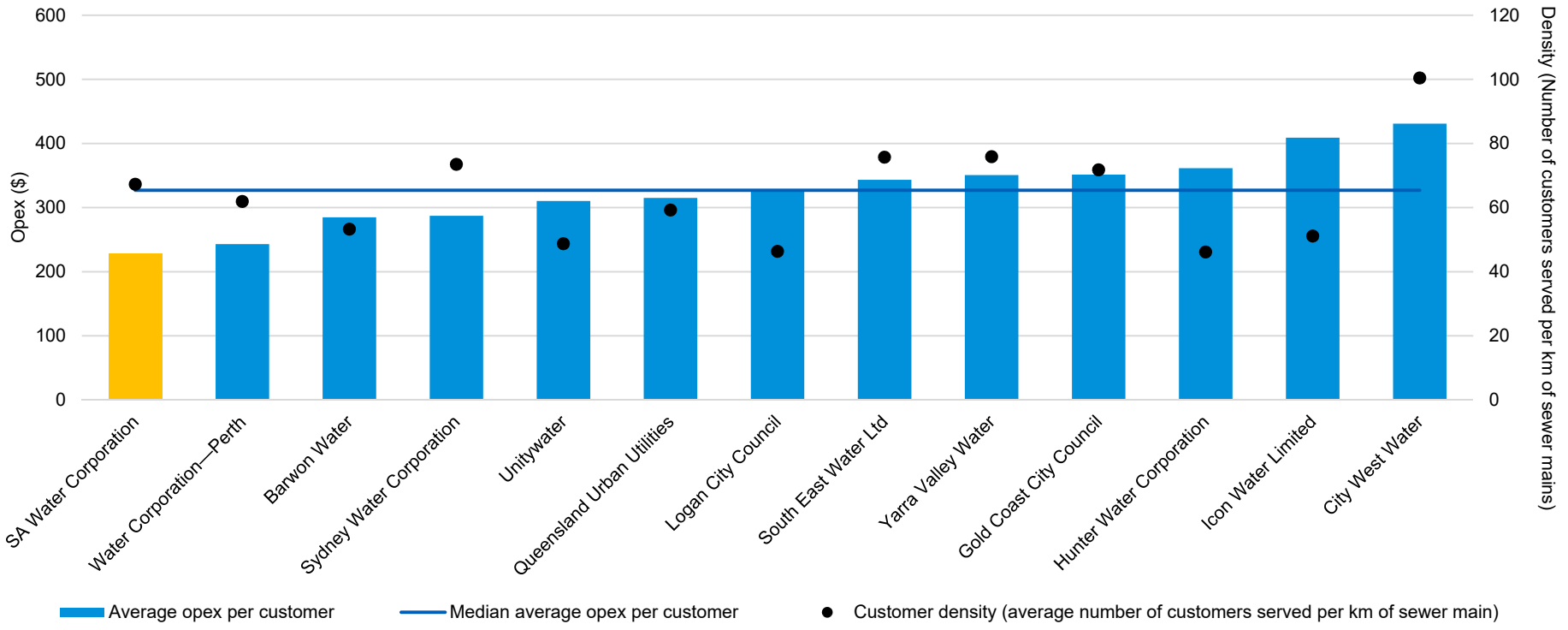
- The figures show SA Water and its Major Water Peers' sewerage opex in 2017-18 against the number of customers, length of sewer mains and channels, and demand for sewerage services.
- SA Water's **sewerage opex in FY18 was the median** among its peers, being 7th out of 13, at approximately $134.9m.
- SA Water served **more customers than two of its Major Water Peers** while having a lower opex.
- SA Water had **longer or similar length of sewer mains and channels to maintain than a number of Major Water Peers** while having a lower opex.
- SA Water **had the 4th highest demand for sewerage services** among Major Water Peers.

Figure 4.11: Sewerage opex and sewerage demand (ML) (2017-18)



4.8 Average sewerage opex per customer

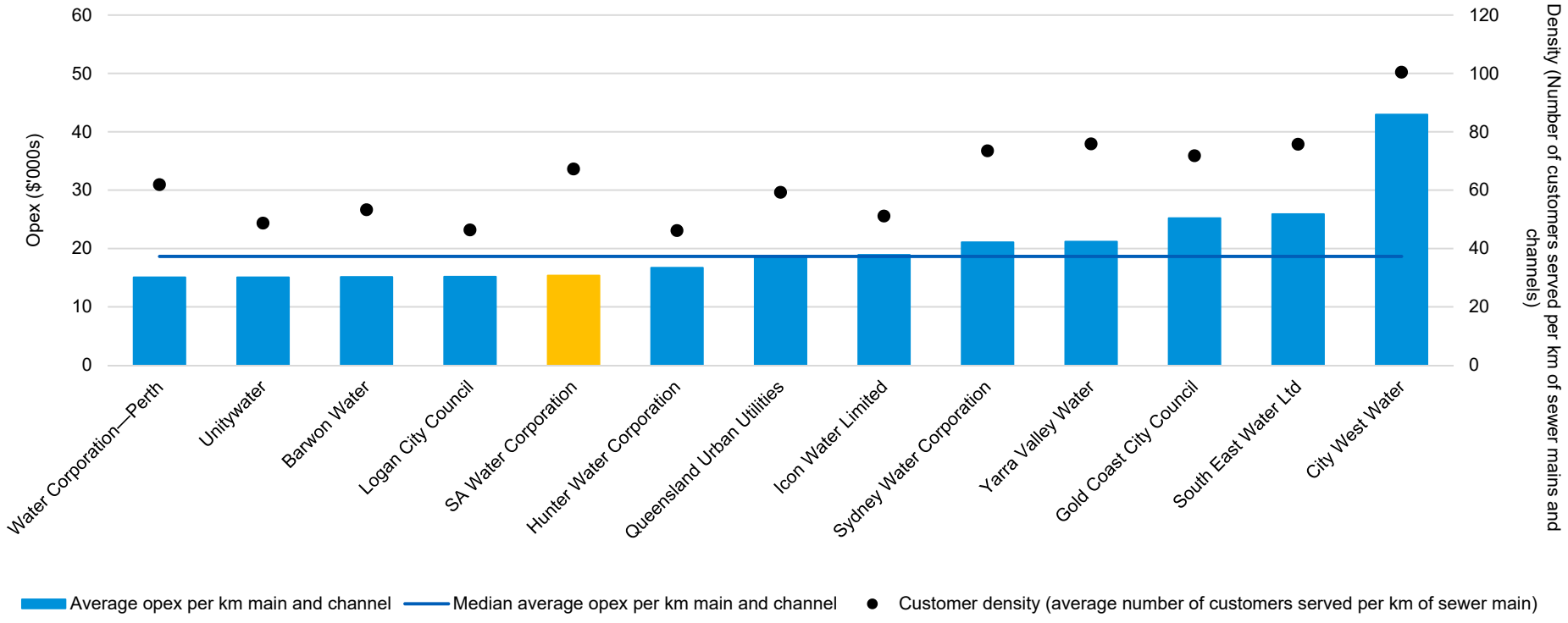
Figure 4.12: Average sewerage opex per customer (FY14-FY18)



- Figure 4.12 shows average sewerage opex per customer of SA Water and its Major Water Peers over the period FY14-FY18 against customer density (average number of customers served per km of sewer main).
- SA Water has **the lowest average sewerage opex per customer** compared to its peers at $229 per customer.
- The high customer density (67.3) was not the only contributor to low average opex as there were a number of the Major Water Peers with higher density of customers and higher average opex per customer.

4.9 Average sewerage opex per km of sewer mains

Figure 4.13: Average sewerage opex per km of sewer main (FY14-FY18)



- Figure 4.13 shows average sewerage opex per customer of SA Water and Major Water Peers over FY14-FY18 against customer density (average number of customers served per km of sewer main).
- SA Water had **one of the lowest average sewerage opex per km of sewer main and channel** in the peer group. SA Water's average opex per km was $15,400, while Water Corporation – Perth's was $15,100.
- SA Water compares favourably against its peers with similar or higher customer density with most of them with higher average opex per km of main and channel.

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Appendices

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Appendix 1.0 Approach and Background

A1.1 Methodology

The following steps were undertaken to develop this report.

1. Data collection

To ensure the benchmarking exercise is transparent and the process is replicable by a reader to make comparison, KPMG have used publicly available data sourced from the Bureau of Meteorology's National Performance Report 2017-18. This data has been coordinated by the Bureau based on submissions from the responding utilities.

2. Plan and undertake benchmarking

KPMG considered a number of different benchmarking techniques utilised to assess the efficiency of regulated utilities. In line with the previous report submitted for SA Water Regulatory Business Proposal 2016-2020, we have used a combination of partial performance analysis and multi-factor productivity in particular to provide comprehensive, repeatable and understandable results.

- Partial Performance Indicator - Uses a single other indicator (such as number of employees per connection or dollars of cost per connection) and thus provides indications of productivity
- Multi factor productivity - Measures more than one input parameter in a single metric.

3. Analysis and qualitative assessment

The benchmarking results were then analysed with inputs from qualitative assessment of the environmental factors to provide more meaningful conclusions.

A1.2 Benchmarking

Why benchmarking is used and its limitations

Benchmarking is particularly challenging for the Australian water utilities industry. While their services are relatively comparable, there are quite different environmental factors across the jurisdictions as well as industry structures influencing the outputs in water services.

SA Water is a vertically integrated business serving 98% of South Australia's population in a service area of more than 900,000km^2 (including sparsely populated regions) and with low volume storages. As an example, benchmarking SA Water costs with a bulk water supplier, or a water supplier only offering retail services without recognising the structural differences could be misleading. This is taken into account when selecting utilities for comparison defined as 'Major Water Peers'. It is important to recognise limitations of this approach when forming a conclusion as there are relative similarities and differences across the businesses and jurisdictions due to various factors including, but not limited to:

- Topography
- Water source, rainfall and the use of catchments and ground water
- Structural separation of the industry (bulk water separated from distribution and retail)
- Environmental requirements and ability to discharge
- Locational issues for discharging sewerage, such as access to large oceans, coastal gulfs or if the utility is land locked
- Density of customer base and the history of the development of the service area
- Size of the organisation
- Use of the private sector in utility operations, and
- Structure of operations and outsourcing of some services where some businesses may buy a service, compared to others that may own the assets that provide the service.

Benchmarking should not be the only tool applied in the analysis of an entity's relative performance, but rather should be used as one of the inputs in analysing a business's relative efficiency. When the differences are taken into account and how one adjusts for this is understood, the benchmarking analysis can provide meaningful insights.

A1.3 NPR Data

A1.3.1 Introduction

The benchmarking analysis in this report has been based on a number of data points produced in the NPR by the BOM. This data is publicly available and replicable. It has been used in previous benchmarking reports, including that commissioned by ESCOSA in 2012 and for SA Water's RBP2016.

The NPR data is transparent in that it is available publicly. As the data is publicly available, the utility respondents can see how the data is used and applied leading to consistency in approach to collection. The data has been collected through a standardised approach, which includes reasonably detailed instructions and definitions which should improve the consistency of interpretation of data categories by the participating utilities.

Further, as this data collection mechanism has been in place for some years, the quality of the data assembled through this approach should be quite high.

An alternative data source such as extracts from water utility annual reports would not yield the relevant data and would not provide the consistency in approach to the assembly of data, leading to a less reliable analysis and less transparent result.

Our analysis uses data on:

- Operating costs; and
- Volumetric data, such as customer numbers, length of pipe and volumes.

A1.3 NPR Data (continued)

A1.3.2 Operating costs

According to the *National urban water utility performance reporting framework: Indicators and definitions handbook 2018* published by National Water Commission, operating costs (i.e. opex) for water and sewerage should **include** the following:

- Water resource access charge or resource rent
- Purchases of raw, treated or recycled water (water supply only)
- Charges for bulk treatment/transfer of sewerage
- Salaries and wages, including overheads on salaries and wages
- Materials, chemicals and energy used
- Contracts
- Accommodation
- All other operating costs that would normally be reported
- Items expensed from work in progress (capitalised expense items) and pensioner remission expenses (Community Service Obligations are likely to have an equivalent inclusion in revenue).
- Competitive neutrality adjustments, which include but not limited to land tax, debits tax, stamp duties and council rates
- Indirect costs – apportioned to water services using a consistent methodology for all reporting years
- Costs associated with BOOT schemes should be reported according to accounting standards.

Operating costs for water and sewerage should **exclude** the following:

- All non-core business operating costs
- Depreciation
- Any write-downs of assets to recoverable amounts
- Write-offs retired or scrapped assets
- The written-down value of assets sold.

A1.3 NPR Data (continued)

A1.3.3 Volumetric inputs

Using volumetric parameters helps to adjust efficiency measurement data to take account of different sized businesses. Simple measures of volumes were examined within the NPR data to determine measures that correlated to the size of organisation. Measures of customer numbers (by water and sewerage) and the length of pipe (water and sewerage) make use of some of the volumetric data available within the NPR published data.

The correlation between operating expenditure, connections (customers) and length of water/sewer mains are demonstrated in *Appendix Section 3.0 Multi factor productivity.*

A1.3.4 Outputs

The definition of key water services outputs included in our analysis are as follows:

- Water connections – this is the same as water customers as defined in the NPR definitions handbook, includes metered, plus non-metered connections (less any sub-metered connections);
- Length of water mains and channels – excludes private mains, bore field mains, disused mains, and recycled water mains supplying water for agricultural uses;
- Volume of water supplied – total metered and estimated non-metered supplies (potable and non-potable);
- Sewerage connections – includes all customer connection but excludes rated, but unconnected (e.g. vacant blocks);
- Length of sewer mains and channels – includes combined sewer and storm water mains, but excludes conduits and pipes downstream of a sewerage treatment plant; and
- Volume of sewerage collected – referred to as volume of sewerage collected or sewage treated effluent.

A1.4 Major Water Peers

A1.4.1 Introduction

As mentioned above, Australian water utilities are subject to a wide range of environmental conditions. These fundamental differences impact the perceived efficiency of water service utilities.

SA Water has a number of outsourcing contracts in providing water and sewerage services including the operation of some water and sewerage treatment plants, and some of the field operations and maintenance of the Adelaide water network. These outsourcing contracts have resulted in the engagement of services selected through a competitive public tendering process. This is not an unusual undertaking for a utility business and many utilities across gas, electricity, water and telecommunications outsource varying inputs to their operating models as a way to drive further efficiencies in the delivery of the services. Therefore, this should not discount the validity of this analysis on SA Water and its peer group.

A1.4.2 Peer group

The peer group has been selected based on a combination of qualitative and quantitative factors including number of customers, length of mains and type of provider. Therefore for example, Melbourne Water has been excluded from the peer group even though they are a primary water utility servicing the Melbourne customer base. This is due to Melbourne water being a bulk water provider and has considerably lower customer service requirements when compared with other utilities as it does not operate or manage customer service connections while for non-bulk utilities, customer service is a significant cost driver.

The peer group includes government owned water utilities. A number of other water services utilities are quite small in comparison and provide limited services. This is one of the factors that makes comparison difficult. Even within South Australia, SA Water provides water services to a significant number of customers for whom it does not provide sewerage services. The treatment of sewerage for those non-SA Water customers includes on-site customer treatment, small sewerage schemes and Community Waste Water Management Schemes (CWMS) often run by local councils. The benchmarking analysis recognises this and provides separate comparisons for water and sewerage services.

A1.4 Major Water Peers (continued)

The Major Water Peers for the purpose of this benchmarking analysis are presented below along with their attributes in FY18.

Utility	State	Water connections ('000s)	Length of water mains (km)	Volume of water sourced (ML)	Sewerage connections ('000s)	Length of sewer mains/ channels (km)	Volume of sewage treated effluent (ML)
Barwon Water	VIC	158	4,232	42,263	141	2,634	24,629
City West Water	VIC	459	5,203	117,676	456	4,394	5,395
Gold Coast City Council	QLD	261	3,469	69,308	247	3,393	50,772
Hunter Water Corporation	NSW	250	5,072	77,100	239	5,119	63,783
Icon Water Limited (former ACTEW)	ACT	174	3,328	52,228	173	3,335	30,240
Logan City Council	QLD	115	2,201	22,840	103	2,166	23,140
Queensland Urban Utilities	QLD	614	9,391	148,844	588	9,594	124,624
SA Water	SA	785	27,438	253,695	611	8,977	105,555
South East Water	VIC	762	9,485	168,556	735	9,583	12,240
Sydney Water Corporation	NSW	1,981	22,822	633,001	1,932	25,863	489,778
Unity Water	QLD	321	6,122	65,506	290	5,801	58,477
Water Corporation – Perth	WA	854	14,677	369,017	786	12,297	120,761
Yarra Valley Water	VIC	802	10,396	163,071	745	9,700	12,088

A1.4.3 Key differences

It is a challenge to benchmark water service utilities due to the different operating environments the peer group needs to operate in as discussed throughout this report. A reader will need to understand the differences in some of the inputs to understand and interpret the relative position of some of the outputs in this report, and this is set out below.

A1.5 Major Water Peers - Key differences (water)

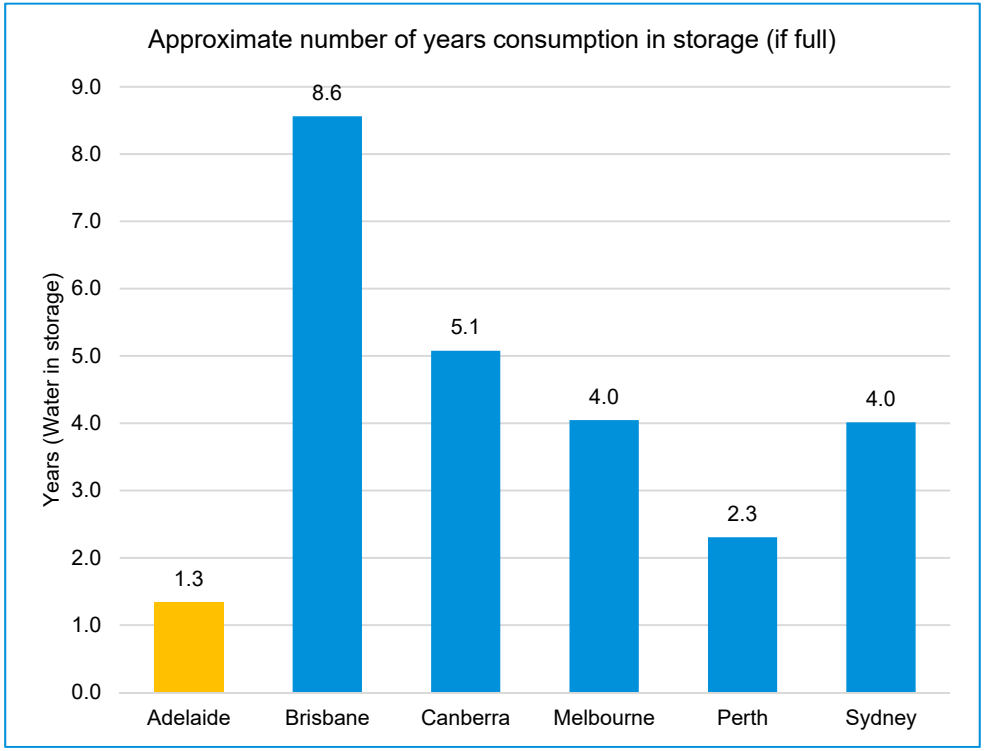
Water

As discussed in *Sections 3.1.3 Environmental factors* and *3.3.1 Major Water Peers*, within the water business, SA Water faces a number of challenges in supplying water to the customers, in an environment with limited catchment opportunity, and low rainfall.

By comparison to many of its peers, SA Water has relatively modest access to rainfall/catchment storages as a source of water, and sources much of its water from the River Murray especially in drought years. As a result of this supply issue, we would expect that it will incur relatively higher operating costs than its peers, with every other parameters being equal, through having to pump water some significant distances to its customers. A comparison of capital city water storages is presented in the subsequent page, which demonstrates the difficulties of SA Water to exploit catchment/storage options in its water supply chain.

Furthermore, having much less opportunity to draw on storages requires SA Water to source some of its needs from its desalination plants, which increases overall operating costs.

A1.6 Water supply in storage

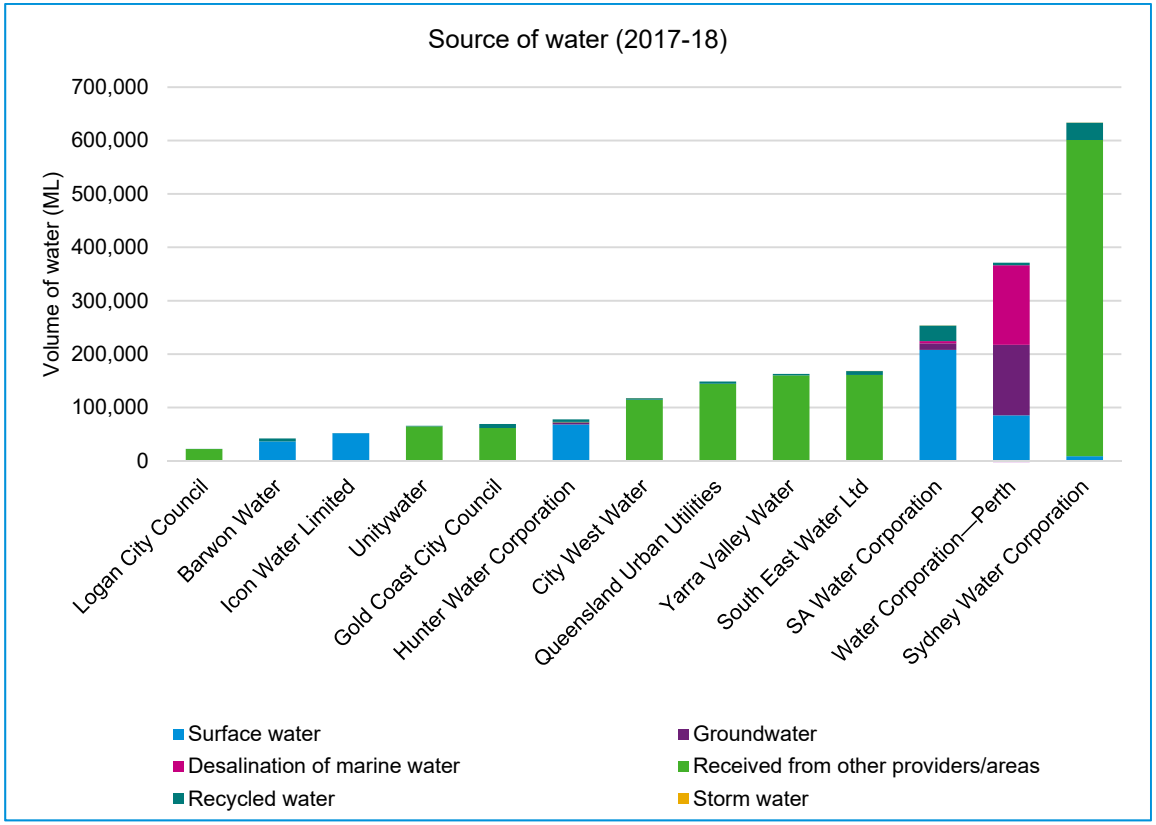


City	Utilities	Capacity (ML)	Consumption (2016-17)	Capacity in Years
Adelaide	SA Water	197,405	147,552*	1.3
Brisbane	Logan City Council; Queensland Urban Utilities; Unity Water	2,220,150	238,521	8.6
Canberra	Icon Water	277,839	46,176	5.1
Melbourne	City West Water; South East Water; Yarra Valley Water	1,812,175	424,562	4.0
Perth	Water Corp – Perth	583,537	253,687	2.3
Sydney	Hunter Water; Sydney Water	2,581,750	643,055	4.0

**Adelaide metropolitan water consumption was sourced from Data SA: https://data.sa.gov.au/data/dataset/annual-report-operations-4-year-comparison/resource/8787edfc-b446-45ef-a99e-0fea564a7568*

- The data on storage capacity was acquired from BOM (http://www.bom.gov.au/water/dashboards/#/water-storages/summary/state) and annual consumption was determined using the NPR data (volume of water supplied to residential customers, commercial, municipal and industrial customers, and others).
- The data above shows SA Water has limited ability to draw its water from storages compared to other metropolitan cities.
- SA Water relies on River Murray water to augment catchment supplies.

A1.7 Source of water



SA Water Source of Water	
Source	**Volume (ML)**
Surface water	208,133
Groundwater	12,150
Desalination of marine water	4,332
Recycling	28,995
Stormwater	85
Total	**253,695**

- SA Water primarily sources its water from surface water (River Murray) which incurs relatively higher operating costs compared to its peers due to the requirement to pump the water over significant distances to its customers.

A1.8 Major Water Peers - Key differences (sewerage)

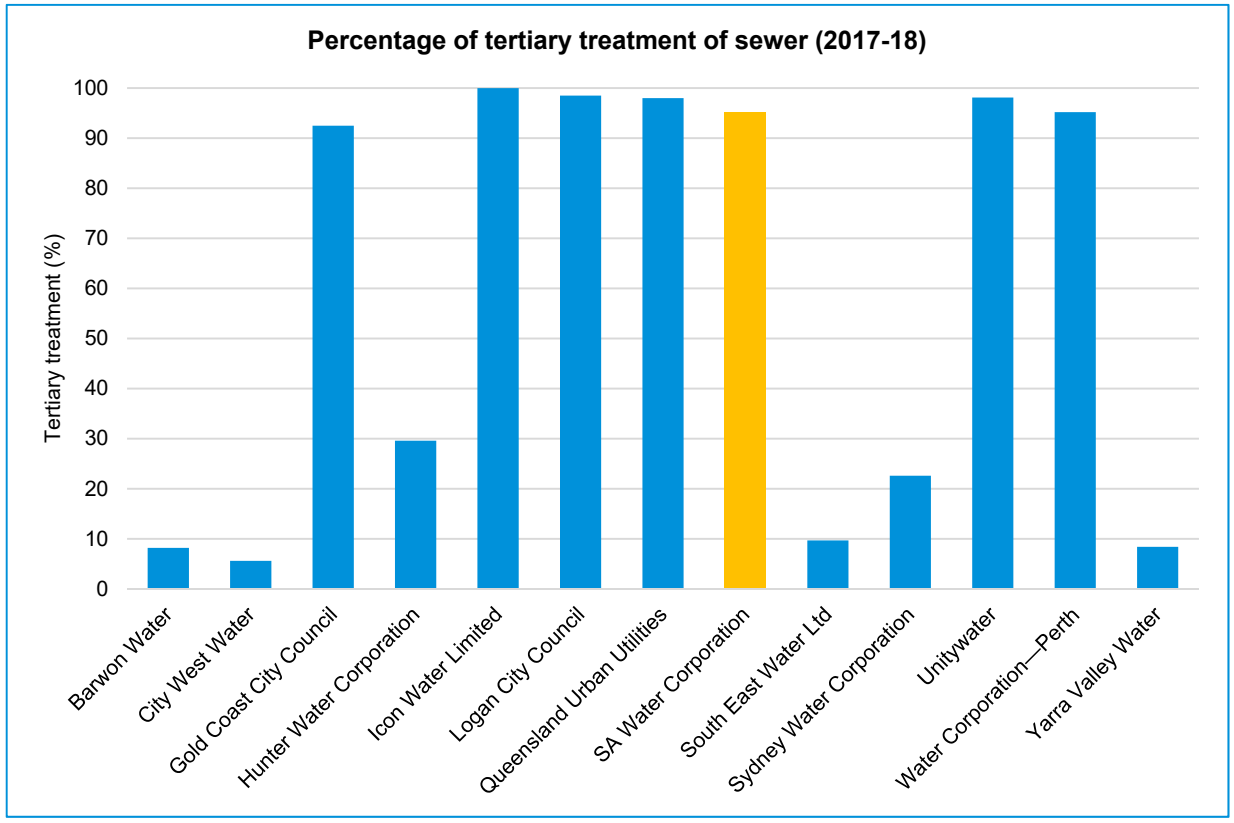
Sewerage

Operating costs for treatment of sewerage differ across jurisdictions due to a number of environmental factors which enable some utilities to exploit less costly options of treatment. These factors include:

- The type of receiving environment where the utility can dispose of sewerage;
- The environment in which the network operates; and
- The topography.

SA Water's sewerage service area for the majority of its customer base is located in the Adelaide metropolitan region. The major SA Water sewerage treatment plants (also known as wastewater treatment plant) discharge treated sewerage to the ocean, as many other large metropolitan water service providers in Australia do. However, Adelaide's access to an ocean receiving environment is a relatively shallow gulf – Gulf St Vincent. We have been advised by SA Water that it is a requirement that discharges to the marine environment have a high level of treatment and therefore is not allowed to make untreated discharges to the ocean from its major sewerage treatment plants. This represents a different set of environmental issues compared to some other cities' Major Water Peers that discharge to a deep water ocean with little tertiary treatment such as Sydney Water, South East Water and Barwon Water, etc.

A1.9 Percentage of tertiary or advanced treatment of sewer



Utility	% of sewerage treated to tertiary level
Barwon Water	8
City West Water	6
Gold Coast City Council	93
Hunter Water Corporation	30
Icon Water Limited	100
Logan City Council	99
Queensland Urban Utilities	98
SA Water Corporation	95
South East Water Ltd	10
Sydney Water Corporation	23
Unitywater	98
Water Corporation—Perth	95
Yarra Valley Water	8

- The above figure shows the percentage of tertiary treatment of sewerage in 2017-18 for SA Water and Major Water Peers.
- SA Water treats nearly 100% of sewerage to a tertiary level. This is in contrast to some water businesses like Sydney Water and South East Water which treat less than 30% to tertiary level before discharging it to the ocean, allowing them to conduct less costly treatment processes.

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Appendix 2.0 Historical opex

A2.1 Historical opex analysis

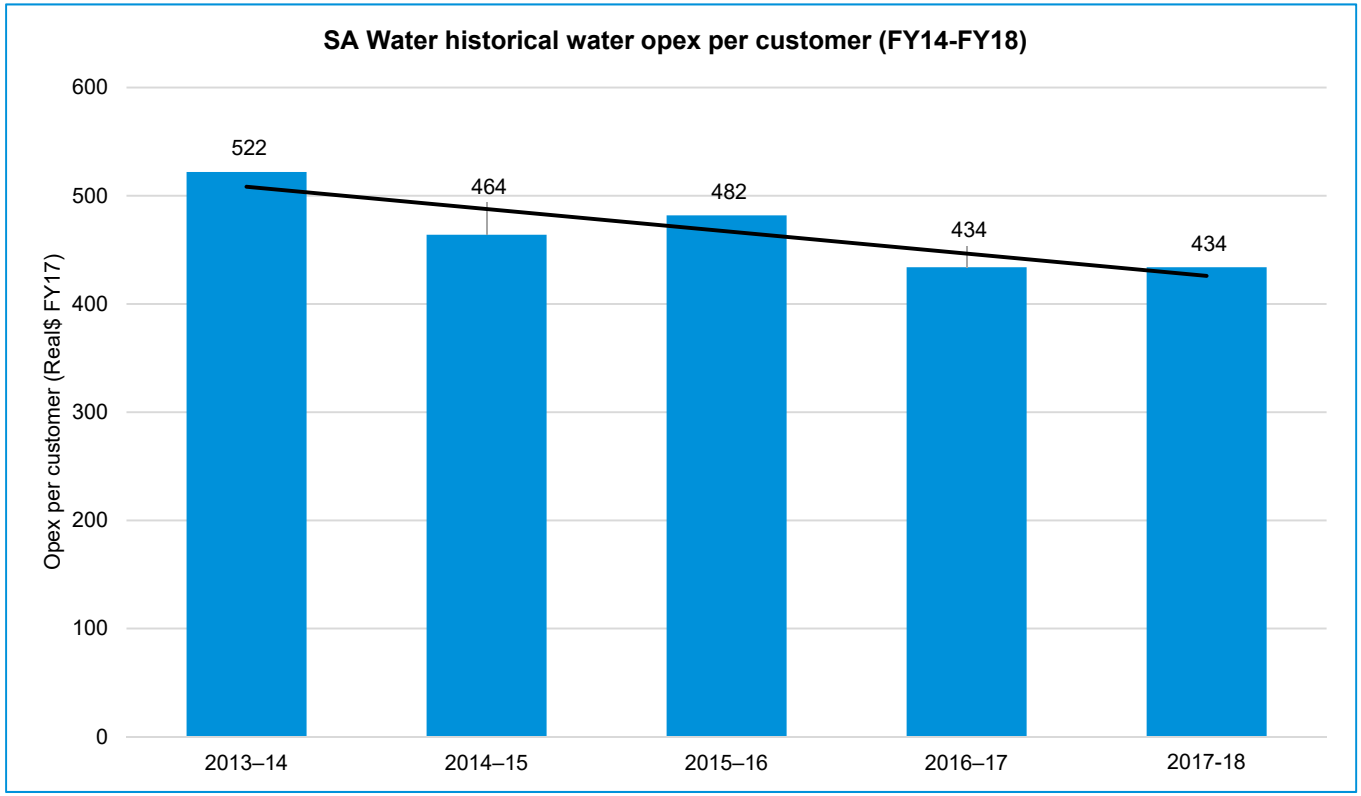
Introduction

To understand SA Water's business efficiency, an analysis has been undertaken to understand how its performance and efficiency has changed over the recent years. To examine how changes in key cost drivers, such as the number of customers, had impacted operating costs, a slightly different approach has been adopted in this report.

Instead of examining changes in the entire annual opex, historical opex per customer for both water services and sewerage services were examined. This analysis is then complemented by analysis of average opex per customer and average opex per km of main over FY14-FY18 for Major Water Peers (see *Section 4.0 NPR Operating Expenditure Results*) and all utilities (refer to *Appendix Section A4.0 NPR Operating Expenditure Results*).

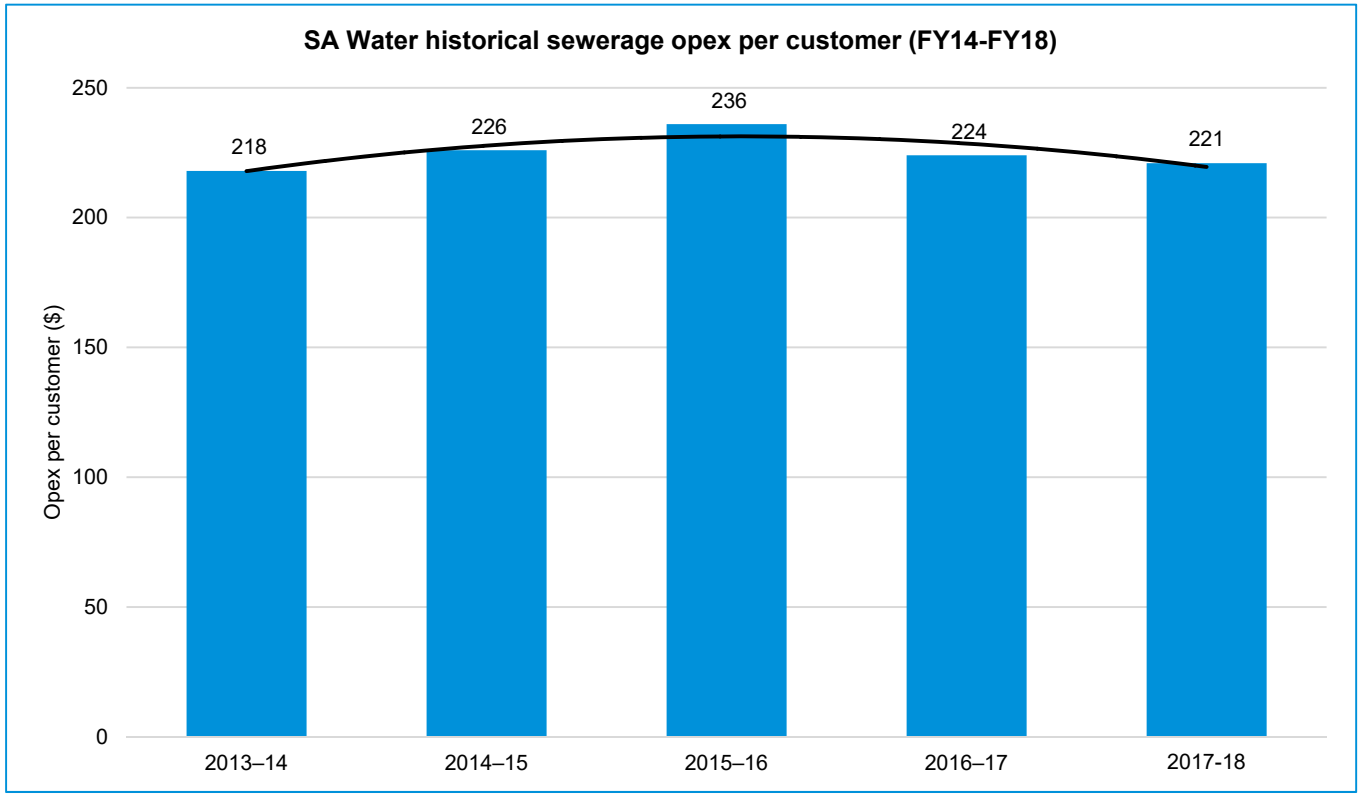
The historical opex data used in this analysis was acquired from the NPR, in which the historical values have been adjusted to real values.

A2.2 SA Water historical water opex per customer



- The above figure shows changes in SA Water's water opex per customer between FY14 and FY18 in Real FY18 dollars.
- There was some fluctuation in SA Water's water opex per customer over the period. However, during the period, there was a decreasing trend with a decrease in opex per customer from $522 to $434 (fall of $88).
- In the same period, SA Water saw an increase in customer numbers by 32,000 and an increase in length of water mains by 454km.
- Use of the Adelaide Desalination Plant has fallen dramatically in the period from 61,000 ML in 2013-14 to only 4,332 ML in 2017-18.

A2.3 SA Water historical sewerage opex per customer



- The figure above shows changes in SA Water's sewerage opex per customer between FY14 and FY18.
- The increasing trend in opex per customer from the first half of this period has been almost completely reversed in the second half with the final two years in the period exhibiting a fall of $15 per customer.
- Over the five year period, the NPR data revealed an increase in customer numbers by 25,000 and an increase in length of sewer mains and channels by 170km.

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Appendix 3.0 Multi factor productivity

A3.1 Multi factor productivity

Multi factor productivity is a method of combining a number of size variables into a single metric that can then be charted against operating costs to provide a normalised comparison of a number of otherwise quite different entities. This allows a meaningful comparison between Australian water utilities who are quite different in the environments, social and business contexts in which they operate.

To achieve this using the available NPR data, a 'CLD' analysis has been used. CLD refers to three elements of the metric as follows:

- C – Customers
- L – Length of pipe
- D – Demand volume

CLD therefore becomes a proxy for the true size of each utility that takes account of these three variables

To retain consistency with the KPMG Benchmarking report produced for SA Water's RBP2016, these three variables have been weighted as shown in the formulae below:

$$CLD = C^{0.5} \times L^{0.3} \times D^{0.2}$$

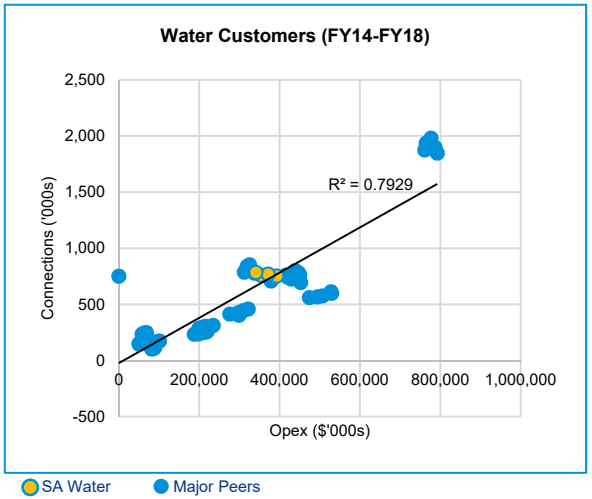
These weightings represent the approximate degree to which each variable influences operating costs. E.g. the number of customers has approximately 2.5 x the degree of influence over operating costs than the volume demand does.

Whilst these variables and their weightings were defined for SA Water's first regulatory proposal in 2013, and were based on different data available at that time, the correlation analyses shown overleaf from the current NPR data are not inconsistent with this approach in that:

- reasonably strong correlations are shown between each variable and operating costs
- customer numbers has the strongest correlation, and
- the correlation of Length and Demand with operating costs are similar to each other and strong enough to support their inclusion in the CLD metric.

A3.2 Correlation between water opex and key output drivers

C



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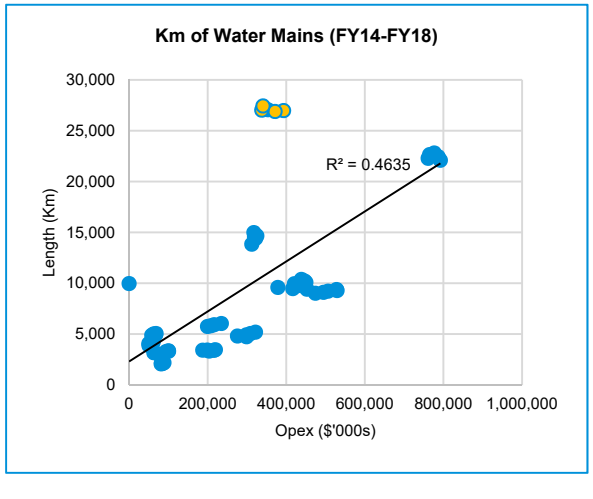

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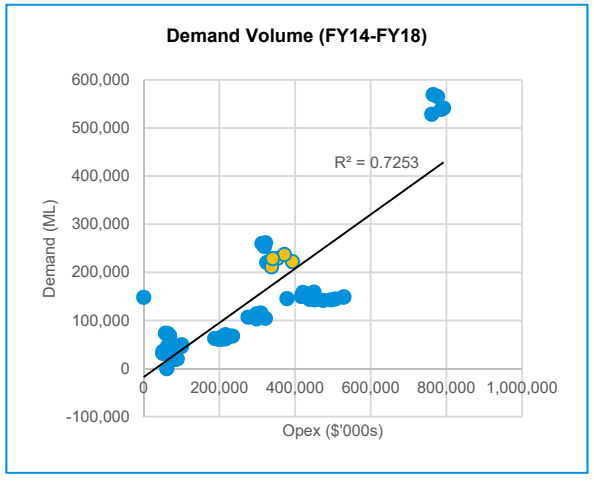
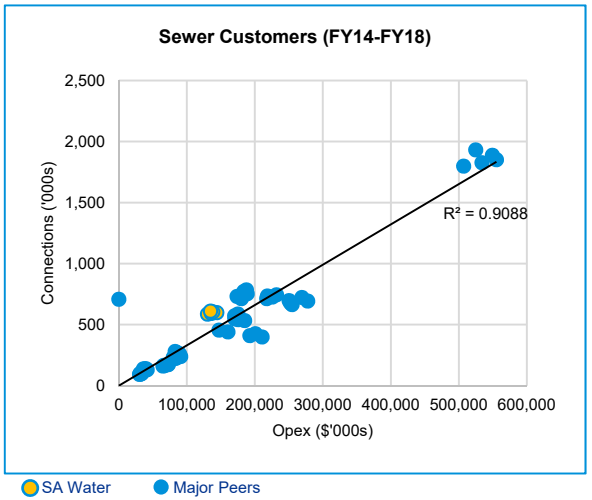


SA Water Major Peers

- The above figures show the correlation between opex and each of the variables in the CLD metric.
- As the R^2 factor approaches 1.0, the relationship becomes stronger.
- In relation to the length of water mains, SA Water has been more efficient compared against its peers over the period (FY14-FY18).
- In relation to the number of customers, SA Water appears to be close to the average efficiency of the peer group.
- The correlation coefficient for opex and km of water mains is relatively low due to SA Water's abnormally high length of pipe compared to the number of customers compared to its Major Water Peers. The correlation without SA Water is 0.8011.

A3.3 Correlation between sewerage opex and key output drivers

C



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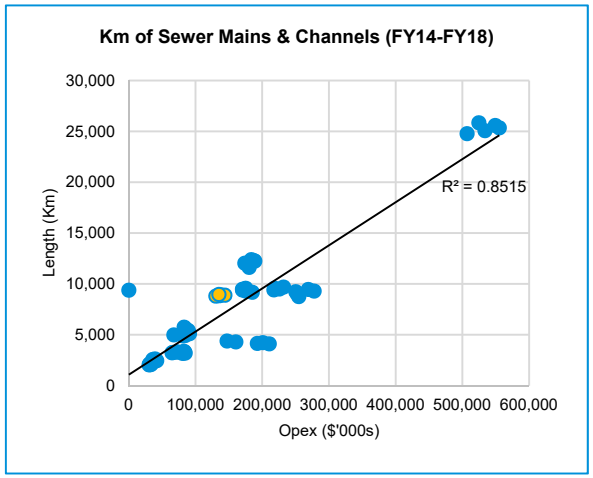

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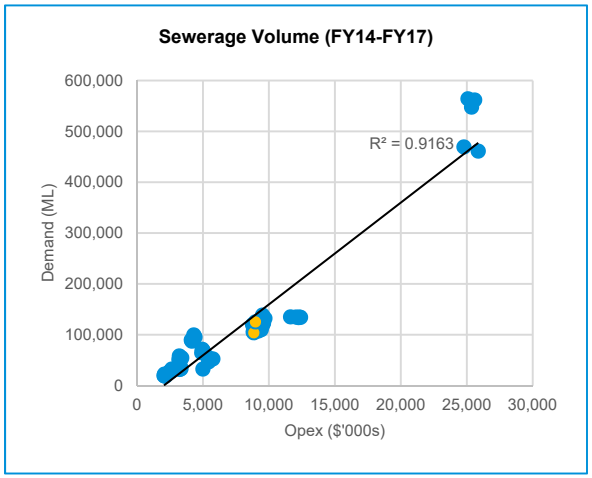

- The above figures show the correlation of sewerage opex and each of the variables in the CLD metric.
- The R^2 results show that there is a strong correlation between opex and each of the variables, with the strongest being with sewer volume.

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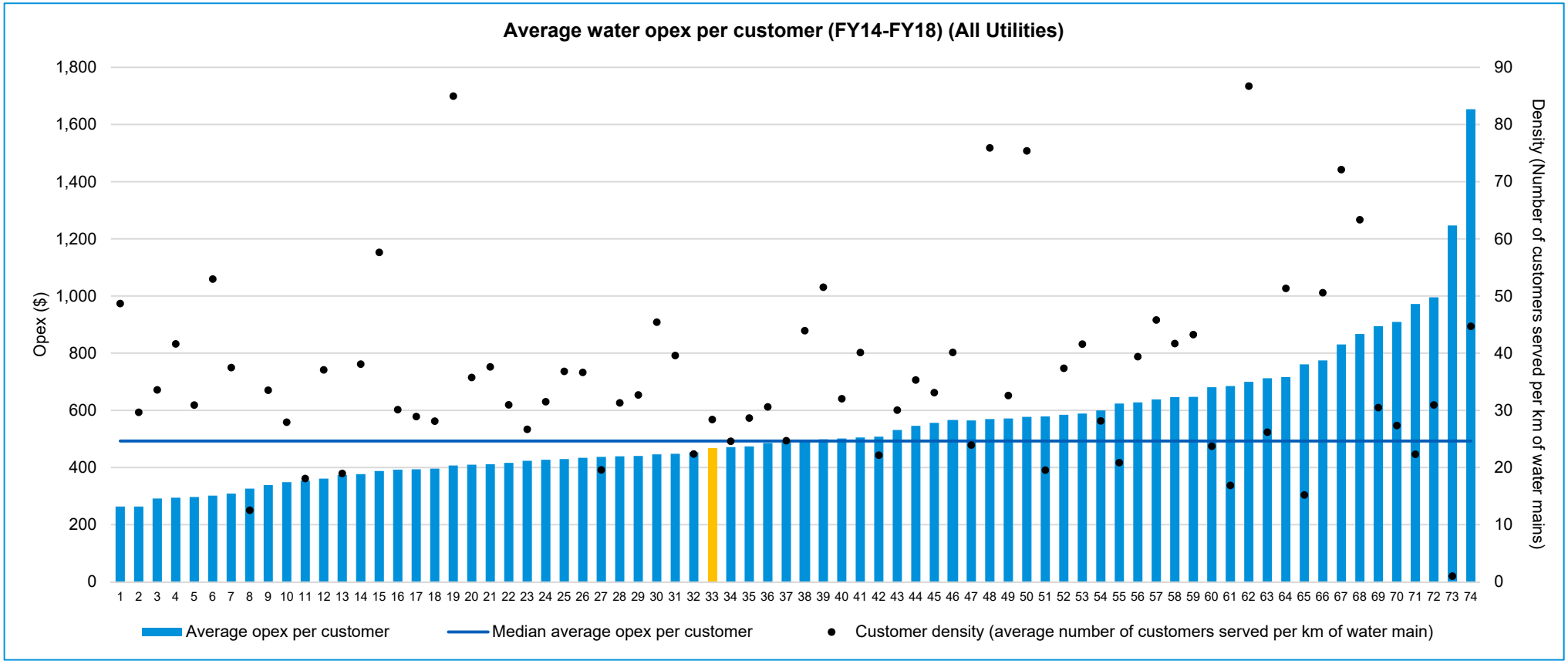
Appendix 4.0 Average opex analysis

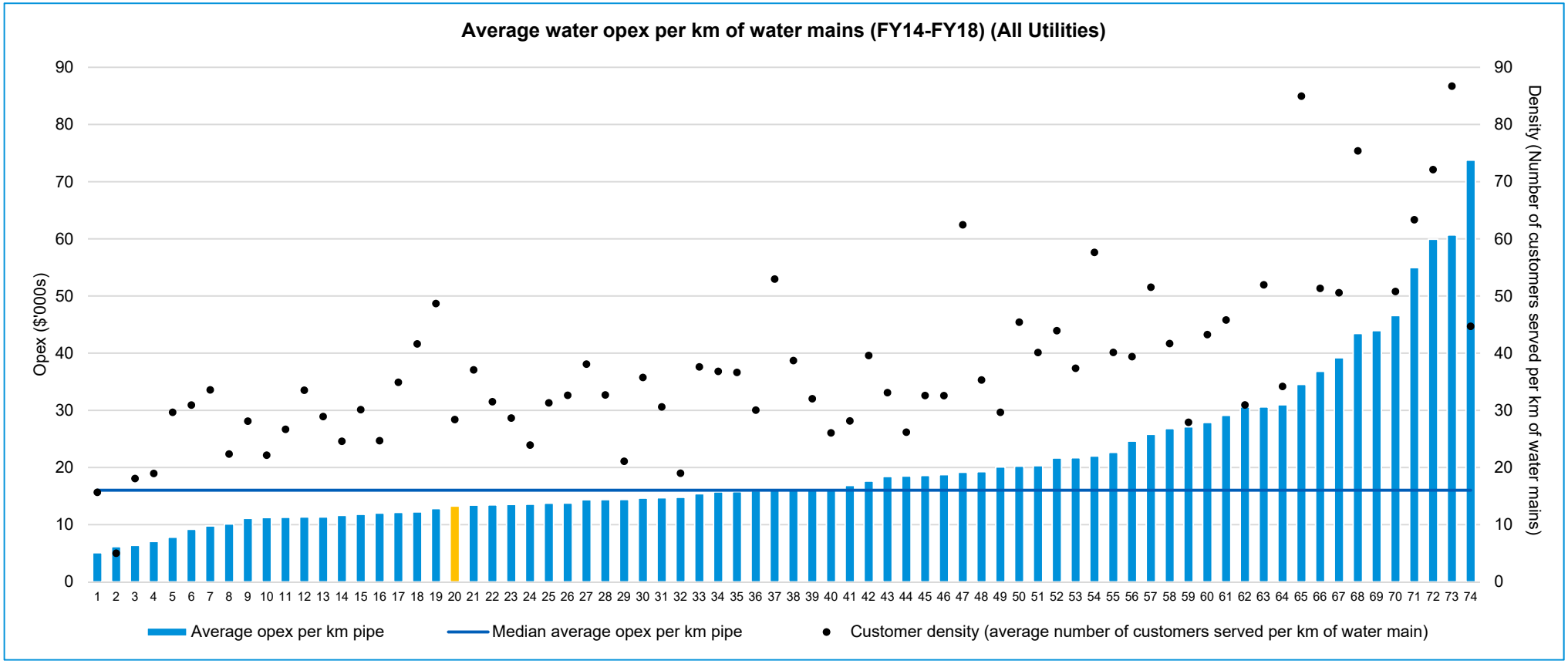
A4.1 Average water opex per customer (all utilities)



- The above figure shows average water opex per customer for all utilities[1] in the NPR data over the FY14-FY18 period against customer density (average number of customers served per km of water main).
- SA Water's( ) performance at just under the median level should be considered in light of its large service area compared to its peers.

[1] Some utilities with zero or incomplete data have been excluded

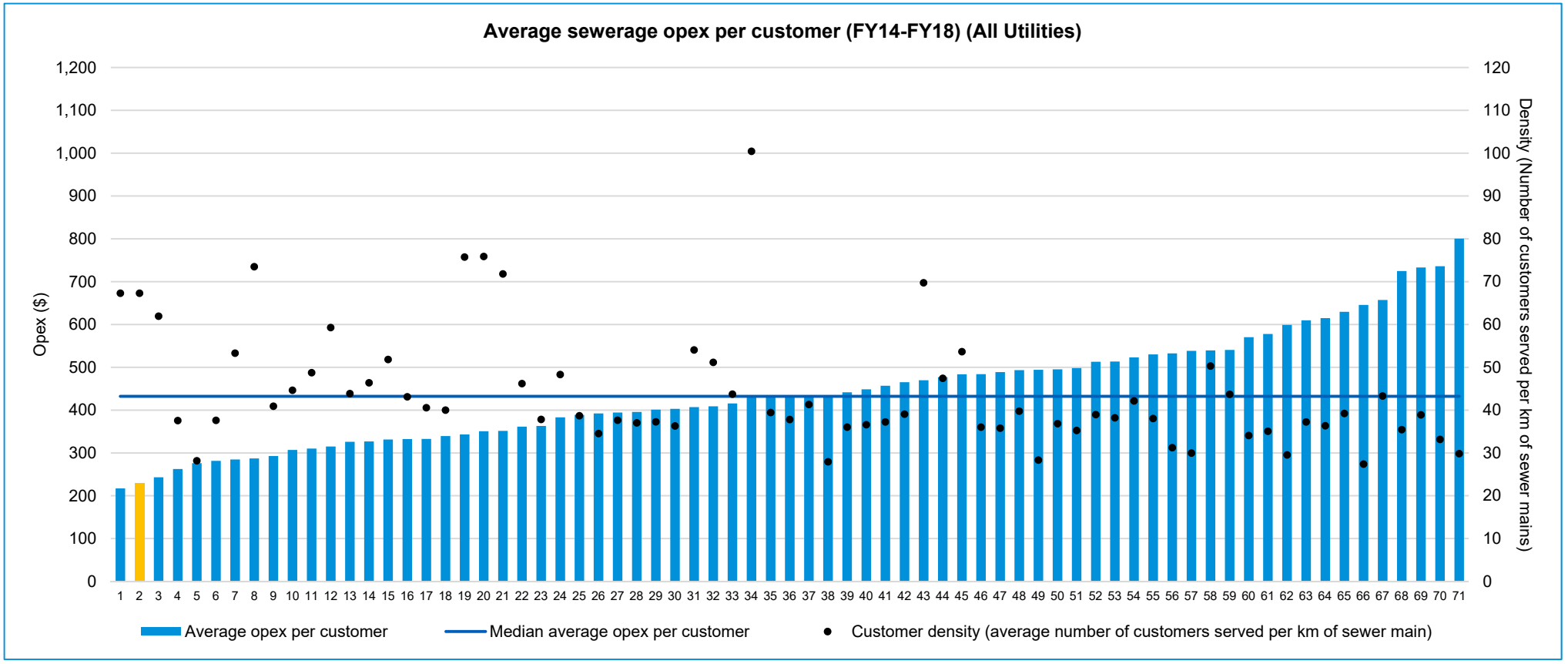
A4.2 Average water opex per km of water mains (all utilities)



- The above figure shows average water opex per km of water main for all utilities in the NPR data over FY14-FY18 against customer density (average number of customers served per km of water main).
- Across the population there is significant variability in density driven by the differences in service area.

[1] Some utilities with zero or incomplete data have been excluded

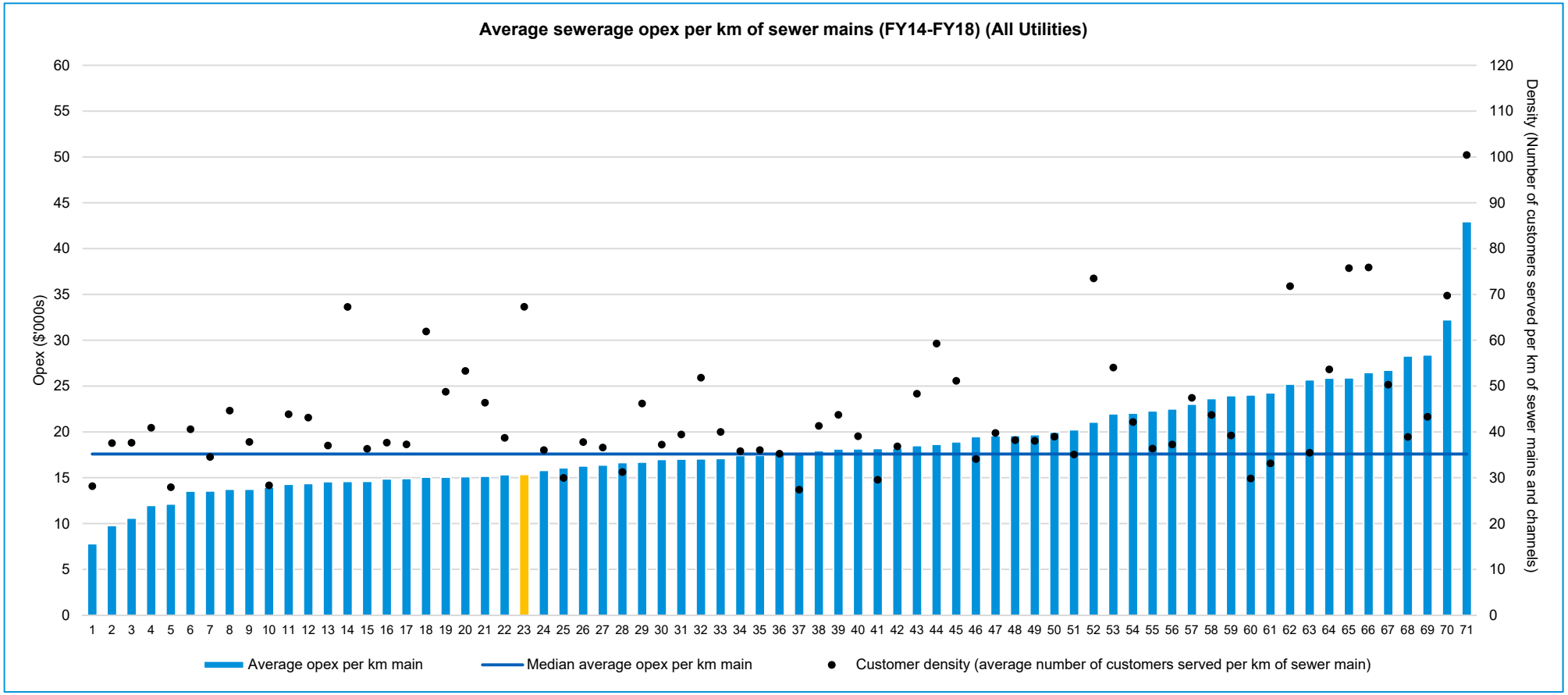
A4.3 Average sewerage opex per customer (all utilities)



- The above figure shows average sewerage opex per customer for all utilities in the NPR over FY14-FY18 against customer density (average number of customers served per km of sewer main).
- As identified in *Section 3.2 Service Area*, SA Water customer density in sewerage is much greater than water due to the reduced service area.
- SA Water had one of the lowest average opex per customer over the FY14-FY18 period.

[1] Some utilities with zero or incomplete data have been excluded

A4.4 Average sewerage opex per km of sewer mains (all utilities)



- The above figure shows average sewerage opex per km of sewer main for all utilities in NPR over FY14-FY18 against customer density (average number of customers served per km of sewer main).
- In this measure, SA Water did not have one of the lowest average opex, but its average opex was still below the median.

[1] Some utilities with zero or incomplete data have been excluded

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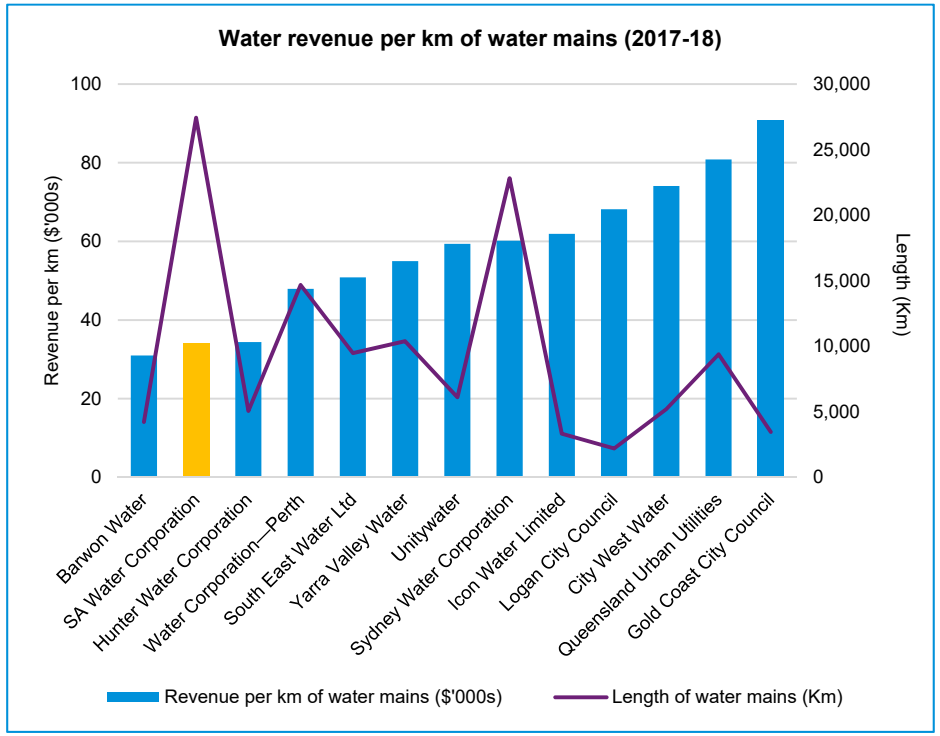
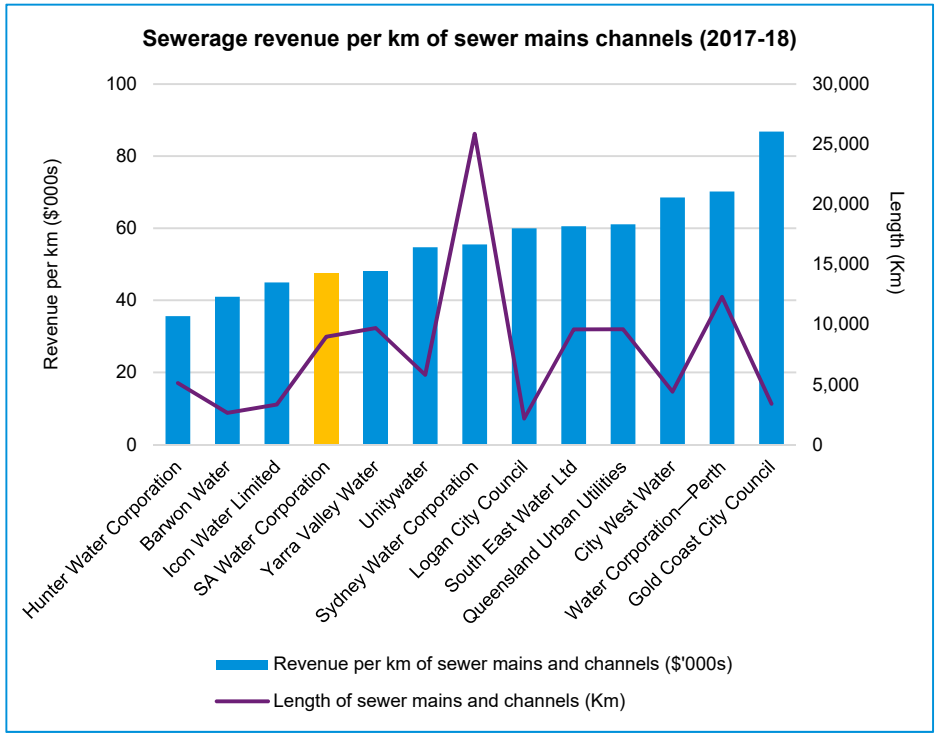
Appendix 5.0 Revenue analysis

A5.1 Revenue per km





- The above figures show revenue per km of mains against the length of main for water services and sewerage services respectively.
- SA Water had the 2nd lowest water revenue per km of water mains among Major Water Peers despite having the longest water mains.
- SA Water had the 4th lowest sewerage revenue per km of sewer mains and channels.

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