

2016 Price Submission

Response to ESC Draft Decision
26 April 2016





Table of contents

Executive Summary	2
<hr/>	
Operating expenditure	4
Capital expenditure	15
Factors impacting financing costs	44
Tariffs and demand	49
<hr/>	
Appendix 1 – Tariff schedule	56
Appendix 2 – Performance indicators	61
Appendix 3 – Price adjustments	64

Executive summary

Melbourne Water welcomes the opportunity to respond to the Essential Services Commission's (ESC) *Melbourne Water Price Review 2016, Draft Decision* ('Draft Decision').

Our 2016 Price Submission, combined with this response, will see positive outcomes for our customers including lower prices, investment to meet the needs of a growing city and resilience to a changing climate. It will also ensure the right incentives are in place to drive continuous improvement over the next five years.

Key elements of Melbourne Water's response to the ESC's Draft Decision include:

- Recommending a further reduction of \$96.5M of operating expenditure from that set out in the 2016 Price Submission on top of efficiencies already outlined
- Recommending a further reduction of \$107M of capital expenditure from that set out in the 2016 Price Submission
- Recommending an increase in the amount of the Victorian Desalination Project costs which are capitalised to \$30M per year (against the ESC's Draft Decision of \$20M per year).

Melbourne Water's proposal for introducing a trailing average approach for the weighted average cost of capital (WACC) has been revised to ensure the benchmark cost of debt better aligns to historical rates paid by Melbourne Water.

Melbourne Water has also revised its proposal for reforming the Waterways and Drainage Charge for non-residential customers. The proposed 10-year reform will see the outdated property-value charge replaced with a flat charge while maintaining only inflation increases for residential and rural customers over the coming period.

This response has been developed after careful evaluation of the issues raised in the ESC's Draft Decision. The response takes into account customer and community feedback, the regulatory principles of the Water Industry Regulatory Order (WIRO) and further reduces wholesale water and sewerage charges from that in our 2016 Price Submission.

A summary of Melbourne Water's response and other elements of the ESC's Draft Decision can be found below. Full details and rationale behind Melbourne Water's response are contained in the subsequent chapters.

While Melbourne Water accepts many elements of the ESC's Draft Decision, it considers there are some aspects which should be reviewed before the final decision. These include:

- Consideration of further allowances for electricity costs based on current market rates and likely outcomes of upcoming price reviews for energy companies
- Consideration of an allowance to enable Melbourne Water to better respond to pollution events in its area

- Re-consideration of Melbourne Water’s proposed major capital projects and allocations, while agreeing to a general efficiency target of 5% across all aspects of services excluding the Land Development area. This will ensure Melbourne Water has sufficient revenue to deliver on its services and avoid undue risk to the region’s waterways and the water supply, sewerage and drainage systems.
- A refinement of the proposed approach to reforming the non-residential waterways and drainage charge by phasing out the outdated land-value based charges for non-residential customers over the next 10 years. Over the next five years, residential and rural customers’ prices will increase with inflation only, while some non-residential customer prices will increase by \$7 (before inflation) per year
- A new tariff to improve water quality in the Quiet Lakes area is proposed following community support for improved water quality
- An updated approach to calculating the cost of debt component of the WACC to better align with historical rates paid following consultation with Treasury Corporation of Victoria. A revised approach has also been developed to the annual updating process
- Establishing water headworks charges on the basis of entitlements and updated bulk sewerage charges
- Minor changes to the supporting indicators to provide better information to customers and ensure these indicators incentivise appropriate investment.

This response is supported by a revised financial model that is consistent with our recommendations and includes revisions to the tax liability.

All numerical values provided in this submission are in 2015/16 real dollars unless specified. All numerical values in the tables are subject to rounding.

Operating expenditure

Melbourne Water has closely considered the ESC's Draft Decision and accepts \$96.5M of the proposed reductions (excluding the impact of Victorian Desalination Project costs). We will work to ensure the required efficiencies are realised. The remaining \$15.9M of the ESC's proposed cost reductions are considered by Melbourne Water to be necessary, prudent and efficient expenditure. Our position in relation to these expenditures is detailed in the following sections.

Energy costs

Through its 2016 Price Submission, Melbourne Water sought costs associated with transitioning to 100% renewable electricity by 2018-19. The ESC's Draft Decision allowed for energy costs associated with:

- An electricity network cost based on the Australian Energy Regulatory (AER) preliminary draft determination
- Electricity price of \$48 per MWh
- Electricity feed-in credited at \$48 per MWh, which includes a 20% retail margin
- Renewable energy certificate price of \$70 per MWh
- Renewable electricity proportion of 20%.

Network costs

Melbourne Water's network costs are associated with transmission and distribution costs that are regulated by the AER. Melbourne Water agrees regulated prices should be used to determine network cost allowances where available. However, prices for these services are still in the process of being set and the AER has recently advised the final outcome of the pricing determination process is not likely to be known until July 2016 for Powercor, AusNet Services, United Energy, CitiPower and Jemena. This makes using the actual AER pricing difficult due to misalignment of timing of the water and electricity network regulatory pricing processes.

For the transmission component, we note that the ESC has adopted the submission from AusNet Services Transmission following the outcomes of its expenditure consultant's report¹. Given a price decision for transmission services is not due until after the conclusion of the Melbourne Water price review, a consistent approach for distribution services would be to adopt the relevant network operators' revised pricing proposals as submitted to the AER in January 2016.

¹ Deloitte Access Economics, Melbourne Water Expenditure Review, 2016, p 51 and AusNet Transmission Group Pty Ltd Transmission Revenue Review 2017-2022 Submission October 2015, page 324

Applying the outcomes from the revised submissions from Jemena, CitiPower, Powercor, United Energy and AusNet Services gives an average annual price increase of 3% per year across the period. This is significantly below the original Melbourne Water 2016 Price Submission level. We request that the interpretation of the X-factors in the AusNet Transmission proposal be revisited as the interpretation appears to be opposite of that applied to the distribution networks.² This would give the AusNet Transmission price path an average increase of 3% per year over the term, not 3% per year average decrease as quoted in Table 4.14³ of expenditure consultant's report. Table 1 below outlines the recommended network cost allowance for Melbourne Water.

Table 1: Proposed network cost allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	10.1	10.5	11.0	10.5	10.2	52.2
Revised proposal	11.7	12.0	12.4	12.8	13.2	61.9
Additional allowance	1.5	1.5	1.4	2.2	3.0	9.7

Export electricity price

The Draft Decision states "electricity generated by Melbourne Water and exported to the electricity grid will be credited at the same wholesale price and with the same retail margin". As Melbourne Water is not a retailer, scheduled generator or licenced market participant, it could not achieve a retail margin and hence such rates in the market. It is also noted that the expenditure consultant's report⁴ makes reference to a feed-in tariff of \$50/MWh. However this tariff is only applicable to systems less than 100 kilowatts⁵ and is therefore not applicable to Melbourne Water's operations. Melbourne Water recommends removal of the 20% uplift in the final decision (see Table 2).

² AusNet Transmission Group Pty Ltd Transmission Revenue Review 2017-2022 Submission October 2015, p324

³ Deloitte, op cit, p51

⁴ Deloitte, op cit, p48

⁵ ESC, Minimum Electricity Feed-In Tariff To Apply From 1 January 2016 To 31 December 2016 Final Decision, August 2015, p1

Table 2: Electricity feed-in credit and revised proposal (2015/16 Real Dollars)

\$ per MWh	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision (\$/MWh)	48.0	48.0	48.0	48.0	48.0	
Revised proposal (\$/MWh)	40.2	40.2	40.2	40.2	40.2	
Draft Decision (\$M/year)	-0.9	-0.8	-0.8	-0.8	-0.8	-4.1
Revised proposal (\$M/year)	-0.7	-0.7	-0.7	-0.7	-0.7	-3.4
Additional allowance \$M	0.1	0.1	0.1	0.1	0.1	0.7

Renewable Energy Certificate price

The ESC has adopted a Renewable Energy Certificate (REC) price of \$70 per REC based on recent market rates⁶. Melbourne Water considers market pricing for Large-scale Generation Certificates (LGC) in the near term will be driven by market dynamics underpinned by the regulated Renewable Energy Target scheme. It is notable that demand for LGCs in the market is required to increase by an additional 75% by 2021 compared with 2015. This demand-side dynamic will put significant upward pressure on the market price. As such, historical pricing is unlikely to be an adequate guide for pricing over the period between 2016-17 and 2020-21. Table 3 shows the regulated trajectory of demand in the LGC market over the period.

Table 3: Required renewable source electricity (GWh per year) under the RET⁷

	2015	2016	2017	2018	2019	2020	2021
GWh	18,850	21,431	26,031	28,637	31,244	33,850	33,000

The recent behaviour of the market price approaching the tax-corrected shortfall penalty charge is likely to continue for the term of the 2016 regulatory period. In developing its 2016 Price Submission, Melbourne Water used REC prices as per forward market quotes sourced from the Australian Financial Markets Association (AFMA)⁸. Melbourne Water considers a forward-looking approach more accurately estimates the REC price over the 2016 regulatory period. Table 4 provides a revised estimate of the REC price and cost based on 20% renewable electricity.

⁶ ESC, Melbourne Water Price Review Draft Decision, 2016, p20

⁷ Renewable Energy (Electricity) Act 2000 S40

⁸ Australian Financial Markets Association (AFMA) weekly subscriber market update, 18/02/16.

Table 4: Renewable energy certificate price and certificate allowance for 20% renewable (2015/16 Real Dollars)

	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision (\$/REC)	70.0	70.0	70.0	70.0	70.0	
Revised proposal (\$/REC)	80.3	79.4	78.5	77.6	76.7	
Draft Decision (\$M/year)	3.1	3.0	3.0	2.9	2.9	14.9
Revised proposal (\$M/year)	3.5	3.4	3.4	3.3	3.2	16.8
Additional allowance \$M	0.5	0.4	0.4	0.3	0.3	1.8

Proportion of renewable electricity

The ESC’s Draft Decision on energy expenditures includes an allowance for 20% renewable electricity. Melbourne Water considers that the customer support for renewable electricity⁹ obtained through the 2016 Price Submission consultation process demonstrates this is a prudent investment.

However, Melbourne Water acknowledges policy expectations for water businesses regarding renewable energy are further developing and therefore are uncertain. For this reason, Melbourne Water is not seeking to include in its prices, the cost of transitioning to 100% renewable electricity at this stage. Melbourne Water remains committed to reducing its impact on climate change and will continue to minimise greenhouse emissions.

While a clear time period has not currently been provided, the Victorian Government’s intention is clear. Below is an extract from the recently released *Water for Victoria Discussion Paper*:

The government proposes that the water sector, including water corporations and catchment management authorities, will maximise its contribution to climate change mitigation by achieving carbon neutrality. The government will work with the water sector to consider implications for the sector and determine an achievable time period for this to occur.¹⁰

Given this expectation, Melbourne Water proposes that the uncertain and unforeseen events mechanism proposed by the ESC includes a reference to ‘policy changes in relation to renewable energy’. This would be designed such that Melbourne Water could adjust prices in the event of the Victorian Government clarifying its expectations of Melbourne Water in relation to procuring renewable energy.

⁹ Melbourne Water 2016 Price Submission p25

¹⁰ Water For Victoria Discussion Paper, 2016, p28

Summary of energy cost

A summary of Melbourne Water’s revised energy proposal is provided in Table 5. This is consistent with the above discussion. The overall change relative to the Draft Decision is provided in Table 6.

Table 5: Proposed energy requirement (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2006 PS Total
USAGE CHARGES						
Purchase Grid Electricity (MWh)	219,990	214,724	216,099	209,479	206,639	
Wholesale rate (\$/MWh)	48	48	48	48	48	
Net Grid Electricity (MWh)	201,906	197,346	199,678	193,062	190,225	
Renewable energy percentage (net)	20%	20%	20%	20%	20%	
Renewable rate (\$/REC)	80.3	79.4	78.5	77.6	76.7	
Total Cost	14.1	13.7	13.7	13.3	13.1	67.8
Electricity Exported to Grid (MWh)	-18,084	-17,378	-16,421	-16,417	-16,413	
Total Income (\$40.2 / MWh)	-0.7	-0.7	-0.7	-0.7	-0.7	-3.4
Net Cost (\$M)	13.4	13.0	13.0	12.6	12.4	64.3
NETWORK CHARGES, SMALL SITES & OTHER (\$M)	12.8	13.1	12.6	13.5	13.7	65.7
TOTAL ELECTRICITY COSTS (\$M)	26.2	26.1	25.6	26.1	26.1	130.0

Table 6: Proposed energy requirement

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	24.0	24.0	23.7	23.4	22.7	117.8
Adjustment – network	1.5	1.5	1.4	2.2	3.0	9.7
Adjustment – feed-in rate	0.1	0.1	0.1	0.1	0.1	0.7
Adjustment – REC price	0.5	0.4	0.4	0.3	0.3	1.8
Revised proposal (from Table 5)	26.2	26.1	25.6	26.1	26.1	130.0
Additional allowance	2.1	2.1	1.9	2.7	3.4	12.2

Pollution response

Melbourne Water is facing increasing costs associated with responding to and managing pollution events within its area. While the ESC acknowledged that this appeared to be a new obligation given the EPA has strengthened Melbourne Water’s role, the ESC’s Draft Decision was not to fund the pollution response service as ‘Melbourne Water has largely been undertaking the function in the past, and its

pollution response costs have historically been included in the reported operating expenditure levels¹¹.

Melbourne Water recommends the decision be reconsidered. The follow extract from the EPA’s Guidance Note (2015) relates to expectations for pollution management.

EPA’s position is that Melbourne Water, pursuant to section 4 of the EP Act, is a ‘protection agency’ in respect of designated waterways and designated land in the Port Phillip and Westernport regions (see further the *Water Act 1989*). In accordance with section 66 of the EP Act, if any designated waterway or designated land in these regions is polluted or an environmental hazard occurs, Melbourne Water, as a protection agency, may, and if ‘directed’ by the EPA, must, conduct a clean up to protect public health and the environment. EPA may specify the method to be used in the clean up of pollution.

Alternatively, EPA may exercise its discretion to issue a statutory clean up notice to Melbourne Water as an ‘occupier’ under section 62A of the EP Act. For example, where Melbourne Water may have caused or permitted pollution to occur in a waterway or another segment of the environment and EPA considers that, a clean up notice is the most appropriate statutory tool.¹²

Melbourne Water’s customer research also revealed an appetite for an enhanced role in pollution response activity (Figure 1). The blue shading indicates customer preference.

Figure 1: Output from customer SIMALTO survey, indicating a higher level of pollution response requested by Melbourne Water customers¹³

Activity type	Option 1 (Base)	Option 2	Option 3
8 Responding to pollution events	Melbourne Water only responds to and cleans up major pollution spills, as required by law	<i>PLUS</i> Melbourne Water uses its discretion to respond to and clean up minor pollution incidents where there are immediate customer and ecological risks	<i>PLUS</i> Melbourne Water takes the lead on investigating and cleaning up identified pollution hotspots

Melbourne Water acknowledges it has delivered limited pollution response services within its current budget, albeit at some expense to existing services. However, the proposed pollution response service described in the 2016 Price Submission is an expanded service, better aligned with our role as a response agency and our customers’ expectations.

¹¹ ESC, op cit, p26

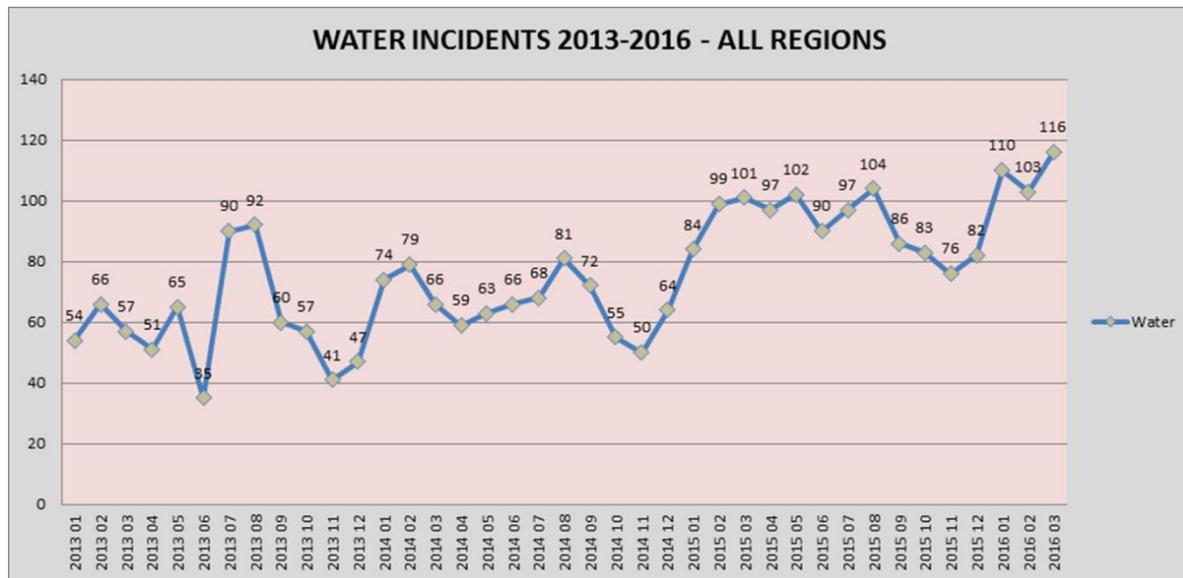
¹² EPA Victoria Guidance – Melbourne Water 2016 Pricing Submission

¹³ Melbourne Water, Waterways and Drainage Investment Plan, 2015, Appendix 1

For these activities, the 2014/15 baseline expenditure was \$0.32M or by extension, \$1.6M for the 2016 regulatory period in the baseline expenditure when the ESC’s productivity hurdle requirement is applied (2% efficiency requirement with 1.8% customer growth). The 2016 Price Submission sought \$5.3M or an additional \$3.7M over the regulatory period.

The additional \$3.7M over the baseline expenditure of \$1.6M is required to meet the higher level of service expected by the regulator and our customers, and enable Melbourne Water to respond to an increasing number of pollution events. Increased urbanisation and expansion of industrial areas around waterways is leading to more frequent instances of pollution events (e.g. as shown by recent fires in Somerton and Broadmeadows in Nov 2015 and Feb 2016. See case study below). Data from EPA Victoria from recent years has demonstrated there is an increasing trend in the rate of pollution events that require a response from Melbourne Water (see Figure 2).

Figure 2: Number of water-related incidents logged by EPA Victoria 2013-2016



Somerton Fire (November 2015)

The Somerton Fire provides a case study both in the type of event and the new level of service required for managing pollution. A fire at a waste management facility in Somerton burned for six days in November 2015, with firefighting water impacting on 7km of the Merri Creek. The creek is highly valued for its ecology but for its amenity by the community. Due to its priority as a waterway and in line with high community expectations, the following activities were carried out. The points below indicate which of these activities was business-as-usual, and which were at a higher level of service:

- Signage erected – business as usual
- Activities to manage public health and ecological impacts at the immediate site of pollution - business as usual
- Erecting barriers and booms on the waterway – business as usual/higher level of service
- Water quality monitoring – higher level of service
- Experts working round the clock to resolve the issue – higher level of service
- Flushing from potable water supply – higher level of service
- Pumping polluted river water to the sewer – higher level of service
- Aeration of river water – higher level of service
- On-ground resources for wildlife rescue and recovery – higher level of service.

The ESC notes the use of pass through mechanisms¹⁴ to recover funding for large unforeseen events. Melbourne Water supports the use of uncertain and unforeseen events clauses for very large pollution events. However, in such significant or emergency events Melbourne Water would seek government assistance before seeking to reopen prices, similar to the approach for managing fire and flood emergencies.

The revised funding sought, less than \$1M per year, relates to the foreseeable and anticipated costs to deliver the service of a protection agency for designated waterways and land. As such, Melbourne Water recommends \$3.7M be added to its operating costs allowance (see Table 7).

Table 7: Pollution response costs

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	-	-	-	-	-	-
Proposed allowance	0.8	0.8	0.8	0.7	0.7	3.7
Additional allowance	0.8	0.8	0.8	0.7	0.7	3.7

Victorian Desalination Project costs

In its 2016 Price Submission, Melbourne Water proposed to recover \$20M per annum of the annual security payments over the expected life of the Victorian Desalination

¹⁴ ESC, op cit, pp26

Project (VDP). This followed an extensive consultation program with end-customers and also took into account the views of retail water businesses and consumer groups.

In its Draft Decision the ESC accepted Melbourne Water’s proposed capitalisation amounts and invited Melbourne Water to provide further information to the ESC on opportunities for capitalisation of VDP payments.

Melbourne Water has reviewed the ESC’s Draft Decision and considered further information from the retail water businesses in support further capitalisation of payments. As a result, Melbourne Water proposes to recover a total of \$30M per year of the annual security payments over the life of the VDP, an increase of \$10M per year. This acknowledges the views of the retail water businesses and will provide some further bill relief, while not imposing significant interest costs for future customers (a concern raised by many community research participants).

In doing so, this decreases the annual security payments which are attributable to operating expenditure, and increases the amounts attributable to capital expenditure to \$30M per year. See Table 8.

Table 8: VDP security amounts attributable to opex and capex (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21
Amounts attributable to operating expenditure	562.7	553.8	550.5	538.7	522.4
Amounts attributable to capital expenditure	30.0	30.0	30.0	30.0	30.0

Water order for 2016/17

On 6 March 2016, the Minister for Water announced it would be placing a water order for 50 billion litres for the year 2016/17, at a cost of \$27.2M. This will now be included in Melbourne Water’s revised proposal. Any future orders would be included in Melbourne Water’s wholesale prices via a pass-through arrangement set out in Appendix 3. These arrangements will mean costs for water orders are billed to the retail water businesses as the water is delivered.

Melbourne Water does not consider there to be avoided costs which could offset the order cost. The water delivered via the VDP could increase pumping costs and reduce Melbourne Water’s ability to generate renewable energy. These costs are proposed to be managed within Melbourne Water’s proposed expenditures.

Operating expenditure profile

As part of the ESC's Draft Decision, further information was sought on the drivers for cost increases over the period and what mitigation is being implemented¹⁵.

Melbourne Water set out its operating expenditures in accordance with the ESC's guidance paper. This included ensuring operating expenditure for the regulatory period were inclusive of sustainable efficiencies that Melbourne Water identified as part of the Victorian Government's efficiency review in 2014, as well as other efficiencies identified during the price review process. Through this, Melbourne Water achieved the 2% efficiency hurdle as required by the ESC.

Proposed business-as-usual operating expenses increase steadily relative to the baseline, with a step up in the final year. As noted in our proposal, key drivers for the increases include escalations in labour, accommodation and maintenance costs. Maintenance costs in particular can be noted as the primary reason for the increase in the final year, accounting for \$4.8M of the \$6.5M increase above target. For waterways and drainage, as advised in our 2016 Price Submission, we will invest an additional \$8.5M to achieve a more sustainable regime to manage wetland sediment, in line with EPA Victoria's direction to Melbourne Water to achieve the regulatory requirement of the State Environment Protection Policy (Waters of Victoria) and the 2001 Port Phillip Bay Management Plan nitrogen targets.

The phasing of this maintenance expenditure is weighted more towards the end of the 2016 regulatory period when we expect to have implemented new processes for the treatment and disposal of sedimentation. Sediment treatment volumes are expected to increase from 10,000m³ to 50,000m³ from the beginning to the end of the period. The disposal methods that are aimed to be in place are anticipated to be more efficient and therefore less costly entering the fifth regulatory period.

A rigorous internal process is in place to ensure that expenditures remain in line with expectations. This includes monthly rolling forecasts, a detailed review of business results undertaken monthly with the Leadership Team, Chief Financial Officer and Managing Director, and a monthly status reporting to the Board.

Operating expenditure summary

On the basis of this response, Melbourne Water is seeking a further \$15.9M relative to the Draft Decision in prudent and efficient operating expenditure over the 2016 regulatory period, with a further \$27.2M associated with delivery of 50 billion litres of water from the VDP. The impact of increasing the amount of VDP capitalisation is also provided. See Table 9.

¹⁵ ESC, op cit, pp33

Table 9: Operating expenditure summary

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	926.3	920.6	920.3	910.8	900.6	4578.6
Additional allowance						
Energy costs	2.1	2.1	1.9	2.7	3.4	12.2
Pollution response	0.8	0.8	0.7	0.7	0.7	3.7
VDP Order Cost	27.2	-	-	-	-	27.2
VDP Amounts attributable to operating expenditure	-10.0	-10.0	-10.0	-10.0	-10.0	-50.0
Total operating expenditure	946.4	913.4	912.9	904.3	894.7	4571.6



Capital Expenditure

Melbourne Water has considered the outcomes of the ESC's Draft Decision and considers the proposed adjustments to major projects and allocations would compromise the level of service Melbourne Water is required to provide and significantly increase the risk of system failure.

Melbourne Water considers a 5% reduction to capital expenditure is prudent and efficient and proposes this to be applied across the period with the exception of land development. Such a target would further encourage innovation while not posing such a high risk to levels of service and delivery of obligations inherent in the Draft Decision.

Overall, Melbourne Water recommends a total of \$2,614.5M in prudent and efficient capital expenditure over the 2016 regulatory period. This is a reduction of \$107M from that proposed in Melbourne Water's 2016 Price Submission but an increase of \$248.5M from the Draft Decision, when capitalised VDP costs are excluded.

ESC Draft Decision

The ESC's Draft Decision reduced Melbourne Water's capital expenditure allowance by \$355.5M over the period. This includes a \$162.5M reduction to major projects, \$147.9M reduction to large allocations and a further 5% cut to remaining capital expenditure, totalling \$45.1M. Overall, this represents a 14% reduction in capital expenditure over the period when capitalised VDP costs are excluded.

Melbourne Water response

The following sections outline Melbourne Water's response to the Draft Decision. This includes further information on Melbourne Water's capital planning processes and additional explanation of variance in forecast expenditure to actuals, as well as response to each of the significant cuts to major projects and allocations.

Melbourne Water considers the proposed reductions outlined in the Draft Decision presents an unacceptable risk to meeting service and compliance obligations.

Melbourne Water has a robust capital planning process. The proposed capital expenditure is designed to efficiently achieve service outcomes, taking into account the long-term planning horizon. Efficiencies have been incorporated into cost estimates, and delivery schedules are considered realistic. Any greater reductions would need to be met through reprioritisation and then deferral of projects resulting in increased risk to service delivery and to meeting our regulatory obligations. This would also result in the need for a larger capital programs in subsequent regulatory periods.

A significant part of Melbourne Water's capital program is already committed and these committed projects have little or no further scope for cost reductions. When excluding the committed projects, the increased impact and percentage expenditure reduction required to meet the Draft Decision allowance for each service is shown below:

- Water from 14.7% to 18.6%
- Sewerage from 16.2% to 21.4%
- Waterways and Drainage services from 10.8% to 22.0%.

If the Draft Decision is confirmed, Melbourne Water will revise its capital program to ensure that critical risks are addressed but may defer other expenditure. This will result in a peak of capital expenditure at the commencement of the next regulatory period as deferred projects become critical. This deferral of expenditure is not recommended because the increased risk to service delivery is considered too significant to outweigh the decrease in prices. It would also impact efficiency of delivery through managing a program with peaks rather than a more flattened program.

Proposal

Melbourne Water proposes that the 5% adjustment recommended for the "remaining capital expenditure" be applied across the whole program. Such a target would further encourage innovation while not posing such a high risk to levels of service and delivery of obligations.

Melbourne Water has specifically excluded cuts to Land Development capital expenditure. Melbourne Water considers the proposed Land Development capital expenditure reflects customer requirements, driven largely by the development industry.

Program drivers

In preparing the 2016 Price Submission, Melbourne Water consulted extensively with retail water business including, South East Water, Yarra Valley Water, City West Water and Western Water, customers, regulators and stakeholders in relation to its capital expenditure proposals.

Planned expenditure over the 2016 regulatory period is focused on delivering high-quality, safe and reliable drinking water, fit-for-purpose recycled water, safe sewage treatment and disposal and the provision of waterway, drainage and flood risk reduction services. Projects are scheduled to respond to the need for renewals to replace aging or damaged assets, population growth, service improvements or regulatory compliance. Projects are managed through our Capital Plan process.

Melbourne Water's capital investment is governed by its Strategic Direction, Asset Management Strategy, Capital Investment and Management Framework, and relevant policies and procedures including the State of Assets Report that formalise the

organisation's commitment to service delivery, integrated water management and financial sustainability.

The Asset Management Strategy captures the customer centric approach to our services. The State of the Assets Report is a 'snapshot' at a point in time, identifying the risks for current assets over the following 12 months. It does not consider the risks of increased requirements from the assets either from service growth or increased service compliance.

As part of the annual development of the 20-year Capital Plan, projects are assessed for their risk to level of service with a five to six year view rather than a one year outlook. This allows for risks over the longer period to be accommodated, with respect to growth and compliance requirements.

To assist in the selection of capital projects, Melbourne Water uses prioritisation models which assess the likelihood and consequence of failure combined with the overall strategic and customer benefits that each potential project provides.

In a number of cases, particularly in the area of water supply, some of the projects initially identified as lower priority have been kept in the 20-year Capital Plan based on feedback from the retail water businesses working in cooperation to provide benefit to the community. These lower priority projects and allocations address services such as water quality management, water reservoir/tank refurbishment, safety works or asset renewal works, all of which are necessary to maintain the current standards of service.

While Melbourne Water remains committed to a balanced approach to managing risk, consistent with our role as a manager of critical infrastructure, there is some evidence to suggest that our risk profile is benchmarked at current industry practice. A risk workshop was held with the retail water businesses in January 2016 where each business shared its risk framework. It was noted that every business had similar risk frameworks. The area of variance was the application of consequence rating for the varying size and application of assets.

A further workshop in April 2016, considered the risk profile of the uncommitted program of projects with a value greater than \$5M. The risk ratings of five projects were adjusted following the workshop – four higher and one lower. While not conclusive, these two workshops indicate Melbourne Water is not an overly conservative risk manager.

Program efficiency

In 2013, Melbourne Water entered into long term (up to 10 years) capital delivery contracts with Tier 1 designers and constructors to deliver a substantial part of its major capital delivery program (projects under \$50M). This panel is delivering

improved efficiency by locking in highly competitive rates, key personnel and capability.

While projects are delivered through the Framework Agreement, a large portion of the proposed expenditure, including the bulk of renewals allocations are delivered through maintenance and low risk capital arrangements.

Efficiencies have also been gained through a detailed review of the phasing of the program, to optimise delivery, and ensure projects are delivered in time to meet obligations and levels of service.

Forecasts also include efficiencies such as bundling like-projects, where appropriate, and assessing projects for non-asset solutions prior to being included in the capital plan. Program delivery efficiencies through bundling and/or consideration of the optimum contractor capabilities have been assumed for projects in the current program.

For the 2016 Price Submission, Capital Plan expenditure forecasts were developed using the latest available market prices and Risk Adjusted Nominal Estimates (RANE). In many cases the latest market rates were fed into the project estimates while several larger projects were independently reviewed by quantity surveyors. For projects greater than \$1M, a RANE was completed, including an appropriate risk analysis which was factored into a Monte Carlo analysis. This approach was supported by the strengthening of cost estimation capability including the appointment of senior estimators from the industry.

Program management across low risk capital, including waterways and land, delivered cost efficiencies through strategic procurement by way of bundling. Examples include the procurement for aerators for the Western Treatment Plant, high voltage switchgear and circuit breakers.

Waterway condition project costings are developed using internal costing guidelines, for standard works, that are reviewed periodically (last review in mid-2015) to account for any reduction in rates or other variables on material and labour inputs.

Mechanical and electrical allocations are estimated through a calibrated model. A combination of Weibull failure curves, replacement values and expected life data, together with Monte Carlo simulation, is used to forecast annual renewals allocation costs. These models have been independently reviewed and are continually updated and calibrated with actual data.

Our 5-year capital program is made up of hundreds of projects all at different stages of development through the Capital Planning process. The plan includes projects at each stage of the process to ensure efficient delivery through continuity of work at either investigation, design and construction stages, rather than continual ramping up

and down. As such, the 5-year program includes projects that are at Business Need Identifier, Preliminary Business Case, Functional Business Case, and final Business Case Approval stages as appropriate.

Program delivery

Melbourne Water recommends the ESC reconsider the Draft Decision to reduce allocations on the basis that the current slower pace of delivery will continue in the next regulatory period. Melbourne Water has a track record of delivery, delivering on its expected capital program through the 2008 regulatory period (2008-2013).

Particular circumstances over the 2013 regulatory period led to total delivery being below plan, and those circumstances have now been resolved, with delivery to plan expected over the 2016 regulatory period. The major contributors to delivery below forecast included:

- Transition of contracts of multiple major and minor delivery arrangements
- Significant internal planning work in response to the 2014 government efficiency review
- Market condition changes in 2014 so that several projects were delivered under initial estimates
- Submission of a 5-year delivery plan for 2013 regulatory period, which was reduced to a 3-year period. Efficiencies identified as part of the 2014 government efficiency review were realised in the first years of the plan.

Melbourne Water has also recently implemented significant improvements to its capital delivery process from end-to-end perspective (project initiation to implementation). These changes will better enable continuous delivery through significant disruptions (such as those encountered during the 2013 regulatory period) as well as provide continuous improvement for business as usual delivery. The changes include the introduction of a new asset management system, improved forward planning of low risk capital programs to allow longer lead times, and updating of business processes.

Key projects

The ESC considered the top five projects from each of the major services and applied a \$162.5M reduction to seven of the 15 projects reviewed. The basis for the reductions included:

- Projects being delivered under budget or not to schedule
- A perceived lack of robust business cases
- Conservative cost estimates.

Further information is provided for each of the key projects.

Water

Winneke Treatment Plant – Ultraviolet Disinfection System

The 2016 Price Submission included \$31.7M for implementing ultraviolet disinfection to the treatment train at the Winneke Treatment Plant to meet new requirements of the *Safe Drinking Water Regulations 2015*. The Draft Decision recommends expenditure of \$27.3M, a \$4.4M (13.8%) reduction through removal of the pilot plant expenditure (\$1.4M) and a 10% reduction based on lower costs achieved through non-infrastructure solutions.

A multi-barrier approach is already applied to water quality management at Winneke, including non-infrastructure and infrastructure barriers. Non-infrastructure based solutions have been investigated to evaluate their impact on protozoan risk and do not meet the required outcomes, and as such the UV disinfection project is required.

The pilot plant has been removed from the project as the validation methodology has developed along with the project (validation will now be undertaken through turbidity monitoring which can be done efficiently in situ). The latest estimate and RANE for the project, excluding the pilot plant, was undertaken in November 2015, with an expected cost of \$42M. Based on these costings, which exclude the pilot plant and have taken non-infrastructure solutions into consideration, it is not recommended to reduce the budget as proposed in the Draft Decision.

The proposed timing has also been reviewed. The project has significant float in its schedule, allowing four years (from December 2015 to December 2020) for design and construction. This allows for managing design delays, stakeholder consultation, approvals, procurement and construction delays. Design and construction will be undertaken with overlapping timelines which will further mitigate any time extensions.

Melbourne Water recommends an allowance of \$30.1M, a 5% reduction (consistent with the proposed efficiency reduction) on the 2016 Price Submission proposal of \$31.7M (Table 10). This is on the basis that:

- The timeframes have sufficient contingency
- Non-infrastructure solutions have been investigated
- Current estimates excluding the pilot plant are higher than the budget allowed for in the submission.

Table 10: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	0.0	0.0	0.3	6.5	20.4	27.3
Revised proposal	0.0	0.5	1.1	21.6	6.9	30.1
Additional allowance	0.0	0.5	0.8	15.1	-13.6	2.8

Merri Creek to MCG Water Main Renewal (section of M41)

The 2016 Price Submission included \$35.6M for renewal of the water main from Merri Creek to the MCG, the final stage in renewal of the water mains from Preston Reservoir to St Kilda junction. The Draft Decision recommends removal of this project, stating that current leakage levels do not adversely impact end-use customers or hinder the ability to achieve obligations or levels of service.

This water main is a critical asset which services Melbourne's CBD and surrounding inner city suburbs. It is the central section of an overall transfer system that moves water from Preston Reservoir to the CBD and through to St Kilda junction. This system must remain in service over the summer demand period to adequately maintain pressure requirements, as set out in the Bulk Water Supply Agreements with the retail water businesses, and deliver the full benefits of projects constructed in the 2013 regulatory period.

Current leakage levels do impact end-use customers and hinder Melbourne Water's ability to achieve levels of service. For example, in 2013/14 the main experienced a significant failure resulting in a 132 million litres of lost water. This single leak alone was equal to 70% of the total volume of leaks from Melbourne Water's mains recorded in that financial year.

In addition to water loss, customers are impacted by failures along this main, including:

- Interruptions to service for around 100,000 residential and commercial properties in the CBD. If a significant failure occurs on this main on a high consumption day, it results in reduced pressure in the CBD. This impacts not only residential and commercial properties, but nearby hospitals
- Regular repairs inconvenience road and public transport users on main CBD feeder routes. Repairs to failures of this main are difficult and often involve extended outages due to ground conditions and high volume traffic, which may extend to multiple days
- Impacts on surrounding retail water business assets, which can have increased risk of failure when additional load is placed on them while this main is out of service.

Condition assessments indicate there is up to a 50% chance in any given year of a significant failure along this main. Smaller failures occur regularly, with the most recent in February 2016. These failures continue to occur even though the main is currently being run under reduced pressure while the M40 main located upstream is

being renewed over the next 18-months. It is expected that frequency of failures on this M41 main will increase once the renewal of the upstream M40 main is completed in 2017, and normal operating pressures are resumed

Therefore, on the basis that failures of this asset do adversely impact customers, including retail water businesses, end-use consumers and the general community including road users, it is recommended a capital expenditure allowance of \$33.8M be included; a 5% reduction consistent with the proposed efficiency reduction on the 2016 Price Submission proposal of \$35.6M (Table 11).

Table 11: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	0.0	0.0	0.0	0.0	0.0	0.0
Revised proposal	3.4	18.7	11.4	0.3	0.0	33.8
Additional allowance	3.4	18.7	11.4	0.3	0.0	33.8

Maroondah Aqueduct Renewal

The Draft Decision has proposed re-phasing of this project from construction in 2016/17 to spreading it over 2016/17 and 2017/18 to allow for project delivery delays.

The project is currently scheduled for construction in 2016/17 and is on schedule to commence in October 2016. Any project delays have been mitigated and allowed for in scheduling, including:

- Stakeholder consultation – has been undertaken with affected landowners, customers and stakeholders, and easement processes have commenced
- Permits and approvals – processes are underway with no major issues to date
- Procurement – pipe has been ordered for the project
- Tender – tender process is underway and construction will commence in October 2016
- Construction – nine-month construction period has been allowed which includes contingencies. A similar project completed in the 1990s, of twice the distance, in more challenging terrain and more affected by inclement weather was completed in 12 months.

On the basis that multiple risks to delivery have been mitigated, and/or allowed for in scheduling, it is recommended an expenditure allowance be provided in for 2016/17. The overall project cost has been reduced by 5% consistent with the proposed efficiency reduction. See Table 12.

Table 12: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	17.5	17.5	0.0	0.0	0.0	35.0
Revised proposal	33.3	0.0	0.0	0.0	0.0	33.3
Additional allowance	15.8	-17.5	0.0	0.0	0.0	-1.8

Sewerage

WTP 55E ASP Renewal

Melbourne Water has developed a strategy to accommodate growth and meet ammonia discharge licence obligations at the Western Treatment Plant (WTP), while also renewing aging infrastructure to ensure efficient operation and meet health and safety obligations. The staging of projects to increase treatment capacity at WTP, including the proposed timing of the 55E Activated Sludge Plant renewal, has been designed to accommodate growth by expanding assets in a just-in-time manner to avoid premature investment and minimise costs to customers.

As a result, the only period when there is capacity available for major refurbishment of the 55E ASP is immediately after the completion of the WTP Treatment Capacity Increase (Stage 2) project. After this project is complete there will be a short window of opportunity to take existing capacity offline for renewal and refurbishment. The 55E Activated Sludge Plant (ASP) Renewal must happen immediately after the Stage 2 augmentation to minimise the risk of non-compliance with respect to ammonia.

The project is planned to be constructed between 2019 and 2022. The expenditure consultant's report states that, on the basis of forecast exceedance of ammonia discharge from the WTP, it is anticipated that the 55E ASP Renewal construction is not required until the fifth regulatory period¹⁶. This recommendation is informed by the suggestion that uncertainties in process selection for the Stage 2 (Treatment Capacity Increase) project and viability of sludge dry stacking will lead to changes in ammonia concentrations over the next three to five years. Neither of these projects will impact the need for the project in question. Regardless of the process selection of the Stage 2 (Treatment Capacity Increase) project, it will be selected to deliver the outcome of low (<1 mg/L) ammonia discharge, and the efficacy of dry stacking has minimal impact on ammonia concentration in the effluent in the short term. Furthermore, sludge management assumptions, including dry stacking efficiencies, are already included in the modelling.

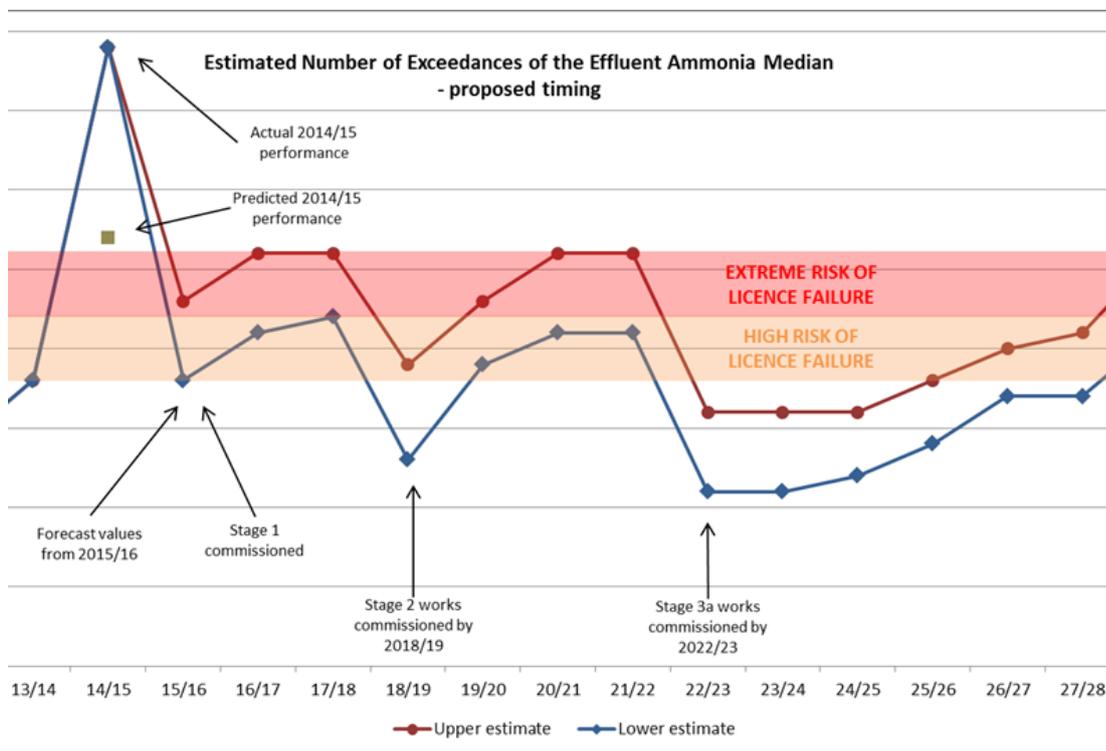
The expenditure consultant's assessment of the graphical information provided is interpreted as showing Melbourne Water to be compliant, albeit nearing the licence condition limit. This graph shows an indicative scenario for ammonia non-compliances, non risk-adjusted, with Melbourne Water on the limit of compliance in the years

¹⁶ Deloitte, op cit, p73

2020/21 to 2022/23. Melbourne Water contends that during this period there is high to extreme risk of not meeting licence requirements, consistent with the expenditure consultant’s comment about the Treatment Capacity Increase project: “with growth rates predicted to increase, the likelihood of exceeding compliance targets increases”¹⁷.

Figure 3 shows that once Stage 2 is commissioned and 55E ASP taken offline, the lower range of forecasts is still at ‘high risk’ of licence non-compliance, and the higher range of forecasts is in the extreme zone. This risk remains high to extreme while 55E is offline through 2019-2022. If this renewal is deferred, the high to extreme period from 2019 is prolonged, increasing the likelihood of non-compliance. Note that realisation of atypical events, such as occurred in 2014/15 means that significant spikes, in excess of model predictions, are also possible.

Figure 3 Estimated number of exceedances of effluent ammonia



As noted above, there is the potential for additional impacts which increase the likelihood of non-compliance. The above graph is based on historical data and average conditions and therefore does not represent the full non-compliance risk. There are several scenarios that contribute to an increase in the level of risk including:

- Greater than forecast flow and load growth. Retailer-provided flow forecasts were increased between the 2013 and 2016 regulatory periods, further increasing the risk

¹⁷ Deloitte, op cit, p71

- Variable climate, rainfall, and recycled water demand. As an example, historical data shows the difference between a dry year and a wet year (and often resultant low recycled water demand) contributes approximately seven additional exceedances in a year
- Changed future conditions with respect to equipment reliability and process performance. For example, ammonia in 2014/15 (39 exceedances) well surpassed expected values (27 exceedances) due to process disruptions (including 25W anaerobic pot performance) and greater than expected sludge accumulation in the lagoon systems

Additional capacity created by the Melbourne Water Stage 2 (Treatment Capacity Increase) project is only sufficient to allow for the two years of offline renewal of 55E ASP. Decommissioning the existing 55E ASP and refurbishment will take two years. An extended commissioning and process stabilisation period (up to 12 months) will also be required due to expected implementation of new technologies.

Deferral of the 55E ASP Renewal project prolongs the period of potential non-compliance beyond the planned window of opportunity, increasing the risk of licence failure from 67% to over 90% over the three year period 2020/21–2022/23.

Melbourne Water considers it is unacceptable to operate the Western Treatment Plant for an additional period at elevated risk levels. It is recommended the capital expenditure for this project should remain as per the 2016 Price Submission with a 5% efficiency reduction (Table 13).

Table 13: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	0.3	0.4	2.0	5.0	0.0	7.8
Revised proposal	0.3	0.4	1.9	4.8	63.5	71.0
Additional allowance	0.0	0.0	-0.1	-0.3	63.5	63.1

Upper Hobsons Bay Main Sewer Renewal

The Upper Hobson’s Bay Sewer Main Renewal addresses high risk sections of the sewer and the need to ensure capacity requirements are met.

The sewer is a key asset in the Melbourne sewerage system. It is a single brick lined sewer located within sandy soils and the groundwater table, located in a highly visible and densely populated area of Melbourne and within a main arterial road.

Brick movements have been identified in condition assessments, and if not corrected, are expected to lead to a sewer collapse in the next five years with significant consequences. A condition assessment completed by CH2M Beca in 2016 confirmed the need to rehabilitate these conduits within the next five years.

Flow capacity is also an issue in the Upper Hobsons Bay Main Sewer. The sewer is approaching its design capacity and some form of augmentation is required to prevent spills and frequent surcharging of the brick sewer. Hydraulic modelling shows the Upper Hobson’s Bay Main Sewer will surcharge during the one in one year rainfall event based on current flows. The business case for this project has been further developed in parallel with the price review process for construction to commence by early 2018. While detailed design has not yet been completed, it has been determined that the renewal will be delivered through structural relining of the sewer with a cured-in-place pipe (CIPP) liner.

Options for addressing capacity issues have been developed by one of Melbourne Water’s technical service providers and assessed through the multi-criteria analysis (MCA) process. The most feasible option identified through the MCA process is to construct a new relieving sewer along New Street (Melbourne Water based its 2016 Price Submission on this option). Melbourne Water therefore recommends an allowance of \$40.3M (inclusive of the 5% reduction) be provided for this project (Table 14).

Table 14: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016/17
Draft Decision	2.0	0.0	0.0	0.0	0.0	2.0
Revised proposal	1.9	19.4	19.0	0.0	0.0	40.3
Additional allowance	-0.1	19.4	19.0	0.0	0.0	38.3

Waterways and Drainage

Alexandra Parade Main Drain Re-decking

The 2016 Price Submission included \$29.1M for re-decking Alexandra Parade Main Drain. The ESC Draft Decision recommends expenditure of \$14.8M, for the remediation of a shorter length of drain, on the basis of risk exposure to community, alternative solutions and a 10% reduction to reflect efficiencies from Framework Agreements.

Since the original submission, the project has progressed through Melbourne Water’s capital process going from initial investigation, through to detailed investigation, options assessment and concept design. The detailed investigation in late 2015/early 2016, determined that the length of drain requiring remedial action is less than what the preliminary assessment of the deck deterioration suggested. At the option assessment stage several viable options, including erecting suitable exclusion fencing, strengthening, patch repairs and selective replacement of decking were evaluated to determine the most suitable solution using a MCA. The project has now reached a concept design stage which has assessed planning requirements, community impact, flora and fauna impacts, and constructability issues, safety in design and cost estimates.

This more comprehensive study has resulted in a solution that will be able to be delivered within the project cost as set out in the Draft Decision. However, consistent with the approach taken for the Winneke UV upgrade, where forecast increased costs are not included, it is proposed the project cost outlined in the 2016 Price Submission be reduced by 5% (Table 15) .

Table 15: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	0.0	0.0	1.5	6.7	6.7	14.8
Revised proposal	0.0	0.0	2.2	12.7	12.7	27.6
Additional allowance	0.0	0.0	0.7	6.0	6.0	12.8

Regan Street Retarding Basin

The Draft Decision included \$9.3M for implementing a project to reduce the unacceptable flood risk in the catchment downstream of Regan Street. The project will reduce this risk to an acceptable level by providing flood storage to reduce flooding to downstream properties. The Draft Decision recommends expenditure of \$8.4M on the expectation of the ability to deliver a 10% reduction in capital cost once detailed options and planning have been completed.

The project will be delivered via the developer works process and as a result Melbourne Water needs to align with the developer's timelines and estimates, which plan for construction during 2017/18.

In order to achieve these timelines, the developer has already rezoned the land for Melbourne Water's retarding basin as an Urban Floodway Zone (UFZ). The project will enter the next stage of the delivery process in early 2016/17.

A significant project risk is the cost of land, which is market driven and likely to increase until the purchase is completed. Therefore the 2016 Price Submission estimate of \$9.3M, less a 5% efficiency target, is considered the most appropriate estimate at this stage (Table 16).

Table 16: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	8.3	0.1	0.0	0.0	0.0	8.4
Revised proposal	8.7	0.1	0.0	0.0	0.0	8.9
Additional allowance	0.5	0.0	0.0	0.0	0.0	0.5

Other key projects

For eight of the 15 key projects reviewed, no reduction in proposed expenditure or re-profiling was made. These projects totalled \$360.6M in expenditure. However,

Melbourne Water’s revised proposal is to reduce the project allowances by 5%, or \$18M consistent with the proposed overall efficiency reduction (Table 17).

Table 17: Proposed project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	64.7	135.6	98.9	41.6	19.9	360.6
Revised proposal	61.4	128.8	94.0	39.5	18.9	342.6
Proposed reduction	-3.2	-6.8	-4.9	-2.1	-1.0	-18.0

Key projects summary

A summary of the proposed key project expenditure is provided in Table 18. Overall, Melbourne Water is seeking an increase of \$131.6M in capital expenditure allowance from the Draft Decision.

Table 18: Proposed key project expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision – key projects	92.8	153.6	102.8	59.8	47.0	455.9
Revised proposal	109.0	167.9	129.6	78.9	102.0	587.4
Additional allowance	16.3	14.3	26.9	19.1	55.0	131.6

Key allocations

The ESC’s Draft Decision saw a 20% reduction across Melbourne Water’s largest allocation programs. This was based on slower progress in delivery and realisable efficiencies from increased competition arising from the design and construction framework agreements. The exception to this was the Land Development program (\$9.9M reduction and a 4% cut on remaining) and retarding basin upgrades (10%). Each of the allocations is considered in the following sections.

Mechanical and Electrical

Mechanical and Electrical

The Draft Decision recommended a 20% reduction (\$42.8M) to the following major mechanical and electrical (M&E) asset renewal allocations:

- ETP – M&E Assets Renewals Program
- WTP – M&E Assets Renewals Program
- Sewer Transfer - M&E Assets Renewals Programs
- Water Quality – M&E Assets Renewals Programs
- Water Transfer – M&E Assets Renewals Programs.

Mechanical and electrical assets include switchboards, substations, pumps, drives, gearboxes, tank chains, outlet gates, sludge collectors, digester overhauls, diffusers, operational systems (e.g. chlorine), mixers, slip recovery drives, penstocks, aerators and membranes.

Effective and efficient management of these assets is critical to ensure that ongoing levels of service are maintained by keeping the water and sewerage systems functioning. A 20% reduction of expenditure on these assets would result in an under-investment in these areas, risking less efficient and unplanned operating expenditures.

The M&E allocation values are based on renewals planning and modelling. These models were developed in preparation for the 2008 regulatory period. As described earlier, the allocation forecasts are estimated through a calibrated model. A combination of Weibull failure distribution curves, replacement values and expected life data, together with Monte Carlo simulation, is used to forecast annual renewals allocation costs. These models have been independently reviewed and are regularly updated and calibrated with actual data.

The increasing age of assets has contributed to the upward trajectory in the modelled annual allocations outcome. Specific examples are the Winneke Water Treatment Plant and ETP which are 35 and 40 years old respectively.

Melbourne Water implements a 'run to failure' asset renewal program where asset failure does not significantly impact delivery on levels of service. For assets where failure is not acceptable, renewals are scheduled based on asset condition assessments to occur just prior to forecast failure. Some of the criteria considered for where failure is not accepted are:

- Impact on level of service
- Increased maintenance costs to maintain assets which economically should be replaced
- Unplanned downtime resulting in inefficient operation
- Unacceptable safety risk
- Environmental risks.

During the 2008 regulatory period M&E renewals investment exceeded the determination allowance. The slower progress in delivery during the 2013 regulatory period is a direct result of the contractor and system transition factors previously outlined. This investment has increased significantly over two years since the low of 2013/14 and is forecast to exceed both the pricing submission and renewals model allowances for the 2015/16 financial year, demonstrating the ability to deliver and confirming the investment level forecast by the model. Given the majority of this investment is through existing and market-tested minor capital delivery partners, reference to realisable efficiencies from increased competition arising from the design and construction framework agreements is not relevant. Melbourne Water therefore proposes a \$203.2M budget allocation for these allocations which includes a 5% reduction on the 2016 Price Submission (Table 19).

Table 19: Proposed allocation expenditure allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	36.4	33.7	30.3	34.7	36.0	171.1
Revised proposal	43.3	40.0	35.9	41.2	42.8	203.2
Additional allowance	6.8	6.3	5.7	6.5	6.8	32.1

Water

Aqueducts Renewals Program and Maroondah Aqueduct Renewal of Tunnel Sections Allocations

The Draft Decision recommends a 20% reduction to the Aqueducts Renewals and the Maroondah Aqueduct Renewal of Tunnel Sections allocations. This reduction would delay the delivery of the piping of the Maroondah aqueduct, therefore extend the use of a leaking, ageing asset, and delay realisation of the benefits of reconfiguring the aqueduct system.

These allocations are used to fund the renewal of the Maroondah Aqueduct, which is one of Melbourne's oldest water supply assets. The aqueduct is critical to the water supply system and is in particularly poor condition, resulting in a high level of leakage and an inability to operate it at full capacity. Average maintenance on the Maroondah Aqueduct costs in the order of \$420,000 per annum and water losses can be as high as \$320,000 per annum.

The 20 year program is planned to progressively renew sections of the aqueduct, tunnels and siphons to achieve a fully piped system. This program of works will deliver on a whole of system strategy which has taken into consideration business risks, obligations and required levels of service for both the Maroondah and Coranderrk aqueduct systems. The strategy includes water quality, transfer flow quantity, yield, asset condition, system losses, health and safety and ongoing maintenance costs. The planned works will increase the capacity of the aqueduct to optimise Maroondah harvesting and allow for additional flow from the Coranderrk system.

The proposed 20% reduction (\$7.8M) in this period would prevent delivery of several sections of the aqueduct renewal leading to a delay in benefits being realised and could result in a step increase in capital expenditure in the next regulatory period. Delays would also result in continuing high maintenance costs. This would further delay system optimisation and the realisation of the benefits of reconfiguring the aqueduct system. Therefore, Melbourne Water proposes the budget for these allocations of \$37.3M which includes Melbourne Water's proposed 5% efficiency (Table 20).

Table 20: Proposed allocation expenditure allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016/17
Draft Decision	0.0	0.1	2.9	17.0	11.5	31.4
Revised proposal	0.0	0.1	3.4	20.2	13.6	37.3
Additional allowance	0.0	0.0	0.5	3.2	2.1	5.9

Water Supply Tanks Renewals

The Draft Decision recommends a 20% reduction (\$4.5M) to the Water Supply Tanks Renewals allocation. Melbourne Water manages 41 steel tanks ranging in size from 20m to 95m in diameter, which are a critical part of the water supply system. Effective and efficient management of these assets is critical to ensure ongoing levels of service are maintained. This program was significantly reviewed through the 2014 government efficiency review process with risk levels reviewed and program expenditure re-profiled.

In developing the program for the 2016 regulatory period, any renewals that could prudently be deferred to later periods have been re-phased. A total of \$16.7M of the funding in this period has been confirmed for three priority tanks, with four other tank renewals to be prioritised. A 20% reduction in investment in this area would result in works on up to two tanks being deferred resulting in an unacceptable level of risk, and lost benefits through not maximising the life of assets.

This allocation funds works to prolong asset life, and renewals of multiple tanks. The program is developed based on observed condition so that works are not undertaken any earlier than necessary and refurbishment approaches are optimised. For example, installation of flexible internal liner systems has been used instead of the more traditional full replacement of steel floor plates. Preventive works, such as installation of sealed ring roads around the tanks to slow down future deterioration, are undertaken to maximise the remaining asset life of the tanks.

The program has been developed prudently and efficiently, and a 20% reduction would result in a greater risk of not meeting levels of service and the missed opportunity of not maximising the remaining asset life of the tanks. Melbourne Water therefore proposes an allowance for \$21.5M which is a 5% reduction from that proposed in the 2016 Price Submission (Table 21).

Table 21: Proposed allocation expenditure allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	0.0	0.0	3.7	7.2	7.1	18.1
Revised proposal	0.0	0.0	4.4	8.6	8.5	21.5
Additional allowance	0.0	0.0	0.7	1.4	1.3	3.4

Sewerage

ETP – Minor Capital Assets Renewals Allocation

A 20% reduction of the ETP Minor Capital Assets Renewals Allocation would result in an underinvestment in this area, which would impact the ability to meet our obligations and levels of service.

ETP was commissioned in 1975 and treats 42% of Melbourne’s sewage, discharging tertiary treated Class A Water into Bass Strait under licence from EPA Victoria. Many of the civil assets at this facility are over 35 years old and have exceeded, or are approaching the end of, their design life (e.g. biosolids stockpiles, membranes and handrail coatings). Due to the corrosive nature of the environment at ETP, these assets will require renewals works due to failure, requirements to meet changes in safety standards, or where risk and consequence of failure is high and pre-emptive replacement is required to reduce risk.

This allocation is assigned for assets where failure is not acceptable, due to the impact on levels of service, increased asset maintenance costs (which economically should be replaced), unplanned downtime (resulting in inefficient operation or unacceptable safety), or environmental risks or incidents.

Some examples include:

- ETP digester roof renewals to prevent a release of sludge
- ETP Secondary Sedimentation Tanks renewals to prevent corrosion of the steelwork
- Upgrades to the roads circling the holding basins and drying pans to ensure they remain safe for operational vehicles.

Melbourne Water therefore recommends \$2.8M in additional capital expenditure allowance be included, which is a 5% reduction from that proposed in the 2016 Price Submission (Table 22).

Table 22: Proposed allocation expenditure allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	3.0	3.0	3.0	3.0	3.0	15.0
Revised proposal	3.6	3.5	3.5	3.6	3.6	17.8
Additional allowance	0.6	0.6	0.6	0.6	0.6	2.8

Hobsons Bay Main Yarra Crossing Optimisation Program

The Draft Decision recommends a 20% reduction to the Hobsons Bay Main Yarra Crossing Optimisation Program. A reduction in funding for this program would result in an unacceptable level of risk and could potentially bring forward the full renewal of the main at a cost of around \$300M.

The Hobsons Bay Main Yarra Crossing Sewer is a critical asset in the transfer of approximately 30% of Melbourne’s sewage to WTP. It was constructed around 1960 and is experiencing significant levels of corrosion. This section of the sewer crosses the navigable section of the Yarra River (from Port Melbourne to Spotswood, crossing south of the West Gate Bridge). Critically, there is no redundancy in the system at this location and it is not possible to divert flows around the Yarra Crossing to other parts of the network. The rehabilitation of the Yarra Crossing is a significant undertaking given the scale of the works and the magnitude of the flows in the system.

Works in this area would avoid the need for a complete renewal of this asset, at a cost of around \$300M. It is estimated that if the proposed works were completed, full renewal could be deferred for a further 20 years. The Hobsons Bay Main Yarra Crossing Optimisation Program would fund works including annual spray coating to extend asset life, installing a structural liner between the drop structures on either side of the Yarra River, and contingency works (including modifying penstocks and the construction of emergency relief structures) to allow for controlled spills in the event of an asset failure.

The allocation is based on an independent consultants report undertaken in 2015. Works that can be deferred have already been moved into the next regulatory period to smooth costs, including part of the structural liner work.

A 20% reduction of the program would result in an unacceptable level of risk. Therefore Melbourne Water proposes a 5% reduction to this allocation from the level proposed in the 2016 Price Submission (Table 23).

Table 23: Proposed allocation expenditure allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	1.6	21.3	8.5	0.8	0.0	32.2
Revised proposal	1.9	25.3	10.1	0.9	0.0	38.2
Additional allowance	0.3	4.0	1.6	0.1	0.0	6.0

Waterways

Healthy Waterways Strategy delivery

The proposed waterways capital program in the 2016 Price Submission is required to deliver the level of service set out in the Waterways and Drainage Investment Plan (WDIP).

The Draft Decision to reduce the program by 20% on the basis of slower delivery of projects and realisable efficiencies would result in only 80% of the waterway condition implementation program being achieved. This would represent a real reduction in service outcomes, with fewer projects delivered or planned projects deferred.

Community engagement data indicates a strong customer preference for enhancement of waterway management activities that support vegetation and habitat management across 35% of our waterways.¹⁸

Our community engagement has consistently shown how highly our customers value waterways in supporting environmental health and liveability within the region. Our customer research has also found a broad satisfaction with Melbourne Water's current level of investment in waterways and drainage services¹⁹.

The proposed waterways capital program in the 2016 Price Submission is realistic and efficient. The program incorporates significant efficiencies compared with the previous 2013 regulatory period. To deliver a similar quantum of works, the waterways capital allocation planned for the 2013/14 to 2017/18 period was forecast at \$94M as compared to the proposed \$68.4M for the upcoming five year regulatory period.

A proposed 20% reduction in the waterways capital program would result in capital expenditure below the levels (based on current capital unit cost analysis) required to deliver the programs of work necessary to achieve WDIP targets for waterway health improvements to maintain biodiversity around waterways. For example:

- The estimated capital unit cost per hectare for renewing aquatic habitat has reduced from \$109,000 for the 2013 regulatory period to \$74,000 for the upcoming regulatory period (a 32% reduction in costs). The proposed 20% reduction in capital expenditure would reduce the unit cost per hectare for aquatic habitat renewal to \$59,000 per ha. Melbourne Water considers this unachievable and the target renewal of 85 ha would need to be reduced to 68 ha
- The estimated capital unit cost per km for renewing waterway vegetation has reduced from \$80,000 per km for the 2013 regulatory period to \$54,000 for the upcoming regulatory period (a 33% reduction in costs). The proposed 20%

¹⁸ Melbourne Water, Waterways and Drainage Investment Plan, 2015, Appendix 1.

¹⁹ Melbourne Water, Waterways and Drainage Investment Plan, 2015, Appendix 1

reduction in capital expenditure would require this target to be achieved at \$43,000 per km. Melbourne Water considers this unachievable and the revegetation target of 351km would need to be reduced to 281km.

Over that last two years Melbourne Water has revised capital planning, programming and project management (scheduling and works planning) to ensure delivery of this capital program.

Table 24 outlines Melbourne Water’s recommended allowance which includes a 5% reduction from the 2016 Price Submission.

Table 24: Proposed allocation expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	10.8	11.0	11.0	11.0	11.0	54.7
Revised proposal	12.9	13.0	13.0	13.0	13.0	65.0
Additional allowance	2.0	2.1	2.1	2.1	2.1	10.3

Land Development Works

Through the Land Development program, Melbourne Water will undertake capital works such as new drainage infrastructure, wetlands and retarding basin to service the growth areas of Melbourne. These works are designed to minimise flood risk for new properties and buildings without adversely impacting waterways. The cost of these works is collected from developers as land is developed through Development Service Schemes.

The Draft Decision proposed a reduction of \$9.9M and then a 4% cut to match the change in forecast developer contributions from the 2013 and 2016 price submissions.

Melbourne Water believes the proposed reduction of \$9.9M is a misunderstanding of the program costs and should be reconsidered. During the expenditure audit, the ESC’s expenditure consultants sought the business cases for the allocations. All business cases were provided by Melbourne Water by email on 3 February and it was noted in transmittal:

Land development works business cases totals \$413.3M out of the total allocation of \$423.2M. The remainder is for smaller value developer schemes allocations, for the purpose of the Price Submission these were added together.

Further information can be provided on the smaller value developer scheme allocations (\$9.9M). This funding is required to deliver the service and does not represent a planned reduction in spend.

The proposed 4% reduction in spend is not considered reasonable given the increase in developer contribution outlined in the Draft Decision. In its Draft Decision, the ESC increased the forecast developer contributions from an average of \$55.7M to \$62.6M

(capital offsetting contributions), an increase of 12%. Given this and Melbourne Water’s further proposed forecast increase (see page 46), the 4% cut is no longer justified. Therefore, Melbourne Water recommends that the full proposed Land Development capital expenditure be included in the ESC’s final decision.

Table 25: Proposed allocation expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	81.7	80.5	79.1	78.0	77.1	396.3
Revised proposal	87.2	85.9	84.5	83.4	82.3	423.2
Additional allowance	5.5	5.5	5.4	5.3	5.2	26.9

Flood Mitigation Works

Flood mitigation works continue to address legacy flood risks on a priority basis as described in the Waterways and Drainage Investment Plan informed by the recently released *Flood Management Strategy: Port Phillip and Westernport*²⁰.

The Draft Decision included a 20% reduction of the flood mitigation program on the basis of slower delivery of projects and realisable efficiencies. Melbourne Water notes, the application of the proposed 20% reduction is applied to the total flood mitigation works (\$128.2M) as set out in the 2016 Price Submission. However, this allocation includes two major projects, the Murrumbeena Main Drain Flood Mitigation Project (\$37.4M) and the Regan Street Retarding Basin Flood Mitigation Project (\$9.3M). These two projects were assessed separately and their costs should be removed from the allocation leaving a residual cost of \$81.5M²¹.

Notwithstanding this, the Draft Decision reduction of 20% will mean the Waterway and Drainage Investment Plan target to reduce flood effects by 15% will need to be reduced to 12%.

Melbourne Water has a long history of delivering flood mitigation works. For the 2008 regulatory period, we delivered on our planned flood mitigation works and we are on track to deliver for the 2013 regulatory period.

Melbourne Water has sought to ensure the capital program is delivered as efficiently as possible. A post implementation review was conducted on the delivery of the flood related services at Melbourne Water for the 2008 regulatory period and 2013 regulatory period. This review included the flood mitigation works program. The learnings from these reviews were incorporated into developing the Flood Management Strategy. These included cost sharing with other agencies, project

²⁰ Melbourne Water 2015 *Flood Management Strategy: Port Phillip and Westernport*

²¹ See 2016 Price Submission, on pg. 74 it is noted that the Waterways and Drainage Capex Allocations Flood Mitigation Works Total (as footnoted) includes Major Projects. This total of \$128.2M includes Murrumbeena M.D Flood Mitigation Works \$37.4M & Regan St Retarding Basin \$9.3M. Removing these two major projects from the allocation reduces the total to \$81.5M

bundling, and low capital intensive solutions such as flood warning systems. Cost estimation for the 2016 Price Submission for flood mitigation works was prepared incorporating these learnings.

Melbourne Water’s proposed expenditure allowance is provided in Table 26. This represents a 5% reduction from the \$81.5M total.

Table 26: Proposed allocation expenditure allowance (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	11.0	18.3	26.5	24.4	22.4	102.6
Revised proposal	3.2	4.1	14.5	28.9	26.6	77.4
Additional allowance	-7.8	-14.2	-12.0	4.5	4.2	-25.2

Rehabilitation of existing wetlands

Melbourne Water has a planned program of works to ensure the wetlands it manages function to protect waterways and the bays from pollutants and toxicants.

The ESC’s Draft Decision included a 20% reduction for this program on the basis of slower delivery of projects and realisable efficiencies. This reduction would lower Melbourne Water’s ability to deliver on agreed levels of service from the intended 74.3% to 69.1% and allow an additional 11.2 tonnes of nitrogen to impact waterways and bays. It would also further restrict the ability of Melbourne Water to return to 100% of the agreed service level in the following regulatory period.

In specific terms, the proposed expenditure reduction of 20% would reduce the area of reinstated vegetation by 25%, with approximately 15 fewer wetlands renewed (out of a total of approximately 60 planned) over the five year regulatory period.

Wetlands provide a crucial role in meeting Melbourne Water’s obligations. Wetlands and sediment ponds are a critical component of meeting the State’s water quality objectives by reducing the total volume of suspended solids, nitrogen and phosphorus, as well as toxicants, from entering waterways and the bays. Current expectations are set through the State Environment Protection Policy Waters of Victoria (SEPP WoV) and associated Port Phillip Bay Environmental Management Plan commitments.

EPA Victoria in its guidance confirmed its requirements in this regard. See below:

Melbourne Water has obligations under SEPP WoV to maintain and renew their constructed sediment ponds and wetlands (or replace or substitute with assets that meet equivalent environmental standards to those required to meet SEPP outcomes) as a critical water treatment asset to ensure they function for the purpose they were built. Constructed sediment ponds and wetlands play a similar role to wastewater treatment plants by removing pollutants from water to a standard set by the EPA that is acceptable for discharge into receiving waterways and bays.²²

In addition, an early draft of the revised Port Phillip Bay Environmental Management Plan indicates there will be a focus/target to “Ensure the design intent for nutrient and sediment load reduction from existing stormwater management assets is being achieved”.

To ensure these assets continue to meet their design requirements, they require regular ‘resetting’. This can include removing sediment or reinstating vegetation.

Melbourne Water’s estimated current performance in terms of nitrogen reduction is 132.3 tonnes/year²³, meaning that only 51.6% of assets are currently meeting their service requirements. The works under this allocation for the 2016 regulatory period will reinstate the equivalent of 720,000m² of wetland vegetation. This will lead to:

- An increase in the current nitrogen reduction performance by an additional 55.8 tonnes
- An increase in the percentage of wetlands that meet their required level of service from 51.6% to 74.3% – on a pathway to 100% level of service in subsequent regulatory periods.

Wetlands are a relatively new asset class and significant learnings have resulted from delivery of this program over recent years. Over the 2013 regulatory period, a budget was allocated to ‘trial run’ several major wetland renewals. This was principally to gain a better understanding of the process and costs associated with renewing large scale wetlands and to accurately forecast budget proposals for the 2016 Price Submission.

The majority of the renewals budget allocation is to be delivered through Melbourne Water’s major capital framework. Work is well advanced for wetland renewal projects planned for 2016/17 and 2017/18 to ensure timely delivery in these forecast years. Five minor capital wetland projects are in progress for 2015/16 delivery and an additional four minor capital and two major capital projects are in train for a 2016/17

²² EPA Victoria Guidance – Melbourne Water 2016 Pricing Submission

²³ This total has been determined using a combination of revised N-reduction modelling and vegetation cover assessments.

start, ensuring our program is advanced and ready to deliver from the start of the new regulatory period.

In developing our 2016 Price Submission Melbourne Water is confident, based on our history of delivery, we have defined a realistic and achievable program. This program is built on realised program and project management improvements, improved network performance monitoring (planning) as well as existing efficiency gains from insourcing Melbourne Water’s minor capital delivery. The forward works program is based on knowledge gained through the current regulatory period of costs to ensure our forecasting is accurate and deliverable.

Table 27 outlines Melbourne Water’s recommended allowance which includes a 5% reduction from the 2016 Price Submission.

Table 27: Proposed allocation expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	2.4	1.5	12.9	12.8	12.6	42.2
Revised proposal	2.8	1.8	15.3	15.2	15.0	50.2
Additional allowance	0.4	0.3	2.4	2.4	2.4	8.0

Retarding Basin spillway/embankment upgrade

The allocation for retarding basin upgrades is to improve the dam safety aspects of the retarding basin embankments. This requirement is set out in the Statement of Obligations.

The program requires a detailed risk assessment of all extreme and high hazard retarding basins (90 basins) to determine the likelihood and consequence of failure (potential loss of life) of a retarding basin during a storm event. This is shown by using a societal risk plot in accordance with the ANCOLD Guidelines. Where retarding basins plot above the “line of tolerability”, those basins require upgrades to the embankments/spillways so that the likelihood of failure reduces to a point below the line of tolerability.

The available information indicates that there is likely to be approximately 80 of the 90 retarding basins plotting above the line of tolerability and thus requiring upgrade works. Presently, there are 12 basins under upgrade design and based on present costings the average cost per basin is \$2.5M. The 2016 price submission allocation is \$45.9m which means around 18 retarding basins can be upgraded during the regulatory period. Seven basins were completed in 2013 regulatory period, leaving a further 55 retarding basins to be completed in subsequent regulatory periods.

As the retarding basin upgrade program is principally centred on risk reduction (potential loss of life), priority should be given to risk reduction ahead of efficiency

gains. The proposed 10% or \$4.6M reduction to the allocation will mean at least two high priority retarding upgrades will be delayed in to later regulatory periods. Interim and temporary risk management alternatives may need to be installed at additional cost. The quantum of upgrade works across several regulatory periods necessitates the maximum possible allocation to be available in order to reduce the organisation’s risk profile.

Table 28 outlines Melbourne Water’s recommended allowance which includes a 5% reduction from the 2016 Price Submission.

Table 28: Proposed key allocation expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	0.4	10.3	10.2	10.2	10.1	41.3
Revised proposal	0.5	10.9	10.7	10.8	10.8	43.6
Additional allowance	0.0	0.5	0.6	0.6	0.6	2.3

Key allocation summary

A summary of the key allocations is provided in Table 29.

Table 29: Proposed key allocation expenditure allowance (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	147.3	179.6	188.1	199.1	190.9	905.3
Revised proposal	155.2	184.7	195.6	225.6	216.2	977.3
Additional allowance	7.9	5.1	7.5	26.5	25.2	72.0

Community liveability assets

As part of its Draft Decision, the ESC sought details on how the proposed \$28.4M for community liveability assets fall within the scope of prescribed services as defined in the relevant legislation. In developing Melbourne Water’s response, we have consulted with the Department of Environment, Land, Water and Planning and sought legal advice.

The *Water Industry Regulatory Order 2014* (‘WIRO’) provides a framework for economic regulation by the ESC for services provided by the regulated water industry. Pursuant to s7 of the WIRO, metropolitan waterways and drainage services are both a declared service and prescribed service for the purposes of “Coverage” under the WIRO.

The management of waterways by water authorities is governed by part 10 of the *Water Act 1989 (Vic)* (‘Water Act’). Specifically, s189 (1)(a) and s189(1)(b) of the Water Act state the following:

An Authority that has a waterway management district has the following functions in relation to designated waterways and designated land or works within that district—

- (a) to identify and plan for State and local community needs relating to the use and to the economic, social and environmental values of land and waterways;*
- (b) to develop and to implement effectively schemes for the use, protection and enhancement of land and waterways;*

Given the above, Melbourne Water must identify and plan for state and local community needs relating to, among other factors, the social and environmental values of the land and waterways. Further, Melbourne Water is required to develop and implement effective schemes for the use, protection and enhancement of the land and waterways.

In order to carry out its functions under the act, s190 (1) of the Water Act requires Melbourne Water to develop a regional waterway strategy. Pursuant to s 190 (4), Melbourne Waters Waterway Strategy must have regard to the aesthetic, recreational and cultural values of waterways within its waterway management district.

It is Melbourne Water's submission that the delivery of \$28.4M of capital expenditure on community projects (such as green spaces for shade and cooling near waterways) falls within the scope of its waterway management functions under the Water Act. Given this, the proposed expenditure is a component of the metropolitan waterways and drainage service which is a prescribed service under s7 of the WIRO.

Capital expenditure summary

On the basis of this submission, Melbourne Water is seeking a \$2,615M in prudent and efficient capital expenditure over the 2016 regulatory period. This is a reduction of \$107M (excluding VDP costs) from that proposed in Melbourne Water's 2016 Price Submission, which represents an efficiency target of 5% applied across all services, excluding the Land Development program. Table 30 and Table 31 below provide a summary of the proposed capital expenditure allowance by project type and by service.

Table 30: Capital expenditure summary – project type (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	466.7	517.2	473.6	456.1	402.5	2,316.5
Proposed allowance						
Victorian Desalination Project	30.0	30.0	30.0	30.0	30.0	150.0
Key projects	109.0	167.9	129.6	78.9	102.0	587.4
Key allocations	155.2	184.7	195.6	225.6	216.2	977.3
Other capital	218.6	186.2	178.7	175.3	140.9	899.8
Total capital expenditure	512.8	568.8	533.9	509.8	489.1	2614.5

Table 31: Capital expenditure summary - service (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	2016 PS Total
Draft Decision	466.7	517.2	473.6	456.1	402.5	2,316.5
Proposed allowance						
Victorian Desalination Project	30.0	30.0	30.0	30.0	30.0	150.0
Water	118.7	84.1	87.6	126.4	73.9	490.7
Sewerage	193.6	289.6	216.8	142.3	184.2	1,026.4
Recycled Water	1.3	1.4	1.5	1.5	1.5	7.3
Waterways	169.2	163.7	198.0	209.6	199.6	940.1
Total capital expenditure	512.8	568.8	533.9	509.8	489.1	2614.5

Key Performance Indicators

Since Melbourne Water's 2016 Price Submission, a small number of Key Performance Indicators have been reviewed to better measure performance against service outcomes and to ensure the KPIs are driving the right outcomes.

System losses

Melbourne Water currently reports water loss from the supply network as a performance indicator. While Melbourne Water's loss rates are very low by industry standards, we have not met the target for this indicator for the last six years.

Water losses occur across the water supply network, both upstream of treatment (raw water) and downstream (potable water). Upstream losses are largely from water transfers through the aqueduct networks and through the treatment process. Losses downstream of treatment typically occur during tank maintenance and mains transfers.

While most losses (>80%) occur upstream of treatment, there are several significant reasons why consideration should be given to excluding upstream losses from future assessment:

- The measure of raw water losses through the aqueduct system is an estimate only, based on analysis of historical water flows. As aqueduct losses are more than 50% of total system losses, errors contribute significantly to errors in the reported performance indicator
- Efforts to reduce aqueduct leakage are embedded in long-term renewal projects that will take many years to effect change – much longer than the 5-year planning time frame of the 2016 regulatory period.
- Given the strategy to reduce losses upstream of treatment is long term, there is little current value in performance indicator based heavily on those losses
- It is common industry practice to report losses based on potable water transfer only.

For these reasons, the metric to exclude water losses upstream of treatment from the calculation will be changed to the following:

“Maintain *potable water* system losses as a percentage of *potable water* supplied to retail water businesses at less than 1%”

Melbourne Water will continue to consult with customers on managing water losses and work with the ESC to ensure this KPI aligns to national reporting requirements.

Recycled Water Service Levels and Discharge Rates

At present, many of the performance indicators for recycled water and compliance indicators for treatment plant discharges are based on a pass or fail criteria. With the current method for computing the performance indicator, even minor issues experienced in these services are reported as a “fail” across the service and do not reflect the (generally) very high standard of service achieved.

To obtain better insight into the performance of these services, the following changes to computational methodology are proposed.

- **Sewerage (ETP & WTP) - Compliance with EPA discharge Licence requirements:**

- Number of EPA Enforcement Sanctions (previously not reported)
- Effluent Discharge – (change from Pass/Fail to %number of parameters passed)
- Odour Discharge – (no change proposed).

- **Recycled Water (ETP & WTP) – Recycled Water schemes fully compliant with regulatory obligations and contractual requirements as outlined in the relevant Bulk Recycled Water Supply Agreements:**

- Reliability – (change from pass/fail for month to % hrs available for month)
- Quality – (no change as metric accurately reflects customer agreements)
- Volume - (change from pass/fail for month to % hrs available for month).



Factors impacting financing costs

Melbourne Water is proposing a revised approach to setting the weighted average cost of capital (WACC). This has been developed to ensure the benchmark cost of debt better aligns to historical rates paid by Melbourne Water. The approach to annual updates has also been revised and this will ensure that the regulatory allowance for financing cost of capital projects aligns to actual costs.

Melbourne Water has also revised its forecast for developer contributions resulting in an increased forecast.

Weighted Average Cost of Capital

Melbourne Water's 2016 Price Submission proposed introducing a 10 year trailing average approach to estimating the cost of debt component of the regulatory weighted average cost of capital (WACC). The ESC indicated in principle support for the trailing average as it better aligns the actual cost of debt to the regulated benchmark, improves debt management and reduces price volatility. However, the ESC did not approve the proposal as it relied on an historical debt series which during the Global Financial Crisis (GFC) years was higher than Melbourne Water's actual debt costs.

The ESC's Draft Decision sets the WACC at 4.2% using an on-the-day approach although the ESC invited Melbourne Water to re-submit a modified trailing average proposal.

Melbourne Water's response

Following the release of the Draft Decision, Melbourne Water has worked closely with Treasury Corporation Victoria (TCV) to revise the cost of debt calculation to ensure a transition to a 10 year trailing average does not result in "gains". This process has sought to better align cost of debt estimates with the actuals incurred. The revised approach includes using:

- Actual TCV lending rates plus a corresponding Financial Accommodation Levy (FAL) to determine final rates at which a BBB rated entity could have borrowed from TCV during the GFC years (2008/09–2012/13)
- RBA 10 year rates reflecting BBB rated corporates used for the non GFC years (2006/07–2007/08, 2013/14–2014/15)
- The RBA and TCV lending rates are determined using a 12 month averaging period ending 31 March.

The resulting historical cost of debt is provided in Table 32, and shows a lowering of cost of debt, particularly during GFC years.

Table 32: Historical cost of debt (nominal)

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
2016 Price Submission	7.2%	8.2%	10.7%	9.2%	8.0%	8.0%	6.9%	7.2%	5.4%	4.9%
Revised	7.0%	7.4%	6.9%	7.4%	7.0%	6.3%	5.3%	7.1%	5.4%	5.3%
Variance	-0.2%	-0.8%	-3.8%	-1.8%	-1.0%	-1.7%	-1.6%	-0.1%	0.0%	0.4%

Applying this series and remaining WACC parameters as set out in the ESC’s Draft Decision results in an opening WACC of 4.4%.

For the purposes of preparing Melbourne Water’s revenue requirement over the period, the WACC can be either set at the starting rate of 4.4% or a forecast prepared. Melbourne Water proposes to forecast the cost of debt (and as such subsequent WACC) using TCV forward rates over the 2016 regulatory period. A forecast is preferred as it is reflective of the expected prices and revenue that will be collected.

The forecast WACC is set out in Table 33.

Table 33: Forecast WACC using trailing average approach

<i>Real</i>	2016/17 to 2020/21				
Risk Free Rate	0.7%				
Equity Premium	6.0%				
Equity Beta	0.65				
Gearing (Debt/Assets)	60%				
Forecast Inflation	2.2%				
Cost of Equity	4.6%				
	2016/17	2017/18	2018/19	2019/20	2020/21
Cost of Debt	4.2%	4.1%	3.9%	3.9%	3.8%
Real Post Tax WACC	4.4%	4.3%	4.2%	4.2%	4.1%

Annual updating

Melbourne Water is proposing that annual updating be applied to the trailing average. While this is acknowledged as introducing more complexity, there is less opportunity for misalignment between the cost of debt allowance and actuals costs²⁴. Annual updating also avoids the risk of customers experiencing price shocks associated with the WACC only being updated once per regulatory period.

Melbourne Water has considered the annual updating approach set out in the report prepared for the ESC²⁵ and considers a more simplified approach may be suitable.

²⁴ Incenta, Melbourne Water – Trailing Average Cost of Debt, p 16

²⁵ Incenta, op cit p 16

Under this approach the difference in the forecast WACC to the actual WACC in each year would be applied to the Regulatory Asset Base (RAB) for each product to calculate a change in allowed revenue. Regulated tariffs would then be adjusted to ensure the correct revenue is collected.

It is proposed that updates to the regulated revenue allowance be applied to the following services which all have RABs:

- Storage operator and bulk water services
- Bulk sewerage services
- Metropolitan waterways and drainage services (including Patterson Lakes Jetties), and
- Diversions

Simplicity and ease of use have guided the application of the trailing average cost of debt for bulk water and sewerage services. Melbourne Water has matched the revenue requirement with tariff revenue for each of the years of the 2016 regulatory period. This approach limits the annual WACC update process to only recalculating the return on assets allowance for each regulatory year.

The exception is the Waterways and Drainage Charge as revenue matching is not possible due to the price path and tariff reform proposed. Therefore, the annual WACC update needs to be applied so that the present value of the revenue requirement must equal the present value of the tariff revenue allowing adjustments to the return on assets allowance. This approach will ensure that prices are set to collect the correct amount of revenue over the entire regulatory period.

In its 2016 Price Submission, Melbourne Water made no allowance for adjusting its tax liability as a result of annually updating WACC. In considering whether to make an adjustment, Melbourne Water modelled the sensitivity of a WACC adjustment on its tax allowance. Melbourne Water found that a WACC adjustment impacts both the revenue (revenue requirement) and expenditure (interest) side of the tax calculation by a similar magnitude. As a result, the impact on the tax allowance is small. After weighing up the additional complexity introduced into price adjustments resulting from allowing a tax adjustment against the small impact of the resulting adjustment on prices, Melbourne Water proposes to maintain its position of making no allowance for tax adjustments resulting from WACC adjustments.

Developer contributions

At the time of the 2016 Price Submission, Melbourne Water's forecast developer contributions were an average of \$59.5M per year. Subsequent to our submission and during the audit process, Melbourne Water indicated it had seen higher than expected development activity and therefore higher than forecast contributions over the current year to date, and would update its forecast as part of its Draft Decision response should this activity continue.

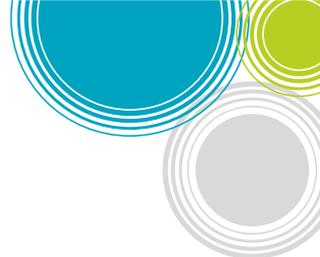
Subsequently, the ESC's Draft Decision provided for an average (capital offsetting) contribution of \$62.6M per annum based on recent actuals. Melbourne Water has also used the period since submitting its 2016 Price Submission to refine its forecasts with the assistance of independent industry experts. This analysis has indicated the key factors impacting underlying demand for new land are likely to be changes to Net Overseas Migration (NOM), the distribution of NOM between the states and to a lesser extent Net interstate Migration (NIM). Other lesser factors include the strength of the economy, changes to lending rates, government policy and grants, performance of the established housing market, capacity of the industry to deliver supply, relative affordability between competing markets and household income patterns. The industry experts also assumed a correction in land sale volumes from late 2016 through to 2018. The extent of this correction will depend on the level of lot supply and developers' appetite for holding lot sales (i.e. selling via investment channels and through builders). Melbourne Water also took into account forecast lot sizes and Scheme rates when revising its forecasts to an average of \$71.1M per annum.

To assist the ESC to reconcile the developer forecasts to the regulatory templates it is noted that, for regulatory purposes, contributions are treated as both a capital and operating offset. As part of the Scheme rate, an administration charge of 1% of land costs and 9% of the remaining costs is paid which funds the costs of developing and administering the Development Service Scheme regime. On average, 6.4% of the money received is related to this administration cost. This is treated as an operating expenditure offset with the remaining contributions received treated as a capital offset expenditure offset with the remaining contributions received treated as a capital offset (see Table 34). In the ESC's financial template, the operating expenditure offsets are counted in 'Other revenue'. This treatment is consistent with the procedures governing Development Service Schemes and benefits customers by lowering prices more than they would otherwise have been set.

Table 34: Proposed developer contribution (2015/16 real dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21	TOTAL
2016 Price Submission – Capex Offset	55.7	55.7	55.7	55.7	55.7	278.5
2016 Price Submission – Opex Offset	3.8	3.8	3.8	3.8	3.8	19.0
Total	59.5	59.5	59.5	59.5	59.5	297.5
Draft Decision – Capex Offset	62.6	62.6	62.6	62.6	62.6	313.0
Draft Decision – Opex Offset (implicit ²⁶)	3.8	3.8	3.8	3.8	3.8	19.0
Total	66.4	66.4	66.4	66.4	66.4	332.0
Revised forecast - Capex offset	70.2	57.9	63.2	70.4	71.2	332.8
Revised forecast - Opex offset	4.8	4.0	4.3	4.8	4.9	22.8
Total	75.0	61.8	67.4	75.2	76.1	355.5

²⁶ The Draft Decision did not specifically adopt an operating cost offset figure



Tariffs and demand

Melbourne Water has revised its proposed water headworks tariffs to a cost per unit of entitlement consistent with the ESC's consideration that this provides a more transparent approach to pricing and could encourage trading.

Melbourne Water has revised its proposal for reforming the Waterways and Drainage Charge for non-residential customers. The proposed 10-year reform will replace the outdated property-value charge with a flat charge while maintaining only inflation increases for residential and rural customers over the coming period.

Melbourne Water has accepted the Draft Decision regarding the Marina at Patterson Lakes and proposes to introduce a charge which would be used to improve water quality in the Quiet Lakes following community support for the proposal.

Water

The ESC's proposal to approve Melbourne Water's bulk headworks water tariffs on the basis that it would improve transparency and better facilitate future water trading is noted.

Melbourne Water has revised its proposed water headworks tariffs to a cost per unit of entitlement consistent with the ESC's consideration that this provides a more transparent approach to pricing and could encourage trading. The headworks prices will continue to be recovered in fixed monthly instalments.

The revised pricing approach will enable Melbourne Water to give effect to any changes to bulk entitlement holdings in the Greater Yarra System Thomson River Pool, Victorian Desalination Project (VDP) or North South Pipeline water supply systems during the course of the 2016 regulatory period. This includes changes to individual retail (urban and regional) bulk entitlement holdings as well as the total volume of water available under all retail bulk entitlement holdings in any of these water supply systems. The latter would require Melbourne Water to adjust its cost per unit of retail water entitlement applied within the affected system. The adjustment would be required to reflect the change in the total volume of water available under all retail bulk entitlement holdings (i.e. the change in the total number of water units across which Melbourne Water's fixed headworks costs are to be apportioned).

This would occur where there is a formal enactment of changes to the Primary Retail Entitlement Holders or Primary Retail Entitlement Holdings (individual or collective) in any of these systems in accordance with an Order made by the Minister under the relevant provisions of the Water Act. Melbourne Water would update the existing bulk entitlements in the Bulk delivery entitlements shares table (see Appendix 3, Table 41), and where applicable, adjust its cost per unit of retail water entitlement to be applied within the affected system, to determine revised prices. Melbourne Water proposes that the uncertain and unforeseen events mechanism proposed by the ESC includes a reference to 'changes to the Primary Retail Entitlement Holders or Primary Retail Entitlement Holdings (individual or collective) in any of the Melbourne Water

supply systems in accordance with an Order made by the Minister under the relevant provisions of the Water Act'. This would be designed such that Melbourne Water could adjust prices and bulk delivery entitlement shares in the event that total volume of water available under all retail bulk entitlement holdings changed.

Melbourne Water supports the ESC's reasoning for approving a single, variable transfer tariff as it is simpler to understand and supported by the retail water businesses.

Melbourne Water also accepts the ESC's decision to remove the interest component for regional retailers as Melbourne Water's borrowing costs are compensated for through the WACC. A complete list of tariffs is provided in Appendix 1.

Victorian Desalination Project pass-through arrangements

Melbourne Water agrees with ESC's view that VDP water order prices would be better separated from the fully fixed headworks tariffs to improve transparency. Revised formulas to reflect this arrangement have been prepared (see Appendix 3).

Melbourne Water proposes to further revise the VDP formula to pass on the costs of water orders to retail water businesses as they are delivered rather than spreading the costs equally over 12 months.

Sewerage

The ESC's proposal to approve Melbourne Water's bulk sewerage tariff structure is welcomed.

However, the ESC's proposal to remove the ITDS tariff at ETP is concerning. The TDS levels in ETP recycled water are currently acceptable for existing recycled water end-uses which predominantly involves application to land (agriculture, golf courses, public open spaces, residential garden watering, etc.). Any increase to current TDS levels at ETP would increase risks to recycled water quality with potential adverse impacts on soils, groundwater and plants. In particular, current end-uses involving salt sensitive plant species would be impacted. Deterioration in quality would reduce the ability to use recycled water beneficially and inhibit the ability of ETP recycled water to contribute to broader resourcing demands in line with the Victorian Government's vision as set out in its Water for Victoria discussion paper. Removal of TDS from recycled water is extremely costly and not financially feasible, and source control remains an effective management approach as supported by the ETP ITDS tariff.

Melbourne Water further updated its sewage load tariffs in response to the Draft Decision requirement that they be reviewed. Prices have generally decreased other than a nominal increase in a load charge at WTP and a volume charge at ETP.

Waterways and Drainage Charge

Non-residential reform

Melbourne Water and the ESC both recognise the need to move around 140,000 non-residential Waterways and Drainage Charge customers from the property value based charge. In its guidance the ESC requirement Melbourne Water to move to a more cost-reflective charge²⁷.

The ESC considered that Melbourne Water's proposal to move the majority of non-residential customers to a flat charge as reasonable. However the ESC is of the view that, whilst acknowledging the pilot nature of Melbourne Water's proposal to move the Top 50 revenue paying customers to a property impact charge, the pricing principles were too broad and there was insufficient information about how prices would be implemented to satisfy the requirements of the WIRO.

In its Draft Decision the ESC proposed not to approve Melbourne Water's Waterways and Drainage Charge tariff structure for non-residential customers and required Melbourne Water to resubmit a proposal that better meets the WIRO.

Revised proposal

In revising its proposal, Melbourne Water will maintain the majority of the reform it proposed in its 2016 Price Submission. It is proposed to transition all non-residential customers from property value tariffs to:

- A fixed charge
- A 10 year transition period to apply (two price review periods)
- Price caps nominated as the form of price control

A step tariff separation is to be retained whereby non-residential customers pay 1.5 times the rate of residential customers on the basis that this reflects the average run-off ratio between residential and non-residential customers.

As the Top 50 revenue paying customers will no longer move to the property impact charge, a 10 year rather than five year transition for all non-residential customers is proposed in order to maintain revenue recovery and align revenue with the price path. The transition period will provide further time and opportunity to research the data and methodology for an impervious surface area charge. Moving to a fixed charge will also provide a more uniform base for implementing further pricing reform.

Residential and rural customers' tariffs will continue to increase each year by the rate of inflation consistent with Melbourne Water's 2016 Price Submission.

²⁷ ESC, Melbourne Water 2016 Price Review Guidance Paper, 2015, p24

Price control

The simplified tariff proposal permits Melbourne Water to revert to price caps rather than a revenue cap for the 2016 regulatory period. This is considered simpler in its application and therefore preferred. The tariff schedule had been updated accordingly.

Requirements of the WIRO

In its Draft Decision, the ESC indicated Melbourne Water must estimate the maximum tariff for each customer or clearly outline an approach to calculate a tariff for each customer and propose an approach for transitioning customers between tariffs, based on cost reflective principles.

This revised proposal contains no pricing principles for setting the charge and instead, is based on setting maximum prices which will apply to each non-residential customer. The transition approach sees the current minimum charge increase while the rate in NAV is progressively lowered. At the culmination of the reform, all non-residential customers will pay a flat charge. As described above, cost reflectivity principles have been retained with non-residential customers paying 1.5 times the rate of residential customers on the basis that this reflects the average run-off ratio between residential and non-residential customers.

Patterson Lakes Marina

Melbourne Water has accepted the ESC's Draft Decision not to approve tariffs for the Patterson Lakes Marina as:

- Maintenance costs are subject to a private contract and a regulated tariff is unnecessary, and
- In the ESC's view the proposed tidal gate capital cost recovery is inconsistent with the findings of an Independent Review.

Melbourne Water considers that both capital and maintenance costs be treated in a consistent manner and, considering the ESC's Draft Decision on the capital cost for the tidal gate at the Marina, Melbourne Water proposes that both be recovered via the Waterways and Drainage Charge.

Quiet Lakes

In its 2016 Price Submission, (Page 80) Melbourne Water indicated that consultations were ongoing with Patterson Lakes Quiet Lakes residents on the option of providing water quality services on a fee for service basis. Following a bore water flushing trial and pricing consultation with all residents, a Water Quality Tariff of \$156 per resident per annum is proposed to apply from the commencement of the 2016 regulatory period.

Background

The Quiet Lakes are a series of three small lakes, located within Patterson Lakes. Quiet Lakes residents have generally wanted water in the lakes to be maintained to a primary contact standard. A user pays principle for higher levels of water quality

service was a key recommendation of the Patterson Lakes independent review undertaken in 2013 at the request of the then Minister for Water.

To help users make an informed decision about the costs under a user-pays model, Melbourne Water agreed to fund a trial to determine if flushing the lakes with bore water could be used to control blue green algae in the lakes.

The trial ran for three years, ending on 31 March 2015. The final review of the trial concluded that the bore flushing had a positive impact on blue-green algae levels.

Consultation

Melbourne Water has consulted extensively with the residents of the Quiet Lakes on the outcomes of the independent review and the bore flushing trial. In September 2015 the Minister for Water confirmed in writing to Kingston Council and a Quiet Lakes resident that a user pays funding model needs to be considered for water quality services, consistent with the recommendations of the independent review.

Melbourne Water subsequently arranged for an independent ballot of all Quiet Lakes residents to be conducted in December 2015 to determine their willingness to pay for the Water Quality tariff. A majority of residents (75% - refer Table 35) voted in support of the proposal.

Table 35: Ballot of Quiet Lakes Property Owners – bore pump flushing charges

Response	Residents	Percentage
Yes	188	74.9%
No	24	9.6%
Opt-out	4	1.6%
Did not vote	35	13.9%
TOTAL	251	100.0%

Proposed services

Proposed higher levels of water quality services consist of Melbourne Water running additional bore flushing over the summer months in Lake Legana and Lake Illawong. This includes pumping 253 million litres of bore water pumped into the lakes for six months of the year (from 1 October – 31 March each year), and weekly blue-green algae monitoring during October and November each year. Melbourne Water will also separately provide 20 million litres of water and additional water quality monitoring to assist in maintaining the lakes. This will be funded through the Waterways and Drainage Charge.

Cost of service and pricing

The total cost of providing bore water and algae monitoring services is estimated at around \$39,000 per annum (see Table 36)

Table 36: Servicing cost – Quiet Lakes (2015/16 Real Dollars)

\$	2016/17	2017/18	2018/19	2019/20	2020/21
Service costs	39,156	38,201	37,269	36,360	35,473

The tariff would be recovered from residents at a rate of \$156²⁸ per annum or \$39 per quarter.

Consistency with the WIRO

Under s3 of the Water Act the Quiet Lakes are defined as a waterway and form an integral part of the local drainage system. At times of heavy rainfall, they store local stormwater run-off until such time as it can be discharged into the regional drains via the McLeod Road pump station or the Patterson River.

Pursuant to s7 of the Water Industry Regulatory Order 2014 ('WIRO'), metropolitan waterways and drainage services are both a declared service and a prescribed service for the purposes of "Coverage" under the WIRO.

Melbourne Water's "Quiet Lakes Water Quality tariff" is proposed as a method of funding in order to increase the quality of the water in the Quiet Lakes ('Service'). This forms part of Melbourne Waters waterways management obligations under the Act.

Melbourne Water notes the management of waterways by water authorities is governed by part 10 of the Act. Specifically, s189 (1)(a) and s189(1)(b) of the Act state the following:

An Authority that has a waterway management district has the following functions in relation to designated waterways and designated land or works within that district:

- (a) to identify and plan for State and local community needs relating to the use and to the economic, social and environmental values of land and waterways;*
- (b) to develop and to implement effectively schemes for the use, protection and enhancement of land and waterways;*

Further, in order to carry out its functions under the act, s190 (1) of the Act requires Melbourne Water to develop a regional waterway strategy ('Strategy'). Under s 190 (4), the strategy must have regard to the aesthetic, recreational and cultural values of waterways within its waterway management district.

Finally, s7 (c) of the WIRO provides that nothing in the WIRO precludes the services that come within paragraphs (a) and (b) from being regulated in relation to "price, standards and conditions of service and supply" differently from any other service that comes within the same category. As a result the service is not a "precluded service"

²⁸ Patterson Lakes charges are proposed to be set in nominal terms for the regulatory period.

on the basis that it seeks to impose a different standard of service for the Quiet Lakes.

Given the above, it is Melbourne Waters submission that both the drainage function of the Quiet Lakes and the service form part of a prescribed service under the WIRO.

Demand

Melbourne Water notes the ESC's proposal to approve our bulk water and sewage demands and drainage customer growth on the basis that the forecasts (with the exception of Western Water) have met the ESC's assessment criteria.

Melbourne Water further accepts the ESC's requirement to update Western Water's bulk water forecasts to reflect latest information and reduced local supply.

The retailers advise that their latest forecasts have not departed materially from the Draft Decision. Melbourne Water does not propose any further amendments to demand in response to the Draft Decision.

Appendix 1 – Tariff schedule

Melbourne Water’s proposed tariffs are provided in the following tables. Note tariffs are subject to the pass-through arrangements set-out in Appendix 3.

WATER AND SEWERAGE PRICES

Estimated tariffs for years 6 – 10 can be found in the regulatory template accompanying this submission

Tariff and Price Component (real \$15/16)	Price (1 July 2016)	PPM (Year 2)	PPM (Year 3)	PPM (Year 4)	PPM (Year 5)
1.1 Storage Operator and bulk water service charges - Greater Yarra System – Thomson River					
<i>(\$/per Entitlement)*</i>					
City West Water	332.52	1.68%	0.87%	2.37%	0.85%
South East Water	332.52	1.68%	0.87%	2.37%	0.85%
Yarra Valley Water	332.52	1.68%	0.87%	2.37%	0.85%
Western Water	332.52	1.68%	0.87%	2.37%	0.85%
<i>(\$/per Month)**</i>					
Barwon Water			761,299.69	-	-
Westernport Water			47,581.23	-	-
South Gippsland Water			47,581.23	-	-
1.2 Storage Operator and bulk water service charges Victorian Desalination Project					
<i>(\$/per Entitlement)*</i>					
City West Water	3,751.22	-1.57%	-0.61%	-2.14%	-3.02%
South East Water	3,751.22	-1.57%	-0.61%	-2.14%	-3.02%
Yarra Valley Water	3,751.22	-1.57%	-0.61%	-2.14%	-3.02%
1.3 Victorian Desalination Project Water Order					
<i>(\$/per Entitlement)</i>					
City West Water	544.39				
South East Water	544.39				
Yarra Valley Water	544.39				
1.4 Storage Operator and bulk water service charges North South Pipeline					
<i>(\$/per Entitlement)*</i>					
City West Water	454.09	1.68%	0.87%	2.37%	0.85%
South East Water	454.09	1.68%	0.87%	2.37%	0.85%
Yarra Valley Water	454.09	1.68%	0.87%	2.37%	0.85%
1.5 Storage operator and bulk water service charges -Transfer					
<i>(\$/per ML)</i>					
Wholesale transfer system	229.17	1.06%	0.44%	2.22%	0.16%
Gippsland Water					
Headworks <i>(\$/per ML)</i>	344.70	1.68%	0.87%	2.37%	0.85%
Transfer <i>(\$/per Month)</i>	1,152.34	1.68%	0.87%	2.37%	0.85%
1.6 Bulk sewerage usage charge – Treatment					
<i>(\$/per ML)</i>					
Western system	268.65	-	-	-	-
Eastern system	72.17	-	-	-	-

Tariff and Price Component (real \$15/16)	Price (1 July 2016)	PPM (Year 2)	PPM (Year 3)	PPM (Year 4)	PPM (Year 5)
1.7 Bulk sewerage usage charge – Transfer					
<i>(\$/per ML)</i>					
Western system	36.75	-	-	-	-
Eastern system	5.25	-	-	-	-
1.8 Bulk sewerage usage charge – Load					
<i>(\$/per Tonne)</i>					
BOD – western system	178.80	-	-	-	-
BOD – eastern system	336.76	-	-	-	-
SS – western system	103.88	-	-	-	-
SS – eastern system	552.95	-	-	-	-
TKN – western system	246.93	-	-	-	-
TKN – eastern system	192.66	-	-	-	-
TDS – western system	29.28	-	-	-	-
TDS – eastern system	29.28	-	-	-	-
1.9 Bulk sewerage service charge					
<i>(\$/per Month)</i>					
City West Water	5,169,010.11	2.68%	2.71%	2.99%	1.16%
South East Water	12,045,096.51	2.43%	2.20%	2.41%	1.07%
Yarra Valley Water	10,316,381.99	2.58%	2.45%	2.66%	1.21%

* Due to these prices being attached to retailers fixed bulk entitlements these headworks prices will be recovered in fixed monthly instalments.

** These prices reflect the transition arrangement agreed to with the listed regional retailers

WATERWAYS AND DRAINAGE PRICES

Estimated tariffs for years 6 – 10 can be found in the regulatory template accompanying this submission

Tariff and Price Component	Price (1 July 2016) (real \$15–16)	PPM (Year 2)	PPM (Year 3)	PPM (Year 4)	PPM (Year 5)
2.1 Waterways and Drainage Charge – All properties located within the area designated as the Urban Growth Boundary, except those indicated in 1.2					
Residential					
- Minimum fee (\$ per annum)	95.58	-	-	-	-
Non-residential					
- Minimum fee (\$ per annum)	115.90	5.46%	5.46%	5.46%	5.46%
- Rate in \$ NAV (cents per annum)	0.8795	-20.78%	-16.78%	-	-
2.2 Waterways and Drainage Charge – All non-residential properties included in the waterway management district as a result of extending Melbourne Water's service area in November 2005 (including all properties within the Shire of Mornington Peninsula), non-residential properties as a result of the extension of the Urban Growth Boundary since 2010 and lifting of farm exemptions except those indicated in 1.3					
Non-residential					
- Minimum fee (\$ per annum)	115.90	5.46%	5.46%	5.46%	5.46%
2.3 Waterways charge – All properties located outside the area designated as the Urban Growth Boundary (\$ per annum), except those indicated in 1.4					
- Minimum fee (\$ per annum)	52.52	-	-	-	-
2.4 Special drainage area charge – All properties in the following parts of the area of the former Dandenong Valley and Western Port Authority as at 5 November 1991, which up to 1997, were subject to a special drainage and river improvement rate					
Koo Wee Rup - Longwarry Flood Protection District	Continuation of the pricing reform commenced in 2013 and concluding in 2021 which will see Divisions A and B replaced with a single cost-reflective price. The current prices in \$NAV will be replaced with unique price paths for individual properties to transition to the single cost-reflective price. During this period those cost of service will be subject to annual CPI adjustments less 1% for service efficiency targets.				
Patterson Lakes	Tariffs in Patterson Lakes Tidal Waterways & Quiet Lakes (except for Jetties annual maintenance) are proposed in nominal terms and held constant in nominal terms across the period. No PPM is proposed				
Properties with access to timber jetties	1,484.00	NOM	NOM	NOM	NOM
Properties with access to concrete jetties	1,031.00	NOM	NOM	NOM	NOM
Jetties annual maintenance	135.56	-	-	-	-
Quiet Lakes water quality service	156.00	NOM	NOM	NOM	NOM
2.5 Miscellaneous services					
Property information statements					
- City West Water	4.59	-	-	-	-
- South East Water	4.59	-	-	-	-
- Yarra Valley Water	4.59	-	-	-	-
Provision of flood level information	38.22	-	-	-	-
Provision of hydrological data					
Storm frequency analysis for selected storm events	131.85	-	-	-	-
Standard fee: One type of daily data	82.00	-	-	-	-

Tariff and Price Component	Price (1 July 2016) (real \$15–16)	PPM (Year 2)	PPM (Year 3)	PPM (Year 4)	PPM (Year 5)
from maximum of two stations					
Standard fee: One type of hourly data from a single station	82.00	-	-	-	-
Provision of one type of 6 minute data from a single station for a period of up to 5 years	82.00	-	-	-	-
Other requests (per hour)	131.85	-	-	-	-
Application fee for construction over Melbourne Water easements or underground pipe (\$)	195.17	-	-	-	-
Inspection fee	397.49	-	-	-	-
Storm water connections/other authorities works/third party works (\$ per connection)					
Application/connection fee	144.31	-	-	-	-
Inspection fee	397.49	-	-	-	-
Fast Track Assessments	1000.00	-	-	-	-
Inspection Charges					
Water Supply Inspections (\$125 per hour)	125.00	-	-	-	-
Complicated Projects/Additional Inspections (\$304 for 3 inspections or \$125 per hour)	125.00	-	-	-	-
Flood feasibility study	768.99	-	-	-	-
2.6 Diversion charges unregulated waterways					
Licence service fee – All licences (\$ per annum)	267.69	-	-	-	-
Plus fee per kilowatt power generation (\$)	21.40	-	-	-	-
Charge \$ per ML – All months	31.29	-	-	-	-
Charge \$ per ML – On–stream winter–fill	15.78	-	-	-	-
Charge \$ per ML – Off–stream winter–fill	15.78	-	-	-	-
Charge \$ per ML – Licensed farm dam	15.78	-	-	-	-
Charge \$ per ML – Non–consumptive	2.02	-	-	-	-
Charge \$ per ML – Stormwater	31.29	-	-	-	-
Works Licence – Hazardous Dams (\$)	90.99	-	-	-	-
Works Operating Licence - General (\$ per annum)	53.76	-	-	-	-
2.7 Diversion charges regulated waterways					
Licence service fee – All licences (\$ per annum)	267.69	-	-	-	-
Charge \$ per ML – All months	65.47	-	-	-	-
Charge \$ per ML – Off-stream winter-fill	15.78	-	-	-	-
2.8 Diversion Application Fees					
Transfer – Sale of Land (\$)	302.46	-	-	-	-
Amalgamation, subdivision (existing licences) (\$)	396.32	-	-	-	-
Minor Amendment (e.g. add / remove parcel, party or existing entity to existing	114.72	-	-	-	-

Tariff and Price Component	Price (1 July 2016) (real \$15-16)	PPM (Year 2)	PPM (Year 3)	PPM (Year 4)	PPM (Year 5)
licence) (\$)					
Transfer – Downstream Trade (\$)	667.51	-	-	-	-
Transfer – Upstream Trade (\$)	985.62	-	-	-	-
Transfer – Repeat Trade Application (\$)	146.01	-	-	-	-
New Licence – Stormwater (\$)	990.83	-	-	-	-
New Licence – Non consumptive / Power Generation (\$)	667.51	-	-	-	-
Additional Charge Where Irrigation and Drainage Plan required (\$)	260.73	-	-	-	-
Works Licence – Amendment (e.g. Pump replacement) (\$)	354.61	-	-	-	-
New Works Construction Licence – Dam / Stormwater (\$)	756.17	-	-	-	-
New Works Construction Licence – Pump Only (\$)	594.49	-	-	-	-
Re-issue – Failure to renew – D&S (\$)	172.08	-	-	-	-
Re-issue – Failure to renew (all-licences) (\$)	260.73	-	-	-	-
Reissue – Following Revocation (\$)	1376.73	-	-	-	-
Copy of Record (\$)	52.14	-	-	-	-
D&S Dam Registration (\$)	93.85	-	-	-	-
Application to Renew (\$)	302.46	-	-	-	-
Land Information Statement (\$)	104.28	-	-	-	-

Appendix 2 – Performance indicators

	2016/17	2017/18	2018/19	2019/20	2020/21
Water					
Production and storage					
Maintain potable water system losses as a percentage of potable water supplied to retail water businesses at less than 1%	<1.0%	<1.0%	<1.0%	<1.0%	<1.0%
Water transfer					
Compliance with retail water businesses' pressure requirements as set out in bulk water supply agreements	99.9%	99.9%	99.9%	99.9%	99.9%
Water quality					
Compliance with the water quality requirements in bulk water supply agreements:	100%	100%	100%	100%	100%
• Microbiological standards (E. coli)	100%	100%	100%	100%	100%
• Disinfection by-products	91.5%	91.5%	91.5%	91.5%	91.5%
• Aesthetics (turbidity)	100%	100%	100%	100%	100%
• Aesthetics (aluminium)	100%	100%	100%	100%	100%
Sewerage					
Treatment					
Compliance with EPA Victoria discharge licence requirements					
WTP					
Number of EPA enforcement sanctions	0	0	0	0	0
% of effluent discharge parameters that meet EPA limits	100%	100%	100%	100%	100%
ETP					
Number of EPA enforcement sanctions	0	0	0	0	0
% of effluent discharge parameters that meet EPA limits	100%	100%	100%	100%	100%
Sewerage transfer					
Offensive odours caused by sewerage transfer activities (that result in a regulatory action)	0	0	0	0	0
EPA SEPP compliance for sewerage system spills					
• System failure – zero spills due to sewerage system failure	0	0	0	0	0
• Zero spills due to storm events of a severity of up to 1-in-5 years	0	0	0	0	0
Biosolids					
Dry tonnes of biosolids beneficially reused (annually)	96,000 ²⁹				
Waterways and Drainage					

²⁹ Future targets are established annually, based on market conditions for biosolids. Melbourne Water is committed to biosolids reuse and has a program of investigating one-off opportunities and well as ongoing markets

	2016/17	2017/18	2018/19	2019/20	2020/21
Value for Melbourne Water customers					
Community satisfaction with waterways is maintained	>80%	>80%	>80%	>80%	>80%
Investment Plan					
Achieve Waterways and Drainage Investment Plan Targets	100%	100%	100%	100%	100%
Maintaining biodiversity around waterways					
Waterways that have undergone active management will be maintained or improved against an established baseline	100%	100%	100%	100%	100%
Restoration of concrete drains and restore to a more natural waterway by replanting with native plants by 2021	-	-	-	-	>5km
Improving amenity					
Invest directly in improving green spaces for shade and cooling across Melbourne by 2021	-	-	-	-	>30ha
Rainwater harvesting, stormwater capture and fit-for-purpose re-use are facilitated					
Facilitated stormwater management over 2016/17-2020/21 achieves multiple benefits (e.g. greening, flood protection, alternative water, capacity building etc.)	100%	100%	100%	100%	100%
Reducing flood risk and impact					
reduction in flood effects, achieved by projects in delivery by Melbourne Water by 2021	-	-	-	-	15%
Diversion services					
Diversions will be managed to meet the service requirements for licence and trade as specified in Melbourne Water's customer charter for diversion services	100%	100%	100%	100%	100%
Delivering development services					
Statutory response times for development referrals	100%	100%	100%	100%	100%
Industry response times will be achieved for development referrals	95%	95%	95%	95%	95%
Development Services Schemes and Strategies will be implemented and reviewed according to the development planning program	100%	100%	100%	100%	100%
Recycled water					
Recycled water schemes fully comply with regulatory obligations and their contractual requirements, as outlined in the relevant bulk recycled water supply agreements including:					
WTP					
• Reliability - % hours available/month	100%	100%	100%	100%	100%
• Quality - % hours at target quality	100%	100%	100%	100%	100%
• Volume - % supplied of target	100%	100%	100%	100%	100%

	2016/17	2017/18	2018/19	2019/20	2020/21
ETP					
• Reliability - % hours available/month	100%	100%	100%	100%	100%
• Quality - % hours at target quality	100%	100%	100%	100%	100%
• Volume - % supplied of target	100%	100%	100%	100%	100%
Corporate					
Renewable energy					
Renewable electricity sourced from the grid and electricity generated (used or exported) from renewable sources as a % of electricity used	20%	20%	20%	20%	20%
Complaints referred to EWOV responded to within EWOV established time	100%	100%	100%	100%	100%

Appendix 3 – Price adjustments

There are three within period adjustments that Melbourne Water is proposing – desalination water order, desalination contract cost change and annual weighted average cost of capital (WACC) update.

	Desalination water order	Desalination contract cost change	Annual WACC update
Greater Yarra System – Thomson River headworks price			X
North South Pipeline headworks price			X
Victorian Desalination Project headworks price		X	X
Victorian Desalination Project water order price	X		
Sewerage fixed price			X
Residential Waterways and Drainage Charge			X
Rural Waterways and Drainage Charge			X
Non-residential Waterways and Drainage Charge			X

When a calculation is required under this document:

1. Year 't' is the year in respect of which the calculation is being made;
2. Year 't-1' is the year immediately preceding regulatory year 't'
3. Year 't-2' is the year immediately preceding regulatory year 't-1'.

All years referred to are regulatory years, reflecting a period of twelve months commencing on 1 July and ending on 30 June. The first regulatory year is 2016/17.

Desalination contract cost adjustment

When the contract costs for the Victorian Desalination Project in any regulatory year differ from the schedule as per Table 37, the change in costs will be calculated in accordance with Equation 1. The costs in Table 37 may be updated or amended when advised, the current contract costs are in line with the advice received on 25 August, 2015.

Table 37: Victorian Desalination Project contract costs (2015/16 Real Dollars)

	2016/17	2017/18	2018/19	2019/20	2020/21
Victorian Desalination Project contract costs	\$592.7 m	\$583.8 m	\$580.5 m	\$568.7 m	\$552.4 m

Equation 1: Desalination contract cost changes

$$DCC_t^{adj} = \left(DCC_t^{for} - DCC_{t,base}^{det} \times \frac{CPI_t}{CPI_{base}} \right) + \left(DCC_{t-1}^{act} - DCC_{t-1}^{for} \right) \times \left(\frac{CPI_t}{CPI_{t-1}} \right) \times (1 + wacc_{t-1}^{act})$$

Where:

DCC_t^{adj}	Is the total change in desalination contract costs.
DCC_t^{for}	Is the forecast desalination contract costs in year t. This will be in real\$ year t
$DCC_{t,base}^{det}$	Is the desalination contract cost allowed for in the revenue requirement for year t as per Table 37.
CPI_t	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter immediately preceding the start of the relevant regulatory year
CPI_{base}	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter in year 2014/15
DCC_{t-1}^{act}	Is the actual desalination contract costs in year (t-1). This will be in real\$ year (t-1)
$wacc_{t-1}^{act}$	Is the real post tax 'vanilla' WACC in year (t-1) as per Equation 4.

Equation 1 calculates the total contract cost changes in two components as Melbourne Water may be advised of a change in contract costs prior to and after the commencement of the financial year.

The first component to determine total changes in contract costs allows for adjustments in forecast desalination costs in year t compared to what was determined (after being adjusted for CPI).

The second component to determine total changes in contract costs is an adjustment for changes in the contract costs between the forecast and actual from the previous year (t-1). These will be adjusted for one year of CPI and the WACC as it is a carry forward amount. VDP contract costs for the determination are as per Table 37.

Price adjustment to reflect annual update to WACC

For each year of the *2016 Price Submission* Melbourne Water proposes the ESC adopt the forecast post-tax real WACC as outlined in Table 38.

Table 38: Forecast Real post tax WACC

	2016/17	2017/18	2018/19	2019/20	2020/21
Real Post Tax WACC	4.4%	4.3%	4.2%	4.2%	4.1%

The proposed WACCs outlined in Table 38 are multiplied by the proposed RABs outlined in Table 39 to determine Melbourne Water’s total expected return on its water, sewerage and waterways and drainage assets.

Table 39: Proposed regulatory asset values (2015/16 Real Dollars)

\$M	2016/17	2017/18	2018/19	2019/20	2020/21
Water					
RAB ^{water}	3,197.8	3,246.1	3,276.1	3,323.0	3,358.7
RAB ^{VDP}	15.0	45.0	75.0	105.0	135.0
RAB ^{NSP}	703.1	695.9	688.8	681.6	674.4
Sewerage					
RAB ^{sewerage}	4,440.2	4,589.3	4,742.8	4,822.3	4,883.6
Recycled water					
RAB ^{AWS}	67.0	66.1	65.2	64.1	63.1
Waterways and drainage					
RAB ^{WWAY}	1,635.4	1,709.7	1,797.0	1,895.4	1,986.0
RAB ^{diversions}	0.3	0.4	0.4	0.5	0.5
RAB ^{Patterson Lakes}	3.4	3.3	3.3	3.2	3.2

Equation 2 to Equation 4 outline the process required to determine the actual WACC in any given year.

Equation 2: Determining cost of equity

$$CoE^{real} = \text{Risk free rate} + (\text{Equity premium} * \text{Equity beta})$$

Where:

CoE^{real}	Is the total cost of equity in real terms for all regulatory years
$Risk\ free\ rate$	Is equal to 0.7% in real terms
$Equity\ premium$	Is equal to 6.0%
$Equity\ beta$	Is equal to 0.65

Equation 3: Determining cost of debt

$$CoD_t^{real} = \frac{\left(1 + \sum_{i=t-9}^t \frac{CoD_i^{nominal}}{10}\right)}{(1 + \pi_{wacc})} - 1$$

Where:

CoD_t^{real}	Is the total cost of debt in real terms for year t
$CoD_i^{nominal}$	Is equal to the simple average of – <i>RBA Table F3 – Non-financial corporate BBB-rated bonds – Yield – 10 year target tenor [Series ID FNFYBBB10M]</i> from 1 April to 31 March before the start of year t (e.g. 1 April 2015 to 31 March 2016 in relation to 2016-17)
π_{wacc}	Is the inflation factor which is equal to 2.2% for all regulatory years

Equation 4: Determining the Actual WACC

$$WACC_t^{real} = CoE^{real} \times (1 - gearing) + CoD_t^{real} \times gearing$$

Where:

$WACC_t^{real}$	Is the post-tax 'vanilla' WACC in real terms for year t rounded to 1 decimal point, i.e. 4.34% is rounded to 4.3%
CoE^{real}	Is the total cost of equity in real terms for all regulatory years
CoD_t^{real}	Is the total cost of debt in real terms for year t
<i>Gearing</i>	Is proposed to be 60%

All cost adjustments associated with annually updating the post-tax real WACC will be placed on each retailer's fixed water and sewerage prices as set out below.

Price formulas

This section sets out the formulae for adjusting Melbourne Water's prices from year to year. Unlike the earlier subsections, these adjustments are expressed in nominal (not real) terms.

Adjusting the Greater Yarra System – Thomson River headworks price

Equation 5 outlines the process for annually adjusting the Greater Yarra System – Thomson River headworks price to reflect the new WACC. This is done in two steps. The first step is to update the previous year's price for inflation and the prescribed price movement as per Schedule 1.1 in Appendix 1. The second step is to add on the adjustment for the movement in the WACC. This is done by multiplying the change in WACC by the RAB³⁰ for water (as listed in Table 39), and then dividing this

³⁰ The mid-point between the opening RAB value and closing RAB value in a particular year

subsequent figure by the total entitlement share for the Greater Yarra System – Thomson River as listed in Table 41.

Equation 5: Greater Yarra System – Thomson River headworks price adjustment

$$P(GYS)_t = P(GYS)_{t-1} \times \frac{CPI_t}{CPI_{t-1}} \times (1 + PPM_t) + \frac{[(WACC_t^{act} - WACC_t^{for}) \times RAB_t^{Water} \times \frac{CPI_t}{CPI_{base}}]}{BE_{total}^{GYS}}$$

Where:

$P(GYS)_t$	Is the price for a 1 ML delivery entitlement share of the Greater Yarra System – Thomson River in year t as per Schedule 1.1 in Appendix 1
CPI_t	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter immediately preceding the start of the relevant regulatory year
CPI_{base}	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter in year 2014/15
PPM_t	Is the prescribed price movement as per Schedule 1.1 in Appendix 1 for year t.
$WACC_t^{act}$	Is the actual calculated real post tax 'vanilla' WACC for year t as per Equation 4
$WACC_t^{for}$	Is the forecast real post tax 'vanilla' WACC as per Table 38 for year t
RAB_t^{Water}	Is the average Water RAB in year t as specified in Table 39
BE_{total}^{GYS}	Is the total Bulk Entitlements in ML's for the Greater Yarra System – Thomson River system as per Table 41

Adjusting the North South Pipeline headworks price

Equation 6 outlines the process for annually updating the North South Pipeline headworks price to reflect the new WACC. The first step is to adjust the previous year's price to reflect movements in inflation and the prescribed price movement as per Schedule 1.4 in Appendix 1. The second step is to add on the adjustment for the movement in the WACC. This is done by multiplying the change in WACC by the RAB for North South Pipeline (as listed in Table 39), and then dividing this subsequent figure by the total entitlement share for the North South Pipeline (as listed in Table 41).

Equation 6: North South Pipeline headworks price adjustment

$$P(NSP)_t = P(NSP)_{t-1} \times \frac{CPI_t}{CPI_{t-1}} \times (1 + PPM_t) + \frac{[(WACC_t^{act} - WACC_t^{for}) \times RAB_t^{NSP} \times \frac{CPI_t}{CPI_{base}}]}{BE_{total}^{NSP}}$$

Where:

$P(NSP)_t$	Is the price for a 1 ML delivery entitlement share of the North South Pipeline in year t as per Schedule 1.4 in Appendix 1
CPI_t	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter immediately preceding the start of the relevant regulatory year
CPI_{base}	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter in year 2014/15
PPM_t	Is the prescribed price movement as per Schedule 1.4 in Appendix 1 for year t.
$WACC_t^{act}$	Is the actual real post tax 'vanilla' calculated WACC for year t as per Equation 4
$WACC_t^{for}$	Is the forecast real post tax 'vanilla' WACC in year t as per Table 38
RAB_t^{NSP}	Is the average North South Pipeline RAB in year t as specified in Table 39
BE_{total}^{NSP}	Is the total Bulk Entitlements in ML's for the North South Pipeline as per Table 41

Adjusting the VDP headworks price

Equation 7 outlines the process for annually updating the Victorian Desalination Project headworks price to reflect adjustments to a) contract costs associated with the Victorian Desalination Project and b) the WACC. The first step is to adjust the previous year's price to reflect movements in inflation and the prescribed price movement as per schedule 1.2 in Appendix 1. The contract cost (as calculated using Equation 1) and WACC adjustments (i.e. movement in WACC multiplied by the RAB) are added together and divided by the total entitlement share for the Victorian Desalination Project as listed in Table 41.

Equation 7: Victorian Desalination Project headworks price adjustment

$$P(VDP)_t = P(VDP)_{t-1} \times \frac{CPI_t}{CPI_{t-1}} \times (1 + PPM_t) + \frac{[DCC_t^{adj} + (WACC_t^{act} - WACC_t^{for}) \times RAB_t^{VDP} \times \frac{CPI_t}{CPI_{base}}]}{BE_{total}^{VDP}}$$

Where:

$P(VDP)_t$	Is the price for a 1 ML delivery entitlement share of the Victorian Desalination Project in year t as specified in Schedule 1.2 in Appendix 1
CPI_t	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter immediately preceding the start of the relevant regulatory year
CPI_{base}	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter in year 2014/15
PPM_t	Is the prescribed price movement as per Schedule 1.2 in Appendix 1 for year t.
DCC_t^{adj}	Is the total change in desalination contract costs, determined using Equation 1
$WACC_t^{act}$	Is the actual calculated real post tax 'vanilla' WACC for year t as per Equation 4
$WACC_t^{for}$	Is the forecast real post tax 'vanilla' WACC in year t as per Table 38
RAB_t^{VDP}	Is the average Victorian Desalination Project RAB in year t as specified in Table 39
BE_{total}^{VDP}	Is the total Bulk Entitlements in ML's for the Victorian Desalination Project as per Table 41

Adjusting the Victorian Desalination Project water order price

Equation 8 outlines the process for calculating the Victorian Desalination Project water order price. This price only applies when a desalination water order occurs, and in years with no order the charge is zero. This price will be charged when the order is delivered, which is similar to the approach adopted for other variable charges, such as the price for water transfer.

Equation 8: Desalination water order cost adjustment

$$P(VDP \text{ order})_{j,t} = DWO_t \times Percentage_{j,t}^{DWO}$$

Where:

$P(VDP\ order)_{j,t}$	Is the desalination water order costs allocated to retail water business j
DWO_t	Is the desalination water order costs invoiced to Melbourne Water by the Department of Environment, Water, Land and Planning.
$Percentage_{j,t}^{DWO}$	Is the percentage of desalination water order costs allocated to retailer j, which is as defined by retailers or if not as listed in Table 40

Table 40: Victorian Desalination Project delivery entitlement shares

Victorian Desalination Project	Retailer share
City West Water	26.4%
South East Water	35.6%
Yarra Valley Water	38.0%
<i>Total</i>	100.0%

Adjusting the sewerage price

Equation 9 outlines the process for annually updating the fixed sewerage prices to reflect the divergence between the forecast and actual WACC. The first step is to adjust the previous year's price to reflect movements in inflation and the prescribed price movement as per Schedule 1.9 in Appendix 1. The second step is to add on the adjustment for the movement in the WACC. This is done by adding one-twelfth of the difference generated after multiplying the change in WACC by the RAB for Sewerage (as listed in Table 39) and each retailer's cost share as listed in Table 42.

Equation 9: Fixed sewerage price (monthly) adjustment

$$P(Sewerage)_{j,t} = P(Sewerage)_{j,t-1} \times \frac{CPI_t}{CPI_{t-1}} \times (1 + PPM_{j,t}) + \left(\frac{1}{12}\right) \left[(WACC_t^{act} - WACC_t^{for}) \times (RAB_t^{sewerage} + RAB_t^{AWS}) \times \frac{CPI_t}{CPI_{base}} \right] \times CAshare_j^{sewerage}$$

Where:

$P(Sewerage)_{j,t}$	Is the monthly fixed sewerage price in year t for business j as per Schedule 1.9 in Appendix 1
CPI_t	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics (6401.0 - Table 8) for the March Quarter immediately preceding the start of the relevant regulatory year
CPI_{base}	Is the Consumer Price Index: All Groups Index for the Eight Capital Cities as published by the Australian Bureau of Statistics

	(6401.0 - Table 8) for the March Quarter in year 2014/15
$PPM_{j,t}$	Is the prescribed price movement as per Schedule 1.9 in Appendix 1 for year t for business j.
$WACC_t^{act}$	Is the actual calculated real post tax 'vanilla' WACC for year t as per Equation 4
$WACC_t^{for}$	Is the forecast real post tax 'vanilla' WACC consistent with Table 38
$RAB_t^{Sewerage}$	Is the average Sewerage RAB in year t consistent with Table 39
RAB_t^{AWS}	Is the average Alternative Water Sources RAB in year t consistent with Table 39 ³¹
$CAshare_j^{sewerage}$	Is the sewerage cost allocation share for retail business j as per Table 42

Table 41 outlines each local water utility's bulk delivery entitlement share for each headwork source.

Table 41: Bulk delivery entitlement shares

Greater Yarra System – Thomson River	Bulk delivery* entitlements (ML)	Retailer share
City West Water	155,227	24.9%
South East Water	209,562	33.6%
Yarra Valley Water	223,271	35.8%
Western Water	18,250	2.9%
Westernport Water	1,000	0.2%
Barwon Water	16,000	2.6%
South Gippsland Water	1,000	0.2%
Total	624,310	100.0%
Victorian Desalination Project		
City West Water	39,595	26.4%
South East Water	53,454	35.6%
Yarra Valley Water	56,951	38.0%
Total	150,000	100.0%
North South Pipeline		
City West Water	25,000	33.3%
South East Water	25,000	33.3%
Yarra Valley Water	25,000	33.3%
Total	75,000	100.0%

* Note bulk delivery entitlements are subject to change pending ministerial advice

Table 42 outlines each local water utility's sewerage cost allocation shares.

³¹ Recycled Water RAB has been included in the sewerage price adjustment as the wholesale recycled water has a shortfall in revenue which is recovered through the sewerage prices charged to the retailers.

Table 42: Sewerage cost allocation shares

Retailer	Retailers' sewerage cost allocation share
City West Water	22.7%
South East Water	40.3%
Yarra Valley Water	37.0%

Price adjustment to reflect annual update to WACC for waterways and drainage, diversions and Patterson Lakes prices

A trailing average approach to the WACC requires that it is updated each year in the regulatory period and prices reflect this. The simple way to do this would be to adjust prices each year to reflect the change in the allowance for the return on assets. However, this only works when the forecast revenue from tariffs equals the revenue requirements – (i.e. as is the case for bulk water and sewerage prices). For waterways and drainage, revenue matching is not possible due to the price path and tariff reform proposed. Consistent with reform proposed, rural and residential prices are subject to inflation increases only for the next five years.

To calculate prices, the present value of the revenue requirement must equal the present value of the tariff revenue (see Equation 10). The approach outlined below ensures that the prices are set to collect the correct amount of revenue over the entire regulatory period.

Equation 10 can be written as per Equation 11. This shows the over and under recoveries in each year of the regulatory period and that the discounted value of these must equal zero. This is the same result as equating the Present Value of Revenue Requirement and the Present Value of Tariff Revenue.

Equation 10 Present Value of Revenue Requirement and Tariff Revenue

$$PV \text{ of Revenue Requirement} = \sum_{i=1}^5 \frac{RevReq_i^j}{\prod_{k=1}^i (1 + w_i)}$$

$$PV \text{ of Tariff Revenue} = \sum_{i=1}^5 \frac{TarRev_i^j}{\prod_{k=1}^i (1 + w_i)}$$

Where:

$RevReq_i^j$	Is the revenue requirement in year i for product j
w_i	Is the WACC in year i
$TarRev_i^j$	Is the tariff revenue in year i

$\prod_{k=1}^i (1 + w_i)$	Is the product of the $(1 + w_i)$
$TarRev_i^{wways}$	$P_i^{res} Q_{i,det}^{res} + P_i^{rural} Q_{i,det}^{rural} + P_i^{nonres(min)} Q_{i,det}^{nonres(min)} + P_i^{nonres(nav)} Q_{i,det}^{nonres(nav)}$ + other revenue _{i,det}
$TarRev_i^{diversions}$	$P_i^{res} Q_{i,det}^{res} + P_i^{rural} Q_{i,det}^{rural} + P_i^{nonres(min)} Q_{i,det}^{nonres(min)} + P_i^{nonres(nav)} Q_{i,det}^{nonres(nav)}$ + other revenue _{i,det}

Equation 11 Alternative to equating revenue requirement and tariff revenue

$$0 = \sum_{i=1}^5 \frac{RevReq_i^j - TarRev_i^j}{\prod_{k=1}^i (1 + w_i)}$$

Where:

$RevReq_i^j$	Is the revenue requirement in year i for product j
w_i	Is the WACC in year i
$TarRev_i^j$	Is the tariff revenue in year i
$\prod_{k=1}^i (1 + w_i)$	Is the product of the $(1 + w_i)$
$TarRev_i^{wways}$	$P_i^{res} Q_{i,det}^{res} + P_i^{rural} Q_{i,det}^{rural} + P_i^{nonres(min)} Q_{i,det}^{nonres(min)} + P_i^{nonres(nav)} Q_{i,det}^{nonres(nav)}$ + other revenue _{i,det}
$TarRev_i^{diversions}$	$P_i^{res} Q_{i,det}^{res} + P_i^{rural} Q_{i,det}^{rural} + P_i^{nonres(min)} Q_{i,det}^{nonres(min)} + P_i^{nonres(nav)} Q_{i,det}^{nonres(nav)}$ + other revenue _{i,det}

To adjust prices for changes in the WACC, it is proposed that the present value calculation be used. The steps to adjust prices are described below.

Steps for adjusting waterways and drainage, diversions and Patterson Lakes prices

The steps for adjusting the prices in year i are as follows:

1. Update the revenue requirement for the divergence between forecast and actual WACC using Equation 12. This formula increases or decreases the revenue requirement by changing the allowance for the return on assets.
2. Update the WACC in the Present Value of Revenue Requirement as per Equation 10 and calculate. This equation should have the determined WACC forecasts for all future years and actual WACC values for the current and preceding years.
3. Recalculate the tariff revenue for the previous years ($i < t$) as per Equation 13. The prices used in the calculation will be the actual prices charged (i.e. updated for previous WACC adjustments).

Update the tariff revenue formula for the current year (i.e. $i=t$) as per

Where:

$TarRev_t$	Is the tariff revenue in year i
P_i^l	Is the price of tariff l in year i, where l = Residential, Rural, Non – residential minimum charge, and Non-residential rate in the NAV.
$Q_{i,det}^l$	Is the quantities for tariff l in year i as per the ESC determination. Where l = Residential, Rural, Non –residential minimum charge, and Non-residential rate in the NAV.
P_i^m	Is the price of tariff m in year i, where m = Diversion prices
Q_i^m	Is the quantities in year i, where m = Diversion quantities
$other\ revenue_i$	Is the other revenue as per the ESC determination in year i for Waterways and Drainage.
$AppFees_i$	Is the application fees as per the ESC determination in year i for Diversions

4. Equation 14. This formula includes an extra component, 'x', in the price movement for non-residential rate in the NAV, and the value of this will reflect the adjustment as a result of the WACC adjustment. It is assumed only the tariff for the non-residential rate in the NAV needs to vary to accommodate the divergences between forecast and actual WACCs.
5. This formula updates future prices based on the current year adjustment.
6. Update the Present Value of Tariff Revenue as per Equation 10 to reflect the updated WACCs as the discount rates.
7. Solve for 'x' such that the Present Value of the Tariff Revenue and Revenue Requirement are equal.
8. This will result in prices being in \$real year i.

Equations and definitions for Waterways and Drainage

The following equations are used to update Waterways and Drainage and Diversions prices for changes in the WACC.

Equation 12 Revenue Requirement adjustment for the actual WACC

$$RevReq_t^{j,actual} = RevReq_t^{j,determination} + (WACC_t^{act} - WACC_t^{for}) \times RAB_t^j$$

Where:

$RevReq_t^{j,actual}$	Actual revenue requirement in a year t (i.e. updated for WACC)
$RevReq_t^{j,determination}$	Determination revenue requirement in a year t (i.e. as per ESC determination)
j	Waterways and drainage, or diversions

$WACC_t^{act}$	Is the actual calculated real post tax 'vanilla' WACC for year t as per Equation 4
$WACC_t^{for}$	Is the forecast real post tax 'vanilla' WACC consistent with Table 38
RAB_t^j	Is the average RAB in year t consistent with Table 39

Equation 13 Tariff revenue for years $i < t$

$$TarRev_{i < t}^{wways} = \sum_l P_{i < t}^l Q_{i < t, det}^l + other\ revenue_{i < t}$$

$$TarRev_{i < t}^{diversions} = \sum_m P_{i < t}^m Q_{i < t}^m + AppFees_{i < t}$$

Where:

$TarRev_t$	Is the tariff revenue in year i
P_i^l	Is the price of tariff l in year i, where l = Residential, Rural, Non – residential minimum charge, and Non-residential rate in the NAV.
$Q_{i, det}^l$	Is the quantities for tariff l in year i as per the ESC determination. Where l = Residential, Rural, Non – residential minimum charge, and Non-residential rate in the NAV.
P_i^m	Is the price of tariff m in year i, where m = Diversion prices
Q_i^m	Is the quantities in year i, where m = Diversion quantities
$other\ revenue_i$	Is the other revenue as per the ESC determination in year i for Waterways and Drainage.
$AppFees_i$	Is the application fees as per the ESC determination in year i for Diversions

Equation 14 Tariff revenue for the current year, $i = t$

$$TarRev_t^{wways} = \sum_l P_{t-1}^l (1 + PPM_t^l) Q_{t, det}^l + x P_{t-1}^{nonres(nav)} Q_{t, det}^{nonres(nav)} + other\ revenue_t$$

$$TarRev_t^{diversions} = \sum_m P_{t-1}^m (1 + PPM_t^m + x) Q_t^m + AppFees_t$$

Where:

$TarRev_t$	Is the tariff revenue in year t
P_t^l	Is the price of tariff l in year t, where l = Residential, Rural, Non –

	residential minimum charge, and Non-residential rate in the NAV.
PPM_t^l	Is the prescribed price path movement for tariff l in year t as per Schedule 2.1 to 2.3 in Appendix 2. Where l = Residential, Rural, Non –residential minimum charge, and Non-residential rate in the NAV.
$Q_{t,det}^l$	Is the quantities for tariff l in year t as per the ESC determination. Where l = Residential, Rural, Non –residential minimum charge, and Non-residential rate in the NAV.
x	Is the increase or decrease in prices expressed as a percentage as a result of the change in the WACC.
$other\ revenue_t$	Is the other revenue as per the ESC determination in year t for Waterways and Drainage.
P_t^m	Is the price of tariff m in year i, where m = Diversion prices
Q_t^m	Is the quantities in year i, where m = Diversion quantities
$AppFees_t$	Is the application fees as per the ESC determination in year t for Diversions

Equation 15 Tariff revenue for the future years, $i > t$

This equation holds future years at the determined PPM, i.e. you only goal seek for the change in the current year.

$$TarRev_{i>t}^{wways} = \sum_t P_{t-1}^l (1 + PPM_t^l) \prod_{j=t+1}^5 (1 + PPM_j^l) Q_{i>t,det}^l + x P_{t-1}^{nonres(nav)} \prod_{j=t+1}^5 (1 + PPM_j^{nonres(nav)}) Q_{i>t,det}^{nonres(nav)} + other\ revenue_{i>t}$$

$$TarRev_{i>t}^{diversions} = \sum_t \left(P_{t-1}^m (1 + PPM_t^m + x) \prod_{j=t+1}^5 (1 + PPM_j^m) Q_{i>t}^m \right) + AppFees_{i>t}$$

Where:

$TarRev_t$	Is the tariff revenue in year t
P_t^l	Is the price of tariff l in year t, where l = Residential, Rural, Non –residential minimum charge, and Non-residential rate in the NAV.
PPM_t^l	Is the prescribed price path movement for tariff l in year t as per Schedule 2.1 to 2.3 in Appendix 2. Where l = Residential, Rural, Non –residential minimum charge, and Non-residential rate in the NAV.
$Q_{t,det}^l$	Is the quantities for tariff l in year t as per the ESC determination. Where l = Residential, Rural, Non –residential minimum charge, and Non-residential rate in the NAV.

x	Is the increase or decrease in prices expressed as a percentage as a result of the change in the WACC.
$other\ revenue_t$	Is the other revenue as per the ESC determination in year t for Waterways and Drainage.
P_t^m	Is the price of tariff m in year i, where m = Diversion prices
Q_t^m	Is the quantities in year i, where m = Diversion quantities
$AppFees_t$	Is the application fees as per the ESC determination in year t for Diversions

Equation 16 Price cap adjustment

$$P_t^{nonres(nav)} = P_{t-1}^{nonres(nav)} \times (1 + PPM_t^{nonres(nav)} + x) \times \frac{CPI_t}{CPI_{base}}$$

$$P_t^l = P_{t-1}^l \times (1 + PPM_t^l) \times \frac{CPI_t}{CPI_{base}}$$

where l = Residential, Rural, Non-residential minimum charge, and all Diversions Tariffs.

Price adjustment Patterson lakes

Patterson Lakes Prices for Timber Jetty and Concrete Jetty tariffs will be adjusted in the same manner as Diversions and Waterways and Drainage (steps 1 to 8).

For all formulas note that $j = \{Timber\ Jetty, Concrete\ Jetty\}$

Equation 17 Step 3: Calculating tariff revenue for previous years

$$TarRev_{i<t}^j = P_{i<t}^j Q_{i<t}^j$$

$$j = \{Timber\ Jetty, Concrete\ Jetty\}$$

Equation 18 Step 4: Calculate tariff revenue for the current year (t=i)

$$TarRev_t^j = P_{t-1}^j (1 + PPM_t^j + x) Q_t^j$$

$$j = \{Timber\ Jetty, Concrete\ Jetty\}$$

Equation 19 Step 5: Calculate tariff revenue for future years

$$TarRev_{i>t}^j = P_{t-1}^j (1 + PPM_t^j + x) \sum_{k=t+1}^5 (1 + PPM_t^k) Q_{i>t}^j$$

$j = \{Timber\ Jetty, Concrete\ Jetty\}$

Equation 20 Step 7: Equating Tariff Revenue and the Revenue Requirement to solve for 'x'

$$PV(RevReq_j \text{ over regulatory period}) = PV(TarRev_j \text{ for regulatory period})$$

Equation 21 Step 8: Updating prices for timber jetty and concrete jetty tariffs

$$P_t^j = P_{t-1}^j \times (1 + PPM_t^j + x) \times \frac{CPI_t}{CPI_{base}}$$

$j = \{Timber\ Jetty, Concrete\ Jetty\}$

Definitions

Symbol/ Character	Definition	Symbol/ Character	Definition
$RevReq_t$	Revenue requirement in a year t. This can be actual (i.e. updated for WACC) or determination (i.e. as per the ESC determination)	P_t^k	Price of tariff k in year t, where k = Residential, Rural, Non – residential minimum charge, and Non-residential rate in the NAV.
$TarRev_t$	Tariff revenue in year t	PPM_t^k	The Prescribed Path Movement for tariff k in year t.
w_t or $WACC_t$	The WACC in year t. This can be actual (i.e. updated) or the determination value.	$Q_{t,det}^k$	The quantity for tariff k in year t as per the ESC determination.
$other\ revenue_t$	Other revenue as per the ESC determination in year t for Waterways and Drainage.	x	The increase or decrease in prices expressed as a percentage as a result of the change in the WACC.
$AppFees_t$	Application fees as per the ESC determination in year t for Diversions		

