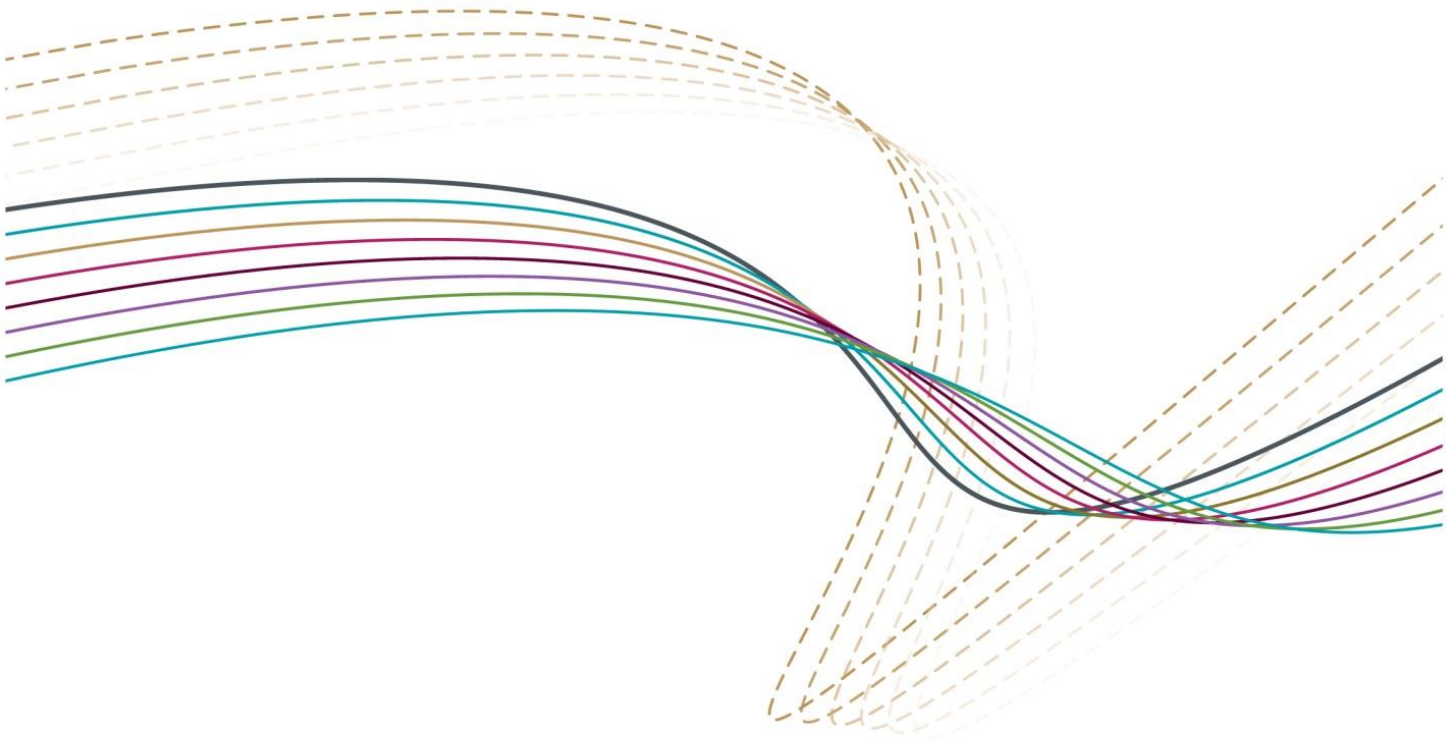


STATE ACTUARY'S OFFICE

# Actuarial Investigation of the State Public Sector Superannuation Scheme (QSuper)

as at 30 June 2016





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# 1 Summary and recommendations

This Review is the first to be undertaken on an annual basis to provide the most comprehensive and up to date picture of the funding position prior to the subsequent State Budget.

On the basis that the assets of the Employer Fund are hypothecated for the purpose of funding QSuper defined benefit payments, total assets exceeded *accrued liabilities* by **\$9.15 billion** as at 30 June 2016. This compares with the \$10.05 billion surplus disclosed at the 2015 valuation, with the reduction primarily the result of the lower than assumed investment return over 2015-16 and changes in the valuation basis at this Review, principally a reduction in expected asset returns. In addition, the more stringent accounting basis applying to the Government's financial statements shows an accrued surplus of \$2.07 billion. The continued strong funding position subsequent to a subdued year in investment markets, combined with the more conservative view of prospective returns, demonstrates the resilience of the scheme.

Subsequent to the 2015 Review, the Under Treasurer advised of a clarification of the interpretation of the Government's fiscal principle to fully fund employee entitlement liabilities (see Appendix F), as follows:

- *"Overfunding of the Scheme should be minimised and*
- *The funding of the Scheme is to be managed in accordance with the spirit of the APRA funding and solvency standards applying to corporate defined benefit schemes."*

My response (see Appendix F) provided the projected funding position of the scheme and the Government subsequently chose to repatriate \$4 billion of assets from the Employer Fund, with the payments spread over the following four years. This Review is the first to be undertaken within the spirit of the APRA framework and consequently I have placed greater emphasis on the *vested benefits* liability measure than in previous Reviews (see Section 8), especially when considering whether further repatriations could be undertaken or if a restoration plan is required.

Consistent with that framework, I have recommended a shortfall limit of **90%** and a target surplus buffer of **120%** of vested benefits for the defined benefit scheme. These limits are intended to guide the assessment of funding position, with coverage below 90% requiring additional funding injections and levels above 120% triggering an assessment of the merit of further surplus repatriation.

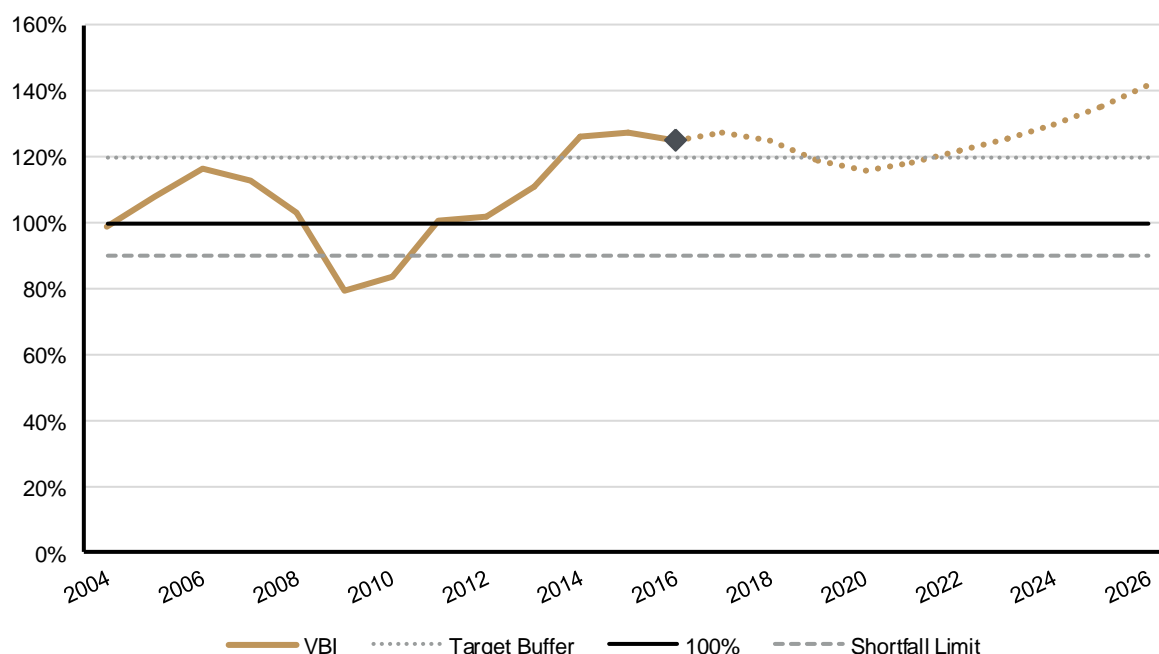
Whilst a shortfall limit below 100% allows the scheme assets to temporarily fall below vested benefits at a particular point in time, this is a key component of the APRA framework that reduces the risk that material funding adjustments are undertaken unnecessarily. In any event, QSuper funding below 100% has limited practical impact due to the Government guarantee underlying benefit entitlements.

Consideration was given to a lower target surplus buffer, however in my view this would not be consistent with the principle of prudence. Further, it would increase the likelihood that funding plans implemented over the Budget estimates period would need material adjustment, placing pressure on both the Budget process and scheme funding.

Taking into account the combination of the employer contribution suspension until 2020 and the repatriation described above, the funding position of the scheme is expected to decline somewhat before resuming an increasing trend, as shown in Figure 1. This demonstrates that the combined funding measures over the last two Budgets are expected to reduce the overfunding of the scheme whilst still maintaining a buffer to protect against adverse experience.



Figure 1 Historical and Projected Vested Benefits Index – Defined Benefit Scheme



The projected VBI is expected to fall below the target buffer over the Budget horizon and, with the probability of the VBI falling below 100% in 2020 around 1 in 3, **existing funding management initiatives (i.e. repatriation and contribution suspension) should proceed as planned.**

I emphasise that there is no single “correct” level of surplus for any defined benefit scheme and that **no guarantee can be provided as to future funding levels due to the variability of scheme outcomes**, particularly investment returns. It is important to note that the risks of fund deficiency fall upon the State, with the legislative guarantee protecting member entitlements and so the effects of a deficit on the security of members’ entitlements are insignificant compared to similar funds in the private sector.

Section 27H of the Superannuation (State Public Sector) Deed 1990 (the Deed) requires the QSuper Board of Trustees to decide, on the advice of the Actuary, the State’s contributions to the QSuper fund to meet benefit payments. Accordingly, I have recommended the following funding arrangements to meet the State’s share of the defined benefit liabilities:

<b>Income protection to be met by State</b>	Income protection benefits to be fully met by the State as required by the Deed
<b>Payments to pensioners from QSuper fund</b>	Consistent with current practice, all payments to pensioners to be met solely from the QSuper fund with no last minute funding drawn from the Employer Fund in respect of them



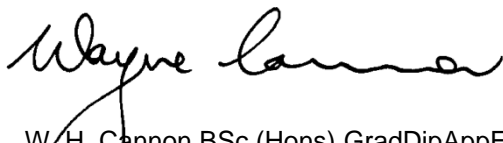
**State to meet 95% of  
defined benefit payments**

Other than the above, the State to meet 95% of defined benefit payments. Benefit payments for this purpose include any transfers to an accumulation category and the present value (see Appendix D) of new pensions that emerge on the exit of defined benefit active members. All payments to pensioners are met solely from the QSuper fund and therefore need to be fully funded at commencement

In summary, if the actuarial assumptions are realised, then last minute State contributions as recommended above will fund the balance of all defined benefit liabilities not met from current QSuper fund assets and future member contributions.

As noted above, this Review is the first to be undertaken on an annual basis and so the next review is due as at 30 June 2017. As discussed in Appendix B, scheme *experience* reviews will still be undertaken on a triennial basis and reported at the subsequent actuarial Review. It follows that all experience-related assumptions from the previous Review have been retained for this valuation, with only the financial assumptions being reassessed.

I would be happy to discuss my recommendations and analysis with you when convenient.



W. H. Cannon BSc (Hons) GradDipAppFin FIAA GAICD  
State Actuary

31 March 2017



## 2 Introduction

### 2.1 Background

The provisions of the Superannuation (State Public Sector) Act 1990 (the Act) and the Superannuation (State Public Sector) Deed 1990 (the Deed) govern the operation of the State Public Sector Superannuation Scheme (QSuper). The Act established the scheme on 13 June 1990 and provided that QSuper conditions are governed by the Deed, which was gazetted on 23 June 1990. Throughout this Report, the assets held within QSuper are referred to as the QSuper fund.

The QSuper Board of Trustees (the Board) is responsible for the management of QSuper. Since 1 July 2007, QSuper Limited (QSL) has provided the scheme's administration, succeeding the Government Superannuation Office (which was a Portfolio Office of Queensland Treasury).

QSuper is a defined benefit scheme and in accordance with the Superannuation Industry (Supervision) Act and Regulations (SIS) and Australian Prudential Regulation Authority (APRA) Superannuation Prudential Standard SPS 160 a regular actuarial review is necessary. Furthermore, Section 19 of the Deed requires an investigation and report as to the state and sufficiency of the fund to be made by the Actuary periodically so that there shall not be a period longer than 3 years between successive such investigations.

Section 19 of the Deed also requires that any such report shall include:

- A statement of the assets of the fund
- A statement as to any liability for benefit payments not expected to be financed out of the assets of the fund or any future contributions to the fund
- Any other matters which the Actuary may consider appropriate generally

This Report presents the results of the actuarial Review performed as at 30 June 2016. This is the first Review to be undertaken on an annual cycle, as agreed with the Under Treasurer during the 2016-17 Budget. I also undertook the last actuarial review of QSuper as at 30 June 2015, which was signed on 31 March 2016. As noted in Appendix B, scheme *experience* reviews will still be undertaken on a triennial basis and reported at the subsequent actuarial Review. It follows that all experience-related assumptions from the previous Review have been retained for this valuation, with only the financial assumptions being reassessed.

QSuper is a regulated superannuation scheme (effective 9 July 2009) under the prudential supervision of APRA and is subject to the SIS legislation. Prior to becoming regulated, QSuper was an exempt public sector superannuation scheme for the purposes of SIS and was subject to a Heads of Government Agreement covering its conduct that required compliance with the "spirit" of SIS where appropriate.

Section 29 of the Act provides for the Government guarantee in respect of the defined benefit payments. This statutory guarantee forms the basis for the specific exemption provided to QSuper from the normal SIS funding and solvency requirements of a regulated fund.

The character of QSuper changed considerably with the introduction of Q2000<sup>1</sup>, on 1 May 2000. From that date, new permanent and temporary Queensland public sector employees joined the Comprehensive Accumulation Category by default and were able to transfer to the Standard Defined Benefit Category (hereinafter denoted the *Defined Benefit Category* for ease of communication) at any time in the future but on a once only basis. Subsequently, the Defined Benefit Category was closed to new members from 12 November 2008. Defined Benefit Category members are still allowed to transfer to the Comprehensive Accumulation Category on an open-ended basis. Casual employees join the Basic Accumulation Category and most can opt to join the Comprehensive Accumulation Category, which requires member contributions.

## 2.2 Structure of the Scheme

QSuper has been designed as a “master plan” so that it is able to provide tailored superannuation coverage for all Queensland public sector employees, depending on the requirements of the relevant employing authority. As a result of various scheme mergers in the past, QSuper has retained membership categories for the members of the predecessor schemes who have not elected to transfer to the main categories. In 2009 a new category (Non-Public Sector Accumulation) was introduced to allow non-government employers to make contributions on behalf of existing members. The membership categories are shown in the following table.

Category	Previous Scheme	Current Status
Defined Benefit	QSuper	Closed to new entrants
Comprehensive Accumulation	–	Open to new permanent and temporary employees and transfers from the other categories, including casuals
Basic Accumulation	Government Officers' Superannuation Scheme (Gosuper)	Open to new casual employees, police cadets and others where nominated by non-core public sector employers
QAS Accumulation	Queensland Ambulance Service Superannuation Scheme (QAS Super)	Closed to new entrants
State 58	State Service Superannuation Fund (State Super)	Closed to new entrants
State 72	State Service Superannuation Fund (State Super)	Closed to new entrants
Police 68	Police Superannuation Fund (Police Super)	Closed to new entrants
Police 74	Police Superannuation Fund (Police Super)	Closed to new entrants
Fire	Queensland Fire Service Superannuation Plan (Fire Super)	Closed to new entrants and no active members remain
Parliament 70	Parliamentary Contributory Superannuation Fund (Parliamentary Super)	Closed to new entrants
Non-Public Sector Accumulation	–	Open to existing members where employer is not a unit of the State public sector

<sup>1</sup> Q2000 was the name given to the project implementing the changes described herein. It is used for convenience in this Report to refer to these changes.



It will be noted that an Act has been passed by Parliament<sup>2</sup> which provides for QSuper to become a public offer fund. The Act has not yet commenced, and it is expected that consequential amendments to the Deed will replace the Non-Public Sector Accumulation Category with the General Accumulation Category to accept new non-Government members. Another consequence of this Act will be the capacity for members to choose superannuation funds other than QSuper from 1 July 2017. To enable such movement, a Defined Benefit Category member will be required to first transfer to the Accumulation Category and so the extent of such transfers may subsequently increase. This issue will be examined in the next triennial review of QSuper member experience.

This Report concentrates on the investigation of the Defined Benefit Category. However, the experience and the liabilities of the closed defined benefit State, Police, Fire and Parliamentary Categories are included where relevant. In addition, the assets and liabilities in respect of the accumulation categories are incorporated as appropriate.

Whilst the employees of most participating agencies are subject to the same basic benefit structure in the Defined Benefit Category, the Police members have slightly different benefit conditions. In addition, the police have traditionally had higher rates of death and disablement than the remainder of the public sector. For these reasons, the police are considered as a separate sub-category within the Defined Benefit Category and are valued separately with their own investigation assumptions. Consequently, throughout this Report, the “non-police” members of the Defined Benefit Category are referred to as Standard members.

The standard benefit payable from the Defined Benefit Category is a defined benefit lump sum, although a pension benefit is available on exit due to total and permanent disablement (TPD). The standard benefit payable from the accumulation categories is a defined contribution lump sum, whilst the State, Police, and Parliamentary categories pay a variety of pension and lump sum benefits. A description of the standard benefits payable under each of the categories is contained in Appendix A.

The contributions required by the Government in respect of defined benefits are set out in Section 27H of the Deed. This Section requires that the contributions payable by the State to the QSuper fund are the amounts decided by the Board on the advice of the Actuary. Section 27H of the Deed also allows for the State to make additional contributions to the QSuper fund for the efficient and effective operation of the scheme. As required by the Deed, the State meets the entire amount of any income protection benefit.

## 2.3 Funding Arrangements

### 2.3.1 Defined Benefit Categories

The defined benefit categories in QSuper are funded differently to a typical regulated scheme in that only employee contributions (including net salary sacrifice contributions) are deposited into the QSuper fund. Benefit payments from the scheme are determined according to the benefit rules as described in Appendix A. However, the State pays a share of these benefits as a last minute contribution to the QSuper fund. The State makes advance provision for its share of benefits in that, at

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<sup>2</sup> The Revenue and Other Legislation Amendment Act 2016 (see <https://www.legislation.qld.gov.au/LEGISLTN/ACTS/2016/16AC064.pdf>)



the same time as member contributions are remitted, employing authorities are required to remit employer contributions to Queensland Treasury, which then deposits them<sup>3</sup> in the Employer Fund<sup>4</sup>. The rate of employer contribution is reviewed at each actuarial investigation.

QSuper's liabilities are effectively limited to the assets in the QSuper fund with the State providing a statutory guarantee in respect of the balance of the defined benefit obligations. However, the total liabilities of the defined benefit categories are the total benefits as described in the Deed and summarised in Appendix A. Consideration of the QSuper fund only would not give a comprehensive understanding of the funding of the scheme and hence, consistent with past practice, this Report considers the overall funding of the scheme taking into account both the QSuper fund and the Employer Fund.

## 2.3.2 Accumulation Categories

The QSuper accumulation categories provide defined contribution benefits and both member contributions and employer contributions are deposited into the QSuper fund. Each member of the category has an account in their name into which the contributions are recorded. Net investment earnings are applied to the account and administration, insurance and taxation costs are deducted from the account. Benefit payments are made from the member's account. The benefits available to members are summarised in Appendix A.

## 2.4 Taxation Status

QSuper is a complying superannuation scheme and is taxed accordingly. The QSuper fund is thus liable for tax at the rate of 15% on investment income and employer contributions, less deductions for the notional cost of insurance, expenses, the discount component of realised capital gains and the income earned in respect of pension assets. The QSuper fund receives foreign tax credits and rebates for imputation credits in respect of its franked dividend income.

This Review has been conducted on the assumption that the QSuper fund will continue to be liable to pay tax on employer contributions and investment income at the standard rates.

## 2.5 Insurance Arrangements

QSuper self-insures death and disability benefits for members of the Defined Benefit Categories. The Accumulation Category was substantially self-insured prior to 30 June 2016 and was subject to regular actuarial review, with reserves maintained by QSuper in accordance with actuarial advice (latest review undertaken by KPMG Actuarial Pty Ltd dated 18 May 2016). Whilst new business from 1 July 2016 is underwritten by QInsure, QSuper retained the "tail" claims incurred prior to that date, with my Office providing actuarial review as they run off.

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<sup>3</sup> Unless the investment of employer contributions is suspended by the Treasurer.

<sup>4</sup> Throughout this Report, the term Employer Fund refers to the investment assets accumulated in a reserve by the Government to meet its future superannuation obligations.



With regard to the self-insurance of defined benefit entitlements, I believe that self-insurance remains appropriate, recognising:

- the defined benefit membership is large enough so that variations in death and disability experience from year to year are small relative to the size of the scheme and to variations in other aspects of the scheme's experience;
- the insured component of death and TPD benefits is declining as the membership ages so the risk exposures are declining; and
- the State has a statutory obligation in respect of the defined benefit obligations of the scheme, so insured benefits are effectively guaranteed.

It has been assumed for the purposes of this Review that the balance of the Accumulation self-insurance reserve is sufficient to meet the liability for outstanding claims as at the investigation date and that any excess is considered part of QSuper's overall accumulation reserves and therefore not available to meet defined benefit liabilities. The liability in respect of outstanding defined benefit income protection payments has been estimated and included in the actuarial balance sheet shown in Section 6.1, which also includes a liability for outstanding death and TPD claims within the liability in respect of Former Defined Benefit Members.

In view of the effective guarantee provided by the State and the declining risk exposure, I believe that it is reasonable for the scheme not to obtain catastrophe insurance cover.

## 2.6 Professional Standards and Legislative Compliance

This Report has been prepared in accordance with Professional Standards 400 (dated July 2015) and 402 (dated September 2012) published by the Actuaries Institute (IAAust) relating to the investigation of defined benefit superannuation funds. It has also taken account of the IAAust Superannuation Practice Committee documents: Discussion Note: Actuarial Requirements of Superannuation Prudential Standard 160 and Discussion Note: Self-insurance Arrangements and Superannuation Prudential Standard 160.

QSuper is a regulated superannuation fund under the supervision of APRA and must meet the relevant prudential reporting requirements. These requirements were described in SPS 160 and Prudential Practice Guide SPG 160 to apply from 1 July 2013. It will be noted that QSuper is not considered a fully funded public sector scheme for the purposes of SPS 160 and therefore its disclosure requirements are limited to those listed in paragraph 24 of SPS 160 (see Section 9). Whilst APRA has previously determined that QSuper should be subject to a triennial actuarial investigation cycle in accordance with paragraph 14 of SPS 160, the annual cycle for actuarial Reviews has now rendered this determination unnecessary.

## 2.7 Financial Accounts

The financial information used in this Review is sourced from:

- the QSuper Financial Statements, which have been audited by the Queensland Auditor-General in the audit report dated 29 September 2016; and
- Queensland Treasury and QIC relating to the Employer Fund.





## 2.8 Legislative Changes

A number of legislative changes to the Defined Benefit Categories have been made since the last Review, summarised as follows:

- Allow Defined Benefit Category members to withdraw amounts directly from their defined benefit account if access to their superannuation on compassionate or financial hardship grounds has been approved. Prior to this, defined benefit members were required to close their defined benefit account and transfer to an accumulation account before they can access their superannuation on compassionate or financial hardship grounds.
- Allow members to pay their tax under the division 293 of the Income Tax Act 1997 (Commonwealth) by electing to reduce a lifetime pension they are entitled to for membership in a defined benefit category; and to facilitate other withdrawals from superannuation to pay the division 293 tax.
- Allow the Board, on the advice of the State Actuary, to change the methodology to determine a salary reduction benefit for defined benefit members who experienced a reduction in salary. This effectively closed a loophole under the previous methodology that resulted in members potentially being paid more than intended under its design.

## 2.9 Recommendations of Previous Actuarial Investigation

I understand that the recommendations from the previous actuarial Review (report dated 31 March 2016) have been implemented by the Board.

## 2.10 Post-Investigation Date Events

Due to the timing of this Report, events can occur after the investigation date that have a material effect on the operations of the scheme. These events and their consequences are discussed in the various sections of this Report where relevant. As a summary, the following material post-investigation date events have been considered as part of this Review.

- The Treasurer announced a repatriation of \$4 billion would be undertaken as part of the 2016-17 State Budget. These funds will be withdrawn in a staged manner over the remainder of the forward estimates.
- The financial year to date investment return at the time of writing was approximately 7.1%. It has been decided not to make direct allowance for the actual 2016-17 investment return in the derivation of scheme liabilities as at the investigation date. The use of short term discount rate assumptions adds complexity and distorts the movements in liabilities and funding indices. That said, the stochastic projections undertaken in Section 8.1.5 are calibrated on experience until the end of December 2016, in order to provide the most up to date picture.





## 3 Membership

### 3.1 Data

QSL supplied data for the investigation at the individual member level, rather than on a grouped basis. The fact that membership information is provided to QSuper directly by employers results in a reasonable amount of inaccurate data being stored. QSL undertakes a data integrity program, which has improved the quality of the membership data.

In particular it will be noted that, in order to meet the more compressed timeframes required by APRA, we have undertaken this Review on data supplied earlier than previous Reviews and therefore of lower quality than that subject to the comprehensive data cleansing that can be completed with longer timeframes.

A number of consistency checks have been applied to the data, both internally and compared to previous data. The checks undertaken and details regarding any amendments made to the membership data are shown in Appendix E. Overall, the quality of the membership data is considered acceptable for the purposes of the investigation, noting that we have adjusted the salaries to correct for the expected bias in the less comprehensively cleansed data (see Section 3.2.5).

In addition, notwithstanding the fact that the investigation is undertaken as at 30 June 2016, the 1 July 2016 salaries were available and have been used when calculating the scheme's liabilities. This provides a more realistic assessment of the scheme's financial position.

### 3.2 Membership Statistics

#### 3.2.1 Membership – General

Values in the following tables were taken from the data supplied by QSL for the purpose of analysing the scheme's experience. It should be noted that the reconciliations might differ immaterially from the information provided in other QSL reports.

In view of the compressed timeframes for this and future actuarial reviews, experience analysis will be undertaken "out of cycle" and reported in the subsequent annual Review. Consequently, we have not shown the detailed reconciliations of membership movements in this Report.

#### 3.2.2 Membership Numbers

As the defined benefit categories of QSuper have been closed to new entrants since at least November 2008, the numbers within most member types has been declining over time, as shown in Table 1.

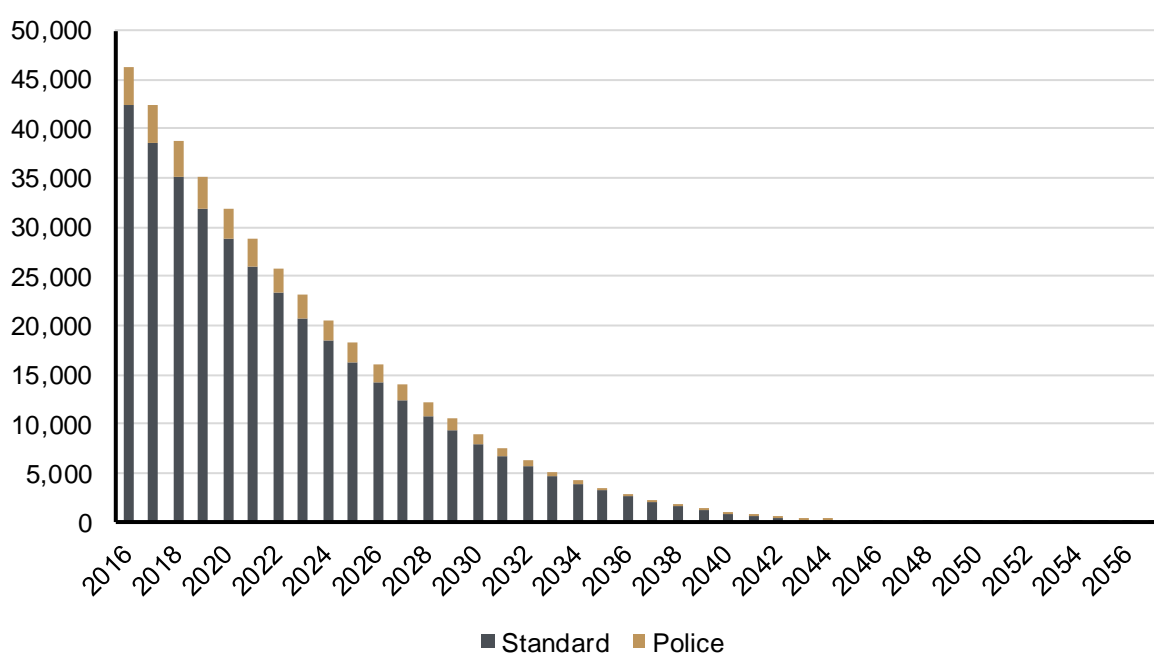
**Table 1 Defined Benefit Membership by Type (as at 30 June)**

	2015	2016
<b>Contributors</b>		
Defined Benefit - Standard	44,880	42,406
Defined Benefit - Police	4,135	3,962
State	431	406
Police	121	114
Parliamentary	10	10
<b>Former Contributors - Pensioners</b>		
Defined Benefit	783	789
State	1,197	1,178
Police	205	206
Parliamentary	138	136
Fire	2	2
<b>Former Contributors - Deferred</b>		
Defined Benefit	35,178	33,194
State	275	241
Police	17	16
<b>Total</b>	<b>87,372</b>	<b>82,660</b>

### 3.2.3 Projections – Contributors – Defined Benefit Category

Based on the assumptions listed in Appendix C, the projected number of members of the Defined Benefit Category is shown in Figure 2. This figure demonstrates the expected continued decline in active membership over time, with around 10% of the members leaving each year.

**Figure 2 Defined Benefit Category – Projected Number of Contributors**



### 3.2.4 Membership Profile – Defined Benefit Category

The membership characteristics of the Defined Benefit Category Standard members as at 30 June 2015 and at 30 June 2016 are summarised in Table 2. All averages are weighted by the relevant 1 July salary.

**Table 2 Defined Benefit Category – Standard Membership Profile<sup>5</sup>**

	30 June 2015			30 June 2016		
	Males	Females	Persons	Males	Females	Persons
Average Age (years)	53.1	51.6	52.2	53.7	52.2	52.8
Average Age At Entry (years)	28.9	29.1	29.0	28.7	28.8	28.8
Average Membership (years)	24.2	22.5	23.2	25.0	23.4	24.1
Average Review Date Salary	\$94,198	\$86,211	\$89,357	\$96,935	\$88,933	\$92,060
Average 1 July Salary	\$96,679	\$88,732	\$91,862	\$99,524	\$91,242	\$94,478
Average Contribution Rate (%)	4.96	4.90	4.93	4.96	4.90	4.93
Average Part-Time Ratio	0.990	0.913	0.945	0.990	0.912	0.944

From this table, the following observations about the Standard membership can be made:

- Average age has increased by 0.6 years since the last Review, to almost 53 years.
- Average service has increased by 0.9 years with males having longer average membership than females.
- Males continue to have significantly higher average salaries than females.
- The average contribution rate is unchanged since the last Review, with females contributing at slightly lower average rates than males.
- Female members continue to work part-time to a greater extent than males. The extent of part-time work has increased marginally for females since the last Review.

The membership characteristics of the Police members as at 30 June 2015 and at 30 June 2016 are summarised in Table 3. All averages are weighted by the relevant 1 July salary.

**Table 3 Defined Benefit Category – Police Membership Profile**

	30 June 2015			30 June 2016		
	Males	Females	Persons	Males	Females	Persons
Average Age (years)	48.5	44.3	47.7	49.2	45.1	48.4
Average Age At Entry (years)	23.7	24.4	23.9	23.7	24.4	23.8
Average Membership (years)	24.8	19.8	23.8	25.5	20.7	24.6
Average Review Date Salary	\$91,382	\$85,656	\$90,206	\$93,797	\$87,861	\$92,563
Average 1 July Salary	\$93,800	\$88,105	\$92,630	\$94,510	\$88,680	\$93,298
Average Contribution Rate (%)	5.99	5.98	5.99	5.99	5.97	5.98
Average Part-Time Ratio	0.999	0.949	0.989	0.999	0.949	0.989

From this table, the following observations can be made:

<sup>5</sup> Review Date Salary refers to the salary used for benefit purposes at 30 June of the relevant year; i.e. the superannuable salary as at the preceding 1 July or later entry. 1 July Salary refers to the salary on the subsequent 1 July; i.e. 1 day after the investigation date of 30 June.

- Male members are 4.1 years older on average than females.
- Although male and female police entered the scheme at about the same age, males have significantly longer average membership than females.
- Male Police members have significantly higher average salaries than female Police members.
- Females tend to contribute at similar rates to males and average contribution rates for both genders have remained stable since the last Review. The vast majority of Police members contribute at the standard rate of 6% of salary.
- The extent of part-time work for the police is very limited with the level of females' part-time work remaining higher than males.

As discussed in previous Reviews, despite the differences in profile between male and female Police members, it is not practical to consider the groups separately due to the relatively small number of female Police. Consequently, the Police members of QSuper are considered as a group throughout the remainder of this Report.

### 3.2.5 Adjustments to Salaries

As discussed in Section 3.1, I have adjusted the raw salaries provided by QSL to compensate for the expected overall underestimation of scheme liabilities. In past years, QSL have provided membership data in a two phase approach, with the Phase I data supplied in late July and used to derive various accounting measures. The data was then reviewed and adjustments were made to incorporate later information as well as any erroneous items. This cleansed data is supplied later in the year and generally used for the actuarial Review.

To determine the accuracy of the Phase I dataset, we compared the total review date salaries for both sets of membership data, as shown in Table 4. It will be noted that Phase II data was not analysed in 2014.

**Table 4 Comparison of Salaries based on Phase I and II Membership Data**

Year	No of Members		Total 1 July Salaries		Salary Adjustment
	Phase I	Phase II	Phase I	Phase II	
2010	75,056	74,975	5,790,139	5,797,979	0.14%
2011	70,565	70,533	5,718,503	5,747,327	0.50%
2012	64,805	64,660	5,428,335	5,435,315	0.13%
2013	56,712	56,618	4,885,826	4,898,214	0.25%
2014	52,416	-	4,673,457	-	
2015	49,113	49,015	4,500,051	4,505,789	0.13%
Average					0.23%

Table 4 demonstrates that an increase in salaries of 0.25% will result in total review date salaries materially equivalent to those provided in the more complete Phase II data.

In order to assess whether any further adjustment was necessary in order to provide a more accurate estimate of scheme liabilities, the total service liabilities were compared again on an equivalent basis, but with the salary adjustments described above at each Review excluded from the differential. This resulted in the differences shown in Table 5, which demonstrates that the remaining differences, whilst all positive are sufficiently small that no further adjustment is necessary.



**Table 5 Comparison of Liabilities<sup>6</sup> based on Phase I and II Membership Data**

Year	Total Service Liability Difference After Salary Adjustment
2010	0.01%
2011	0.14%
2012	0.04%
2013	0.14%
2014	-
2015	0.08%
Average	0.08%

<sup>6</sup> Liabilities are only in respect of active Defined Benefit Category members.

## 4 Investments and accounts

### 4.1 Fund Accounts

Since the previous Review, the QSuper fund has risen from \$58,683 million to \$65,076 million. The transactions of the QSuper fund over this period are summarised in Table 6.

**Table 6 QSuper Consolidated Financial Statements**

	\$ million
<b>Net Assets Available to Pay Benefits at 30 June 2015</b>	<b>58,683</b>
<b>Income</b>	
Investment Revenue	4,623
Members' Contributions	1,125
Employer Contributions	4,575
Transfers from Other Funds	1,139
Other Revenue	0
<b>Total Income</b>	<b>11,462</b>
<b>Expenditure</b>	
Benefit Payments	3,819
Administration Fee	179
Direct Investment Expenses	79
Insurance Premiums	104
Financial Planning Fee	18
Other Expenses	10
<b>Total Expenditure</b>	<b>4,209</b>
Income Tax Expense	860
<b>Net Assets Available to Pay Benefits at 30 June 2016</b>	<b>65,076</b>

After we apportion the assets within the QSuper fund and include the market value of the assets in the Employer Fund, the overall asset position as at 30 June 2016 is shown in Table 7.

**Table 7 Overall Asset Summary**

	\$ million		
As at 30 June 2016	Defined Benefit	Other	Total
QSuper fund	5,236	59,840	65,076
Employer Fund	28,742	-	28,742
<b>Total</b>	<b>33,977</b>	<b>59,840</b>	<b>93,818</b>

### 4.2 Investment Policy

In accordance with the legislative requirements of SIS, the Board has formulated an Investment Policy Statement (IPS) covering both the defined benefit and accumulation categories.

The accumulation categories operate under a Member Investment Choice structure, with clear communication of asset allocations and investment constraints to members. I have reviewed the unit pricing and crediting rate policies for the scheme and believe them to be suitable mechanisms for crediting investment earnings to members' accounts. Accordingly, no further comment regarding the investment policies for the accumulation categories is warranted for the purposes of this Review.

The IPS recognises the statutory guarantee provided by the State in respect of the defined benefits and that the assets to meet these are predominantly held in the Employer Fund. The investment policy for the Employer Fund assets is set by the Long Term Assets Advisory Board (LTAAB), an advisory board constituted under the Queensland Treasury Corporation Act. Accordingly, the IPS is set in liaison with LTAAB and is applicable to the total defined benefit assets. The investments are managed by QIC, with whom LTAAB and the Board have each concluded Investment Management Agreements.

The objectives that inform the investment management decisions of the defined benefit assets have been summarised in a "scorecard" guide and are expressed as liability relative rather than absolute return objectives. The two primary objectives can be broadly defined as a funding objective that seeks to maximise the probability that the scheme earns a sufficient return to pay the future liabilities within the current employer contribution rates and a risk objective that controls the amount of risk that can be taken on in order to meet the funding objective.

An independent liability hedging approach has been adopted with effectively two portfolios, an "asset" portfolio to generate return and a "liability hedge" portfolio, largely implemented through derivatives, to manage the interest rate and inflation risk exposures inherent in the liabilities. These two portfolios combine to achieve the overall investment objectives of the defined benefit assets.

The Board and LTAAB have concluded that the asset allocation ranges and long term target portfolio percentages shown in Table 8 are appropriate for the asset portfolio.

**Table 8 Asset Allocation Ranges**

Asset Class	30 June 2016	Range
<b>Equities</b>	<b>21.3%</b>	<b>10% - 30%</b>
Diversified Alternatives	19.5%	5% - 25%
Infrastructure	7.9%	5% - 15%
Private Equity	7.1%	0% - 10%
Real Estate	9.2%	5% - 15%
<b>Total Alternatives</b>	<b>43.7%</b>	<b>15% - 55%</b>
Cash	31.8%	10% - 50%
Global Fixed Interest	3.1%	0% - 25%
<b>Total Fixed Interest and Cash</b>	<b>34.9%</b>	<b>10% - 60%</b>
Currency	0.2%	-2% - 20%

There are additional controls on the diversified alternatives, real estate, global fixed interest allocations and liquidity exposures.

The Board and LTAAB have determined that the long term target exposures and ranges (expressed in terms of liabilities rather than assets) shown in Table 9 are appropriate for the liability hedge portfolio.



**Table 9 Liability Hedge Portfolio**

Liability Hedge	30 June 2016	Range
Interest Rate Exposure	22.1%	10% - 70%
Inflation Exposure	48.9%	30% - 70%

Subject to the above constraints, the investment manager may vary the actual portfolio weights and liability exposures from the long term targets in response to current market valuations and its outlook (commonly referred to as dynamic asset allocation).

In view of the guarantee provided by the State, the investment policy does not materially affect the security of beneficiary entitlements and should reflect the risk preferences of the Government through LTAAB. The policy described above achieves that objective and can therefore be considered appropriate given the nature of the scheme's liabilities.





## 5 Investigation of assets and liabilities

### 5.1 Purpose of the Investigation

The purpose of an actuarial investigation is to examine the long and short term financial position of a superannuation scheme. Normally, the major reason for an investigation is to determine the level of employer contributions required to provide for the benefits payable from a scheme. However, as discussed in Section 2.3.1, the defined benefit categories are set up differently to most schemes in that employer (i.e. State) contributions are accumulated in the Employer Fund. Benefits payable from QSuper are effectively limited to the assets in the QSuper fund with the balance of the benefits met by the State as a last minute contribution through transfers from the Employer Fund to the QSuper fund. However, since the defined benefit liabilities of the scheme are based on the total benefits described in Appendix A, consideration of the QSuper fund only would not give a comprehensive understanding of the funding and financial position of the scheme. It is therefore appropriate to consider the level of State contribution necessary to provide the benefits payable from the scheme.

Since Q2000, it had been the Government's intention that the contribution levels to the Comprehensive Accumulation Category and the Defined Benefit Category were equivalent and this approach has been used for all prior Reviews. However, subsequent to the decision by the Treasurer to suspend the investment of employer contributions in the 2015-16 Budget, the contribution rate nexus no longer applies. The resulting variation in contribution rates is consistent with actuarial practice in defined benefit schemes generally and will provide more flexibility in managing the funding position of the scheme. In view of the limited effectiveness of variation in employer contribution levels to affect the funding of the scheme (due to the maturity of the membership), I have also considered whether any further surplus repatriation is appropriate in order to manage the funding position of the Scheme.

Similar to previous Reviews, in recognition of the small size of the other defined benefit liabilities (State, Police and Parliamentary categories), the existing contribution levels to these plans have been assumed to be consistent with the corresponding component of the Defined Benefit Category where relevant, with the Parliamentary scheme contribution level maintained at the level recommended at its last direct assessment in 2005, noting the triviality of the Parliamentary liabilities within the Defined Benefit Categories as a whole, subject to any scheme-wide suspensions of contribution investment.

An additional requirement of this investigation is to recommend a methodology to determine the last minute contributions to be made from the Employer Fund to the QSuper fund to meet the State's share of the defined benefit payments. This is discussed in Section 6.4.

### 5.2 Funding and Actuarial Assumptions

Funding is the making of advance provision to meet the cost of accruing benefits. This provides a degree of security for members' benefits and also spreads the cost of providing these benefits over their membership. This setting aside of contributions as benefits accrue is what differentiates between funded and unfunded superannuation schemes. Whilst QSuper is technically an unfunded superannuation scheme, the funding arrangements and the assets maintained in the Employer Fund mean that, for the purposes of actuarial review, it can be regarded as a funded scheme.



It is important to note that the *cost* of the defined benefit scheme is the amount of benefit payments, administration expenses and taxation; i.e. the liabilities listed in the balance sheets shown in Section 6.1. The funding of the scheme is intended to meet these costs in a smooth and equitable manner over time but does not affect the cost of the scheme. Consequently, employer contributions and surplus repatriations are simply two sides of the same coin, linked by the fact that higher repatriations at any point in time increase the likelihood of greater contributions in future; i.e. there is an effective trade-off between them with the material difference being one of timing.

The actuarial review process continually re-evaluates the progress of the scheme funding and makes adjustment over time to target the liabilities. In theory, the intent is to ensure that there is exactly the right amount to pay the last benefit liability of the fund after the last member exits. In practice of course, scheme experience (particularly investment returns) varies from expectation and so surpluses or deficits emerge. Just as adjustments need to be made to react to deficits, it is also appropriate to react to large surpluses, which effectively represent an over contribution in hindsight; i.e. they represent an intergenerational transfer.

In order to determine the contribution rates likely to meet the cost of benefits, it is necessary to make certain actuarial assumptions regarding the future experience of the scheme. These assumptions are based not only on the past experience of the scheme but also, *inter alia*, on views regarding the likely future values of economic factors such as the rate of investment return and salary inflation. Whilst each assumption should be reasonable in its own right, it is important to consider the actuarial basis as a whole as variations in one or more assumptions are often counterbalanced by consequent changes in other aspects of the basis.

In this Review, I have also considered liabilities derived in accordance with the relevant accounting standard within the Government's financial statements; viz. AASB 119. It requires that liabilities and expenses for certain employee entitlements (defined benefit superannuation, long service leave) be measured using actuarial techniques which incorporate specific assumptions regarding the discount rate applicable to the liability, financial variables such as salary and benefit inflation, and demographic variables such as turnover and mortality which affect the timing and amount of benefit payments. Whilst all of these assumptions are important, the discount rate and financial assumptions have the most effect on the results, with these listed in Appendix C.

The AASB 119 net discount rate of 1.9% is well below the 5.0% assumed investment return that has been used to calculate the accrued position under the funding basis. For the purpose of determining a funding strategy for a superannuation scheme, it is common actuarial practice that the present value of the liabilities should be based on the long-term earnings rate likely to be achieved through the actual investment strategy. Given a strategic asset allocation for defined benefit assets that includes a material allocation to growth assets, it is expected that the long-term earnings rate will exceed the long-term bond rate.

Whilst the funding basis is commonly used as part of the budgeting process underlying contribution rate recommendations, as I noted in my previous Reviews, the AASB 119 liabilities can provide useful information in assessing the funding position of the scheme, as discussed in Section 6.5.

It is important to note that AASB 119 applies to the financial statements of the employer sponsor and does not apply to the superannuation scheme, or the Board. The accounting standard for superannuation schemes (AASB 1056) has recently been promulgated, materially changing the disclosure requirements for the scheme compared with the previous standard AAS 25. As anticipated in the last Review, I expect that AASB 1056 will permit liabilities to be calculated on a basis broadly consistent with AASB 119 although this has not yet been confirmed with QSL.



The assumptions employed in this Review are summarised in Appendix C.

## 5.3 Valuation Method

The valuation method used in this Review is based on the aggregate funding method, although a considerable amount of flexibility is applied to the setting of contribution policy and surplus management.

Subsequent to the 2015 Review, the Under Treasurer advised of a clarification of the interpretation of the Government's fiscal principle to fully fund employee entitlement liabilities (see Appendix F), as follows:

- *"Overfunding of the Scheme should be minimised and*
- *The funding of the Scheme is to be managed in accordance with the spirit of the APRA funding and solvency standards applying to corporate defined benefit schemes."*

My response (see Appendix F) provided the projected funding position of the scheme and the Government subsequently chose to repatriate \$4 billion of assets from the Employer Fund, with the payments spread over the following four years. This Review is the first to be undertaken within the spirit of the APRA framework and consequently I have placed greater emphasis on the *vested benefits* liability measure than in previous Reviews (see Section 8), especially when considering whether further repatriations could be undertaken or if a restoration plan is required.

The employer contribution would generally be expressed as a percentage of members' salaries. Whilst these contribution rates are provided in Table 14 and Table 15, it should be recognised that this Review has been undertaken on the basis that the suspension of the investment of employer contributions for five years announced by the Treasurer in the 2015-16 Budget will continue with investment recommencing in 2020-21. It should also be noted that the valuation also considers the level of contributions paid from the Employer Fund to the QSuper fund as part of the last minute funding arrangements.

## 5.4 Value of Assets

The value placed on the QSuper fund assets for this Review was the market value at 30 June 2016 from the QSuper audited financial statements, viz. \$65,076 million. After allowing for the other membership Categories within QSuper, the notional assets held in respect of the Defined Benefit Categories was estimated to be \$5,236 million.

The market value at the investigation date of the assets in the Employer Fund of \$28,742 million was used where relevant to achieve an understanding of the total funding and financial position.

## 6 Investigation results

### 6.1 Investigation Balance Sheet

The results of the investigation in respect of existing members (including former members with preserved or pension entitlements) at the investigation date on a whole of scheme basis can be summarised in the balance sheet shown in Table 10.

**Table 10 Overall Balance Sheet as at 30 June 2016<sup>7</sup>**

	\$ millions		
	Past Service	Future Service	Total Service
<b>Value of Assets and Future Member Contributions</b>			
Market Value of QSuper Fund Assets	65,076	0	65,076
Market Value of Employer Fund Assets	28,742	0	28,742
Member Contributions	0	1,521	1,521
Employer Contributions at Current Rates after 2019-20	0	2,273	2,273
<b>Total Value of Assets (A)</b>	<b>93,818</b>	<b>3,794</b>	<b>97,612</b>
<b>Value of Benefits, Tax &amp; Expenses</b>			
Active Defined Benefit Members	17,912	5,672	23,584
Current and Contingent Pensioners	1,222	0	1,222
Former Defined Benefit Members	2,370	0	2,370
Accumulation Benefits	43,956	0	43,956
Account Based Pensions	14,598	0	14,598
Disability Income Benefit	16	189	205
Surcharge Provision	(49)	0	(49)
Expenses	593	177	770
Reserves	1,308	0	1,308
Value of Net Contributions Tax	2,743	735	3,478
<b>Total Value of Benefits, Expenses &amp; Tax (B)</b>	<b>84,669</b>	<b>6,773</b>	<b>91,442</b>
<b>Surplus / (Deficit) (A) - (B)</b>	<b>9,149</b>	<b>(2,979)</b>	<b>6,170</b>

The balance sheet has been constructed on the basis that, subsequent to the cessation of the suspension period, invested future employer contributions will be consistent with the rates recommended at the 2015 Review. This is not well defined for the Defined Benefit Category because the amount is dependent upon each member's contribution rate and part-time status. It has been assumed for this purpose that the average member contribution rate and part-time ratio will remain constant for each of the main membership groups, viz. Standard Males, Standard Females and Police.

All reserves held in respect of accumulation categories have been included as an accrued liability in the balance sheet. It will also be noted that future service liabilities have not been incorporated into the balance sheet in respect of accumulation categories. As these categories are fully funded, these

<sup>7</sup> Reserves include the accumulated premiums in respect of the capital guarantee provided to members of the closed VPP option within the Accumulation Category.

liabilities would be exactly offset by corresponding assets resulting from future employer and member contributions and so the net financial position of the scheme is unaffected.

The balance sheet shown in Table 10 incorporates all of the categories within QSuper. This Review is substantially concerned with the defined benefit components of the scheme and so I have recast the balance sheet with all non-defined benefit assets and liabilities removed, as shown in Table 11.

**Table 11 Defined Benefit Balance Sheet as at 30 June 2016 – Funding Basis**

	\$ millions		
	Past Service	Future Service	Total Service
<b>Value of Assets and Future Member Contributions</b>			
Market Value of QSuper Fund Notional DB Assets	5,236	0	5,236
Market Value of Employer Fund Assets	28,742	0	28,742
Member Contributions	0	1,521	1,521
Employer Contributions at Current Rates after 2019-20	0	2,273	2,273
<b>Total Value of Assets (A)</b>	<b>33,977</b>	<b>3,794</b>	<b>37,771</b>
<b>Value of Benefits, Tax &amp; Expenses</b>			
Active Defined Benefit Members	17,912	5,672	23,584
Current and Contingent Pensioners	1,222	0	1,222
Former Defined Benefit Members	2,370	0	2,370
Disability Income Benefit	16	189	205
Surcharge Provision	(28)	0	(28)
Expenses	593	177	770
Value of Net Contributions Tax	2,743	735	3,478
<b>Total Value of Benefits, Expenses &amp; Tax (B)</b>	<b>24,828</b>	<b>6,773</b>	<b>31,601</b>
<b>Surplus / (Deficit) (A) - (B)</b>	<b>9,149</b>	<b>(2,979)</b>	<b>6,170</b>

Table 11 shows that, on the assumptions underlying the funding basis, the defined benefit scheme is in a very healthy financial position, even allowing for the more conservative assessment of future expected investment returns at this Review. A reconciliation of the movement in the accrued surplus is shown in Section 7.

In order to gain a more comprehensive understanding of the financial position of the scheme, it is also important to consider the corresponding balance sheet derived in accordance with the accounting basis used in the Government's financial statements, as shown in Table 12.

**Table 12 Defined Benefit Balance Sheet as at 30 June 2016 – Accounting Basis**

	\$ millions		
	Past Service	Future Service	Total Service
<b>Value of Assets and Future Member Contributions</b>			
Market Value of QSuper Fund Notional DB Assets	5,236	0	5,236
Market Value of Employer Fund Assets	28,742	0	28,742
Member Contributions	0	1,844	1,844
Employer Contributions at Current Rates after 2019-20	0	3,034	3,034
<b>Total Value of Assets (A)</b>	<b>33,977</b>	<b>4,878</b>	<b>38,855</b>
<b>Value of Benefits, Tax &amp; Expenses</b>			
Active Defined Benefit Members	22,826	8,397	31,223
Current and Contingent Pensioners	1,799	0	1,799
Former Defined Benefit Members	2,803	0	2,803
Disability Income Benefit	16	230	247
Surcharge Provision	(28)	0	(28)
Expenses	756	256	1,012
Value of Net Contributions Tax	3,734	1,146	4,880
<b>Total Value of Benefits, Expenses &amp; Tax (B)</b>	<b>31,907</b>	<b>10,030</b>	<b>41,937</b>
<b>Surplus / (Deficit) (A) - (B)</b>	<b>2,070</b>	<b>(5,152)</b>	<b>(3,082)</b>

The difference in the surplus positions between the funding and accounting bases is effectively the present value of the risk premia expected to be earned from the asset allocation over the remaining time until the defined benefit liabilities are eventually extinguished. Whilst these returns are based on reasonable expectations, they are of course not available until earned. In the usual context where contribution rates are the key mechanism for defined benefit funding management, they can be considered as a budgeting estimate, which are adjusted as investment returns and other aspects of scheme experience emerge over time.

The accounting basis can be considered to provide a view of the solvency position of the scheme in that it does not require the sponsor and therefore future generations of taxpayers to guarantee investment returns above risk-free rates. The extent of intergenerational risk transfer is linked to the strategic investment strategy for the assets, which is selected by the Board and Government, taking into account their collective risk preferences. Putting aside the conceptual differences between the two bases, it is important to recognise the practical reality that the Government is required to include the accounting liabilities within its overall balance sheet. Consequently, whilst the accounting view does not drive recommendations of contribution rates, it can provide useful context when considering the funding position of the scheme.

As noted in Section 2.3.1, the Government has a legislative obligation to fund the defined benefit liabilities over and above the assets held within the QSuper fund. The difference between the economic value of the defined benefit liabilities (as proxied by the accounting value) and the assets held in the QSuper fund in respect of the defined benefit members can be considered as an estimate of the value of the Government's statutory guarantee. At the valuation date, the value of the Government guarantee in respect of accrued service was \$26.70 billion.

The deficit in respect of future service when contributions are made at the current rates under either basis is indicative that the value of future accruals is greater than the existing employer contribution rates. This shortfall is not problematic in itself and is taken into account with the accrued and projected

surplus positions when considering the recommendations of this Review. It will also be noted that the effect of the suspension of employer contribution investment is demonstrated in the larger future service deficits as discussed in the previous Review.

In view of the increase in valuation frequency and the consequent retention of the non-financial assumptions within the basis, I have not undertaken any sensitivity analyses of those assumptions. The sensitivity of the liabilities to the financial assumptions (discount rate, inflation) is demonstrated by the differences observed in the valuation balance sheets on the funding and accounting bases.

## 6.2 Cash Flow Profile

The expected cash flows underlying the liabilities shown in Table 10 and Table 11 are shown in Figure 3. Only the first forty years have been shown.

**Figure 3 Projected Benefit Cash Flows**

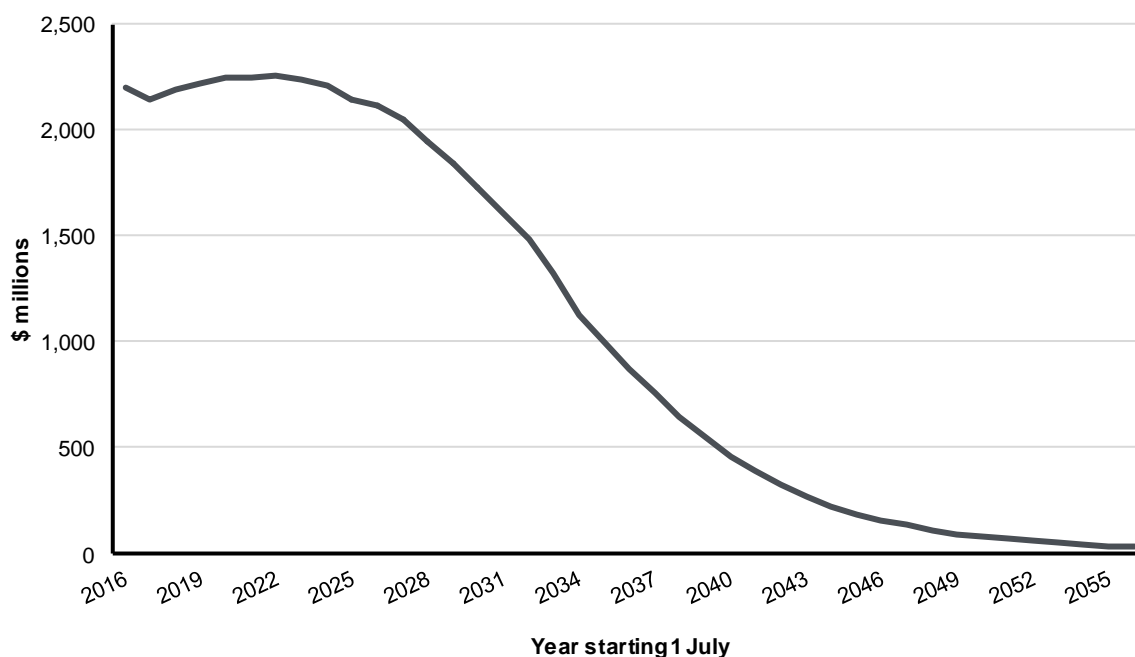


Figure 3 demonstrates that annual cash flows will remain high for some years with expected annual benefit payments over \$1 billion for around twenty years and consequently that the effective “life” of the defined benefit scheme is still quite long.

## 6.3 Superannuation Guarantee

The Superannuation Guarantee (Administration) Act (1992) (SG Act) requires that, from 1 July 1992, employers contribute a specified minimum percentage of salary to a complying superannuation scheme on behalf of each employee. This payment must be fully vested (i.e. available to the employee unconditionally) and preserved in the scheme until the person meets a condition of release.





The rate of employer contribution currently exceeds that required by the SG Act at all member contribution levels for a comparable salary definition. However, the SG Act was changed so that the effective salary definition from 1 July 2008 for SG purposes is Ordinary Time Earnings (OTE) and in addition the SG rates have been legislated to increase over time, with the rate remaining at 9.5% until 2021 before increasing gradually to 12% by 2025.

The Deed was amended so that if the contribution paid on behalf of a member in a pay period after 1 July 2008 is less than the notional employer contribution rate (currently 9.5%) applied to OTE, the difference is paid by the employer into the member's accumulation account. However, for those QSuper members employed in core government agencies, this test applied from 1 July 2006. In a sense this top-up contribution can be considered as a pre-payment of any potential additional benefits that would have otherwise been payable as a result of the comparison of standard QSuper benefits with the SG equivalent minimum requisite benefit and the SG Certificate reflects this.

Given this approach, and the relatively high level of benefit accrual within QSuper for most members, the possibility of further additional benefit payments over and above the standard benefits plus the accumulated top-up contributions is relatively remote. The possible circumstances where such payments might be required have been analysed and a combination of the following attributes are required:

- OTE materially greater than superannuable salary;
- Low member contribution rate;
- Long membership (equivalently young age at entry, below age 30) and/or late retirement);
- Recent entry (noting that the plan was closed to new entrants in November 2008); and
- High investment returns over long periods

Whilst these situations are very unlikely to occur in respect of the current membership, they are not impossible and in addition, the level of the top-ups is asymmetrically related to a number of the parameters listed above. Consequently, I have modelled the potential additional top-ups using a Monte Carlo simulation, with the existing membership used to calibrate the potential parameter space and investment returns assumed to follow a normal distribution with mean 5% (i.e. the funding basis discount rate) and standard deviation 7% divided by the square root of the projection period. The expected present value of additional top-up payments relative to the present value of Defined Benefit entitlements has been estimated to be 0.10%, including a margin for model uncertainty. This amount has been included in the balance sheets shown above within the liabilities relating to active Defined Benefit Category members.

Similar issues apply to the State and Police Categories although even less commonly, except for situations where a resigning member does not choose the preserved benefit. As it has been assumed that all such members choose that benefit, in line with the experience of the scheme, and considering the relatively minor component of the overall liabilities, no further explicit allowance has been made for these Categories. There are no additional payments expected in respect of the Parliamentary Category.

## 6.4 Employer Fund Share of Defined Benefit Payments

The Deed was amended in February 2011 such that contributions payable to meet the State's share of defined benefits not provided by the QSuper fund assets are decided by the Board on the advice of





the Actuary. This amendment generalised the funding provisions and removed the specific provisions that previously applied to each of the defined benefit categories.

For a number of years all payments to pensioners have been met from the QSuper fund with no last minute contribution drawn from the Employer Fund in respect of them and I recommend that this arrangement continue.

The Deed further requires that all income protection benefits in respect of defined benefit members be fully met by the State.

Other than pension and accumulation benefits (fully met from the QSuper fund) and defined benefit income protection benefits (fully met by the State), I recommend that transfers from the Employer Fund continue to be made as last minute contributions by the State at the level of 95% of defined benefit payments (whether paid directly to a member or to an accumulation category). This proportion has remained constant since the last Review, due to the effect of the strong investment return achieved within the defined benefit component of QSuper being materially offset by changes in the valuation basis.

It should be noted that defined benefit member voluntary contributions are excluded as they are funded within the accumulation assets and that the CF proportion includes an allowance for contributions tax and hence there should be no grossing up of the amounts to be transferred. "Defined benefit payments" for this purpose explicitly include:

- Preserved benefits in respect of State/Police members on transfer to an accumulation category
- Member balances transferred to an accumulation account in respect of DB category members who resign before age 55
- DRB benefits transferred to an accumulation category as a result of a conversion to an ILO, death or TPD or reaching age 55

New pensions that commence payment upon an active member's exit should be fully funded at emergence since all payments made to pensioners are to be met from the QSuper fund with no last minute contribution in respect of them. A contribution from the Employer Fund equal to 95% of the estimated present value at the commencement of each new pension (derived as shown in Appendix D) should therefore also be made.

If the actuarial assumptions are realised, then last minute State contributions as described above will fund the balance of all defined benefit liabilities (including those that arise in respect of service after the investigation date) not met from the current QSuper fund assets and future member contributions.

It should be noted that the defined benefit liabilities include contributions tax and expenses in addition to benefit payments to which the recommended proportion is applied. The proportion to apply to those benefits not *fully* met from either the QSuper fund or the State will continue to be recalculated as part of each future actuarial valuation.

## 6.5 Level of Surplus

As discussed in Section 6.1, the surplus position of the defined benefit plan depends critically on the assumptions used to calculate the present value of benefit payments. On the funding basis, used in this and past Reviews to assess the level of required contributions on the assumption that investment

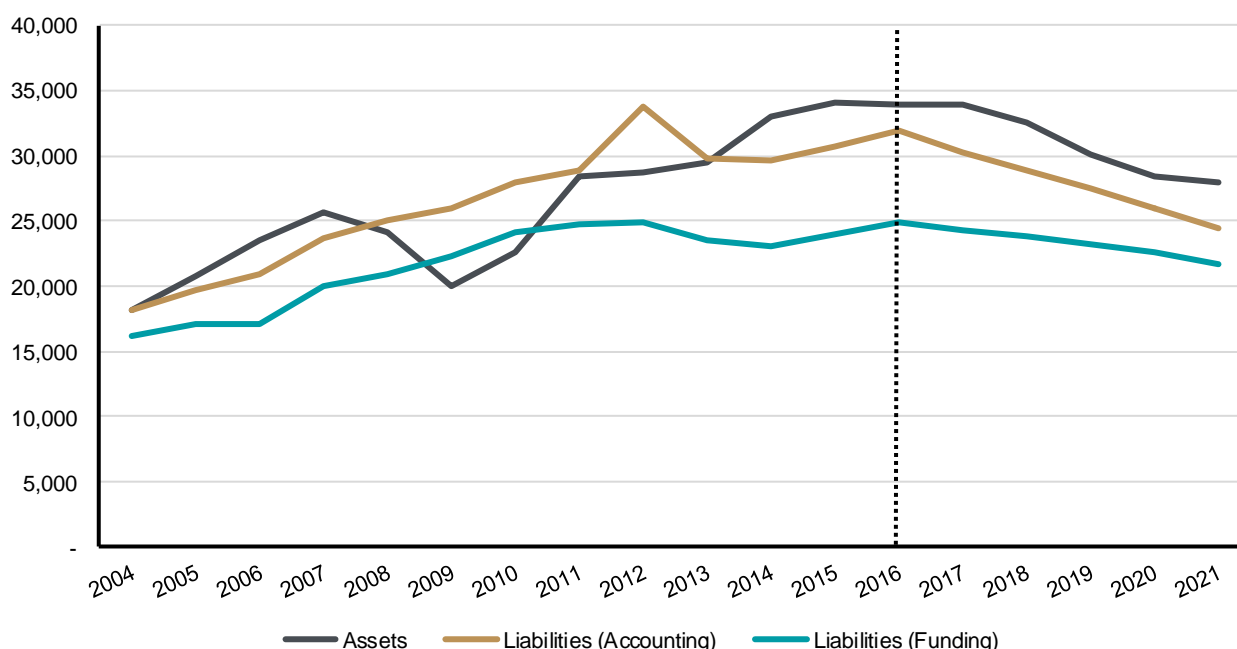
risk premia are achieved, the plan has an accrued surplus of \$9.15 billion and an overall actuarial surplus (allowing for future State contributions at the current rates) of \$6.17 billion, or 18% of defined benefit assets.

On the accounting basis used within the Government's financial statements, the picture is quite different, with an accrued surplus of \$2.07 billion and an actuarial deficit of \$3.08 billion. This position compares extremely favourably with other Governments in Australia and I note that there is no requirement or practice to fund defined benefit schemes to the levels indicated by the accounting basis.

As noted in Section 5.3, this Review is the first to be undertaken within the spirit of the APRA framework and consequently there is greater emphasis on the *vested benefits* liability measure than in previous Reviews (see Section 8), especially when considering whether further repatriations could be undertaken or if a restoration plan is required. Nevertheless, the funding positions shown under the funding and accounting bases still provide useful input regarding the solvency and management of the scheme and therefore I have considered them in greater detail here.

As a baseline, the projected assets and liabilities of the defined benefit scheme over the next five years are shown in Figure 4. The accounting basis liabilities are based on Queensland Treasury's forecasts of discount rates from the 2016-17 Budget, as shown in Table 13, whilst assets are projected to provide a return consistent with the funding basis discount rate of 5.0% p.a., after fees and taxes. Whilst I recognise that these forecasts may not eventuate and there will be differing views as to their accuracy, as there always is with forecasts of this nature, it is important to recognise that this comparison is only one component of the overall analysis used to inform the expected surplus levels within the scheme.

**Figure 4 Historical and Projected Defined Benefit Assets and Liabilities (\$m) - Baseline**



**Table 13 Forecast Gross Discount Rates from 2016-17 Budget**

As at 30 June	Gross Discount Rate
2016	2.00%
2017	2.30%
2018	2.55%
2019	2.80%
2020	3.05%
2021	3.30%

Figure 4 indicates that, based on the assumptions described above, the accounting surplus is expected to be broadly maintained and the funding basis surplus is expected to decline slightly over the next several years, allowing for the suspension of employer contribution investment and the repatriation decided at the 2016-17 Budget. Importantly, Figure 4 also demonstrates that the liabilities have approximately peaked in dollar terms at the valuation date, subject to changes in real discount rates going forward. This is consistent with the reducing duration of the liabilities as the membership ages and the liabilities begin to run down.

So, the baseline projections of the funding position of the defined benefit scheme suggest that the overall funding position is expected to be broadly maintained from the already extremely strong position shown in this Review. This suggests that the combined funding measures over the last two Budgets have reduced the overfunding of the scheme whilst still maintaining a buffer to support the funding position. Also relevant here is the likelihood of subdued salary growth over the short to medium term, potentially further reducing the liabilities relative to that shown above. As noted above, any decisions on further repatriations of surplus from the scheme need to be done within the spirit of the APRA funding framework and this is considered further in Section 8.1.

## 6.6 Recommended Contribution Rates

As noted in Section 5.1, this Review has been undertaken on the basis that the suspension of investment of employer contributions announced by the Treasurer in the 2015-16 Budget continues for five years, with investment to recommence thereafter. Those employer contribution rates for Standard and Police members of the Defined Benefit Category and the Comprehensive Accumulation Category are shown in Table 14.

**Table 14 Employer Contribution Rates - Defined Benefit and Comprehensive Accumulation Categories**

Member Contribution Rate	Employer Contribution Rate	
	Standard	Police
2%	9.75%	-
3%	10.75%	12.0%
4%	11.75%	14.0%
5%	12.75%	16.0%
6%	-	18.0%

With regard to the other defined benefit categories, it has been assumed that the employer will contribute at the equivalent rate to the corresponding group in the Defined Benefit Category as shown in Table 15. It will be noted that the Parliamentary Category does not have a corresponding group with



the Defined Benefit Category and so its contribution level has been determined using the last direct assessment in 2005, noting the triviality of the Parliamentary liabilities within the Defined Benefit Categories as a whole.

**Table 15      Employer Contribution Rates -  
State, Police and Parliamentary Categories<sup>8</sup>**

Category	Employer Contribution Rate
State	4.75% of Salary + 1.00 x Member Contributions
Police	3.00% of Salary + 2.00 x Member Contributions
Parliamentary	5.00 x Member Contributions

<sup>8</sup> The employer contribution rates for the State and Police categories are equivalent to the contribution rates in respect of the relevant Defined Benefit Plan members less the 3% contribution to the Basic Accumulation Plan.



## 7 Factors affecting the accrued surplus

The last Review revealed a surplus of assets over accrued liabilities of \$10,055 million as at 30 June 2015.

The balance sheets illustrated in Table 10 and Table 11 show an accrued surplus position of \$9,149 million which is a decrease of \$906 million from that disclosed at the previous Review. The main sources of this change have been identified as follows:

- **Asset Movements and Investment Returns**  
The actual investment returns achieved over the last year has been lower than the level assumed at the last Review. The resulting deficit has been estimated to be \$580 million.
- **Accumulated Surplus**  
The surplus at the last Review is expected to increase at the previously assumed discount rate, resulting in an additional surplus at this Review of approximately \$603 million.
- **Salary Inflation**  
The growth in salaries since the last Review was lower than assumed in the 2015 valuation, resulting in a surplus of approximately \$317 million.
- **Changes in the Actuarial Basis**  
The actuarial valuation basis has changed from that used in the 2015 Review, with the reasons for this discussed in detail in Appendix B. The basis changes have decreased the surplus by approximately \$797 million.
- **Cost of Accruals**  
The deficit arising from the cost of accruals being greater than employer contributions over the inter-investigation period has been estimated to be \$515 million.



## 8 Funding status

This section of the Report looks at the extent to which QSuper would be able to meet benefits accrued to date, without taking into account future contributions, by deriving various indices comparing assets with different benefit amounts. In order to allow a meaningful comparison to be made, the QSuper fund and the Employer Fund have been combined when determining the market value of assets for the purposes of calculating the various indices.

In view of the clarification of the fiscal principle regarding full funding, I have concentrated on the indices relating to the Defined Benefit scheme as a whole, rather than that applying to Defined Benefit Plan *active members only*. The difference relates to the non-active defined benefit members; i.e. deferred and pensioner members.

In addition, some of the indices have been projected for the ten years following the investigation date. These projections have assumed the employer contribution rates are maintained, subject to any investment suspension, previous repatriations/restorations are implemented as planned and that the valuation assumptions are exactly realised.

### 8.1 Vested Benefits

#### 8.1.1 Definition

“Vested Benefits” are the benefits that would be payable had all members voluntarily resigned on the investigation date. Total vested benefits would usually be regarded as the bare minimum that should be covered by a scheme. Whilst paragraph 23 of SPS 160 does not apply to QSuper, the coverage of vested benefits is nevertheless an important indicator of a scheme’s short term financial condition and so I have followed the spirit of SPS 160 in this regard. This relationship is usually expressed as an index defined as the ratio of assets to vested benefits, or vested benefits index (VBI).

The vested benefits have been calculated as the total of all resignation benefits or, for eligible members (including the accumulation categories), early retirement benefits that would have been payable to members at the investigation date plus the value of former members’ preserved benefits and pensions in payment. In determining the value of resignation benefits in the Defined Benefit Category, deferred retirement benefits have been discounted in line with the funding basis. The value of the vested benefits has also been adjusted to reflect the contribution tax liability that would become payable if all members were to resign.

It is an interesting consequence of the benefit design of the Defined Benefit Category that the vested benefit is generally greater than the present value of accrued liabilities and consequently, in the absence of an accrued surplus, the vested benefits would be expected to be greater than scheme assets.

In previous Reviews I have noted that, with a Government sponsor assured of perpetual existence and also given the funding arrangements of the scheme and statutory guarantee, a VBI of less than 100% did not necessarily require specific action. In addition, accrued liabilities represent the present value of the expected future benefit payments related to service prior to the calculation date, whilst vested benefits represents the somewhat artificial situation where all members effectively leave on the one day. This is why actuarial management has always concentrated on accrued liabilities rather than



vested benefits as they represent the more meaningful measure for a scheme that is effectively assured of perpetual existence.

### 8.1.2 Shortfall Limit

However, as noted above, the Government now requires that the funding position of the scheme be managed in accordance with the spirit of APRA standard SPS 160 applying to private sector defined benefit schemes and so consideration needs to be given to the specification of a “shortfall limit”.

SPS 160 defines funds as being in “satisfactory financial condition” when their assets are greater than total vested benefits (i.e. VBI > 100%) and the shortfall limit as that level of VBI the Trustees can “*reasonably expect that, because of corrections to temporary negative market fluctuations in the value of fund assets, the fund can be restored to a satisfactory financial position within one year*”. The intent is to provide some leeway where funding levels can fall below 100% due to temporary market conditions without the Trustee going to the expense and complication of an actuarial investigation and imposition of a restoration plan.

The actuarial profession has provided some guidance<sup>9</sup> that suggests shortfall limits around 96%-100% recognising the trade-off between unnecessary corrective action and the security of member entitlements. It is arguable that the statutory guarantee of Defined Benefit member entitlements means that a lower shortfall limit is acceptable for QSuper, noting the disturbance to the Budget process caused by frequent adjustments to funding. On balance, **I recommend a shortfall limit of 90%** as providing a reasonable compromise between these competing issues.

Whilst a shortfall limit below 100% allows the scheme assets to temporarily fall below vested benefits at a particular point in time, this is a key component of the APRA framework that reduces the risk that material funding plans are undertaken unnecessarily. In any event, QSuper funding below 100% has limited practical effect due to the Government guarantee underlying benefit entitlements.

### 8.1.3 Target Buffer

The interpretation of the fiscal principle of full funding also includes that “*overfunding of the Government’s defined benefit scheme should be minimised*”. As noted in my May 2016 letter to the Under Treasurer (see Appendix F), taken at face value, this would suggest that any excess over 100% VBI should be repatriated. However, the lower the level of VBI, the greater the chance that a restoration plan will be required and so it would be prudent to maintain a buffer above 100% to reduce the need for frequent demands for additional funding and the consequent disruption to the Budget process. This “target buffer” represents a trade-off between access to surplus funds and disruption to budget planning.

There is no optimal level for such a buffer and it does not represent a hard limit requiring specific action. Nevertheless, it provides a useful benchmark against which to implement the interpretation of the funding principle. Again, on balance, **I recommend a target buffer of 120%** be used when considering the funding management of the scheme. It will be noted that projections of funding position will be undertaken at each Review, taking into account any contribution suspensions and

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<sup>9</sup> See [http://www.actuaries.asn.au/Library/Standards/SuperannuationEmployeeBenefits/2013/SPCIN\\_SPS160ShortfallLimit.pdf](http://www.actuaries.asn.au/Library/Standards/SuperannuationEmployeeBenefits/2013/SPCIN_SPS160ShortfallLimit.pdf)





repatriations already planned and these projections will be compared with the buffer, rather than simply the position at the valuation date.

Consideration was given to a lower target surplus buffer, however in my view this would not be consistent with the principle of prudence. Further, it would increase the likelihood that funding plans implemented over the Budget estimates period would need material adjustment, placing pressure on both the Budget process and scheme funding.

## 8.1.4 VBIs at the Valuation Date

The VBI can be defined in respect of various membership groups within QSuper. As at 30 June 2016, the value of the vested benefits and VBI for the commonly considered groups were as shown in Table 16.

**Table 16 Vested Benefits and VBI at 30 June 2016**

	Vested Benefits (\$ million)	VBI
QSuper (incl Accumulation etc)	87,006	107.8%
<b>QSuper Defined Benefit Scheme (incl deferred and pensioner members)</b>	<b>27,166</b>	<b>125.1%</b>
Active Defined Benefit category members only	22,440	135.3%

In previous Reviews, I have considered the VBI in respect of **active defined benefit members only**, although the concentration on the VBI for the entire Defined Benefit scheme (i.e. including deferred and pensioner members) in accordance with SPS 160 has superseded this substantially.

## 8.1.5 VBI Projections

It is usual to look at the progress of the various indices from Review to Review. An increase in an index would generally indicate a strengthening of a scheme's financial position while a decrease would indicate a weakening. The corresponding vested benefit indices at the previous Review are shown in Table 17. The small declines since the last Review are substantially due to the relatively low investment return and the change in the actuarial basis.

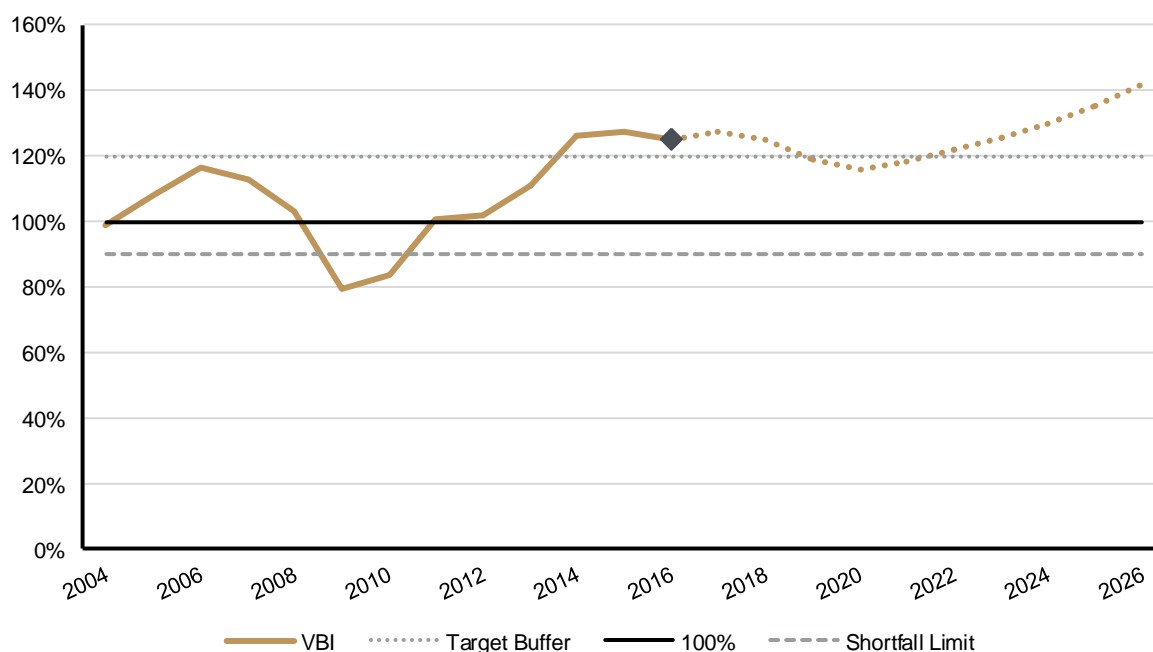
**Table 17 VBI at 30 June 2015**

	VBI at 30 June 2015
QSuper (incl Accumulation etc)	109.1%
<b>QSuper Defined Benefit Scheme (incl deferred and pensioner members)</b>	<b>127.3%</b>
Active Defined Benefit category members only	138.2%

In addition, Figure 5 shows the vested benefits index for the last several years as well as its projection for the ten years following the investigation date. As noted above, the vested benefits depend on the actuarial valuation assumptions because the withdrawal benefit for defined benefit members is the deferred AWOTE linked retirement benefit. Consequently, the historical values aren't strictly comparable but the broad trends are still meaningful.



Figure 5 Historical and Projected Deterministic Vested Benefits Index – Defined Benefit Scheme



The projections shown in Figure 5 are based on the deterministic assumptions shown in Appendix C and so do not reflect the expected volatility related to inflation and investment returns. Similarly to my previous Review, QIC has provided stochastic projections of the VBI so that I can assess the distribution of potential outcomes and allow for more extreme positions than the baseline projection shown above. These models incorporate QIC’s assessment of asset class returns, volatility and correlation, as well as realised inflation and prospective inflation and interest rates.

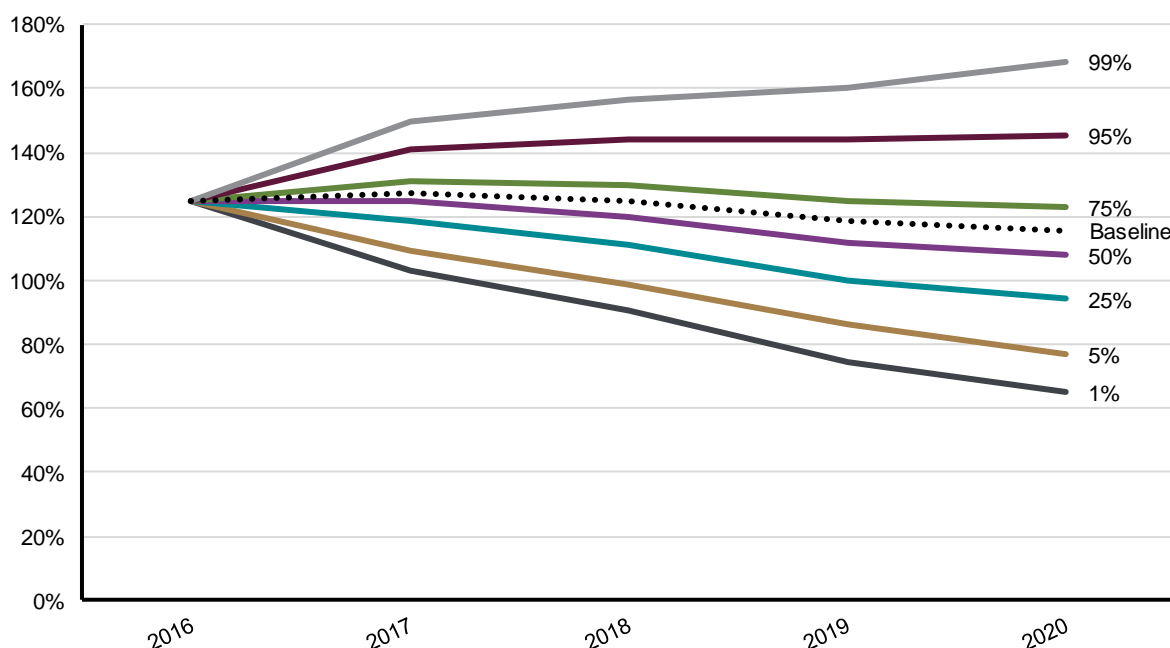
Before considering the distributions of potential outcomes for the funding position of the scheme it is worth noting the uncertainties implicit within QIC’s models, or any such asset-liability models for that matter. These models reflect reasonable expectations as to future returns and volatility but they are subject to specification and calibration errors and cannot be expected to demonstrate the entire range of possible outcomes; i.e. **it is certainly possible for outcomes outside the distributions shown to occur in practice**. Whilst they provide useful input for decisions regarding funding strategies, it is important for all stakeholders to recognise that the **modelled outcomes are not subject to any guarantees**.

It is also worth commenting on the forecast horizon over which to assess these projections. I have chosen four years, reflecting the forward estimates and a reasonable period to allow for the models to perform at their best<sup>10</sup> as well as a medium term horizon for decision making that is not overly reactive to short term issues. Longer periods would be subject to one of the major risks with such models where mean reversion assumptions tend to underestimate the “tail” of return distributions, particularly on the downside.

<sup>10</sup> The economic and other relationships underlying QIC’s models are more reflective of medium term outcomes and so the projected outcomes are more meaningful over 3-5 years than in the shorter term.

The distribution of potential outcomes for the VBI over the next five years is shown in Figure 6. Each line represents a percentile of the distribution of possible outcomes. For example, the line labelled “50%” represents the median outcome with a 50% chance of a higher outcome and 50% chance of lower. The line labelled 5% represents the fifth percentile, the amount where there is a 5% or 1 in 20 chance of a lower outcome.

**Figure 6 Projected Vested Benefits Index Distribution – Defined Benefit Scheme**



QIC’s median net return for the five year period of 5.4% is higher than the 5.0% p.a. assumed in the Baseline projection demonstrated in Figure 4, mainly as a result of the relatively high expectations for 2016-17, incorporating the strong return year to date. The median cumulative CPI and salary inflation outcomes over the period to 30 June 2020 from the QIC models are 2.2% p.a. and 3.3% p.a. respectively, which are higher than the assumptions used in this Review. The implied median gap between investment returns and salary inflation from the QIC models is therefore 2.1% compared to the deterministic assumptions underlying this valuation of 2.4%<sup>11</sup>. This apparent inconsistency is not problematic as the timeframes for the two assumption sets are different. In addition, QIC’s models are continually evolving and the stochastic projections shown in Figure 6 are based on later information than that used to calibrate the valuation assumptions.

These charts demonstrate that the vested benefits of defined benefit members are expected to remain adequately covered by the corresponding overall scheme assets throughout the forward estimates, subject of course to actual volatile investment outcomes. The projected VBI is expected to fall below the target buffer over the Budget horizon and, with the probability of the VBI falling below 100% in 2020 around 1 in 3, **existing funding management initiatives (i.e. repatriation and contribution suspension) should proceed as planned.**

<sup>11</sup> The higher gap for the deterministic assumption set produces lower vested benefit amounts and so the Baseline projection is higher than the median stochastic projection.



## 8.2 Accrued Retirement Benefits

For the purpose of assessing the progress of a scheme towards funding the members' normal age retirement benefits it is useful to compare the value of the scheme's assets to the level of normal age retirement benefits accrued at the date of the investigation. This comparison gives the "Accrued Retirement Benefits Index" or ARBI. The ARBI *excludes* the assets and liabilities in respect of the accumulation categories, deferred benefits and pensioners.

The value of the accrued benefits has been determined as the member's retirement benefit based on the 1 July 2016 salary and service to the investigation date. The accrued retirement benefits have been adjusted to take into account the estimated accrued contributions tax liability.

The accrued retirement benefits are not benefits that are immediately payable. They are not liable to be paid until the member has reached retirement age. With a positive gap between the rate of investment income and salary inflation, the assets would grow at a faster rate than the accrued benefits and so the ratio of assets to accrued retirement benefits should increase over time. Hence, it would be expected that the ARBI would generally be less than 100% during the active service of the collective membership.

The ARBI for active defined benefit members at the Review date was 131.5%, compared to the equivalent ARBI at the last Review of 132.9%. As the average age of the membership has grown since the last Review, the ARBI would have been expected to increase, other things being equal. However its small decrease is indicative of the decline in funding position, caused substantially by the lower than assumed investment return since the last Review.

## 8.3 Discounted Accrued Retirement Benefits

To illustrate the effect of the gap between investment earnings and salary inflation, a further calculation was made in which the accrued benefit for each *active* member was discounted, for each year prior to age 55, by the gap between salary inflation and the discount rate assumed in the funding basis. The ratio of the assets to these "discounted accrued benefits" is another indicator of the degree to which members' retirement benefits are funded. The "discounted accrued benefits" index at this valuation was 141.4%.

The equivalent index at the last Review was 145.7%. This moderate decline is caused by both the lower than expected investment return and the strengthening of the actuarial basis at this Review.

## 8.4 Actuarial Value of Accrued Benefits

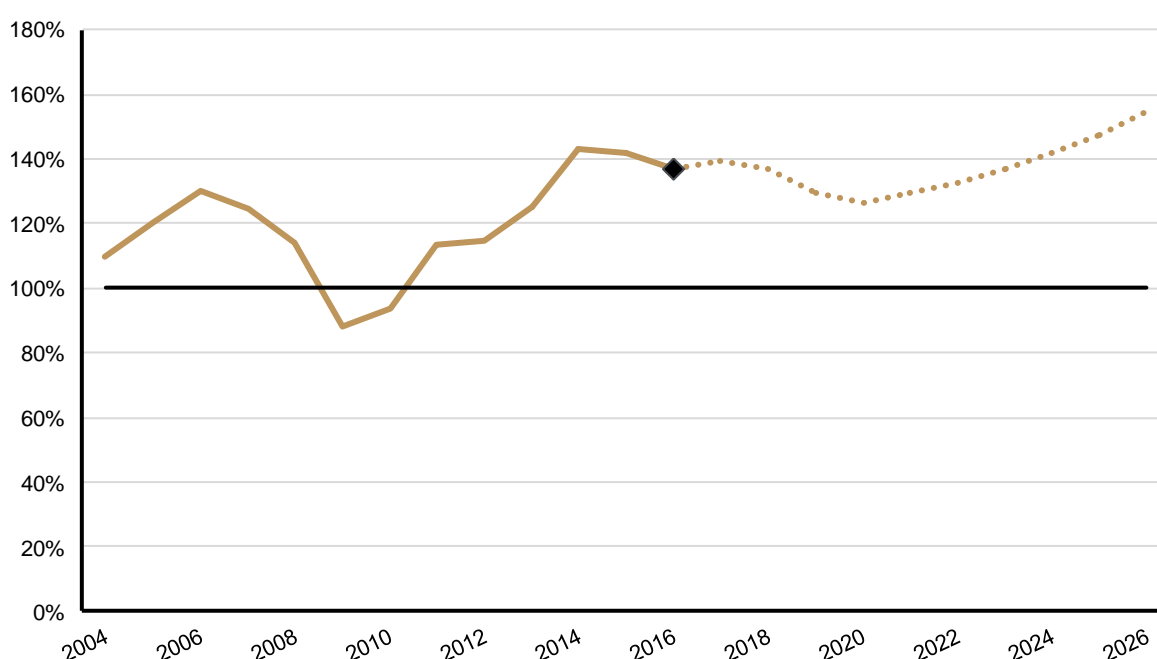
An additional funding indicator which takes into account the liability accrued from service prior to the investigation date for all types of benefit (i.e. not only age retirement) is the present value of accrued liabilities. The present value of accrued liabilities (*including* current pensions, preserved benefits, Accumulation members and adjusted for accrued taxation liabilities) on the funding basis at the investigation date was \$84,669 million, as shown in Table 10.

Another way of presenting this figure is in the form of an index defined similarly to those described above. As at the investigation date, the actuarial value of accrued benefits index (AVABI) for QSuper

as a whole (i.e. including the Accumulation Categories) was 110.8%. For the **defined benefits scheme only**, the AVABI at the investigation date was 136.8%, compared to 141.8% at the previous Review. The decrease in this index is again largely due to the lower than expected investment return and strengthening of the actuarial basis since the last Review. This dependence on the valuation basis, particularly the financial assumptions, means that the levels of the AVABI over time are not strictly comparable; however the broad trends can still be meaningful.

The historical and projected AVABI (defined benefit scheme) for the ten years following the investigation date is shown in Figure 7. This chart demonstrates that, on the basis of the assumptions made within this Review, the funding position is expected to remain strong for the next several years.

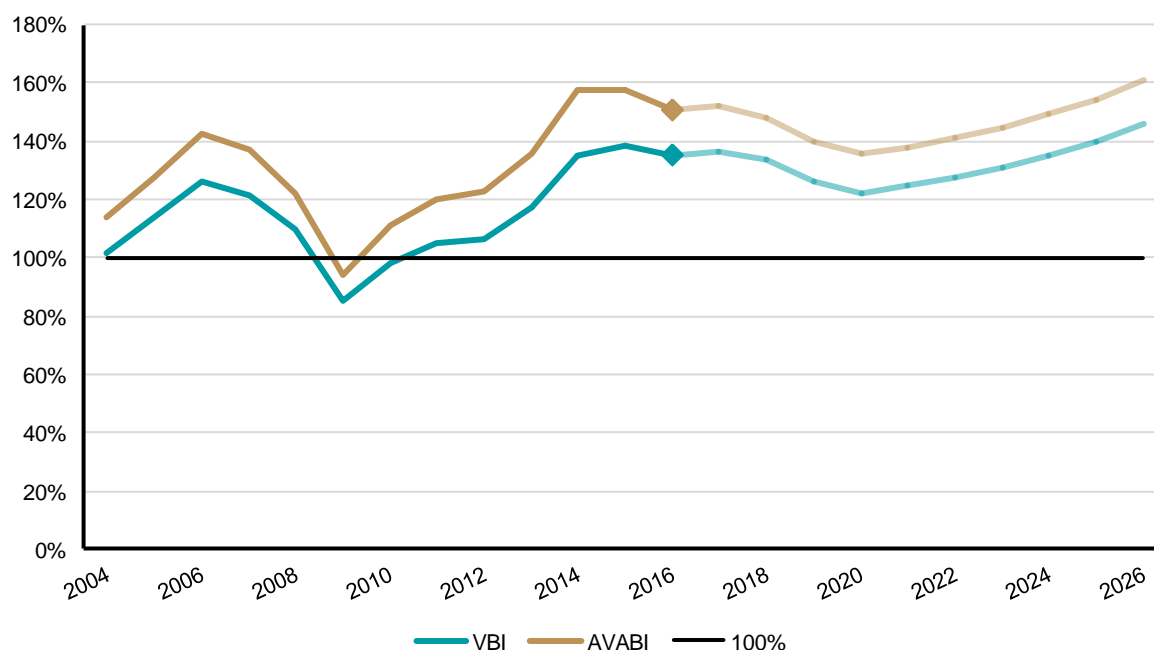
**Figure 7 Historical and Projected Actuarial Value of Accrued Benefits Index – Funding Basis**



## 8.5 Active DB Members Projections Only

As noted above, in previous Reviews I have focused on the active defined benefit members only when considering the funding of vested benefits and accrued liabilities, whereas this Review has concentrated on the indices for the *overall* defined benefit scheme; i.e. including deferred and pensioner members as well as active members. For completeness, I have shown the projected VBI and AVABI positions for active defined benefit members only in Figure 8. These projections are similar to those shown in the preceding sections, albeit at higher levels, as the components relating to non-active members are by definition taken to be 100% funded when deriving the active member indices.

Figure 8 Historical and Projected VBI and AVABI – Active DB Members Only



## 8.6 Summary

The funding indices have decreased slightly since the last Review, primarily as a result of the lower than assumed investment return over 2015-16. Their absolute levels are all high and indicative of the very strong funding position, measured on the funding basis. I have also shown the expected progress of the funding positions taking into account previously announced funding measures, demonstrating that the funding position of the scheme is expected to decline somewhat in line with their intent before resuming an increasing trend.

## 9 Required statements

Section 19 of the Deed requires the following statements:

- The assets of the QSuper fund as at 30 June 2016 were \$65,076 million.
- It is expected that the assets of the QSuper fund and future member and employer contributions will finance all liabilities for benefit payments as at 30 June 2016.

The requirements of paragraph 23 of SPS 160 are not appropriate to QSuper in view of the funding arrangements of the scheme. With regard to paragraph 24 of SPS 160, I make the following statements:

- The value of the assets of the fund at the valuation date, excluding any amount held to meet the Operational Risk Financial Reserve (ORFR) was \$64,913 million.
- I recommend that employer contributions from the Employer fund to QSuper be made as follows:

**Income protection to be met by State**      Income protection benefits to be fully met by the State as required by the Deed

**Payments to pensioners from QSuper fund**      Consistent with current practice, all payments to pensioners to be met solely from the QSuper fund with no last minute funding drawn from the Employer Fund in respect of them

**State to meet 95% of defined benefit payments**      Other than the above, the State to meet 95% of defined benefit payments. Benefit payments for this purpose include any transfers to an accumulation category and the present value (see Appendix D) of new pensions that emerge on the exit of defined benefit active members. All payments to pensioners are met solely from the QSuper fund and therefore need to be fully funded at commencement

- These recommendations are based on accrued liabilities that have been determined using assumptions and valuation methods that are appropriate to the liabilities of QSuper.
- Section 29 of the Act requires that the Treasurer must contribute the amounts necessary to meet defined benefit payments that do not relate to past member and employer contributions. The contributions described above are consistent with that requirement and therefore I consider that the liabilities are adequately funded.
- An event prescribed under section 342(4)(a) of the SIS Act and listed in regulation 12.10 of the SIS Regulations has not occurred.

QSuper self-insures death and disability benefits for members of the Accumulation and Defined Benefit Categories. The Accumulation self-insurance arrangements are subject to annual actuarial review, with reserves maintained by QSuper in accordance with actuarial advice. With regard to the self-insurance of defined benefit entitlements, I believe that self-insurance remains appropriate, recognising:

- the State has a statutory obligation in respect of the defined benefit obligations of the scheme, so insured benefits are effectively guaranteed;



- the defined benefit membership is large enough so that variations in death and disability experience from year to year are small relative to the size of the scheme and to variations in other aspects of the scheme's experience; and
- the insured component of death/TPD benefits is declining as the membership ages so the risks are declining.

With regard to APRA reporting standard SRS 160.0, I note the following:

- The long term investment return assumption was 5.0%.
- The long term wage growth assumption was 2.6%.
- The long term consumer price index assumption was 1.6%.
- The weighted average term of projected defined benefit liabilities was 8.8 years.
- The relevant date for the above items was 30 June 2016.

The following amounts are required for accounts prepared in accordance with the accounting standard AAS25:

- The value of vested benefits as at 30 June 2016 was \$87,006 million.
- The value of accrued benefits as at 30 June 2016 was \$84,669 million.



## 10 Material risks

The Actuaries Institute professional standard governing the valuation of defined benefit schemes (PS 400) requires a discussion of the material risks relevant to the scheme. In my view, the major risks affecting the defined benefit plan within QSuper are as follows:

- Investment risks resulting from the mismatch between the investment strategy and the liabilities. Whilst the Board and Government have reduced this mismatch in recent years, it remains material and represents the single largest risk to the funding position of the scheme.
- As noted in Section 2, I have undertaken this Review on the basis that the assets held in respect of employee entitlement liabilities within the Consolidated Fund will continue to be hypothecated for that purpose, subject to any recommendations made via the actuarial review process. Whilst this has been the stated and practised position of successive Governments over many years, this approach is not legislatively required. Should the Government choose to utilise some or all of these assets for other purposes outside of the actuarial management framework, the funding position of the scheme will obviously be reduced.
- Most of the scheme's liabilities are linked to members' salaries and therefore the funding position of the scheme can also be adversely affected by an increase in liabilities resulting from unexpected public sector wages growth. Similarly, the liabilities linked to AWOTE (deferred retirement benefits of former members) and CPI (pensions) are also subject to the risk of high inflation levels, although the impacts are much less.

In view of the legislative guarantee provided by the State, these risks manifest as a funding risk for the Government, rather than practically affecting beneficiary security. Nevertheless, overseas experience has demonstrated that even Government guarantees are not inviolable and so all stakeholders need to be aware of them.





## Appendix A Benefit and contribution conditions

QSuper is designed on a “master trust” concept, which permits state public sector employing authorities to provide unique scheme conditions for their employees. Some employing authorities have opted for benefit conditions slightly different to the standard QSuper benefits but the vast majority of members of the scheme receive the standard benefits set out below.

Over the years a number of government superannuation schemes have been merged into QSuper. Each of the merged schemes now operates as a category of QSuper with existing members’ benefits and conditions carried through substantially unaltered.

A full description of the benefit and contribution conditions of the scheme is contained in the Deed. This summary is intended to provide a broad overview only.

In accordance with the Commonwealth Family Law Act, QSuper is required to transfer benefits to member spouses in certain circumstances. The Board has received approval to use a “valuation and payout” methodology where a member’s interest is valued at the relevant date. The valuation method for the defined benefit categories<sup>12</sup> has been specified as the value payable upon transfer to an accumulation category, whilst the member’s account balance is used for accumulation category members (i.e. the default method prescribed by the Family Law Regulations). Following a family law split, the member’s entitlements are reduced proportionately and then they continue to accrue benefits normally, thus implementing a “clean break” between the parties to the split.

Since 1 July 2006, members have been able to crystallise part or all of their defined benefit and transfer the resulting amount to a “transition to retirement” (TtR) pension. The basis upon which the crystallisation is undertaken is equivalent to that applying to Family Law split; i.e. the basis used for transfers to an accumulation category. I have analysed the effect of TtR transfers in this Review in Section B.4.

### A.1 QSuper Defined Benefit Category

#### A.1.1 Eligibility

The Defined Benefit Category was closed to new entrants from 12 November 2008, although there was a 6 month window for late elections to occur.

Non-casual members of the Comprehensive Accumulation Category were previously allowed a once-only option to transfer to the Defined Benefit Category.

In addition, members who retained their entire benefit within QSuper after a previous exit were able to return to the Defined Benefit Category upon re-joining the Queensland public sector. However, since the closure of the latter category this option is no longer available, except for members who are re-

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<sup>12</sup> The Parliamentary Category uses a different methodology for Family Law valuation and also splits certain benefit payments using the “percentage only” technique described in the relevant regulations.



appointed to the Government within one month of exit who are essentially deemed to have continued their original membership.

## A.1.2 Review Date

The accounting year for QSuper is the financial year ended 30 June. However, salaries for benefit and contribution purposes in the Defined Benefit Category are updated on 1 July of each year (the Annual Review Date). Salary is defined in the Deed and is usually the base salary or wages of a member although various subgroups have allowances included within superannuable salary.

## A.1.3 Retirement Date

There is no Normal Retirement Date for the Defined Benefit Category. Members over age 65 who work for more than 40 hours in a 30 consecutive day period are allowed to contribute until age 75. This Review has incorporated allowance for members retiring after age 65 (see Section B.4.2).

## A.1.4 Final Average Salary/Final Salary

Final Average Salary is the average of the review date salaries over the previous year, having regard to the period of time for which they were applicable.

Final Salary is the review date salary applicable immediately prior to the occurrence of the relevant event unless this occurs in the year preceding the member's 55th birthday, in which case the final salary is equal to the average of review salaries since age 54.

## A.1.5 Benefit Accruals

During each Annual Review Year, members accrue an Annual Compulsory Contribution Accrual, which depends on the rate of the member's contributions, and an Annual Basic Benefit Accrual. Both of these are expressed as a percentage of salary.

The Annual Compulsory Contribution Accrual for Standard members is calculated as follows:

$$\text{Annual Compulsory Contribution Accrual} = 12.5\% \times \frac{\text{Compulsory Contributions During Year}}{\text{Annual Review Date Salary}} \div 5\%$$

The Annual Basic Benefit Accrual for Standard members is calculated as follows:

$$\text{Annual Basic Benefit Accrual} = 8.5\% \times \frac{\text{The proportion of the Annual Review Year during which compulsory contributions have been received in respect of the member}}{1}$$

This can be summarised as 8.5% plus 2.5 times member contribution rate.

For Police members, the accruals are defined as follows:

$$\text{Annual Compulsory Contribution Accrual} = 21.0\% \times \frac{\text{Compulsory Contributions During Year}}{\text{Annual Review Date Salary}} \div 6\%$$



$$\text{Annual Basic Benefit Accrual} = 3.5\% \times \text{The proportion of the Annual Review Year during which compulsory contributions have been received in respect of the member}$$

This can be summarised as 3.5% plus 3.5 times member contribution rate.

Thus, a Standard member who contributes at the standard rate of 5% of salary will accrue a benefit of 21% of salary per annum. Similarly, Police who contribute at the standard rate of 6% accrue benefits at 24.5% of salary per annum.

## A.1.6 Retirement Benefit

Where a member retires or otherwise leaves service on or after their 55th birthday, a lump sum benefit is payable that is calculated as follows:

$$\text{Benefit} = \text{Final Average Salary} \times \text{The sum of the member's Annual Compulsory Contribution Accruals and Annual Basic Benefit Accruals}$$

## A.1.7 Total and Permanent Disablement Benefit

Where a member becomes totally and permanently disabled (TPD) prior to age 55, the member has the choice of taking a lump sum benefit or a pension benefit. The lump sum benefit is calculated as follows:

$$\text{Benefit} = \text{Retirement Benefit} + \text{Prospective Membership Benefit}$$

The retirement benefit is calculated using Final Salary rather than Final Average Salary. The prospective membership benefit for Standard members is as follows:

$$\text{Prospective Membership Benefit} = \text{Final Salary} \times 21\% \times \text{Potential Membership from date of disablement to member's 55th birthday}$$

The prospective membership benefit for Police members is as follows:

$$\text{Prospective Membership Benefit} = \text{Final Salary} \times 24.5\% \times \text{Potential Membership from date of disablement to member's 55th birthday}$$

Members may elect to take an annual pension benefit, which is calculated as follows:

$$\text{Annual Pension} = \frac{\text{Lump Sum Benefit}}{9.8} \quad (\text{Standard member})$$

$$\text{Annual Pension} = \frac{\text{Lump Sum Benefit}}{11.43} \quad (\text{Police member})$$



The annual pension is limited to 75% of Final Salary. This pension is adjusted annually in line with increases in the Brisbane All Groups Consumer Price Index. On the death of the pensioner before the pension has been paid for five years, a lump sum benefit is payable equal to the current annual rate of the pension multiplied by the number of years and fractions of a year until the five year term is reached.

The Deed was amended on 1 July 2006 to provide for the children of members who die within one year of TPD to receive pensions equivalent to those payable had the member died in service (see Section A.1.9).

## **A.1.8 Permanent and Partial Disablement Benefit**

Where a member becomes permanently and partially disabled (PPD) prior to age 55 a lump sum benefit is payable which is calculated as for the retirement benefit but using Final Salary rather than Final Average Salary.

## **A.1.9 Death Benefit**

Where a member dies prior to age 55, a lump sum benefit equal to the lump sum on total and permanent disablement is payable.

In addition, a child's pension is payable to each child of the deceased member.

## **A.1.10 Benefit on Involuntary Termination**

Where a member's employment is terminated involuntarily a lump sum benefit is payable that is equal to the benefit payable on permanent and partial disablement. Involuntary termination includes voluntary early retirements, redundancies and retrenchments.

## **A.1.11 Benefit on Withdrawal**

Where a member ceases employment and is not entitled to any other benefit, the benefit payable is calculated as for the retirement benefit but using Final Salary rather than Final Average Salary. This benefit comprises two components:

- An amount equal to the member's contributions accumulated with interest. This component is transferred to an accumulation category and a portion may, subject to SIS preservation requirements, be immediately accessible as cash.
- The balance of the benefit (the Deferred Retirement Benefit or DRB) must be preserved until a preservation cashing condition is satisfied. Members can choose two options for indexation of the DRB. The default option is for the benefit to be increased in line with Average Weekly Ordinary Time Earnings (AWOTE) until age 55, at which time it is transferred to an accumulation category. Alternatively, the DRB can at any time be converted to a cash equivalent amount (the Investment Linked Option or ILO) that will be transferred to an accumulation category. The ILO is calculated by discounting the AWOTE linked benefit by 2.88% compound for each year from conversion until age 55.

## A.1.12 Minimum Benefit

The minimum benefit payable for any reason shall not be less than the defined Withdrawal Benefit as at the date of exit. In addition, benefits payable since 1 July 1992 must not be less than the Minimum Requisite Benefit defined in the Superannuation Guarantee Benefit Certificate for the scheme.

## A.1.13 Income Protection Benefit

Where a Standard member becomes temporarily disabled and has been absent from duty on sick leave without salary for a continuous period of 14 days, the member may be entitled to receive a pension of 75% of Final Salary for the period of temporary disability. Whilst in receipt of an Income Protection benefit, a member is deemed to have contributed at the Standard Contribution Rate for benefit accrual purposes. The pension ceases when the pension has been paid in respect of a single condition for a period of two years or the member is deemed PPD or TPD. Police members of the Defined Benefit Category, magistrates and Parliamentarians do not have access to the Income Protection benefit.

## A.1.14 Member Contributions

The Standard Contribution Rate to the Defined Benefit Category is 5% of salary. However, members are able to choose the level at which they contribute within the range 2% to 8% provided that contributions in excess of 5% are only allowed in order to “catch up” for having previously contributed at a rate below 5%. Members are able to salary sacrifice their member contributions by grossing up their contribution by dividing by 85%; e.g. a 5.88% salary sacrifice contribution is equivalent to a 5% after-tax contribution.

The standard rate of contribution for Police members is 6% of salary, with rates allowed between 3% and 9%.

## A.1.15 Transfer to the Accumulation Category

Members of the Defined Benefit Category are able to transfer to the Comprehensive Accumulation Category at any time on an open-ended basis. The transfer benefit is equivalent to the cash equivalent withdrawal benefit described in A.1.11. Having transferred from the Defined Benefit Category, members are unable to transfer back from the Comprehensive Accumulation Category.

# A.2 QSuper Accumulation Categories

## A.2.1 Eligibility

Since 1 May 2000, all new public sector employees have joined an accumulation category by default. Non-casual members were previously allowed a once-only option to transfer to the Defined Benefit Category, but following the closure of this category from 12 November 2008 this option is no longer available.



## A.2.2 Benefits

A lump sum benefit is available to members when they permanently retire at or after their preservation age. The benefit is equal to the balance of the member's account at retirement. The member's account is comprised of member and employer contributions and interest. Deductions are made for administration costs, taxation and insurance premiums.

On resignation, all or part of a member's account must be preserved until a preservation cashing condition is satisfied.

If a member dies or becomes TPD before age 65, the benefit provided is equal to the member's account balance plus any additional insurance proceeds. Non-casual members (other than police and Parliamentarians) also have access to income protection insurance.

## A.2.3 Member Contributions

Generally, all non-casual employees contribute 5% of their salary. The standard contribution level may be varied, from 2% to 5%, and members (including those in defined benefit categories) may make additional voluntary contributions.

There are some non-casual employees (wages employees with commencement dates prior to 1 May 2000) who have elected not to make contributions. These employees are not compelled to change. However, the option to contribute remains open for these employees and there is no time limit for this choice. If they commence contributions they must continue to contribute. The option not to contribute is unavailable for non-casual employees who commenced after 1 May 2000.

Casual employees do not have to contribute. If they choose to contribute, they are eligible to receive the same level of employer contributions as non-casual employees.

## A.2.4 Employer Contributions

Members who contribute to an accumulation category receive employer contributions at the rate of 7.75% of salary plus a matching of their own net contributions up to 5% of salary.

For non-contributory members, the employer contribution rate is in line with the Commonwealth's Superannuation Guarantee requirements.

Where the employee is a member of either the State or Police Category, the employer contributes 3% of salary to an accumulation account (formerly known as "GOSUPER").

## A.2.5 Transfer to Defined Benefit Category

With the closure of the Defined Benefit Category, this option is no longer available.



## A.3 QSuper State Category

Since 1 January 1991, new members have not generally been able to enter the State Category. An exception to this occurs when a previous member who has retained a preserved benefit in the category re-joins the public sector. They are allowed the option of continuing their previous membership or joining the Comprehensive Accumulation Category. Due to changes in benefit design over the lifetime of the scheme, the complexity of some benefit conditions and the operation of transitional arrangements, the category does not lend itself to a simple and concise summary of the benefit and contribution conditions.

The following summarises the benefit and contribution conditions for a member who entered the category after 30 June 1988.

### A.3.1 Normal Retirement Age

The normal retirement date is the 65th birthday for all members. Members who remain as public sector employees after their 65th birthday, or after 42.5 years of membership from age 20, do not continue to accrue benefits within the category and the QSuper fund component of their normal retirement benefit is paid from that date. The member is then moved to the Comprehensive Accumulation Category where all future contributions are deposited. The remainder of the benefit is paid on retirement.

### A.3.2 Final Average Salary

Final average salary (FAS) is defined as the average fortnightly salary received by the contributor during the year immediately preceding the member's exit from the scheme. However, any increases in salary in the two years prior to retirement which are in addition to Award increases are averaged over two years.

### A.3.3 Service to Count

Service starts accruing from the later of the date of joining the category and the member's 20th birthday.

The maximum amount of service to count is 42.5 years.

### A.3.4 Categories of Membership

There are two categories of membership – category A and category B. These are medical categories based on a medical examination of the member on entry to the category.

The benefits of the two categories are basically the same except that the ill-health and death benefits for category B members are restricted during the first 10 years of their membership if the cause of ill-health or death is related to the reason for being classified as category B.



## A.3.5 Pensions

Pensions payable are indexed annually according to the increase in the Brisbane All Groups Consumer Price Index (CPI).

Where a pensioner dies leaving a spouse, a lump sum benefit is payable that may be converted to a 2/3rds reversionary pension at the discretion of the spouse. In certain circumstances, child and orphan pensions are also payable.

## A.3.6 Retirement Benefit

The retirement benefit is available after the member has reached age 60.

The benefit is defined as a pension but this can be commuted to a lump sum.

The fortnightly amount of the pension is calculated as follows:

$$\text{Fortnightly Pension} = \frac{3}{200} \times \text{Service to date of retirement} \times \text{FAS}$$

The lump sum payable in lieu of the pension is calculated by multiplying the above pension by a commutation factor that varies depending on the member's age in years and complete months. At age 60 the commutation factor equals 313. It then reduces linearly to 261 at age 65.

## A.3.7 Early Retirement Benefit

The early retirement benefit is available after the member has reached age 55 but before age 60. It is defined as a lump sum benefit; however, this can be converted to a pension at the member's choice.

The amount of the lump sum benefit is calculated as follows:

$$\text{Benefit} = \frac{3}{200} \times \text{Service to date of early retirement} \times \text{FAS} \times 313 \times (1 - 2\% \times [60 - \text{Age at Retirement}])$$

The fortnightly pension payable in lieu of the lump sum benefit is equal to the lump sum benefit divided by a factor. This factor is equal to 365 at age 55 and reduces linearly to 313 at age 60.

## A.3.8 Death Benefit

The death benefit is payable as a lump sum or a pension.

The lump sum benefit payable is as follows:

$$\text{Benefit} = \frac{3}{170} \times \max(\text{Service to date of death}, \text{Potential service to age 60}) \times \text{FAS} \times T$$

T is a factor dependent on the age of the member at death. For a member aged 25 or less at death, T equals 137. It rises linearly to 235 at age 50, remains constant until age 60 and then falls to equal 196 at age 65.





The spouse's pension is calculated as follows:

$$\text{Benefit} = \frac{3}{170} \times \text{Potential service to age 65} \times \text{FAS} \times \frac{2}{3}$$

Orphan and child pensions are also payable where applicable.

The death benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the State account.

## A.3.9 Ill-Health Benefit

A short term incapacity benefit is payable to members commencing after 2 weeks of approved sick leave without pay. This benefit is a pension calculated as follows:

$$\text{Fortnightly Pension} = \frac{3}{170} \times \text{Potential service to age 65} \times \text{FAS}$$

On ill-health retirement a pension is payable calculated as for the short term benefit.

Where the Board is satisfied with the member's medical competency to deal with a lump sum, the pension may be commuted. In this situation, the lump sum payable is the same as that payable had the member died.

The ill-health benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the State account.

## A.3.10 Resignation Benefit

On resignation the member has the option to take a withdrawal benefit or to preserve the entire benefit in QSuper.

The withdrawal benefit is equal to member contributions plus interest, and the required level of superannuation guarantee contributions as referred to in Section A.3.11. A portion of the benefit is, subject to SIS preservation requirements, immediately accessible in cash. The balance of the withdrawal benefit is transferred to an accumulation account and must be preserved until a preservation cashing condition is satisfied.

The benefit payable if the member takes the preservation option is calculated as follows:

$$\text{Benefit} = \text{Retirement Benefit payable at 55} \times \frac{\text{Service to date of exit}}{\text{Service to age 55}} \times \text{Discount}$$

Where,

$$\text{Discount} = 1 - 2\% \times (55 - \text{Age at Exit})$$

The benefit as calculated above is preserved in accordance with SIS requirements until a preservation cashing condition is met and earns interest at the crediting rate of the Balanced member investment option in the accumulation category while it remains in the State Category.



A member who has previously elected the preserved option and whose benefit remains within the State Category may subsequently choose to take the withdrawal benefit instead, in which case the benefit will be determined as described above for the latter option.

The preserved benefit is transferred to an accumulation account or another complying superannuation fund at age 55, on becoming incapacitated or earlier at the option of the member.

The amount calculated above under the preserved option is payable on involuntary termination.

### A.3.11 Superannuation Guarantee

Since 30 June 1992, a minimum requisite benefit (MRB) has been defined in accordance with the Superannuation Guarantee Administration Act (1992). Every benefit payable from QSuper is subject to a minimum of the MRB. In practice, an increase in benefit is usually only payable when a resigning member chooses not to take the preserved benefit defined above (see Section 6.3). In this case, an additional benefit is paid and preserved in accordance with the SIS requirements.

### A.3.12 Member Contributions

The level of contributions paid by a member is a percentage of the member's salary as at the previous review date (1 October) or later date of joining the category. The percentage depends on the member's age at the review date and is as set out in Table 18.

**Table 18 State Category Level of Members' Contributions**

Age	Member Contribution Rate
Under 20	2.0%
20-24	4.0%
25-34	4.5%
35 or greater	5.0%

### A.3.13 Existing Members' Benefit Design

There are several differences between the benefit design described above and that for existing members. The differences with the greatest financial significance are:

- Members who joined the category prior to 1 July 1988 have an accrual rate of 3/170 for service prior to that date for the purposes of age and early retirement benefits.
- Male members who joined the category prior to 27 February 1984 and who commute their pension benefit on retirement are paid an endowment benefit in lieu of a spouse's pension.
- For female members who joined the category prior to 27 February 1984 the commutation factors for converting the retirement pension to a lump sum are higher than for other members. This is illustrated in the Table 19.



**Table 19 State Category Retirement Pension Commutation Factors**

Age	Pre 27/2/84 Females	Other Members
60	13	12
65	11	10

### A.3.14 Transfer to the Accumulation Category

Members of the State Category are able to transfer to the Comprehensive Accumulation Category at any time on an open-ended basis. The transfer benefit is equivalent to the preserved withdrawal benefit described in A.3.10. Having transferred from the State Category, members are unable to transfer back from the Comprehensive Accumulation Category.

## A.4 QSuper Police Category

Since 1 January 1993, new members have not generally been able to enter the Police Category. An exception to this occurs when a previous member who has retained a preserved benefit in the category re-joins the police service. They are allowed the option of continuing their previous membership or joining the Comprehensive Accumulation Category. Due to changes in benefit design over the lifetime of the Police Category, the complexity of some benefit conditions and the operation of transitional arrangements, the category does not lend itself to a simple and concise summary of the benefit and contribution conditions.

The following summarises the benefit and contribution conditions for a member who entered the category after 30 June 1988.

### A.4.1 Normal Retirement Age

The normal retirement date is the 60th birthday for all members. The Superannuation Legislation Amendment Act 1995 removed the previous specific variations for the Commissioner and Deputy Commissioner for whom the 65th and 62nd birthday respectively were considered as the normal retirement date. Members are now able to continue their membership after age 60 but in practice most retirements occur at or before age 60.

### A.4.2 Final Average Salary

FAS is defined as the average fortnightly salary received by the contributor during the year immediately preceding the member's exit from the category except that any increases in salary in the two years prior to retirement which are in addition to Award increases are averaged over two years.

### A.4.3 Service to Count

Service starts accruing from the later of the date of joining the category and the member's 20th birthday.

## A.4.4 Pensions

Pensions payable are indexed annually according to the increase in the Brisbane All Groups CPI.

Where a pensioner dies leaving a spouse, a lump sum benefit is payable, which may be converted to a 2/3rds reversionary pension at the discretion of the spouse.

## A.4.5 Retirement Benefit

The retirement benefit is payable when the member reaches age 60.

The benefit is defined as a pension but this can be commuted to a lump sum.

The fortnightly amount of the pension is calculated as follows:

$$\text{Fortnightly Pension} = \frac{1}{62.5} \times \text{Service to date of retirement} \times \text{FAS}$$

The lump sum payable in lieu of the pension is calculated by multiplying the above pension by a commutation factor of 313.1.

## A.4.6 Early Retirement Benefit

The early retirement benefit is available after the member has reached age 55. It is defined as a pension benefit, however this can be converted to a lump sum if the member wishes.

The fortnightly amount of the pension is calculated as follows:

$$\text{Fortnightly Pension} = \frac{1}{62.5} \times \text{Service to date of early retirement} \times \text{FAS} \times (1 - 3\% \times [60 - \text{Age at Retirement}])$$

The lump sum payable in lieu of the pension benefit is equal to the pension benefit multiplied by a commutation factor. This factor is equal to 365.3 at age 55 and reduces linearly to 313.1 at age 60.

## A.4.7 Death Benefit

The death benefit is payable as a lump sum or a pension.

The lump sum benefit payable is as follows:

$$\text{Benefit} = \frac{3}{160} \times \max(\text{Service to date of death}, \text{Potential service to age 55}) \times \text{FAS} \times T$$

T is a factor dependent on the age of the member at death. For a member aged 25 or less at death, T equals 139. It rises linearly to 235 at age 50 and remains constant until age 60.

The spouse's pension is calculated as follows:

$$\text{Fortnightly Pension} = \frac{3}{160} \times \text{Potential service to age 60} \times \text{FAS} \times \frac{2}{3}$$



Orphan and child pensions are also payable where applicable.

The death benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the Police account.

## A.4.8 Ill-Health Benefit

On ill-health retirement a pension is payable calculated as follows:

$$\text{Fortnightly Pension} = \frac{3}{160} \times \text{Potential service to age 60} \times \text{FAS}$$

Where the Board is satisfied with the member's medical competency to deal with a lump sum, the pension may be commuted. In this situation, the lump sum payable is the same as that payable had the member died.

The ill-health benefit as defined above is inclusive of the member's GOSUPER balance, which is reimbursed to the Police account.

## A.4.9 Resignation Benefit

On resignation the member has the option to take a withdrawal benefit or to preserve the entire benefit in QSuper.

The withdrawal benefit is equal to member contributions plus interest, and the required level of superannuation guarantee contributions as referred to in Section A.4.10. A portion of the benefit is, subject to SIS preservation requirements, immediately accessible in cash. The balance of the withdrawal benefit is transferred to an accumulation account and must be preserved until a preservation cashing condition is satisfied.

The benefit payable if the member takes the preservation option is calculated as follows:

$$\text{Benefit} = \text{Retirement Benefit payable at 55} \times \frac{\text{Service to date of exit}}{\text{Service to age 55}} \times \text{Discount}$$

Where,

$$\text{Discount} = 1 - 2\% \times (55 - \text{Age at Exit})$$

The benefit as calculated above is preserved in accordance with SIS requirements until a preservation cashing condition is met and earns interest at the crediting rate of the Balanced member investment option in the accumulation category while it remains in the Police Category.

A member who has previously elected the preserved option and whose benefit remains within the Police Category may subsequently choose to take the withdrawal benefit instead, in which case the benefit will be determined as described above for the latter option.

The preserved benefit is transferred to an accumulation account or another complying superannuation fund at age 55, on becoming incapacitated or earlier at the option of the member.



The amount calculated above under the preserved option is payable on involuntary termination.

## A.4.10 Superannuation Guarantee

Since 30 June 1992, a MRB has been defined in accordance with the Superannuation Guarantee Administration Act (1992). Every benefit payable from QSuper is subject to a minimum of the MRB. In practice, an increase in benefit is usually only payable when a resigning member chooses not to take the preserved benefit defined above (see Section 6.3). In this case, an additional benefit is paid and preserved in accordance with the SIS requirements.

## A.4.11 Member Contributions

The level of contributions paid by a member is a percentage of the member's salary. Here "salary" is the member's salary as at the preceding review date (1 October) or later entry. The percentage depends on the member's age at the review date or later entry as set out in Table 20.

**Table 20 Police Category Level of Members' Contributions**

Age	Member Contribution Rate
Under 20	2.0%
20-24	6.0%
25-34	6.5%
35 or greater	7.0%

## A.4.12 Existing Members' Benefit Design

There are several differences between the benefit design described above and that for existing members. The differences with the greatest financial significance are:

- Members who joined the category prior to 1 July 1988 have an accrual rate of 3/160 for service prior to that date for the purposes of age and early retirement benefits.
- Members who were members under the 1968 Act receive unit benefits in respect of the level of their salary as at 31 December 1974 and receive benefits as described above only in respect of their salary increases since that date.
- Male members who joined the category prior to 27 February 1984 and who commute their pension benefit on retirement are entitled to an endowment benefit in lieu of a spouse's pension.

## A.4.13 Transfer to the Accumulation Category

Members of the Police Category are able to transfer to the Comprehensive Accumulation Category at any time on an open-ended basis. The transfer benefit is equivalent to the preserved withdrawal benefit described in Appendix A.4.9. Having transferred from the Police Category, members are unable to transfer back from the Accumulation Category.

## A.5 QSuper Parliamentary Category

Since the closure of the Defined Benefit Category, new Parliamentarians have become members of the Comprehensive Accumulation Category. On 30 June 2007, all assets and liabilities of the Parliamentary Contributory Superannuation Fund were transferred to the QSuper fund. Consequently, all contributing members and pensioners became members of QSuper at that date.

Due to changes in benefit design over the lifetime of the Parliamentary Scheme, the complexity of some benefit conditions and the operation of transitional arrangements, the category does not lend itself to a simple and concise summary of the benefit and contribution conditions.

The following summarises the main benefit and contribution conditions applying to most members.

### A.5.1 Pensions

Pensions payable from the Scheme are indexed annually according to the increase in the Brisbane All Groups CPI for members exiting prior to 17 December 2004. For those members active at 17 December 2004 who later become eligible for a pension, the pension is indexed annually according to the increase in backbenchers' salary.

### A.5.2 Leaving Service Benefit

(a) If the member left voluntarily with less than 11 years membership:

$$\text{Benefit} = 2 \times \frac{1}{6} \times \text{Member's Aggregate Contributions}$$

If the member left with less than 8 years membership due to defeat at an election, failure to gain preselection (i.e. the member left involuntarily), or for other reasons that satisfy the Board:

$$\text{Benefit} = 3 \times \frac{1}{3} \times \text{Member's Aggregate Contributions}$$

(b) In any other case:

$$\text{Annual Pension} = \text{Basic Salary} \times \left[ 0.50 + \frac{0.025}{12} \times (t - 96) \right] \times \frac{\text{Total Salary Received}}{\text{Total Basic Salary}}$$

Where:

*t* is complete months of membership with a maximum value of 240; and

*Basic Salary* is the annual salary of a backbencher

This pension may be converted to a lump sum (provided the member is less than 75 years old) using a commutation factor of 10 for a member aged less than 71. The commutation factor is reduced by 0.5 for each year of age in excess of 70.



## A.5.3 Death Benefit for Current Member

(a) Less than 8 years of membership:

*Annual Pension = 40% of Basic Salary at the date of the member's death*

(b) 8 or more years of membership:

The greater of the following two pensions:

*Annual Pension = 40% of Basic Salary at the date of the member's death*

*Annual Pension =  $\frac{2}{3}$  of Leaving Service pension payable at the member's death*

The spouse has the option of receiving a lump sum benefit in lieu of the above. The commutation factor to apply to the annual pension amount depends on the age of the spouse at the date of the member's death. These factors are listed in Schedule 29 of the Deed.

## A.5.4 Death Benefit for Former Member

The greater of the following two pensions:

*Annual Pension = 40% of Basic Salary at the date of the member's death*

*Annual Pension =  $\frac{2}{3}$  of pension payable on leaving service*

The benefit payable to spouses of former members is in proportion to the amount of pension the former member took on leaving service.

The spouse has the option of receiving a lump sum benefit in lieu of the above. The commutation factor to apply to the annual pension amount depends on the age of the spouse at the date of the member's death. These factors are listed in Schedule 29 of the Deed.

## A.5.5 Ill-Health Benefit

The benefit payable is calculated as for leaving service for those with over 8 years membership. For those with less than 8 years membership, the benefit payable is a pension calculated as for leaving service except that a minimum of 50% of basic salary is applied. The resulting pension may be commuted to a lump sum using a commutation factor of 9.

## A.5.6 Superannuation Guarantee

Since 30 June 1992, a MRB has been defined in accordance with the Superannuation Guarantee Administration Act (1992). Every benefit payable from the Scheme is subject to a minimum of the MRB. In practice, an increase in benefit from that described above is not expected (see Section 6.3).





## A.5.7 Member Contributions

Members contribute a net 11.5% of their salary until their 70th birthday.



## Appendix B Analysis of experience

### B.1 General

Despite the decision to undertake actuarial reviews on an annual basis, experience reviews are not undertaken more frequently than the previous triennial cycle as the data will not be statistically credible. In practice, experience reviews will be undertaken out of cycle with the rest of the valuation process and reported on in the next scheduled valuation report. As no such review has been undertaken since the previous valuation, Appendix B only contains information relating to updated assumptions. The reader is referred to the previous valuation report for the detailed experience analysis.

### B.2 Financial Assumptions

As discussed in Section 5.2, liabilities have been calculated on two different bases within this Report; viz. the funding basis and the accounting basis. These bases consist of the same demographic and member behaviour assumptions but use different financial assumptions (discount rate, price and salary inflation) in line with their different purposes. This Section concentrates on the funding basis, as the accounting assumptions have been chosen by Queensland Treasury<sup>13</sup>, based on my advice. For completeness, these assumptions are shown in Table 21.

**Table 21 Accounting Financial Assumptions**

Gross Discount Rate	2.0%
Net Discount Rate (allowing for investment taxation)	1.9%
Salary Inflation	2.6%
Price (CPI) Inflation	1.6%

It is important to note that the assumptions used for accounting purposes are consistent with the requirements of the relevant accounting standard (AASB 119) and are not strictly comparable with those used in the funding basis, as discussed in Section 5.2. However, in line with the previous review, I have used consistent assumptions for price and salary inflation in both the accounting and funding bases. This is discussed further in Section B.2.2.

When setting the discount rate and inflation assumptions to be used in the funding basis, it is not so much their absolute value that is important but their relative levels. This is mainly due to the simple mathematics of inflation and discounting, where adjustments to both the assumptions effectively cancel out but also because the intrinsic economic relationships between the parameters are more stable than their absolute levels.

The assumptions made in the previous actuarial Review (funding basis) are shown in Table 22.

<sup>13</sup> See Note 48 in <https://www.treasury.qld.gov.au/publications-resources/state-finances/2015-16/state-finances-report-2015-16.pdf>.



**Table 22 Previous Review Funding Basis Financial Assumptions**

Discount Rate (Net Investment Return)	6.0%
Salary Inflation	3.2%
Price (CPI) Inflation	2.2%

The implied real salary inflation rate was therefore 1.0% and the net real investment return was assumed to be 3.8%, with the gap between investment return and salary inflation at 2.8%.

Whilst each of these assumptions are considered in turn, it is important to emphasise that, whilst the assumed level of each parameter should be reasonable in its own right, the relativities between the financial assumptions are more important.

## B.2.1 Investment Returns

The net investment return earned by the combined QSuper fund and Employer Fund since the last Review was 4.0%. In addition, as shown in Section 2.10, the year to date return for 2016-17 is substantially higher than the assumed level. Nevertheless, the fund earning rate assumed in the Review is not necessarily based on past experience but should be a realistic estimate of the long term average rate of return to be earned in the future.

Firstly, it is important to note that the starting point for the funding basis discount rate assumption is that consistent with the previous valuation and the assumed level of inflation (see below). It will be noted that, technically the real rate of return rather than the gap between return and inflation measure is the relevant measure of financial consistency, however it is common practice to consider the gap due to its ease of calculation. Consequently, the return assumption consistent with the previous basis would be 5.4%.

QIC's latest asset class return models (adjusted for consistency with the Consumer Price Index (CPI) assumption used in this Review) imply a net return for the current asset portfolio described in Section 4.2 of approximately 4.8% p.a. over the next eight years and 5.1% over the next ten years. Noting the approximate duration of the defined benefit liabilities of just under nine years and allowing for a small prudential margin, I have decided to assume a long term net return of **5.0%** p.a. in order to discount projected cash flows within the funding basis.

## B.2.2 Price (CPI) Inflation – Funding Basis

The level of price inflation is not a critical assumption in itself, as only a small proportion of the scheme's liabilities are CPI linked. However, the analysis concentrates on the levels of real salary inflation and real investment return and so the price inflation assumption forms an important component of the financial basis.

The starting point when setting an assumption for future inflation is commonly the midpoint of the 2%-3% range targeted by the Reserve Bank (RBA). This is not unreasonable given the credible record that the RBA has built in containing inflation within that band, although I have traditionally also taken into account commentary from the Reserve Bank and forecasts from QIC when setting the inflation assumption in the funding basis.

However I have concluded that the complexity of differential price and salary inflation assumptions in the funding and accounting bases is not justified, especially given the importance of the "gap" and the



relatively simplistic approach previously used to calibrate the inflation assumption for funding purposes. Consequently, a single set of price and salary inflation assumptions will be used for both bases, with just the discount rate differing, in line with their different purposes. This approach also has the useful benefit of materially reducing the complexity of the valuation calculations whilst retaining the integrity of the overall process.

So, for both accounting and funding bases, I have assumed price inflation of 1.6% p.a.

For completeness, the rationale underlying the selected CPI inflation in the accounting basis is shown in Section B.2.3 below.

## B.2.3 Price (CPI) Inflation – Accounting Basis

One method of determining the level of price inflation implied by the market is to consider the difference between yields on nominal and inflation linked Commonwealth bonds of similar maturity, generally referred to as break-even inflation. Break-even inflation is not, however, an unbiased estimate of the market's expectation of future price inflation, since nominal bond investors would be expected to demand a premium above their expectations to compensate them for bearing inflation risk. This relationship can be expressed as <sup>14</sup>:

$$\text{Nominal Yield} = \text{Inflation-linked Yield} + \text{Expected inflation} + \text{Inflation Risk Premium}$$

where *Inflation Risk Premium (IRP)* is the risk premium that holders of nominal bonds should receive to cover the risk of unanticipated inflation reducing the real value of the nominal asset. QIC estimates the inflation risk premium to be around 25bps in equilibrium but note that it can vary materially over time.

Various research has attempted to quantify the IRP and a consensus estimate has not emerged that can be applied in the current context. For example, 2008 research <sup>15</sup> by Peter Hördahl produced estimates of the average IRP term structure for US and Euro markets, as follows (taken from Hördahl's paper):

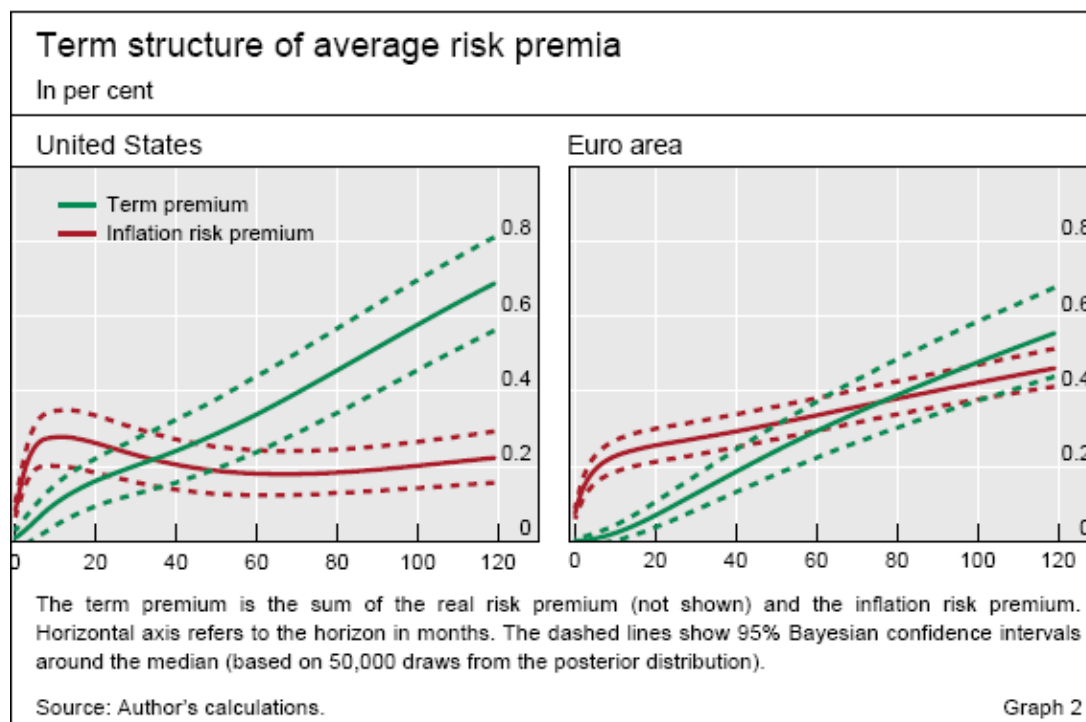
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<sup>14</sup> See

[http://www.treasury.gov.au/~media/Treasury/Publications%20and%20Media/Publications/2012/Economic%20Roundup%20Issue%202/Downloads/01\\_Measuring\\_market\\_inflation\\_exp.ashx](http://www.treasury.gov.au/~media/Treasury/Publications%20and%20Media/Publications/2012/Economic%20Roundup%20Issue%202/Downloads/01_Measuring_market_inflation_exp.ashx) for a comprehensive discussion.

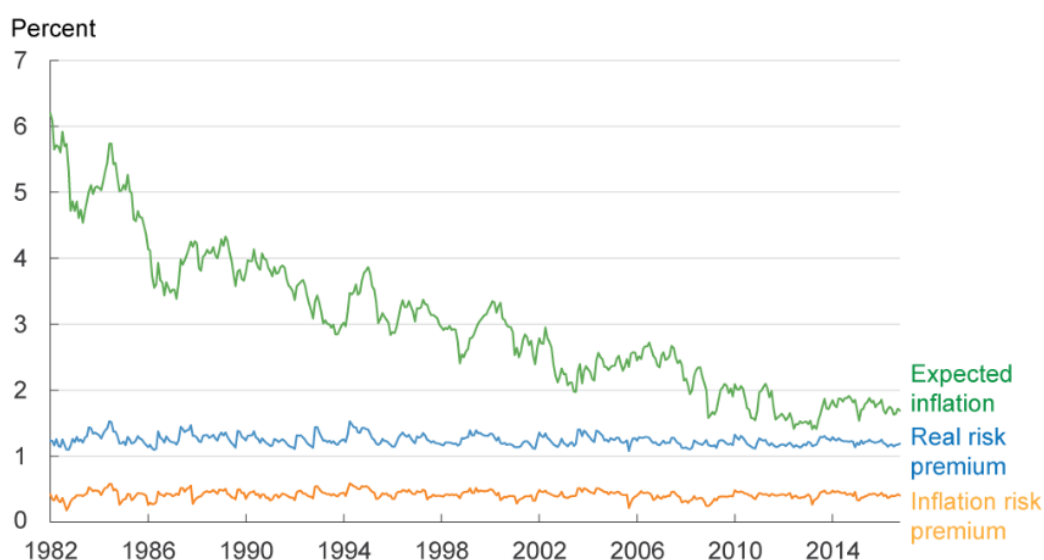
<sup>15</sup> See [http://www.bis.org/publ/qtrpdf/r\\_qt0809e.pdf](http://www.bis.org/publ/qtrpdf/r_qt0809e.pdf)

Figure 9 Average IRP Term Structure



The Federal Reserve Bank of Cleveland produces a comprehensive model of market consistent inflation expectations within the US market and derives an explicit estimate of the US IRP over time<sup>16</sup>. At the time of writing, their estimates of ten year inflation expectations and IRP were as follows:

Figure 10 Expectations of Inflation and the IRP



<sup>16</sup> See

<https://www.clevelandfed.org/Our%20Research/Indicators%20and%20Data/Estimates%20of%20Inflation%20Expectations>



Whilst it is known that the IRP for a given term varies over time as market assessments of future inflation volatility vary, the estimates are difficult to obtain in practice and, in any event, are not currently available for the Australian market. In my view, there is sufficient evidence to incorporate allowance for the IRP when determining the market estimate of expected future inflation. Taking into account the research discussed above, I believe it is reasonable to assume an IRP of 0.25%.

Another factor affecting this approach for estimating inflation expectations is the so-called scarcity or liquidity bias in indexed versus nominal bonds in Australia as a result of the relative scarcity of and strong demand for the former. After discontinuing the issuance of inflation linked bonds in 2003, the Commonwealth recommenced in 2009<sup>17</sup> and committed in the 2011 Budget to ongoing issuance. The Australian Financial Markets Reports indicated a significant increase in turnover of indexed bonds relative to nominal bonds in 2009-10 and 2010-11, although this relativity reduced during 2011-12. Consequently, the scarcity bias is expected to have reduced somewhat in 2009-2011 before rising again during 2012.

This issue was examined in a NERA Economic Consulting Report in March 2007<sup>18</sup> where they estimated that the “relative bias” in indexed versus nominal Commonwealth bonds was of the order of 20 bps in the Australian market, as a result of the relative scarcity of and the substantial demand for indexed bonds.

It must also be recognised that the design of inflation linked Commonwealth bonds is such that prices embed not only expected future inflation, but also in part known past CPI<sup>19</sup>. The two most recent quarters have demonstrated lower levels of annualised inflation than the breakeven rate and consequently it can be argued that the implied market estimate of prospective inflation should be somewhat higher than breakeven. I have estimated this effect to be around 7 bps.

An alternative approach is to use the zero coupon inflation swap curve (ZCIS) to derive market inflationary expectations, as described in a paper by Reserve Bank economists Richard Finlay and David Olivan<sup>20</sup>. A comparison of the ZCIS rates and break even inflation estimates shown in that paper, as well as the swap rates as at 30 June 2016<sup>21</sup> are shown in Table 23.

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<sup>17</sup> See <http://aofm.gov.au/operational-notice/operational-notice-treasury-indexed-bonds-resumption-of-issuance-and-participation-in-syndicate/>

<sup>18</sup> See [https://www.aer.gov.au/system/files/Attachment%20to%20Alinta's%20submission%20-%20NERA%20report%20\(March%202007\).pdf](https://www.aer.gov.au/system/files/Attachment%20to%20Alinta's%20submission%20-%20NERA%20report%20(March%202007).pdf)

<sup>19</sup> For example, an interest payment in August 2014 would be based on the average of known CPI increases in the preceding March and December quarters. Similarly a payment in November 2014 would be based on the average of the preceding known March and (not yet known) June quarter CPI.

<sup>20</sup> See <http://www.rba.gov.au/publications/bulletin/2012/mar/pdf/bu-0312-6.pdf>

<sup>21</sup> Source: Bloomberg

**Table 23 Break Even Inflation Estimates & Swap Rates**



Zero Coupon Inflation Swap Rates at  
30 June 2016

Tenor (years)	ZCIS Rate
1	1.30%
2	1.38%
3	1.54%
4	1.70%
5	1.82%
6	1.92%
7	2.00%
8	2.05%
9	2.09%
10	2.13%
15	2.24%
20	2.31%
25	2.38%
30	2.44%

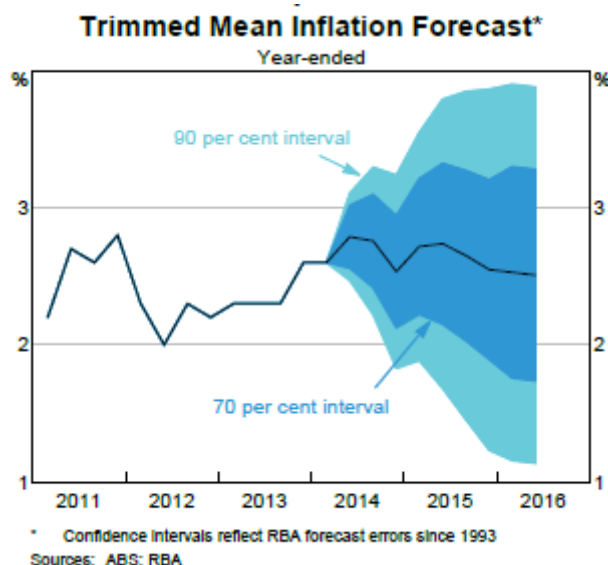
The correlation between the two approaches is clearly very strong, although inflation expectations from the swap market are somewhat higher than break-even inflation. The gap was greater during the turmoil in bond markets in the first half of 2009 but has declined more recently. Finlay and Olivan attribute this difference to the scarcity bias discussed earlier and also note another related potential cause; market intermediaries hedging their positions in the inflation-indexed bond market may require compensation for the relatively lower liquidity in that market. Further, they note that the implied inflation rates from swaps can also be biased by the variable level of the IRP. Devlin and Patwardhan<sup>14</sup> however assert that “inflation swap rates are not subject to the kind of liquidity premia that can affect bond market break-evens” but that there are other reasons why the swap rates provide a biased estimate of inflation expectations, as follows:

1. inflation swap rates likely incorporate some premia for inflation risk — compensation demanded by the inflation payer for potential volatility in realised inflation over the term of the swap
2. while inflation swaps are more liquid than Treasury indexed bonds in the sense that they can be created as required, the tailoring of contracts and their bilateral nature makes inflation swaps less liquid ‘on the way out’ — since the holder of an inflation swap who wished to exit the contract early would have to renegotiate terms with the original issuer, who may or may not be willing to do so
3. regulatory changes enacted in recent years have meant that banks dealing in the inflation swaps market are required to set aside significantly more capital against any derivatives exposures. Compensation demanded by banks for these higher capital charges may also have introduced a systematic bias into inflation swap rates

Whilst these factors will generally result in the swap rates overestimating the market’s underlying inflation expectations, their effects are not quantifiable and so the adjustment necessary to produce an unbiased and mutually compatible estimate of price inflation is not clear.

A final point to provide context to this issue is provided by the RBA, when they demonstrate the uncertainty of their short term predictions for the trimmed mean CPI (a smoothed measure of price inflation), as follows:

Figure 11 Variability of RBA Inflation Forecast



In summary, there is not a single objective and widely accepted estimate of market consistent inflation expectations. I have taken all of the above into account and estimated the market consistent level of price inflation over the term of the liabilities to be 1.6%.

## B.2.4 Salary Inflation

A comparison of actual to expected increases in salaries over the investigation period is shown in Table 24.

Table 24 Observed Rates of Salary Inflation

Year Ending 1 July	Standard Males		Standard Females		Police		Total	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
2016	2.7%	3.8%	2.6%	3.8%	0.8%	4.0%	2.5%	3.8%

From the above it can be seen that total salary increases over 2015-16 for all membership groups were lower than those assumed. Overall, the increases observed are consistent with the relatively subdued public sector wage growth observed since 2012.

The relatively low level of salary growth amongst Police members reflects the timing of an enterprise bargaining increase that applied from 1 July 2016 but was not certified until 11 November 2016. This increase was not included in the membership data, however this type of issue has occurred before with the Phase I membership data and is compensated for using the method described in Section 3.2.5; i.e. whilst the Police review date salaries have been underestimated, the overall salaries are reasonable for the purposes of the valuation.

Looking forward, the amount of salaries received by members in the future will be affected by the following two factors:

- Inflationary increases; and
- Promotional increases due to increasing seniority etc.





For a scheme with a broadly stable membership profile, changes in average salaries are largely unaffected by promotional salary changes and can be used to estimate inflationary salary increases. However, this is not the case for the Defined Benefit Category since it was closed to new entrants in November 2008 and there had been comparatively few new entrants since 2001. As such, changes in average salaries reflect both inflationary and promotional effects.

Furthermore, there are a multitude of Certified Agreements and the distribution of these can differ significantly by age, gender and for the Defined Benefit Category compared with the overall QSuper membership. Realised salary inflation would therefore not be expected to be uniform for the different sub-groups and thus can only be estimated.

If *promotional* salary increases since the previous Review are assumed to have been consistent with the assumptions made at the last Review, the implied salary inflation over the period has been estimated to be 1.9%; i.e. lower than the 3.2% p.a. adopted at the previous Review.

Given the difficulties in determining past salary inflation rates and recognising that future inflation is not necessarily related to the recent past, the level of real salary growth has been considered in some detail.

Firstly, the levels of salary inflation in the broader market such as Average Weekly Ordinary Time Earnings (AWOTE) have been examined. The historical rates of real salary growth as measured by the excess of Queensland AWOTE over Australia All Groups CPI<sup>22</sup> for various periods ending on the valuation date are shown in Table 25.

**Table 25 Real Salary Growth**

Number of Years to Dec 2015	Real Qld AWOTE Increase (p.a.)
5	0.6%
10	1.6%
15	1.7%
20	1.8%
25	1.7%
30	1.2%

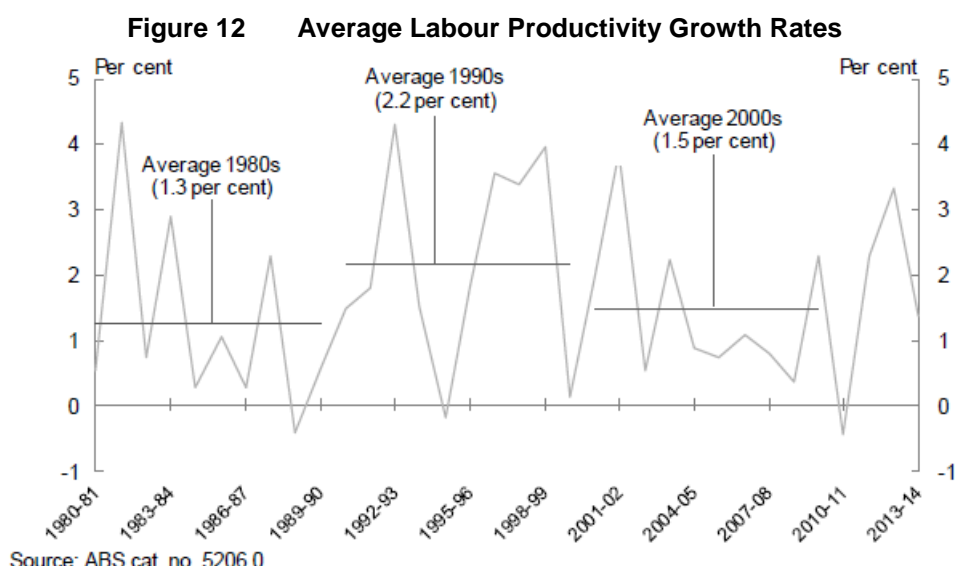
Whilst the longer term level of real salary growth has been just over 1% p.a., over the last ten years the level has been around 1.6% p.a. Patrick D'Arcy and Linus Gustafsson of the RBA also note that<sup>23</sup> "sustained changes in the terms of trade mean that real income growth per hour worked can diverge from productivity growth for a period of time" and that "the boom in the terms of trade over the past decade has allowed national income to grow at a faster pace than productivity." The Governor of the RBA, Glenn Stevens, stated in his media release of 3 July 2012 that "*Australia's terms of trade have peaked, though remain historically high.*" The real income growth in excess of productivity growth that

<sup>22</sup> The measure of price inflation incorporated in inflation-linked bonds is the All Groups weighted average capital cities, commonly considered as "Australia CPI".

<sup>23</sup> Patrick D'Arcy and Linus Gustafsson, in an article entitled "Australia's Productivity Performance and Real Incomes" published in the June 2012 RBA Bulletin observe "*In the long run, growth in productivity is the primary determinant of growth in real income.*"

occurred over the last decade from the improvement in Australia's terms of trade is thus unlikely to be repeated.

As noted above, economic theory asserts that long-run real salary growth should be closely related to labour productivity growth<sup>23</sup>. The most recent Intergenerational Report<sup>24</sup> assumed a rate of productivity growth of 1.5% p.a. based on that observed through the 2000s, shown in the following graph, taken from that Report.



Another source of information regarding real salary growth is the forecasts produced by Deloitte Access Economics<sup>25</sup>. Their projections for growth in various inflation measures for Queensland and Australia for the next several years are shown below.

**Table 26 Wage and Price Inflation Forecasts by Deloitte Access Economics**

Year	Qld AWE	Qld Wage Price Index	Australia AWE	Australia AWOTE	Australia Wage Price Index	Australia CPI
2016-17	2.4%	2.5%	2.1%	2.6%	2.2%	2.3%
2017-18	2.9%	3.0%	2.7%	3.3%	2.7%	2.5%
2018-19	3.3%	3.7%	3.0%	3.5%	3.3%	2.4%
2019-20	3.3%	4.0%	3.0%	3.6%	3.8%	2.3%
Average	3.0%	3.3%	2.7%	3.3%	3.0%	2.4%

Whilst Deloitte do not produce a Queensland AWOTE forecast, Table 26 demonstrates that the Queensland and Australian forecasts of AWE growth are very similar, whilst Australian AWOTE is expected to increase at a higher rate. This suggests an expected level of real Queensland salary growth above Australian price inflation of around 1.2% over the forecast period.

<sup>24</sup> See

[http://www.treasury.gov.au/~media/Treasury/Publications%20and%20Media/Publications/2015/2015%20Intergenerational%20Report/Downloads/PDF/2015\\_IGR.ashx](http://www.treasury.gov.au/~media/Treasury/Publications%20and%20Media/Publications/2015/2015%20Intergenerational%20Report/Downloads/PDF/2015_IGR.ashx)

<sup>25</sup> Source: Deloitte Access Economics Business Outlook March 2015



Queensland Treasury also produces inflation forecasts as part of the Budget papers<sup>26</sup>, as follows:

**Table 27 Queensland Treasury Inflation Forecasts**

Year	Queensland CPI	Queensland Wage Price Index
2016-17	2.00%	2.25%
2017-18	2.50%	2.75%
Average	2.25%	2.50%

The Wage Price Index measures changes in the price of labour over time unaffected by measurable changes in the quantity or quality of work performed; i.e. it effectively excludes labour productivity growth. Consequently, these forecasts would imply a greater rate of real increase in AWOTE than the 0.25% p.a. indicated.

Another source of information regarding this relationship is the corresponding assumptions used by actuaries in similar contexts, as follows:

**Table 28 Summary of Real Salary Growth Assumptions Used**

Year	Scheme	Real Salary Growth Assumption
2011	Defence Force Pension Schemes	1.50%
2012	NDIS Costings Review	1.50%
2012	NSW Report on State Finances - State Super Funds	0.00%
2012	NSW Report on State Finances - Energy Industry Super Fund	1.00%
2013	Australia Post Superannuation Scheme	1.00%
2014	ASIC Superannuation Calculator	1.00%
2014	Defence Force Pension Schemes	1.50%
2015	NSW Report on State Finances - State Super Funds	0.00%
2015	ASIC Superannuation Calculator	1.50%

Finally, I note the general expectation that salary increases for Queensland public servants are likely to be constrained over the next few years resulting in lower real salary increases over the duration of the liabilities than would be expected for the general community. In this regard I note the comments of the RBA in its May 2013 Statement on Monetary Policy<sup>27</sup>, as follows:

*Fiscal restraint continues to keep public sector wages contained, with year-ended growth in public sector wages near or below 3 per cent in all states except Western Australia.*

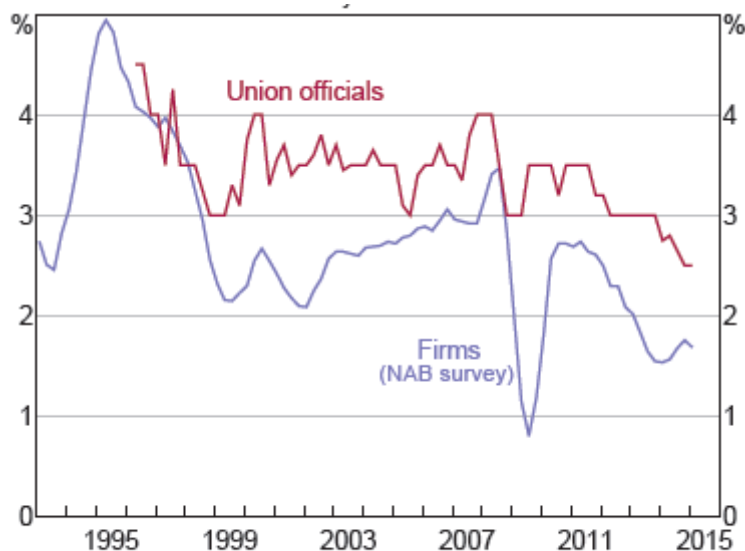
Further support for the assertion of relatively subdued wage growth going forward comes from a recent RBA paper<sup>28</sup>, which includes the following two charts showing wage expectations:

<sup>26</sup> See page 31 of <http://www.budget.qld.gov.au/budget-papers/2014-15/bp2-2-2014-15.pdf>

<sup>27</sup> See <http://www.rba.gov.au/publications/smp/2013/may/pdf/0513.pdf>

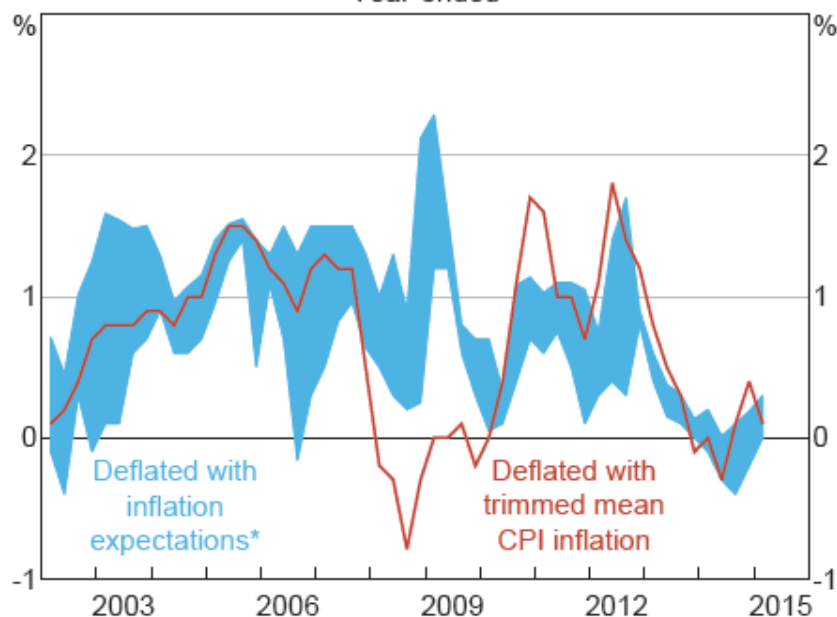
<sup>28</sup> See <http://www.rba.gov.au/publications/bulletin/2015/jun/pdf/bu-0615-2.pdf>

**Figure 13 Expected Wage Growth One Year Ahead**



Sources: Australian Council of Trade Unions; Employment Research Australia; NAB; RBA; Workplace Research Centre

**Figure 14 Real Wage Price Index Growth**  
Year-ended



\* Inflation expectations obtained from bond yields, union surveys and market economist surveys (from 2005)

Sources: ABS; Australian Council of Trade Unions; Employment Research Australia; RBA; Workplace Research Centre; Yieldbroker

Taking all of the above into account, I have concluded that a reasonable estimate of the level of salary/AWOTE growth is 1.0% p.a. in excess of the rate of CPI. This results in an assumed market consistent annual rate of salary inflation of 2.6%.



I am cognisant that the wages policy underlying many existing bargaining agreements would suggest a lower salary inflation assumption than I have derived above. However, it must be recognised that the assumption applies over the duration of the liabilities on average and not just the period over which current and planned agreements will apply. Whilst it can be argued that public sector wage growth can be held lower than the broader economy over the short to medium term, there is no evidence to suggest that such an outcome can be sustained over the longer timeframes underlying the liabilities.

The resulting gap between salary inflation and investment return of 2.4% is lower than the 2.8% assumed at the last Review. This is consistent with QIC's and many commentators' return expectations being lower than previously.

In summary, the financial assumptions chosen for the funding basis at this Review are shown in Table 29, with the previous assumptions shown for comparison.

**Table 29 Current and Previous Funding Basis Financial Assumptions**

	Previous	Current
Discount Rate (Net Investment Return)	6.00%	5.00%
Salary Inflation	3.20%	2.60%
Price (CPI) Inflation	2.20%	1.60%



## Appendix C Investigation assumptions

### C.1 Financial Assumptions

#### C.1.1 Interest

The assumed long term earning rate on the fund's assets after tax and investment expenses is 5.0% p.a.

#### C.1.2 Salary Growth

Long term salary growth due to inflation and changes in Average Weekly Ordinary Time Earnings are assumed to be at the rate of 2.6% p.a.

Salary growth due to promotion is assumed to be in accordance with the salary scale set out in the service tables (Table 33, Table 34 and Table 35).

#### C.1.3 Inflation

This assumption is relevant for the purpose of valuing pensions that are increased in line with increases in the Consumer Price Index. Pensions in payment have been assumed to increase at the rate of 1.6% p.a.

#### C.1.4 Financial Assumptions Underlying Accounting Basis

The responsibility for selection of the key assumptions underlying employee entitlement liabilities under AASB 119 rests with the reporting entity. The assumptions chosen by the Government, based on my advice, necessary to derive figures in accordance with AASB 119 as at 30 June 2016 were as follows:

- The gross discount rate for all the Government's employee entitlement schemes is the annually convertible yield of a notional duration matched Commonwealth Government nominal bond at the relevant date. As at 30 June 2016, this was 2.0%.
- A net discount rate of 1.9% was used to determine the non-pension defined benefit obligations of QSuper as at 30 June 2016. This produced substantially the same total obligation as an explicit allowance for investment tax when added onto the liability valued at the gross discount rate.
- The level of price inflation was 1.6%.
- The level of salary inflation for QSuper was an amount 1.0% p.a. above the level of the price inflation assumption. As at 30 June 2016, this was 2.6%.

## C.2 Demographic Assumptions

### C.2.1 Active Members

The decrement rates used for the Defined Benefit Category are based on the scheme's own experience and are illustrated in the service tables (Table 33, Table 34 and Table 35). The decrement rates for the State, Police and Parliamentary Categories are based on these rates where appropriate.

It is assumed that 2.0% of resigning Defined Benefit Category members choose the investment linked option (ILO). For those members who retain the deferred retirement benefit on withdrawal, subsequent conversions to an ILO and early payment on death and total and permanent disablement are not explicitly modelled. However a 0.1% loading was applied to allow for the implicit insurance provided and the ILO option.

The assumption as to the probability of leaving at future elections for the Parliamentary Category is shown in Table 30.

**Table 30 Parliamentary Category – Proportion Assumed to Leave at Future Elections**

Years of Service at Election	Probability of Exit at Election
0-4	0%
4-8	0%
8-11	0%
11+	60%

For completeness, the above table includes an assumed probability of exit for all years of service, although it is noted that no member in the Parliamentary Category had fewer than eleven years of service at the investigation date.

### C.2.2 Deferred Members

The decrement rates used for the Deferred Retirement Benefit Category are based on the scheme's own experience and are illustrated in Table 36.

### C.2.3 Pensioners

The base mortality rates for all Defined Benefit, State, Police and Parliamentary Category pensioners are those of Queensland Life Tables 2012-2014 (Males or Females, as appropriate) with age ratings varying by the type of pension as shown in Table 31.

**Table 31 Mortality Age Ratings**

Type of Pension	Males	Females
Age Retirement	- 2 years	- 2 years
Ill-Health Retirement	+ 4 years	+ 4 years
Spouse	- 2 years	- 2 years

Mortality improvement has been incorporated in the value of pensions consistent with the last 25 years of population mortality experience in the Australian Life Tables 2010-2012, as shown in Table 32.

It has also been assumed that males are three years older than their spouses and that all pensioners are married. Regarding the option to select or commute pension benefits, the following has been assumed:

- Defined Benefit Category – 50% of total and permanent disablement exits will take the pension;
- State Categories – 75% of age retirees, 75% of ill-health retirees and 50% of pensioner spouses will take the pension;
- Police Categories – 50% of age retirees, ill-health retirees and pensioner spouses will take the pension;
- Parliamentary Category – 90% of eligible members and 100% of eligible spouses will take the pension;

**Table 32 Mortality Improvement Rates**

Age	Annual Percentage Improvement in Mortality	
	Males	Females
20	3.68	2.52
25	2.91	2.36
30	1.77	1.70
35	1.09	1.11
40	1.18	1.21
45	1.72	1.64
50	2.28	1.98
55	2.73	2.26
60	3.04	2.46
65	3.19	2.56
70	3.14	2.55
75	2.86	2.38
80	2.29	2.06
85	1.66	1.52
90	0.89	0.83
95	0.00	0.20

## C.3 Expenses

It has been assumed that pension administration expenses will equate to 2.75% of pension payments, non-pension administration expenses will equate to 2.75% of benefit payments and income protection administration expenses will be 11.00% of income protection payments.

## C.4 Income Protection Benefit

The income protection benefit is expected to cost 0.45% of salaries for Standard Males and 0.75% of salaries for Standard Females in the Defined Benefit Category. The income protection benefit is





assumed to cost 1.30% of salaries for members of the State Category. There is no income protection benefit for Police Category members or Police members of the Defined Benefit Category.

## **C.5 Child and Orphan Benefits**

Child and orphan benefits have been allowed for by increasing the costs of lump sum death benefits by 4%.

## **C.6 Member Contribution Rates**

It was assumed that average member contribution rates for the active members at the investigation date would be maintained in the future.

## **C.7 Superannuation Guarantee**

It was assumed that additional payments resulting from the application of the minimum requisite benefit test specified in the Superannuation Guarantee Certificate would be approximately 0.10% of Defined Benefit Category benefit payments.

## C.8 Service and Decrement Tables

**Table 33 Service Table – Standard Male Members**

Age x	Number Attaining Age x	Number leaving within one year of attaining age x as a result of				Salary Scale	Family Law/ TiR Rate
		PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation		
16	100,000	0	12	0	2,550	100	0.0000
17	97,438	0	11	0	3,264	112	0.0000
18	94,163	0	11	0	3,813	128	0.0000
19	90,338	0	11	0	4,200	150	0.0000
20	86,127	0	10	1	4,435	185	0.0000
21	81,681	0	10	1	4,615	221	0.0000
22	77,056	52	9	2	4,737	256	0.0000
23	72,257	145	8	1	4,655	284	0.0000
24	67,447	212	8	2	4,612	306	0.0000
25	62,613	260	7	2	4,467	323	0.0000
26	57,878	289	7	3	4,214	341	0.0001
27	53,366	304	7	4	3,964	358	0.0001
28	49,088	308	7	4	3,571	374	0.0001
29	45,197	306	7	5	3,130	389	0.0001
30	41,750	298	7	6	2,724	403	0.0002
31	38,716	288	7	6	2,371	415	0.0002
32	36,043	276	7	7	2,064	425	0.0003
33	33,690	263	7	8	1,714	436	0.0003
34	31,698	251	7	9	1,499	445	0.0004
35	29,932	239	7	9	1,332	455	0.0005
36	28,344	227	7	10	1,185	465	0.0006
37	26,914	216	8	11	1,041	474	0.0007
38	25,638	207	8	12	934	484	0.0007
39	24,477	198	8	13	837	493	0.0008
40	23,420	191	8	14	759	502	0.0009
41	22,447	186	9	15	697	511	0.0010
42	21,541	182	9	16	630	520	0.0010
43	20,703	180	10	17	568	528	0.0011
44	19,928	179	10	18	529	536	0.0011
45	19,192	180	10	19	480	544	0.0011
46	18,502	183	11	20	448	552	0.0011
47	17,839	188	11	21	417	558	0.0011
48	17,201	195	12	22	390	565	0.0010
49	16,583	203	13	23	365	571	0.0010
50	15,979	212	13	24	343	576	0.0010
51	15,386	224	14	25	324	581	0.0009
52	14,800	237	14	25	306	586	0.0009
53	14,218	251	15	26	290	590	0.0009
54	13,637	266	15	27	275	593	0.0008
55	13,054	1,303	15	26	0	595	0.0008
56	11,709	1,169	15	25	0	597	0.0100
57	10,501	1,048	14	24	0	599	0.0100
58	9,414	940	14	22	0	600	0.0090
59	8,438	842	14	21	0	600	0.0080
60	7,561	1,284	13	0	0	600	0.0075
61	6,264	939	12	0	0	600	0.0200
62	5,314	849	11	0	0	600	0.0200
63	4,454	756	10	0	0	600	0.0140
64	3,688	995	8	0	0	600	0.0150
65	2,686	912	6	0	0	600	0.0150
66	1,768	529	4	0	0	600	0.0200
67	1,234	345	3	0	0	600	0.0250
68	885	265	3	0	0	600	0.0250
69	618	185	2	0	0	600	0.0250
70	431	431	0	0	0	600	0.0250



**Table 34 Service Table – Standard Female Members**

Age x	Number Attaining Age x	Number leaving within one year of attaining age x as a result of				Salary Scale	Family Law/ TtR Rate
		PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation		
16	100,000	0	2	0	2,450	100	0.0000
17	97,548	0	2	0	3,073	113	0.0000
18	94,473	0	2	0	3,637	127	0.0000
19	90,834	0	2	1	4,133	142	0.0000
20	86,699	0	3	1	4,465	158	0.0000
21	82,230	0	2	2	4,646	186	0.0000
22	77,581	0	2	2	4,849	207	0.0000
23	72,727	62	2	3	4,907	226	0.0000
24	67,754	111	3	3	4,908	240	0.0000
25	62,729	146	2	4	4,793	252	0.0000
26	57,785	168	2	4	4,587	263	0.0001
27	53,023	181	3	5	4,260	275	0.0001
28	48,574	186	2	6	3,757	285	0.0001
29	44,624	186	2	6	3,228	294	0.0001
30	41,202	186	2	7	2,651	302	0.0002
31	38,355	184	2	8	2,238	309	0.0002
32	35,923	180	2	9	1,917	315	0.0003
33	33,816	175	3	10	1,568	321	0.0003
34	32,060	170	2	11	1,371	326	0.0004
35	30,506	164	3	12	1,250	330	0.0005
36	29,078	158	3	13	1,139	334	0.0006
37	27,765	152	3	14	1,038	338	0.0007
38	26,559	146	3	15	945	342	0.0007
39	25,450	141	3	16	871	346	0.0008
40	24,420	135	3	17	803	349	0.0009
41	23,461	131	3	18	740	353	0.0010
42	22,569	127	4	19	682	356	0.0010
43	21,737	125	4	20	656	360	0.0011
44	20,933	122	4	21	623	363	0.0011
45	20,163	121	4	22	591	366	0.0011
46	19,426	121	4	23	534	370	0.0011
47	18,743	122	4	24	515	373	0.0011
48	18,078	124	5	25	481	376	0.0010
49	17,443	127	5	25	464	379	0.0010
50	16,822	132	5	26	432	381	0.0010
51	16,227	137	5	27	416	384	0.0009
52	15,642	143	6	28	387	386	0.0009
53	15,079	150	6	28	373	388	0.0009
54	14,522	158	6	29	359	390	0.0008
55	13,970	1,535	6	28	0	392	0.0008
56	12,400	1,114	6	27	0	394	0.0100
57	11,253	1,011	6	25	0	396	0.0100
58	10,210	917	6	24	0	397	0.0090
59	9,262	832	6	23	0	399	0.0080
60	8,401	1,260	6	0	0	400	0.0075
61	7,135	998	6	0	0	401	0.0200
62	6,130	858	6	0	0	401	0.0200
63	5,267	948	5	0	0	401	0.0140
64	4,314	949	5	0	0	401	0.0150
65	3,361	940	4	0	0	401	0.0150
66	2,417	604	3	0	0	401	0.0200
67	1,810	470	3	0	0	401	0.0250
68	1,337	347	2	0	0	401	0.0250
69	987	256	2	0	0	401	0.0250
70	729	729	0	0	0	401	0.0250

**Table 35 Service Table – Police Members**

Age x	Number Attaining Age x	Number leaving within one year of attaining age x as a result of					Family Law/ TtR Rate
		PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	
16	100,000	0	0	44	400	100	0.0000
17	99,555	0	0	44	408	106	0.0000
18	99,103	0	0	44	425	111	0.0000
19	98,631	0	0	44	443	117	0.0000
20	98,144	0	0	52	481	123	0.0000
21	97,610	0	0	52	512	129	0.0000
22	97,045	0	0	62	534	135	0.0000
23	96,450	0	0	60	607	140	0.0000
24	95,783	0	0	70	717	146	0.0000
25	94,996	0	0	68	878	152	0.0000
26	94,050	0	0	75	1,104	157	0.0001
27	92,869	73	0	75	1,323	162	0.0001
28	91,399	118	4	81	1,553	168	0.0001
29	89,643	145	6	87	1,735	173	0.0001
30	87,669	166	8	93	1,881	178	0.0002
31	85,521	184	10	106	1,976	183	0.0002
32	83,245	195	12	118	2,015	187	0.0003
33	80,903	205	14	130	1,982	192	0.0003
34	78,573	209	17	139	1,947	196	0.0004
35	76,260	211	19	157	1,876	200	0.0005
36	73,998	211	21	166	1,713	204	0.0006
37	71,886	207	23	174	1,591	208	0.0007
38	69,891	203	27	182	1,481	212	0.0007
39	68,000	195	29	191	1,392	215	0.0008
40	66,192	188	31	201	1,319	218	0.0009
41	64,451	180	33	213	1,245	221	0.0010
42	62,779	170	37	226	1,164	224	0.0010
43	61,183	162	39	240	1,083	227	0.0011
44	59,660	157	41	253	990	230	0.0011
45	58,217	153	43	269	891	232	0.0011
46	56,864	155	44	284	812	234	0.0011
47	55,568	164	48	300	731	236	0.0011
48	54,325	184	50	317	657	238	0.0010
49	53,116	217	52	335	601	240	0.0010
50	51,910	259	54	352	553	242	0.0010
51	50,691	354	56	369	489	243	0.0009
52	49,421	476	58	387	425	245	0.0009
53	48,075	632	60	402	371	246	0.0009
54	46,609	828	62	416	338	247	0.0008
55	44,966	6,708	60	400	0	249	0.0008
56	37,798	4,132	54	367	0	250	0.0100
57	33,244	4,295	48	340	0	251	0.0100
58	28,560	3,688	44	311	0	251	0.0090
59	24,517	4,869	39	273	0	252	0.0080
60	19,337	19,337	0	0	0	253	0.0075



**Table 36 Decrement Table – DRB Members**

Age	Rate of leaving as a result of		
	Death	TPD	Transfer to Accumulation
21	0.0001	0.0000	0.0150
22	0.0001	0.0000	0.0150
23	0.0001	0.0000	0.0150
24	0.0002	0.0000	0.0150
25	0.0002	0.0000	0.0150
26	0.0002	0.0000	0.0150
27	0.0002	0.0000	0.0150
28	0.0003	0.0000	0.0150
29	0.0003	0.0001	0.0150
30	0.0003	0.0001	0.0150
31	0.0003	0.0001	0.0150
32	0.0003	0.0001	0.0150
33	0.0003	0.0001	0.0150
34	0.0003	0.0002	0.0150
35	0.0004	0.0002	0.0150
36	0.0004	0.0002	0.0150
37	0.0004	0.0002	0.0150
38	0.0004	0.0003	0.0150
39	0.0005	0.0003	0.0150
40	0.0005	0.0004	0.0150
41	0.0005	0.0004	0.0150
42	0.0005	0.0005	0.0150
43	0.0006	0.0006	0.0150
44	0.0006	0.0007	0.0150
45	0.0007	0.0008	0.0150
46	0.0007	0.0009	0.0150
47	0.0008	0.0010	0.0150
48	0.0009	0.0012	0.0150
49	0.0009	0.0014	0.0150
50	0.0010	0.0016	0.0150
51	0.0011	0.0018	0.0150
52	0.0013	0.0020	0.0150
53	0.0014	0.0023	0.0150
54	0.0016	0.0026	0.0150



## Appendix D Pension factors for funding purposes

As noted in Section 6.4, as new pensions emerge for the defined benefit categories, they are funded by a transfer from the Employer Fund equal to 95% of the present value of the pension liability. This liability is in turn calculated as the annual value of the pension multiplied by a pension factor intended to approximate the value of \$1 per annum payable for the life of the pensioner and any subsequent reversionary spouse.

These pension factors are shown in the following tables, depending on the method of indexation applicable to the pension, the pension type (age, ill-health, spouse) and the age last birthday of the member at retirement or death. For members aged over 100, the age 100 factor should be used.



**Table 37 Pension Factors to Determine Value of New Pensions for Funding Purposes (to age 60)**

Age Last Birthday	CPI Indexed			Salary Indexed		
	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse
16	27.965	27.727	27.519	36.072	35.607	35.273
17	27.880	27.634	27.416	35.894	35.416	35.071
18	27.792	27.537	27.311	35.712	35.220	34.865
19	27.701	27.436	27.203	35.526	35.019	34.656
20	27.608	27.331	27.093	35.336	34.814	34.443
21	27.511	27.223	26.979	35.142	34.602	34.226
22	27.411	27.111	26.862	34.942	34.385	34.004
23	27.308	26.994	26.741	34.738	34.163	33.777
24	27.201	26.874	26.616	34.529	33.935	33.544
25	27.090	26.749	26.487	34.315	33.701	33.306
26	26.975	26.620	26.353	34.095	33.461	33.062
27	26.856	26.486	26.215	33.869	33.214	32.811
28	26.733	26.347	26.071	33.638	32.962	32.554
29	26.605	26.203	25.922	33.400	32.703	32.290
30	26.473	26.053	25.767	33.157	32.437	32.020
31	26.336	25.898	25.607	32.907	32.164	31.742
32	26.193	25.738	25.442	32.652	31.885	31.458
33	26.046	25.571	25.270	32.389	31.598	31.166
34	25.893	25.399	25.092	32.120	31.304	30.867
35	25.735	25.221	24.908	31.843	31.003	30.561
36	25.571	25.036	24.717	31.560	30.694	30.246
37	25.401	24.845	24.519	31.269	30.378	29.924
38	25.225	24.647	24.315	30.971	30.053	29.593
39	25.043	24.442	24.103	30.666	29.720	29.255
40	24.854	24.229	23.885	30.354	29.379	28.909
41	24.659	24.008	23.660	30.033	29.029	28.556
42	24.457	23.780	23.427	29.705	28.670	28.194
43	24.248	23.545	23.186	29.368	28.302	27.823
44	24.032	23.301	22.937	29.024	27.927	27.444
45	23.807	23.049	22.679	28.670	27.542	27.055
46	23.575	22.789	22.412	28.308	27.149	26.657
47	23.335	22.520	22.137	27.937	26.746	26.250
48	23.086	22.242	21.853	27.557	26.335	25.834
49	22.830	21.955	21.561	27.169	25.914	25.411
50	22.565	21.660	21.261	26.772	25.485	24.979
51	22.292	21.355	20.952	26.366	25.046	24.539
52	22.010	21.041	20.635	25.952	24.598	24.091
53	21.719	20.716	20.309	25.528	24.140	23.635
54	21.419	20.382	19.974	25.096	23.673	23.170
55	21.110	20.037	19.631	24.654	23.196	22.698
56	20.791	19.683	19.278	24.203	22.709	22.218
57	20.463	19.318	18.917	23.744	22.214	21.730
58	20.125	18.944	18.547	23.274	21.710	21.235
59	19.777	18.559	18.168	22.796	21.197	20.731
60	19.419	18.165	17.779	22.308	20.676	20.219



**Table 38 Pension Factors to Determine Value of New Pensions for Funding Purposes (over age 60)**

Age Last Birthday	CPI Indexed			Salary Indexed		
	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse	Age Retirement Pension with 2/3 Reversion	Ill Health Pension with 2/3 Reversion	Spouse
61	19.050	17.760	17.381	21.811	20.146	19.700
62	18.671	17.345	16.973	21.305	19.607	19.173
63	18.283	16.919	16.557	20.790	19.060	18.641
64	17.885	16.484	16.134	20.268	18.506	18.103
65	17.476	16.040	15.704	19.737	17.944	17.560
66	17.058	15.586	15.266	19.198	17.377	17.012
67	16.631	15.124	14.820	18.652	16.804	16.458
68	16.193	14.655	14.366	18.098	16.226	15.900
69	15.746	14.178	13.905	17.537	15.644	15.337
70	15.290	13.696	13.437	16.970	15.060	14.772
71	14.825	13.207	12.965	16.397	14.473	14.204
72	14.353	12.714	12.488	15.819	13.884	13.636
73	13.874	12.216	12.008	15.238	13.295	13.068
74	13.388	11.714	11.525	14.654	12.707	12.501
75	12.896	11.211	11.042	14.067	12.121	11.937
76	12.401	10.708	10.558	13.480	11.540	11.376
77	11.901	10.207	10.075	12.894	10.964	10.821
78	11.399	9.710	9.593	12.309	10.397	10.270
79	10.896	9.219	9.113	11.726	9.841	9.726
80	10.392	8.735	8.637	11.147	9.297	9.189
81	9.889	8.262	8.165	10.573	8.767	8.661
82	9.389	7.800	7.700	10.007	8.252	8.144
83	8.895	7.350	7.246	9.451	7.755	7.641
84	8.409	6.914	6.804	8.907	7.275	7.155
85	7.934	6.495	6.377	8.379	6.816	6.687
86	7.471	6.094	5.966	7.867	6.378	6.241
87	7.022	5.713	5.573	7.375	5.965	5.815
88	6.590	5.353	5.198	6.902	5.577	5.410
89	6.175	5.018	4.842	6.452	5.215	5.029
90	5.781	4.706	4.507	6.025	4.882	4.670
91	5.409	4.421	4.193	5.624	4.577	4.336
92	5.059	4.163	3.902	5.249	4.301	4.027
93	4.734	3.927	3.634	4.902	4.051	3.744
94	4.435	3.712	3.389	4.584	3.822	3.487
95	4.162	3.512	3.169	4.294	3.611	3.255
96	3.915	3.327	2.972	4.032	3.415	3.049
97	3.692	3.153	2.802	3.797	3.233	2.870
98	3.492	2.991	2.654	3.586	3.063	2.716
99	3.311	2.840	2.525	3.396	2.905	2.581
100	3.147	2.701	2.408	3.224	2.760	2.459



## Appendix E Data integrity checks and adjustments

This Appendix lists the checks undertaken on the membership data provided by QSuper as well as any adjustments that have been made in order to provide the best assessment of the scheme's liabilities.

The following data files were supplied in respect of each Category of membership within QSuper.

**Table 39 List of Data Sources**

Name of File	Date	Category	Description
<b>Contributors</b>			
DB Actives 2015-2016.txt	29/07/2016	Defined Benefit	Membership details of active members at 30 June 2016
Defined Benefit Category - Salary reduction.txt	4/08/2016	Defined Benefit	Details of members who had salary reduction benefits at 30 June 2016
Police Category - Active Members 2015-2016.txt	27/07/2016	Police	Membership details of active members at 30 June 2016
State Category - Active Members 2015-2016.txt	27/07/2016	State	Membership details of active members at 30 June 2016
Actuary data - Appendix 5 - Active Members 30-6-16 Final.xls	19/07/2016	Parliamentary	Membership details of active members at 30 June 2016
Accumulation Category - Members.txt	4/08/2016	Accumulation	Membership details of accumulation members at 30 June 2016
Income Account (Allocated Pension) - Members.txt	7/07/2016	Income Account	Membership details of income account based members at 30 June 2016
<b>Pensioners</b>			
Defined Benefit Category - Pensioners.txt	20/07/2016	Defined Benefit	Pensions in payment at 30 June 2016 and pensioner movements in 2015-16 financial year
Actuary Data - Appendix 14 - Parliamentary Category - Pensioners 30062016 FINAL.xlsx	13/07/2016	Parliamentary	Pensions in payment at 30 June 2016 and pensioner movements in 2015-16 financial year
Police Category - Pensioners.txt	20/07/2016	Police	Pensions in payment at 30 June 2016 and pensioner movements in 2015-16 financial year
State Category - Pensioners.txt	27/07/2016	State	Pensions in payment at 30 June 2016 and pensioner movements in 2015-16 financial year
Fire Category - pensioners.txt	6/07/2016	Fire	Pensions in payment at 30 June 2016 and pensioner movements in 2015-16 financial year
Commuters 2016.xls	4/08/2016	State & Police	Pensions in payment at 30 June 2016 and pensioner movements in 2015-16 financial year
<b>Deferred Members</b>			
Deferred Retirement Benefit - Members.txt	7/07/2016	Defined Benefit	Membership details at 30 June 2016
<b>Preserved Members</b>			
Actuary Data - Appendix 8 - Preserved Members 30-06-2016 Final.xls	29/06/2016	Parliamentary	Membership details at 30 June 2016
State Category - Preserved Members 2015-2016.txt	27/07/2016	State	Membership details at 30 June 2016
Police Category - Preserved Members 2015-2016.txt	27/07/2016	Police	Membership details at 30 June 2016
<b>Assets</b>			
QSuper Signed 30 June 2016 Financial Statements.pdf	11/11/2016		Audited financial statements as at 30 June 2016
QTC 3A Account - Transaction Detail by Product_115930107_1.pdf	29/07/2016		Consolidated fund assets as at 30 June 2016
Old Govt ALM - June16 QTR v2.xlsx	16/08/2016		Defined Benefit/Accumulation asset split for financial year 2015-16

A number of checks were performed on the data to ensure that it was of sufficient quality to be relied upon. These checks are summarised below by Category of membership.

### Deferred Members Actives at 30 June 2016

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Gender
- Date Commenced after Valuation Date
- Missing Date Commenced, Date of Birth
- AWOTE Benefit less than zero
- Low (15) or High (55) Age at 30 June 2016

### Pensioners - DB, State, Police, & Parliamentary

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Pension Type, Gender, Commencement Code or Termination Code
- Missing Date Of Birth, Date Commenced
- Missing or Zero Pension or Reversion Amount



- Date Terminated outside period 1 July 2015 to 30 June 2016
- Commencement Code but no Date Commenced in period
- Termination Code but no Termination Date, and vice versa
- Date Terminated before Date Commenced
- Compare pension amount at start indexed with pension increases with actual pension amount at end
- Low (\$20 per f/n) or High (\$4.5k per f/n) Pension Amount or Reversion Amount
- Low (16 Child, 55 Pensioner) or High (25 Child, 100 Pensioner) Pension Age

Reconciliation of new pensioners, exits and pensioners in payment at the end of the year with the corresponding pensioner data at the beginning of the year.

**Preserved  
Members - State,  
Police Actives at  
30 June 2016**

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Gender
- Missing Date Of Birth
- Missing, Zero or Negative Preserved Balance at 30 June 2016

**Defined Benefit  
Category  
Members - Actives  
at  
30 June 2016**

Checking the validity of values in the fields of the files (e.g. unknown values, blank cells), particularly:

- Invalid Gender, Previous Scheme Indicator, TTR Indicator, FL Indicator
- Missing Date Of Birth, Date Joined DB Plan
- Low (15) or High (70) Age at 30 June 2016
- Missing Date Joined Previous Scheme if Previous Scheme indicator was not blank
- Date Joined Previous Scheme later than Date Joined DB Plan
- Date Joined Previous Scheme later than Police Closure Date if Previous Scheme Indicator equal to P
- Date Joined Previous Scheme later than State Closure Date if Previous Scheme Indicator equal to S
- Date Joined DB Plan later than DB Closure Date
- Missing or Zero 1 July 2016, 2015 & 2014 Review Date Salary and OTE Salary
- Low (\$5k) or High (\$1m) 1 July 2016, 2015 & 2014



Review Date Salary and OTE Salary

- High (100%) DB Salary Increase in 2014-2015 and 2015-16 financial year
- Missing or High (9.45 DB Standard, 11 DB Police, 2.0 ATM) Accrued Multiple & ATM at 30 June 2016
- Missing ATM where Previous Scheme Indicator is S or P
- Zero, Low (2% DB Standard, 3% DB Police) or High (8% DB Standard, 9% DB Police) Member Contribution Rate
- Missing or Zero FTE Ratio
- Missing or Zero Career FTE Ratio
- FTE Ratio or Career FTE Ratio greater than 1.0
- Missing, Zero or High Service (1.1 times Service) For Prospective Benefit
- Missing or Zero Member Contribution Balance at 30 June 2016
- High (\$1.5m) Voluntary Contribution Balance at 30 June 2016
- Missing or Zero TTR Multiple if TTR Indicator = Y
- Missing or Zero FL Multiple if FL Indicator = Y
- Missing Date of TTR if TTR Indicator = Y
- Missing Date of FL if FL Indicator = Y
- TTR Multiple greater than Accrued Multiple at TTR Date if TTR Indicator = Y
- FL Multiple greater than Accrued Multiple at FL Date if FL Indicator = Y

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

Adjustments made to the data include:

- Duplicate membership records due to secondments or multiple part-time memberships were combined to a single record for each life
- Removal of membership records in relation to an agency redundancy program that were incorrectly included in the actives data
- Minor corrections were advised by QSuper in respect of individual membership records in respect of the following fields:
  - 1 July 2016 Review Date Salary



- 1 July 2014 Review Date Salary
- Member Contribution Rate
- OTE Salary
- TTR Multiple
- If missing or zero Member Contribution Rate, assume member is on Leave Without Pay
- Where FTE Ratio is less than zero, set to be equal to Career FTE Ratio if Career FTE Ratio reasonable, otherwise Impute an average equal to the non-zero average FTE Ratio
- Where Career FTE Ratio is less than zero, set to be equal to FTE Ratio if FTE Ratio reasonable, otherwise Impute an average equal to the non-zero average Career FTE Ratio
- Imputed the maximum Member Contribution Rate if Member Contribution Rate was greater than the maximum allowable (30 records adjusted)
- Imputed the standard Member Contribution Rate if Member Contribution Rate was less than the minimum allowable (38 records adjusted)
- If Service for Prospective Benefit is greater than calculated Service, amend Date Joined field (466 records adjusted)
- If Low or Missing Salary, use the previous years' Salary, otherwise impute an average Salary (4 records adjusted)
- If Low OTE Salary, use the 1 July Review Date Salary (4 records adjusted)
- If High Salary Growth in year, impute Salary at start of year equal to Salary at start of previous year if Salary at start of year is greater than Salary at end of year (8 records adjusted)

**Police Category  
Members - Actives  
at 30 June 2016**

- Low (18) or High (60) Age at 30 June 2016
- Date Joined Fund after Police Plan Closure Date
- Low (15) Age at Date Joined Fund
- Invalid Gender, Section 24A Indicator
- Missing Section 24A Rate if Section 24A Indicator = Y
- Missing Additional Contribution Rate if member has Additional Service years
- Low (\$10k) or High (\$150k) Salary at 30 June 2016
- Low (\$10k) OTE Salary at 30 September 2015
- Low (\$500) Accumulation Balance at 30 June 2016



- High (\$90k) Annual Pension Amount at 30 June 2016
- High (\$900k) Lump Sum Payable on Retirement at 30 June 2016
- Missing or Zero Vested Benefit at 30 June 2016
- Retirement Benefit provided but member is below Retirement Age
- Retirement Benefit not provided but member is above Retirement Age
- Resignation Benefit provided but member is above Retirement Age
- Resignation Benefit not provided but member is below Retirement Age

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

**State Category  
Members - Actives  
at 30 June 2016**

- Low (16) or High (65) Age at 30 June 2016
- Date Joined Fund after State Plan Closure Date
- Low (15) Age at Date Joined Fund
- Invalid Gender, Section 24A Indicator
- Low (\$10k) or High (\$250k) 30 June 2016 Review Date Salary
- Low (\$10k) OTE Salary at 30 September 2015
- Low (\$500) Accumulation Balance at 30 June 2016
- Low (\$0) Member Contribution Balance at 30 June 2016
- High Portability Service (15), Reduced Service (12) or Additional Service (25) at 30 June 2016
- Missing Additional Contribution Rate if member has Additional Service years
- High (\$120k) Annual Pension Amount or Lump Sum Payable on Retirement (\$1.2m) at 30 June 2016
- Missing or Zero Vested Benefit at 30 June 2016
- Retirement Benefit provided but member is below Retirement Age
- Retirement Benefit not provided but member is above Retirement Age
- Resignation Benefit provided but member is above Retirement Age
- Resignation Benefit not provided but member is below Retirement Age



Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

**Parliamentary  
Category  
Members - Actives  
at  
30 June 2016**

- Low (18) or High (70) Age at 30 June 2016
- Low (18) Age at Election Date
- Missing Date Of Birth, Date of Entry
- Election Date after Valuation Date
- Invalid Member Category
- Low (<\$Backbencher) or High Own Salary (\$300k) at 30 June 2016
- Low (\$1m) or High (\$3m) Accumulated Own Salary at 30 June 2016
- Low (\$1m) or High (\$3m) Accumulated Backbencher Salary at 30 June 2016
- Total Accumulated Own Salary is less than Total Accumulated Backbencher Salary as at 30 June 2016
- Total Member Contributions at 30 June 2016 not equal to Member Contribution Rate times Total Own Salary

Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

## Appendix F Correspondence re Fiscal Principle Interpretation



Queensland  
Government

Queensland Treasury

Our Ref: 01853-2106

Mr Wayne Cannon  
State Actuary  
Level 8  
100 George Street  
BRISBANE QLD 4000

Dear Mr Cannon

I refer to your recent review of the State Public Sector Superannuation Scheme (QSuper) as at 30 June 2015.

As you know, one of the Government's fiscal principles is to target full funding of long term liabilities such as superannuation and Workcover in accordance with actuarial advice.

Until now, limited policy guidance has been provided by the Government in relation to this fiscal principle. The Government now wishes to provide greater policy clarity to guide adherence to this important fiscal principle.

The Government has recently considered this matter with particular regard given to the manner in which corporate defined benefit fund liabilities are managed.

The Government has determined that in interpreting the fiscal principle:

1. Overfunding of the Government's defined benefit scheme should be minimised; and
2. The funding of the defined benefit scheme is to be managed in accordance with the spirit of the APRA funding and solvency standards applying to corporate defined benefit schemes.

Having regard to this additional policy guidance, it would be appreciated if you could provide further actuarial advice on the funding position of the State's defined benefit scheme and, in particular, the level of surplus funds in the scheme.

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100 George Street Brisbane  
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Facsimile +61 7 3035 3202  
Website [www.treasury.qld.gov.au](http://www.treasury.qld.gov.au)  
ABN 90 856 020 239



- 2 -

Beyond this initial actuarial advice, it is envisaged that future actuarial reports on the State's defined benefit scheme would also be based on the policy parameters outlined above.

Please feel free to contact me if you require any further information.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Jim Murphy'.

Jim Murphy  
Under Treasurer

2015/16





State Actuary's Office

Queensland Treasury

20 May 2016

Mr Jim Murphy  
Under-Treasurer  
Queensland Treasury  
Level 9, 100 George Street  
BRISBANE QLD 4000

Dear Mr Murphy

**Actuarial Investigation of the State Public Sector Superannuation Scheme (QSuper)**

I refer to your letter of 20 May 2016 in which you provided further guidance on the interpretation of the Government's fiscal principle targeting full funding of superannuation liabilities and requested my opinion on the funding position of the defined benefit scheme (the *Scheme*) in light of that guidance. This advice is based on the analysis described in the investigation Report<sup>1</sup> and must be read in conjunction with that Report.

You have advised that the fiscal principle of full funding is to be interpreted as follows:

1. Overfunding of the Scheme should be minimised and
2. The funding of the Scheme is to be managed in accordance with the spirit of the APRA funding and solvency standards applying to corporate defined benefit schemes.

In brief, the APRA standard defines "satisfactory financial position" as the fund assets<sup>2</sup> exceeding the total vested benefits of the Scheme; i.e. the total of all benefits payable if all members voluntarily leave the Scheme on the calculation date. Where the vested benefit is a pension or deferred benefit, the present value is derived, based on the funding basis<sup>3</sup>. The standard requires that funds in an "unsatisfactory financial position" (UFP) must set out a restoration plan to return the fund to a "satisfactory financial position" within a reasonable period not exceeding three years.

This is a different benchmark than the actuarial value of accrued liabilities used to assess funding level in my investigation and is discussed within Chapter 8 of the Report. Figure 8 and Figure 9 in the Report show the past and projected future values of the Vested Benefit

<sup>1</sup> "Actuarial Investigation of the State Public Sector Superannuation Scheme (QSuper) as at 30 June 2015" dated 31 March 2016

<sup>2</sup> Strictly, total assets excluding the Operational Risk Financial Requirement

<sup>3</sup> See Section 5.2 of the Report.

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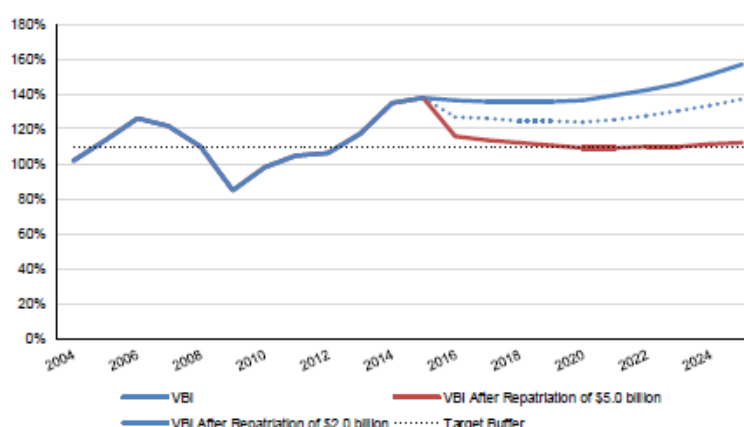
Index and Actuarial Value of Accrued Benefits Index in respect of active members only. The APRA requirement of satisfactory financial position is effectively equivalent to the active member VBI being above 100% on the funding basis. You will note that vested benefits are generally greater than accrued liabilities for active members of the Defined Benefit plan of QSuper and so the VBI benchmark can be considered as more conservative than the accrued liabilities.

### Repatriation of Surplus Funds

Taken at face value, the minimisation of overfunding relative to APRA's benchmark would imply that any excess over a 100% VBI could be repatriated. Of course, the lower the level of the VBI, the greater will be the chance that a restoration plan will be required. So it would be prudent to retain a buffer above 100% to reduce the need for frequent demands for additional funding and the consequent disruption to the Budget process. Unfortunately, the available modelling tools do not allow the comprehensive stochastic analysis undertaken in the investigation of accrued liabilities (see Section 6.6 of the Report) in respect of vested benefits. So it is not possible to quantify the appropriate level of that buffer and I have made a judgement call to target a VBI of around 110% in respect of active members only.

A maximum repatriation of \$5.0 billion will result in the expected progress of the active member VBI shown in Figure 1. Similarly to the actuarial investigation, I have taken the suspension of investment of employer contributions announced in the 2015-16 Budget as fixed and I note that the amount does not need to be adjusted for investment return since the valuation date.

Figure 1 - Historical and Projected VBI (Funding Basis)



It must be stressed that Figure 1 is a deterministic projection based on the assumptions used in the funding basis. In practice, actual funding levels will be managed by the more reactive funding process implied by the new guidance and described herein. As noted in my

letter to you dated 26 April 2016, a \$5.0 billion repatriation would result in a 28% chance of accrued deficit at 30 June 2020 on the funding basis.

Of course, the Government may wish to retain a greater buffer above vested benefits in order to reduce the likelihood of the imposition of a restoration plan and so may choose a lower level of repatriation.

### *Risks*

It is important to recognise the consequences of this interpretation of the fiscal principle relative to the treatment underlying the recommendation in my Report; viz.

- Ongoing surplus positions will be lower;
- The likelihood and magnitude of calls on the Government to contribute funds as part of a restoration plan in order to meet the fiscal principle will be greater.

In practice, due to the maturity of Scheme membership and the suspension of employer contribution investment announced in the 2015-16 Budget, the value of future contributions is sufficiently small that their ability to repair adverse funding positions is quite limited. This means that restoration plans will need to focus on lump sum contributions to the Employer Fund.

In my view, this risk is greater than it appears on face value as the circumstances in which a deficit arises (i.e. adverse investment markets, subdued economy etc) are likely to be ones where the Government is unlikely to have easy access to cash to repair the deficit, either through receipts or borrowings. In effect, there is a "doubling up" of the risks facing the sponsor. In order to ensure the ongoing funding of the Scheme, it is critical that the Government recognises this issue and stands ready to contribute additional funds should adverse experience occur in future.

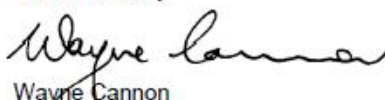
Finally, it is important to note that defined benefit beneficiary security essentially consists of the assets held within the QSuper Trust (about \$5 billion) and a "promise" from the Government to provide the additional funds necessary to meet benefit payments (\$20 billion+). The value of this promise is enhanced by the Government holding assets for the specific purpose of meeting the liabilities and this is recognised by all stakeholders. So, to the extent that those assets are reduced, the value of the promise and consequently the security of member entitlements must also be reduced. However, it is important to note that such reductions are at the margin and of trivial practical significance, as long as the Government's covenant is strong.

In conclusion, the Scheme is very well funded and there is scope to repatriate some of the surplus. Based on the revised criteria listed above, a maximum repatriation of \$5.0 billion could be undertaken whilst maintaining consistency with the APRA funding standards, allowing for the contribution suspension and a small buffer against adverse experience.

QUEENSLAND TREASURY

I trust that this information meets your needs. Please do not hesitate to contact me if you would like to discuss this matter or require anything further.

Yours sincerely

  
Wayne Cannon  
State Actuary

