Independent Review of Cost Forecasts

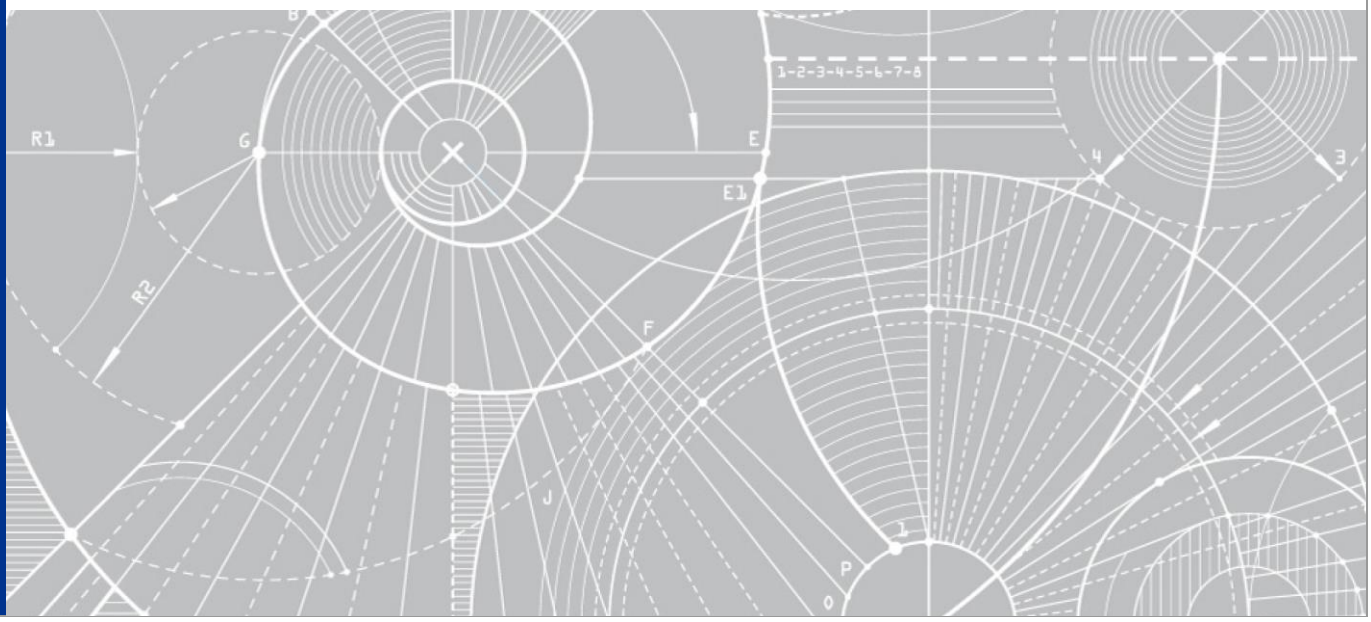
SEQWATER

Gold Coast Desalination Project

QE06934R001 | 3

Client Reference

24 July 2014



JACOBS®

Independent Review of Cost Forecasts

Project no:	QE06934
Document title:	Gold Coast Desalination Project
Document no:	QE06934R001
Revision:	3
Date:	24 July 2014
Client name:	Seqwater
Client no:	Client Reference
Project manager:	Madeleine Kench
Author:	Gerhard Joubert, Maddy Kench, Jamie Fellingham
File name:	QE06934R001 - GCDP - Independent Review of Cost Forecasts - V4

Sinclair Knight Merz Pty Ltd (Jacobs)
ABN 37 001 024 095
32 Cordelia Street
PO Box 3848
South Brisbane QLD 4101 Australia
T +61 7 3026 7100
F +61 7 3026 7300
www.jacobs.com

Document history and status

Revision	Date	Description	By	Review	Approved
A	02/06/2014	For internal review	M Kench	S Hinchliffe	S Hinchliffe
0	02/06/2014	Draft for client review	M Kench	S Hinchliffe	P Nixon
1	11/06/2014	Final	M Kench	S Hinchliffe	P Nixon
2	30/06/2014	Final	M Kench	S Hinchliffe	P Nixon
3	22/07/2014	Final	M Kench	S Hinchliffe	P Nixon

Contents

Appendix A. Initial data review and gap analysis

Appendix B. Organisation structure

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs are to review the Gold Coast Desalination Project budget proposal for period 2016-2018 in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

The information and analysis provided in this report has been inhibited by the client imposed time and budget constraints.

This report has been prepared on behalf of, and for the exclusive use of, Jacobs's Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

Executive Summary

Jacobs undertook an independent review of Veolia's pre-budget submission of operating expenditure for 2014/15 financial year (FY) for the Gold Coast Desalination Plant (GCDP). The GCDP has the capacity to produce 133 ML of treated water per day, but utilisation has been low recently because of increased water security in the region. The GCDP is currently on hot standby, ie it is not permanently in use, but is required to be capable of being brought back on line within a set period.

Jacobs' review included a brief review of trends in historical costs over the last two years. Over this period, Veolia is expecting that its total fixed operating expenditure will increase from $10.5M (FY2012/13) to $13.1M (FY 2014/15), which represents a 44% increase. The fixed expenditure component is largely independent of the operational mode of the plant and refers to costs associated with routine operating and maintenance activities and makes up the majority of the total operating expenditure. It is notable that there are significant variances between the FY 2012/13 actual costs and the FY 2014/15 budgeted cost with increases in the employee and preventative repair and maintenance costs and corresponding decreases in fixed energy and project related repair and maintenance costs. These high expenditure categories formed the key focus of Jacobs' review. The review specifically considered:

- Preventative maintenance costs
- Direct employee costs
- Repair & maintenance – projects
- Other fixed costs

Jacobs found the majority of expenditure reviewed to be prudent and efficient. However, there are areas in which Jacobs recommended savings could be made. The table below outlines the proposed savings from Jacobs review.

Table 0.1 : Proposed savings

Category	Saving	Comments
Preventative Maintenance	$11,800	With the exception of the intake and outfall structures inspections, expenditure on the main preventative maintenance tasks reviewed is prudent. The need to undertake a detailed inspection of the intake and outfall structures every six months is found to be not prudent. Jacobs recommends that the detailed inspection should be scheduled to occur every two years (ie next in 2016), with the timing reviewed following the major inspection in August 2014. This represents an overall reduction in person hours of 118 person hours (or a reduction in costs of $11,800, based on $100/hr). Jacobs also recommends that consideration should be given to allocating calibration activities to Veolia's senior operator and determining the maintenance intervals for equipment on an hours-run basis, rather than a fixed time basis.
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
Repair & Maintenance - Projects	N/A	The projects selected from review have already been excluded from Seqwater's budget. Jacobs supports this action as the prudency and or efficiency of these projects is yet to be established.
Other Fixed Costs	$246,000 to $306,000	Jacobs supports the findings of the business case to reduce these costs by utilising GCDP potable water to substitute this consumption of potable water. This will also reduce GCDP's requirement for the GCCC supply to be available in order to run GCDP. Jacobs notes that this project is already underway and understands that the benefits will be realised in the FY 2014/15.
Total	**$517,800 to $577,800**	

1. Introduction

Seqwater engaged Jacobs to review five separate budget proposals relating to the Western Corridor Recycled Water (WCRW) Scheme and the Gold Coast Desalination Plant (GCDP). The purpose of the investigation was to assess the budget proposals provided by Seqwater's operations and maintenance sub-contractor in context of prudency and efficiency as determined by the Queensland Competition Authority (QCA).

This report outlines Jacobs' findings for the review of the budgets submitted by the GCDP.

The GCDP was developed as an asset to address the impact of the drought, turning seawater into drinking water using a reverse osmosis (RO) process. It has the capacity to produce 133 ML of treated water per day, but utilisation has been low recently because of increased water security in the region. The GCDP is currently on hot standby, ie it is not permanently in use, but is required to be capable of being brought back on line within a set period.

The plant operates under a design-build-operate contract with the Gold Coast Desalination Alliance, comprising Seqwater, John Holland and Veolia.

1.1 Scope of work

Seqwater requested an independent review of the operating expenditure proposed for the Gold Coast Desalination Plant for the 2014/15 financial year (FY) and commissioned Jacobs to undertake this review. The review seeks to establish whether the proposed operating expenditure supports the business objectives of prudency and efficiency as required by the QCA.

The budgets reviewed, are the budgets as developed and provided by Seqwater's relevant operations and maintenance sub-contractor. For the GCDP, these are the budgets developed by the Gold Coast Desalination Alliance partners of John Holland and Veolia. The costs reviewed are Veolia's Pre-Budget Submission for FY14/15. The costs included within this review exclude Seqwater's internal costs, unless otherwise stated.

The QCA's definitions for prudency and efficiency are included below for capital and operating costs. These definitions have been taken from the QCA's terms of reference for the last regulatory review. These definitions have been applied in this review.

Operating Costs

- Prudent - required to meet legal and regulatory obligations or contracts with customers; and
- Efficient - undertaken in a least-cost manner over the life of the relevant assets and is consistent with relevant benchmarks.

Capital Costs

- Prudent - required as a result of a legal obligation, new growth, renewal of existing infrastructure or it achieves an increase in the reliability or the quality of supply that is explicitly endorsed or desired by customers, external agencies or participating councils
- Efficient - capital expenditure is efficient if:
    - The scope of the works is the best means of achieving the desired outcomes after having regard to the options available, including more cost-effective regional solutions, the substitution possibilities between capital and operational expenditure and non-network alternatives such as demand management;
    - The standard of the works conforms to technical, design and construction requirements in legislation, industry and other standards, codes and manuals, Compatibility with existing and adjacent infrastructure is relevant as is consideration of modern engineering equivalents and technologies.
    - The cost of the defined scope and standard of works is consistent with conditions prevailing in the markets for engineering, equipment supply and construction.

To assess the proposed expenditure against the objectives of prudency and efficiency the following questions may typically be considered:

- Has the need for the expenditure been thoroughly investigated, and is it clearly defined, justified and documented?
- Is evidence of the need, including all reference material that demonstrates the need well documented and available?
- Have all feasible expenditure options been identified and analysed and has the least cost option been selected?
- Is there a sound appraisal process in place to allow for consistency and transparency in approach?
- Is the proposed operating costs accurate, capable of verification, consistent with internal costing method, and has variations to previous plans been explained?

1.2 Conflicts of interest

Jacobs acknowledges a potential perceived conflict of interest in the following sections. Sinclair Knight Merz (SKM) was acquired by Jacobs in December in 2013. SKM has had the following involvement with the GCDP:

- SKM was involved with certain aspects of the design of the GCDP
- SKM has previously undertaken surveys of various aspects of the GCDP (refer Section 5.2)
- SKM undertook a Security Concept Report (June 2007) (refer Section 8.1.2)

Seqwater has been aware of SKM's previous involvement with the GCDP from the proposal stage of this project.

2. Background

2.1 Basis of Plant Operation and Maintenance

Veolia has developed operation and maintenance costs for the GCDP based on the following assumptions, according to a letter from Veolia to Seqwater (Ben Bowen to Alex Fisher, 14 April 2014)[1]. Jacobs notes that Veolia have advised that the assumptions below relate to forecast figure for 2016 to 2028 and do not necessarily relate to FY 2014/15.

General Assumptions

- No allowance made for foreign exchange movement
- Cost codes used in monthly claims used to map to cost categories provided by Seqwater in the templates

Operational Assumptions:

- Volume produced (3.4 million litres per day) is per the GCDP Proposed Operating Volumes Table provided by Seqwater with the exception of 2013, 2014, 2015. Actual or budget volumes have been used for the years 2013, 2014 and 2015.
- Input seawater quality and temperature as per monthly averages for the last 12 months
- Pre-treatment running of 18 hours prior to commencement of production and during production for all months except December, January and February has been assumed
- Pre-treatment running of 24 hours per day, 7 days per week for December, January and February.
- Diffuser seawater bypass volumes per current operation
- Potable water purchased from Gold Coast City Council for current internal functions and at current cost plus 10%
- Auto-flushing project complete and in operation
- Access to RO building as described in the R2A Report[2]
- Increased leak surveillance start up as described in the R2A Report

Availability Assumptions

- Maintained in a state to be able to produce at 100% of capacity within 72 hours
- Maintained in a state to be able to produce at 33% capacity within 24 hours

Economic Assumptions

- All costs are in 2014 (Dec 2013) dollars with the exception of 2013 being in 2013 dollars and 2015 being in 2015 dollars.
- Veolia did not produce 2013 Actual figures and Seqwater has not provided these to Veolia. 2013 invoiced amounts (claim) have been used in the regulatory template provided to Seqwater.
- Veolia did not produce 2014 Q2 figures and Seqwater has not provided these to Veolia. 2014 invoiced amounts (claim) and Veolia's Q3 submission have been used in the template provided to Seqwater.
- The 2015 budget expenditure figures per Veolia's submission have been used for the 2015 entries in the template. Veolia has not been advised of any adjustments made to these figures by Seqwater.
- Costs have been separated as per the OPEX template provided by Seqwater
- No incidents will occur that would require construction phase Professional Indemnity Insurance run off to respond

[1] Note that assumptions may have been re-worded for clarity
[2] Discussed further in Section 7

- No regulatory/statutory changes, with the exception of Superannuation Guarantee (Administration) Act

Variable cost assumptions

Variable Electricity:

- For the period of 1 November 2013 to 31 March 2014, 519ML were produced over 151 days ie. 3.4ML/d at 12ML twice per week. This has been used to calculate average electricity demand, consumption and power factor
- No 100% production testing has been included within the total annual volume parameters

Treatment Chemicals:

- Dosing rates consistent with 2015 budget

Cleaning Chemicals:

- One CIP of membranes/year

Sludge and Waste Disposals:

- Sludge and waste disposal rates consistent with 2015 budget levels

Fixed Costs Assumptions

Employee Cost – Direct

- Head count to remain constant throughout the 15 year reporting period from FY 2012/13 to FY 2027/28
- Includes Superannuation Guarantee Charge increase to 12% by 2020
- 2014 operators Enterprise Bargaining Arrangement (EBA) rates applied from 2016

Employee Cost – Indirect

- Training costs based on training forecast

External Consultant Costs

- Costs consistent with 2015 budget

Motor vehicle Related Costs

- The number of vehicles required for the plant will remain consistent during the 15 year period

Water Analysis & Lab Consumables

- Water quality monitoring (operational and verification) for sea water and drinking (treated) water is carried out as per the water quality monitoring program that is currently in place

Repair and Maintenance – Preventative

- Based on predicted maintenance schedules as at April 2014
- Hourly rates for mechanical and electrical contractors remain constant
- Service contracts remain constant in scope for all forecast periods
- [redacted]
- Preventative maintenance includes Corrective Maintenance costs
- Corrective costs are constant and calculated period August to December 2013

Repair and Maintenance – Breakdown

- Breakdown costs are constant and calculation period August to December 2013

Repairs and Maintenance – Projects

- Project costs included in 2015 were not included in the 2015 Budget Submission as requested by Seqwater at the time. These costs have been included in 2015.

Repairs and Maintenance – Asset Replacement

Membrane Replacement

- Based on Hydraunautic's projection software with operational experience
- Membrane replacement as per membrane replacement program
- Membrane change out is based on pump pressure constraint and not water quality constraints
- Membrane flux and salt rejection decline is assumed constant with time

All Assets

- No regulatory changes that require modification to the asset to comply eg. registration of RO pressure vessels
- No changes to water quality specification that require modification to the asset to comply eg chlorination of potable water
- Asset replacement is per Veolia's System CARMs process not Seqwater's provided useful/design lives, as agreed with [redacted]
- No replacement of major pipelines of all material types
- No major failures of civil or marine assets eg marine structures damaged or major corrosion
- No tank replacements or tank liner
- No replacement of access and walkways
- No replacement of RO pressure vessels

Spare Parts

- It has been assumed that the required spare parts will not vary

Plant Consumables and Rentals

- Costs consistent with 2015 budget, with the exception sludge bins being purchased and no longer leased.

Fixed Electricity

- The period of 1 November 2013 to 31 March 2014 (519ML produced over 151 days, ie 3.4ML/d at 12ML twice per week) has been used to calculate average electricity demand, consumption and power factor

Office and IT related Costs

- Costs consistent with 2015 budget

Other Fixed Costs

Potable water has been included at cost plus 10% of the purchase price from the Gold Coast City Council. Note that the 2015 budget did not include the full purchase price of potable water from GCCC or additional 10% as requested by Seqwater at the time.

3. Outline of budget

3.1 Information provided

Jacobs used the following documents provided by Seqwater and Veolia for the review:

- *MWA Long term OPEX Template 2014-03-19*
- *R and M 15yr Forecast Rev 3*
- *15 Year Budget Membrane Replacementsv2*
- *PM Schedule FY 15*
- *20140328 2028 Budget Assumptions (Attachments 1 to 6)*
- *GCD Asset Man Plan*
- *GCD Energy Assumptions*
- *Seqwater Recycled Plants Valuations (Client 29 04 2014)*

3.2 Overall budget

The proposed operating expenditure for the period FY 2014/15 to FY 2027/28 is shown in the chart below and comprises the project's actual and budget costs for the fixed, variable and service fee components of expenditure. Actual total operating costs summate to [redacted] and reflects a 30% increase in expenditure over the period FY 2012/13 to FY 2014/15 (ie an annual increase of around 1.9%) and a 28% over the period FY 2014/15 to FY 2027/28.

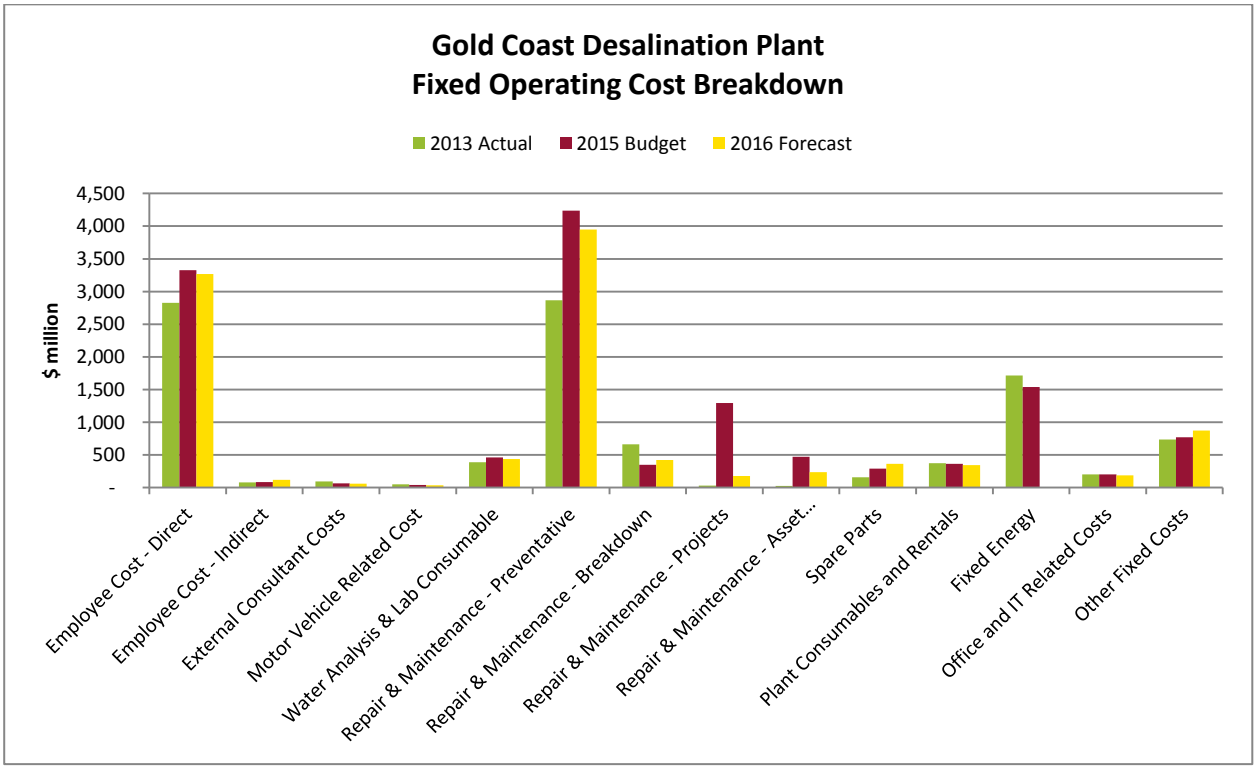
Peak expenditures in the FY 2019/20, FY 2023/24 and FY 2024/25 forecasts relates to periodic spot expenditures associated with asset replacement and preventative maintenance activities as scheduled in the Contract Asset Renewal Management System (CARMS) employed by Veolia. These peak expenditure periods fall outside the scope of this assessment.

[redacted]

The operating cost for the GCDP consists of three key components of expenditure: variable expenditure, fixed expenditure and a services fee. The variable component comprises expenditure associated with energy usage, chemical treatment and cleaning, and sludge and waste disposal. These activities are largely dependent on the mode of operation of the plant and can vary significantly according to the production rate. These costs generally make up less than 20% of the total operating expenditure. Because of the variable nature of this expenditure component and the low valve of this expenditure in FY 2014/15 and future years Jacobs did not further review the variable costs.

The fixed expenditure component is largely independent of the operational mode of the plant and refers to costs associated with routine operating and maintenance activities and makes up the majority of the total operating expenditure. The following chart provides a breakdown of the fixed operating expenditure proposed by Veolia for the period FY2012/13 to FY2015/16. The FY2014/15 proposed operating costs have been based on budget cost submitted to Seqwater in November 2013 and revised[3] to reflect better visibility on maintenance activities and schedules.

To allow for a like-for-like comparison the costs in the chart have been adjusted to exclude inflationary costs and FY 2014/15 was taken as the reference year.



Over this period, Veolia is expecting that its total fixed operating expenditure will increase from $10.5M (FY 2012/13) to $13.1M (FY 2014/15), which represents a 28% increase. The forecast expenditure in FY 2016 is $10.5M.

3.3 Sample selection for detailed analysis

The Gold Coast Desalination Plant expenditure for FY 2014/15 was reviewed anticipating the same level of scrutiny being required by Seqwater is required by the QCA for a regulatory review. To this extent, and taking into consideration time and budget constraints, Seqwater requested that the review consider at least 80% of the total budget value with a priority on the highest value items.

A breakdown of the FY 2014/15 budget, including decommissioning costs is shown in **Table 3.1.** Note that these costs exclude Seqwater's internal costs for the GCDP.

[3] Jacobs notes that although revised values have been provided by Veolia, a revised budget has not been submitted.

Table 3.1 : Operating cost breakdown

	Costs $000's		
	Veolia's Actual FY 2012/13	Veolia's Q3 Submission FY 2013/14	Veolia's Pre-Budget Submission FY 2014/15
Variable Costs			-
Variable Energy	1,593	1,907	1,825 ^
Treatment Chemical	553	747	523
Cleaning Chemical	-	-	36
Sludge and Waste Disposal	134	161	116
Total Variable Costs	**2,280**	**2,815**	**2,501**
Fixed Costs			
Employee Cost - Direct	2,760	2,828	3,327
Employee Cost - Indirect	78	76	84
External Consultant Costs	92	119	65
Motor Vehicle Related Cost	46	39	39
Water Analysis & Lab Consumable	377	392	463
Repair & Maintenance - Preventative	2,794	3,863	4,235
Repair & Maintenance - Breakdown	646	334	351
Repair & Maintenance - Projects	29	68	1,292
Repair & Maintenance - Asset Replacement	25	5	469
Spare Parts	155	202	289
Plant Consumables and Rentals	364	326	363
Fixed Energy	1,675	2,054	1,501^
Office and IT Related Costs	197	199	199
Other Fixed Costs	717	803	769
Total Fixed Costs	**9,956**	**11,309**	**13,447**
Volumes Water (ML)	2,806	1,409	1,872

Source: *MWA Long term OPEX Template 2014-03-19, ^Additional energy information provided by Seqwater*

The key areas of fixed operating expenditure for FY 2014/15 are:

- Direct employee costs
- Preventative repair and maintenance costs
- Project repair and maintenance costs, and
- Other fixed costs.

As such, the selected sample is shown in **Table 3.2.**

Table 3.2 : Sample selection

Categories	Veolia's Pre-Budget Submission FY 2014/15 Cost^ ($ million)	Percentage of GCDP Total Fixed & Variable Costs (excluding energy costs)	Percentage of GCDP Total Fixed & Variable Costs (including energy costs)
Repair & Maintenance – Preventative	4,235	30%	24%
Employee Cost – Direct	3,327	26%	19%
Repair & Maintenance – Projects*	368	0%	0%
Other Fixed Costs	769	6%	4%
Total	**8,699**	**62%**	**47%**

Source: *^MWA Long term OPEX Template 2014-03-19*

*Note: In the original information presented to Jacobs, for FY 2014/15 (the selected year for review) the top project costs related to the need to relocate equipment outside of the high pressure areas (Projects VP 247 and VP 249). These projects were reviewed by Jacobs' in its draft report. Following Jacobs' issuing its draft report, further information was provided regarding the projects included within Seqwater's FY 2014/15 budget. This is discussed further in Section 7.

The sample was selected prior to energy costs being provided by Seqwater. As such, lower value items were selected for review over these costs. Prior to the inclusion of energy costs and using the original project costs, the four selected cost categories accounted for nearly 80% of the total fixed operating costs. With energy costs included and the revised project costs, this percentage reduces to just under 50%.

It is notable that there are significant, and material, variances between FY 2012/13 actual costs and FY 2014/15 budgeted costs with increases in the employee and preventative repair and maintenance costs and corresponding decreases in fixed energy and project related repair and maintenance costs. These high expenditure categories formed the key focus of Jacobs' review.

3.4 Initial gap analysis

Jacobs SKM undertook an initial data review and gap analysis. This information is presented in **Appendix A.** This information request was discussed with stakeholders from Seqwater and Veolia Water. As a result of this discussion a subsequent round of information was provided.

4. Overall assessment

Desalination operating cost is impacted by several factors such as type of technology, energy availability, geographic location, plant capacity, and feedwater quality. Other important factors affecting costs include costs associated with transporting water from source to desalination plant, distribution of treated water, and concentrate disposal.

Limited data is available on Australian desalination plants to enable a comprehensive benchmarking exercise to be undertaken. Information on international desalination plants was therefore sourced to enable high level comparisons to be performed. It is important to note that the operating costs for the plants used for benchmarking were not necessarily calculated in a consistent fashion and therefore they are approximate at best and do not represent a definitive picture.

Given the limited information available on desalination plants, the large number of variables and the unique operating mode in Australia a true like-for-like comparison is not possible. However, this is not uncommon in benchmarking, particularly for plants that tend to be unique and or few in numbers. It is therefore not possible to get a true like-for-like comparison in such benchmarking. The purpose of this comparison is therefore not to set a level or standard to achieve, but rather to make a general assessment of where the GCDP operation sit in comparison with other similar operations and prompt investigations to understand the differences.

The international based operating costs have been sourced from a report developed by Sandia National Laboratories in 2003. The report included a comprehensive review of literature and information on desalination costs as summarised in the ‘Universities Council on Water Resources, Journal of Contemporary Water Research & Education, Issue 132, Pages 39-45, December 2005’. To enable their use in this benchmarking, the costs were adjusted for cost escalation and labour rate differences to a FY 2014/15 Australian equivalent.

The report provides a range of operating costs from a ten sources for the seawater reverse osmosis process. To this extent no conclusive findings can be made from the comparison. However, the range of sources is comprehensive enough to provide a reasonable understanding of the level at which the GCDP is operating compared to the norm. Major differences would be the result of the base assumptions, including energy usage.

In the Australian context benchmark information were obtained from the Independent Pricing and Regulatory Tribunal (IPART) Final Determination of July 2012 on the efficient operating expenditure of the Sydney Desalination Plant (SDP). The SDP commissioned in December 2009 is one of the largest operating desalination plants in the world with a design capacity of 250 ML/D. In comparison the GCDP has a design capacity of 133 ML/D.

The Adelaide Desalination Plant was commissioned at the end of 2012 with a design capacity of 270 ML/D. In April 2014, the Adelaide Desalination Plant produced an average of 168 ML/D. In September 2012, SA Water submitted its first Regulatory Business Proposal to the Essential Services Commission of SA which stated that the Adelaide Desalination Plant would be placed in stand-by mode’, following the 24 month proving period (ending December 2014) while sufficient, cheaper water is available. Under the ‘stand-by mode’ the Adelaide Desalination Plant is required to be back on stream within weeks, as compared to 24 hours for the GCDP. The Adelaide Desalination Plant is owned by the SA Government and operated under a 20 year contract with AdelaideAqua. The values presented in the following analysis are based on available data during 2012 based on the plant operating during the proving period.

With the GCDP in standby mode a comparison based on actual volume of water produced is not sensible. To allow for a comparison with fully operational plants, all plants are presented in the context of their design capacities rather than their current production volumes. This has the potential to understate the total operating expenditure as the variable component of the operating cost is understated and can have a significant impact.

The variable component refers to expenditures associated with treatment and cleaning chemicals, sludge and waste disposal, and the variable component of energy costs. These expenditures are highly dependent on the mode of operation and the volume of water treated. As an example the SDP’s variable operating cost makes up

around half of its total operating cost. No adjustments were made to the GCDP operating costs to account for the variable component.

For the Australian comparison only fixed operating expenditures were used. The fixed expenditure refers to costs associated with regular and routine operational and maintenance activities which are largely independent of the plant operations and allows for a more reasonable comparison. It should be noted that the GCDP operating expenditures presented in the comparisons excludes energy costs.

Figure 1 shows the proposed operating cost of the GCDP in relation to the International and Australian desalination operations.

Although the comparison does not allow for conclusive findings it is notable that the operating cost of the GCDP is around 20% of the average expected operating cost of a typical fully operational desalination plant, whereas the proposed operating cost of the Adelaide plant is around 3% of the average expected operating cost of a typical fully operational desalination plant. The difference is likely to be the result of the difference in the mode of standby operation (although Jacobs has insufficient information to confirm that this is the case). The GCDP is required to remain fully operational but at a very low output level, and capable of 100% output within 72 hours.

Figure 1: International Seawater Desalination Plant Comparison

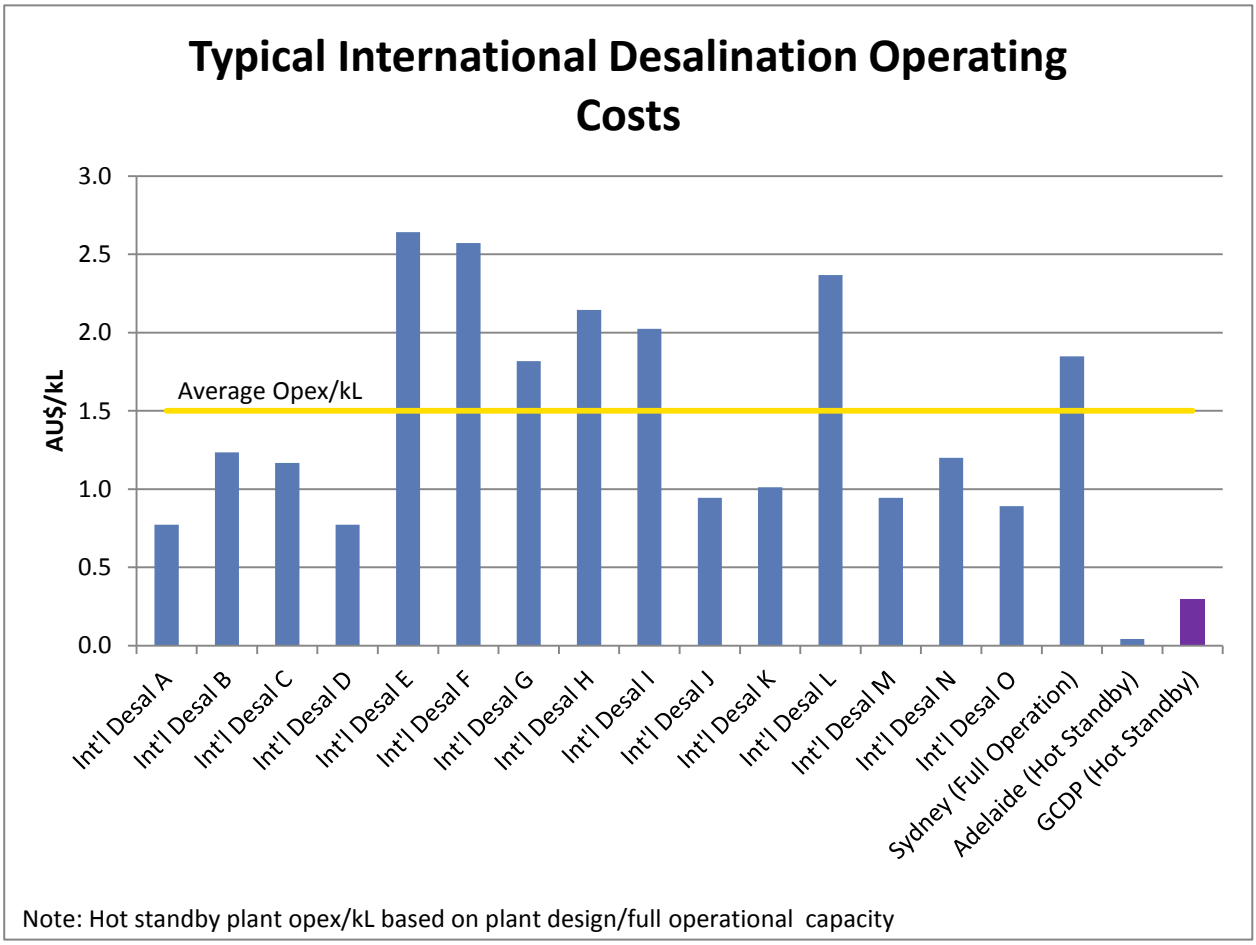
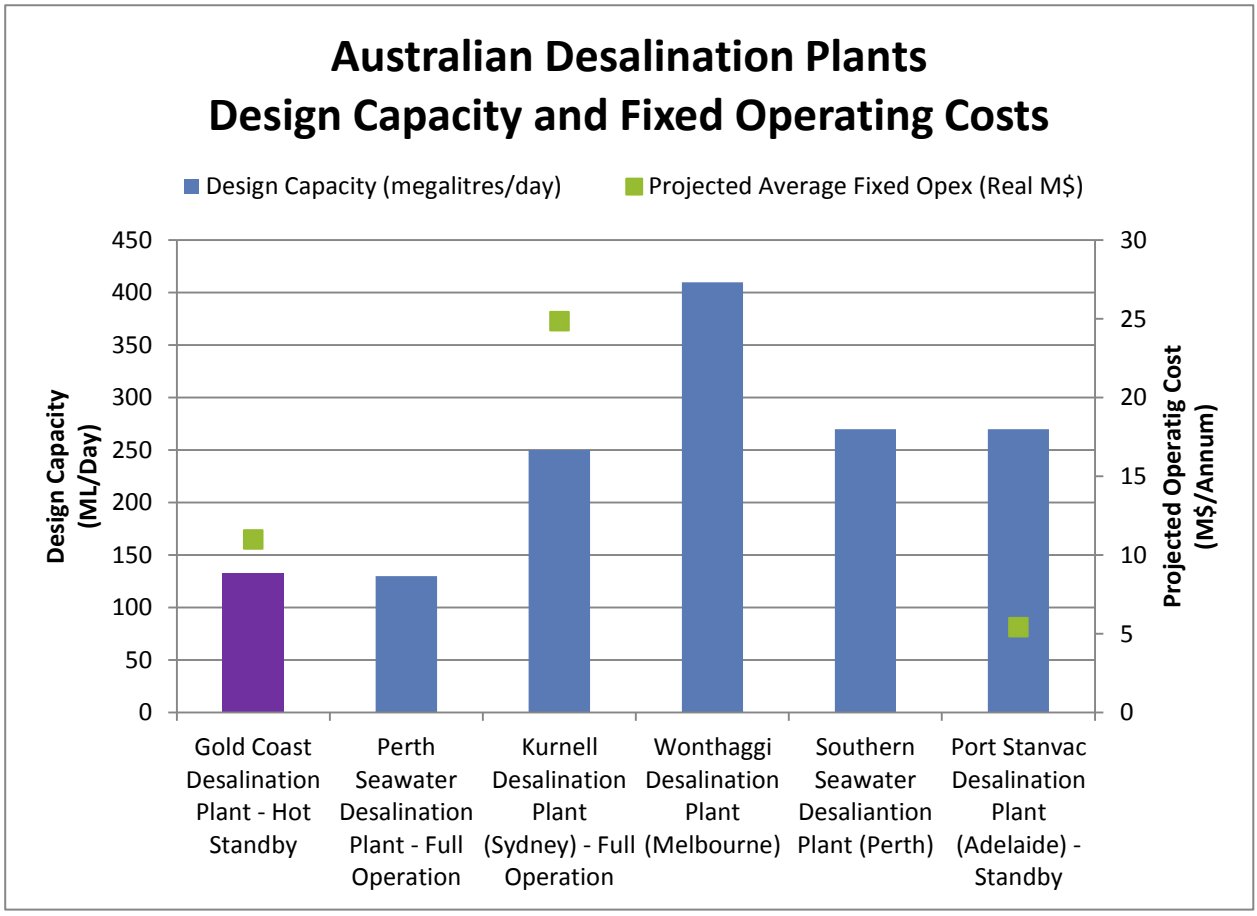


Figure 2 takes a closer look at the proposed GCDP operating cost in the context of the Australian desalination plants and compares the fixed operating expenditures in the context of their design capacities.

The GCDP is a much smaller plant at half the design capacity than both the Sydney and the Adelaide plants. In comparison the proposed operating cost therefore are considered high at around 44% of the fully operational Sydney plant and at around double the projected operating cost of the Adelaide plant operating in standby mode.

It should be noted that the comparison does not make a statement about the accuracy of the GCDP operating expenditure; it only suggests the impact that the mode of operation and associated preventative and other maintenance requirements have on costs.

Figure 2: Australian Seawater Desalination Plant Comparison



The above comparison provides a high level view of where the GCDP operating expenditure sits within the general context of Australian operating seawater reverse osmosis desalination plants. The conclusions that can be drawn are:

- Being in standby mode it is expected that operating costs will be significantly lower than normal operating costs and at 20% the proposed expenditure is considered reasonable considering the requirements of a 'hot standby' mode
- However, and considering the comparison of fixed operating costs within the Australian context the operating costs are high, although insufficient information is available about the Australian plant operational requirements to make a conclusive finding. Further investigation will be required to fully understand the impact of the operational requirements imposed on the GCDP.

Specific areas of operating costs are discussed in the following sections.

5. Preventative maintenance

A breakdown of repair and maintenance costs is shown in **Table 5.1** drawn from two spreadsheet sources; *R and M 15yr Forecast Rev 3* and *MWA Long term OPEX Template 2014-03-19*. Of these two sources, Jacobs understands that the *R and M 15yr Forecast Rev 3* spreadsheet presents the most recent information[4]. As such, the costs from this source have been used in our review.

Table 5.1 : Repair and maintenance costs

Area	Veolia's Pre-Budget Submission FY 2014/15 Cost ($'000s)	
	Source: R and M 15yr Forecast Rev 3	**Source: MWA Long term OPEX Template 2014-03-19**
Repair & Maintenance – Preventative	1,577 (4,308 = Repair & Maintenance = Preventative + Corrective + Asset Refurbishment)	4,235
Repair & Maintenance - Breakdown	435	351
Repair & Maintenance - Asset Replacement	170	469
Spare Parts	373	289
Total	**5,286^**	**5,344**

^ Including Preventative + Corrective + Asset Refurbishment in Repair & Maintenance – Preventative

A comparison is shown with historical repair and maintenance costs in **Table 5.2** taken from published data from a review undertaken for the QCA.

Table 5.2 : Historical repair and maintenance costs

FY	Cost ($'000s)	Increase	Source	Assumption
2011/12	4,655		QCA Review : *Grid Service Charges 2012-2013 Assessment of Capital and Operating Expenditure Seqwater* (SKM, June 2012)	Repairs and maintenance includes: • Planned mechanical, electrical and civil maintenance • Repairs and maintenance projects • Reactive (unplanned) maintenance in the case of break downs • Stockpiling of critical spare parts
2012/13	5,167	11%		
2013/14	No data available			
2014/15	6,368	24% (over two periods)	*R and M 15yr Forecast Rev 3*	Includes: • Repair & Maintenance – Preventative • Repair & Maintenance - Projects • Repair & Maintenance – Breakdown • Spare Parts

The costs of repair and maintenance are projected to continue to increase at a rate of approximately 12% a year (assuming consistent cost increases between FY 2012/13 and FY 2014/15). This rate is materially higher than the increase in CPI and Jacobs' projected increases due to labour and contractors (expected to be around 3% for labour and 4.6% for contractors – based on a recent review of the Wage Price Index).

[4] Jacobs notes that this information was not the budget submitted by Veolia.

The following section reviews the most significant repair and maintenance costs in detail. **Table 5.3** outlines the repair and maintenance costs for the top ten contractors.

Table 5.3 : Repair and maintenance costs for top ten contractors

Contractor	FY 2014/15 Cost ($'000s)	Total number of hours for FY 2014/15
Total	**1,577.12**	

Source: *RM 15yr Forecast Rev 3*

Two contractors undertake the majority of the maintenance work. These are:

- [redacted] the primary electrical subcontractor
- Metal Maintenance Pty Ltd (MMT) the primary maintenance subcontractor

Full names of the other contractors were not available at the time of writing.

Jacobs understands that hours are allocated to contractors based on the skills required for the tasks. Costs are calculated based on hourly rates for the contractors. The provided rates for contractors are shown in **Table 5.4.** From documentation provided to justify project expenditure (refer to Section 7) Jacobs understands that the average operator hourly rate is [redacted][5]. It is noted that the average operator hourly rate and the contractor hourly rates are not directly comparable, as the average operator hourly rate excludes on costs for overheads (such as tools, training) which are included in the contractor rates.

Table 5.4 : Contractor rates

Contractor	Rate ($/hr)	Veolia assumptions
		This has been estimated on the assumption that some may require external consultant and some by internal staff.

Source: *RM 15yr Forecast Rev 3*

For discussions with Veolia, Jacobs understands that frequency of tasks is determined from a combination of:

- Vendor recommendations
- Veolia's Reliability Centred Maintenance (RCM)
- Review of asset condition following previous maintenance cycles (e.g. is the asset condition better or worse than expected? As such, does the frequency need to be increased or decreased?).

[5] Capital investment paper - Post FY15 capital investment Mapping Hoses (Veolia Water, undated)

Jacobs has focused on the tasks with the highest number of hours assigned and hence are the highest cost items. The tasks with the top number of hours assigned are listed in **Table 5.5.**

Table 5.5 : Significant preventative maintenance activities

PM Code	Department	Description	Total estimated hours for task	Total hours for FY 2014/15	Contractor

Source: *^PM Schedule FY15, * RM 15yr Forecast Rev 3*

The two source spreadsheets used to undertake this analysis (*RM 15yr Forecast Rev 3* and *PM Schedule FY15*) contain contradictory values for the number of hours assigned to each contractor. This is shown in **Table 5.6.** Jacobs understands that the information from *R and M 15yr Forecast Rev 3* is more recent, and has used these values in its analysis.

Table 5.6 : Comparison of overall contractor hours between sources

Contractor	Total number of hours for FY 2014/15	
	Source: *RM 15yr Forecast Rev 3*	Source: *PM Schedule FY15*

The prudency and efficiency of the highest cost items is discussed in the following sections.

5.1 Prudency assessment

This section identifies whether the expenditure is prudent, i.e. whether the task is required to meet legal and regulatory obligations or contracts with customers.

Cleaning and calibration of instruments

The GCDP will remain operational, albeit at a very low level of output, and is required to be capable of 100% output within 72 hours. It is therefore prudent for the process instrumentation to be calibrated in order to meet the plant's availability requirements.

Compliance inspections of emergency lighting

AS/NZS 2293.2 states that emergency lighting shall be inspected and maintained in accordance with the six-monthly and yearly procedures specified in the Standard. Expenditure is therefore prudent to meet regulatory obligations.

Servicing of Lightnin mixers

Information provided by Veolia indicates that the Lightnin mixers in the lime, residuals and pre-treatment areas require annual servicing. As with all mechanical equipment, it is prudent to maintain the mixers in accordance with the manufacturer's recommendations, RCM or other criteria.

Inspection of air conditioning units

AS/NZS 3666.2 specifies inspection and maintenance requirements for air handling systems, including monthly inspections of intakes, exhausts and air filters. Expenditure is therefore prudent to meet regulatory obligations.

Inspection of intake and outfall structures

Jacobs requested additional information supporting and detailing the need to undertake inspection of intake and outfall structures and the required frequency of this task. Veolia stated that:

> *"GCD-R-0067 is for the '6 monthly inspection of intake and outfall structures'. The PM schedule was first set up due to a safety issue, if the structural steelwork was to fail in this location while a person is on the structure then the consequence would be a fatality. SKM were* [sic] *engaged to inspect the outfall shaft structural steelwork supporting the walkway over the outlet shaft, the hours for this work were not recorded in this work order (WO). It was originally estimated to be 120 person hours for the SKM inspection, crane mobilisation, use and demobilisation, to carry out the inspection. At the time it was set up as 6 monthly. SKM inspected the structure in August 2012 and recommended re-inspection in two years. The PM Schedule should have been amended from the findings of the SKM inspection but was not. And hence the WO's continued to be generated on a 6 monthly basis. The next two inspections in 2013 were conducted by the operators and it was only a high level examination to ensure that no major corrosion had occurred since the SKM inspection, hence the low hours recorded. Now in 2014 the next external consultant inspection of the structure is due, and it will be estimated to be approximately 120 person hours in total. This PM schedule is to be amended after the next external inspection. The amendment will be the recommended frequency of the next inspection. Another PM will be created for the 6 monthly high level (2hr) inspection of the structure which will be completed by the Operators. In order to mitigate the risk of a fatality from the failure of the structural steel it is prudent to continue with the 2 yearly structural steel inspection as well as the 6 monthly high level review for corrosion by operators."*

Jacobs agrees with Veolia that it is prudent to continue to inspect the outfall structural steel work for signs of corrosion as per the frequency recommended by the specialists undertaking the inspection.

Jacobs also questioned the allowance for a separate ROV inspection. Veolia's Asset Management Plan for Gold Coast Desalination Plant (Veolia, September 2012) states that:

> *The intake and outfall pipelines will be inspected every two years. A plant shutdown will be required during inspections to assure diver's safety. Inspections will be by the use of Remote Operated Vehicles (ROV) equipment and will determine the requirement and schedule for further maintenance.*

Jacobs understands that the ROV is used for inspecting the tunnels and tanks. The budgeted amount for this activity in FY 2014/15 is [redacted], with the following two years at [redacted]. This pattern continues with [redacted] occurring every third year. Jacobs understands that the [redacted] coincides with the inspection of the outfalls, the lower amount with inspection of the tanks only.

In response to Jacobs request for additional information regarding the ROV inspections, Veolia provided the following information:

"The ROV inspectionof the intake and diffuser outlets takes into consideration the planning of the ROV inspection, the weather conditions since the last dive, the intake friction factor and the analysis of the last report. Consideration is given to the risk/likelihood of the plant being unable to ramp up to 100% production when called in a water supply emergency vs the cost of undertaking the inspection in order to be able to predict if/when cleaning of the inlet tunnel will be required. Costs and timing are also a consideration of this task as the only ROV capable of carrying out the inspection is imported from the USA. After the review of 2013 ROV inspection and giving consideration to the rate of accumulation of debris in the inlet tunnel the next inspection has been scheduled for 2015. There was an ROV inspection of the sediment build-up within the riser of the offshore intake structure and the first 50m of the intake tunnel during 2012,prior to this the inspections were 2009 and 2010".

Jacobs is satisfied that the proposed inspection of the intake and outlet diffusers is necessary for the continued operation of the GCDP. Jacobs recommends that the frequency of the next review be assessed following each inspection, as is the current practice, to develop an optimised inspection schedule.

5.2 Efficiency assessment

This section identifies whether the expenditure is efficient, i.e. undertaken in a least-cost manner over the life of the relevant assets and is consistent with relevant benchmarks.

Cleaning and calibration of instruments

The major instrument maintenance tasks (GCD-R-1010, GCD-R-0013, GCD-R-1071 and GCD-R-1072) are planned to be carried out by the electrical sub-contractor, [redacted]. We note that instrument calibration and maintenance is included in the job description for a senior operator. Veolia's senior operator for the GCDP has a position description: GC16. However, we note that with the number of hours required being greater than a full time equivalent (FTE), it would necessary to employ more than one resource to undertake this task. [redacted].

Actual hours spent performing instrument maintenance tasks between January 2013 and April 2014 correlate closely to the budgeted hours for 2015. The required frequency of cleaning and calibration of instruments is not expected to be significantly affected by the reduced future run times of the plant, and so we consider the budgeted hours for 2015 to generally be appropriate and efficient.

Jacobs questioned why task GCD-R-0013 was duplicated in spreadsheet *PM Schedule FY15*, leading to an apparent additional 260 hours of budgeted time. The duplicate rows are replicated in **Table 5.5** above. In response, Veolia provided the following information:

"In 'Hot Standby' the plant is started twice a week to produce 12ML of water each time. One line is for the WO that is generated for the Monday night run and the other line is for the WO that is generated for the Thursday night run. The verification of instruments prior to each start-up takes approximately 5 hrs.

Therefore 5hrs x 52weeks = 260hrs for the Monday runs.

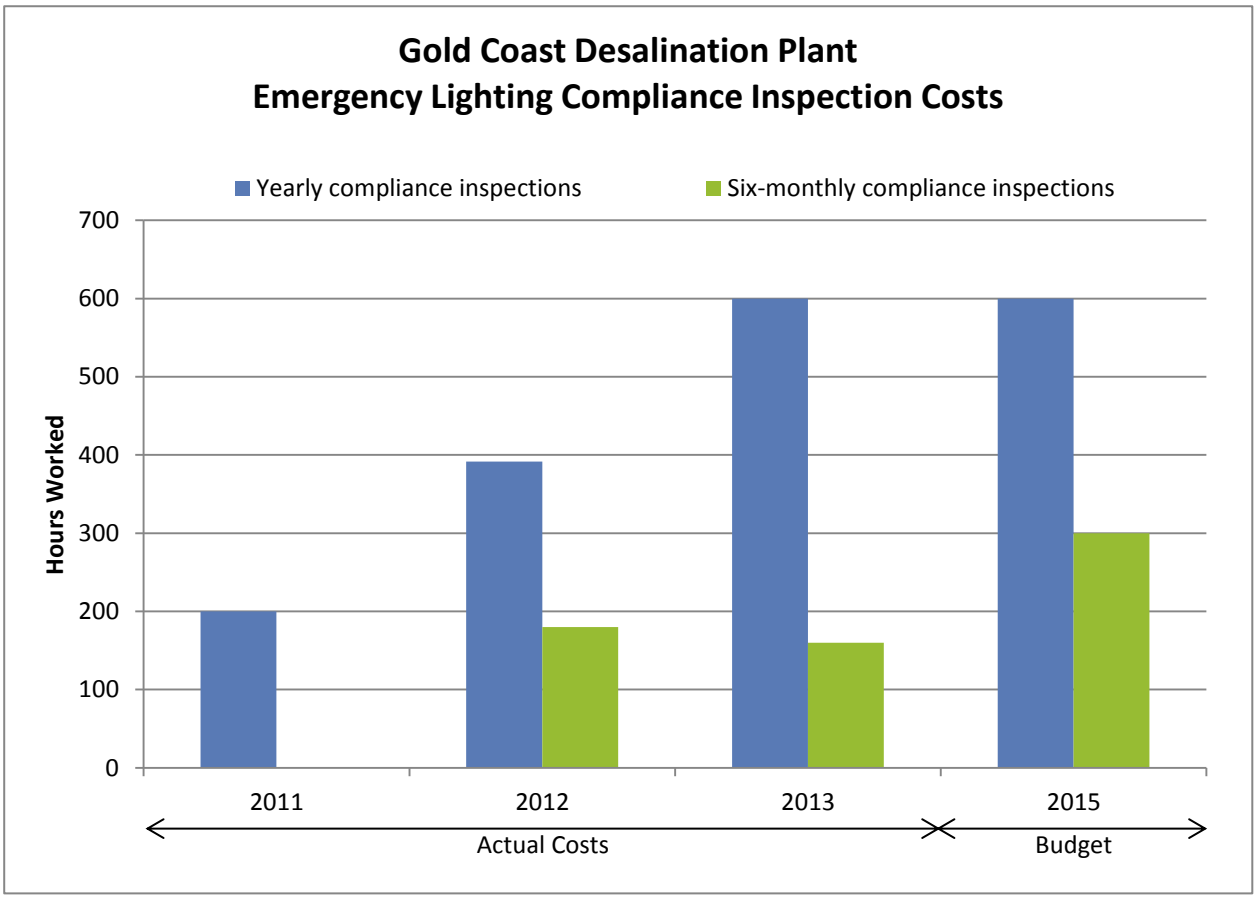
And 5hrs x 52weeks = 260hrs for the Thursday runs"

Jacobs acknowledges this clarification and hence accepts that the specified hours for this task are appropriate.

Compliance inspections of emergency lighting

AS/NZS 2293.2 requires that the inspection and maintenance procedures be carried out by suitably qualified and experienced persons. As such, it is appropriate that the work is performed to the electrical sub-contractor, EIG.

As the emergency lighting system has aged, so the actual number of hours worked on the yearly inspection and maintenance tasks in recent years has increased. In addition, at the last yearly inspection, it was estimated that the next six-monthly inspection would require twice the amount of time. The number of hours allocated to the tasks therefore is considered to be reasonable. Refer to the chart below.



Servicing of Lightnin mixers

The servicing of Lightnin mixers is carried out by the mechanical maintenance sub-contractor, [redacted]. The budgeted costs for 2015 are extrapolated from actual expenditure in recent years, as detailed in **Table 5.7** below.

Table 5.7 : Lightnin Mixer Servicing Costs

Area	Actual Costs ($'000s)			Budgeted Costs ($'000s)
	2011	2012	2013	2015
Route 85 – Pre-treatment	-	80	81	80
Route 86 - Lime	80	-	81	80
Route 88 - Residuals	-	80	96.5	80
Total	**80**	**160**	**258.5**	**240**

Jacobs understands that the mixers are required to be operational, regardless of the operating mode of the plant. This is to avoid particles within the solutions from settling out. As such, the operating hours for these mixers is constant even when the plant is running at low output.

Jacobs notes that the mixers in each of the three areas have only been serviced in two of the last three years. Jacobs questioned whether the mixers are required to be serviced annually, or whether a longer service interval may be appropriate. In response, Veolia provided the following information:

> *"The mixers are due to be serviced on an annual basis. Historically this has not been achieved as process and operational restrictions prevented the drives from been taken out of service."*

Jacobs accepts this clarification and hence, the hours for this task.

Inspection of air conditioning units

Actual hours spent inspecting air conditioning units between January 2013 and April 2014 correlate very closely to the budgeted hours for 2015. The required frequency of inspections is stipulated in AS/NZS 3666.2 and would not be affected by the reduced future run times of the plant, and so we consider the budgeted hours for 2015 to generally be appropriate and efficient.

Inspection of intake and outfall structures

Veolia's information indicates that inspections of the intake and outfall structures will be conducted by a sub-contractor, but a particular service provider has not been allocated. Veolia has indicated that the actual time spent on this task in 2012 and 2013 is not clear, since the hours have been recorded against other work orders.

The latest information provided by Veolia supports the need for a single large inspection in August 2014. However, on the basis of the recommendation arising from the last major inspection of two-yearly inspections, Jacobs recommends that the person hours for GCD-R-0067 be reduced to 122; 120 person hours for a detailed inspection and 2 hours for a 6 monthly high level inspection. This represents an overall reduction in person hours of 118 person hours (or a reduction in costs of [redacted]).

5.3 Summary

Jacobs considers that the expenditure on the main preventative maintenance tasks listed in **Table 5.5** is prudent. In addition, we have found that the majority of expenditure that has been reviewed in this exercise is efficient. The exception is with respect to the proposed need to undertake a detailed inspection of the intake and outfall structures every six months. On the basis of the recommendation arising from the last major inspection, Jacobs is of the opinion that the detailed inspection should be scheduled to occur every two years (ie next in 2016), with the timing reviewed following the major inspection in August 2014. This represents an overall reduction in person hours of 118 person hours (or a reduction in costs of [redacted]).

In general, Jacobs is of the view that consideration should be given to determining the maintenance intervals for equipment on an hours run basis, rather than a fixed time basis.

6. Direct employee costs

6.1 Provided information

Jacobs understands that the *MWA Long term OPEX Template 2014-03-19* was submitted to Seqwater in November 2013. The budget was formed considering the number of FTEs at the time. Based on conversations with Veolia, there are considered to be minimal changes since this budget was submitted (with the minor exception of a change in EBA). As such, Jacobs has reviewed the direct employee costs as outlined in the *MWA Long term OPEX Template 2014-03-19* spreadsheet.

Table 6.1 provides a further breakdown of costs.

Table 6.1 : Employee cost breakdown

Employee Costs - Direct	Veolia's Pre-Budget Submission Costs ($'000s)
76400 - Salaries & Wages	2,866
76405 - Bonuses	133
76425 - Overtime	48
76495 - Workers Compensation	4
76520 - Contractors - Full/Part Time (long term)	223
76530 - Contractors - Temporary Staff Costs	53
Total	**3,327**

The largest cost component of the direct employee costs is salaries and wages, as would be expected. To support this cost, Veolia has provided both an organisational structure and a breakdown of FTEs.

There are 22.5 FTEs assigned directly to the GCDP, comprised of 12 operators and the remaining staff performing other tasks. In addition, there are a number of other staff who work with the scheme office or are shared resources across all areas, which account for an additional 3.75 FTEs. In total there are 26.25 FTEs as identified in **Table 6.1**.

Table 6.2 : Employee breakdown

Position	FT /PT	Hours	PD Code	Allocation
Administration Officer	100%	1,760	GC08	GCDP
AP/Contracts Admin	100%	1,760	GC14	GCDP
Laboratory Technician	100%	1,760	GC06	GCDP
Maintenance Operations Coordinator	100%	1,760	GC18	GCDP
Maintenance Supervisor	100%	1,760	GC03	GCDP
Operations Manager	100%	1,760	GC01	GCDP
Operations Supervisor	100%	1,760	GC02	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP

Position	FT /PT	Hours	PD Code	Allocation
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator	100%	1,760	GC10	GCDP
Operator (Senior)	100%	1,760	GC16	GCDP
Process Engineer (Senior)	100%	1,760	GC04	GCDP
Project Engineer	100%	1,760	GC07/GC17	GCDP
Training Admin	50%	880	QL20	GCDP
Water Quality Process Engineer	100%	1,760	GC05	GCDP
Asset Manager	10%	176		Shared resource
Control Systems Maintenance Supervisor	75%	1,320		Shared resource
Document Controller	30%	528		Shared resource
Project Engineer	10%	176		Shared resource
Assistant Accountant	10%	176		Scheme Office
Business Systems Manager	20%	352		Scheme Office
Environmental Manager	10%	176		Scheme Office
Environmental Officer	50%	880		Scheme Office
HR Manager	40%	704		Scheme Office
Procurement & Contracts Manager	10%	176		Scheme Office
Procurement Officer	40%	704		Scheme Office
Safety Manager	40%	704		Scheme Office
Training Admin Officer	30%	528		Scheme Office
Total FTEs	**26.25**			

For the shared and scheme office employees, hours apportioned to the GCDP are recorded via Veolia's timesheet system. Timesheets are approved by the Operations Manager. Veolia has stated that only work directly related to the GCDP is charged to the project, e.g. time spent procuring items for the GCDP. Legal and IT hours are not charged to the GCDP, instead covered within Veolia's overhead.

A comparison of the historical employee costs between 2013 (actual) and 2015 (forecast), is shown in **Table 6.3**.

Table 6.3 : Employee cost trend

	FY 2012/13 Actual	FY 2014/15 Forecast	Percentage change
Employee Cost – Direct and Indirect ($'000s)	2,838	3,411	20%
External Consultant Costs ($'000s)	92	65	-30%
Volumes Water (ML)	2,806	1,872	-33%

Table 6.3 shows that between FY 2012/13 and FY 2014/15, whilst there has been a minor decrease in the external consultant costs, there has been a significant increase (20%) in employee costs. During this period the volume of water supplied reduced. Jacobs understands that the mode of operation has been consistent over this period.

Veolia has stated that the reason for the increase in employee costs is due to:

- There being vacancies in previous years which are now filled
- Annual increases in salary
- Changes to the EBA

6.2 Prudency assessment

Jacobs understands that the expenditure on employee costs is used to meet the following driver categories:

- Legal obligations
- Operations and maintenance of existing infrastructure

Veolia is required to supply drinking water to meet license conditions for public health and environmental discharge limitations. The engagement of labour to operate and maintain the infrastructure under the responsibility of Veolia is required to fulfil its obligations and therefore Jacobs is of the opinion that this expenditure is prudent.

6.3 Efficiency assessment

Jacobs has compared the resources in **Table 6.1** to the provided organisational charts and rosters for operators. The above resources are included within the organisational chart, with the minor exception of the part time Training Admin person who is likely to be captured within other charts. All of the operators named are included on the rosters for operators, including the two operators who are listed as relief operators on the organisational chart.

Jacobs has reviewed the rosters for operators. The roster is arranged so that from Monday to Friday there are:

- Two operators working an ordinary day (07:00 to 15:30)
- Two operators working a day shift (06:00 to 18:00)
- Two operators working a night shift (18:00 to 06:00).

During the weekends, this is reduced to four operators, with:

- Two operators working a day shift (06:00 to 18:00)
- Two operators working a night shift (18:00 to 06:00)

As such the plant is continually manned by at least two people at all times and by four people during ordinary working hours between Monday and Friday.

Jacobs understands that the plant runs twice a week overnight. One of the key reasons for this is the limited access to the plant during run hours (which is further described in Section 7).

The operators work in five week repeating shift patterns, working between 24 and 60 hours per week. Over the five weeks, we understand that operators work on average 42 hours/ week Based on the total above hours, the sum of the hours for the operators for the plant is approximately 504 hours a week.

Figure 6.1 shows the PM hours for Veolia Water. This shows a base line of approximately 40 hours a week, rising to peaks of around 125 hours for short periods. A comparison with the number of available hours available to the operators reveals that there are between 379 and 464 additional hours a week available to operate the plant.

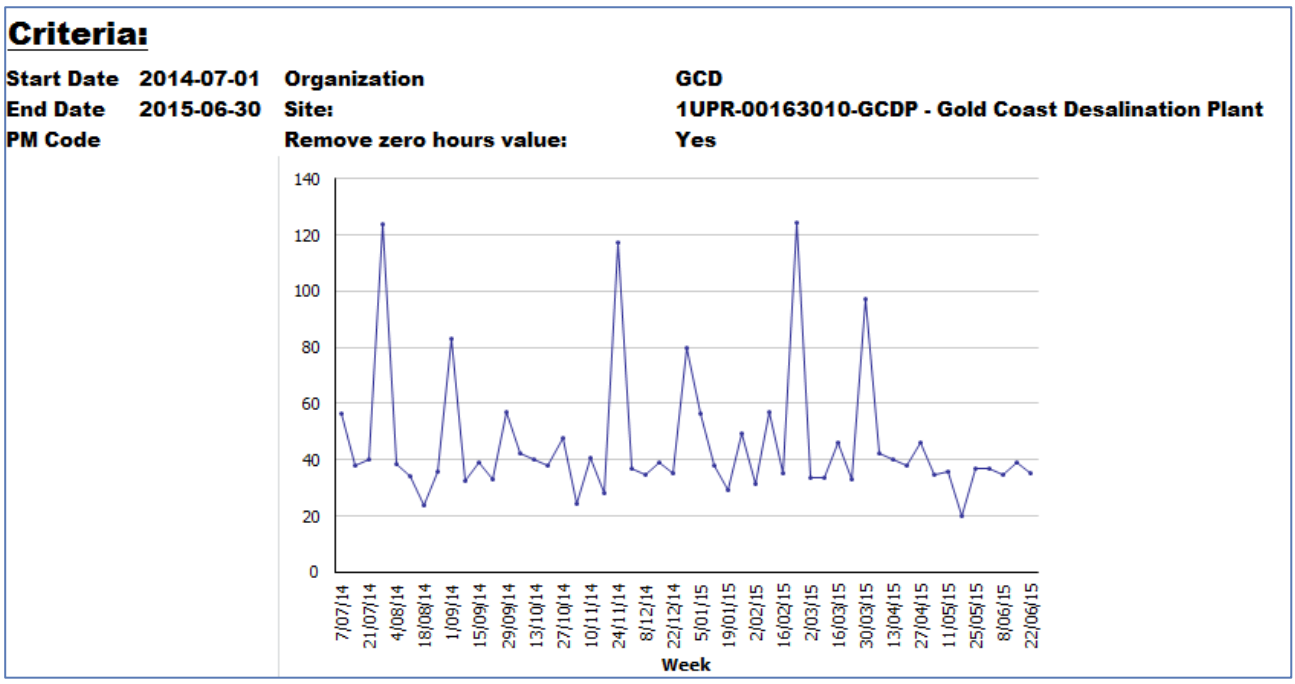


Figure 6.1 : PM hours for Veolia Water (Source: *PM Schedule FY15)*

Jacobs understands that this time is required to undertake regular operation of the plant including:

- Managing chemical deliveries and sludge removal
- Managing permits to isolate equipment
- Operating the live equipment (e.g. the live pre and post treatment streams)
- Taking samples

Jacobs requested that Veolia submit the routine lists for the operators to Seqwater to provide further justification for the need to have up to four operators working during the working week. This information is presented in **Table 6.4,** ranked from highest number of hours to lowest.

Table 6.4 : Activities undertaken by operators

Activity	Activity Requirements	Total Manhours Per Week for Activity
Duty Operator	Acknowledge alarms, interrogate trends, issues brownfield (non-isolation) permits etc	168.0
ICC Operator	Prepare isolation permits	84.0
Routine W/O	Completion of weekly Routine Work orders	77.0
Membrane Management	Based on doing 2 trains per week, Membrane Vessel Leak checks 12 trains per month, Leak repairs	56.0
Annual Leave	Based on 5 weeks A/L	44.0
Laboratory Sampling and Analysis	Collection of samples, analysis in laboratory, entering data. Checking results of analysers, confirm quality of water through process.	41.0

Activity	Activity Requirements	Total Manhours Per Week for Activity
Moving mapping hoses on trains	Moving 186 mapping hoses on trains	16.8
Housekeeping		14.0
Breakdowns/corrective actions	Breakdown/corrective actions averaged out	14.0
Training	Training averaged	12.6
Site Walks and Inspections (Rounds)	Physical Inspection of Site by Operator and Assistant. Should occur once a day start of night shift	10.5
Daily Duties	Complete daily duties as per FM-GWA-GCD-2023-5 excluding Lab work, Plant Walk down, lime plant, residuals -these are covered separately (Plant Walk through done on start of Night Shift)	10.5
Sludge Management	Inspect parking of trailers', filling of trailers, and operation of centrifuge. 0.5 hours per shift	7.0
Thinkener/Lime Saturator Cleaning	Cleaning Launders	7.0
Residuals area	Bin Pickup and hose down	7.0
Safety Showers inspection and maintenance	Safety Shower Testing	5.0
Toolbox/Meetings	Hours average over 5 days	4.9
Chemical Deliveries	Supervise unloading deliveries, clean-up, and complete paperwork. 11 chemical types onsite with 14 days max storage. Based on Hot Standby	3.5
Lime Plant	Inspect and clean	3.5
Train Mapping	Mapping trains during runs	2.1
Sick Leave	10 Days per Operator	2.1
Manual Loading Chemicals	Chemicals onsite need to be manually loaded into hopper. These include poly, Fluoride, Sodium Silicate, Anti Scalant . This is averaged at 2 hours per week @ 66 %.	0.7
Chemical Inventory	Bulk Chemical automated only Poly, Sodium Silicate need to be checked	0.4
Fluoride	Cleaning equipment /checks	0.3
Total		**591.8**

Jacobs notes that the top two tasks include issuing permits. The Duty Operator task allows for a resource to be undertaking this task full time (24/7). The ICC Operator role also undertakes permitting as well for at least 12 hours a day. Veolia has advised that this equates to two different types of permitting and that there is no overlap in activities. Jacobs still notes that this is a significant amount of time to spend on permitting.

For the third highest ranked task, Routine W/O, there is a mismatch between the hours suggested by Figure 6.1 and the recorded hours (77 hours). Figure 6.1 shows that on average 40 hours a week is spent on preventative maintenance, rather than 77 hours.

[redacted].

Jacobs notes that the costs currently allow for the Operations Manager to be employed full time on the GCDP. Our understanding is that this resource shares his time with the WCRW Scheme. As such, Jacobs questions the

allocation of 100% of this resource to the GCDP. Jacobs notes that no costs are included for this resource in the WCRW Scheme. This is further discussed in a separate report on the WCRW Scheme.

In June 2012, SKM undertook a benchmarking review of fixed and variable operating costs for the then grid service providers (Seqwater, Linkwater and WaterSecure)[6]. In this review, SKM developed a number of metrics regarding employee numbers and costs.

Applying these metrics, at the time of that review, the numbers for WaterSecure (responsible at the time for both the WCRW Scheme and the GCDP) were generally favourable. This is not unexpected due to the business model that WaterSecure implemented by contracting out a significant proportion of its activities and roles to Veolia Water. As such, employee costs were relatively low, whilst contractor costs were high.

In this review, Jacobs has reviewed the following metrics, using the actual FTE numbers from Veolia Water.

- Total employee cost as a proportion of total operating expenditure
- Water supplied as a proportion of total full-time equivalents
- Total employee cost as a proportion of total full-time equivalents

The results of this are presented in the following sections. The following benchmarking metrics were considered, but not applied for the reasons as presented in **Table 6.5.**

Table 6.5 : Benchmarking metrics

Metric	Reason not applied
Total operating expenditure as a proportion of water supplied data	GCDP is in a hot standby mode, whereby volume of water supply is limited. As such, this metric is not considered to be relevant for the GCDP.
Total operating expenditure as a proportion of non-current assets	The GCDP is relatively new asset; as such it does not have a high value of non-current assets. A review of *Seqwater Recycled Plants Valuations (Client 29 04 2014)* shows that the average remaining life for assets is 39 years. This metric is not considered to be relevant for the GCDP.
Total operating expenditure as a proportion of total revenue	GCDP is in a hot standby mode, whereby volume of water supply is limited. As such, the revenue will be limited by supply. This metric is not considered to be relevant for the GCDP.
Total revenue as a proportion of total full-time equivalents	GCDP is in a hot standby mode, whereby volume of water supply is limited. As such, the revenue will be limited by supply. This metric is not considered to be relevant for the GCDP.
Total full-time equivalents as a proportion of non-current assets	The GCDP is relatively new asset; as such it is not expected to have a high value of non-current assets. This metric is not considered to be relevant for the GCDP.

6.3.1 Total employee cost as a proportion of total operating expenditure

Figure 6.2 presents a comparison of the proportion of the total employee cost to the total operating expenditure for a number of Australian water utilities based on data collected in FY 2012.

[6] Gird Service Charges 2012-13: Phase 1 – 2011/12 Fixed and Variable Operating Expenditure Benchmark Review (SKM, June 2012)

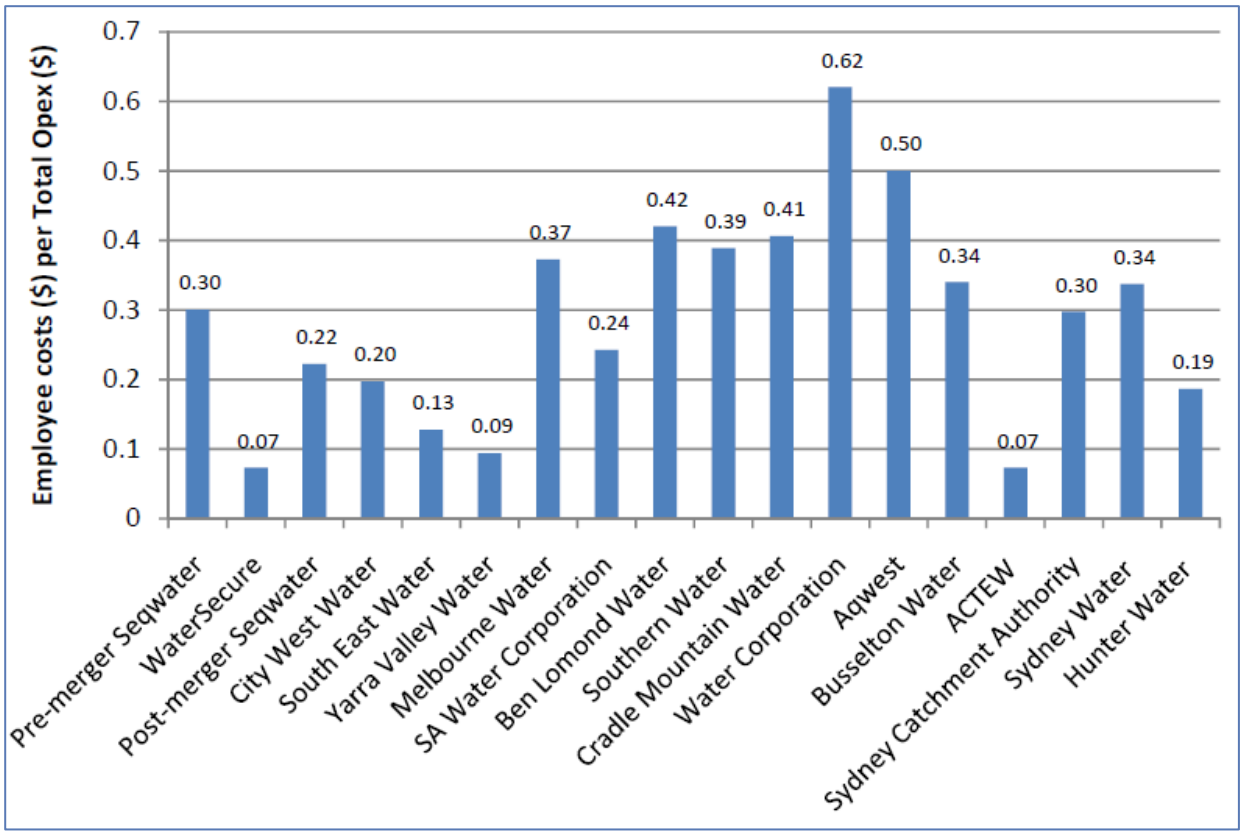


Figure 6.2 : Total employee cost as a proportion of total operating expenditure (Source: Gird Service Charges 2012-13: Phase 1 – 2011/12 Fixed and Variable Operating Expenditure Benchmark Review (SKM, June 2012))

For the GCDP for FY 2014/15, the ratio of total employee cost ([redacted]. Note that this does not include any operating costs experienced by Seqwater for which values are not available to Jacobs.

Given that employee costs form a large percentage of operating costs, Jacobs does not expect that these ratios have changed substantially from 2012, with both employee costs and operating costs growing at a similar rate.

Jacobs considers that, based on the above information, the total employee costs for Veolia as a proportion of total operating expenditure is consistent with that of an efficient operator.

6.3.2 Water supplied as a proportion of total full-time equivalents

Figure 6.3 presents a comparison of the proportion of the water supplied to the total FTEs for a number of Australian water utilities based on data collected in FY 2012. A higher proportion of water supplied to the total full time equivalents indicates broadly, for a given operation size, maintenance schedule and distribution network, that the entity is more efficient.

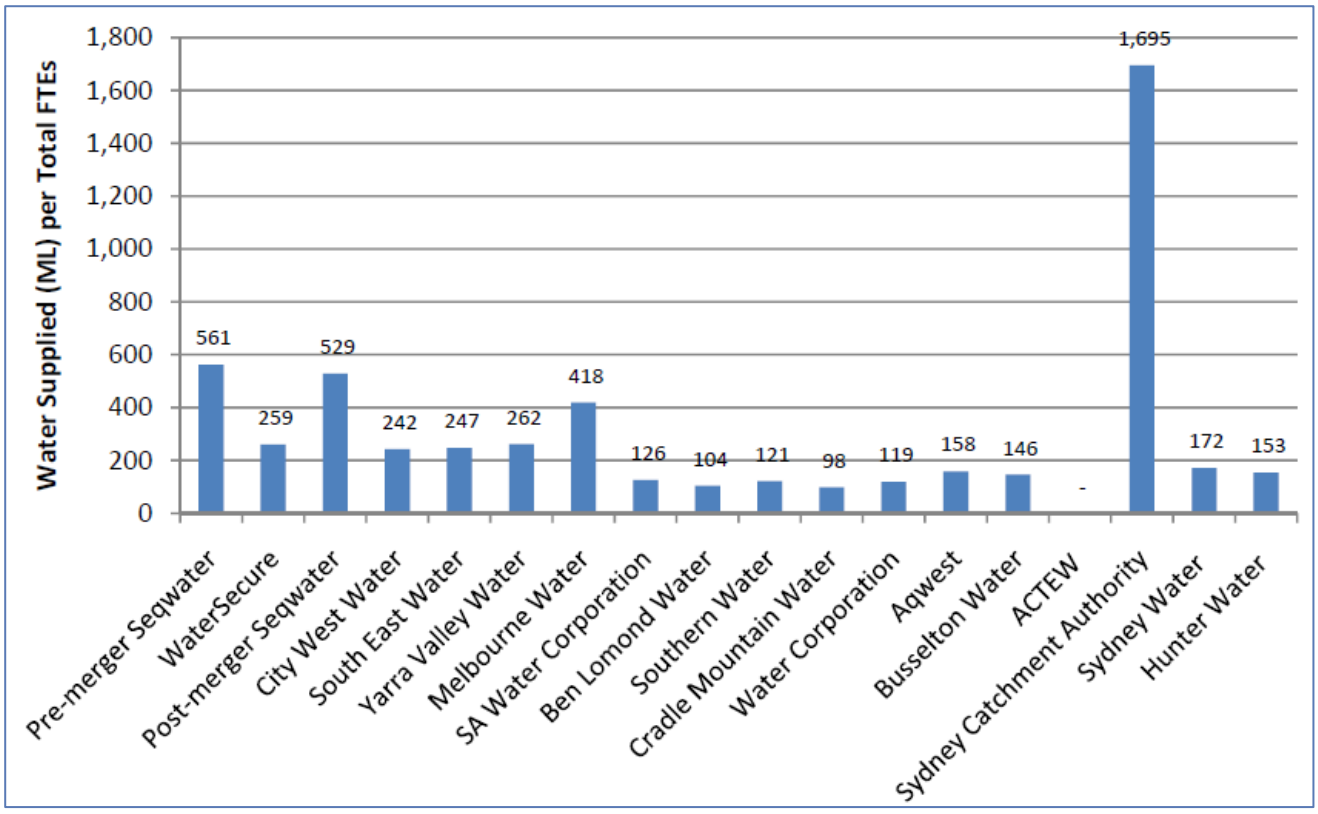


Figure 6.3 : Water supplied as a proportion of total full-time equivalents (Source: Gird Service Charges 2012-13: Phase 1 – 2011/12 Fixed and Variable Operating Expenditure Benchmark Review (SKM, June 2012))

For the GCDP for FY 2014/15, the proportion of the water supplied (1,872) to the total FTEs (26.25) is 71.3. Note that this does not include any Seqwater FTEs for which values are not available to Jacobs.

Whilst this metric appears favourable for GCDP, there are a number of items to consider:

- The GCDP is entirely a water supply entity. The majority of comparator companies also undertake many activities that are not related to water supply (such as wastewater treatment, retail and distribution).
- The GCDP's production is not based on the capacity of the plant, but a function of its hot standby operational mode

Taking into account the above, Jacobs considers that, this metric cannot be sensibly used to review the GCDP.

6.3.3 Total employee cost as a proportion of total full-time equivalents

Figure 6.3 presents a comparison of the proportion of the total employee cost to the total of full-time equivalents for a number of Australian water utilities based on data collected in FY 2012. A lower proportion of total employee cost to total full-time equivalents indicates broadly, for a given operation size, maintenance schedule and distribution network, that the entity is more efficient.

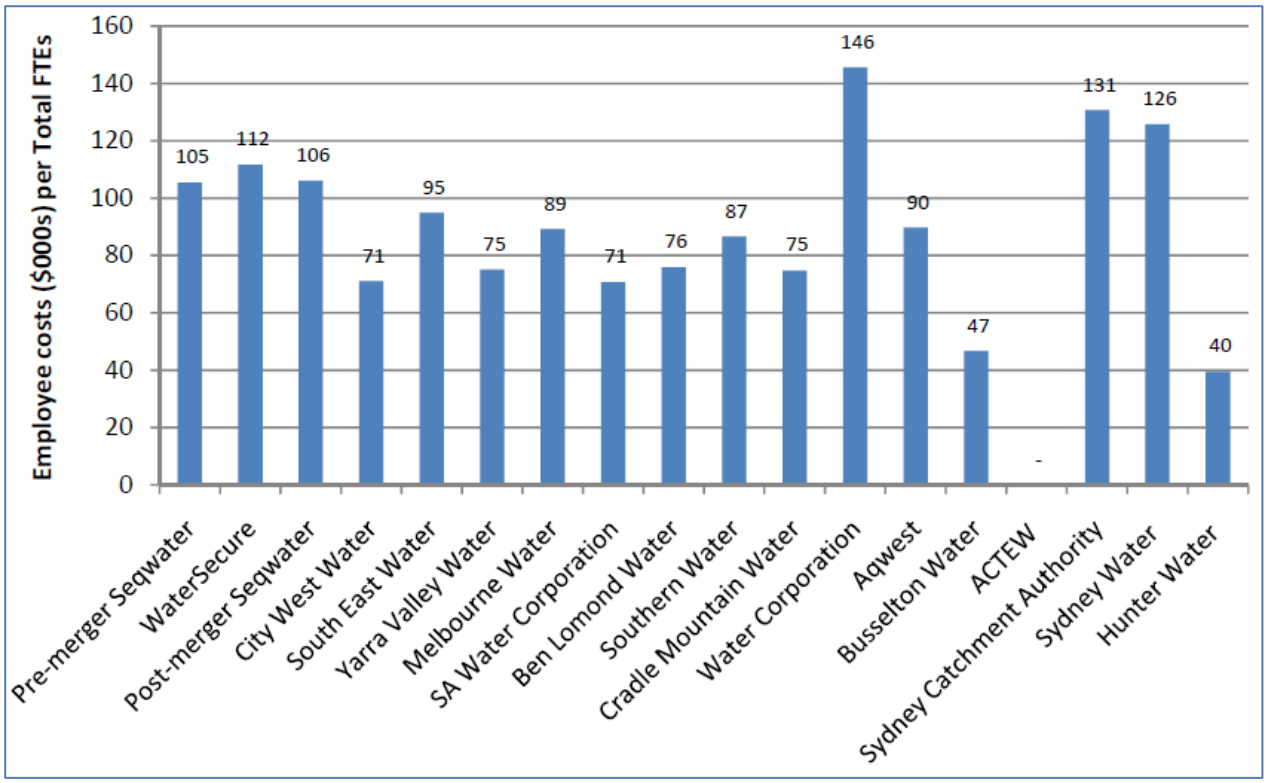


Figure 6.4 : Total employee cost as a proportion of total full-time equivalents (Source: Gird Service Charges 2012-13: Phase 1 – 2011/12 Fixed and Variable Operating Expenditure Benchmark Review (SKM, June 2012))

For the GCDP for FY 2014/15, the ratio of total employee cost (including direct and indirect costs - $3.051million) to the total FTEs (26.25) is 116.2 (or $116,200 per FTE).

On the basis of similar investigations recently undertaken, Jacobs considers that annual increase in salary rates would be between 2.3 and 3% per annum for this period. Using the upper end of this spectrum, the comparative rate in FY 2012, would be $106,300). This metric places GCDP towards the top end of the costs. However, in considering this, the following points should be noted:

- There is likely to be a salary difference between workers in the public and private sectors
- A desalination plant utilises high technology plant, and as such, employees must be highly skilled

Jacobs has recently undertaken work reviewing costs for another desalination plant in Australia. A comparison of these costs shows that the costs per FTE are higher for the comparable desalination plant than for the GCDP.

On the basis of the above, Jacobs considers that, whilst the costs per FTE are high when compared across the overall water industry, there are reasons for this and costs are in line with other specific desalination plants.

6.4 Summary

Jacobs finds the direct employee costs to be prudent.

Jacobs recommends the following efficiency improvements:

- [redacted].
- [redacted].

[redacted].

7. Repair & Maintenance - Projects

7.1 Provided information

Table 7.1 provides a breakdown of the Repair & Maintenance – Projects costs for FY 2013/14 to FY 2015/16. In the original information presented to Jacobs, for FY 2014/15 (the selected year for review) the top costs were related to the need to relocate equipment outside of the high pressure areas (Projects VP 247 and VP 249). These projects were reviewed by Jacobs' in its draft report. Following Jacobs' issuing its draft report, further information was provided regarding the projects included within Seqwater's FY 2014/15 budget. **Table 7.1** shows this updated information. Projects VP 247 and VP 249 are no longer included within Seqwater's FY 2014/15 budget. Jacobs supports the removal of these items as described in the following sections. In addition, Jacobs believes that the following comments are relevant, should these projects be proposed for future years.

Table 7.1 : Project breakdown

VP No.	Project Title	Project Cost ($'000s)*	FY^			Comment^
			2013/14	2014/15	2015/16	
VP 247	Relocation of Mapping lines to outside HP Areas	400.00	-	-	-	Not included in Seqwater 2014/15 budget
VP 249	Relocation of Sample Panels to outside HP Areas	300.00	-	-	-	Not included in Seqwater 2014/15 budget
VP 261	Pressure Warning Beacons	92.57	92.57	-	-	Included in Seqwater 2013/14 budget
VP 223	Emergency Communication	79.44	-	79.44	-	Included in Seqwater 2014/15 budget
VP 222	Outfall Sample Pump Electric Winch	13.04	13.04	-	-	Included in Seqwater 2013/14 budget
VP 224	Internal Use of Potable Water	92.00		92.00	-	Included in Seqwater 2014/15 budget
VP 230	SCADA Upgrade	196.57		196.57	-	Included in Seqwater 2014/15 budget
VP 219	Fire System Ring Main Bolts	69.26	69.26	-	-	Included in Seqwater 2013/14 budget
	Replacement of Emergency Lighting	180.00	-			Not included in Seqwater 2014/15 budget
	Australian Bay Lobsters - Not a Veolia project	-	-	-	-	Not included in Seqwater 2014/15 budget
	Sludge Bins purchase	110.00	110.00	-	-	Included in Seqwater 2013/14 budget
FY Total			**284.87**	**368.01**	**0**	

Source: **RM 15yr Forecast Rev 3, ^revised program from Seqwater.*

Project VP 224 - The Internal Use of Potable Water Project is discussed in Section 8.1.1, with reference to reducing potable water costs.

Jacobs specifically sought information on the largest projects (relocation of mapping lines to outside high pressure areas and relocation of sample panels to outside high pressure areas).

The following information was provided:

- Capital investment paper - Post FY15 capital investment Mapping Hoses (Veolia Water, undated)

- Capital investment paper - Post FY15 capital investment Sample Panels (Veolia Water, undated)
- Briefing Paper - BP264A High Pressure Safety at GCDP - Update FINAL - ALG approved (GCD Alliance, April 2012)
- Briefing Paper - BP236 Reintroduction of Personnel to HP Areas Rev 3 - ALG approved (GCD Alliance, July 2013)

7.2 Background

Prior to August 2011, operations staff were allowed to enter the Reverse Osmosis (RO) Building when the plant was operating. One of the tasks that the operations staff would conduct was the membrane mapping of the RO vessels. This is a task that has to be conducted when the RO process is pressurised and therefore access to the RO Building when the plant is operating is critical.

In August 2011 it was identified that several defects were present in the RO Building which created a risk of release of high pressure water. It was recommended and approved by the APMT (BP241 – Exclusion Zone and BP264A – High Pressure Safety) that all high pressure areas of the plant (>10 bar pressure) which includes the RO Building are an exclusion zone when the plant was pressurised until the defects had been rectified.

In January 2012 a Briefing Paper was raised to document the high pressure risk failures and the required controls. At the time it was agreed that once controls were put in place access could be granted to the building. In July 2013 a second briefing note was issued documenting that whilst all original controls are in place, further failure modes were identified. A detailed review of the issues was undertaken by an independent consultant (R2A).

The outcomes of this review were that access would only be allowed into the building during operation under specific conditions (e.g. to carry out safety critical inspections, during a water supply emergency, to prevent major consequence asset damage (>$1 million) after the two-hour recommissioning exclusion). Membrane mapping was specifically identified as an activity that was not permitted to occur within the RO building whilst operational.

In this document a number of high pressure risk precautionary measures were identified and assessed. This recommended an investigation into the permanent relocation of the mapping hoses. This was agreed to by all Seqwater and Veolia stakeholders.

7.3 Prudency assessment

7.3.1 Relocation of mapping lines to outside high pressure areas

The identified drivers for the project are identified below:

Table 7.2 : Project driver- Relocation of mapping lines to outside high pressure areas

Driver	Primary or secondary	% weighting (sums to 100%)
Compliance	The primary driver is that the project will address the issue of non-compliance with the Building Fire safety Regulations whilst removing several OH&S issues.	80
Efficiency	A secondary driver is that it will produce an OPEX cost reduction.	20

The Capital investment paper - Post FY15 capital investment Mapping Hoses states that:

> *For plants which use RO membrane filtration, the membrane part of the process is a key indicator of the overall process performance. As a consequence it is essential to be able to track the behaviour of each membrane for process optimization, fault finding and decision making purposes. The degradation of the 1st Pass membranes leading to higher conductivity feed to the 2nd Pass has been listed on the GCD plant risk profile as a high risk due to the potential for the scaling of the 2nd pass membranes and the*

subsequent need for increased CIP of the 2nd pass membranes. The current control measure for this is to monitor the 1st Pass membrane performance and make further operational changes as required to reduce the likelihood of the scaling of the 2nd pass membranes from occurring. The monitoring of membrane performance becomes increasingly critical as the membranes age. To do this the overall performance of each train is monitored and if there is an issue with high salt passage, i.e. an increase in the conductivity of the permeate water from the train, then mapping is used to determine if the issue is with the entire train or if there is just an issue with a solitary vessel. Also mapping is used in order to monitor the performance of each vessel and trend each vessels performance.

Jacobs considers that it is necessary to undertake monitoring of the membranes to monitor the performance of the GCDP.

Jacobs agrees that there is currently an unacceptable level of risk of working in the RO building on pressurised equipment. We note that in other facilities, such as the desalination plant in Perth, blast screens have been installed. From verbal discussions with Veolia we understand this option was reviewed and found to be insufficient. This is documented at a high level in Table 3 in Briefing Paper - BP236. Whilst a review of the risk level of working within the RO building is beyond the scope of this investigation, Jacobs is satisfied that the decision making process to exclude personnel from the RO building has been robust and well documented.

The Capital investment paper - Post FY15 capital investment Mapping Hoses further states that:

In order to conduct mapping of the vessels, there was a set of 186 temporary mapping hoses procured and used. These mapping hoses were connected to a train prior to a pressurisation, and the mapping tubes are run to the nearest entry/exit point to the building and into an IBC that is located outside the building. The discharge from the IBC is then ran back into the building and discharged on to the floor of the Reverse Osmosis Building floor to run into the floor drains.

A restraint on this system is that the operations staff can only map one train per hot standby run.

The frequency of mapping is an important issue. At present the mapping frequency has been reduced to a 3 month period due to the plants mode of operation (hot standby). The operators currently have sufficient equipment to map one train. Jacobs understands from the Capital investment paper that:

To relocate a set of temporary mapping hoses it takes approximately 4 hours and it is a two person activity that requires a scissor lift. Therefore to relocate the mapping hoses once per week to ensure that the all the trains are mapped within a 12 week period equates to $21,627 per annum.

Jacobs has reviewed the assumption for this number and agree that these costs are reasonable. The current method of operation (two runs per week) means that it is possible for the operators to map two trains a week, resulting in a doubling of the labour cost of $43,254 per annum.

It is apparent that the capital cost for this project ($460,000) far exceeds the current costs of moving the temporary hoses to map the trains, even if the frequency of this is doubled. From direct enquiry, Jacobs understands that there is very little evidence of scale in the second pass. We agree that as the first-pass permeate quality decreases (as the membranes age) the likelihood of second pass scale formation increases. However, there is not an immediate need to increase the mapping frequency.

Jacobs has attempted to contact Hydranautics (based in California) to determine its perspective on the required frequency of mapping, but at the point of writing has been unsuccessful in this. At present, an in absence of information to the contrary, Jacobs does not believe the need to increase the frequency of mapping has been sufficiently justified. There may in future be a requirement to increase the frequency and this should be closely monitored.

The secondary justifications for the project are as follows:

The Entry to Operating High Pressure Areas procedure that has recently been drafted. It states that 'The doors to the RO building will be locked physically or electronically when the process is pressurised.'

Currently the temporary mapping hoses are run out through one of these doors, therefore there is a need to address this issue and ensure that the new procedure is adhered to.

It has been identified that the mapping hoses are contravening Building Fire Safety Regulation 2008 Part 2 Division 2 Keeping evacuation routes free from Obstruction – general…. Therefore it has been determined that the placing of hoses on the floor of the RO Building that cross evacuation routes is contravening this code.

Whilst Jacobs has not visited site, it may be possible through adjustment to the RO building doors, though a "cat flap" or such arrangement, to allow the door to be locked whilst the hoses are in position.

Jacobs notes that the primary driver for this project is to address the issue of non-compliance with the Building Fire safety Regulations whilst removing several OH&S issues. Veolia has identified the blocking of evacuation routes as contravening this code. Jacobs agrees that the placement of the hoses across the floor of the RO building is of concern. Whilst for most of the time the hoses are in place, the building is empty and physically locked shut, it is recognised that there will be times (such as during the movement of the mapping hoses) that these will be crossing evacuation routes. It is recommended that a procedure be developed (if not already in place) to consider the best placement of hoses to keep evacuation routes as clear as possible at all times, such as removing and storing hoses when not in use, and maintaining a clear alternative evacuation route.

In summary, Jacobs concludes that there is currently insufficient information to increase the frequency of the mapping, and as such the prudency of the project at this time has not been demonstrated. As the need to map the membranes becomes more frequent, there may be a need for this project in future. Jacobs recommends that an options investigation, including a review of the risk status of the RO building should be taken into consideration. We note that there are concerns regarding potential non-compliance with fire regulations, but question whether there may be more economical or operational solutions to these problems.

7.3.2 Relocation of RO sample panels to outside high pressure areas

The identified driver for the project is identified below:

Table 7.3 : Project driver- Relocation of RO sample panels to outside high pressure areas

Driver	Primary or secondary	% weighting (sums to 100%)
Service	The primary driver is that the project will improve the reliability of service, because currently if there is an issue with the trains conductivity and flow instruments then the issue cannot be investigated because it is located with the high pressure area.	100

The Capital investment paper - Post FY15 capital investment Sample Panels states that:

The conductivity instruments for each train are installed inside the high pressure area. Currently operations are unable to verify readings that are displayed on SCADA because of the inability to enter the high pressure area to verify/calibrate the instruments. Therefore to address this issue it is proposed to relocate the instruments outside the high pressure area.

The Capital investment paper - Post FY15 capital investment Sample Panels further states that:

A detailed investigation of this project is required to determine if the risk of an issue or failure of instruments located it the RO building and the resulting damage to membranes or equipment or the failure to produce potable water that meets minimum water quality limits is sufficient to warrant the relocation of the instrumentation.

If we assume that the risk is sufficiently high and unacceptable then the project is prudent because it addresses the risk of damage to membranes or equipment or the failure to produce potable water that meets minimum water quality limits that result from instrument failure or erroneous measurement.

Jacobs notes that there is still work required to investigate and justify this work. At present we understand that the monitors associated with each train will need to be checked, cleaned and recalibrated prior to pressurising and running of each train anyway. We also consider that the issue of leaving long lag times between sample source and sample monitor should be considered (i.e. additional 20m of hose pipe can add significant time lag).

In summary, Jacobs concludes that the prudency of the project at this time has not been demonstrated.

7.4 Efficiency assessment

As the prudency of these projects has not been established, Jacobs has not undertaken a full efficiency review. We note that for both items are based on budget prices from sub-contractors. If the work proceeds, Jacobs recommends that consideration be given to competitively tendering both projects as a combined package of works.

7.5 Summary

As noted in Section 7.1, the projects selected from review have already been excluded from Seqwater's budget. Jacobs supports this action as the prudency and or efficiency of these projects is yet to be established.

8. Other Fixed Costs

A breakdown of the other fixed costs is provided in **Table 8.1.** No other details of specific costs were provided to Jacobs for this review.

Table 8.1 : Other fixed costs breakdown

Item	Veolia's Pre-Budget Submission Costs ($'000s)
73000 - Bulk Water	323.00
76225 - Disposals - Garbage	8.89
76235 - Disposals - Trade Waste	0.23
77000 - Safety Equipment	7.18
77005 - Safety Clothing	12.30
77010 - Safety Other	30.32
77710 - Freight - Other	2.60
77800 - Security Patrols	277.36
77805 - Security Other	15.49
77405 - Subscriptions - Staff Memberships	1.23
77410 - Subscriptions - Publications / Web Sites	0.39
77415 - Subscriptions - Licences	3.04
77420 - Subscriptions - Other	1.77
78000 - Travel Airfares - Local	0.02
78005 - Travel Airfares - International	1.45
78020 - Travel Ground Transport	0.39
78030 - Travel Parking	0.62
78040 - Travel Accommodation	2.54
78050 - Travel All Other - Local	0.32
78075 - Food & Drinks - With Overnight Stay (<21days)	0.02
78090 - Food & Drink: Special Events	1.51
78730 - Gifts	0.43
77235 - Insurance - Other (EXCL VEHICLES)	13.50
76010 - CAPEX P&L - Plant	16.91
76015 - CAPEX P&L - Office Equipment & Fittings	6.66
77015 - CAPEX P&L - Tools & Equipment	41.00
Total	**769.17**

The most significant costs are the bulk water costs and the security patrols. These are considered in more detail in the following sections.

Jacobs notes that the 'Other' fixed costs category is relatively consistent with historical costs. Assuming that the components of this category remain consistent over time, the costs would be expected to increase in line with bulk water prices and labour/contractor prices (for the security component).

The costs for bulk water have increased on average by 10% over the last two financial years, as shown in **Table 8.2.**

Table 8.2 : Bulk water price increases

	FY 2012/13	FY 2013/14	FY 2014/15
Bulk water price – Gold Coast ($/ML)	$2,225	$2,470	$2,715
Percentage increase		11%	10%

Source: Bulk water prices - DEWS[7]

Jacobs estimates that the cost for contractors is estimated to have increased by between 2.3 and 4.6%.

On the basis of the above, the increases in costs for the 'Other' fixed costs category are reasonable.

8.1 Prudency and efficiency assessment

8.1.1 Potable water

The GCDP utilises potable water for a number of purposes on site, including essential processes and services during production, such as for mechanical seal quenching, pump cooling, site safety showers and eyewash basins, as well as the supply for hand basins, the laboratory and the administration building. Currently there is only one town water supply to the site. This is a single point of failure which has occurred on a couple of occasions, once resulting in shutdown of the plant.

The GCDP has an approximate annual water utility bill of between $360,000 and $420,000 ($323,000 for FY15) from Gold Coast City Council (GCCC). However, after factoring in revenue from Queensland Government State Bulk Water charges, the real cost to Seqwater is approximately $150k per annum.

Seqwater has in place a business case (*Business Case VP 224, Internal Service Water Upgrade*, Version 4, December 2013) to reduce these costs by utilising GCDP potable water to substitute this consumption of GCCC potable water. This will also reduce GCDP's requirement for the GCCC supply to be available in order to run GCDP.

According to the business case, for an investment of $92k an operational saving of approximately $114,000 per annum can be achieved by utilising site produced and network potable water in lieu of GCCC supply. This project is shown in **Table 7.1**. The primary aim of the project is to reduce the GCCC water bill for the GCDP and to improve plant reliability.

Jacobs has reviewed the business case and finds this project prudent. Jacobs notes that this project is already underway and understands that the benefits will be realised in the FY 2014/15. As such the costs for potable water should reduce from between $360,000 and $420,000 per annum, to approximately $114,000 per annum.

8.1.2 Security patrols

The following information was provided specific to security patrols:

- Briefing Paper BP 048 Security Scope Change, including:
  - Plant Security Design Change Approval Request (GCD Alliance, August 2007)
  - Security Concept Report (GCD Alliance/SKM, June 2007)
- Security daily logs for March and April ([redacted], as dated)
- Standard Operating Procedures ([redacted], June 2011)
- Courier Inductions (done by security) (GCD Alliance, February 2013)

[7] http://www.dews.qld.gov.au/policies-initiatives/water-sector-reform/water-pricing/bulk-water-prices

- Chemical Delivery Induction (done by security) (GCD Alliance, February 2013)
- Chemical Induction Questionnaire (done by security) (GCD Alliance, February 2013)
- Visitor Inductions (done by security) (GCD Alliance, December 2012)
- Copy of subcontract for period 1 October 2009 to 30 September 2010 (GCD Alliance, various)

The GCD Alliance currently employs [redacted] to undertake 24/7 security. This occurs in two shifts: 6:00am to 6:00pm, and 6:00pm to 6:00am. There is one guard per shift. In addition a site vehicle is provided. Duties include:

- Manning the gate house
- Inductions
- Daily logs
- Site patrols.

According to the Briefing Paper BP 048 Security Scope Change, in the initial design of the GCDP, allowance was made for the security to a standard which was considered to be typical of the level of security at other water treatment plants in the Gold Coast Area. The security measures allowed for included a standard 2.4m perimeter fence, CCTV cameras at various locations linked to the operator console and entry control to doors using either conventional lock or key or swipe cards. During design development, a Security Risk Assessment was performed. This Risk Assessment highlighted a number of areas which required further consideration. Subsequently a preliminary Security Concept Report was commissioned to identify areas of the GCDP which required additional security measures. The Security Concept Report highlighted the need to address key aspects of the plant security in order to comply with the National Guidelines for Critical Infrastructure Protection (CIP) legislation, which was anticipated to be required at that time. This included the recommendation for a full time (24/7) physical security presence.

Jacobs understands that the GCDP is not presently specifically classified as critical infrastructure. However, according to the CIP legislation, owners and operators of major infrastructure are responsible for undertaking a risk assessment to assess the risks and provide adequate security. Jacobs further understands that Seqwater is currently reviewing the need to maintain full time security at this and other sites. It is noted that other water treatment plants, which are fully operational, do not have the same level of security.

Jacobs recommends that as part of Seqwater's overall review of security, Seqwater reviews the risk assessments undertaken as part of the Security Concept Report taking cognisance of the revised operating model of the GCDP. This should be benchmarked against Seqwater's other water treatment plants. The aim of this risk assessment would be to determine what level of security is appropriate for this, and other water treatment plants owned and operated by Seqwater. This may result in a decision to reduce the amount of security patrols, and to rely on other security measures, such as operators monitoring CCTV and managing visitor/contractor and staff security control procedures. The impact of this on the availability of operators would need to be considered. Jacobs is not able to comment definitively on the benefits of this measure as undertaking a review of the risk register is beyond the scope of this report.

The GCD Alliance's subcontract with [redacted] is based for period 1 October 2009 to 30 September 2010, with the option to extend for 3 x 1 years. Jacobs notes that this contract should have expired in September 2013. It is presumed that an extension may have been granted whilst Seqwater reviews the requirement for 24/7 security.

Based on the information provided to date, and with the recommendation that further investigation be undertaken prior to future contract award, Jacobs finds the requirement for security patrols to be prudent.

Jacobs has reviewed the efficiency of the security costs. Jacobs reviewed the tender evaluation for security patrol [redacted] placed third of six in terms of costs (from lowest to highest). However, there were documented reasons for not selecting the cheaper tenderers, including lack of experience and systems, high staff turnover and poor past performance. Jacobs is satisfied that the tendering process and selection was reasonable. As

such the costs are in line with market conditions and are efficient. Jacobs recommends the competitive tendering of future contracts to ensure that rates stay consistent with market conditions.

The subcontract with [redacted] outlines the following rates for the contract. There is no escalation clause in the contract.

Table 8.3 : Security patrol - rates

Description	Unit	Rate per person
[redacted]		

Based on the hourly rates from **Table 8.3**, and the assumption of 11 public holidays a year, the costs for 24/7 security are as presented in **Table 8.4.**

Table 8.4 : Security patrol – cost estimate

Description	Period	Cost
[redacted]		

From Jacobs' calculations, the total for 77800 - Security Patrols in the budget is based on a flat rate of [redacted].

8.2 Summary

The other fixed costs category contains two significant costs, bulk water and security patrols. Combined these costs make up nearly 80% of this category for FY 2014/15.

In terms of bulk water costs Jacobs supports the findings of the business case to reduce these costs by utilising GCDP potable water to substitute this consumption of GCCC potable water. This will also reduce GCDP's requirement for the GCCC supply to be available in order to run GCDP. Jacobs notes that this project is already underway and understands that the benefits will be realised in the FY 2014/15. As such the costs for potable water should reduce from between $360,000 and $420,000 per annum to approximately $114,000 per annum.

For security patrols, Jacobs finds the current costs to be prudent and efficient. Jacobs recommends that the security requirements are reviewed in the event that the classification of the plant is reduced from being Critical Infrastructure.

9. Summary

9.1 Key findings

Jacobs has reviewed the FY 2014/15 budget for the GCDP, including a brief review of trends in historical costs over the last two years. Over this period, Veolia is expecting that its total fixed operating expenditure will increase from $10.5M (FY2012/13) to $13.1M (FY 2014/15), which represents a 44% increase.

The fixed expenditure component is largely independent of the operational mode of the plant and refers to costs associated with routine operating and maintenance activities and makes up the majority of the total operating expenditure. It is notable that there are significant variances between the FY 2012/13 actual costs and the FY 2014/15 budgeted cost with increases in the employee and preventative repair and maintenance costs and corresponding decreases in fixed energy and project related repair and maintenance costs. These high expenditure categories formed the key focus of Jacobs' review.

For the overall costs, given the large number of variables and the unique operating mode of the GCDP, it is challenging to find a true like-for-like comparison with other facilities. It is noted that compared to figures for another Australian desalination plant when run in a process proving mode, the costs are higher. This may be due to the specific differences in the operating modes of the two plants.

For the preventative maintenance costs, with the exception of the intake and outfall structures inspections, expenditure on the main preventative maintenance tasks reviewed is prudent. The need to undertake a detailed inspection of the intake and outfall structures every six months is found to be not prudent. On the basis of the last recommendation following inspection, Jacobs considers that this should be scheduled to occur every two years (ie next in 2016), with the timing reviewed following the major inspection in August 2014. This represents an overall reduction in person hours of 118 person hours (or a reduction in costs [redacted]).

Jacobs has also found that the majority of expenditure that has been reviewed in this exercise is efficient. However, there are areas in which savings could be made including allocation of calibration activities to Veolia's senior operator for the GCDP. Jacobs has insufficient information to be able to determine an estimate of efficiency for this task.

Jacobs also recommends that consideration should be given to determining the maintenance intervals for equipment on an hours run basis, rather than a fixed time basis.

For direct employee costs, the costs have found to be prudent. Jacobs recommends that the following efficiencies may be achieved:

- [redacted].
- [redacted].

[redacted].

For Repair & Maintenance – Projects, Jacobs has found both key projects not to be prudent due to a lack of justification. As such Jacobs supports the costs associated with both of these projects not be included in the budget.

For other fixed costs, in terms of bulk water costs Jacobs supports the findings of the business case to reduce these costs by utilising GCDP potable water to substitute this consumption of GCCC potable water. This will also reduce GCDP's requirement for the GCCC supply to be available in order to run GCDP. Jacobs notes that this project is already underway and understands that the benefits will be realised in the FY 2014/15. As such the costs for potable water should reduce from between $360,000 and $420,000 per annum to approximately $114,000 per annum.

For security patrols, Jacobs finds the costs to be prudent and efficient.

9.2 Recommendations

For those expenditure items where the forecast cost has been determined not to be efficient, Jacobs recommends that Seqwater requests that Veolia water revisits these forecasts in light of our findings.

Appendix A. Initial data review and gap analysis

Date	13 May 2014
Subject	**Independent cost review - GCDP**

The following is a list of questions from Jacobs SKM regarding the GCDP forecast costs. The responses from Veolia based on a meeting held on the 13 May 2014 are recorded in blue.

The questions below refer in part to the provided spreadsheets:

- *MWA Long term OPEX Template 2014-03-19*
- *R and M 15yr Forecast Rev 3*
- *15Year Budget Membrane Replacementsv2*
- *PM Schedule FY 15*

1) Please can you confirm that the MWA Long term OPEX Template 2014-03-19 spreadsheet contains all of the budget costs for the GCDP, i.e. that the total proposed costs for FY 2014/15 are $14.135 million. Alternatively please provide any additional costs (e.g. CAPEX cost spreadsheet)

- The *MWA Long term OPEX Template 2014-03-19* spreadsheet contains all of the budget costs for the GCDP, with the exception of some additional "project costs". Jacobs SKM will base its review on these costs.

Based on a review of *MWA Long term OPEX Template 2014-03-19*, there are four costs we are particularly interested in:

Area	FY 2014/15 Cost	Source
Repair & Maintenance – Preventative	$4.235 million	*MWA Long term OPEX Template 2014-03-19*
Employee Cost – Direct	$3.327 million	*MWA Long term OPEX Template 2014-03-19*
Repair & Maintenance - Projects	$1.292 million	*MWA Long term OPEX Template 2014-03-19*
Other Fixed Costs	$0.768 million	*MWA Long term OPEX Template 2014-03-19*

Repair & Maintenance – Preventative

2) For Repair & Maintenance – Preventative, please confirm that a breakdown for this cost is provided in *R and M 15yr Forecast Rev 3*. Please clarify the difference in costs between these two spreadsheets (it could be that this includes other costs from this spreadsheet, e.g. corrective and asset refurbishment). Also, please confirm the reason for difference is other costs and confirm which source presents the most reliable source of data. Whilst the overall total is comparable between spreadsheets, the allocation between areas is different.

- The *MWA Long term OPEX Template 2014-03-19* was submitted to Seqwater in November 2013. The *R and M 15yr Forecast Rev 3* contains more recent costs. The costs from *R and M 15yr Forecast Rev 3* should be used in the analysis of Repair & Maintenance – Preventative.

Area	FY 2014/15 Cost ($'000s)	
	Source: MWA Long term OPEX Template 2014-03-19	**Source: R and M 15yr Forecast Rev 3** **TO BE USED**
Repair & Maintenance – Preventative	4,235	1,577 (4,308 - Repair & Maintenance - PS & CO & Refurb)
Repair & Maintenance - Breakdown	351	435
Repair & Maintenance - Projects	1,292	1,082
Repair & Maintenance - Asset Replacement	469	170
Spare Parts	289	373
Total	**6,636**	**6,368^**

^ Including PS & CO & Refurb in Repair & Maintenance - Preventative

3) Please provide a key to the allocation of hours in *R and M 15yr Forecast Rev 3* (PS tab, Column A), i.e. the definitions of items such as [redacted] and others. This should relate to an org structure (where relevant).

- [redacted] is the primary electrical contractor
- [redacted] is the primary maintenance contractor.
- The above two contractors undertake the majority of the maintenance work. Costs are calculated based on the documented hourly rate.
- There are other smaller lump sum contracts (e.g. ROV – remotely operated vehicle for inspecting the tunnels and tanks) – see rows 11 to 28.

4) The values for Preventative Maintenance (PM) come from a tab called "PS Workings" (within R and M 15yr Forecast Rev 3). Please can you demonstrate how hours are assigned to [redacted] and others?

- Hours are allocated based on skills required for tasks.

5) The information in "PS Workings" seems to align with the information in "*PM Schedule FY15*", although some of the dates are different. In addition, *PM Schedule FY15* also shows breakdown to different groups. A comparison of the overall numbers (see below) show that the total number of hours align over the July period. Please confirm that the breakdown from PM Schedule FY15 can be used to identify hours for categories other than [redacted]?

- The information within PM Schedule FY15 and R and M 15yr Forecast Rev 3, PS Workings is considered to be similar. If in doubt, the information from R and M 15yr Forecast Rev 3, PS Workings should be used.

From: PM Schedule FY15

	JUL			
	07	14	21	28
[redacted]				
[redacted]				
[redacted]				
Total Hours per week	635.2	407.1	160.4	261

From: R and M 15yr Forecast Rev 3, PS Workings

	JUL			
	07	14	21	28
[redacted]				
[redacted]				
PMs hours not assigned	188.4	85.7	2	0

In particular, we will be focussing on areas with a high number of hours assigned, as follows:

PM Code	Department	Description	Total Est Hours	Total over FY 2014/15
GCD-R-1071	GCD-CO	1 Monthly Calibration Online Analytical Instruments	95	1,045
GCD-R-1010	GCD-CO	1 Monthly Cleaning of Online Instrument Panels	20	220
GCD-R-1072	GCD-CO	1 Weekly Calibration of Online pH and Temperature Analysers	10	510
GCD-R-0013	GCD-CO	1 Weekly Calibration Verification of Startup Instruments	5	255
				255
GCD-R-0252	GCD-CO	1 Yearly Compliance Inspections Emergency Lighting	600	600
GCD-R-0251	GCD-CO	6 Monthly Compliance Inspections Emergency Lighting	300	300
GCD-R-2500	GCD-CO	1 Yearly Service of Lightnin Mixers	80	240
GCD-R-0261	GCD-CO	1 Monthly Inspection of Air Conditioning Units	40	480
GCD-R-0067	GCD-CO	6 Monthly Inspection of Intake and Outfall Structures	120	240

6) For the above tasks, please provide details of the task, basis for determining frequency and details of who is performing the tasks (including which tasks are contracted out).

- Frequency of tasks is determined by:
  - Vendor recommendation
  - RCM
  - Feedback following previous maintenance cycles
- **Organisational charts to be provided.**

Employee Cost – Direct

7) For Employee Cost – Direct, please provide a breakdown of costs and associated organisation chart.

- The *MWA Long term OPEX Template 2014-03-19* was submitted to Seqwater in November 2013. Budget was formed based on consideration of FTEs at the time. There are considered to be minimal changes since this budget was submitted (minor change in EBA). Jacobs SKM to review Employee Cost – Direct as outlined in the *MWA Long term OPEX Template 2014-03-19* spreadsheet.
- **A cost breakdown to be provided.**
- **Organisational charts to be provided.**

8) Please provide information on the tasks undertaken by direct employees.

- **Task information to be provided.** It is understood that tasks include supervision, management, support functions (finance, procurement, admin etc).

9) Please identify critical and non-critical staff.

- There are 23 FTEs, 12 operators and the remaining staff performing other tasks (as will be identified in the organisational charts and task descriptions).

Projects

10) For Projects, please provide further information to allow a review of prudency and efficiency. We require details for the three largest projects (Relocation of Mapping lines to outside HP Areas, Relocation of Sample Panels to outside HP Areas, Replacement of Emergency Lighting). Details should include: basis outline of project, project driver, basis of cost estimate, details of any options analysis undertaken, plus any supporting documentation.

- Projects may or may not have been submitted in the budget
  - [redacted] **to confirm**
  - **Business cases to be provided for high value projects scheduled in FY 2014/15.**
  - **Other supporting documentation to be provided.**

Other Fixed Costs

- **Breakdown of costs and supporting documentation to be provided.**

Appendix B. Organisation structure