

Water and Sewer Network Reliability Master Plan



For the 2023-28 regulatory period

AM2703 Drinking Water Supply ALCMP – Part 2 Reliability

AM2704 Sewage Collection ALCMP – Part 2 Reliability



Aboriginal acknowledgment

South East Water proudly acknowledges the Traditional Owners of the land on which we work and live, and pay respects to their Elders past, present and emerging.

We acknowledge their songlines, cultural lore and continuing connection to the land and water. We recognise and value the rich cultural heritage and ongoing contributions of Aboriginal people and communities to our society in Victoria.

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1. Introduction

The Water and Sewer Network Reliability Master Plan summarises South East Water's investments for the regulatory period 2023-28 with an outlook to 2028-33, it covers seven capital investment portfolios as listed in Table 1 and their associated operational expenditure.

As depicted in Figure 1, the initiatives proposed in these investment portfolios supports South East Water's vision of "Innovate with Purpose, Act with Care" and contributes to delivering the Five Customer Outcomes:

- **Get the basics right, always** - Our customers want safe and reliable services, now and always. At its essence, this means clean and quality drinking water, and the safe disposal of wastewater.
- **Make my experience better** - Our customers told us that they want a better experience with us, every time they talk to us, see us out and about or visit us online.
- **Warn me, inform me** - Our customers want to be warned, and kept updated, about disruptions – both planned and emergency.
- **Fair and affordable for all** – Our customers told us that because water is the most essential of services, it must be fair and affordable for everyone.
- **Support my community, protect our environment** - Our customers want us to support their community and protect our environment – delivering long-term water security in a way that honours the environment and ongoing liveability.

This plan contributes to South East Water's long-term planning and strategic asset management investment plans and delivers value for our customer and community through our key focus areas:

- **Empower our people** – We're one team that reflects the diversity of our customers. We welcome differences, and everyone's ideas and viewpoints are valued, building a safe space where people find inspiring opportunities in water.
- **Deliver for our customers** – As part of the community, we know how important it is to get the basics right, and make our customer's experience better every time. In delivering our customer outcomes, all our actions support a thriving, more liveable community.
- **Protect our environment** – As we're learning from the Traditional Owners, water is essential for a healthy country. We're driving long-term water security, net zero emissions and repurposing waste to protect our environment, support our community.
- **Optimise our operations** – We are committed to refining our processes, products, assets, and service. We strive for continuous improvement. We warn and inform our customers at the right time, as we deliver seamless, fair and affordable services for all.
- **Drive Innovation at scale** – Our innovation stretches beyond basic prototypes and is proven to work at scale in real- life communities. We call it "life-size" innovation. Through partnerships and commercialisation, we share our data, expertise and technology to create step- change impact.

The scope of this Master Plan covers all asset classes within the sewage collection, potable water, and recycled water networks. Figure 2 and Appendix C provides a map and information summary of the assets covered by this Master Plan. Refer to Appendix A for an Executive Summary Presentation.

When considering the total performance of an asset this document should be read alongside the other asset and strategic plans as indicated in Figure 3 and Figure 4. In particular this document forms Part 2 – Reliability of both water and sewer asset lifecycle management plans (AM2703 and AM2704), with Part 1 being the growth plans, as shown in Figure 5. The Part 2 - Reliability are combined as they are responding in an integrated manner, in response to a common set of customer feedback, risk assessment processes and newly combined customer interruption KPIs.

| | | | | | |
|--|---|---|---|---|--|
| Our Vision | INNOVATE WITH PURPOSE, ACT WITH CARE | | | | |
| Our Purpose | To deliver healthy water for life for our customers, community and environment | | | | |
| Customer Outcomes | Get the basics right, always Make my experience better Warn me, inform me Fair & Affordable for all Support my community, protect our environment | | | | |
| Our Focus Areas | Empower our people We're one team made up of so many different people. Everyone's ideas and viewpoints are valued and acted on, to make our customers' experience better and to build a place where people want to work and grow. | Deliver for our Customers As part of the community, we know how important it is to get the basics right, every time. All our actions support a stronger, fairer, more liveable community. | Protect our environment To drive long term water security, protect our environment and safeguard our community, we're committed to zero emissions and waste reduction. | Optimise our Operations Committed to refining our purses, products, assets, and service. We strive for continuous improvement. We warn and inform our customers at the right time, as we can deliver seamless, fair and affordable services for all. | Drive Innovation at scale Our innovation stretches beyond basic prototypes and is proven to work at scale in real-life communities. We call it "life-size" innovation. |
| ... and deliver.. (Customer recommendations, Regulatory requirements, stakeholder commitments) | <ul style="list-style-type: none"> Project teams that cross the boundary of departments. Strong partnership contractors and consultants on safety and social procurement. TRIFR, Safety Observations. Culture AMP – Employee Trust, Engagement. Diversity in team composition. | <ul style="list-style-type: none"> Public Health and Safety– SFARP approach to Safe Drinking Water and Sewage spill Customer Recommendation 2 – Reliable services across the whole network. Improve incident notification to and from our stakeholders, critical customers. Reduced impact of unplanned disruptions | <ul style="list-style-type: none"> General Environmental Duty – manage sewage blockages, spills and waste disposal to so far as reasonably practicable. Safety – for our customers, community and staff members. Water conservation – achieving Sustainable Economic Level of Leakage. | <ul style="list-style-type: none"> Efficient delivery Models that promote safety, innovation, environmental and social objectives. Prudent and efficient asset management, embedding Digital. Develop and integrate new technology to improve the operational efficiency of our water and sewer systems. | <ul style="list-style-type: none"> Digital engineering, using data science approach and geospatial tools to effectively monitor and analyse asset risk Efficient delivery that minimise adverse impact to customers, community and the environment Through partnerships and commercialisation, we share our data, expertise and technology to create step- change impact. |
| By doing... (Initiatives) | Living our values – We put Safety First, We're Real, We Care, We Discover, We deliver Sustainably | <ul style="list-style-type: none"> Water Quality Improvements Asset Condition Assessment and Renewal Risk Monitoring and Control Asset Maintenance | <ul style="list-style-type: none"> Critical Sewer Condition Assessment and Renewal Leakage Management that integrates with our Digital Utility roadmap. | <ul style="list-style-type: none"> New Maintenance Model New Capital Delivery Model Asset Management, Risk Profiling and Forecasting | <ul style="list-style-type: none"> Innovation on trenchless renewal technologies Innovation on maintenance and monitoring technologies Asset Risk Profiling & Live Operational Hydraulic Models |
| Measured by | 100% of Have Your Say action plans are developed and in train We have established the root causes of Top 5 Safety & Wellbeing risks and identified controls. | Water Quality Incidents Sewer blockages and spill levels Water supply interruptions Customer complaints | No. of Significant Sewer Spill Sewer blockages and spill levels Customer complaints Sustainable Economic Level of Leakage | Customer satisfaction, trust, value for money Customer complaints Delivery Contract Performance Framework | Delivering customer service outcome in a cost effective way despite aging asset and climate change. Reduced impact of unplanned disruption. |
| | We put safety first We're bold We care We discover We're real We deliver sustainably | | | | |



Figure 1: Strategy on a Page – Water and Sewer Network Reliability

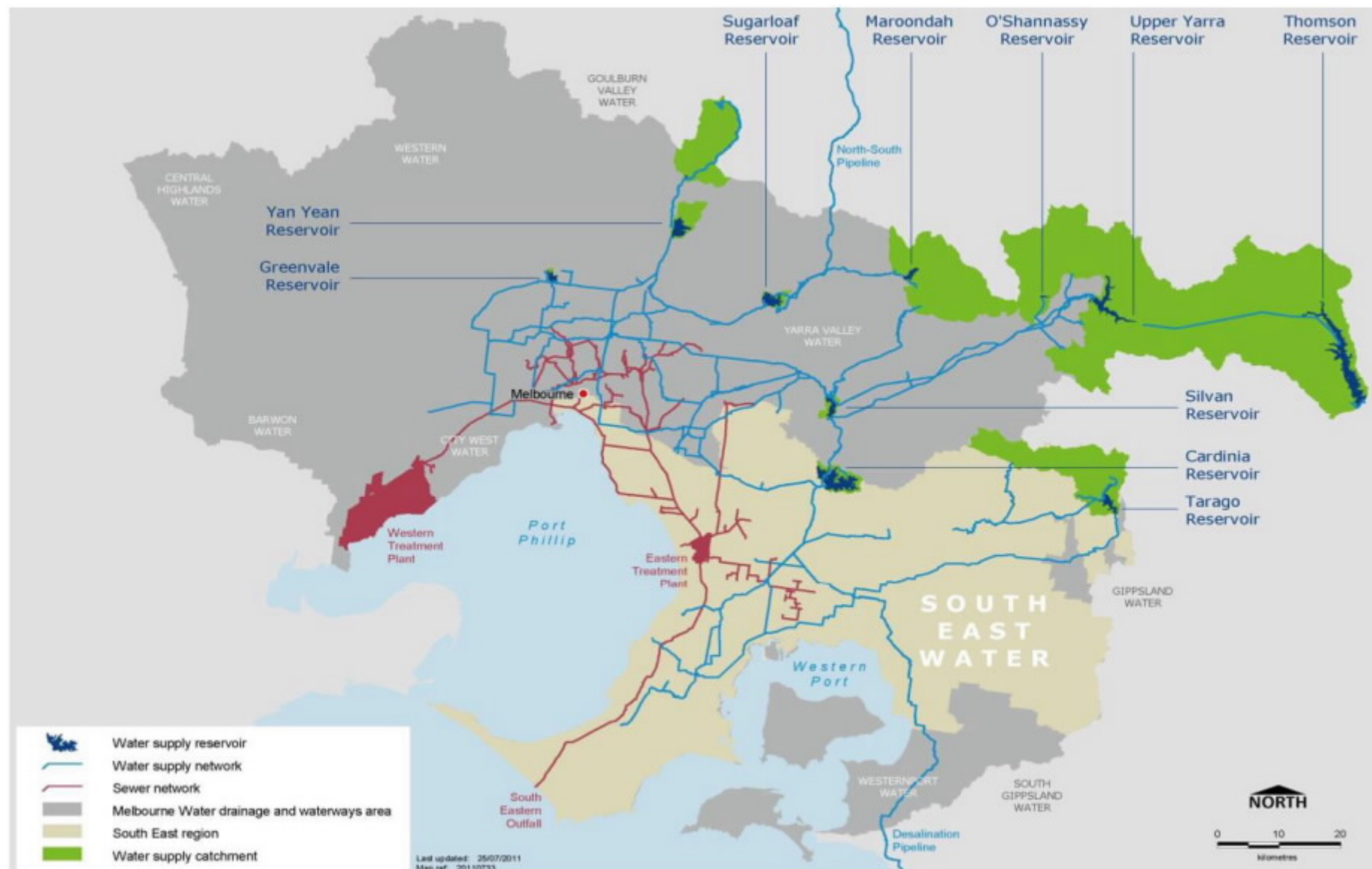


Figure 2: South East Water Service Area

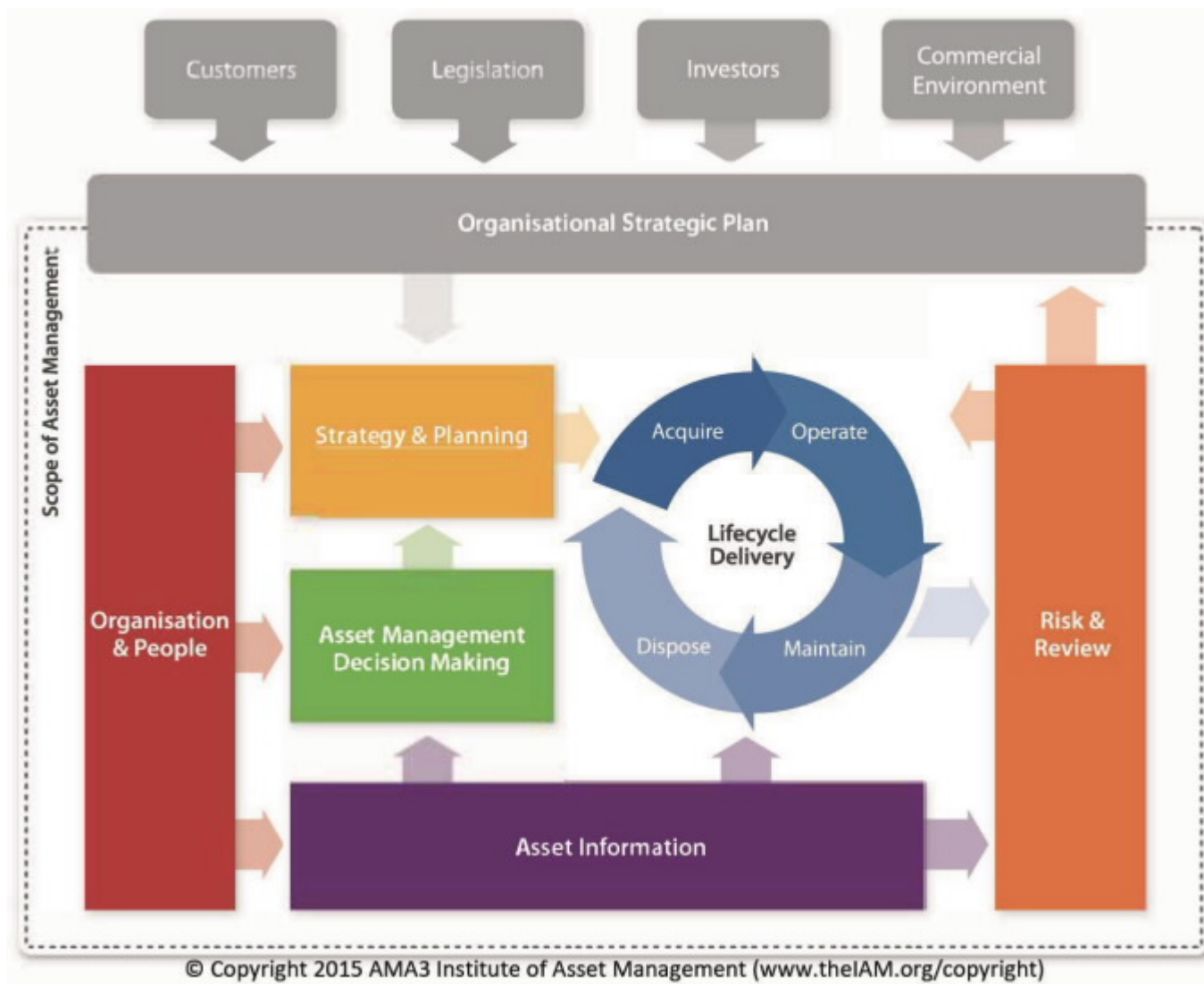


Figure 3: Asset Lifecycle Management

Source: AMA3 Institute of Asset Management Copyright 2015

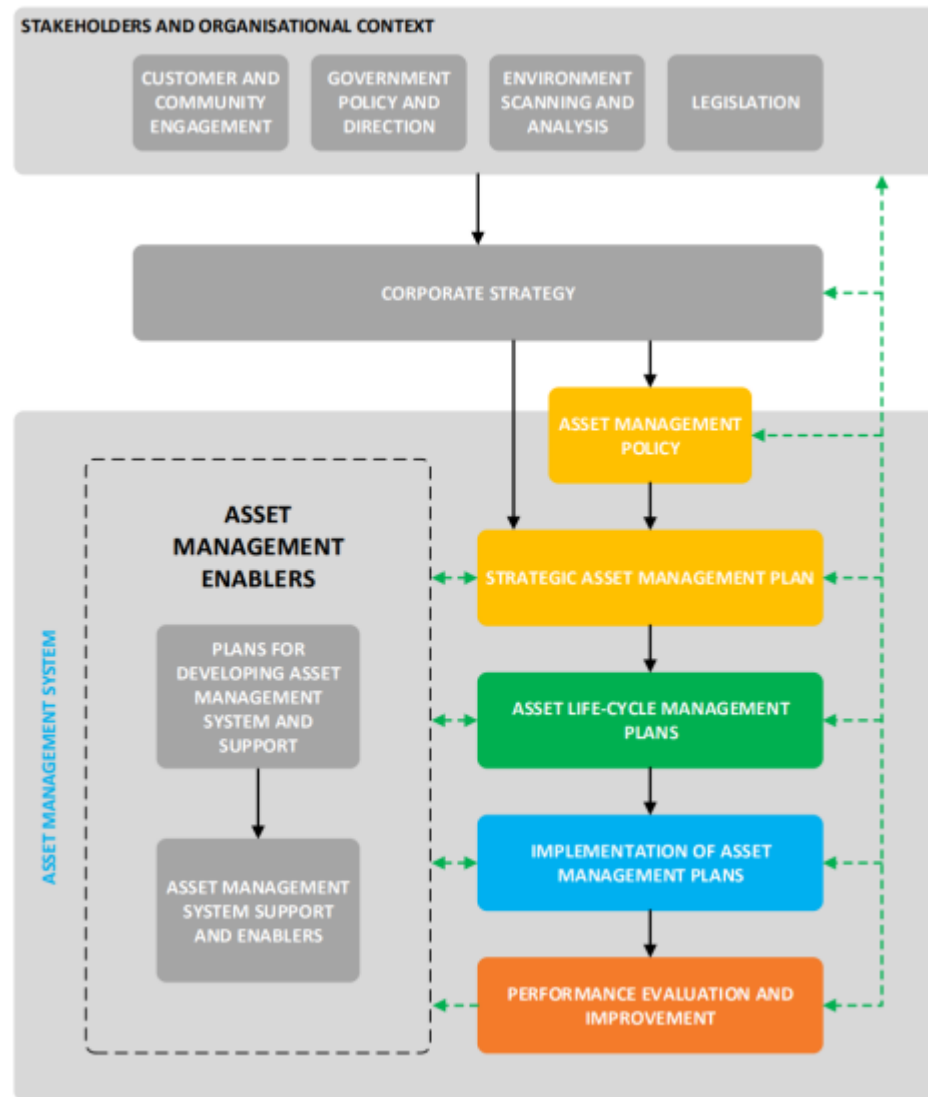


Figure 4: South East Water Asset Management Framework

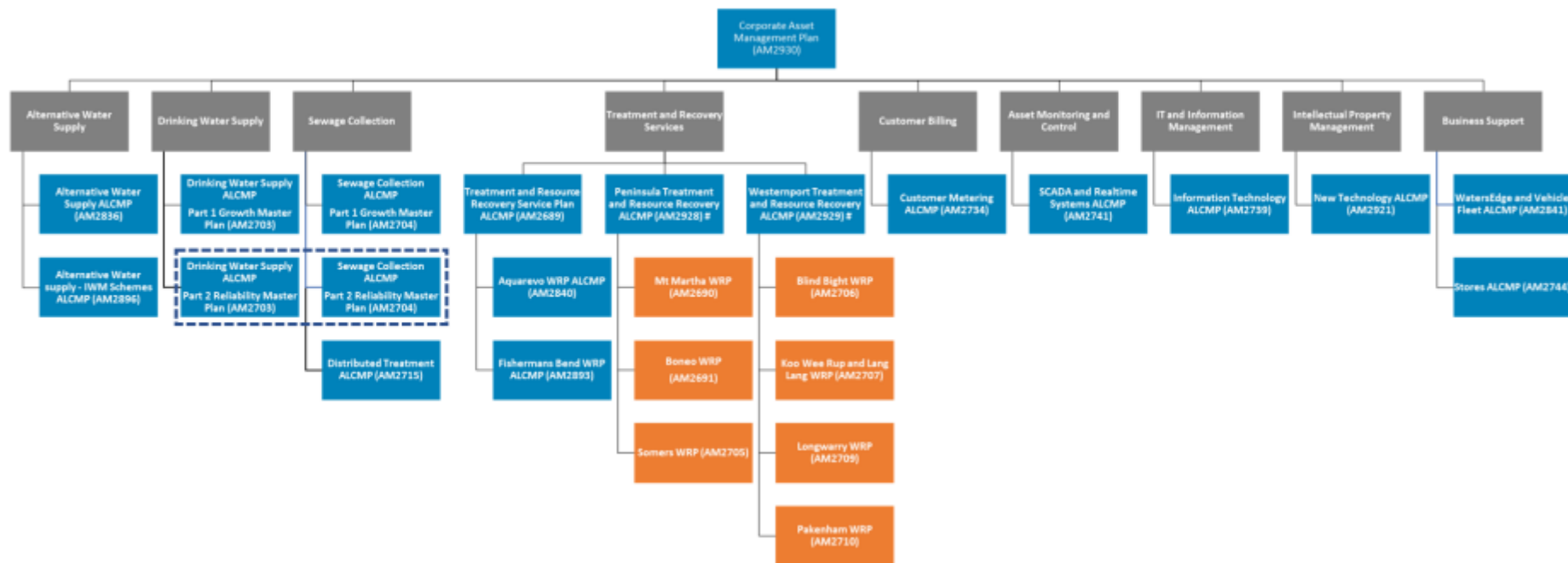


Figure 5: Corporate Asset Management Plans

Table 1: Reliability Master Plan Portfolio Summary

| Investment portfolio | Objectives |
|---|---|
| Potable Water Improvements / Compliance | Meet compliance with safety regulations and management. |
| Potable Water Quality | Meet compliance with safe drinking water regulations. |
| Potable Water Reliability | Maintain drinking water network levels of service including for customer interruptions through planned and reactive operations and maintenance activities considering condition, performance, system resilience, criticality, and risk assessment. |
| Potable Water Renewals | Maintain drinking water network levels of service for customer interruptions through predominately reactively responding to non-critical asset failures as they occur. Assets with multiple failures or history of failure, that have significant customer interruptions or environmental impact are prioritised to be renewed. |
| Sewer Improvements / Compliance | Meet compliance with environmental protection regulations including the General Environmental Duty (GED), safety regulations and management. |
| Sewer Reliability | Maintain sewer network levels of service for customer interruptions through planned and reactive operations and maintenance activities considering condition, performance, system resilience, criticality, and risk assessment. |
| Sewer Renewals | Maintain sewer network levels of service for customer interruptions through predominately reactively responding to asset failure as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed. |

Note: The need for budget allocation has been reviewed for Recycled Water Renewals, to maintain recycled water network levels of service for customer interruptions through predominately reactively responding to asset failures as they occur. Based on historical performance, the need to reactively renew recycled water network is very small or negligible. The excellent performance is reflective of the age and materials of our recycled water network. Therefore, it is determined that no capital expenditure will be budgeted for the Recycled Water Renewals as a portfolio in the Price Submission for regulatory period 2023-28.

During the regulatory period 2023- 2028, the actual performance will be tracked, and funding will be reprioritised as the need arises and as these assets age.

2. Performance

We have delivered customer outcomes to a high standard over the 2018-23 period, ensuring that customers received the outcomes they paid for. We are working to make improvements to how we identify and address customer complaints.

2.1 Customer outcome performance 2018-23

The Water and Sewer Network Reliability and Renewal Programs for the current 2018-23 regulatory period has contributed to South East Water delivering customer outcomes to a high standard. There are 8 out of 18 output measures and targets relevant to the water and sewer reliability programs as shown in Table 2.

We report our performance in delivering these outcomes to our customers every 3 months on our website and to the Essential Service Commission (ESC) each year. Of the 8 targets delivered in each year from 2018-19 to 2021-22, we have met the target or been within the tolerance band 100% of the time. Of these, only two metrics ever exceeded the target but were still within the tolerance band (i.e., one each for water and sewer).

Table 2: 2018-23 Outcomes and Output Measures that apply to Water and Sewer Network Reliability comparison to Performance

| Outcome | Output measures | 2018-23 target | 2018-23 target tolerance band | Performance (4-year average 2018-2022) |
|---|---|----------------|-------------------------------|--|
| 1. Get the basics right, always | Number of Safe Drinking Water Regulations non-compliance incidents (water sampling and audits) ⁽¹⁾ | 0 | 5 | ● 0.25 ⁽²⁾ |
| | Number of water quality complaints per 100 customers | 0.18 | 0.20 | ◆ 0.11 |
| | Number of customers receiving greater than 5 unplanned water supply interruptions | 532 | 559 | ◆ 196 |
| | Number of customers receiving 3 or more sewerage blockages | 17 | 46 | ● 23 ⁽³⁾ |
| 2. Warn me, inform me | Average duration of unplanned water supply interruptions (minutes) | 88 | 92.9 | ◆ 81 |
| | Percentage of customers impacted by an unplanned water supply interruption in peak times | 28% - 27.6% | 30.5% | ◆ 26.7% |
| | Planned water interruptions restored within notification period (%) | 98% | 96% | ◆ 99% |
| 5. Support my community, protect our environment | Number of EPA reportable sewer spills | 20 | 23 | ◆ 13 |

Note: A green diamond ♦ represents performance which is within the target and an orange circle ● represents performance which has exceeded the target but is within the tolerance band.

(1) Output measure original defined in the regulatory period 2018-23 as the percentage compliance with drinking water and recycled water standards. Subsequently redefined but still measuring water quality performance.

(2) Performance was 0 for all years except one incident in 2020/21.

(3) Climate variation of drier than average weather in 2018-19, followed by a wet weather in 2020-22 subsequently resulted in more blockages than expected.

2.2 Capital Expenditure Performance 2018-23

South East Water reviewed our capital expenditure in the 2018-23 regulatory period for the water and sewer reliability programs and a summary is provided in Table 3 and Figure 6. Capital expenditure is expected to be no more than 2% higher than the 2018-23 allowance. See Appendix D for Works Delivery Performance by program.

Table 3: Overall Water and Sewer Network Reliability Capital Expenditure Performance - 2018-23, \$M (in 2022-23 dollar)

| | 2018-19 \$M | 2019-20 \$M | 2020-21 \$M | 2021-22 \$M | 2022-23 \$M | 5- Year Total 2018-23 |
|---|----------------|----------------|----------------|-----------------|----------------|--------------------------|
| Inflated Budget during Price Submission in 2018 | 64.6 | 63.3 | 62.8 | 66.2 | 63.2 | 320.2 |
| Updated Actual/ Forecast | 63.1 | 75.4 | 67.7 | 55.3 | 64.7 | 326.33 |
| Variance | -1.5 (-2%) | 12.1 (19%) | 14.9 (8%) | -10.9 (-16%) | 1.5 (2%) | 6.1 (2%) |

(1) Please note there was no potable water compliance budget or actuals in the regulatory period 2018/23.

(2) The Overall Water and Sewer Network Reliability Capital Expenditure covers Potable Water Quality, Potable Water Reliability, Potable Water Renewal, Sewer Improvements / Compliance, Sewer Reliability, Sewer Renewal.

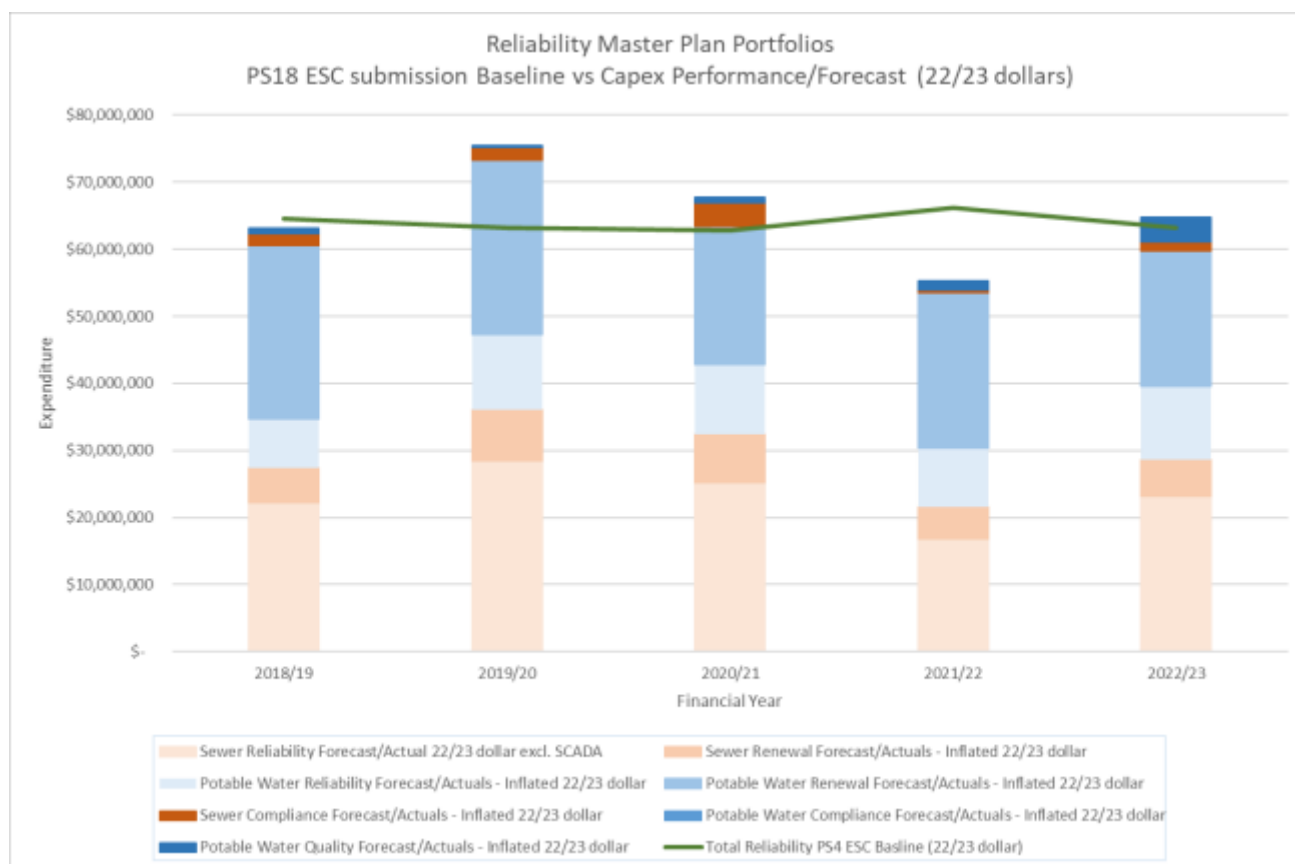


Figure 6: Reliability Master Plan Capital Expenditure Performance 2018-23 against Price Submission in 2018 (PS18) ESC submission Baseline (in 2022-23 dollar)

2.3 Operating Expenditure Performance 2018-23

South East Water have also reviewed our operational expenditure performance. We have delivered savings in the current regulatory period, with forecast operating expenditure \$0.7 million less than the benchmark OPEX allowance of \$699 million (escalated to \$2022-23). Overall South East Water performance across each year is provided in Figure 7, with Network performance provided in Figure 8. This reflects our commitment to reducing total operating costs. These cost savings were delivered through efficiencies. This included:

- ☐ streamlining functions within the business; and
- ☐ introducing new technologies and innovations that helped to reduce costs.

The efficiency of our current period performance is demonstrated by independent metropolitan and national benchmarking studies.

- ☐ South East Water benchmarks favourably against other metropolitan Melbourne water corporations. This is evidenced in the *National performance report 2020-21: Urban Water Utilities*, issued by the Bureau of Meteorology. This report compares urban water utilities across Australia and shows that our operating expenses per property are at the median or below over the 5-year period to 2020-21 compared to other metropolitan water utilities.
- ☐ The Water Services Association of Australia undertook a benchmarking study on the 2019-20 operating expenses of comparable water businesses. It shows that South East Water benchmarks favourably. When compared against 19 other water businesses across Australia, we have 69% (or \$90 million) of operating expenses in the top quartile

for efficiency. The report rated South East Water's OPEX categories including water network, wastewater network, retail and corporate expenditure on finance, human resources, fleet and property in the top quartile.

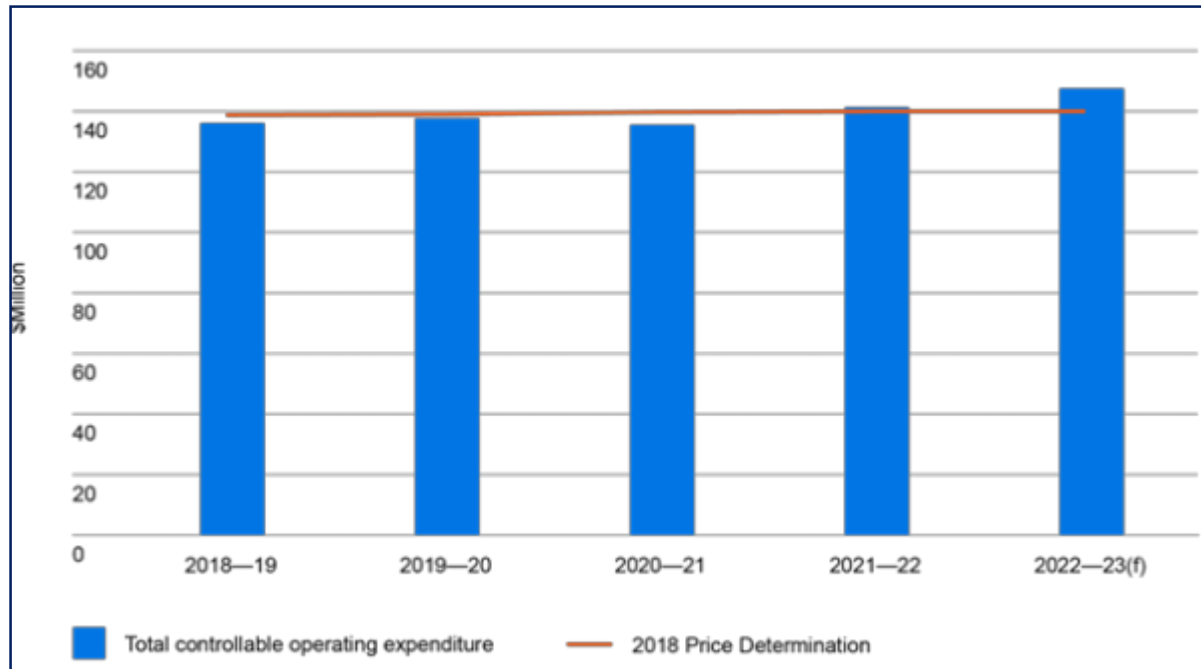


Figure 7: Operating Expenditure Performance 2018-23, South East Water compared to benchmark allowance (\$2022-23)

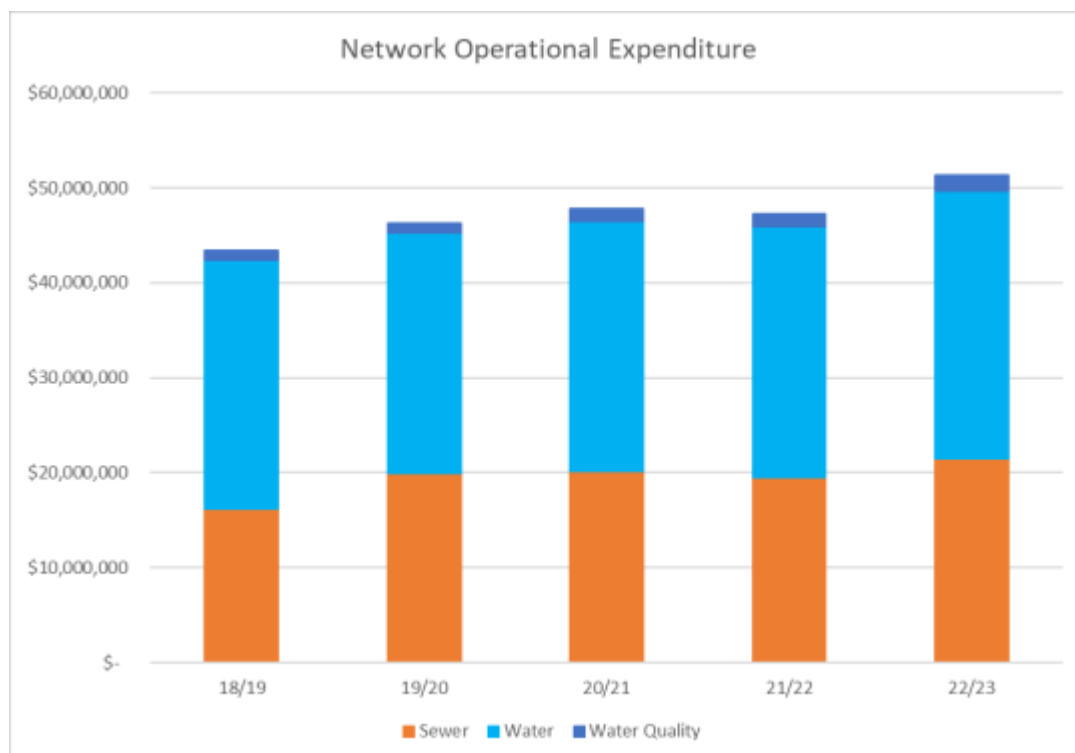


Figure 8: Water and Sewer Network Operating Expenditure Performance 2018-23, South East Water

2.4 Customer Satisfaction Performance

The asset reliability and renewal initiatives covered in the Reliability Master Plan is a key factor in enabling South East Water to maintain our satisfaction, trust and value for money rating. This occurs in two ways. First, the investments reduce water service interruptions, and secondly the crews dispatched to undertake works are highly visible to our customers. This visibility reassures our customers that their bills are being well spent, maintaining their network, and reducing water loss. Maintaining timely, professional, and well supported work crews on the job ensure that any direct interactions reinforce the general reassurance.

Customer satisfaction with South East Water is regularly tested in surveys conducted by the ESC and by our business. Both sources indicate a high level of customer satisfaction with us since the commencement of the 2018-23 regulatory period.

The ESC's quarterly water customer satisfaction survey asks customers about their view on value for money, reputation in the community, level of trust and overall satisfaction. This survey shows that we consistently have had one of the higher customer satisfaction ratings among the Victorian water businesses in the current regulatory period.

There is also consistency in customer satisfaction outcomes between the ESC's and our customer surveys. We test customer satisfaction on an ongoing basis via:

- ☐ Post-interaction surveys: sent out following an inbound call to the accounts and faults & emergencies call centres, completing a transaction or lodging an enquiry online;
- ☐ After an unplanned interruption: emailed and letter box drop surveys containing the same questions, that go to any household affected by an unplanned water supply interruption; and
- ☐ Brand tracker survey: monthly survey conducted by a panel provider targeting customers in our service area.

Over the period 1 July 2018 to 31 March 2022, 102,652 participants responded to these surveys providing the following satisfaction scores (with 100% representing the highest possible score):

- ☐ Overall customer satisfaction: 84%.
- ☐ Reputation: 83%.
- ☐ Trust: 85%.
- ☐ Value for money: 73%.

2.5 Capturing 2018-23 learnings in our proposed 2023-28 investment plans

This Master Plan builds on the learnings from the water and sewer renewals and reliability investments delivered during the 2018-23 regulatory period particularly:

- Potable water quality improvements in response to a number of potable water quality incidents that occurred in 2020 and 2021, including the Silvan Water Quality Incident (2020) which resulted in a boil water notice, and establishment of an industry working group working with the Department of Health to develop an industry wide joint action plan to ensure the provision of safe drinking water.
- Critical assets review and renewals in response to a number of critical water main and sewer failures and incidents to better protect the safety of our customers, community and protecting the receiving environment. This includes the Baxter Branch Sewer Incident, Ranelagh Beach Rising Main and Pump Station Incident, Bluff Road water main failure, and Chapel Street water main failure.
- Innovations in technology for asset renewals and risk monitoring to drive more cost-effective ways to deliver enhanced customer outcomes.
 - In 2021, South East Water and Interflow jointly won the Civil Contractors Federation Victoria CCF Earth Award for the Mountain Highway AC Water Main Renewal Project. We will continue to innovate on trenchless asset renewal technologies in collaboration with our delivery partners to drive efficiency and minimise customer impacts in asset renewals.
 - Will continue to use the pipe extraction tool on water main renewal projects with our renewal contractors where it offers cost and delivery efficiencies.
 - The proposed digital meter roll out presented in the Digital Utility asset management plan, outside of this report will contribute to a longer term, sustainable improvement in leakage performance. Our network management strategy will complement our digital metering strategy to achieve joint efficiency.
 - The roll out of Advanced BlokAid sewer monitoring devices, yielding cost efficiency in the prevention and management of sewer spills.
 - South East Water also has a separate asset management plan for research and development. This has been considered in the development of this plan and includes a number of initiatives and potential if proceed beyond research and development and trials to implementation and roll out such as:
 - Advanced low cost sensors for water quality management.
 - Advanced data analytics for drinking water – relating to geo-referencing for Hydrotrak – a technology that captures where tankers are located near a fill point to notify them to complete tanker fill details as required.
 - Water tank integrity monitoring technology – for detection of potential wildlife ingress to tanks that could affect water quality.
 - Multix Cathodic – loggers to record and transmit cathodic protection results from test points on our mild steel mains to replace manual spot checking or temporary logging. This is in conjunction with any temporary logging undertaken as part of collaboration with Victorian Electrolysis Commission (VEC);
 - Condition assessment technologies using fibre optic – if proceeds implementation would be beyond the regulatory period 2023-2028;
 - Sewer Digital Twin – ARC linkage project for creation of a digital twin network to allow for real time analysis and enhance operation ability;
 - Condition assessment technology with machine learning algorithm based on sewer camera images to assess condition and maintenance requirements;

- Multix sensor development – development of low cost sensors such as velocity sensors, H2S sensors, spill detection for Multix for use in conjunction with Multix Radar (level sensor); and
 - Effect Based Assessment Tool to determine potential sewerage network impact in compliance with General Environmental Duty.
- Our successful delivery models and new asset maintenance contract.
 - The Reliability Program contract is a bespoke delivery model developed by South East Water. It has been recognised by the industry as an efficient delivery model to drive the best of collaboration and best of competition. The model has been adopted by our peer Great Western Water in 2018, and a large part of the concepts are now incorporated into the latest Victorian Government “Major Works Contract” released in 2022. We are planning to capture the learnings from this successful model as we further develop our new capital delivery model – the integrated planning and delivery model for the regulatory period 2023-28.
 - The new asset maintenance contract will bring new ideas and innovation, and improve safety, processes, efficiency and value. Following a competitive process, South East Water has entered into a new contract for Maintenance Services, effective 1 October 2022 for a period of 5 years. The new maintenance model enables improved future performance through both the competition elements of the model (the higher performing partner in a workstream has the opportunity to win more work) and the collaboration elements of the model (partners working together and with South East Water to improve performance). We have also refined and streamlined the workstreams, increasing scopes of work to better align with the capability of the partners and provide improved economies of scale. An example of this is the combining of water and sewer into one stream, effectively reducing management and administrative levels.
- The application of data science approaches, integrating with spatial analysis, to better manage customer interruptions, and asset risk profiling including:
 - Development and implementation of a bespoke Asset Risk Management Model (ARMM), which provides us with a comprehensive picture of our asset base based on our corporate risk framework. This enables the identification of our critical assets, their consequence of failure and identifies their associated risk level based on the likelihood of failure considering the asset condition and failure history. The framework classifies the risk consequence across a range of categories including customer services, regulatory/legal, reputation/image, environment, and safety. We also commenced a project to deliver an updated PARMS (Pipeline Asset Risk Management System) model of the water network. PARMS being an integrated suite of computer-based models designed to help manage renewal investment and is a risk-based life cycle costing simulation tool that predicts future system performance and estimates budgets under a range of alternative asset management policies. PARMS also provides a business as usual approach to prioritising renewals that uses best available data. PARMS consists of two main decision support systems being PARMS Retic and PARMS T&D and our project includes both. This project will support our ARMM and the results will be integrated with, inform, validate and optimise water main renewals during the regulatory period 2023-28.
 - Valve insertion program to manage shut off block sizes. We have planned a future enhancement to the Asset Risk Management Model (ARMM) following the successful completion of a pilot shut off block analysis study of a single water supply zone during the regulatory period 2018-23 using existing available hydraulic models. This study batch sequenced model runs to turn each shut off block one by one to understand the impact on hydraulic performance (e.g. levels of service such as pressure and impact on the number of customers and critical customers) and thus provided enhanced

insights to both the criticality of individual water mains and a valve insertion program to manage shut off block sizes.

- Live operational hydraulic modelling pilot studies to utilise real time SCADA data for on-going verification and status and performance of the network. This provides insights and supports operational decision making such as shut down planning, network optimisation, impact of seasonal demand variations and supports incident response e.g. to ensure provision of safe drinking water in the event of a potable water quality incident.

We have incorporated these learnings into the proposed expenditure in the 2023-28 regulatory period as further explained in Section 6 – Outcomes.

3. Risk

3.1 South East Water Corporate Risk Framework

In the pursuit of its strategic objectives, South East Water faces a broad range of risks and opportunities that reflect the nature of its business as well as external market challenges. These risks and opportunities can either impact positively or negatively on the achievement of our customer outcomes.

Our risk management framework, in accordance with the Australian/New Zealand Risk Management Standard (AS/NZS 31000) and the requirements of the Victorian Government Risk Management Framework, provides a consistent, forward-looking approach to identifying and assessing these uncertainties.

The risk framework is embedded as part of various corporate and operational processes as well as established management systems across South East Water. These include, but are not limited to:

- ☐ Corporate planning process
- ☐ Safety management system
- ☐ Environmental management system
- ☐ Asset management system
- ☐ Quality management system
- ☐ Compliance management system
- ☐ HAACP plans (various)
- ☐ Incident management plans
- ☐ Continuity and emergency management plans
- ☐ Business case register

3.1.1 Risk Evaluation

To ensure a high level of assurance over its key risks and that controls are in place and operating effectively, South East Water has adopted the ‘three lines of defence’ model as the basis for its assurance framework.

The Asset Management Planning process forms one of the 1st lines of defence for corporate risk assurance activities. Risk evaluation processes are embedded across all of our asset management processes and our risk appetite is developed and updated in line with our strategic focus area to help with decision making and ensure effective governance.

Within our risk management framework, risks are evaluated using a semi-quantitative model that explicitly considers the likelihood of various adverse consequences occurring, see Table 4.

Consequences are scored between 1- Insignificant to 5 – Catastrophic, according to the impact that the risk may have on the achievement of the following objectives, and it defines the criticality of assets:

- ☐ Providing for the health and safety of our people, our customers and the community.
- ☐ Delivering safe and secure supply of drinking water for customers, protecting public health.
- ☐ Achieving environmental compliance and minimising third-party damage.
- ☐ Effective management of systems, assets, project performance and service delivery.
- ☐ Minimising financial losses.

- Maintaining our professional reputation.

The likelihood of adverse consequences is also scored between 1- Rare, to 5 – Almost Certain based on various contributory factors. These include the asset location, the operating environment, assessment of the asset condition and the forecast remaining life of the asset applying IPWEA guideline or equivalent industry best practices.

Table 4: South East Water Corporate Risk Framework: Likelihood Table

| Rating | Likelihood Description | % |
|-----------------------------|---|--------|
| Almost Certain -5 | Event <i>will occur</i> , almost certainly, at least once every year | >98% |
| Likely -4 | Event is <i>likely to occur</i> (once every 1 to 2 years) | 50-98% |
| Possible -3 | Event <i>may occur</i> (between once every 2 to 5 years) | 20-49% |
| Unlikely -2 | Event is <i>not likely to occur</i> (between once every 5 to 20 years) | 5-19% |
| Rare -1 | Event will <i>only occur in exceptional</i> circumstances (less than once every 20 years) | <5% |

Our risk management framework assesses each risk and opportunity across four classifications – Extreme, High, Medium, and Low. Each risk is categorised according to the magnitude of the risk score and the magnitude of the potential consequences see Figure 9.

Figure 9: Risk Rating Heat Map, South East Water Corporate Risk Framework

| | | Negative Consequence (Threat) | | | | | Positive Consequence (Opportunity) | | | | |
|------------|---|-------------------------------|------|------|------|------|------------------------------------|------|------|-----|-----|
| | | 1 | 2 | 3 | 4 | 5 | 5 | 4 | 3 | 2 | 1 |
| Likelihood | 5 | Med | High | Ext | Ext | Ext | High | High | High | Med | Low |
| | 4 | Low | Med | High | Ext | Ext | High | High | Med | Med | Low |
| | 3 | Low | Low | Med | High | Ext | High | Med | Med | Med | Low |
| | 2 | Low | Low | Med | Med | High | Med | Med | Med | Low | Low |
| | 1 | Low | Low | Med | Med | High | Low | Low | Low | Low | Low |

The process of evaluating risks involves considering the scope and effectiveness of existing risk control measures in terms of prevention, protection and recovery, and whether the level of

residual risks is acceptable when evaluated against its associated risk appetite. Where further risk reduction is warranted either to improve the effectiveness of risk control, or to lower a risk to below its acceptable risk appetite, new initiatives and their associated expenditure requirements are identified, investigated and defined for inclusion in the corporate asset management plan, and associated asset lifecycle management plans and master plans.

The nature of South East Water's capital projects means that time for implementation is significant with detailed studies, consents and third-part approvals required before the project can be fully developed and delivered. As a result, major projects can take several years to plan, develop, approve and implement. Some strategic projects may take even longer and may be delivered in several key stages.

Combined with the competing objective to maintain affordability by not creating adverse customer bill impact, and resourcing constraints limited by the industry and market's ability to increase deliverability in respond to the forecast timeframe for the risk to reach an unacceptable level, these are key factors guiding the positioning of projects within the corporate asset management plan, and associated asset lifecycle management plans and master plans.

Our key risks are reported regularly to our executive team, an overview of the risks addressed by this master plan is outlined Table 5. With the risk addressed by each of the portfolios detailed in Table 6.

Table 5: Key Risks Addressed by the Reliability Master Plan

| Risk Description | Potential Consequence | Consequence Criteria | Key Controls and Mitigation Strategies | Customer Impact |
|---|--|--|---|--|
| Safety – operational hazards SEW work involves significant operational hazards including confined spaces, working at height, trenching, excavations, working alone, and working near bodies of water | Workers may be exposed to serious harm Safety non-compliance Financial penalties | <input type="checkbox"/> People <input type="checkbox"/> Financial <input type="checkbox"/> Regulatory | <input type="checkbox"/> Implement safety in design. <input type="checkbox"/> Regular asset inspection and maintenance to ensure safe access. <input type="checkbox"/> Asset upgrade to improve safety. <input type="checkbox"/> Clear standards for work involving significant operational hazards. <input type="checkbox"/> Training of staff to industry standards. <input type="checkbox"/> Using qualified, well-trained contractors. <input type="checkbox"/> Ongoing monitoring of relevant lead and lag H&S indicators. | <input type="checkbox"/> Safety risk <input type="checkbox"/> Improved service |
| Safety – process safety A major failure of plant such as fire, chemical leak or explosion carries significant H&S risk | Workers, the public or the environment may be exposed to serious harm Safety non-compliance Financial penalties | <input type="checkbox"/> Environmental <input type="checkbox"/> Financial <input type="checkbox"/> Regulatory <input type="checkbox"/> Reputation | <input type="checkbox"/> Plant design, operations and containment systems to address this risk <input type="checkbox"/> Regular plant condition assessments and specific regulation-driven compliance reviews undertaken <input type="checkbox"/> Plant upgrades to improve safety and compliance | <input type="checkbox"/> Service disruption <input type="checkbox"/> Loss of confidence |
| Safety – Critical asset failure A major failure of assets such as a large diameter water main or branch sewer at major road intersection/ corridor, train or tram crossings or near sensitive environment carries significant H&S risk and environmental risk | Works, the public or the environment may be exposed to serious harm Major service disruption Environmental and/or Safety noncompliance Loss of reputation | <input type="checkbox"/> People <input type="checkbox"/> Safety <input type="checkbox"/> Customers <input type="checkbox"/> Regulatory <input type="checkbox"/> Reputation <input type="checkbox"/> Environment | <input type="checkbox"/> Asset upgrade or renewal <input type="checkbox"/> Condition assessment <input type="checkbox"/> Asset Monitoring and Alarms <input type="checkbox"/> Sleeving <input type="checkbox"/> Cathodic protection <input type="checkbox"/> Installation of asset isolations <input type="checkbox"/> Long term - target elimination of extreme risk assets in water and sewer network (~15 years) | <input type="checkbox"/> Safety risk <input type="checkbox"/> Community disruption <input type="checkbox"/> Service disruption <input type="checkbox"/> Loss of confidence <input type="checkbox"/> Environmental Impact |
| Non-critical asset failure in sewer and water network | Unplanned disruption to customer service | <input type="checkbox"/> Service <input type="checkbox"/> Reputation | <input type="checkbox"/> Asset maintenance, inspections, and repairs <input type="checkbox"/> Asset renewal program | Maintain unplanned disruption service target |

| Risk Description | Potential Consequence | Consequence Criteria | Key Controls and Mitigation Strategies | Customer Impact |
|---|--|---|---|--|
| Failure to Convey Sewage Flows This includes the impact of stormwater overflows in wet-weather events and longer-term climate change | Environmental impacts or failure to meet customer levels of service Failure to meet customer levels of service Non-compliance Fines and Penalties | <input type="checkbox"/> Environmental <input type="checkbox"/> Regulatory <input type="checkbox"/> Service <input type="checkbox"/> Financial | <input type="checkbox"/> Asset management renewal and upgrade programmes <input type="checkbox"/> Network maintenance, monitoring, condition assessment and upgrades to address structural and serviceability issues such as blockages <input type="checkbox"/> Long term - target elimination of extreme risk assets in sewer network (~15 years) | <input type="checkbox"/> Service disruption <input type="checkbox"/> Degraded local environment <input type="checkbox"/> Adverse impact to amenity and recreational use of waterways, public open spaces and beaches |
| Major Water Quality Event The quality of treated water supplied is compromised | Compliance with Drinking Water Standards and/or public health is adversely impacted Service disruption | <input type="checkbox"/> Regulatory <input type="checkbox"/> Service <input type="checkbox"/> Reputation <input type="checkbox"/> Financial | <input type="checkbox"/> Water Quality Safety Plan <input type="checkbox"/> Operation within well-established water treatment protocols <input type="checkbox"/> Disinfection and testing of all water prior to entering supply <input type="checkbox"/> Chlorine levels are maintained in the distribution system <input type="checkbox"/> Water safety and contamination notification in place <input type="checkbox"/> Quarterly compliance reviews by the Drinking Water Assessors <input type="checkbox"/> Industry working group working with the Department of Health to develop industry wide action plans to improve the provision of safe drinking water. | <input type="checkbox"/> Health and safety risk <input type="checkbox"/> Service disruption <input type="checkbox"/> Loss of confidence |
| Availability of Trained Staff, Contractors and Suppliers Failure to attract and retain sufficient direct or supporting skilled and qualified resource | SEW employees, contractors, suppliers and consultants not resourced to deliver on the corporate objectives | <input type="checkbox"/> Service <input type="checkbox"/> Financial <input type="checkbox"/> Reputation | <input type="checkbox"/> Staff training and competencies framework <input type="checkbox"/> Operational succession planning <input type="checkbox"/> Ensure sufficient numbers of skilled and qualified resources are available <input type="checkbox"/> Market resources are identified and retained to support business deliverables through maintenance and capital delivery models | <input type="checkbox"/> Service disruption <input type="checkbox"/> Meet customer outcomes |
| Major Project Cost Overrun Actual cost of delivery is higher than anticipated | The funding requirement is outside the CAMP (Corporate Asset Management Plan) forecast | <input type="checkbox"/> Financial | <input type="checkbox"/> Procurement strategies to minimise capital and whole-of-life costs on new assets <input type="checkbox"/> Invest in integrated planning and early contractor involvement <input type="checkbox"/> Monitoring of each project's costs and delivery time | Meet customer outcomes |

Table 6: Reliability Master Plan Investment portfolio objectives, risks management and benefits

| Investment portfolio | Objectives | Key Risks Addressed | Other Benefits |
|---|--|--|--|
| Potable Water Quality | Meet compliance with Safe Drinking Water regulations. | <input type="checkbox"/> Major Water Quality Event <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers <input type="checkbox"/> Major Project Cost Overrun | <input type="checkbox"/> Compliance to Safe Drinking Water regulations. <input type="checkbox"/> Reduce customer disruptions. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |
| Potable Water Improvements / Compliance | Meet compliance with Safety regulations and management. | <input type="checkbox"/> Safety – Critical Assets Failure <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers <input type="checkbox"/> Major Project Cost Overrun | <input type="checkbox"/> Compliance to Health and Safety Regulations. <input type="checkbox"/> Reduce water network losses. <input type="checkbox"/> Maintain operating and capital expenditure costs due to reactive repair, renewal or maintenance of failed assets. <input type="checkbox"/> Reduce customer disruptions. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |
| Potable Water Reliability | Maintain drinking water network levels of service for customer interruptions through planned and reactive operations and maintenance activities. | <input type="checkbox"/> Non-Critical Asset Failure in water network. <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers | <input type="checkbox"/> Less frequent, and shorter customer service interruptions. <input type="checkbox"/> Reduce water network losses. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |
| Potable Water Renewals | Maintain drinking water network levels of service for customer interruptions through predominately reactively responding to asset failures as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed. | <input type="checkbox"/> Non-Critical Asset Failure in water network. <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers | <input type="checkbox"/> Reduce water network losses. <input type="checkbox"/> Reduce customer disruptions. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |
| Sewer Improvements / Compliance | Meet compliance with environmental protection regulations including the General Environmental Duty (GED), Safety regulations and management. | <input type="checkbox"/> Safety – Critical Asset Failure <input type="checkbox"/> Failure to Treat Wastewater to the Required Standard and Convey Sewage Flows <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers | <input type="checkbox"/> Compliance to Health and Safety Regulations. <input type="checkbox"/> Compliance to Environmental Protection Regulations. <input type="checkbox"/> Maintain operating and capital expenditure costs due to reactive repair, renewal or maintenance of failed assets. <input type="checkbox"/> Reduce customer disruptions. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |

| Investment portfolio | Objectives | Key Risks Addressed | Other Benefits |
|-------------------------|--|---|--|
| | | <input type="checkbox"/> Major Project Cost Overrun | |
| Sewer Reliability | Maintain sewer network levels of service for customer interruptions through planned and reactive operations and maintenance activities. | <input type="checkbox"/> Non-Critical Asset Failure in sewer network. <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers | <input type="checkbox"/> Less frequent, and shorter customer service interruptions. <input type="checkbox"/> Protecting the environment <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |
| Sewer Renewals | Maintain sewer network levels of service for customer interruptions through predominately reactively responding to asset failure as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed. | <input type="checkbox"/> Non-Critical Asset Failure in sewer network. <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers | <input type="checkbox"/> Protecting the environment <input type="checkbox"/> Reduce customer disruptions. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |
| Recycled Water Renewals | Maintain recycled water network levels of service for customer interruptions through predominately reactively responding to asset failures as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed. | <input type="checkbox"/> Non-Critical Asset Failure in recycled water network. <input type="checkbox"/> Availability of Trained Staff, Contractors and Suppliers | <input type="checkbox"/> Reduce water network losses. <input type="checkbox"/> Reduce customer disruptions. <input type="checkbox"/> Deliver our customer outcomes and associated service targets. |

3.2 Network Risk Analysis

3.2.1 Critical Asset Program

Following a number of critical asset failure incidents in 2017–2018, we conducted a critical asset review using the criticality matrix outlined in our corporate risk framework, to identify and locate our critical assets. These assets are regarded as critical assets because if they fail, the adverse consequence to customers, community, and environment would be regarded as ‘high’ to ‘catastrophic’ in line with corporate consequence table shown in Figure 10.

By joining the critical asset data obtained from the review with asset condition and failure history data, we can form a full understanding of an asset’s risk profile, which in turn enables us to prioritise our investments on critical assets that have a high likelihood or are at imminent risk of failure.

As critical asset risk profiling evolves over the regulatory period, and as asset conditions change and become known from ongoing asset condition assessments, we will continually update asset risk profiles and reprioritise investment in individual projects, when considered prudent to do so. This approach to critical asset management, ensures we continue to comply with regulatory requirements and deliver reliable services to customers.

The Critical Asset Program has been established to drive a transformative change in the way we manage critical assets through a 5- year development and implementation program since 2018.

The Critical Asset Program achieved the following objectives:

- Be customer centric when we make asset management decisions.
- Integrated approach to identify most critical assets and their ongoing assurance approach, ensuring alignment with the corporate risk framework.
- Alignment with South East Water Board/ Executive Risk Appetite, with special consideration of financial viability, customer impact, and reputation.
- Ensuring the organisation continues to comply with changing regulatory requirements in safety, safe drinking potable water quality, and environmental protection.
- Compliance with Asset Management Assurance Framework (AMAF) and ISO55001 accreditation requirements.
- Create a sustainable system and tool – the Asset Risk Management Model (ARMM) for the ongoing monitoring and proactive management of network asset risk profiling, effectiveness of risk controls, capital and operational works planning. ARMM is complementary to our existing Water Main Renewal Analyser and Prioritiser (WRAP) and Sewer Asset Renewal Prioritiser (SARP) tools, which are used to manage the works prioritisation for the planned water and sewer renewal programs predominately reactively after asset fails.
- Embedding in Price Submission for the regulatory period 2023-28 – We have engaged with our customers and stakeholders and have proposed to address the gaps identified in managing critical assets risk around safety, environmental protection, and safe drinking water through the operational and capital expenditure programs. We are aiming to target elimination of critical asset failures through a 15-year capital investment program. We will target investments on the extreme risk assets with the highest risk rating first, implement and maintain risk control and mitigation.

The Criticality Framework shown in Figure 10 below has been applied to analyse all water and sewer network assets, based on the Corporate Risk Framework.

| Rating | | Financial | Customer Service | Regulatory/Legal | Reputation & Image | Environmental | People | Safety | Product Quality |
|--------------|---|---|---|--|---|---|--|---|---|
| Catastrophic | 5 | Financial impact* in excess of \$26,000,000 | <ul style="list-style-type: none"> Unavailability of critical services or systems* (despite mitigation measures) for > 5 days affecting a large number of customers or important community facilities (e.g. 10,000+ customers, multiple key customers, utilities, transport infrastructure) | Serious isolated, or repeated, breach of legislation, regulation, agreement or contract, that is difficult to rectify and results in one or more of: <ul style="list-style-type: none"> Prosecution leading to imprisonment or significant sanction Material restrictions or conditions placed on licence/permit Public inquiry Repeated major regulatory/legal impacts (Consequence Rating 4) | <ul style="list-style-type: none"> Public outcry (community action or protests, including online) (Lasting 3+ days) Negative media coverage at state or national level (Lasting 3+ days) Impact to reputation (Lasting 1+ year) Critical impact on relations with key stakeholders (loss of government support) Repeated major reputation impacts (Consequence Rating 4) | <ul style="list-style-type: none"> Contamination to land, air, groundwater or surface water (clean-up / recovery over 1 year) Impact on species, habitat, community amenity or heritage sites (restoration period over 1 year) Enforcement action undertaken by EPA in the form of an enforceable undertaking, or court prosecution Repeated major environmental impacts (Consequence Rating 4) | <ul style="list-style-type: none"> Unavailability, or loss of key resources that creates a material and/or sustained impairment to delivery of a critical service, for 1 month or longer Repeated major people impacts (Consequence Rating 4) | <ul style="list-style-type: none"> Single or multiple fatalities, Permanent life-changing disability or illness (physical or mental) Repeated major safety impacts (Consequence Rating 4) | Direct or indirect product exposure (water, sewage, by products) causing: <ul style="list-style-type: none"> Causing a death or permanent disability, or causing widespread incapacitating illness. |
| | | Financial impact* between \$13,000,000 and \$26,000,000 | <ul style="list-style-type: none"> Unavailability of critical services or systems* (despite mitigation measures) for between 1 and 5 days affecting a large number of customers or important community facilities (e.g. 2,000+ customers, key customer, utilities, transport infrastructure) | Isolated breach of legislation, regulation, agreement or contracts, and results in one or more of: <ul style="list-style-type: none"> Prosecution with high compensation (or fine) and negative precedent Ministerial or formal intervention by regulator (enforceable undertaking) Repeated moderate regulatory/legal impacts (Consequence Rating 3) | <ul style="list-style-type: none"> Public outcry (community action or protests, including online) (Lasting 2 to 3 days) Adverse state media coverage (Lasting 2 to 3 days) Impact to reputation but repairable (within 1 year) Adverse impact on relations with key stakeholders Repeated moderate reputation impacts (Consequence Rating 3) | <ul style="list-style-type: none"> Contamination to land, air, groundwater or surface water (clean-up / recovery within 1 year) Impact on species, habitat, community amenity or heritage sites (restoration within 1 year) Enforcement action undertaken by EPA in the form of a Penalty Infringement Notice (or similar) Repeated moderate environmental impacts (Consequence Rating 3) | <ul style="list-style-type: none"> Unavailability or loss of key resources that creates noticeable and/or temporary impairment to delivery of a critical service for 1 week to 1 month Repeated moderate people impacts (Consequence Rating 3) | <ul style="list-style-type: none"> Permanent injury or illness (physical or mental) Repeated moderate safety impacts (Consequence Rating 3) | Direct or indirect product exposure (water, sewage, by products) causing: <ul style="list-style-type: none"> Isolated, incapacitating illness Widespread exposure to a contaminant that could cause illness in healthy people |
| | | Financial impact* between \$3,000,000 and \$13,000,000 | <ul style="list-style-type: none"> Unavailability of critical services or systems* (despite mitigation measures) for up to 1 day affecting a large number of customers or important community facilities | Non-compliance with legislation regulation, agreements or contracts, that is reportable and/or requires an immediate response to an external party. This may result in: <ul style="list-style-type: none"> Infringement notice (or similar) External review or audit Repeated minor regulatory/legal impacts (Consequence Rating 2) | <ul style="list-style-type: none"> Public outcry (Multiple customer complaints including online) Adverse state media coverage (Lasting 1 to 2 days) Limited, repairable damage to reputation Some concern on relations with key stakeholders (explanation required) Repeated minor reputation impacts (Consequence Rating 2) | <ul style="list-style-type: none"> Contamination to land, air, groundwater or surface water (clean-up / recovery of a localised event within weeks) Impact on species, habitat, community amenity or heritage sites (restoration within weeks) Enforcement action undertaken by EPA in the form of a warning Repeated minor environmental impacts (Consequence Rating 2) | <ul style="list-style-type: none"> Unavailability or loss of key resources that creates noticeable and/or temporary impairment to delivery of a critical service for 2 days to 1 week Repeated minor people impacts (Consequence Rating 2) | <ul style="list-style-type: none"> Injury or illness (physical or mental) requiring in-patient hospitalisation A dangerous occurrence with high potential incident. Repeated minor safety impacts (Consequence Rating 2) | Direct or indirect product exposure (water, sewage, by products) causing: <ul style="list-style-type: none"> Isolated non-incapacitating illness Isolated exposure to a contaminant that could cause illness to healthy people Widespread exposure to a contaminant that could cause illness in vulnerable people (immune deficient, people in care or receiving medical treatment, children) only |

| Rating | | Financial | Customer Service | Regulatory/Legal | Reputation & Image | Environmental | People | Safety | Product Quality |
|---------------|---|---|--|--|--|---|--|--|---|
| Minor | 2 | Financial impact* between \$600,000 and \$3,000,000 | <ul style="list-style-type: none">Unavailability of critical services or systems* (despite mitigation measures) for up to 5 hours affecting a separate groups of customers or important community facilities (slightly inconvenienced) | <ul style="list-style-type: none">Non-compliance with legislation, regulation, agreements or contracts that is reportable but has minimal impact to operations and no urgency for rectificationRepeated insignificant regulatory / legal impacts (Consequence Rating 1) | <ul style="list-style-type: none">Localised complaints that can be managed to achieve an effective outcomeAdverse local media coverage (single instance)Some concerns on relations with local council and / or MPRepeated insignificant reputation impacts (Consequence Rating 1) | <ul style="list-style-type: none">Temporary contamination (days) to land, air, groundwater or surface water to immediate area around asset or activityNo lasting impact (days) on species, habitat, community amenity or heritage sitesSelf reporting or notification to EPA<ul style="list-style-type: none">Volume of uncontained sewage spill over 200 Litres, recycled water over 50 kLRepeated insignificant environmental impacts (Consequence Rating 1) | <ul style="list-style-type: none">Unavailability or loss of key resources that creates noticeable and/or temporary impairment to delivery of a critical service for 0.5 to 2.0 daysRepeated insignificant people impacts (Consequence Rating 1) | <ul style="list-style-type: none">Injuries or illness (physical or mental) requiring medical attention (nothing notifiable* will be considered as minor)A close call with moderate incident potential. No lost timeRepeated insignificant safety impacts (Consequence Rating 1) <p><i>*As per BS 2086 (Statutory reportable injury and/or dangerous occurrences)</i></p> | <p>Direct or indirect product exposure (water, sewage, by products) causing:</p> <ul style="list-style-type: none">Widespread exposure to a contaminant that will not cause illness |
| | | Financial impact* up to \$600,000 | Unavailability of critical services or systems* (despite mitigation measures) that has a negligible impact to customers or important community facilities | Non-compliance with legislation, regulation, agreements or contracts that has no impact to operations and/or no requirement to report) | <ul style="list-style-type: none">Local complaint, no media coverage | <ul style="list-style-type: none">Temporary contamination (hours) to land, to immediate area around asset or activityNo impact on species, habitat, community amenity or heritage sitesVolume of uncontained sewage spill up to 200 Litres to waters or 50KL to land, or recycled water up to 50 kLNo EPA notification | <ul style="list-style-type: none">Unavailability or loss of key resources that creates noticeable and/or temporary impairment to delivery of a critical service for up to 0.5 a day | <ul style="list-style-type: none">A close call with minor incident potential.First aid treatmentNo lost time | <p>Direct or indirect product exposure (water, sewage, by products) causing:</p> <ul style="list-style-type: none">Isolated exposure to a contaminant that will not cause illness |
| Insignificant | 1 | <p>* Inclusive of direct and indirect costs</p> | <p>* critical services or systems as defined in SEW's Business Continuity Command Plan</p> | | | | | | |

Figure 10: Criticality Framework – Asset Management

3.2.2 Identification of the criticality of an asset

We determine the asset criticality of each water and sewer network asset and apply a different risk treatment approach to control and reduce risk.

- Based on the consequence of failure scored between 1- Insignificant to 5 – Catastrophic defined in the Criticality Framework (Figure 10), according to the impact that the failure may cause influencing our delivery of the below objectives, we define the criticality of assets:
 - Providing for the health and safety of our people, our customers and the community.
 - Delivering safe and secure supply of drinking water for customers, protecting public health
 - Achieving environmental compliance and minimising third-party damage
 - Effective management of systems, assets, project performance and service delivery
 - Minimising financial losses
 - Maintaining our professional reputation
- The criticality assessment conducted at individual network asset level identified that effective risk controls and risk treatment are implemented to the majority of critical assets identified.
- The Critical Asset Framework approach provides clarity on how assets will be managed when coupled with likelihood of failure data, and effectiveness of risk controls, to form a complete asset risk profile as follows:
 - a. **Critical Assets (Current Risk)** - Less than 5% of our water and sewer network assets have a current /residual risk that require further risk mitigation to reduce their risk levels from Extreme Risk rating, to Medium to High risk ratings. Our management approach is to target elimination of service failure through monitoring, maintenance, renewals, or replacement to minimise failure.
 - b. **Critical Assets (Effective Risk Control)** - 15% of existing assets have a gross risk that relies on the effectiveness of our current risk controls, to maintain a medium to high risk ratings. The ongoing maintenance of risk controls is a significant part of the water reliability and sewer reliability capital investment portfolios to prevent these assets from reaching the extreme risk levels. Mitigation methods include maintenance, network monitoring, cathodic protection, inspections and condition assessment. Our management approach for these assets is just in time renewal or rehabilitation.
 - c. **Non-Critical Assets** – 80% of our water and sewer network assets have moderate/low risks. In terms of our non-critical assets, we will continue to operate and maintain assets to deliver customer outcomes and keep failure rates and impacts within agreed customer levels of service. This will be monitored and measured by the customer disruption performance target: ‘Customers experiencing more than 5 unplanned disruptions in a 12-month period (water, sewer and water quality)’ as outlined in the Outcomes section. With an ageing asset base, climate change, and improved technology in detecting and discovering asset failures that historically would be undetected, we are forecasting there will be an increasing need to invest so we can maintain customer levels of service.

Through our investments, we are proposing to leverage advancements in technology, information and digital engineering to manage these risks through early detection and rectification, to minimise customer impacts. This proactive approach to asset management will keep our investments in non-critical asset management at either slightly reduced or relatively stable levels.

3.2.3 Risk Assessment

We conducted risk assessments on existing and proposed future assets, applying a common risk management framework at both a catchment level, and an individual asset level. We also used comprehensive data sources and various techniques, such as hydraulic modelling, risk profiling, geospatial analysis and data science methods, to support our analysis. Through our analysis, we were able to inform our capital investment priorities for the 2023–28 regulatory period and beyond. We adopted a four steps methodology as illustrated in Figure 11 below.



Figure 11 : Risk Profiling Methodology

As the ongoing monitoring of risks and reprioritisation of investment needs is essential for the management of water and sewer network reliability, and the associated proposed capital and operational expenditure, we developed and embedded a holistic Asset Risk Management Model (ARMM) to enable risk-based and data driven investments. Investment needs have been assessed by applying a risk management framework across the various asset classes down to the individual asset level. The tool also allows on-going asset performance monitoring, and reprioritisation of investment as new data becomes available with a geospatial context. With the assistance of engineering judgement, the Asset Risk Management Model (ARMM) enables support for prioritisation of investment based on the South East Water's Corporate Risk Framework and Risk Appetite. Figure 12 provides a couple of screen shots from Asset Risk Management model. The ARMM and inbuilt rules have been developed in line with South East Water's frameworks, applicable regulations and industry best practice.

Third Party Damage to Assets

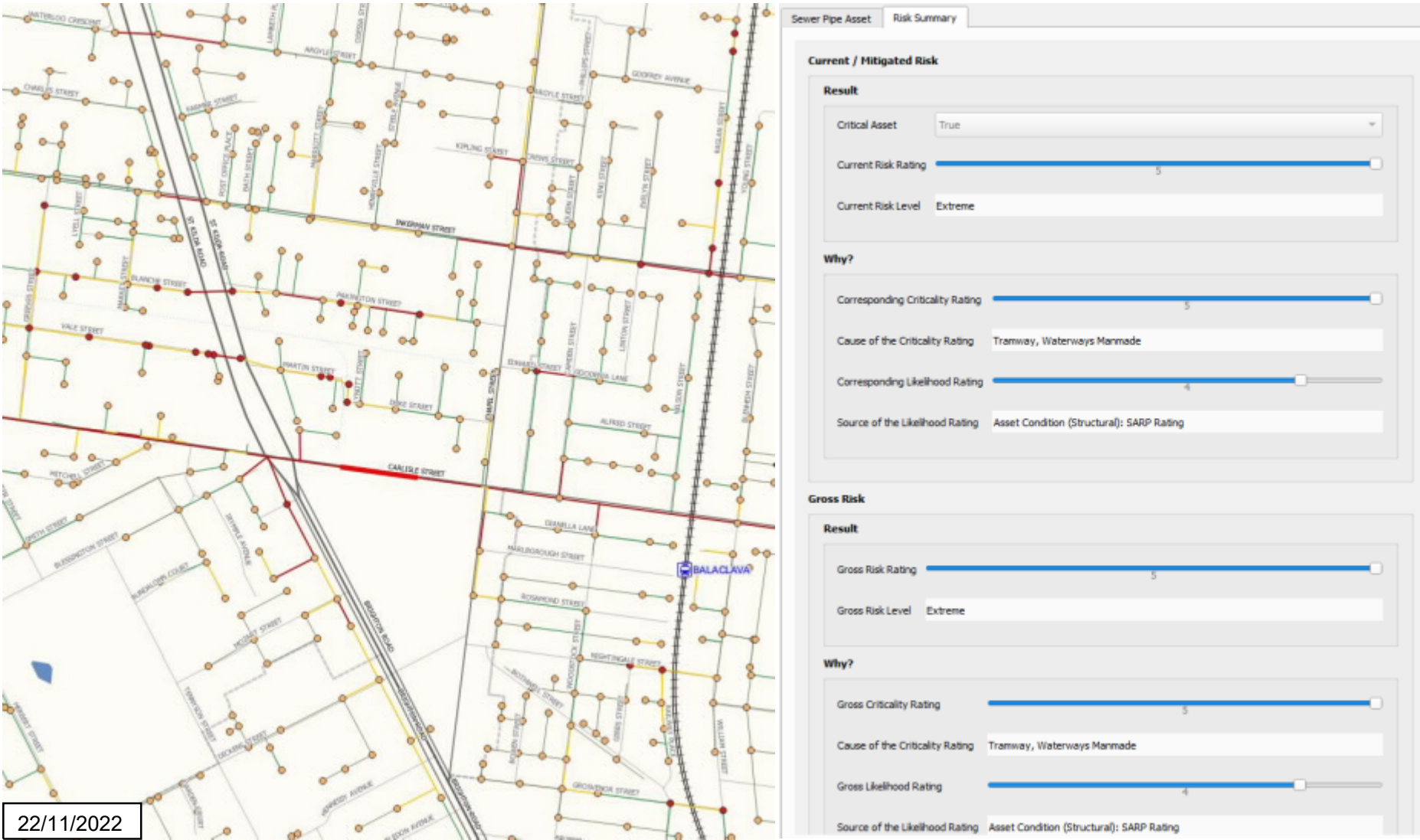
While we have good modelling tools to predict the likelihood of asset failure based on conditions, material, age, climate change, and other factors, not all causes of failure are predictable. An example of this is third party damage to our assets. Third party damage occurs when another organisation, a developer, a customer or any other party damage our assets when they conduct other activities. Regardless of our condition assessment and renewal strategies, these unexpected events will still represent a risk to South East Water that we need to manage.

We proactively manage these risks via asset protection.

- Build Over Guidelines that provide best practice procedures for the public on our website. This informs what to do if they are planning works over or adjacent to water or sewer assets (up to an including 225mm diameter) or easements.
- Our asset locations are made available to third parties via resources like SEWmap, ASSETWEBMAP and Before You Dig Australia (formerly Dial Before You Dig), or Property Connect application.
- In accordance with the Water Act 1989, the third party need our approval if they intend to build over any of our easements or within one meter of water supply, sewerage, or recycled water assets. They are advised to lodge a build over request through our online portal Property Connect.

In the event of third party damage to our assets as a result of their works, this triggers an operational response, and depending on the severity of impact, initiate Incident Management (Refer to Section 5.6). We also try to recover the cost of repairs from the party if there is any damage to our assets as a result of their works.

Figure 12: Screen Shot from the Asset Risk Management Model



3.2.3.1 Establish Current Risk Profile

We established the current risk profile based on likelihood and consequence of asset or service failure events, applying the corporate risk framework.

We use data including; failure history, condition assessment, geospatial asset and risk receptors to calculate the risk. Information provided through the ARMM has enabled a more comprehensive picture of our asset base in terms of likelihood and consequence of failure. This information has demonstrated that we have existing assets at or near the end of their useful life. The quantity of these asset is set to increase substantially over the medium term. If left unchecked this will result in escalating repair costs, environmental damage, incidents, property damage and much more. To prevent this occurring, our proposed investment plan for the regulatory period 2023-28 introduces step change investments in the Potable Water Quality Program, Potable Water Improvements/ Compliance Program and Sewer Improvements / Compliance Program, and utilise new ways of controlling risk.

To quantify this we use the ARMM tool to generate an estimate on the remaining life of our assets and nominal renewal as that life is schedule to end. The ARMM tool is designed to generate estimates for our water and sewer network assets. Treatment assets are not included in the model.

Based on the results from the ARMM analysis we can develop multiple risk investment scenarios dependent on the rate we roll out mitigative risk controls and clearly articulate the trade off and consequences of the selected approach.

Figure 13 below provides a snapshot of our current risk profile for sewer network and water network as of 2021 for illustration. The actual current risk profile is managed in the ARMM model using the latest data sources. It should be noted that while the water network has fewer assets identified as extreme to high risk, South East Water has a low-risk appetite to the consequence of water quality non-compliance. The sewer network has been identified to have a substantial quantity of assets at extreme to high risk of potentially causing significant adverse impact to the environment.

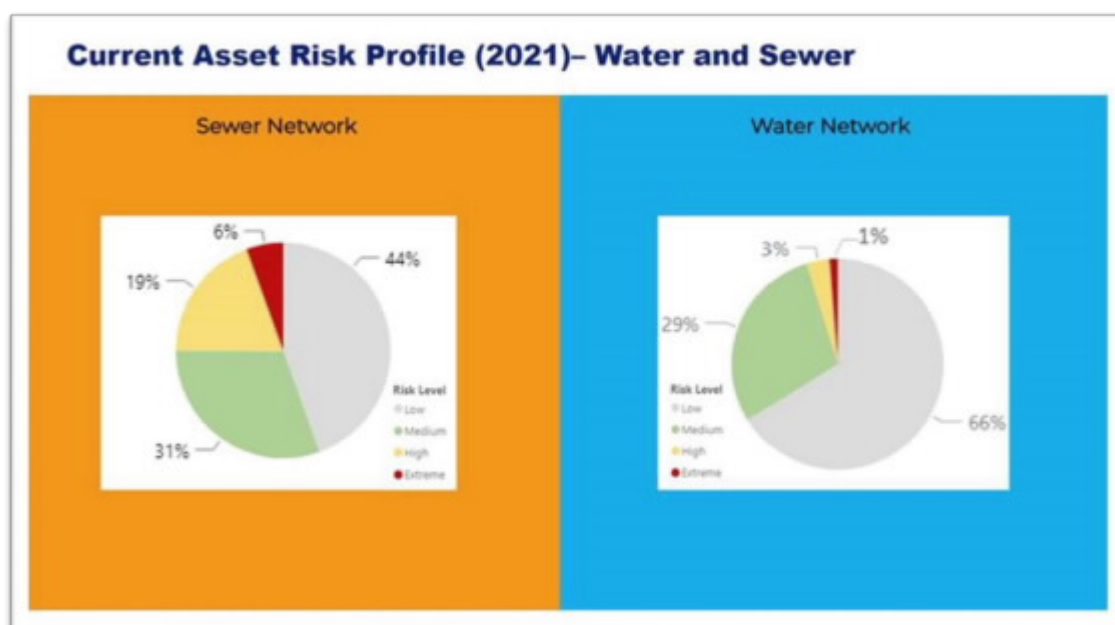


Figure 13: Current Risk Profile as of 2021

3.2.3.2 Planning Risk Mitigation and Controls

- **Initial control selection:** Depending on the asset type, failure mode, risk, criticality of an asset and cost effectiveness of each type of risk control, appropriate control measure can be selected for an asset and whose timing of implementation will depend on the prioritisation process. Refer to Figure 15 for cost effectiveness of risk controls.
- **Prioritise investment:** At the program, portfolio and business level the nominated controls are compared against each other to ensure that the aim of minimising risk within budgetary, deliverability, constructability, capability, availability and regulatory constraints.
- **Project Approval:** Once prioritised further design and optimisation of the solution within the local context is undertaken to ensure value and to seek expenditure approval.
- **Implementation:** During the delivery of controls a number of risk control measure exist such as selecting preferred partners, auditing of outcomes on site and handover process.
- **Monitoring and Control:** Post implementation of control we review and improve our process by understanding the risk reduction performance, cost effectiveness and regulatory compliance of implemented controls.
- **Periodic Review of Rules against expectations:** South East Water's risk appetite and regulations often change, we regularly review our rules, models and controls to stay within these expectations.

Figure 14 and Figure 15 below indicates our management approach and investment strategy based on the risk and criticality of the asset. The process used to develop the capital plan has considered non-asset solutions and monitoring technologies to defer the need for renewal works.

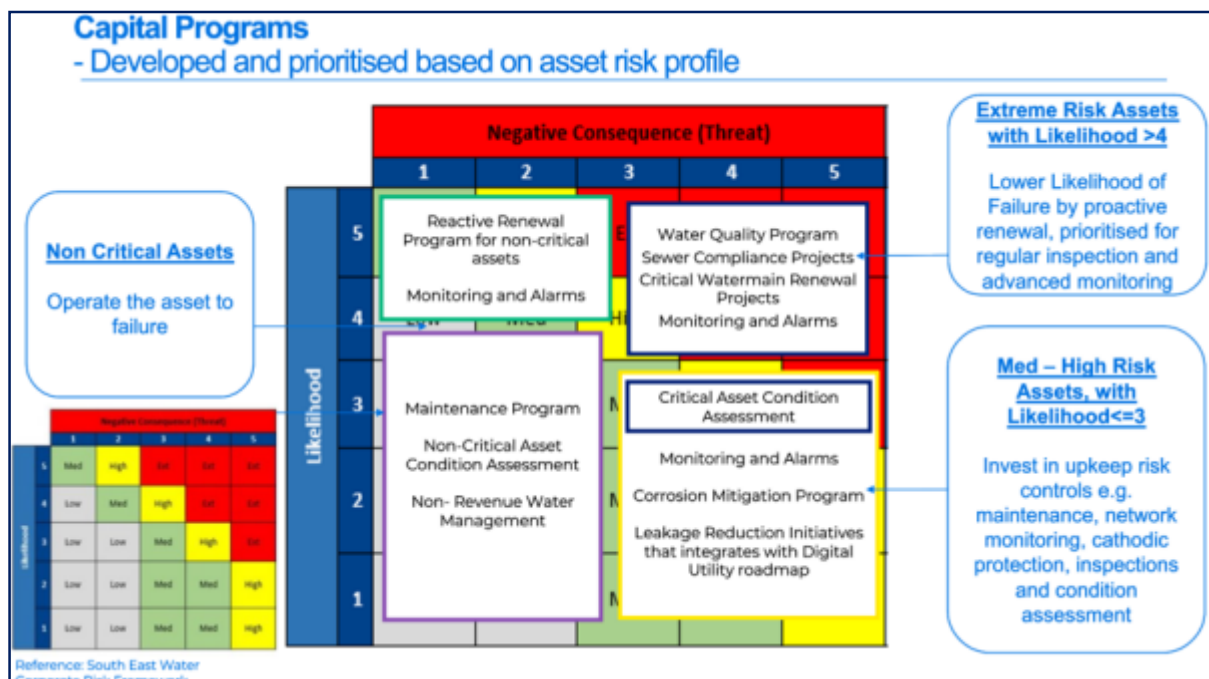


Figure 14: Risk Mitigation and Controls Overview

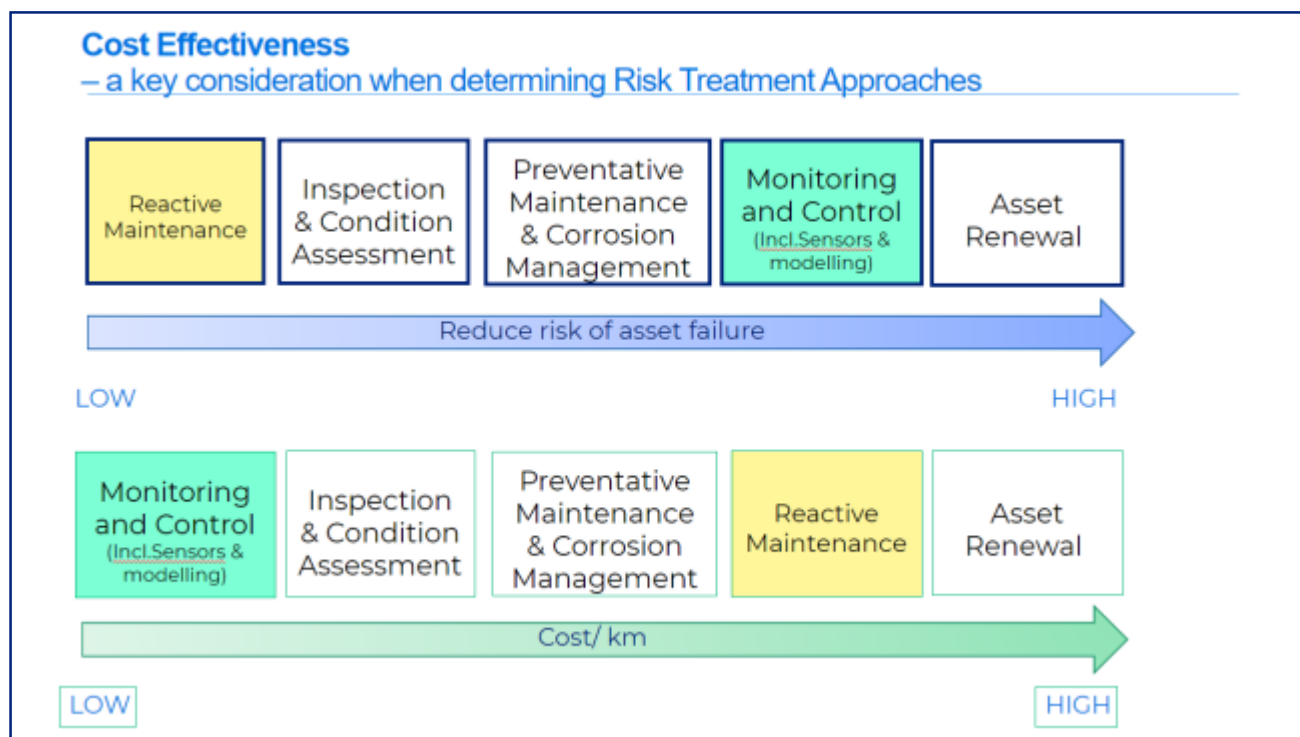


Figure 15: Cost Effectiveness of Risk Controls

3.2.3.3 Forecast Future Risk Profile

The process for generating the future risk profile is the same as the current risk profile outlined with the addition with the ARMM tool we produce a future yearly updated risk forecast that is calculated taking into consideration potential changes in likelihood and reduction in remaining lives and impact of any future forecast risk controls being applied in that year at an individual asset level.

The ARMM tool is designed to generate estimates for our water and sewer network assets. Treatment assets are not included in the model.

3.2.4 Capital Investment Planning

Based on the results from the ARMM analysis we are able to develop multiple risk investment scenarios dependent on the rate we roll out mitigative controls and clearly articulate the trade off and consequences of the selected approach.

Once our investment needs were identified through our risk-based capital investment planning process, we grouped our 2023–28 capital investment program into investment portfolios by service type and cost drivers. Each investment portfolio is made up of a set of projects and programs of work that were identified and prioritised using an iterative process of review and challenge to ensure capital expenditure was prudent and efficient. We also established ownership and accountability for each portfolio for planning and delivery purposes.

Recognising South East Water is having No/ Low Risk Appetite on Extreme risks that have been identified in water quality, water network and sewer network. The following new capital programs/ allocations have been introduced:

- Potable Water Quality – to address Silvan Water Quality Incident actions, post incident learnings and prospective action plan from the joint Industry Working Group.

- Potable Water Improvements/ Compliance – to address safety risks associated with critical water asset failure, and dam safety requirements. For example, critical watermains with failure history and in poor conditions, particularly located in major roads, at major road intersections or in proximity to rail and trams.
- Sewer Compliance – to address new environment protection regulatory requirements and associated general environmental duty for critical sewer asset failure. For example, critical sewer with failure history and in poor condition, particularly located in close proximity to sensitive waterways, customers, or beaches.

The following existing capital programs/ allocations are also maintained to keep up with delivering expected customer levels of service and addressing our non-critical asset management requirements

- Water reliability - Maintain drinking water network levels of service including customer interruptions through planned and reactive operations and maintenance activities considering condition, performance, system resilience, criticality and risk assessment.
- Water renewal - Maintain drinking water network levels of service including customer interruptions through predominately reactively responding to non-critical asset failures as they occur. Assets with multiple failures or history of failure, that have significant customer interruptions or environmental impact are prioritised to be renewed. This is managed using Water Main Renewal Analyser and Prioritisor (WRAP) developed by South East Water. This asset management system includes database software and processes to identify and analyse the merits of renewing non-critical water main assets and to prioritise the order of renewal and is updated regularly (e.g. typically at least monthly and an output of which is a priority list). The WRAP manual outlines the philosophies, principles and application.
- Sewer reliability - Maintain sewer network levels of service for customer interruptions through planned and reactive operations and maintenance activities considering condition, performance, system resilience, criticality and risk assessment.
- Sewer renewal - Maintain sewer network levels of service for customer interruptions through predominately reactively responding to asset failure as they occur. Assets with multiple failures or history of failure, that have significant customer interruptions or environmental impact are prioritised to be renewed. This is managed using the Sewer Asset Renewal Prioritisor (SARP) developed by South East Water. SARP is database software that takes into account the condition of each individual asset from CCTV inspection, coupled with verification of the condition rating updated regularly based on the availability review of CCTV footages, the appropriate asset management method such as monitoring, cleaning, repair or renewal is determined.

3.3 Portfolio Risk Analysis - Investment Options Development

Once we grouped our 2023-28 capital investment program into investment portfolios by service type and cost drivers, we then developed a range of investment scenarios based on different financial and resourcing constraints. This allowed us to better understand the risk impact associated with a reduction in investment in the 2023–28 regulatory period, broadly broken into 3 scenarios consistent with the business approach:

- 1) Low Cost / High Risk: This scenario reflected a continuation of expenditure at the same level as actual/forecasted for the 2018-23 regulatory period.
- 2) Balanced Cost / Risk: This scenario consisted of a few sub-scenarios, and explored the financial need to meet all obligations by specified timeframe. There is also an additional focus on using alternatives risk control measures such as monitoring, control, inspections, and Preventative Maintenance rather than renewal.
- 3) High Cost / Low Risk: This scenario reflected an immediate uplift in expenditure to meet our regulatory obligation in full mostly with renewal by the end of 2028-32 regulatory period.

Each scenario outlined the extent of risk mitigation and asset performance given the level of investment, as well as the trade-offs and consequences of selecting the investment scenario.

With reference to Table 7, which list out the scenarios analysed and their associated assumptions. The balanced option was taken to the business wide prioritisation and risk appetite process. This process considered the portfolios within the Reliability Master Plan against portfolios from other parts of the business in order to construct a South East Water wide risk and cost profile of the business to provide a balanced and optimised view across competing needs and drivers.

The final capital investment scenario for each investment portfolio was selected based on South East Water's risk mitigation processes, risk appetite, regulatory obligations and strategic objectives. For example, South East Water have no (or very little) risk appetite for safety or regulatory compliance and obligations. Benefits and customer outcomes to be delivered through each investment portfolio were also carefully considered when informing the decision-making process.

Section 7 Expenditure proposals records the outcome of this corporate process for the Reliability Suite of portfolios. This projected expenditure was selected for the revenue request for several reasons including:

- ☐ Balance of cost risk of exposure between South East Water and the Customer.
- ☐ Overall ability to spend by South East Water taking into account resourcing constraints and market capacity.
- ☐ Balance of priorities of other portfolios proposed by South East Water.

Table 7: Risk Scenarios

| | High Risk/Low Cost | Balanced Risk Cost Preferred Option | Low Risk / High Cost |
|----------------------|--|---|--|
| Total Cost | \$335.3M | \$467.7M | \$546.2M |
| Inflated cost (CAMP) | \$376.0M | \$524.5M | \$612.5M |
| Plan Description | <ul style="list-style-type: none"> <input type="checkbox"/> Continuation of expenditure at the same level to the 2018-23 regulatory period. <input type="checkbox"/> Continue to reactively respond and renew critical and non-critical asset failures <input type="checkbox"/> Prioritise Condition assessment of assets with previous failure history. <input type="checkbox"/> Prioritised monitoring of assets with previous failure history and high operational risk assets. | <ul style="list-style-type: none"> <input type="checkbox"/> Target elimination of extreme risk with a failure that impacts regulatory compliance and customer service by 2038 (15 year program)* <input type="checkbox"/> Renewal budget only enough to cover extreme risk assets currently known to have poor conditions. If we discover higher priorities through condition assessment or failure events, projects will be reprioritised, and defer. <input type="checkbox"/> Condition assessment completed for all extreme risk critical assets and achieve a total of 33% of critical sewer assets inspected by 2032. <input type="checkbox"/> Monitoring and controls implemented to extreme risk assets for early warning or detection of failure. Minimising impacts. | <ul style="list-style-type: none"> <input type="checkbox"/> Target elimination of extreme risk with a failure that impacts regulatory compliance and customer service by 2032 (10 year program)* <input type="checkbox"/> Address extreme regulatory compliance risk assets, covering both assets currently known to have poor conditions, and as we discover more through a vigorous condition assessment program.* <input type="checkbox"/> Condition assessment completed for all extreme risk critical assets and achieve a total of 50% of critical sewer inspected by 2028 <input type="checkbox"/> Monitoring and controls implemented to extreme and high risk assets for early warning or detection of failure. Minimising impacts. |
| Risk | <p>Compliance:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Compliance to environmental protection safety and drinking water regulations. <p>Cost</p> <ul style="list-style-type: none"> <input type="checkbox"/> Unexpected costs to manage reactive repairs and renewals. | <p>Compliance:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Demonstrated commitment to compliance while balancing customer expectations over 15 years. | <p>Compliance:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Demonstrated commitment to compliance while balancing customer expectations over 10 years. |

The selection of the proposed revenue request (expenditure) does bring with it a number of risks:

- 1) Regulatory obligations may not be met until at least 2038/39:
 - a. There will be critical assets without a condition assessment whose priority will still be determined through theoretical models.
 - b. The risk of spill from a critical sewer asset failure will remain throughout the 2023-28 and 2028-33 regulatory period.
 - c. The risk of leaks and bursts from critical potable water mains will remain throughout the 2023-28 and 2028-33 regulatory period.
- 2) Unplanned works on assets will continue to be a feature of the Reliability Master Plan. In response to unforeseen asset failures unexpected expenditures are still likely to occur throughout the 2023-28 regulatory period.

Once the final capital investment scenario was selected for each investment portfolio, project and program schedules were finalised, and the associated risks to meeting performance targets were captured for ongoing monitoring and management.

4. Engagement

This submission for the 2023-28 regulatory period have been prepared through an extensive process of engaging and collaborating with our customers and community.

In response, this plan will focus on maintaining reliable services. Our customers are seeking easier ways to transact and that give them ready access to information when they need it - In the reliability context, when there is a service disruption.

4.1 What we learnt from our engagement

South East Water has prepared detailed expenditure proposals based on what we heard in the engagement process and the deliberation with the community panel. Table 8 shows how the Reliability Master Plan response to our customer engagement process.

Table 8: Reflecting Engagement Feedback in Network Reliability Master Plan

| What we learnt from our engagement | Our response in the Water and Sewer Network Reliability Master Plan |
|---|--|
| Customer outcomes <ul style="list-style-type: none"> □ The 5 outcomes agreed for the current 2018-23 regulatory period still resonate with customers. □ Qualitative surveys and focus groups showed strongest support for the “<i>Make my experience better</i>” outcome. | <ul style="list-style-type: none"> □ The proposed investment in this master plan predominately contributes to delivering the “Get the Basics Right, Always” Customer Outcome, and aligns well in supporting other business functions in delivering the other 4 customer outcomes. |
| Disruptions and sewer spills <ul style="list-style-type: none"> □ High quality drinking water and reliable supply (water and wastewater) was most highly valued in qualitative surveys and focus groups. □ Willingness to pay analysis survey participants on average supported an increase in expenditure of \$0.5m (NPV (Net Present Value), 5 years) to reduce water supply outages. □ Best worst scaling showed strongest support for increased expenditure to reduce the number of sewer spills. | <ul style="list-style-type: none"> □ Increased capital expenditure program focused on critical water main and sewer assets, which prioritises maintenance and renewals in areas with high community and/ or environmental impact. □ New Contract for maintenance of assets will bring new ideas and innovation, and improve safety, processes, efficiency, and value. □ Using Technology like sensors in our digital meters and sewer flows to detect and respond earlier to minimise water and sewer disruptions. □ Increased potable water quality investment and monitoring to ensure safe drinking water |
| Other customer experience issues <ul style="list-style-type: none"> □ Customers are seeking easier access to information on South East Water’s website. □ Customers are seeking improved functionality to allow them to self-serve by completing key tasks themselves online. | <ul style="list-style-type: none"> □ The status of water and sewer network interruptions, including planned and unplanned works, repairs, and outages are displayed on an interactive map 24/7 at South East Water website. SEW LIVE (southeastwater.com.au) □ Infrastructure renewal and upgrade project location, timeframe and status are available for customer access on South East Water website. Upgrades and Projects South East Water |
| Affordability <ul style="list-style-type: none"> □ Qualitative surveys and focus groups showed a consistent desire for no price increases and an emphasis on affordability over expenditure on reducing carbon emissions. □ First Nations customers sought support and compassion for vulnerable customers, including to help them understand payment options and how to communicate with South East Water on their affordability issues. | <ul style="list-style-type: none"> □ We are proposing to maintain the Potable Water Reliability, Potable Water Renewal, Sewer Reliability, and Sewer Renewal capital portfolios at either slightly reduced, or relatively stable levels to keep costs down, despite aging assets and climate change may increase asset failure rates. □ We have spread the Potable Water Network Compliance and Sewer Network Compliance capital investment portfolios to target addressing all known extreme risks assets over a 15-year period, this is contributing to no price increase in the 2023-28 regulatory period. |

| What we learnt from our engagement | Our response in the Water and Sewer Network Reliability Master Plan |
|--|---|
| <ul style="list-style-type: none"> Willingness to pay analysis survey participants on average supported an increase in expenditure of \$6.1m (NPV, 5 years) to assist customers in genuine financial need. | <ul style="list-style-type: none"> We have analysed a range of investment options to optimise our proposal to achieve a prudent and efficient investment that meet our regulatory requirements, customer expectations, stakeholder requirements and risk appetite. For example, we have investigated the bill impact of addressing critical asset failure risks in a shorter timeframe such as 5 years, or 10 years and those options were not selected. (Refer to Risk Section 3) |
| <p>Digital metering</p> <ul style="list-style-type: none"> Willingness to pay analysis survey participants on average supported an increase in expenditure of \$46.2m (NPV, 5 years) to roll out digital meters. The community panel recommended the replacement of all meters with digital meters over 5 years Customers who indicated they do not have enough to meet basic expenses are concerned by the cost of digital meters. Better-off and younger customers are more supportive of transitioning to digital meters to obtain the benefits they offer. | <ul style="list-style-type: none"> The water network reliability investment portfolio compliments the digital metering program by co-ordinating network monitoring, network operations and maintenance activities with the digital meter roll out to optimise the yield of benefits generated such as non-revenue water/leakage reduction, early detection and resolution of faults and issues. |
| <p>Innovation</p> <ul style="list-style-type: none"> Qualitative surveys and focus groups showed support for South East Water taking a lead on innovation. | <ul style="list-style-type: none"> We are leveraging innovations in advanced network monitoring technologies and data analytics to drive cost efficiency in managing asset failure risks. This is the basis on how we could maintain either slightly reduced, or relatively stable capital expenditure forecast for the potable water reliability, potable water renewal, sewer reliability, and sewer renewal portfolios despite aging assets, and climate change. We also collaborate with our delivery partners to drive innovation in asset renewal technology, improving safety outcomes, minimising customer interruptions, and improving efficiency in delivery. |
| <p>Education and awareness</p> <ul style="list-style-type: none"> Qualitative surveys and focus groups supported education and communication on water conservation. This is also an issue that is important to First Nations customers. Willingness the pay analysis survey participants on average supported an increase in expenditure of \$3.7m (NPV, 5 years) to fund water related education. | <ul style="list-style-type: none"> When we set up customer engagement for critical asset renewal projects, we leverage the project opportunity to educate customers and community about water literacy, the purpose and outcomes the projects will deliver. We do this both face to face by setting up project engagement office, or virtually through a digital engagement space that has an interactive customer experience. https://consultationspace.com/SEW/ |
| <p>Integrated Water Management</p> <ul style="list-style-type: none"> Our most recent qualitative surveys and focus groups shows ongoing community concern about securing future water supply and improving waterway health via Integrated Water Management investment. Best worst analysis showed strongest support for recycled/stormwater projects for agricultural and business users to create further jobs and employment. WTP (willingness to pay) analysis survey participants on average supported an increase in expenditure of \$8.2m (NPV, 5 years) on alternative water investment. | <ul style="list-style-type: none"> When conducting problem definition and concept design for asset reliability projects, we consider opportunities in delivering integrated water management outcomes. For example, when a transmission water main is identified as requiring replacement, the option of whether we could slip line that pipeline to reuse it for alternative water supply is considered. |
| <p>Sustainability and climate change</p> <ul style="list-style-type: none"> Qualitative surveys and focus groups indicated that customers prioritise local environmental benefits and affordability over emissions reductions. This includes | <ul style="list-style-type: none"> The Sewer Network Improvements/ Compliance capital investment portfolio targets monitoring, renewing, and assessing the conditions of critical sewer assets to protect locations with sensitive waterways, bathing beaches, and significant environmental values. |

| What we learnt from our engagement | Our response in the Water and Sewer Network Reliability Master Plan |
|--|---|
| <ul style="list-style-type: none"> providing healthy waterways and places to walk/ride/relax in nature. First Nations customers also supported riverbank and environment rehabilitation. WTP analysis survey participants on average supported an increase in expenditure of \$2.7m (NPV, 5 years) to fund emissions reduction. | <ul style="list-style-type: none"> Refer to Section 6 Outcomes – Environmental Protection in this master plan for further details. |

4.2 Community Panel Recommendations

A community panel was convened to work with South East Water in a deliberative process that would consider how to best reflect the lessons from this customer engagement within the 2023 – 2028 price submission. The community panel were specifically tasked with considering how to balance differing community needs and costs.

Six full days of facilitated education and deliberation sessions were undertaken over the period from October to December 2021. With the challenge of COVID impacts on the process, the community panel fluctuated between 29 and 35 participants, with 33 participating on the final day.

The community panel made 8 final recommendations, which were subsequently presented to the South East Water Board.

Extracted from “South East Water Price Submission Community Panel Report”, Recommendation 2 provided in Figure 16 below is of particular relevance to this Water and Sewer Network Reliability Master Plan.

| Recommendation 2 | |
|---------------------------|---|
| Heading | <p><i>What would best describe the experience we want in a few key words?</i></p> <p>Reliable service across the whole network</p> |
| Description of experience | <p><i>What sort of service (more, less, same or different) do you want and why is this important? Provide any evidence to support?</i></p> <ul style="list-style-type: none"> Increase spending on proactive planned maintenance and upgrades to systems and processes to reduce unplanned disruptions. Stricter targets on disruptions (fewer disruptions). Environmentally sustainable materials and processes are prioritised and implemented where the benefits outweigh the costs and they are not cost prohibitive |
| What is success? | <p><i>How would we know if this was successful?</i></p> <ul style="list-style-type: none"> Reduced unplanned disruptions to our sewage and water supply in a cost-effective way. |
| What should happen? | <p><i>What should be offered to people if this experience is not met by South East Water?</i></p> <ul style="list-style-type: none"> Current consumers compensation for sewer spills is maintained at \$1500. Consideration be given to compensating affected businesses. |

Figure 16: Community Panel Recommendation 2

Customers want current water and sewerage services improved and are willing to have a bill impact of \$1.64 to achieve reliable services across the whole network. South East Water’s performance against key performance indicators in this area has been consistently high.

South East Water will achieve these by:

- **Potable Water Quality:** We have increased potable water quality investment and monitoring to ensure safe drinking water.
- **Potable Water and Sewer Improvements/ Compliance:** We have increased capital expenditure focussed on critical water main and sewer assets, which prioritises asset inspection, monitoring and renewals in areas with high community and/or environmental impact, reducing the impact on our customers and sensitive environment in a cost-effective way. This will also deliver safety improvement for assets, operations and maintenance activities.
- **Water and Sewer Reliability and Renewals:** We have demonstrated a willingness to take on the risks of climate variations, aging assets, and cost escalations, to reduce budget levels while maintaining customer service objectives at current levels. We are actively managing these risks by implementing a new maintenance contract, bringing new ideas and innovation, improve safety, processes, efficiency, and value. We are also using technology like sensors in our digital meters and of sewer flows to detect and respond earlier to minimise water and sewer disruptions.

4.3 Ongoing culture of embedded engagement

South East Water does not limit its engagement with customers and stakeholders to the process of preparing our price submission. Involving and engaging with our customers and community is an important part of our day-to-day business culture and operation.

During delivery of water and sewer network renewal projects, we engage with customers and the community who are impacted by these projects. When setting up customer engagement for critical asset renewal projects, we leverage the project opportunity to educate customers and community about water literacy, the purpose and outcomes of the project. We do this either face to face by setting up a project engagement office in the local area, or virtually through a digital engagement space that has an interactive customer experience, as shown in Figure 17.



Figure 17: Example of critical asset renewal customer engagement setup

We have an ongoing customer insights program to help provide an understanding of what is important to our customers and how they feel with respect to value-for-money, trust, reputation and overall satisfaction. The outcome of the program helps inform the organisation on

investment priorities and customer improvement initiatives. Key elements of the customer insights program that directly link to the Water and Sewer Network Reliability Master Plan are:

1. Daily post-transaction customer feedback (surveys)

On average, we conduct and analyse (290,000 – issued / 23,000 – received) post-transaction surveys each year that provide insights on a weekly, monthly, quarterly, and annual basis. These allow us to understand how the customer is feeling at a granular level with respect to a broad range of matters including customer service quality, customer billing experiences and water service delivery. At present, we gain customer feedback through 5 transactional channels:

- ☐ customer contact centre
- ☐ payments and affordability
- ☐ customer portal
- ☐ faults and emergencies
- ☐ unplanned water interruption events

2. Monthly field surveys

Each month, we conduct over 200 field surveys (Brandtracker) to understand the most important factors that influence our customers' perception and how that translates to operational priorities and improvements.

3. Weekly network services surveys

Each week we send digital feedback surveys to customers who had contacted us to report a water or sewer issue or recently had work completed at their property. This gives them the opportunity to provide feedback and score us from 1 (poor) to 10 (excellent) on service, attitude, time to repair and overall thoughts on their experience and the organisation. These surveys and scores are used to inform our customer satisfaction scores (CSAT), contractor performance reports and KPI's, identify opportunities for improvement and allow us to follow up directly with customers to resolve issues.

4. Customer engagement data analysis

To complement the insights gained from the customer feedback and field surveys, we conduct analysis on transaction data including customer verbatims and engagement trends to enrich our learnings and inform further customer research focus areas.

5. Management

5.1 Asset Management Framework

This Water and Sewer Network Reliability Master Plan has been developed within the context of South East Water's Strategic Asset Management Framework and is part of a suite of Asset Lifecycle Management Plans that support the Corporate Asset Management Plan. This document is Part II of the Asset Lifecycle Management Plans for Drinking Water Supply (AM2703), and Sewage Collection (AM2704). The Water and Sewer Network Growth Master Plans (separate documents) are Part I to these Asset Lifecycle Management Plans.

During the Price Submission for regulatory period 2018-23, South East Water structured our asset management plans differently. The Reliability Master Plan presented in this report is a consolidation of 10 different Asset Management Plans from the Price Submission 2018-23 period namely:

- AM2684 – Gravity Sewer Network Reliability (2017)
- AM2685 – Reliability of Pump Stations and Rising Main (2017)
- AM2686 – Pressure Sewer System Reliability (2017)
- AM2687 – Reliability of Network Odour and Corrosion (2017)
- AM2688 – Sewer Connections Reliability (2017)
- AM2692 – Reliability of Water and Recycled Water Reticulation (2017)
- AM2693 – Non-Revenue Water Reduction (2017)
- AM2694 – Reliability of Water and RW Storages & Pump Stations (2017)
- AM2695 – Water and Recycled Water Quality (2017)
- AM2697 – Water and Recycled Water Network Reliability (2017)

The capital programs have been developed to address the Asset Management Objectives, as defined in the South East Water Strategic Asset Management Framework and compliant with the Asset Management Accountability Framework (AMAF). It's also targeting ISO55001 compliance.

The scope of this master plan aligns with other management systems (E.g. OH&S, Quality, Environment, Compliance, Financial, Business case...etc.) and support the overarching South East Water objectives. (Refer to [BS2721 Management System Register](#).)

5.1.1 Reliability and Growth Planning Interfaces

This document is Part 2 - Reliability of AM2703 and AM2704 the Water Supply and Sewer Collection Asset Lifecycle Management Plans. The growth plans have been separated by water and sewer networks to reflect the catchment/distribution zone based assessment process including the hydraulic models used to develop them. The Asset Lifecycle Management Plans Part 2- Reliability are combined as they are responding in an integrated manner, in response to a common set of customer feedback and risk assessment process.

When developing projects and intervention options both reliability and growth triggers are assessed for the long and short term. For example, the Hanna Street Branch Sewer Upgrade Project Stages 1 and 2 (growth/capacity) and Stage 3 (renewal) will undergo detailed design and be delivered as one project. The sequencing of these works will allow flow diversion to be achieved via Stage 1 and Stage 2 capacity upgrade, prior to renewals, effectively mitigating the risk and achieving delivery efficiency for the overall project.

5.2 Capital Investment Planning – Decision to Invest

In general, our decision to invest is focused on achieving our asset management objectives through prudent and efficient management of risk. In asset planning, this means continually assessing risk and prioritising or reprioritising investment to address areas with the highest risk levels in accordance with our risk appetite.

The risk level is determined in accordance with our risk management framework and considers both the likelihood and consequence of a risk event taking into account the current risk management controls. The risk level is continually reviewed to address changes in regulatory requirements, emerging risks and our current performance. The risk appetite, that is set by our executive and board is aligned with the strategic vision and informs our decision making within agreed risk boundaries. Depending on the consequences of a risk event and risk appetite we may choose to implement preventative and/or reactive risk management control measures and investments.

Refer to Section 3.1 South East Water Corporate Risk Framework, and 3.2 Network Risk Analysis, which detailed how the reliability portfolios of investment has been developed applying the South East Water Corporate Risk Framework, following a prudent, network risk analysis approach for capital investment planning.

Our asset management objectives and asset risk events are summarised in Table 9.

Table 9: Asset Management Objectives and Asset Risk Events

| Asset Management Objectives | | Asset Risk Event | Corporate Risk Consequence Category |
|--------------------------------------|--|---|-------------------------------------|
| SAFE | Our assets are safe for our people, our customers and our community | Worker safety hazard Customer safety hazard Public safety hazard | Safety & Wellbeing |
| DEPENDABLE | Assets perform as and when required (available, reliable , maintainable, and supported so that they can dependably deliver specified service levels) | Customer Service Restriction Customer Service Disruption Customer Dis-satisfaction Development Restriction Customer Aesthetic Quality | Service |
| RESILIENT | Our assets are protected, secured and durable so that they are resilient to external impacts , including but not limited to aggressive environments, climate change, 3 rd party damage, cyber-attack and physical intrusion. | External Hazard | |
| CAPABLE | Within resource constraints assets have the capacity to deliver sufficient product to meet customer demand and specified service levels | Environmental Hazard | Environmental |
| ENERGY AND EMISSION EFFICIENT | Energy consumption and greenhouse gas emissions are reduced through efficiency and optimised utilisation | Excessive Energy Consumption/Emissions | |
| ENVIRONMENTALLY SUSTAINABLE | Our assets shall protect the environment and human health from pollution impacts | Community Disruption | Product Quality |
| COST EFFECTIVE | We deliver services for the minimum whole lifecycle cost to South East Water, our customers and the wider community | Excessive Cost | Financial |

| | | | |
|------------------|--|----------------|------------|
| COMPLIANT | We will meet our commitments (including legislative obligations, licences, agreements, regulation and specified service levels.) | Non-compliance | Regulatory |
|------------------|--|----------------|------------|

Table 10 below outlines how the reliability proposed investment addresses the various asset management objectives and their associated risk triggers. The main asset management objectives the Reliability Master Plan addresses relate to are Safe, Compliant, Cost Effective and Dependable.

Table 10: Asset Management Objectives and Proposed Initiatives/ Programs

| Asset Management Objective | Risk Triggers | Proposed Initiatives/ Program of Works |
|----------------------------|--|---|
| Safe | <ul style="list-style-type: none"> <input type="checkbox"/> Safe drinking water and alternative water supply. <input type="checkbox"/> Minimise sewer spills within customer premises. <input type="checkbox"/> Target elimination of catastrophic asset failure events. | <ul style="list-style-type: none"> <input type="checkbox"/> Potable Water Quality Program <input type="checkbox"/> Critical Asset Renewal and Upgrade Program <input type="checkbox"/> Critical Asset Condition Assessment Program <input type="checkbox"/> Network Monitoring and Alarms Program <input type="checkbox"/> Risk Models and Management Tools |
| Compliant | <ul style="list-style-type: none"> <input type="checkbox"/> Compliance with Health, Environmental and Safety regulatory requirements. <input type="checkbox"/> South East Water has a risk-based investment framework that complies with general environmental duty. <input type="checkbox"/> South East Water meets customer charter obligations. <input type="checkbox"/> Target elimination of extreme risk assets that have experienced a failure that impacts regulatory compliance and specified service levels. <input type="checkbox"/> Outcome of investigations into water quality incidents. | <ul style="list-style-type: none"> <input type="checkbox"/> Potable Water Quality Program <input type="checkbox"/> Critical Asset Renewal and Upgrade Program <input type="checkbox"/> Critical Asset Condition Assessment Program <input type="checkbox"/> Corrosion Mitigation Program <input type="checkbox"/> Network Monitoring and Alarms Program <input type="checkbox"/> Risk Models and Management Tools <input type="checkbox"/> Sewage Storages that are triggered by GED compliance (not growth) |
| Cost Effective | <ul style="list-style-type: none"> <input type="checkbox"/> Make sound investment decisions based on needs, cost effectiveness of risk controls, and risk-based prioritisation. <input type="checkbox"/> All investments delivered via an effective delivery model. <input type="checkbox"/> Run non-critical assets to intervene based on levels of service. | <ul style="list-style-type: none"> <input type="checkbox"/> Cost effectiveness is a key consideration in all proposed programs. |
| Dependable | <ul style="list-style-type: none"> <input type="checkbox"/> Meet customer levels of service as informed by customer and community engagement. <input type="checkbox"/> Run non-critical assets to intervene based on levels of service. | <ul style="list-style-type: none"> <input type="checkbox"/> Non-Critical Asset Renewal Program <input type="checkbox"/> Non-Critical Asset Condition Assessment Program <input type="checkbox"/> Maintenance Program <input type="checkbox"/> Corrosion Mitigation Program <input type="checkbox"/> Network Monitoring and Alarms Program |

| | | |
|--------------------------------------|---|---|
| | | <input type="checkbox"/> Risk Models and Management Tools |
| Resilient | <input type="checkbox"/> Assets are adaptive to climate change <input type="checkbox"/> Redundancy in the system to provide recovery or service continuity for natural disaster scenarios such as bush fire events or major interruption in bulk supply. | <input type="checkbox"/> Water and Recycled Water Storages that are triggered by resilient driver, not growth. <input type="checkbox"/> |
| Capable | <input type="checkbox"/> Within resource constraints assets have the capacity to deliver sufficient product of the required quality to meet customer demand and specified service levels. | <input type="checkbox"/> Corrosion Mitigation Program <input type="checkbox"/> Maintenance Program <input type="checkbox"/> Network Monitoring and Alarms Program |
| Environmentally Sustainable | <input type="checkbox"/> Refer to compliant objective with respect to GED. <input type="checkbox"/> Water conservation through achievement of an economic level of leakage | <input type="checkbox"/> Refer to compliant objective with respect to GED. <input type="checkbox"/> Non-Revenue Water Management Program |
| Energy and Emission Efficient | <input type="checkbox"/> Contribute to Net CO2 emission targets by incorporating energy and emission efficiency in option analysis and functional design of asset upgrades. | <input type="checkbox"/> Critical Asset Renewal Program will consider goals when selecting preferred option. |

5.3 Method for developing the capital expenditure portfolios

Our capital investment plan was developed through a rigorous process that identified the investment required to meet our five customer outcomes, and five strategic focus areas. The process included the development of reference strategies and master plans that inform the lifecycle management of assets to service growth, maintain service levels, and meeting regulatory compliance requirements.

A common risk management framework and asset management framework has been applied within each service (e.g. water, sewer, alternative water, business technology and services) and to the cost drivers (e.g. maintain service levels, growth, improvements/ compliance) in the process outlined below. Refer to the Corporate Asset Management Plan for detail.

Refer to Section 3 – Risk, which detailed how the reliability portfolios of investment have been developed, applying the South East Water Corporate Risk Framework, following a prudent network risk analysis approach for capital investment planning. Portfolio risk analysis were then undertaken to analyse investment options.

The process used to develop the capital plan has considered non-asset solutions and monitoring technologies to defer the need for renewal works.

5.3.1 Risk-based capital investment planning

A key objective when developing our capital investment plan was to deliver on customer outcomes while managing risk and uncertainty to ensure that our customers receive the service that they are paying for with affordability in mind. To achieve this, our projects and programs of work were developed based on a risk- based capital investment planning process that is underpinned by value, risk appetite and our customer outcomes.

We conducted risk assessments on existing and proposed future assets applying a common risk management framework at both a catchment level, and an individual asset level. We use rich sources of data and analyse this data through techniques such as hydraulic modelling, risk profiling, geospatial analysis and data science techniques, to inform our investment priorities and identify where capital investment is required in the regulatory period 2023-28, with an outlook into 2028-33.

For example, following a number of critical asset failure incidents in 2017 -2018, we conducted a critical asset review using the criticality matrix in our corporate risk framework, to identify and locate our critical assets. These assets are regarded as critical assets because if and when they fail, the adverse consequence to customers, community, and environment would be regarded as high to catastrophic. Then we couple the criticality data with asset condition data and failure history to form a full picture of asset risk profile which in turn enables us to prioritise our investments on critical assets that have a high likelihood or are at imminent risk of failure. As critical asset risk profiling changes over the regulatory period as asset conditions change and become known from asset condition assessments, we will continually update the risk profiling and will reprioritise investment in individual projects. This critical asset management approach ensures we continue to comply with regulatory requirements for safety, environmental protection, and water quality. (Refer to Section 3- Risk for details)

In contrast, we will continue to operate and maintain our non-critical assets to deliver customer outcomes and keep failure rates and impacts within customer levels of service. This will be monitored and measured by the customer disruption performance target “Customers experiencing more than 5 unplanned disruptions in a 12 month period (water, sewer and water quality)”. With an aging asset base, climate change, and improved technology in detecting and discovering asset failures which historically would be unknown, we are forecasting there will be an increasing need to maintain customer levels of service. We are proposing to leverage advancements in technology, information and digital engineering to manage this risk through early detection and rectification to minimise customer impacts, keeping our investments on non-critical asset management at either slightly reduced, or relatively stable level. (Refer to Section 6.2 for detail)

5.3.2 Investment portfolio development and prioritisation

Once the investment needs are established via the risk-based capital investment planning approach described above, they are then grouped into investment portfolios by service type, and cost drivers. We establish ownership and accountability per investment portfolio for the planning and delivery of our capital investment program. Each investment portfolio is made up of a set of projects and programs of work that were identified and prioritised using an iterative process of review and challenge to ensure capital expenditure was prudent and efficient. Refer to Section 3.3 for more details.

5.3.3 Business cases

Concept briefs and business cases were prepared for the key capital expenditure projects identified within reference strategies and master plans. These included an outline of the problem to be addressed, the expected benefits and how these align with our customer outcomes, the options that were considered, justification for the selected option, and details of the risk assessment conducted. Business cases are put forward through a prudent endorsement and approval process following the delegated authority.

5.3.4 Cost estimating methods

P50 estimates were completed for identified projects to ensure forecasts were robust and capital expenditure was prudent and efficient.

When estimating our projects and programs, we applied cost estimating methods suitable for project forecasting for concept design and pricing submission, developed in line with the “SEW PS5 Cost Estimate Report Rev 5”. The methods used for cost estimation can broadly be summarised as:

- ☐ Unit Rates (As specified in the Unit Rate Report).
- ☐ Project specific estimates following first principles prepared by a qualified estimating personnel.
- ☐ Based on quotation from supplier or service provider.
- ☐ Based on previous expenditure for similar activities or past projects.

All estimates presented in this report are in 2022/23 dollars.

5.4 Approach to forecasting operating expenditure

South East Water’s controllable expenditure includes the day-to-day costs of running our water and sewerage network and treatment plants (such as maintenance, electricity and labour), as well as customer service and billing.

Operating expenditure outside of our control includes:

- ☐ Melbourne Water’s bulk charges for collection and treatment of drinking water and treatment of sewage.
- ☐ an environmental contribution made to the Victorian government.
- ☐ other licence fees and charges.

Our proposed approach to developing our forecast for controllable operating expenditure for the 2023-28 regulatory period involved:

- ☐ using 2021-22 actual expenditure as a base.
- ☐ undertaking a comprehensive review of all activities and resource requirements.

Our proposed operating expenditure for the next regulatory period commits us to a continued focus on efficiency and ongoing management of controllable operating costs. We are confident in this commitment, even with positive growth in our customer base and increasing input prices.

Operating expenditure is allocated to the services supplied on:

- ☐ a direct charge basis – where costs that relate directly to a specific service (water, sewerage and recycled water) are allocated in full to that service.
- ☐ an indirect charge basis – where costs which are not directly related to a specific service are allocated based on the percentage allocation of direct costs to those services.
- ☐ non-prescribed activity, which is removed for the setting of prices.

5.5 Prudency and Efficiency

Prudency and Efficiency underpins the development of the reliability investment programs.

5.5.1 Prudency

In assessing the needs of the reliability investment programs the following considerations have been incorporated:

- New compliance requirements: The Environment Protection Act 2017 introduced the General Environmental Duty, and direction from the Department of Health in response to potable water quality incidents has introduced new requirements on water quality management. Asset risk profiling and the investment prioritisation approach has been updated in this submission to address these regulatory compliance requirements.
- Data Driven Investments: Investment programs are developed based on geospatial asset risk management models (ARMM), which determine the likelihood and consequence level of individual assets and displays results via GIS (Geographic Information System) maps and Power BI dashboards. The tool incorporates; asset failure data, asset condition, customer impact, environmental impact, locality specific information and the effectiveness of existing risk controls. Investment needs have been assessed by applying a risk management framework across the various asset classes down to an individual asset level. The tool also allows on-going asset performance monitoring, and reprioritisation of investment as new data becomes available. For non-critical asset water and sewer renewal programs utilise WRAP and SARP. (Refer to Section 3.2 Network Risk Analysis for details)
- Focus on Highest Risk Assets: Assets have also been prioritised for investment based on the South East Water Corporate Risk Framework and Risk Appetite. The risk scores produced by the ARMM, WRAP and SARP tools drive the development of the programs including the quantity of work forecasted for each program. The development of risk mitigation approaches was analysed using the asset management best practice – Failure Mode Effects Cause Analysis (FMECA), and Risk Bowties, such that the most cost-effective means of intervention is assigned to a specific asset based on its risk profile, as well as its prospective failure mode.
- Engagement with Stakeholders: The logic adopted in the ARMM tool has been developed via a robust process incorporating knowledge and skills from a broad range of internal South East Water subject matter experts and external consultancy, specialised in risk, water infrastructure management, asset management, and data science. The risk consultancy provided transferrable learnings from international experience servicing across other industries such as defence force, and transportation. The ARMM tool has been presented to other metropolitan water organisations in Victoria, and the OzWater conference – a highly regarded major event for the Australian water industry and has received peer recognition as a best practice approach that other major water utilities are keen to learn from.
- Engagement with Customers and Community: Customers want current water and sewerage services improved and are willing to have a bill impact of \$1.64 to achieve reliable services across the whole network. South East Water's performance against key performance indicators in this area has been consistently high.

5.5.2 Efficiency

To drive efficiency in the reliability investment program the following consideration have been incorporated:

- Learn and Adapt through Past Performance: The cost and risk reduction effectiveness of available intervention approaches has been analysed using historical performance data.

For example, asset renewal has been identified as the most effective approach in lowering risk, but at relatively high cost; hence the preferred investment option for extreme risk assets where the likelihood of failure is imminent. In contrast, monitoring and alarms has been identified as being the next most effective means of lowering risk at minimal cost, therefore is the preferred investment option to manage high to extreme risk assets where the likelihood of failure is known to be lower. (Refer to 3.2.3.2 for details)

Leveraging Innovation and Technology: Central to this is our increasing ability to monitor for and early detection of prospective sewer blockages via the implementation of advanced monitoring technologies such as BlokAid or Multix. This allows us to better manage the potential impact to the environment and our customers, and the increasing costs associated with obtaining better knowledge of actual performance and issues in the network. A recent BlokAid deployment project to our Smart Sewer network as part of the Beach Guard program has seen a reduction in sewer spills (half of the baseline) and a benefit cost ratio of up to 3 times when comparing the cost of installation to the potential avoided sewer spill clean-up costs.

The proposed digital meter roll out (presented in the Digital Utility asset management plan, outside of this report) will contribute to a longer term, sustainable reduction in non-revenue water and leakage performance. The project is forecast to increase operating expenditure over the regulatory period 2023-28. For further details refer to Section 6.7 Non-Revenue Water.

- Review of Delivery Model: South East Water is procuring a new capital delivery model to ensure we will continue to have the most prudent and efficient way to procure and deliver our planning, design and construction services via professional services consultancy and contractor service providers.

The initial stages of the proposed program will be delivered under the existing Reliability Program Contract and the recently appointed Maintenance models. From 2023-24 the new Integrated Planning and Delivery (IPD) Capital Delivery model will be established and will deliver the majority of the expenditure across the Reliability Master Plan. The breakdown of Reliability Master Plan by delivery model is provided in Figure 18.

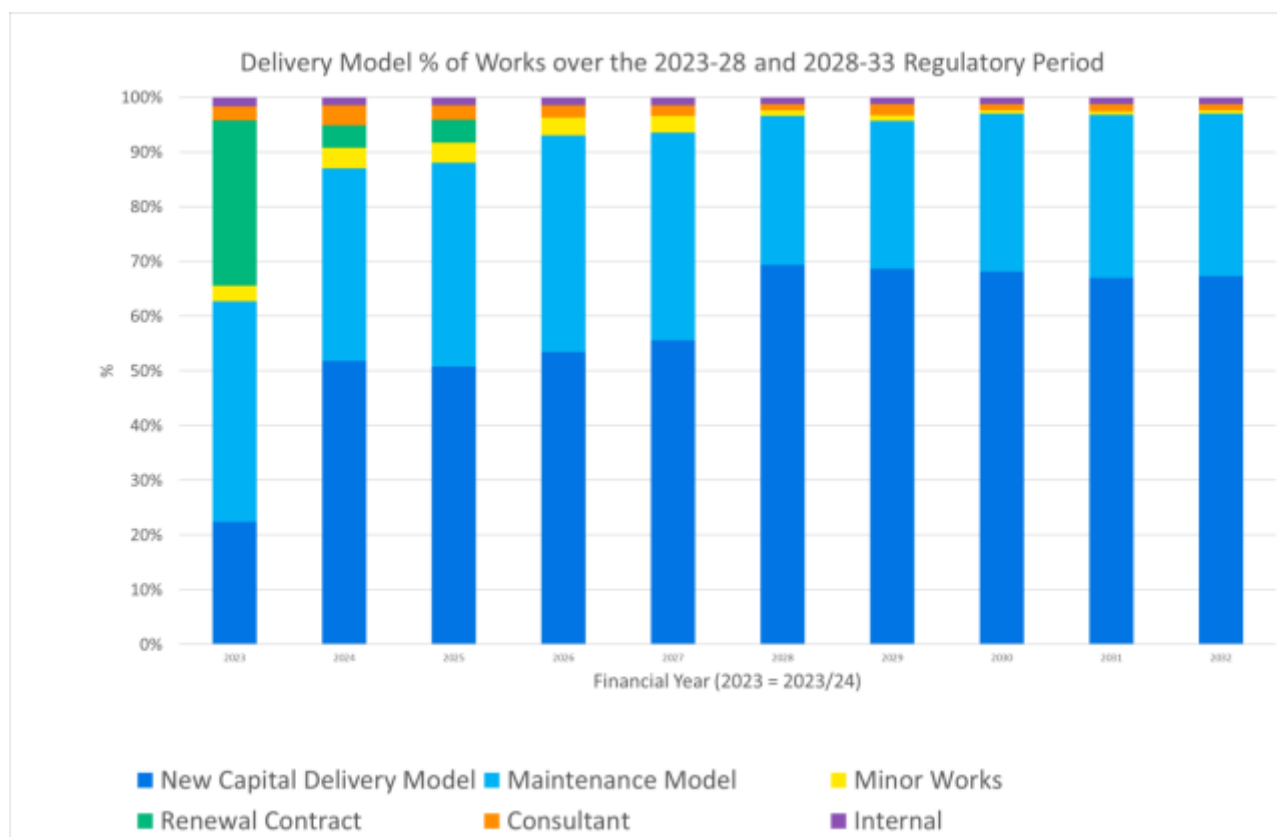


Figure 18 : Delivery Model Expenditure Percentage for the Reliability Master Plan

Through our capital expenditure program for 2023-28, we will continue to improve our services and invest in technology to enable operational efficiencies and minimise the impact of additional cost pressures on our customers.

When developing our capital expenditure program, we ensured we made sound investment decisions based on a needs and benefits analysis/basis, operational impacts, cost effectiveness of risk controls, and risk-based prioritisation. We set an operating cost efficiency target of 2.0% (compounding year-on-year). The target aligns to our continuous improvement of our operating processes to assure we are prudently managing operating expenditure and meeting our efficiency commitments.

In addition, our capital expenditure program assumes a 5% delivery efficiency for projects and programs delivered through our new integrated planning and delivery Capital Delivery Model that comes into effect in July 2023. This efficiency is based on the quantum of the proposed capital expenditure program that provides economies of scale.

These efficiencies are derived from the integrated planning process incorporating early contractor involvement and program optimisation, the increased scale and term of the contract providing a reliable workload and ability to attract and retain the best resources and the allocation of projects reducing tendering costs. These efficiencies will assist in offsetting some or all the anticipated construction cost escalation above Consumer Price Index (CPI) within the period.

Throughout 2018-23 South East Water's major capital works programs have demonstrated their ability to manage costs below observed escalation levels in the construction sector.

Finally, we incorporated cost efficiencies in our capital expenditure program that we developed through delivery of programs in previous regulatory periods. Some examples include:

- ❑ Delivering network renewal programs by packaging projects by geographical areas to reduce project management overheads.
- ❑ Ensuring planned capital investment considers the associated impact on operational expenditure when constructing and managing our assets. For example, we re-evaluated the possibility to replace the pumped asset with a gravity network solution during project planning for the Guy St Rising Main renewal.
- ❑ Taking a risk-based approach to determine the optimal risk control or risk mitigation method. This includes implementing advanced monitoring and alarms to our high risks assets to minimise the impact of asset failure on customers, and to report on the condition of our critical water and sewerage assets to inform timely augmentation.
- ❑ Prioritising projects to deliver energy use efficiencies based on financial return.

Going forward, we will continue to deliver cost efficiencies and remain within our allocated capital program budget by taking a whole-of-program approach to managing risk in our capital program and using our 'risk bank'. The risk bank model enables us to fund the small number of projects that go over budget through the reserve of unrealised risks within our capital program. We will be taking this approach again in 2023-28 and expanding it into an investment portfolio view to better manage risk and deliver cost efficiencies at a portfolio level.

5.6 Incident Management

One of the controls for providing reliable services to our customers is our incident management response to asset failures or service disruptions. In the context of water and sewer network reliability, South East Water actively manages the following type of incidents, which could cause service disruptions to our customers and community, and to mitigate health and safety risks and to protect the environment:

- ❑ Unplanned asset failures for example caused by third party damage, soil movement, tree root intrusion, blockages or as they reach end of life.
- ❑ Power outages which could affect the operation and control of our systems.
- ❑ Natural events such as bushfire, flood, tsunami, earthquake, strong winds etc.

We manage incidents following the South East Water Incident Management Plan (BS1868) and the Emergency Management Act 2013, and Emergency Management Victoria's operational standards and incident management operating procedures as one of the responder agencies. The Emergency Management Manual Victoria integrates the principal policy and planning documents for emergency management in Victoria, Part 7 outlines the role of Water Authorities (Available on line at: www.justice.vic.gov.au/emergencymanual).

Effective management of emergencies requires the coordinated effort of multiple agencies and a common understanding of a universal management process. We have adopted the Australasian Inter-service Incident Management System (AIIMS) alongside our peers and other Victorian agencies.

As a team, we also learn from each incident and their associated recovery journey, to improve our management approach, systems and processes and feedback those actions into the planning function of asset lifecycle management for continuous improvement.

5.6.1 Case Study: A Birds-eye view of incidents

On 28 July 2022, a 600mm sewer rising main in Officer was struck and damaged by a third-party contractor performing drilling works under a road. The rising main was a critical outlet for

transporting effluent from our Pakenham Water Recycling Plant to the Eastern Treatment Plant in Bangholme. The extensive damage caused by the drilling meant crews were not able to repair the pipe using clamps, instead needing to completely drain the rising main to replace a section of the Glass Reinforced Plastic (GRP) pipe. See Figure 19.

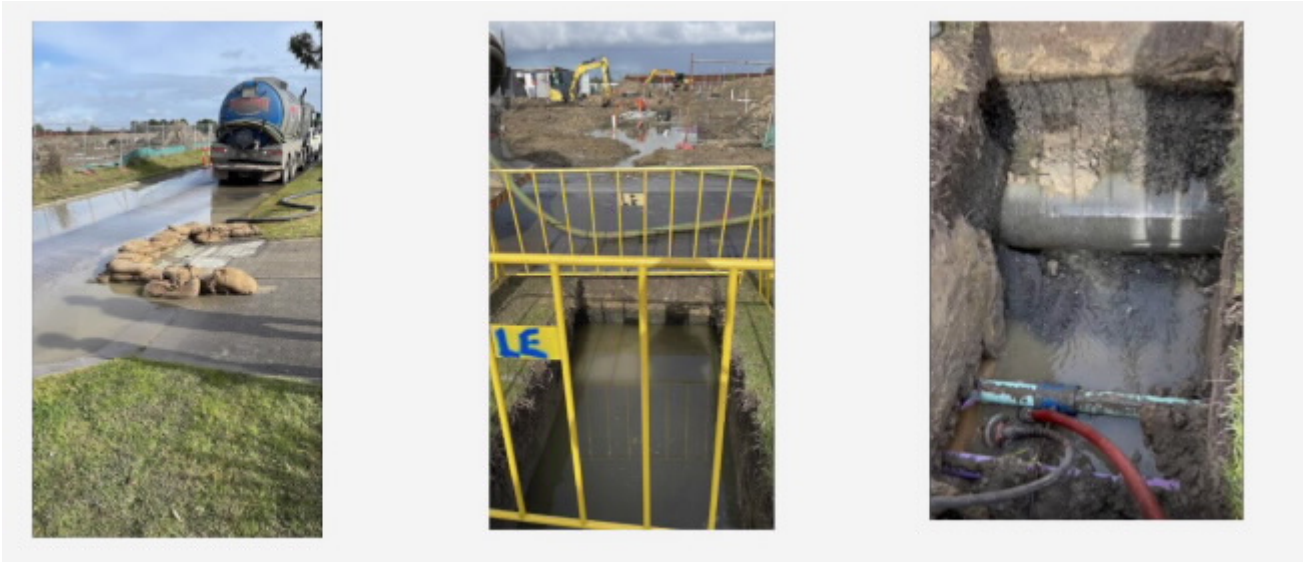


Figure 19: Third Party Damage to 600mm sewer rising main in Officer

[Protecting nearby wetlands](#)

Unfortunately, sewage from the damaged pipe escaped into nearby wetlands via a local stormwater drain. With assistance from our Environment team, Sewer Operations team members quickly mapped and carried out water quality sampling and monitoring to assess the impact of the spill.

Using an Environmental Sensitivity Mapping tool created following the Watson's Creek sewer spill in 2019, the team quickly identified the presence of sensitive species located downstream (Growling Grass Frog and Dwarf Galaxias Fish) and adjusted their education and flushing to help best protect them. See Figure 20.

[A view from the ground/ An eye in the sky](#)

The remote Incident Management Team (IMT) were able to see live videos and photos via virtual meeting technologies from our crews on the ground as the incident progressed. These regular updates were instrumental in making informed decisions.

Our Survey team was brought in to fly the drone to explore the incident site. The drone was used to search for any visible plumes in the wetlands potentially created by the spill. See Figure 21.

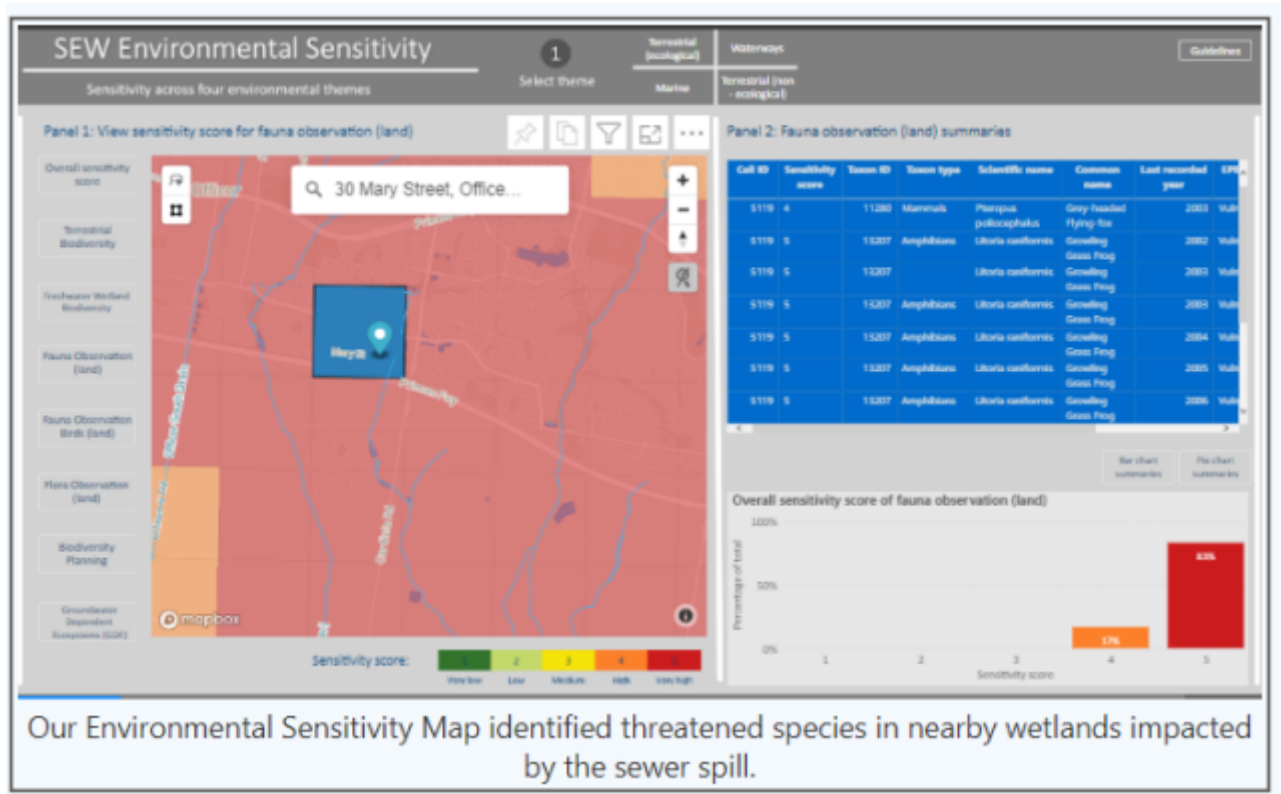


Figure 20: Environmental Sensitivity Map illustration



Figure 21: Using Live video drone footage to help the remote IMT manage the incident

Local knowledge helps manage our network

Communication between our Wastewater technicians and our Pakenham WRP was crucial in responding to the wider impacts of the damaged rising main on flows within our network. Using SCADA technology, the team were able to remotely manage flows from our Pakenham WRP and isolate nearby pump stations, helping our crews to successfully educt the rising main for repairs.

Acting with care for local residents

14 properties in Mary Street, Officer were impacted by our crews performing the emergency works. Whilst their services were not impacted, residents were unable to access their driveways due to the road being closed for safety, see Figure 22.

Our Customer Liaison team spoke personally to residents and sent SMS messages after hours to manage the incident. Traffic crew on the ground who personally carried food and items down the closed street for local residents.

Water quality signage and targeted social media advertisement were used to advise local residents and pets to avoid the wetlands until declared safe again for use.



Traffic crew on the ground assisted local residents with their shopping after access to driveways was restricted for safety reasons.

Figure 22: Assisting local residents

Ensuring business continuity for incidents

Whilst embracing new technology has greatly assisted us in incident management, it should be acknowledged that incidents of this scale place a significant strain on our people and resources. At South East Water, we implement fatigue management in accordance to our [BS 2803 Fatigue Management Procedure](#) and have people across the organisation who are trained for supporting incident management, and support the operations and maintenance teams to ensure business continuity, and knowledge sharing.

Asset Protection Improvements

We're continuing to improve the process of identifying, proving and protecting our assets in the field which may be impacted by external parties performing ground penetration and construction works. (Refer to Section 3.2.3)

6. Outcomes

The 2023-28 price submission is designed to deliver on our 5 customer outcomes that have been reaffirmed by customers as the outcomes they most value. The associated outputs and targets have been updated to align them to service levels and priorities and supporting investments agreed for the 2023-28 period, particularly those arising from the community panel deliberation process. For example, our proposed digital utility investments (including digital metering) will improve our visibility of the network and identification of defects at an earlier stage resulting in improved performance targets.

With reference to Table 11 below, targets that are either increasing or are being maintained. The water and sewer network reliability initiatives in this master plan contributes mostly to achieving the customer outcome “Get the Basics right, always”.

It should also be recognised that other proposed initiatives covered by other investment portfolios in the overarching Corporate Asset Management Plan, and Price Submission complements the water and sewer reliability portfolios to achieve reliable services to our customers. For example, the roll out of digital meters (out of the scope of this master plan) will deliver Customer Outcome 2 - Warn me Inform me, Output measure - Customer savings realised through repair of digital meter detected property leaks. Our customer notification program (out of scope of this master plan) will ensure at least 75% of customers affected will be notified per unplanned disruption.

Table 12 below outlines the objective and outcomes for each of the investment portfolios covered in this master plan

Table 11: 2023-28 Proposed Output and Targets

| Output measures | 2021-22 result | 5 year average | 2027-28 target |
|---|-------------------------------|----------------|----------------|
| 1. Get the basics right, always | | | |
| Percentage compliance with drinking water and recycled water standards | 100% | 100% | 100% |
| Customers experiencing more than 5 unplanned disruptions in a 12-month period (water, sewer and water quality) ^(a) | Redefined | N/A | 450 |
| Total volume of water saved through digital detection of network leaks (ML) | New | N/A | 1,271 |
| 2. Warn me, inform me | | | |
| Customer savings realised through repair of digital meter detected property leaks ^(b) | \$585,700 | N/A | \$7,793,723 |
| Customers notified per unplanned disruption as a percentage of total customers affected | 71% | 63% | 75% |
| Water literacy of South East Water customers | New | N/A | 31% |
| 3. Fair and affordable for all | | | |
| Percentage of existing properties upgraded to a digital meter | 9% | N/A | 85% |
| Total customers supported (provided assistance) | 10,612 (COVID-19 impacted) | 7,134 | 10,000 |
| Percentage of customers with arrears greater than 90 days who have used South East Water support offerings | 41% | 37% | 55% |
| 4. Make my experience better | | | |

| | | | |
|--|-----------|------|--------|
| Total number of inbound contacts (per 100 customers) | 62.6 | 67.9 | 59.5 |
| Overall customer satisfaction with South East Water ^(c) | Redefined | N/A | 70% |
| Number of enquiries relating to the explanation of charges (per 100 customers) | 7 | 5.4 | 5.4 |
| 5. Support my community, protect my environment | | | |
| Overall community trust in South East Water | 68% | 63% | 70% |
| Total greenhouse gas emissions (tCO ₂ e) | 28,577 | N/A | 12,033 |
| Alternative water (as a percentage of total water) supplied to customers | 4.0% | 3.8% | 7.0% |
| Number of EPA reportable dry weather sewer spills ^(d) | 11 | 14 | 15 |

(N/A) Data not available due to new or redefined measure

(a) Water quality disruptions relate to the issue of a 'Do not drink' or 'Boil water' advisory

(b) Total water saved from date leak fixed to next bill date by the 2023/24 tier 2 water price (\$4.0896 per kL)

(c) Re-baselined due to expansion of channels including credit management and hardship. Response of 7 and above out of 10 are considered positive

(d) Target is based on longer-term modelling given weather dependency

Table 12: Investment Portfolios Objective and Outcomes

| Investment portfolios | Objective | Outcomes | Capital program investment 2023-28 (\$m) |
|--|--|---|--|
| Potable Water Quality | Meet compliance with Safe Drinking Water regulations. | 1. Get the basics right, always. | 63.1 |
| Potable Water Improvements/ Compliance | Maintain compliance with safety regulations and management. | 1. Get the basics right, always. | 67.5 |
| Potable Water Reliability | Maintain drinking water network levels of service for customer interruptions through planned and reactive operations and maintenance activities. | 1. Get the basics right, always. | 57.6 |
| Potable Water Renewals | Maintain drinking water network levels of service for customer interruptions through predominately reactively responding to asset failures as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed. | 1. Get the basics right, always. | 84.1 |
| Sewer Improvements/ Compliance | Maintain compliance with environmental protection regulations including the General Environmental Duty (GED), safety regulations and management. | 1. Get the basics right, always. 5. Support my community, protect our environment. | 98.9 |
| Sewer Reliability | Maintain sewer network levels of service for customer interruptions through planned and reactive operations and maintenance activities. | 1. Get the basics right, always. 5. Support my community, protect our environment. | 91.7 |
| Sewer Renewals | Maintain sewer network levels of service for customer interruptions through predominately reactively responding to asset failures as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed | 1. Get the basics right, always. 5. Support my community, protect our environment. | 28.7 |

6.1 Outcome 1: Get the basics right, always

Customers have told us that it's critical that the services we provide are safe and reliable. For them, it's important we maintain and improve upon current high levels of service and that, as experts in our field, they trust and expect us to continuously innovate and improve.

For us, that means fewer unplanned disruptions for customers across all our services and continuing to meet our compliance obligations. It means continually refreshing our knowledge, using ideas from across the sector, and drawing on predictive digital technologies, to proactively find better, less-disruptive ways to deliver the basics for our customers.

Output measures for 2018-23 (*Get the basics right, always*) included 3 separate levels of service outputs relating to different aspects of service:

1. Number of water quality complaints per 100 customers
2. Number of customers receiving greater than 5 unplanned water supply interruptions
3. Number of customers receiving 3 or more sewerage blockages.

These have been combined into an 'all-of-service' output measure for unplanned interruptions based on customer sentiment that any disruption is an inconvenience, regardless of the specific service.

New additional output measures have been added under Outcome 1, relating to:

- Percentage compliance with drinking and recycled water standards
- Total volume of water saved through digital detection of network leaks (ML).

Water supply, sewage collection, sewage treatment and provision of alternative water are vital for the protection of public health and our environment. If you're connected to our water supply and sewerage system, we'll supply you with services and take all reasonable care in operating our system to avoid unplanned interruptions such as water main bursts and leaks, sewer blockages, spills and odours.

Our investment portfolios and operational interventions are designed to get the basics right by maintaining our assets to provide reliable and dependable services and long term resilient asset performance.

The reliability of our assets is challenged in the following ways:

- Age and condition of our assets – asset risk profiling of our network assets indicates we have a potential backlog of critical assets that have exceeded their nominal asset life and potentially needing renewal of around \$160 million or other risk control measures.
- Climate variations – the frequency of water main bursts or sewer blockages is extremely sensitive to climate variations due to tree root intrusion, earth movement and blockages. This increases the risk of:
 - A net capital investment requirement higher than proposed.
 - An increase in the operating expenditure to adapt from the 2021-22 La Nina weather pattern that has reduced work volumes to align with the three year or neutral weather pattern.
 - Adverse long- term impacts of climate change on our assets (Refer to separate Climate Adaptation Action Plan)
- Sewer product quality including impacts from fats, oils, grease and trade waste.
- Damage due to third-party activities.
- Encroachment of community neighbours into amenity buffers around major pump stations and treatment plants.

We are also improving how we manage the reliability of our water and sewerage assets through our asset information systems and monitoring technologies. This has allowed us to respond to a changing regulatory environment with agility. We have also applied lessons learnt during the 2018-23 regulatory period as follows:

- Expanded potable water quality portfolio investment to ensure our customers have a more resilient safe drinking water supply.
- Targeting the highest risk assets in compliance with EPA and safety regulations.
- Implementing new technologies through our maintenance contract to reduce customer disruptions and increase the monitoring of our network.
- Responding to our Climate Adaptation risks.

6.2 Customer Interruptions Service Performance

- Customers were asked to consider the potential to reduce their bills through a reduction in customer interruption service performance. Their response was they are willing to pay more to receive an increased performance in reliable water and sewer services.
- With aging assets, climate change, and predicted higher costs due to infrastructure skill shortages and impacts from the COVID-19 pandemic, increasing investment levels will be required to keep up with current service performance if we continue doing what we were doing.
- We are proposing for South East Water to assume more risk on maintaining the customer interruptions service performance by lowering our Potable Water Renewal Capital Expenditure Portfolio to average of c. \$16M per annum (unescalated) in 2023-28, from average of \$17.7M per annum (original unescalated forecast) in 2018-23 (Refer to Section 6.2). We will manage this risk via innovations in our approach:
 - A new Maintenance contract starting in 2022 has prescribed a requirement to implement technologies to repair water mains while maintaining continuous supply to customers i.e. avoiding unplanned interruptions where possible.
 - We will insert isolation valves to reduce shutoff block sizes, to reduce the number of customers experiencing interruptions.
 - In 2021, South East Water and Interflow jointly won the Civil Contractors Federation Victoria CCF Earth Award for the Mountain Highway AC (Asbestos Cement) Water Main Renewal Project. We will continue to innovate on trenchless asset renewal technologies in collaboration with our delivery partners to drive efficiency and minimise customer impacts in asset renewals.

6.2.1 Capital Investment Portfolios: Sewer Renewals and Reliability

We are investing \$120m under the Sewer Renewals and Sewer Reliability portfolios including:

- \$29m on sewer renewals to reactively respond to sewer asset failures when the cost of repair exceeds that of renewal, or when at risk of breaching customer levels of service.
- \$91M on sewer reliability portfolio for capitalised maintenance such as maintaining property connection branches (PCB), pressure sewers and mechanical, electrical and civil assets, ensuring an appropriate balance between maximising asset lifespan and the risk of asset failure.

An Aging Asset Base

The Sewer Network has a large potential backlog of assets that have exceeded their nominal asset life, while in the next 25 years a steady rate of aging is predicted. The quantification of the replacement of our sewer network assets based on age and nominal asset life is provided in Table 13 and Figure 23.

Table 13: Sewer Network Pipeline Replacement Profile based on Age and Nominal Asset Life

| Asset Type | 25 Year Average per 5 year price submission | 50 Year Average per 5 year price submission | 100 Year Average per 5 year price submission |
|--|---|---|--|
| Critical Assets | ~\$98 million | ~\$95 million | ~\$188 million |
| Non-Critical Assets | ~\$102 million | ~\$119 million | ~\$207 million |
| Total | ~\$200 | ~\$213 million | ~\$395 million |
| Total sewer spend within the Reliability Master Plan for the 5 years of the 2023-28 Regulatory Period on Sewer assets is \$209 million | | | |

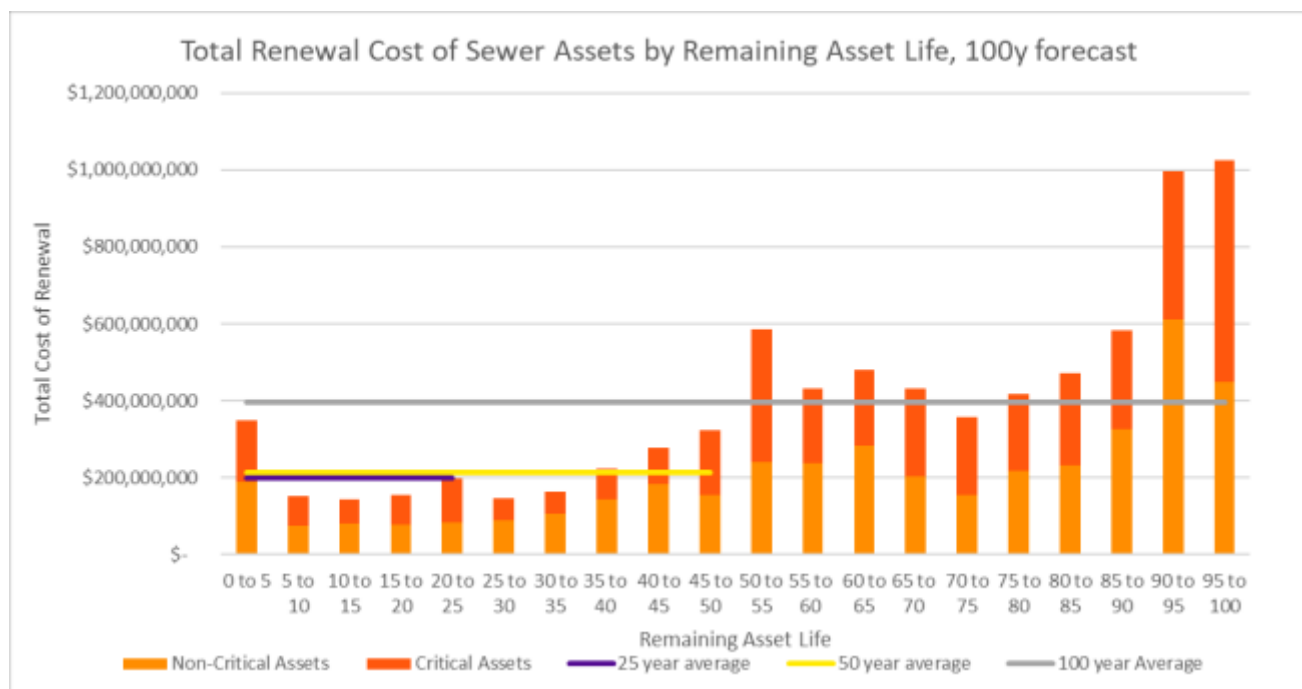


Figure 23 : Total Renewal Cost of Sewer Network Assets by Remaining Asset Life

Innovating for efficiency

Our Advanced BlokAid monitoring device and associated analytic tools have been evaluated and iteratively innovated throughout the 2018 to 2023 regulatory period. These devices provide early warning alarms to our Operations and Maintenance teams, enabling them to attend sewer blockages prior to spill, preventing adverse impacts on our customers and the environment. This success has provided confidence in the technologies' ability to reduce risk, enabling us to expand the program in the 2023 to 2028 regulatory period.

We have learnt that sewer spills can be avoided and detected early. Advanced BlokAids have been rolled out through our Beach Guard program, where we have seen sewer spills reduce from a 5% baseline to 2.5%. During a recent spill in the inner city, we were able to respond at least 2 hours earlier than a customer reporting a failure.

We have learnt that the installation of devices needs to be supported by analytical tools for optimising device placements, considering the consequence of impacts and sub catchment coverage. The combination of the devices and tools have shown that a Benefit Cost Ratio of 3 can be achieved when comparing the costs of installation to the potential avoided sewer spill clean-up costs.

Asset Risk profiling shows that we have a potential backlog of critical sewer assets that have exceeded their nominal asset life and potentially needing renewal estimated at around \$160 million or other risk control measures. Building on the success of the devices we are able to take on some of the financial risk and have budgeted for \$94 million revenue request for renewal in the 2023 to 2028 regulatory period. With the remaining risk being reduced by investing \$8.8 million in monitoring.

6.2.2 Capital Investment Portfolios: Water Renewals and Reliability

We are investing \$141m under the Potable Water Reliability and Potable Water Renewals portfolios, including

- \$57m on Potable Water Reliability for capitalised maintenance such as maintaining our water services, mechanical, electrical and civil assets ensuring an appropriate balance between maximising asset lifespan and the risk of asset failure. Investment also included corrosion mitigation preventative works, condition assessments and non-revenue water programs.
- \$84m on Potable Water Renewals to maintain our drinking water network levels of service for customer interruptions by responding to asset failures.

The performance of regulatory period 2018-23 has informed our risk appetite and prioritisation of investment this period.

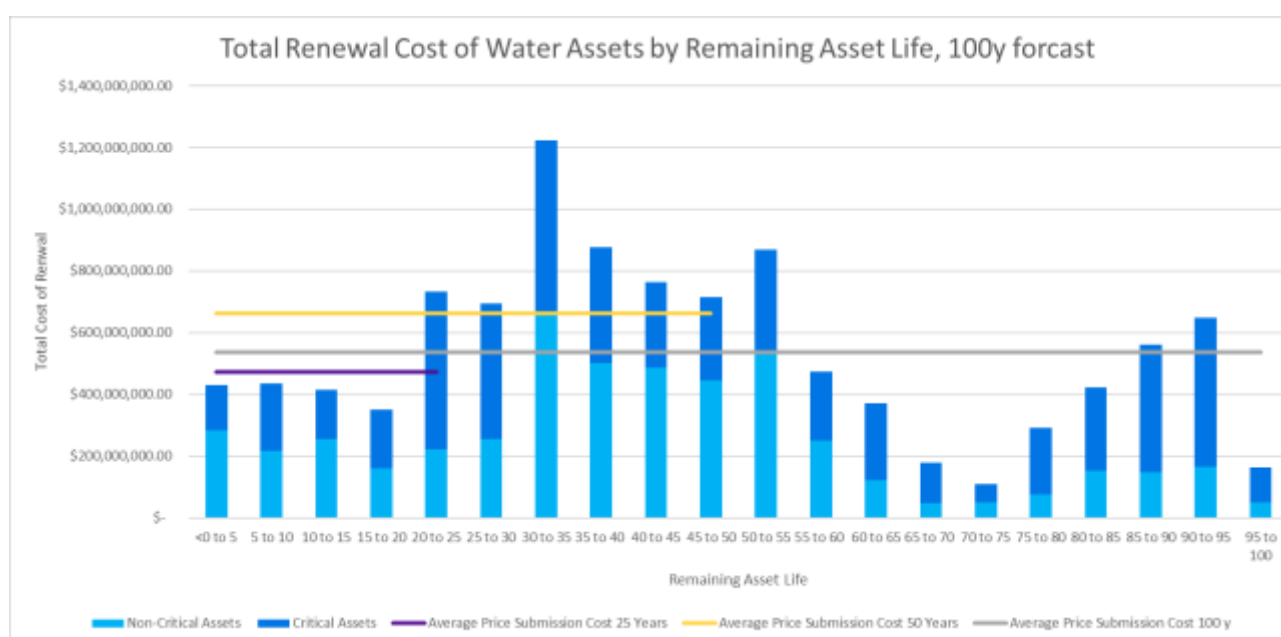
Note: Our investment plan continues to not include investment in renewal of recycled water assets as are relatively new and have a very low history and risk of failure. We will reprioritise funding as the need arises however is not expected to require significant investment.

An Aging Asset Base

The Potable Water Network has a steady backlog of assets that have exceeded their nominal asset life or other risk control measures and this will continue to grow in the immediate term, while beyond the next 20-year period there is a substantial wave of assets that will exceed their nominal asset life and potentially will need to be renewed or other risk control measures. The quantification of our potable water network assets based on age and nominal asset life is provided in Table 14 and Figure 24.

Table 14: Potable Water Network Replacement Profile based on Age and Nominal Asset Life

| Asset Type | 25 Year Average per 5 year price submission | 50 Year Average per 5 year price submission | 100 Year Average per 5 year price submission |
|--|---|---|--|
| Critical Assets | ~\$245 million | ~\$315 million | ~\$282 million |
| Non-Critical Assets | ~\$228 million | ~\$349 million | ~\$255 million |
| Total | ~\$473 million | ~\$663 million | ~\$536 million |
| Total potable water spend within the Reliability Master Plan for the 5 years of the 2023-28 Regulatory Period on potable water assets is \$259 million | | | |

**Figure 24 : Total Renewal Cost of Potable Water Network Assets by Remaining Asset Life**

Innovating for efficiency

With aging assets, and climate change, we expect asset failure likelihood will continue to trend up. Transferring the successful learning from sewer reliability management in the regulatory period 2018 to 2023, we are planning to invest in research, development and innovation to gain efficiency in how we manage the customer outcome in a more cost-effective way. For example, the new maintenance model has allowed for new technology to allow some water main maintenance to be undertaken without shutting down water supply in the impacted area. This is an effective way to reduce unplanned customer disruptions, addressing key feedback from our customer engagement, while deferring the capital investment on water main renewal. As such we are proposing South East Water to assume more risk on maintaining the customer interruptions service performance by lowering out Potable Water Renewal investment from an average of \$17.7m per annum (original unescalated forecast) in the regulatory period 2018-23 to average of \$16m per annum (unescalated) in the regulatory period 2023-28.

6.3 Safety Improvements

Occupational Health and Safety (OH&S) legislation requires us to identify, understand and proactively minimise risk. This includes managing the risk level of asset failure where it could adversely impact the safety of the community. Breach of our OH&S obligations invokes both civil and criminal penalties.

At South East Water we continue to invest to improve how we manage the safety of our water and sewer assets in response to incidents, audits and regulatory changes. This includes:

- Prioritising investment for the renewal and repair of storages and water main assets that may cause harm to the public in the event of failure.
- Implementing new procedures and controls to limit H2S exposure to our staff and contractors.
- Improving the safety and security of our tanks and pump stations.
- Continued rollout of our turret top installations to reduce working at height risks.

6.3.1 Capital Investment Portfolio: Potable Water Improvements/ Compliance

In 2018-23, we did not have a specific proactive Potable Water Improvements/Compliance plan or portfolio. We reactively delivered renewals or repairs after assets failed, particularly water mains, under the potable water reliability portfolios. All works were completed living our values of We put Safety first.

Information developed through our Asset Risk Management Model (ARMM) has enabled a more comprehensive picture of our asset base in terms of likelihood and consequence of failure. The ARMM considers failure history and South East Water has a number of critical assets that have experienced more than one recent failure. This information has demonstrated that we have existing assets at or near the end of their useful life. The quantity of these assets is set to increase substantially over the medium term. If left unchecked this will result in escalating safety risk, repair costs, environmental damage, incidents, property damage and much more. To prevent this occurring, we are ramping up our investment to meet this challenge.

In 2023-28, we are investing \$68m on Potable Water Improvements/Compliance to improve the safety of storages, water mains, and dams that may cause harm to the public in the event of failure. The increase in investment reflects our revised approach to managing the risk of critical asset failures and includes \$10m to improve the safety of our referable dams such as Moorabbin Reservoir.

Moorabbin Reservoir Safety Improvements

South East Water has three potable water “referable dams” according to the categories defined by the Australian National Committee on Large Dams (ANCOLD). These are the Moorabbin Reservoir and Rosedale Grove Basins No. 1 and No 2.

ANCOLD sets guidelines for the construction, operation and maintenance, surveillance and remedial action for referable dams and South East Water abides by these guidelines.

Accordingly, our processes for monitoring and surveillance included a *Dam Safety Inspection and Report* (May 2015) that identified a number of areas of improvement involving minor works at Rosedale Grove Basins and significant works at the Moorabbin Reservoir subject to further investigation.

More recently we conducted a geotechnical investigation (Feb 2021) and a further *Dam Safety Review* (August 2021) at the Rosedale Grove Basins. Overall, it was concluded that the Rosedale Basins are being managed with an effective dam safety program however minor works (c. \$0.26M escalated to 2022-23) are required to comply with an ALARP (as low as reasonably practicable) assessment to reduce the risk of failure and included in the regulatory period 2023-28.

At Moorabbin Reservoir a detailed stability review (February 2022) indicated where it did not meet current standards-based stability acceptance criteria or design practices. Although there was no imminent safety concern, the appearance of defects and localised damage indicated an increased risk of failure during 'Unusual' or 'Extreme' conditions that does not satisfy ALARP criteria. It was recommended that risk-reduction upgrades be considered based on their cost benefit and prioritised depending on the criticality of the reservoir and its intended long-term use. See Table 15 for additional information.

In the 2018-23 regulatory period we commenced implementing non-structural risk reduction recommendations, such as lowering the operating level, and conducting ongoing Dam Safety Review before commencing further exploration of strategic options. Significant investment is required which will include major works such as embankment stabilisation, wall stabilisation, internal water proofing, or complete abandonment and replacement.

Budget in the 2023-2028 regulatory period is based on stabilising the gravity walls and installing drainage outside the walls. The cost estimate flagged in the 2018-23 regulatory period of c. \$10M for Moorabbin Dam has been retained pending ongoing testing and finalisation of the Dam Safety Review.

Table 15: Moorabbin Dam Project Summary

Project: Moorabbin Dam

Investment portfolio: Potable Water Improvements/ Compliance

2023-28 cost and timing: \$10.5m

Service category: Potable Water

Asset Category and Driver: Potable Water Improvements/ Compliance

Outcome: Get the Basics Right, Always

Risk rating: High (SEW)

Risk rating post control: Low (SEW)

Description:

Investment based on stabilising the gravity walls and installing drainage outside the walls pending ongoing testing and finalisation of Dam Safety Review.

6.4 Safe Drinking Water

Our customers expect a drinking water supply that continues to meet our legislative obligations including the *Safe Drinking Water Act 2003*, the *Safe Drinking Water Regulations 2015* and the *Health (Fluoridation) Act 1973*.

As a water retailer we work in partnership with Melbourne Water, the wholesaler who supplies our drinking water and manages the water catchments, dams and primary water treatment facilities, including the Victorian Desalination Plant. The transfer arrangements related to water quality and quantity of supply into our network is formalised under a Bulk Water Supply Agreement with Melbourne Water.

Historically South East Water has performed well against our water quality targets and we continue to adopt a risk-based approach to water quality management. Our success is underpinned by preventive, proactive and multiple barrier principles and our accredited Hazard Analysis and Critical Control Points (HACCP) Plan that addresses the requirements specified under the *Safe Drinking Water Act 2003*.

Due to water restrictions in place at the time of preparing for Price Submission in 2017-18, there was no longer a proactive water mains cleaning program and only periodic flushing of mains with water quality issues, reactive mains cleaning in specific areas where complaints occurred or in the instance of bursts.

Recently we have encountered an increasing number of potable water quality incidents and we are facing the prospect of future changes to the *Safe Drinking Water Regulations*. In response we have developed a new Drinking Water Policy and Chlorine Strategy to increase our ability to control and mitigate the risk of water quality issues from the bulk water supplies within the distribution network.

Accordingly, we are increasing our investment in potable water quality improvements and compliance to reduce the risk of potable water quality incidents and to ensure adequate disinfectant residual and contact time is achieved throughout the distribution system, through further secondary disinfection.

Key investments included improvements to monitoring, testing and secondary disinfection such as:

- ☐ Maintenance, servicing, calibration and operation of continuous online water quality testing monitoring units (COLTs).
- ☐ Maintenance, servicing, calibration and operation of South East Water's Chlorine residual treatment units (CRTUs) for secondary disinfection.
- ☐ Maintenance, installation, upgrade and replacement of monitoring of water quality network assets (e.g. sample taps).
- ☐ Installation and relocation of secondary chlorination units to improve chlorine residuals.

The lessons learnt from those incidents has produced findings from the Department of Health to improve the industry's ability to control and mitigate the risk of water quality issues from the bulk water supplies within the distribution network. Consequently, an increased requirement for South East Water as a distributor and retailer.

6.4.1 Capital Investment Portfolios: Water Quality

We proposed a Potable Water Quality Program at a total capital expenditure of \$63million (\$ escalate to 2022-23) spread across the 5- year period from 2023 to 2028, to drive step change improvements in the approach we manage this public health risk – classified as catastrophic consequence in our risk framework.

The capital expenditure budget for potable water quality management was at \$1 million in total across the 5-year period from 2018 to 2023 during the price submission in 2018 and it was increased by a further \$6M (\$ escalated to 2022-23) during the annual corporate planning budget review, to implement our new drinking water policy and chlorine strategy.

The key initiatives included in the program from 2023 to 2028 are listed below:

- Increased secondary disinfection through upgrades and installation of chlorination units \$37M (\$ escalated to 2022-23), see Table 16 for more detail.
- Water quality asset integrity and performance initiatives to improve inspection, maintenance, condition assessment, repair and upgrade of water storages and floating covers and sample taps \$16M (\$ escalated to 2022-23).
- Improvements to network visibility and control at interface points, and our water storages by installing actuated valves and monitoring, operational hydraulic modelling and modelling of water storages \$10M (\$ escalated to 2022-23).

The potable water quality program also includes an operational expenditure step change towards \$3.27M per annum by 2028. This relates to additional water quality testing and network cleaning and flushing.

Table 16: Chlorinators Upgrade and Installation Project Summary

Project: Chlorinators Upgrade and Installation

Investment portfolio: Potable Water Quality

2023-28 cost and timing: \$37m

Service category: Potable Water

Asset Category and Driver: Potable Water Quality, Improvements/ Compliance

Outcome: Get the Basics Right, Always

Risk rating: Extreme

Risk rating post control: Low

Description:

- Upgrade to 15no. existing chlorination units
- Construction of 10no. additional (new) chlorination units
- New second bulk chlorine receipt and storage facility to improve resilience and efficiency
- Procurement of mobile disinfection units and generators for emergency response

The Victorian Industry's response to potable water quality incidents

Following several potable water quality incidents between August 2020 – May 2021 South East Water updated our Drinking Water Quality Policy, Post Incident Action Register and Chlorination Strategy to address health related water quality risks. This required an initial investment of \$6.8M, in 2021 to 2023 and further \$63M into the 2023 to 2028 period. Most of this step change improvement will be delivered with our industry partners under the new capital delivery model.

The investments planned consider the lessons learnt from the potable water quality incidents, the recommendations from an independent investigation commissioned by the Department of Health into the Silvan Incident (2021) and in advance of finalising a Joint Action Plan as part of

the response and the Draft Guidance Protocol prepared by the Department of Health (29 December 2020)

- ☐ This program is delivering:
- ☐ Improvements to our inspection and maintenance program for water storage assets.
- ☐ A review and improvements to our sampling approach.
- ☐ Implementation of our chlorination strategy to improve chlorine residual through secondary chlorination. This means relocation of a secondary chlorinator at Maskell's Hill, secondary chlorinator upgrades at Frankston South and Lang Lang, upgrades to Programmable Logic Controllers (PLCs) at disinfection sites previously transferred from Melbourne Water to South East Water and improving residual chlorine in the Rowville View High Level and The Basin High Level tank zones.
- ☐ Increased real time monitoring to assist with early detection and to provide evidence in the event of an incident.

South East Water is proposing to deliver improvements in the industry's ability to control and mitigate the risk of water quality issues from the bulk water supplies within the distribution network. Consequently, the increased requirement and expectation for South East Water as a distributor and retailer is a key consideration and we have proposed a number of key initiatives to increase our ability to ensure secondary disinfection, improve water quality asset integrity and performance and in network visibility and control.

The Department of Health were presented with the proposed \$63M potable water quality investment plan for the regulatory period 2023 to 2028, with our Managing Director and management team in June 2022, and support for the objectives of the investment was provided in the meeting.

6.5 Environmental Protection

The new Environment Protection Regulations came into effect on 1 July 2021 and affect all parts of South East Water. South East Water has focused on understanding and preparing to ensure a measured investment response is made.

We are adopting a systemic response to the EPA regulations in accordance with our General Environmental Duties (GED). Our Environment Management System has been developed to align with the GED requirements and we continue to conduct risk assessments on existing assets to inform our investment priorities.

Through this work we have identified that we have existing assets at or near the end of their useful life and the quantity of these assets is set to increase substantially over the medium term. To prevent this reaching unsustainable levels, our investment in this area will be increased and delivered across multiple submissions to reduce the risk of regulatory failure and additional significant failures in the future, while balancing our ability to increase deliverability in steps so far as is reasonably practicable.

In this plan our investments are prioritised based on risk level, taking into account known asset failure history or poor condition and will be optimised as our understanding of asset condition and performance improves. The assessment and risk level of each critical asset is determined via our Asset Risk Management Model (ARMM) based on likelihood and consequence of service failure.

6.5.1 Capital Investment Portfolios: Sewer Improvements/ Compliance

The Reliability Program has reviewed and updated our sewage collection asset management approach, associated risk profiling and capital prioritisation tools to align with the GED expectation. This is a change from the previous management approach when we reactively respond to asset or service failures as they occur.

Through the review, 74km of critical sewer and rising mains were identified to have reached a condition rating of 4 and 5 where failure is imminent. 5.1km of critical rising mains had experienced previous failure, 5 Sewer Pump Stations had been observed to be in poor condition requiring rehabilitation and 15 Sewer Pump Stations would require a higher standard than the previously adopted 2-hours Peak Dry Weather Flow containment standard. There is also a backlog of 1650km of critical sewer and rising mains with unknown condition. The low cost, high risk, minimal performance approach we historically adopted in previous regulatory periods to fix assets after failure, is no longer adequate to protect the environment and maintain compliance with environmental regulations.

We are investing \$99m under our Sewer Improvements/Compliance portfolio, shifting our focus from odour control to sewage spill prevention.

The investments target extreme risk assets, or compliance with EPA or safety regulations.

Prioritising investment on critical sewer network assets, including branch sewers, rising mains, pump stations rated at “extreme risk” based on its asset condition and environmental impact if it were to fail. These are typically assets identified as having poor condition with high frequency of failure and repair history, and are located within close proximity to sensitive waterways, sensitive customers, bathing beach, or endangered fauna or flora.

The investment will cover a range of risk controls including monitoring, condition assessment, renewal and preventative maintenance works, to effectively manage the risk of environmental

impact So Far As Is Reasonably Practicable (SFARP), to maintain compliance with the new Environmental Protection Regulations and South East Water's General Environmental Duty. Refer to Deep Dive – General Environmental Duty Response below.

These works differ from the sewer renewals program that are predominately reactively responding to failed non-critical assets.

The following programs of works will complement each other to achieve compliance to General Environmental Duty and the desired customer service performance informed by the Price Submission 2023 Customer and Community Engagement Project:

- Risk management tools and models:
 - Enables us to identify environmental risks and attribute it to our individual assets.
 - Enables prioritisation of investments in all other programs.
- Sewer Asset Renewal program
 - Target renewal of all critical sewers at extreme risk category by 2038 through a planned 15-year investment program, prioritising the highest risk assets to be renewed first, while monitoring the remaining assets to inform continuous reprioritisation or any unacceptable risk that would trigger bring-forward intervention.
 - Rehabilitation of 5 Sewer Pump Stations, renewal of 2.5km of Sewer Rising mains and improve detention capacity of 9 Sewer Pump Stations within the Sewer Reliability Master Plan (remaining 6 No. of detention tank identified for capacity improvement will be delivered via Growth Master Plan as growth has been their primary driver for investment.)
- Sewer Asset Condition Assessment Program to improve knowledge of our asset condition and inform on actual risk and failure modes of our asset.
- Sewer Monitoring and Alarms Program
 - In the regulatory period 2018-23, South East Water has innovated, developed and implemented advanced sewer monitoring devices such as the Advanced BlokAid, and Multix as a cost effective means of risk control, that can be implemented at relative low cost to provide broad coverage as compared with conventional cost and labour intensive methods such as a frequent sewer cleaning and CCTV program. These innovations have been recognised by the water industry across Australia and internationally in the OzWater 2020 Australia Water Association conference. We will leverage on this successful innovation and roll out advanced sewer monitoring devices on both the extreme risk assets that are programmed in the pipeline of works but not yet renewed, and medium to high risk assets to balance the investment on cleaning and defer the timing of asset renewal.
- Sewer Maintenance Program to replace, renewal and repair deteriorating asset and facility to maintain current risk and functionality of assets.
- Corrosion Mitigation Program
 - Corrosion study to determine network corrosion issue in hot spot areas such as Cranbourne and Dandenong.
 - Continuation of odour control and corrosion mitigation project to reduce asset failure risks and odour complaints.

We expect the proposed increase in capital investment to address sewage spill prevention and mitigation will create an increased pressure in operating expenditure in this Price Submission period 2023 to 2028, as we discover and uncover issues through the vigorous condition assessment program and monitoring program. From 2038 onwards, we forecast the OPEX (Operational Expenses) pressure will gradually reduce once asset requirements are addressed, to maintain the uplift performance achieved on an ongoing basis. Refer to the Price Submission 2023 OPEX work stream for details.

General Environmental Duty Response

The new Environment Protection Regulations came into effect on 1 July 2021. Although new requirements fall into several categories, the foundation of the new Act is the General Environmental Duty (GED) which is modelled on the general duty that underpins Victoria's Occupational Health and Safety (OH&S) legislation. The GED requires a bespoke approach in which environmental risks are identified, understood and proactively minimised so far as reasonably practicable (SFARP) at a site and activity level. Breach of the GED invokes a similar response to an OH&S breach with both civil and criminal penalties applicable.

The risk assessments have identified that ongoing compliance with the new EPA regulations will require significant additional administrative burdens associated with identifying and assessing environmental impacts and risks, documenting outcomes, developing and implementing procedural controls, training staff and contractors, completing regular audits and inspections to confirm controls remain in place and effective, addressing any deficiencies found during audits, and collating and reporting environmental monitoring data and findings. Deloitte quantified the additional administrative burden in a Regulatory Impact Statement and we have used this as part of our "step change" assessment.

In the regulatory period 2018-23, South East Water developed and began implementing a systemic response to the new EPA regulations. We conducted risk assessments on existing assets, addressed priority issues, and delivered a new Environment Management System that better aligns with the changes. We also updated our risk management approach for our network assets and developed and introduced an Asset Risk Management Model (ARMM) to meet the GED requirement for a risk-based approach.

The introduction of the GED has prompted the following step changes:

1. Focus on a risk-based investment in assets that have the potential to spill to a sensitive environment through monitoring, condition assessment and renewal.
2. Implementing a risk-based storage design which delivers additional storage for pump stations located near sensitive environments.
3. Increased investment in data, tools, processes that improve our asset and process reliability.

The historical landscape of discharge to the environment is changing. Prior to the GED, the expectation was to contain flows in sewers to the design standard of one in 5-year return period wet weather event, discharges outside of that which complied with the State Environment Protection Policy were licenced. There is now less guidance, more freedom to challenge those standards, and yet the expectation that standards are higher. We will need to undergo more work to validate our objectives and to demonstrate that we have reduced the risk to the environment So Far As is Reasonably Practicable (SFARP).

6.6 Climate Change Adaptation

During the 2018-23 regulatory period South East Water undertook a Climate Adaptation investigation to assess the main risk facing the company. The *Climate Adaptation Action Plan* (CAAP) identifies nineteen high or extreme risks in 2030. Table 17 outlines those that have the most significant link the Reliability Master Plan.

Table 17: Climate Adaptation Risks with Significant Links to Reliability Master Plan.

| No.1 | Risk | Most Significant Consequence | 2030 Threat Rating | Control Action |
|----------|---|--|--------------------|--|
| 151, 171 | Soil Movement leading to sewer leaks and blockages | Repeated non-compliance at the infringement notice or external audit requirement level | Extreme | Significant increases to sewer monitoring and renewal / replacement program planned for 2023-28; specific actions outlined in Sewer Lifecycle Asset Management Plan |
| 153 | Increase heat and reduced rainfall increase tree root impacts | Repeated spills with day scale impacts on immediate areas unavailability of critical services for up to one day | High | |
| 146 | Increased soil erosion leads to asset damage | Possibility of significant contamination to the environment with an enforceable undertaking issued by the Environment Protection Authority Victoria as well as significant negative media coverage | High | |
| 142 147 | Intense rainfall overwhelming sewer network capacity | Repeated spills with day scale impacts on immediate areas; unavailability of critical services for up to 1 day; possibility of infringement notices being issued | High | Ongoing, conduct climate rainfall modelling on all assets being renewed or at high risk, implementing upgrades on a risk vs cost basis |
| 91 | Bushfire damage to assets impacting operations | Unavailability of critical services or systems for between 1 and 5 days, affecting a large number of customers | Medium | Up to date Bushfire Attack Level assessments conducted of assets. Conduct works specific to each site as identified by BALs and appropriate bushfire modelling (2026) |
| 206 | Emergency Response incident response impacts on resourcing | Lack of employee capacity at peak periods, leading to repeated impairment to delivery of critical services for up to 0.5 days | High | Increased available incident response resources. Develop and maintain emergency management plans. |

6.6.1 Long Term Impacts of Climate Change

The long term impacts on the Reliability Master Plan include:

- Bushfire mitigation investment: In response to bushfire modelling by DEWLP as part of the Climate Change Adapt project two South East Water potable water network locations were identified as high risk bushfire locations without existing adequate risk controls on critical assets, water pump station WP212 Dromana and WP216 Hughendon Road, Upper Beaconsfield. Whilst the water pump station at WP216 has an existing deluge system the associated storage tank does not. For the regulatory period 2023 to 2028 we have included for deluge systems at the pump station at WP212 and storage tank at WP216 to mitigate bushfire risk.
- Changing climate means more bursts: For the water network climate change is not expected to significantly alter the risk profile for bursts and leakage in the immediate 5 year term beyond the impact of existing natural weather and rainfall variability on soil movement leading to bursts and leakage. Existing programs will be revised in future pricing submissions as the risk profile changes.
- Drier climate means more tree root blockages: For the sewer network, drier and hotter summers and extreme rainfall is expected to increase tree root blockages and soil movement leading to structural failure of pipelines. Hot spot blockage location will be monitored via the Network Monitoring and Alarm program expected to contribute to the mitigation of this risk.
- Saltwater Intrusion: Sea level rises will lead to saltwater intrusion and corrosion, however this is not expected to significantly alter the risk profiles on the sewerage network in next 5 to 10 years.

Longer term risk and impacts beyond 10 years will be monitored by South East Water to inform potential works in future Pricing Submissions.

6.6.2 Short Term Climate Variability

In parallel to long term climate change adaptation planning, we are adapting to shorter cycles of climate variations in the way we plan for and manage our water and sewer network assets to provide reliable services to our customers. When we examine the historical performance of key performance indicators from the past 6 to 10 years:

- >5 unplanned water supply interruptions (see Figure 25).
- Number of significant dry weather sewer spills. (see Figure 26)
- Number of customer receiving 3 or more blockages (see Figure 27)

It demonstrates that climate variability is a significant driver impacting performance and our capital expenditure for water and sewer network maintenance, and renewals. Other factors include the condition, material and age of the asset. During the drier, hotter period from 2013 to 2017, water and sewer pipelines were more susceptible to breakage and bursts due to soil movement, and this is reflected in the >5 unplanned water supply interruptions and number of significant dry weather spills measures. During the wetter, cooler period from 2018 to 2022, the amount of water and sewer pipeline breakage and bursts declined, while sewer spills due to blockages significantly increased. In 2019/20 and 2020/21 we increased our investment to proactively manage the blockage issues within customer properties which effectively achieved bringing customer interruptions by sewer blockages back to our desired service levels.

10 year performance > 5 unplanned water supply interruptions

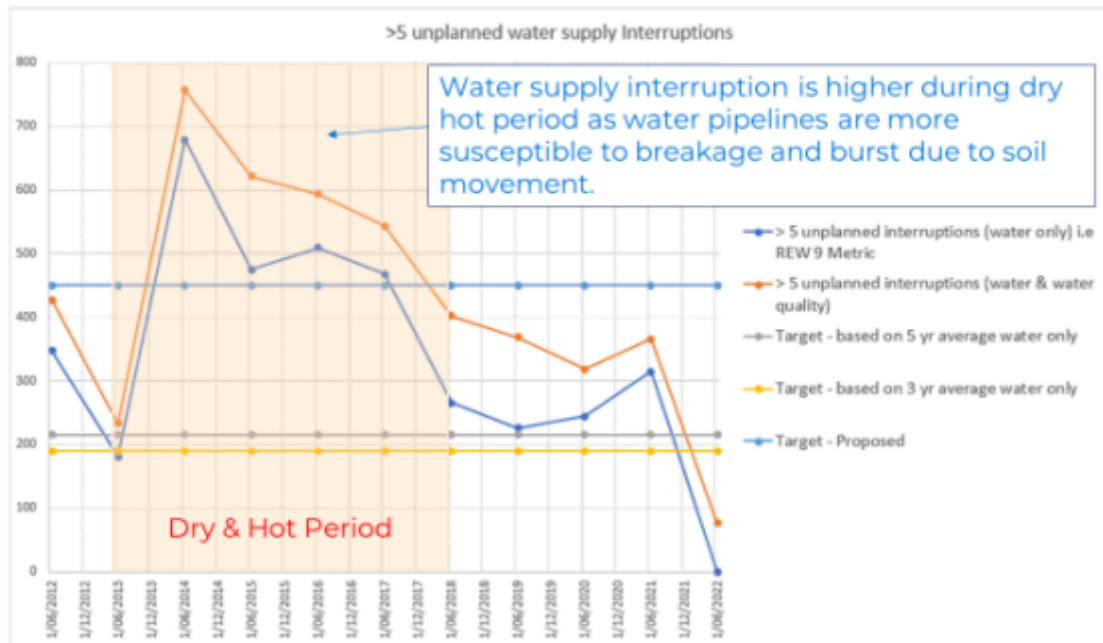


Figure 25: Over five Unplanned Water Supply Interruptions 10-year Trend

10 year performance– No. of Significant Dry Weather Spill

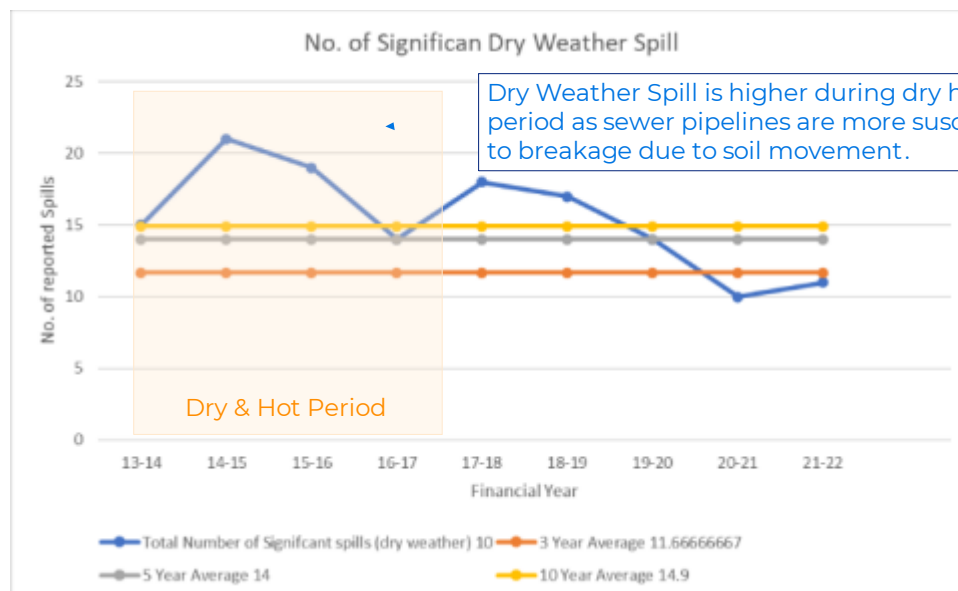


Figure 26: Significant Dry Weather Spills 10 Year Performance

Past performance No. of Customers receiving 3 or more blockages

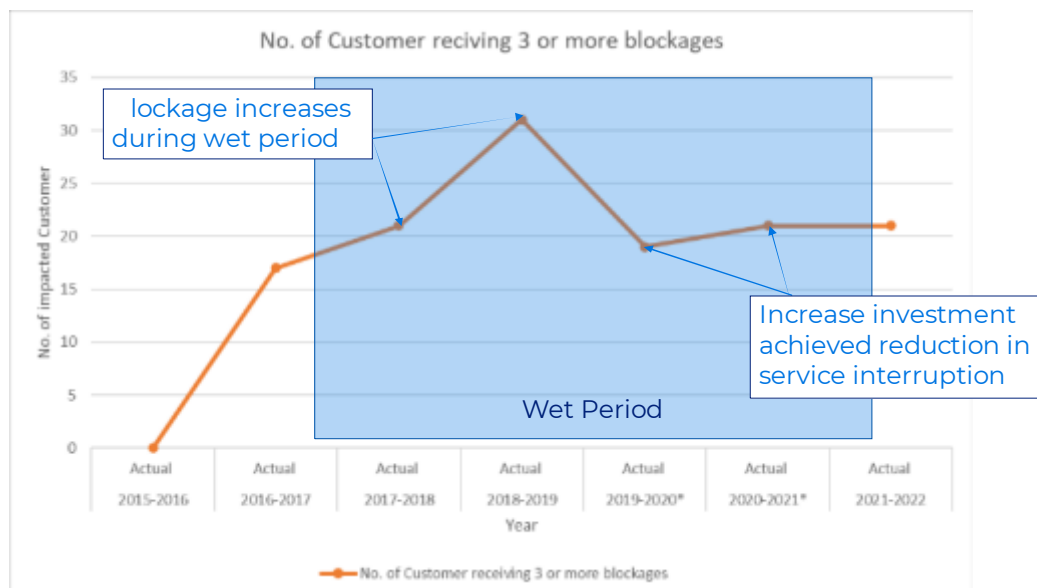


Figure 27: Number of Customer Receiving 3 or More Blockages Past Performance

Our capital investment plan in the price submission for regulatory period 2023 to 2028, addresses these climate related challenges by:

- ☐ Setting output targets that take into account the effect of climate variability, acknowledging current climate science does not provide detailed prediction of climate variability.
- ☐ Taking on cost escalation risks to maintain the water and sewer network due to growth and aging assets through innovations such as the water network valve insertion/shut off block reduction program, and implementing advanced sensor technology and data analytics to provide better risk management at lower cost.
- ☐ Ensuring prudence and efficiency when we deliver works through innovating our capital delivery model and implementing the new maintenance model.
- ☐ Investment in critical asset management to proactively manage our compliance risk to safety, environmental protection, and drinking water quality.

6.6.3 Setting output targets that consider the effect of climate variability

Significant Sewer Spill Prevention and Mitigation - Dry Weather Sewer Spill Target

EPA have notification protocols for reporting high priority sewer spills where all high priority spills are reported to EPA regardless of whether is a dry or wet weather spill. Only dry weather spill is reported against our KPI to ESC to measure against performance of our management as the value for our customers is realised through avoidance of dry weather spill.

The target for the 2023-28 regulatory period was reviewed against the historical performance over the past 10 years, the proposed level of expenditure in the pricing submission period and considering climate variability and the updated EPA Guidelines and expectation. The business has agreed that the target for the number of reportable dry weather spills shall be reduced from 20 in the 2018-23 regulatory period to 15 in the 2023-28 regulatory period over a 12 month period.

Customer disruptions – Customers experiencing more than 5 unplanned disruptions in a 12-month period (water, sewer and water quality)

The unplanned water supply interruptions metric historically did not consider interruptions due to water quality. Water quality and sewer interruptions data was not historically captured in the required format to allow for a backward calculation of a combined performance. Therefore, the unplanned interruptions (water and water quality) is a theoretical performance based on a single incident affection c. 20% of the network pushing an equivalent percentage of customers experiencing 5 unplanned interruptions to > 5 unplanned interruptions. See Figure 28.

Output Targets– Regulatory Period 20232028

A new customer disruption target is proposed in the Price Submission for regulatory period 2023 –28, measuring the combined water, sewer, and water quality unplanned interruption to customers . This is in respond to customer's feedback from the customer and community engagement .

When setting these targets, we have taken into consideration:

- Climate variability based on water network, and dry weather sewer spill historical performance Acknowledging current climate science does not provide detailed prediction of climate variability for next 5 to 10 years.
- A sensitivity check of prospective water quality impact to the combined target based on the recent Silvan water quality incident.
- A sensitivity check of impact when water and sewer performance are combined .

| Output measures | 2021-22 result | 5-year average | 2027-28 target |
|---|----------------|----------------|----------------|
| 1. Get the basics right, always | | | |
| Customers experiencing more than 5 unplanned disruptions in a 12-month period (water, sewer and water quality) ^(a) | Redefined | N/A | 450 |
| 5. Support my community, protect my environment | | | |
| Number of EPA reportable dry weather sewer spills (d) | 11 | 14 | 15 |

Figure 28: Output Targets related to water and sewer network reliability

6.7 Non-Revenue water

Non-revenue water is forecast to be around 12.2% of total bulk water based on historical average for the last 5 years (2016/17-2020/21) as outlined in Table 18. Due to digital metering, non-revenue water is forecast to decrease by one percentage point at the end of the digital metering rollout period by 2029-30.

Table 18: Non-revenue Water Performance for last 5 years

| | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 |
|--------------------------------|---------|---------|-----------|-----------|-----------|
| Non-revenue water (ML) | 18,620 | 20,711 | 21,5132.6 | 17,445.04 | 17,524.44 |
| Bulk Water (ML) | 152,475 | 161,067 | 162,046 | 155,247 | 154,805 |
| % of Bulk Water ⁽¹⁾ | 12.2% | 12.9% | 13.3% | 11.2% | 11.3% |

(1) Five year average = 12.2%

Interfacing with Digital Meter rollout

The objective of the proposed digital meter roll out (presented in the Digital Utility asset management plan, outside of this report) is to deliver water savings, customer satisfaction and improved planning capability. The water savings will contribute to a longer term, sustainable reduction in non-revenue water and leakage performance.

The project is forecast to increase operating expenditure over the regulatory period 2023-28. Cost increases are expected in areas such as telecommunication service provider costs, IoT (Internet of Things) and data analytics platforms and customer engagement to provide education and drive behaviour change. This will be largely offset by savings achieved by reducing labour costs in manual meter reading, billing and accounts, efficiencies realised in network maintenance due to more planned rather than unplanned maintenance and a reduction in non-revenue water losses due to early leak detection. Refer to the Price Submission document for Forecast operating expenditure step change in digital metering.

Non-Revenue water activities proposed in the regulatory period that were deferred and complimentary to the digital meter roll out are proposed to be delivered in the regulatory period 2023-28. The activities will contribute towards achieving a sustainable economic level of leakage (SELL) as identified in South East Water SELL report (Jacobs, February 2022) commissioned by South East Water. The activities proposed for this regulatory period complimentary to the digital meter roll out include:

- Ongoing Hydrotrak Unit replacement.
- Continuation of zone meters for new growth areas and the existing network previously identified.
- Preparation and development of updated zone metering and monitoring strategy and annual review.
- Management software.
- Allowance for new zone metering and pressure reduction activities complimentary and informed by the DU (Digital Utility) meter roll out and findings on network performance.

7. Expenditure proposals

When developing our capital expenditure program for 2023-28, we considered our customer feedback and strategic focus areas. As well as reaffirming the 5 outcomes agreed for the current 2018-23 regulatory period, our customers told us they want us to:

- ☐ reduce the number of service disruptions and sewer spills and provide a reliable service across our network.
- ☐ keep water affordable and accessible to all.
- ☐ roll out digital customer meters to obtain the benefits they offer.
- ☐ secure future water supplies, improve the health of our waterways and protect our environment
- ☐ innovate and deliver new energy-efficient technologies that help to reduce costs.

Other factors we considered included:

- ☐ compliance requirements, and ensuring we continue to meet the intent of existing and proposed new government and regulator obligations
- ☐ trends in customer behaviours, needs and expectations, with a focus on continuing to deliver liveability benefits to our customers
- ☐ insights from digitised network capacity modelling and critical asset reviews, which gave us a deep understanding of where there are existing and potential capacity and performance issues in our networks and assets.
- ☐ projections for future growth, and the impact it will have on demand for water and sewerage services in growth areas.
- ☐ climate change and ensuring our assets deliver climate resilient water supplies, minimise flooding and reduce urban heat impacts.
- ☐ our capability and capacity to deliver based on past performance, and in the future, through our various capital delivery models.

We will be investing \$491.5m for capital works and \$355.3m for operational expenses on our water and sewer network assets to deliver safe and reliable services for the 2023-28 regulatory period.

Table 19, Table 20, Table 21, Table 22, Figure 29, Figure 30 and Figure 31 shows the actual¹ and forecasted capital expenditure for the 10-year period from 2018-19 to 2027-28.

- This represents a 154% increase on the projected capital expenditure of \$320 million during 2018-23 for the water and sewer renewal, and reliability programs.
- Two new capital investment programs have been introduced, namely the Potable Water Improvements/Compliance, and Sewer Improvements/Compliance Programs to address the changing regulatory requirements and risk appetite for safety management and environmental protection.
- There has also been a significant increase in the Potable Water Quality portfolio and program.

Full breakdown of expenditure by year, portfolio and subprograms are maintained in South East Water capital forecasting software Anaplan, and a snapshot summary provided in Appendix B.

7.1 Capital Expenditure Forecast

Capital expenditure forecasts are broadly based on major capital projects and key programs to deliver on customer outcomes including capitalised maintenance, condition assessment, monitoring, repair, rehabilitation, renewals and upgrades.

The capital expenditure summary for the portfolios that make up the Water and Sewer Network Reliability Master Plan for the three regulatory periods 2018-23, 2023-28 and 2028-33 are provided below in Table 28. Yearly expenditure across the portfolios is shown in Table 20, Table 21, Table 22, Figure 29, Figure 30 and Figure 31.

Apart from general economic pressures impacting the cost of capital asset delivery, the increase in our capital expenditure program for 2023-28 is due to increased compliance-related investment driven by:

- The new environmental protection regulations associated with the Environmental Protection Act 2017 that came into effect on 1 July 2021.
- Industry-wide improvements for potable water quality management to ensure the provision of safe drinking water triggered by the Silvan Water Quality Incident in 2020 that affected multiple water organisations and their customers.
- Safety improvements to maintain compliance to safety regulations for critical assets that are identified to be at risk based on their failure history, asset condition and their location which can cause high to catastrophic consequence if they failure.

We are targeting to maintain either slightly reduced, or relatively stable capital expenditure for water and sewer reliability and renewals despite increasing need to address aging assets and climate change, by leveraging continuous innovation in technology and digital engineering to drive cost efficiency.

¹ Actual spend from 2018-19 to May 2022 and estimated / forecast spend to July 2023. All figures are in 2022/23 Australian dollars.

Table 19: Capital Expenditure by Portfolio and Regulatory Period within the Water and Sewer Network Reliability Master Plan, \$M (in 2022-23 dollar)

| Portfolio | 2018-23 Regulatory Period \$M (Forecast and Actual) | 2023-28 Regulatory Period \$M | 2028-33 Regulatory Period \$M |
|---|--|--------------------------------------|--------------------------------------|
| Potable Water Quality | \$6.8 | \$63.1 | \$70.6 |
| Potable Water Improvements/ Compliance | \$0 | \$67.5 | \$127.5 |
| Potable Water Reliability* | \$48.6 | \$57.6 | \$57.9 |
| Potable Water Renewal* | \$115.8 | \$84.1 | \$84.1 |
| Sewer Improvements/ Compliance | \$8.9 | \$98.9 | \$129.2 |
| Sewer Reliability | \$116.0 | \$91.7 | \$85.3 |
| Sewer Renewal | \$30.2 | \$28.7 | \$21.5 |
| Total | \$326.3 | \$491.6 | \$576.1 |

*Given our recycled water assets are relatively new and have a very low history and risk of failure investment in renewal of these assets was not required in the 2018-23 Regulatory period. Our investment plan for 2023-28 and 2028-33 regulatory periods continues to not include investment in renewal of recycled water assets due to the ongoing low likelihood and risk of failure. We will reprioritise funding as the need arises however is not expected to require significant investment.

Table 20: Potable Water Quality Capital Expenditure \$M (in 2022-23 dollar)

| | 2023-24 \$M | 2024-25 \$M | 2025-26 \$M | 2026-27 \$M | 2027-28 \$M | 5- Year Total 2023-28 |
|-----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------------------------|
| Potable Water Quality | 15.7 | 12.9 | 11.9 | 11.3 | 11.3 | 63.1 |
| | 2028-29 \$M | 2029-30 \$M | 2030-31 \$M | 2031-32 \$M | 2032-33 \$M | 5- Year Total 2028-33 |
| Potable Water Quality | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 70.6 |

Table 21: Water Network Capital Expenditure \$M (in 2022-23 dollar)

| | 2023-24 \$M | 2024-25 \$M | 2025-26 \$M | 2026-27 \$M | 2027-28 \$M | 5- Year Total 2023-28 |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|------------------------------|
| Potable Water Improvements/ Compliance | 7.4 | 14.7 | 17.0 | 12.1 | 16.2 | 67.5 |
| Potable Water Reliability | 11.3 | 12.3 | 11.2 | 11.7 | 11.0 | 57.6 |
| Potable Water Renewal | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 84.1 |
| | 2028-29 \$M | 2029-30 \$M | 2030-31 \$M | 2031-32 \$M | 2032-33 \$M | 5- Year Total 2028-33 |
| Potable Water Improvements/ Compliance | 25.5 | 25.5 | 25.5 | 25.5 | 25.5 | 127.5 |
| Potable Water Reliability | 11.4 | 12.2 | 11.2 | 11.5 | 11.5 | 57.9 |
| Potable Water Renewal | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 84.1 |

Table 22: Sewer Network Capital Expenditure \$M (in 2022-23 dollar)

| | 2023-24 \$M | 2024-25 \$M | 2025-26 \$M | 2026-27 \$M | 2027-28 \$M | 5- Year Total 2023-28 |
|--------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------------------------|
| Sewer Improvements/ Compliance | 15.0 | 22.7 | 19.8 | 20.4 | 21.0 | 98.9 |
| Sewer Reliability | 16.4 | 17.1 | 18.8 | 19.4 | 20.0 | 91.7 |
| Sewer Renewal | 5.6 | 5.6 | 5.8 | 5.9 | 5.9 | 28.7 |
| | 2028-29 \$M | 2029-30 \$M | 2030-31 \$M | 2031-32 \$M | 2032-33 \$M | 5- Year Total 2028-33 |
| Sewer Improvements/ Compliance | 25.8 | 25.4 | 25.3 | 25.5 | 27.2 | 129.2 |
| Sewer Reliability | 16.9 | 17.0 | 17.2 | 16.9 | 17.3 | 85.3 |
| Sewer Renewal | 4.7 | 4.7 | 4.7 | 3.7 | 3.7 | 21.5 |

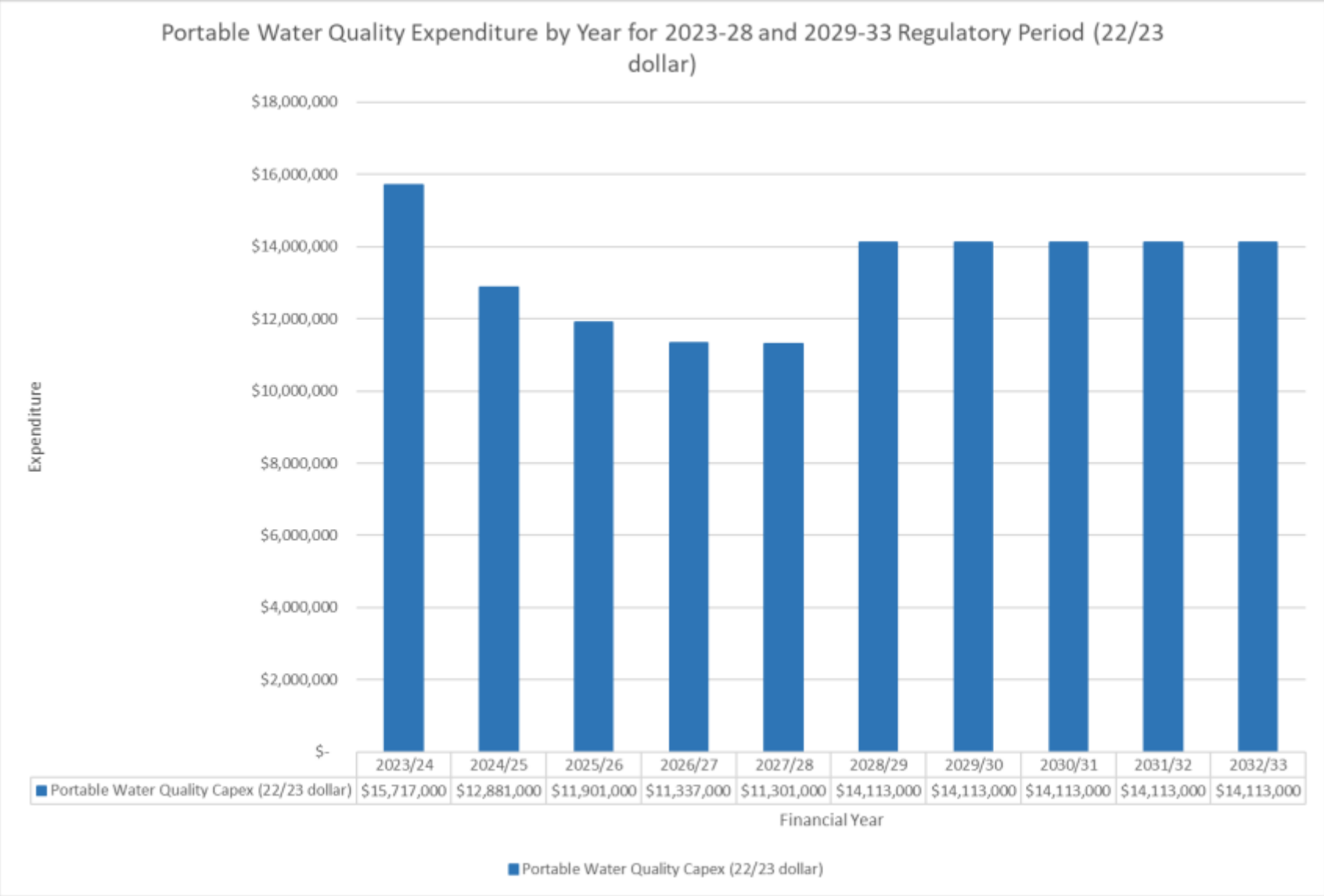


Figure 29: Potable Water Quality Yearly CAPEX for 2023-28 and 2029-33 Regulatory Period

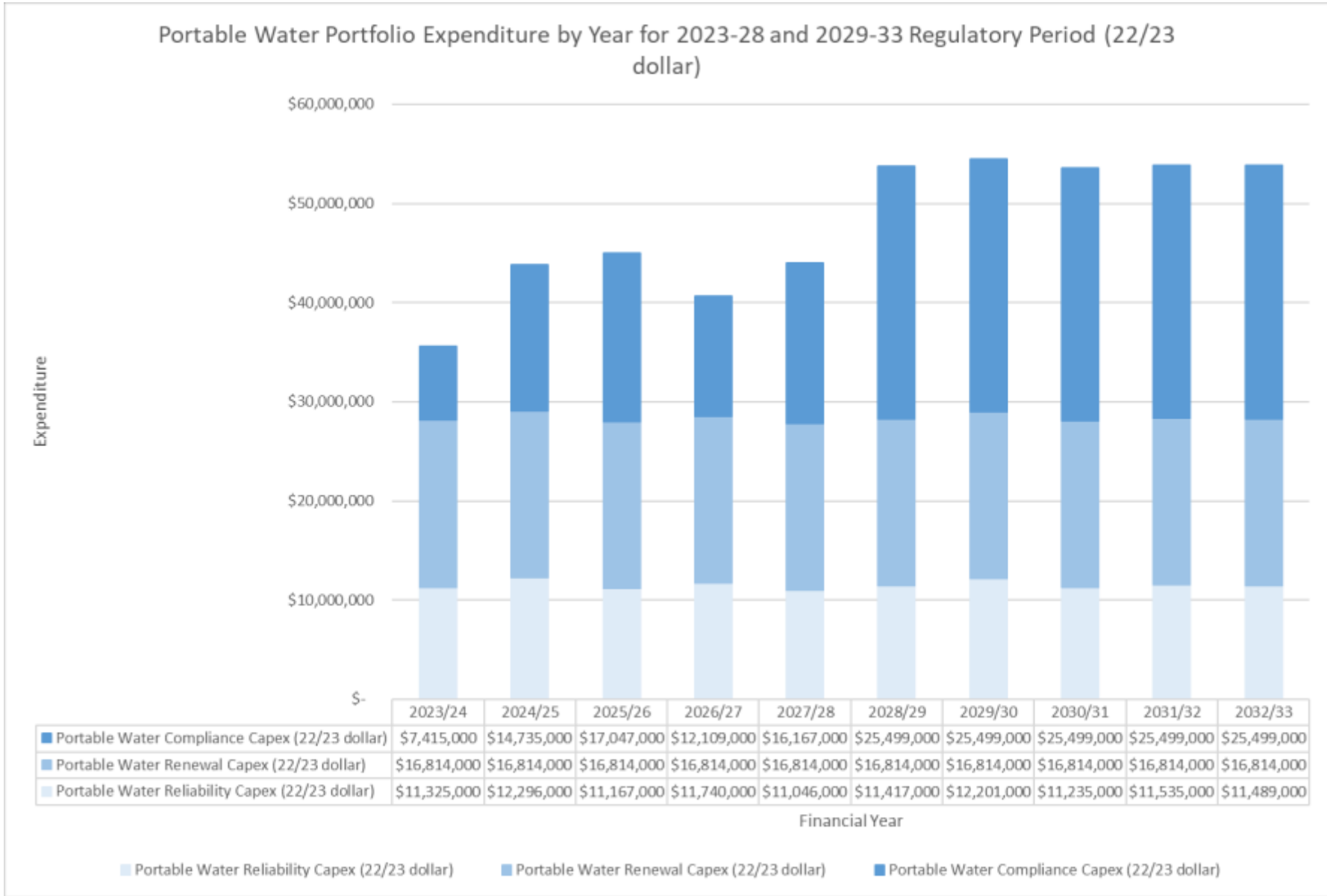


Figure 30: Potable Water Portfolios Yearly CAPEX for 2023-28 and 2029-33 Regulatory Period

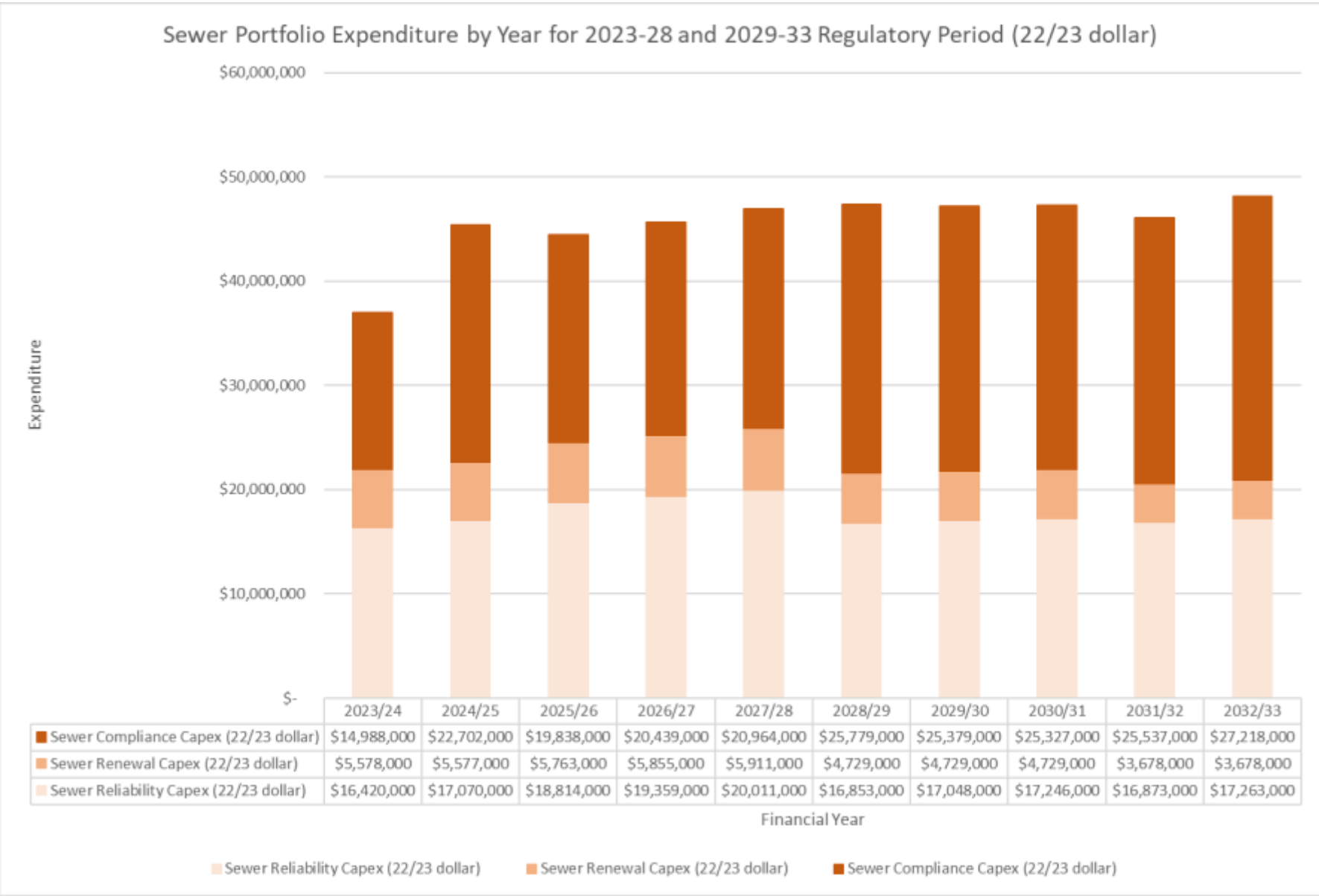


Figure 31: Sewer Portfolios Yearly CAPEX for 2023-28 and 2029-33 Regulatory Period

7.2 Operating Expenditure Forecast

We developed our forecasts of operating expenditure on the 2021-22 baseline year. We then projected forward an annual growth allowance and efficiency improvement rate (i.e. 2.0% per annum) over the pricing period.

The operational expenditure summary for the portfolios that make up the Reliability Master Plan for the regulatory period 2023-28 is provided below in Table 23.

Table 23: Operational Expenditure 2023-28 – Operations and Maintenance associated with the Reliability Master Plan

| | 2023-24 \$m | 2024-25 \$m | 2025-26 \$m | 2026-27 \$m | 2027-28 \$m | Total 2023-28 |
|--------------------------|----------------|----------------|----------------|----------------|----------------|------------------|
| Operations & Maintenance | 67.52 | 66.92 | 66.67 | 66.59 | 66.51 | 334.22 |

Within the above operational expenditures there are two step change increases which have been documented separately as part of the Price Submission. Described below and quantified across Table 24, Table 25 and Table 26

Maintenance Model

Following a competitive tender process, South East Water has entered into a contract for Maintenance Services, effective in October 2022 for a period of 5 years. This will replace the current contract which has been in operation since 2013.

The maintenance model step change reflects the incremental cost to South East Water of the maintenance services provided under the new contract.

The new maintenance model enables improved future performance of South East Water through both the competition elements of the model (the higher performing partner in a workstream has the opportunity to win more work) and the collaboration elements of the model (partners working together and with South East Water to improve performance).

South East Water has refined and streamlined the workstreams, increasing scopes of work to better align with the capability of its partners and provide improved economies of scale. An example of this is the combining of water and sewer into one stream, effectively reducing management and administrative levels. Further, the increased scope will effectively reduce South East Water's reliance on small, independent contractors, leading to further economies of scale.

Water Quality

Following several potable water quality incidents in 2020 and 2021, South East Water has been working closely with the Department of Health to address any gaps in potable water quality management. Increased expenditure is required to implement the following actions:

- ☐ an expedited tank cleaning process.
- ☐ chlorination strategy to achieve a minimum residual level of chlorine in the network which includes doubling the chlorination units in the network, increased sampling and improved monitoring via the installation of new technology capable of monitoring chlorine at all potable water tanks in the network.
- ☐ reinstatement of water mains cleaning and flushing program.

Table 24: Operational Expenditures Step Changes addressing customer outcome and community panel recommendations

| Step Change | Customer Outcome | Community Panel Recommendation |
|-------------------|--|--|
| Maintenance Model | <input type="checkbox"/> Get the basics right, always <input type="checkbox"/> Warn me, inform me | 2. Reliable service across the whole network |
| Water Quality | <input type="checkbox"/> Get the basics right, always | 1. Water security (quality and quantity) |

Table 25: Operating Expenditure Step Changes – \$million (2022-23 dollars)

| | 2023-24 \$M | 2024-25 \$M | 2025-26 \$M | 2026-27 \$M | 2027-28 \$M |
|-------------------|-------------|-------------|-------------|-------------|-------------|
| Maintenance Model | 4.47 | 4.47 | 4.47 | 4.47 | 4.47 |
| Water Quality | 3.13 | 3.18 | 3.21 | 3.24 | 3.27 |

We also identified “Job Volumes FY21-22” as an operating expenditure item that required adjustment for the next regulatory period as compared with baseline in 2021-22 see Table 26.

Table 26: Operating expenditure adjustment, baseline 2021-22 - \$million (2022-23 dollars)

| Item | Description | Adjustment to the baseline year (\$m) |
|---------------------|---|---------------------------------------|
| Job Volumes FY21-22 | The 2021-22 year has seen La Nina weather pattern, which impacted activity levels. This adjustment aligns job volumes to a three year or neutral weather pattern. | 1.3 |

8. References

| Supporting Document | Summary | LINK |
|--|---|----------------------|
| Price Submission 2023-28 (South East Water, 30 September 2022) | Price Submission as sent to the ESC September 2022 | LINK |
| Corporate Asset Management Plan 2023-28 (South East Water, 30 September 2022) | To support the Price Submission as sent to ESC September 2022 | LINK |
| Asset Risk Management Methodology Report | Provides details on how the Asset Risk Management Model works and how it should be used, maintained and enhanced. | LINK |
| Investigation into the Disinfection Failure at Silvan Water Treatment Plant (CRF Consulting Ltd, UK) | Recommendations from a third-party independent review completed for the Department of Health in June 2022, following the Silvan Water Quality Incident in 2020. | LINK |
| Price Submission Customer Engagement Finding Summary | Provides a summary of earlier engagement with the wider customer base with findings in terms of desired level of engagement and focus areas for investments. | LINK |
| South East Water Price Submission Community Panel Report | Provides the recommendation made by South East Water Price Submission Community Panel. | LINK |
| Climate Adapt Plan | Details the Climate Change Adaptation Risks facing South East Water. | LINK |
| Digital Utility Asset Management Plan | Outlines the proposed digital utility program. | LINK |
| Capital Delivery Report | Outlines how the proposed delivery model will work and the expectation on how it will deliver efficient outcomes for South East Water. | LINK |
| SEW PS5 Cost Estimate Report Rev 5 | Provides guidance on how cost estimates are to be done and documented for the 2023-28 regulatory period submission. | LINK |
| PS5 Unit Rate Tables | Provides the unit rates used for the 2023-28 regulatory period submission for various investments made at South East Water. | LINK |
| Strategic Asset Management Framework | Provides a link to all the supporting documents that relate to the Strategic Asset Management Plan | LINK |
| ESC 2023 Guidance Paper | The ESC provided additional guidance for water authorities to assist in preparing the submission for the 2023-28 regulatory period. | LINK |
| WRAP System | Manual for Watermain Renewal Analyser Prioritisor | LINK |

| Supporting Document | Summary | LINK |
|-------------------------|--|----------------------|
| Accountability Matrices | Outlines the key accountability and collaboration areas of each Business Area. | LINK |



APPENDICES

9. Appendix A – Executive Summary Presentation

The Reliability Master Plan Executive Summary

<https://southeastwater.sharepoint.com/:p:/s/prj-00129/EV--YEWX4nxAhdR9AR16olsBwD4Hv6cdQMunOwnY3xq2sQ?e=cz22io>

10. Appendix B – Proposed Projects and Initiatives Budget Summary and Analysis

The proposed projects and initiatives budget are summarised in Project List below and the spreadsheet [Projects and Program List](#), which lists out:

| Operating expenditure step change | Link |
|---|----------------------|
| Water Quality | LINK |
| Revised Water and Sewer Maintenance Model | LINK |
| Maintenance Work Volumes | LINK |

Link to Data extract - Pivot Tables for analysis

https://southeastwater.sharepoint.com/:x:/s/prj-00129/Ed9_FoyUsKZJiLFqbwPjqr0BrgNhjvOeHTwzJQGL5AQZSQ?e=ODuw6Z

10.1 Sewer Network Reliability Portfolio Program and Project List

| Sewer Network Reliability Portfolio Capital Delivery Program/Project | | | | | | | | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|----------------|
| | 2023 | 2024 | 2025 | 2026 | 2027 | Total P523 | 2028 | 2029 | 2030 | 2031 | 2032 | Total P528 |
| Sewer Improvement/Compliance | \$ 14,987,802 | \$ 22,701,338 | \$ 19,837,662 | \$ 20,438,771 | \$ 20,964,216 | \$ 98,929,789 | \$ 25,778,346 | \$ 25,379,008 | \$ 25,326,463 | \$ 25,536,641 | \$ 27,218,066 | \$ 129,238,524 |
| Sewer Improvement/Compliance Portfolio | \$ 14,987,802 | \$ 22,701,338 | \$ 19,837,662 | \$ 20,438,771 | \$ 20,964,216 | \$ 98,929,789 | \$ 25,778,346 | \$ 25,379,008 | \$ 25,326,463 | \$ 25,536,641 | \$ 27,218,066 | \$ 129,238,524 |
| Critical Gravity Sewer Renewal Project List | \$ 3,678,117 | \$ 8,407,125 | \$ 4,203,562 | \$ 5,254,453 | \$ 6,305,344 | \$ 27,848,601 | \$ 10,508,906 | \$ 7,881,679 | \$ 3,678,117 | \$ 4,729,008 | \$ 12,925,954 | \$ 39,723,664 |
| Hanna St & Wells St Sewer Upgrade Stage 3 (Renewal) | \$ - | \$ 0 | \$ - | \$ 4,203,562 | \$ 4,203,562 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Bentleigh Interceptor Renewal Project | \$ - | \$ 4,203,562 | \$ 4,203,562 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Caulfield West Branch Renewal Project | \$ 3,678,117 | \$ 4,203,562 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Amberley Crescent Branch Renewal Project | \$ - | \$ - | \$ - | \$ 1,050,891 | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Chelsea Branch & Carrum Branch Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 3,152,672 | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - |
| Ferry Creek Main & Corhamwarra Creek Main Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 2,101,781 | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - |
| Elster Creek & Elster Creek 5th Branch Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 2,942,494 | \$ - |
| Dandenong Springsvale Sewer Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 5,254,453 | \$ - | \$ - | \$ - | \$ - | \$ - |
| Knox Sewer Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 3,678,117 | \$ - | \$ - | \$ - | \$ - |
| Inner City Sewer Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 3,678,117 | \$ 2,101,781 | \$ - | \$ - |
| Bayside Sewer Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 2,101,781 | \$ - |
| Monash Sewer Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 3,152,672 |
| Mornington Peninsula Sewer Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 4,729,008 |
| Sewer Rising Main Renewal Project List | \$ 1,050,891 | \$ 1,944,148 | \$ - | \$ 2,101,781 | \$ 2,627,226 | \$ 7,724,046 | \$ 2,627,226 | \$ 5,254,453 | \$ 5,254,453 | \$ 1,576,336 | \$ 1,576,336 | \$ 16,288,804 |
| Baxter-Tooridin Rd RM (840m DN200) | \$ 945,802 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Burdoo Way RM (160m DN160) | \$ - | \$ 840,712 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Webb St RM (950m DN400) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 2,627,226 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| SRM Outlet replacement (Reid, Mason, Beach) | \$ - | \$ - | \$ - | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Riveria St RM | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Beluga St RM | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Railway Rd (Baxter) RM (470m DN200) | \$ - | \$ 840,712 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Sixth Avenue Rising Main | \$ 105,089 | \$ 762,723 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Sewer Pump Station Renewal Project List | \$ 1,681,425 | \$ 1,681,425 | \$ 1,681,425 | \$ 1,418,702 | \$ 1,418,702 | \$ 7,881,679 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 10,508,906 |
| Pump Station Rectification Works | \$ 630,534 | \$ 630,534 | \$ 630,534 | \$ 630,534 | \$ 630,534 | \$ 630,534 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Adamson Rd PS Rehab | \$ - | \$ - | \$ 1,050,891 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Franklin Rd PS Rehab | \$ 1,050,891 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Salmon St PS | \$ - | \$ 1,050,891 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Burdett St PS Rehab | \$ - | \$ - | \$ - | \$ 788,168 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Brasser Ave PS Rehab | \$ - | \$ - | \$ - | \$ - | \$ 788,168 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Sewer Maintenance Structure Renewal Project List | \$ 1,050,891 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 9,458,015 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 1,050,891 | \$ 2,627,226 | \$ 9,963,461 |
| Metropolitan Region Maintenance Structure Renewal Project | \$ 1,050,891 | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Mornington Peninsula Region Maintenance Structure Renewal Project | \$ - | \$ - | \$ 2,101,781 | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Western Port Region Maintenance Structure Renewal Project | \$ - | \$ - | \$ - | \$ - | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Sewer Detention Tank Upgrade GED Compliance Project List | \$ 1,639,389 | \$ 1,050,891 | \$ 4,492,557 | \$ 2,290,941 | \$ 1,240,051 | \$ 10,713,830 | \$ 2,553,664 | \$ 2,154,326 | \$ 5,254,453 | \$ 8,091,858 | \$ - | \$ 18,054,300 |
| MIRANG AV Detention Tank Upgrade - FD | \$ - | \$ - | \$ 315,267 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| ADAMSON RD Detention Tank Upgrade - FD | \$ - | \$ - | \$ 315,267 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Craig Rd Detention Tank Upgrade | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Old Mornington Rd Detention Tank Upgrade | \$ 630,534 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Moorooduc Rd Detention Tank Upgrade | \$ - | \$ - | \$ 1,760,242 | \$ 1,050,891 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Baxter-Tooridin Rd Detention Tank Upgrade | \$ - | \$ - | \$ 0 | \$ 1,240,051 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Grant Rd Detention Tank Upgrade | \$ 0 | \$ 1,050,891 | \$ 2,101,781 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Railway Rd Detention Tank Upgrade | \$ - | \$ - | \$ - | \$ - | \$ 1,240,051 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Guelph St Detention Tank Upgrade | \$ 903,766 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| New St Detention Tank Upgrade | \$ 105,089 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Sewer Condition Assessment Program List | \$ 4,102,677 | \$ 4,417,944 | \$ 4,523,033 | \$ 4,523,033 | \$ 4,523,033 | \$ 22,089,720 | \$ 2,417,048 | \$ 2,417,048 | \$ 3,467,939 | \$ 4,518,830 | \$ 4,518,830 | \$ 17,330,695 |
| Sewer CCTV Condition Assessment Program | \$ 3,362,850 | \$ 3,678,117 | \$ 3,783,206 | \$ 3,783,206 | \$ 3,783,206 | \$ 3,783,206 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Maintenance Structure Condition Assessment Program | \$ 346,794 | \$ 346,794 | \$ 346,794 | \$ 346,794 | \$ 346,794 | \$ 346,794 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Rising Main & Facilities Condition Assessment Program | \$ 393,033 | \$ 393,033 | \$ 393,033 | \$ 393,033 | \$ 393,033 | \$ 393,033 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Network Monitoring and Alarms | \$ 1,008,855 | \$ 2,059,746 | \$ 2,059,746 | \$ 2,059,746 | \$ 2,059,746 | \$ 9,247,837 | \$ 2,469,593 | \$ 2,469,593 | \$ 2,469,593 | \$ 2,469,593 | \$ 2,469,593 | \$ 12,347,964 |
| Misc Monitoring | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Critical Sewer Monitoring Program | \$ 893,257 | \$ 893,257 | \$ 893,257 | \$ 893,257 | \$ 893,257 | \$ 893,257 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Rising Main & Pressure Sewer Monitoring Program | \$ 115,598 | \$ 1,166,489 | \$ 1,166,489 | \$ 1,166,489 | \$ 1,166,489 | \$ 1,166,489 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Risk Model and Management Tools | \$ 775,557 | \$ 1,038,280 | \$ 775,557 | \$ 688,333 | \$ 688,333 | \$ 3,966,061 | \$ 998,346 | \$ 998,346 | \$ 998,346 | \$ 998,346 | \$ 998,346 | \$ 4,991,730 |
| Sewer Maintain Service Standard | \$ 21,998,293 | \$ 22,646,692 | \$ 24,577,178 | \$ 25,212,067 | \$ 25,921,793 | \$ 126,356,922 | \$ 21,582,140 | \$ 21,776,555 | \$ 21,975,173 | \$ 20,551,216 | \$ 20,941,307 | \$ 106,826,391 |
| Sewer Renewals Portfolio | \$ 5,578,127 | \$ 5,577,076 | \$ 5,763,084 | \$ 5,854,511 | \$ 5,911,260 | \$ 28,684,059 | \$ 4,729,008 | \$ 4,729,008 | \$ 4,729,008 | \$ 3,678,117 | \$ 3,678,117 | \$ 21,543,257 |
| Gravity Sewer Renewal Program | \$ 3,476,346 | \$ 3,475,295 | \$ 3,661,303 | \$ 3,752,730 | \$ 3,809,478 | \$ 18,175,153 | \$ 3,678,117 | \$ 3,678,117 | \$ 3,678,117 | \$ 3,678,117 | \$ 3,678,117 | \$ 18,390,585 |
| Branch Sewer Renewal Program | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 10,508,906 | \$ 1,050,891 | \$ 1,050,891 | \$ 1,050,891 | \$ - | \$ - | \$ 3,152,672 |
| Sewer Reliability Portfolio | \$ 16,420,145 | \$ 17,068,616 | \$ 18,814,094 | \$ 19,358,455 | \$ 20,010,533 | \$ 91,872,864 | \$ 16,853,132 | \$ 17,047,547 | \$ 17,246,165 | \$ 16,879,099 | \$ 17,263,190 | \$ 81,283,134 |
| PCB Renewals Program | \$ 4,275,100 | \$ 4,274,049 | \$ 4,524,161 | \$ 4,647,115 | \$ 4,722,779 | \$ 22,443,203 | \$ 5,254,453 | \$ 5,254,453 | \$ 5,254,453 | \$ 5,254,453 | \$ 5,254,453 | \$ 26,272,265 |
| Sewer Maintenance Program List | \$ 9,606,268 | \$10,256,769 | \$11,657,606 | \$12,032,774 | \$12,580,813 | \$ 56,134,230 | \$ 8,708,884 | \$ 8,903,298 | \$ 9,101,917 | \$ 8,728,851 | \$ 9,118,941 | \$ 44,561,891 |
| M&E Maintenance Program | \$ 6,265,410 | \$ 5,749,422 | \$ 6,788,753 | \$ 7,032,560 | \$ 7,488,646 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Civil Maintenance Program | \$ 1,473,425 | \$ 2,639,914 | \$ 2,901,586 | \$ 2,983,555 | \$ 3,045,032 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Pressure Sewer Maintenance Program | \$ 1,867,433 | \$ 1,867,433 | \$ 1,967,267 | \$ 2,016,659 | \$ 2,047,135 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Labour Capitalisation | \$ 788,015 | \$ 788,015 | \$ 788,015 | \$ 788,015 | \$ 788,015 | \$ 3,940,073 | \$ 788,015 | \$ 788,015 | \$ 788,015 | \$ 788,015 | \$ 788,015 | \$ 3,940,073 |
| Corrosion Mitigation Program | \$ 1,750,784 | \$ 1,750,784 | \$ 1,844,313 | \$ 1,890,552 | \$ 1,918,926 | \$ 9,155,359 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 2,101,781 | \$ 10,508,906 |

| |
|--|
| Investment Objective |
| Investment Portfolio |
| Capital Program Group (Parent Project) |
| Capital Program/Projects Name |

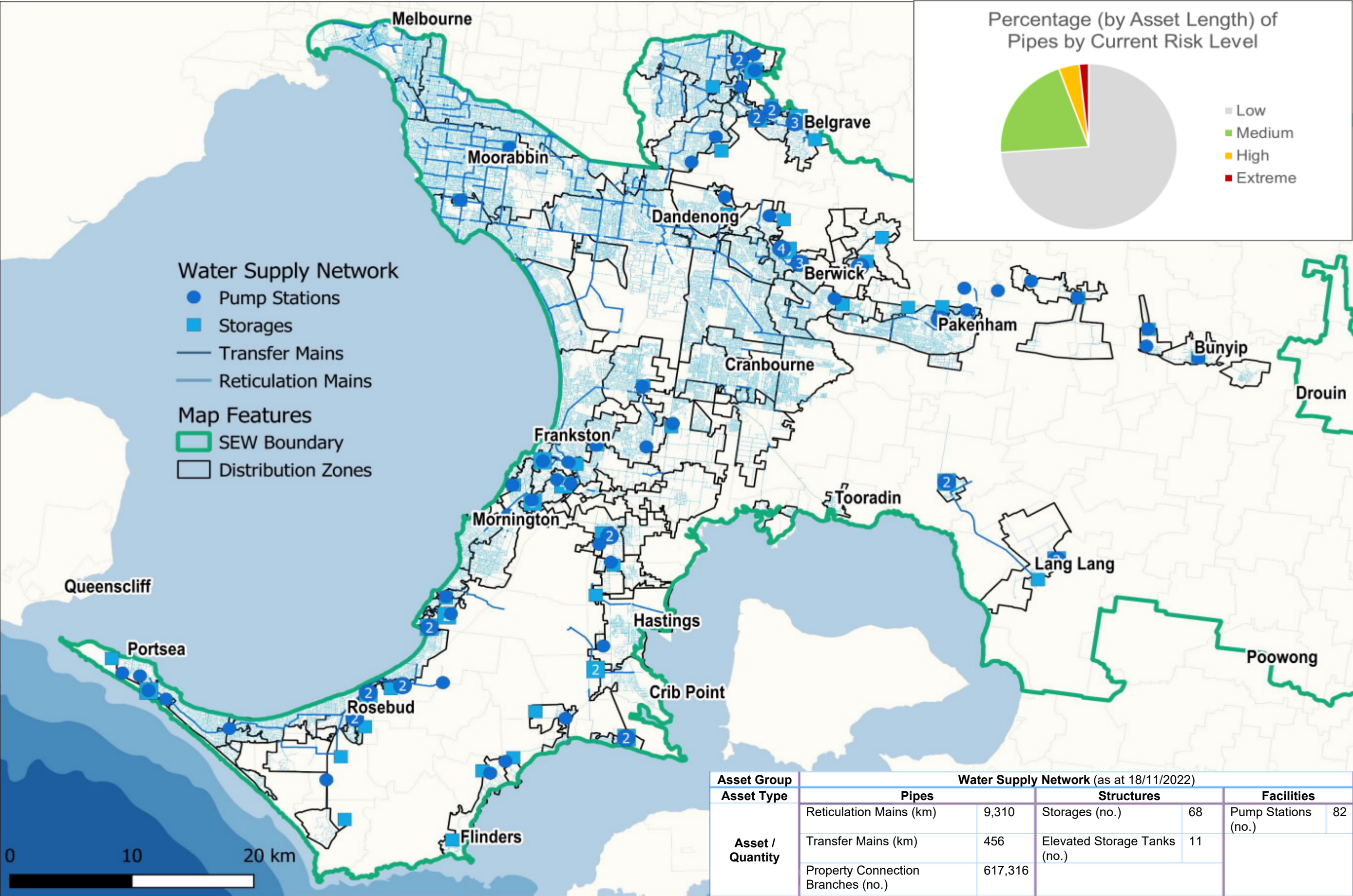
10.2 Water Network Reliability Portfolio Program and Project List

| Water Network Reliability Master Plan Capital Investment | | | | | | | | | | | | |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Inflated 22/23 dollar | | | | | | | | | | | | |
| | 2023 | 2024 | 2025 | 2026 | 2027 | Total P52023 | 2028 | 2029 | 2030 | 2031 | 2032 | Total P52028 |
| Potable Water Quality Improvements/ Compliance | \$ 15,716,552 | \$ 12,881,123 | \$ 11,901,017 | \$ 11,337,077 | \$ 11,300,927 | \$ 63,136,696 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 70,566,494 |
| Potable Water Quality Portfolio | \$ 15,716,552 | \$ 12,881,123 | \$ 11,901,017 | \$ 11,337,077 | \$ 11,300,927 | \$ 63,136,696 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 70,566,494 |
| PP5204- Water Quality Improvement Program (P52023) | \$ 15,716,552 | \$ 12,881,123 | \$ 11,901,017 | \$ 11,337,077 | \$ 11,300,927 | \$ 63,136,696 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 14,113,299 | \$ 70,566,494 |
| PP2248 Chlorination Plants - CRTU (WQ903) | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 | \$ 140,819 |
| PP2249 Continuous On-line Monitoring - COLT (WQ901) | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 | \$ 43,087 |
| PP2250 Asset Alterations for Water Quality (WQ900) | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 | \$ 32,578 |
| [PP5204] PLC (Ex Chlorinator) Upgrade (15no.) - See also AP5723 | \$ 2,794,735 | \$ 3,940,840 | \$ 3,940,840 | \$ 3,940,840 | \$ 3,940,840 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Monitoring Additions (COLT) (9no. interface retailer interface points) | \$ 630,534 | \$ 630,534 | \$ 157,634 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Remote Valving (Actuated valves and control to allowance bypassing all reservoirs and shut MW offalues via SCADA) | \$ 367,812 | \$ 367,812 | \$ 367,812 | \$ 341,539 | \$ 341,539 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Chlorinator (CRTU) Additions (10 new units - reservoirs, balance across interface points/network) | \$ 2,627,226 | \$ 2,627,226 | \$ 2,627,226 | \$ 2,627,226 | \$ 2,627,226 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Additional Bulk Storage Facility (redundancy to sole ex bulk storage at Mt Eliza and refilling efficiency improvement) | \$ 1,050,891 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Replacement Field Instrumentation | \$ 15,763 | \$ 15,763 | \$ 15,763 | \$ 15,763 | \$ 15,763 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Sample Tap Inspections | \$ 157,634 | \$ 157,634 | \$ 157,634 | \$ 157,634 | \$ 157,634 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Sample Tap Boxes on Storage Tanks | \$ 27,744 | \$ 27,744 | \$ 27,744 | \$ 27,744 | \$ 27,744 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Customer Sample Tap Boxes (10 year program i.e. 50% within P55/P52023) | \$ 277,435 | \$ 277,435 | \$ 277,435 | \$ 277,435 | \$ 277,435 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Tank Inspections via Drone | \$ 60,952 | \$ 60,952 | \$ 60,952 | \$ 60,952 | \$ 60,952 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Tank Inspections via ROV | \$ 60,952 | \$ 60,952 | \$ 60,952 | \$ 60,952 | \$ 60,952 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Water Storage Upgrade Projects - Tank CFD Modelling & Tracing | \$ 262,723 | \$ 262,723 | \$ 262,723 | \$ 262,723 | \$ 262,723 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Inlet Dosing Pipework (+10% allowance to provide for) | \$ 394,084 | \$ 394,084 | \$ 394,084 | \$ 394,084 | \$ 394,084 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Portable Potable Disinfection units | \$ 262,723 | \$ 262,723 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Portable Generators for chlorinator back up | \$ 525,445 | \$ 525,445 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Storage Tank Detection (Wildlife Detection/Animal Ingress Technology at Reservoirs) | \$ 189,160 | \$ 189,160 | \$ 189,160 | \$ 189,160 | \$ 157,634 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Hydrotank Installations | \$ - | \$ - | \$ 380,034 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] ARM Water Storage Risk Tool | \$ 157,634 | \$ 157,634 | \$ 157,634 | \$ 157,634 | \$ 157,634 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Water Storage Upgrade Projects - Strategy Report & Program Development | \$ 52,545 | \$ 52,545 | \$ 52,545 | \$ 52,545 | \$ 52,545 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Water Storage Upgrade Projects - Tank Upgrade Works, Decommission and refurbishment previous abandoned storages & PS | \$ - | \$ 630,534 | \$ 1,209,224 | \$ 1,209,224 | \$ 1,209,224 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] Water Storage Upgrade Program - Minor Tank Roof Repairs | \$ 52,545 | \$ 52,545 | \$ 52,545 | \$ 52,545 | \$ 52,545 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] New/additional online network WQ Sensors within network | \$ 145,023 | \$ 145,023 | \$ 145,023 | \$ 145,023 | \$ 145,023 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204/AP4833] Live Operational Hydraulic Models (age, chlorine residual, operational) | \$ 525,445 | \$ 525,445 | \$ 525,445 | \$ 525,445 | \$ 525,445 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] WQ Sensors at key customers existing technology (chlocams) (25 sites @ 520k/unit) | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| [PP5204] WQ Sensors at key customers - Rollout units developed by R&D | \$ 21,018 | \$ 21,018 | \$ 21,018 | \$ 21,018 | \$ 21,018 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| PP2229 - Storages | \$ 3,215,725 | \$ 1,113,944 | \$ 496,020 | \$ 496,020 | \$ 496,020 | \$ - | \$ 496,020 | \$ 496,020 | \$ 496,020 | \$ 496,020 | \$ 496,020 | \$ 496,020 |
| AP5723 - Chlorinator Upgrade Stage 1 | \$ 1,519,234 | \$ 59,838 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Remaining balance of Option 3 in P528 + Fixed Roofs for Tanks | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 13,400,795 | \$ 13,400,795 | \$ 13,400,795 | \$ 13,400,795 | \$ 13,400,795 | \$ 13,400,795 |
| Potable Water Improvements/ Compliance | \$ 7,414,942 | \$ 14,734,395 | \$ 17,046,348 | \$ 12,109,207 | \$ 16,166,764 | \$ 67,471,657 | \$ 25,498,632 | \$ 25,498,632 | \$ 25,498,632 | \$ 25,498,632 | \$ 25,498,632 | \$ 127,493,159 |
| Potable Water Improvements/ Compliance Portfolio | \$ 7,414,942 | \$ 14,734,395 | \$ 17,046,348 | \$ 12,109,207 | \$ 16,166,764 | \$ 67,471,657 | \$ 25,498,632 | \$ 25,498,632 | \$ 25,498,632 | \$ 25,498,632 | \$ 25,498,632 | \$ 127,493,159 |
| PP5200- Dam, Storages and Pump Station Project List (P52023) | \$ 851,221 | \$ 5,648,537 | \$ 5,649,720 | \$ 315,267 | \$ 315,267 | \$ 12,700,013 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 525,445 |
| AP5727 Moorabbin ANCOLD Referrable Dam Works (P52023) | \$ - | \$ 5,254,453 | \$ 5,254,453 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5728 Rosedale Grove ANCOLD Referrable Dam (P52023) | \$ 262,723 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5730 Floating Cover Replacement - Rosedale Gr Basin (P52023) see PP2229 & PP5204 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5731 Floating Cover Replacement - Eliza Dr (P52023) see PP2229 & PP5204 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5729 Electronic Metered Standpipe (EMS) Refurbishment | \$ 315,267 | \$ 315,267 | \$ 315,267 | \$ 315,267 | \$ 315,267 | \$ 315,267 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5732 Storage General improvements/Compliance | \$ 210,178 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Storage General Compliance (\$ against PP5200) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 | \$ 105,089 |
| AP5733 Deluge Systems 2no. Bushfire Risk (Climate Adapt) | \$ 63,053 | \$ 78,817 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| PP2215-PP93177 Critical Water Main Renewal Project List | \$ 6,563,721 | \$ 9,085,858 | \$ 11,476,628 | \$ 11,793,940 | \$ 15,851,497 | \$ 54,771,644 | \$ 25,393,543 | \$ 25,393,543 | \$ 25,393,543 | \$ 25,393,543 | \$ 25,393,543 | \$ 120,967,714 |
| AP4775 Sorrento-Portsea DN300RC Length 4.3km | \$ 5,884,987 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP4867 Dromana Portsea Pipeline No. 1 - Nepean Rd Rosebud DN375RC Length 3.2km | \$ - | \$ 8,407,125 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5924 Alexandra Ave Stage 1 DN600MSLB Length 1.3km - Stage 1 | \$ - | \$ - | \$ - | \$ 5,557,603 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5925 Alexandra Ave Stage 1 DN600MSLB Length 1.3km - Stage 2 | \$ - | \$ - | \$ - | \$ 5,557,603 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP4429 Mornington Pipeline No.1 675RC Length 2.1km - Stage 1 | \$ - | \$ - | \$ 8,821,281 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5922 Mornington Pipeline No.1 525RC Length 2.1km - Stage 2 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 5,499,547 | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5926 Clayton Rd Off-line DN750 Renew as DN450? Length 1.1km | \$ - | \$ - | \$ - | \$ - | \$ 4,045,929 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Bluff Rd DN600MS Length 1.22km | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 5,640,395 | \$ - |
| South Rd DN600MS Length 1.88km | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 8,654,172 | \$ - |
| AP5927 Alma Rd DN450CI Length 1.4km | \$ - | \$ - | \$ - | \$ - | \$ 5,099,268 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| AP5928 Jasper Rd/South Rd 2xDN300CI Length 2.7km (total) - Stage 1 | \$ - | \$ - | \$ - | \$ - | \$ 4,939,186 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Jasper Rd/South Rd 2xDN300CI Length 2.7km (total) - Stage 2 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 4,939,186 | \$ - | \$ - | \$ - | \$ - | \$ - |
| Neerim Road DN 600MSLB Hughesdale to Caulfield Stage 1 - GROWTH DN900 NO MOVE PRIV | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 9,509,553 | \$ - | \$ - | \$ - | \$ - | \$ - |
| Neerim Road DN 600MSLB Hughesdale to Caulfield Stage 2 - GROWTH DN900 NO MOVE PRIV | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 9,509,553 | \$ -</ | | | |

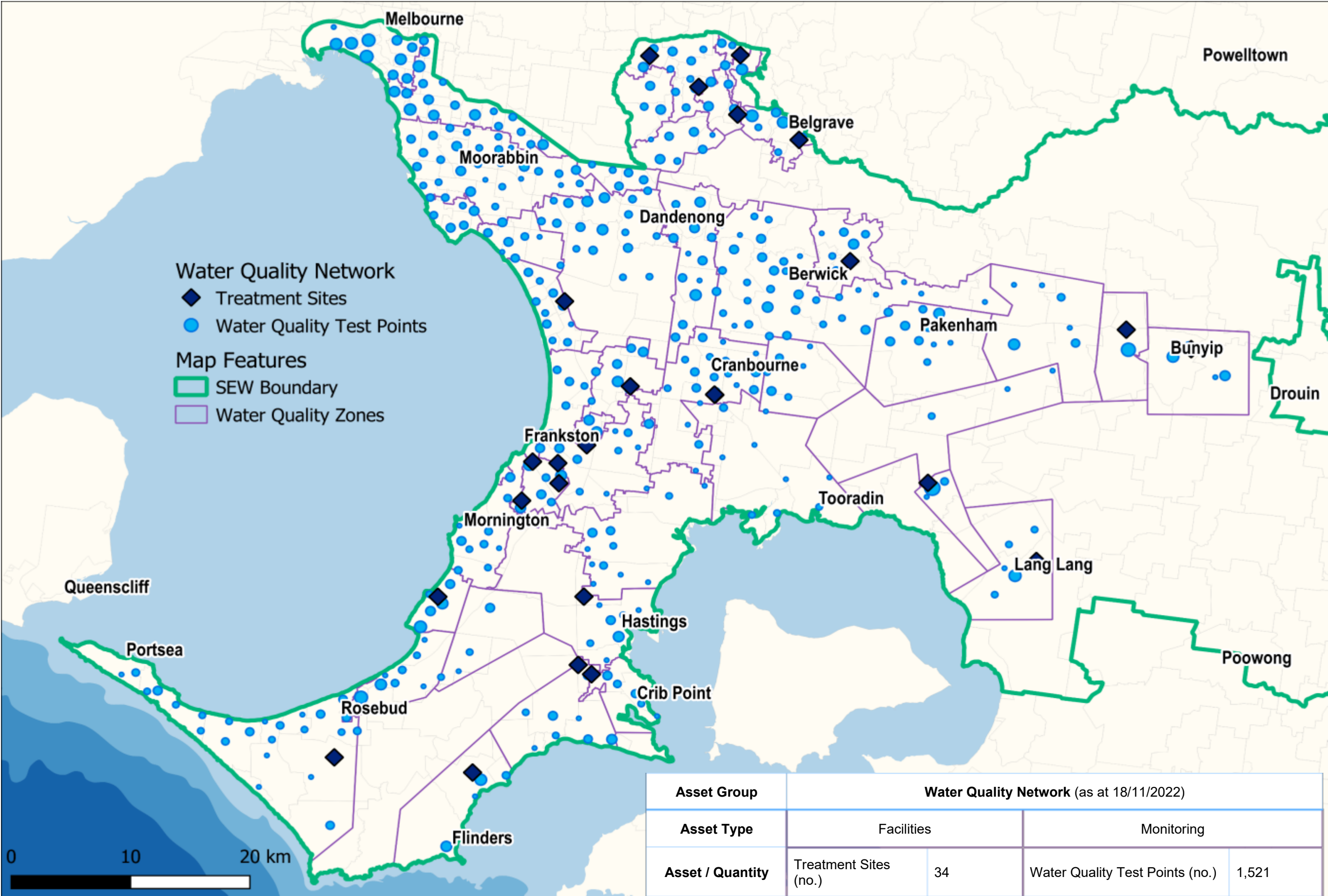
11. Appendix C – Asset Summary and System Understanding

The following sections contain maps and statistics for various assets covered by the Reliability Master Plan.

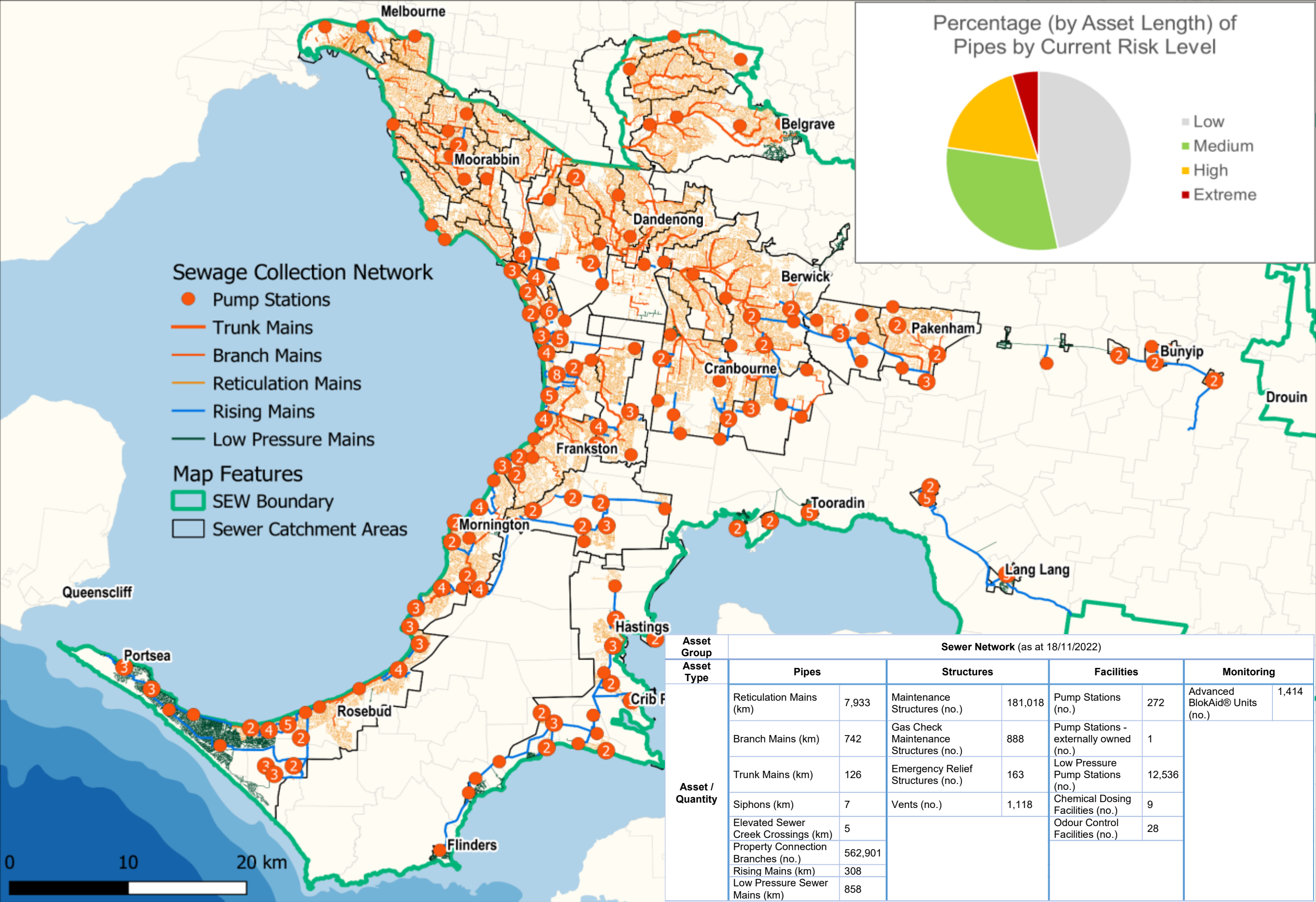
11.1 Potable Water Supply Assets



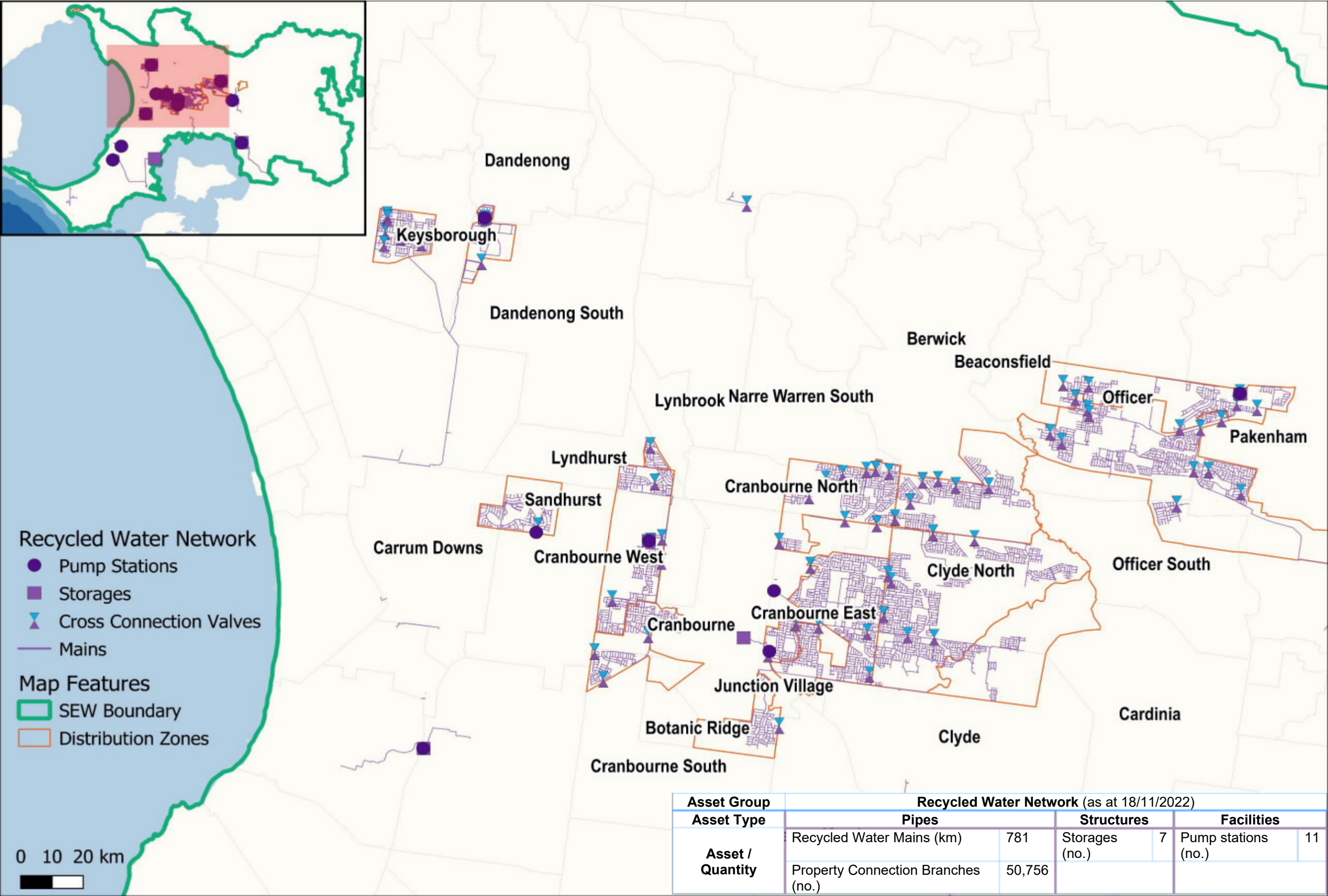
11.2 Potable Water Quality Assets



11.3 Sewage Collection



11.4 Recycled Water Supply



12. Appendix D – Works Delivery Performance

The majority of water and sewer network reliability and renewal budget were delivered via the following three works delivery mechanisms:

- The Reliability Program contract – delivering water and sewer network renewal works. Covering planned and unplanned works, emergency works. Open cut and trenchless renewal methods.
- The Maintenance contract – delivering preventative, and reactive maintenance.
- Minor works contract – delivering minor capital works, and emergency works.

A small number of sewer rising main and pump station renewal projects have been delivered by the Pipes and Structures Program.

The good works delivery performance across these delivery mechanisms is evident in achieving regulatory compliance and the desired customer levels of service within tolerance, within the allocated budget. This is achieved through proactive management and budget reallocation within the various budget portfolios between water and sewer network reliability, and amongst the various drivers of reliability, renewal, and Improvements/ Compliance to address changing risks and uncertainties as they arise.

12.1 Water main renewal program

The water main renewal program maintains drinking water network levels of service for customer interruptions through predominantly reactively responding to non-critical asset failures as they occur. Assets with multiple failures or history of failure, that have significant customer interruptions or environmental impact are prioritised to be renewed. The program has delivered the following outcomes:

- Renewal of more than 140km of water mains up to FY22/23 at an average of c. 28km/annum.
- Capital expenditure is forecast to be \$115.5M compared to \$118.7M (\$ escalated 2022-23) in the pricing submission i.e. within 3%. Up to FY22/23 actual capital expenditure is \$95.6M compared to \$92.4M (\$ escalated 2022-23) in the pricing submission.
- Achieved the customer outcome for 'get the basics right', exceeding the performance target we set for customer service water supply interruptions (i.e. > 5 unplanned water supply interruption achieved average up to FY22/23 of 196 compared to target of 532).
- Risk management approach has led to a return from the risk bank of c. \$10.2M and c. \$14.2M exclusive and inclusive of Chapel St and Cecil St water main renewals respectively.
- Completion and ongoing delivery of renewal of a number of critical water mains in this regulatory period.
 - For example, at Bluff Road , City Road, Cecil Street (due for completion early in 2023), and Chapel Street (also due for completion in 2023).
 - This has included water main renewals at complex road intersections identified amongst the top 20 at risk intersections. For example, at Queens Rd/Union Rd intersection, also known as the Queensway renewal project, at Dorcas

St/Clarendon St intersection and at Commercial Rd / Punt Rd intersection outside the Alfred Hospital.

- Completion of highly reactive and time critical emergency renewal works of both critical and non-critical reticulation water main assets. For example, at Centre Road, Lorimer Street, Chandos Street, Fromer Street, Tooradin Station Road, and Hudson Street.

12.2 Sewer renewal program

The sewer renewal program maintains the sewer network levels of service for customer interruptions through predominately reactively responding to asset failures as they occur. Assets with multiple failures, significant customer interruptions or environmental impact are prioritised to be renewed. The program has delivered the following outcomes:

- Renewal of more than 90km of retic sewer and more than 11km of branch sewer at an average of c. 20km/annum.
- Capital expenditure is forecasted to be \$28M compared to \$30M (\$ escalated 2022-23) in the pricing submission i.e., within 8%. Up to FY22/23 actual capital expenditure is \$24.7M compared to \$22.4M (\$ escalated 2022-23) in the pricing submission.
- The sewer renewal program supports achieving the customer outcome for “get the basics right, always” (Number of customers receiving 3 or more sewerage blockages) and “support my community, protect our environment” (number of EPA reported dry weather spills).

12.3 Sewer Pump Station and Rising Main Renewals

While we continually monitor and assess the condition of our assets to inform renewal or rehabilitation on a risk prioritised basis, sometimes unexpected failures occur. During the 2018-23 regulatory period, a number of unforeseen critical assets have failed causing an environmental impact. In response, we brought forward the renewal of the following assets, which is reflected in the Rising Main and Pump Station actual spend as compared with budgets.

Pump Station Rising Mains

Ranelagh Beach Pump Station is located on the beach front in Mount Eliza with a rising main alignment along the beach front, discharging into the gravity system on top of the cliff. In 2018 the Ranelagh Beach rising main failed causing sewage spills. In response we brought forward the renewal of the rising main. This unplanned renewal resulted in an additional capital expenditure of \$2.6M.

This expenditure was accounted for in the rising main renewal cost centre resulting in an increase from the planned \$6.8M to a forecasted \$9.7M during the 2018-23 regulatory period.

Pump Station Rehabilitations

Officer South Pump Station is one of South East Water's largest pump stations, with a designed flow rate of 600l/s in Stage 2 operation and an ultimate design rate of 1270L/s in future scenario making it the largest pump station at South East Water. Unexpected septic sewage volumes in the pump station have created a corrosive environment promoting failure of its liner in the pump well, jeopardising structural integrity. This put a high safety risk on the asset as well as our operators. A rehabilitation project on the pump station was undertaken with the installation of a new odour facility to eliminate any safety risk and ensure performance of the asset. This unbudgeted project has resulted in a capital expenditure of c. \$8.5M (\$ escalated 2022-23).

During planned renewal works of the Valetta St rising main, it was observed the wet well and metallic fixtures of the Valetta St Pump Station had significantly deteriorated due to extensive corrosion. An urgent rehabilitation project has been undertaken within the 2018-23 regulatory period to address the safety concerns as a result of the deterioration. This unplanned project further resulted an additional capital expenditure of c. \$ 1.3M.

These reactive works have resulted in a forecast total capital expenditure for pump station rehabilitation works of \$12.2M compared to \$5M budget based on past historical expenditure (\$ escalated 2022-23) in the pricing submission.

Sewer pump station and rising main renewals was predominately delivered via the Pipes and Structures Program or Minor Works contract.

12.4 Condition assessment program

South East Water continually monitors the condition of our assets via various inspection and condition assessment programs. These programs include inspection programs on our creek crossing, maintenance holes, vent stack, pipe fittings and CCTV condition assessment program on the gravity sewer network, condition assessment on our pressure network, condition assessment on facilities and reactive condition assessment on failed assets.

In the regulatory period 2018-23, we have inspected the condition of over 450km of gravity sewer network using CCTV inspection, of which over 70km have been assessed for renewal, over 50km immediately repaired and over 60km have been put on an on-going monitoring program. A forecasted capital expenditure of \$7.7M compared to \$6.2M budgeted in the pricing submission. Additional expenditure was reallocated to cater for reactive CCTV inspection due to the unexpected higher amount of sewer blockages impacted by climate variation.

The overall capital spent on inspection and condition assessment program of the sewer network are in line with the budget, a forecast of \$10M compared to the \$9.95M (\$ escalated to 2022-23) in the Pricing Submission.

In the regulatory period 2018-23, we deferred investment on whole scale water main condition assessment program due to prioritising water main renewal of assets that had failed to meet customer outcomes and output measures. We still undertook a limited number of condition assessments (pipe sample/coupons and laboratory testing) to confirm the condition of select critical mains. The expenditure for which was incorporated in the critical water main renewal expenditure.

The overall capital spend on the water main condition assessment program part of the Potable Water Reliability Portfolio is a forecast of \$0.22M compared to the \$1.59M (\$ escalated to 2022-23) in the Pricing Submission.

The condition assessment program is predominantly delivered via the maintenance contract, or the Reliability Program contractors.

12.5 Capitalised maintenance program

This included capitalised maintenance for maintaining property connection branches (PCB), pressure sewers and mechanical, electrical, and civil assets ensuring an appropriate balance between maximising asset lifespan and the risk of asset failure.

We have also implemented a new 5-year contract for maintenance services effective 1 October 2022 to bring new ideas and innovation, and improve safety, processes, efficiency and value. For example, the new maintenance model has allowed for new technology to allow water main maintenance to be undertaken without shutting down water supply in the impacted area.

South East Water have also refined and streamlined the workstreams, increasing scope of work to better align with the capability of its partners and provide improved economies of scale. An example of this is the combining of water and sewer into one stream, effectively reducing management and administrative levels.

12.6 Cathodic protection program

We continued to invest in our corrosion mitigation program specifically to establish and improve the cathodic protection levels of our mild steel water mains and tanks to reduce corrosion rates and extend the life of these assets.

South East Water has c. 550km of mild steel mains comprising c. 5.2% of our water main network. Approximately 80% of all South East Water's water mains greater than 450mm diameter are of mild steel construction. Whilst these mains are structurally sound, they are subject to small perforations as a result of corrosion, these perforations lead to leaks and bursts. The use of cathodic protection systems in certain parts of our network is an effective strategy to reduce corrosion. Cathodic protection systems in our network are typically one of two varieties:

- ☐ A sacrificial anode connected to the main which corrodes preferentially; or
- ☐ An impressed current system which provides electrical current to the main, reducing the corrosion rate.

As part of a Corrosion Strategy Review for regulatory period 2018-23 a *Cathodic Protection Maintenance Summary Report* was prepared in 2017. The report specifically related to cathodic protection systems and stray current electrolysis mitigation for water main and tanks and included management strategies and associated capital and operational expenditure for regulatory period 2018-23 and 2023-2028. The strategies included a number of activities as follows:

- ☐ Improved monitoring and reporting;
- ☐ Installation of additional test points;
- ☐ Rectification works to cathodic protection systems;
- ☐ Program for replacing and upgrading aged impressed current transformer rectifier units (TRU); and
- ☐ Isolation works.

Capital expenditure is forecast to be \$1.8M compared to \$2.6M (\$ escalated 2022-23) as part of the Potable Water Reliability portfolio in the pricing submission. The capital investment over the regulatory period and delivery performance having been affected by COVID (e.g. our maintenance contractors having defer works to prioritise reactive repairs over proactive works due to impact on resources and restrictions) and ongoing discussions with local authorities surrounding permission for the installation of cathodic protection systems on Council owned land. Cathodic protection works completed between 2019/20 and 2021/22 as compared to works identified to be delivered across both the regulatory period 2018-23 and 2023-28 is summarised in Table 27.

The balance of current identified works forms the capital expenditure program for 2023-28 and beyond. As asset conditions change and become known, we will continually update and reprioritise the investment in the individual identified works over the regulatory period 2023-28.

Table 27: Cathodic Protection Program Delivered between 2019/20 - 2021/22

| Description of Works | No. Identified | Completed |
|---|-----------------------|------------------|
| Water main isolation – including test point and bond | 20 | 3 |
| Impressed Current Cathodic Protection System – Installation / Feasibility | 13 | 1 |
| Service isolation | 24 | 17 |
| Installation / Reinstatement Test Points incl. Bonds | 35 | 15 |
| Impressed Current Cathodic Protection System – Anode Ground Bed Replacement | 6 | 2 |
| Impressed Current Cathodic Protection System – Rectifier Replacement | 18 | 11 |
| Total | 116 | 49 |



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