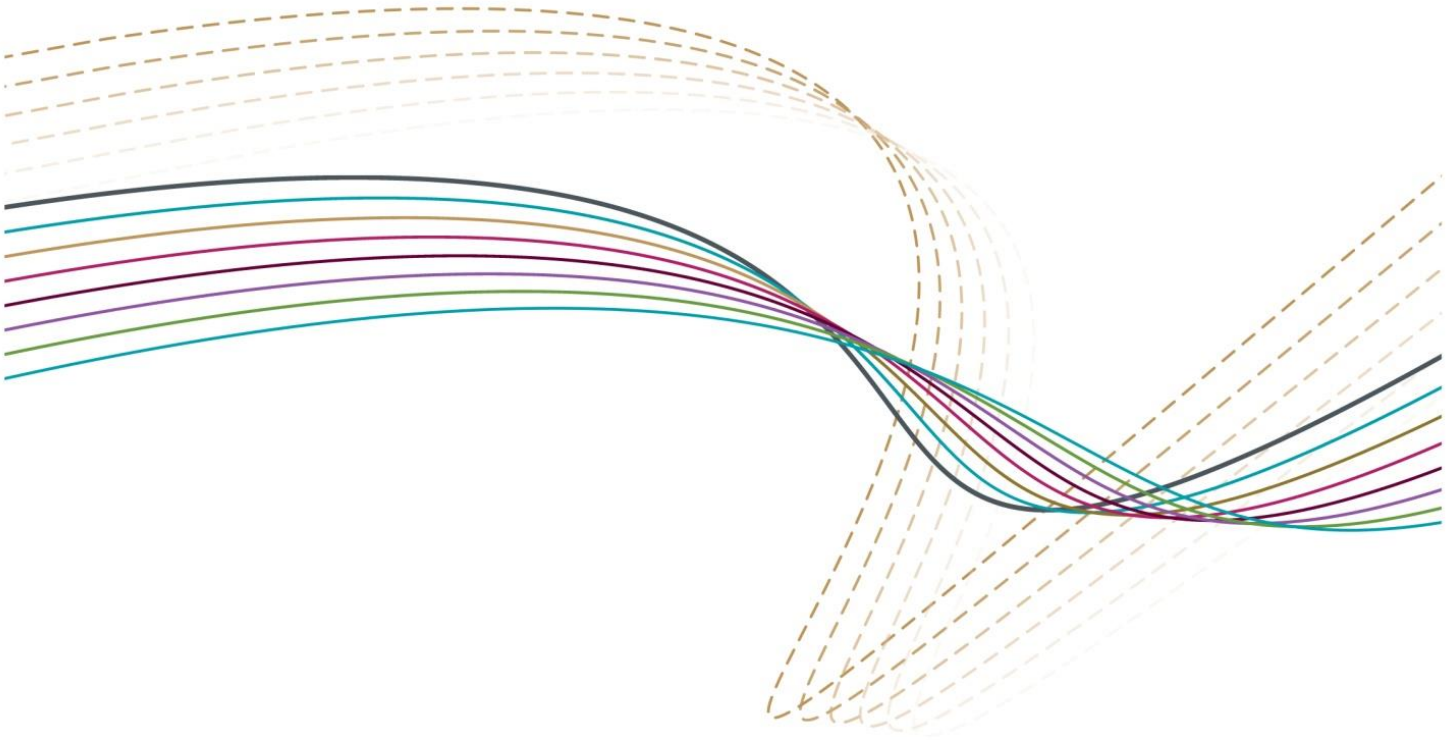
STATE ACTUARY'S OFFICE

Actuarial Investigation of QSuper

as at 30 June 2018



QUEENSLAND TREASURY

Queensland Government

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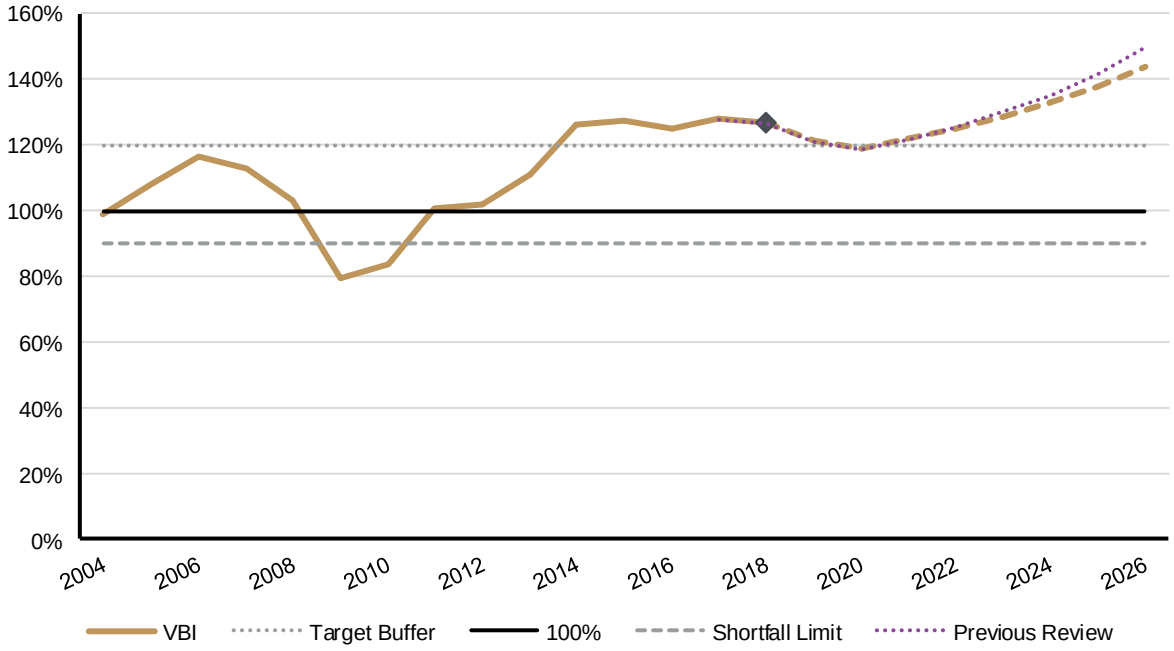
1 Summary and recommendations

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 **$10.063 billion** as at 30 June 2018. This compares with the $10.152 billion surplus disclosed at the 2017 valuation, with the effect of the higher than assumed investment return over 2017-18 and changes in the actuarial basis offsetting the asset repatriation that occurred during the year. In addition, the more stringent accounting basis applying to the Government's financial statements shows an accrued surplus of $2.934 billion.

Taking into account the combination of the employer contribution suspension until 2020 and the remaining tranches of the repatriation decided as part of the 2016-17 State Budget, the funding position of the scheme is projected to decline somewhat before resuming an increasing trend, as shown in Figure 1. This demonstrates that the combined funding measures over recent Budgets are projected to reduce the overfunding of the scheme whilst still maintaining a buffer to protect against adverse experience, consistent with my previous Review.

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



The VBI is projected to fall below the target buffer over the Budget horizon and, with the probability of the VBI falling below 100% in 2022 around 1 in 4, **existing funding management initiatives (i.e. repatriation and contribution suspension) should proceed as planned.**

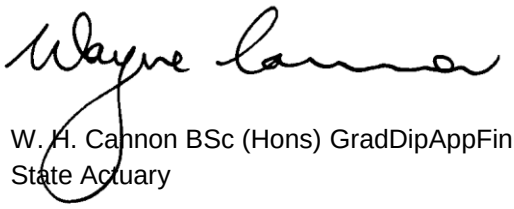
I emphasise that there is no single "correct" level of surplus for any defined benefit scheme and that **no guarantee can be provided as to future funding levels due to the variability of scheme outcomes**, particularly investment returns. It is important to note that the risks of fund deficiency fall 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 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:

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 90% of defined benefit payments	Other than the above, the State to meet 90% 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.

In line with the decision to undertake actuarial reviews on an annual basis, the next Review is due as at 30 June 2019. As discussed in Appendix B, scheme *experience* reviews are still undertaken on a triennial basis and reported at the subsequent actuarial review. In order to resynchronise the timing of the experience reviews, we have analysed the two years until 30 June 2017. The next experience review will cover the triennium from 1 July 2017 until 30 June 2020 and be reported in the 30 June 2021 actuarial investigation report.



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State Actuary

4 December 2018

2 Introduction

2.1 Background

The provisions of the Superannuation (State Public Sector) Act 1990 (the Act) and the Deed govern the operation of QSuper[1]. 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 (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 2018. This is the third Review to be undertaken on an annual cycle, as agreed with the Under Treasurer during the 2016-17 State Budget. I also undertook the last actuarial review of QSuper as at 30 June 2017, which was signed on 1 December 2017. As noted in Appendix B, scheme *experience* reviews will still be undertaken on a triennial basis and reported at the subsequent actuarial Review. In order to resynchronise the timing of the such reviews, we have analysed the experience for the two years until 30 June 2017. The next experience review will cover the triennium from 1 July 2017 until 30 June 2020 and be reported in the 30 June 2021 actuarial investigation report.

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.

[1] Note that QSuper was previously denoted as the State Public Sector Superannuation Scheme, however the name was formally changed to QSuper in the *Superannuation (State Public Sector) (Scheme Membership) Amendment of Deed Regulation 2017*.

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[2], 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 Table 1.

It will be noted that, consequent to the Revenue and Other Legislation Amendment Act 2017, QSuper become a public offer fund on 1 July 2017, with the Non-Public Sector Accumulation Category being replaced by the General Accumulation Category to accept new non-Government members. Another consequence of that Act was 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.

[2] 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.

Table 1 Membership Categories

Category	Previous Scheme	Current Status
Defined Benefit	QSuper	Closed to new entrants
Comprehensive Accumulation	–	Open to new permanent and temporary public sector employees and transfers from the other categories, including casuals
Basic Accumulation	Government Officers' Superannuation Scheme (Gosuper)	Open to new casual public sector employees, police cadets and others where nominated by non-core public sector employers
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
General Accumulation	–	Open to the general public, former public sector employees who continue QSuper membership and employees of an employer that is not a unit of the State public sector

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 the same time as member contributions are remitted, employing authorities are required to remit employer contributions to Queensland Treasury, which then deposits them[3] in the Employer Fund[4]. 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.

[3] Unless the investment of employer contributions is suspended by the Treasurer.

[4] 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.

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 me as at 30 June 2018, with liabilities included within QSuper's financial statements). 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.

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 June 2017) 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 27 September 2018; and
- Queensland Treasury and QIC relating to the Employer Fund.

2.8 Legislative Changes

There has not been any substantial change to the legislation governing the Defined Benefit Categories of QSuper since the last Review.

2.9 Recommendations of Previous Actuarial Investigation

I understand that the recommendations from the previous actuarial Review (Report dated 1 December 2017) have been implemented by the Board.

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 in previous triennial 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 2018, the 1 July 2018 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 2.

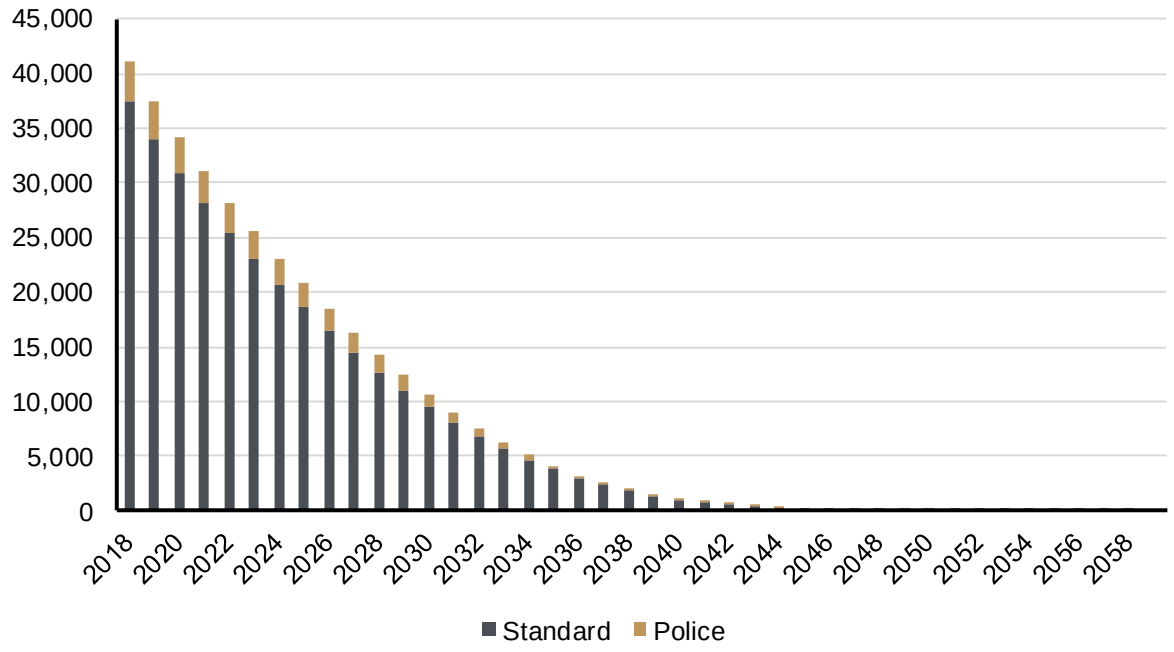
Table 2 Defined Benefit Membership by Type (as at 30 June)

	2017	2018
Contributors		
Defined Benefit - Standard	39,909	37,484
Defined Benefit - Police	3,796	3,638
State	381	338
Police	108	104
Parliamentary	10	6
Former Contributors - Pensioners		
Defined Benefit	800	784
State	1,164	1,155
Police	202	197
Parliamentary	135	137
Fire	2	2
Former Contributors - Deferred		
Defined Benefit	31,095	29,092
State	199	158
Police	16	16
Total	**77,817**	**73,111**

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 2017 and at 30 June 2018 are summarised in Table 3. All averages are weighted by the relevant 1 July salary.

Table 3 Defined Benefit Category – Standard Membership Profile[5]

	30 June 2017			30 June 2018		
	Males	Females	Persons	Males	Females	Persons
Average Age (years)	54.3	52.8	53.4	54.9	53.4	54.0
Average Age At Entry (years)	28.5	28.5	28.5	28.3	28.1	28.2
Average Membership (years)	25.8	24.3	24.9	26.6	25.3	25.8
Average Review Date Salary	$100,181	$92,766	$95,639	$103,445	$95,783	$98,733
Average 1 July Salary	$103,075	$95,753	$98,590	$106,399	$98,648	$101,632
Average Contribution Rate (%)	4.96	4.91	4.93	4.96	4.91	4.93
Average Career Part-Time Ratio	0.989	0.911	0.943	0.988	0.910	0.942

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 around 54 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 since the last Review.

The membership characteristics of the Police members as at 30 June 2017 and at 30 June 2018 are summarised in Table 4. All averages are weighted by the relevant 1 July salary.

Table 4 Defined Benefit Category – Police Membership Profile

	30 June 2017			30 June 2018		
	Males	Females	Persons	Males	Females	Persons
Average Age (years)	49.8	46.0	49.0	50.5	46.9	49.7
Average Age At Entry (years)	23.6	24.4	23.8	23.6	24.2	23.7
Average Membership (years)	26.2	21.6	25.3	26.9	22.6	26.0
Average Review Date Salary	$98,351	$92,034	$97,004	$101,944	$95,652	$100,587
Average 1 July Salary	$102,036	$95,653	$100,676	$105,827	$99,483	$104,458
Average Contribution Rate (%)	5.99	5.99	5.99	5.99	5.99	5.99
Average Career Part-Time Ratio	0.999	0.948	0.989	0.999	0.948	0.989

From this table, the following observations can be made:

[5] 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 3.6 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. Prior to 2016, QSL 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 was 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 5. It will be noted that Phase II data was not analysed in 2014.

Table 5 Comparison of Salaries based on Phase I and II Membership Data

	No of Members		Total 1 July Salaries		Salary
Year	Phase I	Phase II	Phase I	Phase II	Adjustment
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 5 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 6, which demonstrates that the remaining differences, whilst all positive are sufficiently small that no further adjustment is necessary.

Table 6 Comparison of Liabilities[6] 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%

[6] Liabilities are only in respect of active Defined Benefit Category members.

4 Investments and accounts

4.1 Fund Accounts

QSuper's financial statements are subject to the accounting standard AASB 1056. In order to determine the net assets available to meet member benefits for the purposes of the actuarial review, we have excluded the value of the Employer-sponsor receivables, as shown in Table 7.

Table 7 Net Assets Available for Member Benefits

	$ million
Net Assets Available for Member Benefits at 30 June 2018	**101,692**
Employer-sponsor receivables	(21,504)
Net Assets Available for Valuation Purposes at 30 June 2018	**80,188**

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 2018 is shown in Table 8.

Table 8 Overall Asset Summary

	$ million		
As at 30 June 2018	Defined Benefit	Other	Total
QSuper fund	6,442	73,746	80,188
Employer Fund	28,107	-	28,107
Total	34,549	73,746	108,295

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.

Since the last actuarial investigation, LTAAB has concluded a major review of its investment arrangements, subsequent to the introduction of the APRA funding and solvency framework, which

reduced the emphasis on liability hedging. The new arrangements are based around the following principles:

- The purpose of the long term assets is to minimise the intergenerational inequity associated with superannuation liabilities by matching the State's liabilities with those assets.
- Its risk appetite is equivalent to a 50% equities/50% bonds portfolio.
- Target a reduction in illiquidity in order to meet anticipated cash flow requirements.
- Using the Vested Benefit Index ("VBI") to measure the superannuation liability means the liability hedge can be unwound,
- The primary objectives against which the long term asset portfolio is measured are:
    - Full Funding: Probability of achieving full funding; i.e. a vested benefit index ("VBI") of 100% in every year of the following four year period
    - Equilibrium return forecasts of 7%
    - Shortfall Chance: Probability of VBI falling below the shortfall limit (90%) in any year of the following four year period
    - Shortfall Size: Average of potential shortfall (CVaR) when VBI is below the shortfall limit (90%)

LTAAB and the QSuper Board have subsequently concluded that the following strategic asset allocation will provide the optimal chance of meeting those objectives, as shown in Table 9.

Table 9 Strategic Asset Allocation

Asset Class	Strategic Allocation
Global Equities	22.7%
Private Equity	6.6%
Equities	**29.3%**
Real Estate	10.2%
Infrastructure	7.6%
Insurance	4.1%
Illiquid Alternatives	7.5%
Liquid Alternatives	3.3%
Total Alternatives	**32.7%**
Fixed Income	23.2%
Cash	14.8%
Total Cash and Fixed Income	**38.0%**

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 6.5.

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 2.5% is well below the 5.75% 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 6.6.

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. In consultation with QSuper, it has been decided that member liabilities are calculated on a basis consistent with AASB 119.

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, 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 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 third to be undertaken within the spirit of the APRA framework and consequently I have continued to place 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 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 2018 from the QSuper audited financial statements, viz. $80,188 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 $6,442 million.

The market value at the investigation date of the assets in the Employer Fund of $28,107 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 2018[7]

	$ millions		
	Past Service	Future Service	Total Service
Value of Assets and Future Member Contributions			
Market Value of QSuper Fund Assets	80,188	0	80,188
Market Value of Employer Fund Assets	28,107	0	28,107
Member Contributions	0	1,428	1,428
Employer Contributions at Current Rates after 2019-20	0	2,448	2,448
Total Value of Assets (A)	**108,295**	**3,876**	**112,171**
Value of Benefits, Tax & Expenses			
Active Defined Benefit Members	17,938	5,255	23,193
Current and Contingent Pensioners	1,243	0	1,243
Former Defined Benefit Members	2,140	0	2,140
Accumulation Benefits	55,631	0	55,631
Account Based Pensions	16,892	0	16,892
Disability Income Benefit	22	217	239
Surcharge Provision	(42)	0	(42)
Expenses	640	188	828
Reserves	1,242	0	1,242
Value of Net Contributions Tax	2,526	689	3,215
Total Value of Benefits, Expenses & Tax (B)	**98,232**	**6,349**	**104,581**
Surplus / (Deficit) (A) - (B)	**10,063**	**(2,473)**	**7,590**

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

[7] 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 2018 – Funding Basis

	$ millions		
	Past Service	Future Service	Total Service
Value of Assets and Future Member Contributions			
Market Value of QSuper Fund Notional DB Assets	6,442	0	6,442
Market Value of Employer Fund Assets	28,107	0	28,107
Member Contributions	0	1,428	1,428
Employer Contributions at Current Rates after 2019-20	0	2,448	2,448
Total Value of Assets (A)	**34,549**	**3,876**	**38,425**
Value of Benefits, Tax & Expenses			
Active Defined Benefit Members	17,938	5,255	23,193
Current and Contingent Pensioners	1,243	0	1,243
Former Defined Benefit Members	2,140	0	2,140
Disability Income Benefit	22	217	239
Surcharge Provision	(23)	0	(23)
Expenses	640	188	828
Value of Net Contributions Tax	2,526	689	3,215
Total Value of Benefits, Expenses & Tax (B)	**24,486**	**6,349**	**30,834**
Surplus / (Deficit) (A) - (B)	**10,063**	**(2,473)**	**7,590**

Table 11 shows that, on the assumptions underlying the funding basis, the defined benefit scheme is in a very healthy financial position. A reconciliation of the movement in the accrued surplus is shown in Section 7. It is important to note that the surplus position demonstrated above does not include any allowance for the remaining tranches of the asset repatriation announced by the Government as part of the 2016-17 Budget; i.e. some of the surplus has effectively been earmarked. I have considered the effect of the repatriation in more detail in Section 8.1.5.

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 2018 – Accounting Basis

	$ millions		
	Past Service	Future Service	Total Service
Value of Assets and Future Contributions			
Market Value of QSuper Fund Notional DB Assets	6,442	0	6,442
Market Value of Employer Fund Assets	28,107	0	28,107
Member Contributions	0	1,733	1,733
Employer Contributions at Current Rates after 2019-20	0	3,197	3,197
Total Value of Assets (A)	**34,549**	**4,930**	**39,479**
Value of Benefits, Tax & Expenses			
Active Defined Benefit Members	22,944	7,793	30,737
Current and Contingent Pensioners	1,831	0	1,831
Former Defined Benefit Members	2,500	0	2,500
Disability Income Benefit	22	265	287
Surcharge Provision	(23)	0	(23)
Expenses	817	271	1,088
Value of Net Contributions Tax	3,524	1,074	4,598
Total Value of Benefits, Expenses & Tax (B)	**31,615**	**9,403**	**41,018**
Surplus / (Deficit) (A) - (B)	**2,934**	**(4,473)**	**(1,539)**

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 $25.20 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 suspension of employer contribution investment has been allowed for in the present value of Employer Contributions.

6.2 Sensitivity to Key Assumptions

The balance sheets shown in Table 11 and Table 12 are based on the relevant actuarial assumptions listed in Appendix C without any loading to allow for possible adverse experience. Whilst these assumptions represent our best estimates of the likely future experience of the scheme, it is important to consider the effect on the funding position of departures from them.

Table 13 illustrates the alternative scenarios considered and their effects on the accrued liabilities. It is important to note that the scenarios shown are not considered equally likely nor do they reflect any particular percentile of the distributions of possible scheme experience, especially any lower or upper bound. They are simply shown to demonstrate the sensitivity of the valuation results to the various assumptions.

Table 13 Sensitivity of Investigation Results on Accrued Liabilities

Scenario	Effect on Accrued Liability
Discount Rate +1%	-7.45%
Salary Inflation +1%	7.85%
CPI Inflation +1%	0.54%
Promotional Salary Growth 10% Higher	0.26%
Retirement Rates - Effect of Preservation Age Adjustments	0.58%
Retirement Rates - 50% Higher Than Assumed	1.99%

The first three scenarios refer to changes in the financial assumptions; viz. the assumed rate of salary and price inflation and the discount rate used to derive the present value of projected future cash flows. These are critical assumptions within any actuarial investigation and it is important to understand the effect of changes in these parameters. Table 13 demonstrates the importance of the discount rate and salary inflation assumptions as well as the minor impact of variations in the assumed level of price inflation. These outcomes are not surprising as most defined benefit liabilities are linked to salary growth with only a small proportion of the overall liabilities being CPI-linked pensions.

At this Review, we have increased the assumed level of promotional salary growth for Standard Female members (see Section B.3), recognising small increases that have been observed over several years. Noting the sensitivity to inflationary salary growth shown above, it might be expected that the other component of projected future salaries; viz. promotional salary growth would also have a material effect on liabilities. However, the small effect demonstrated in Table 13 reflects the relatively high average age of the defined benefit membership and the fact that promotional salary growth at the higher ages tends to be relatively low.

Noting the relatively advanced age of the membership, retirement rates represent the most important of the decrement assumptions included within the actuarial basis shown in Appendix C. As noted in Section B.4.3, at this Review we have made allowance for the expected effects of the increases in preservation ages (the age from which superannuation benefits are generally available) for members born after 1 July 1960. We have shown the effect on accrued liabilities of this allowance as an example of the sensitivity of the retirement decrement assumption, as well as the relative effect of a

substantial increase in retirement rates across all ages. As Table 13 demonstrates, the effects are relatively minor.

In summary, the accrued liabilities are not very sensitive to the assumptions regarding price inflation, promotional salary growth and age retirement rates. However, the accrued liabilities are very sensitive to the gap between investment returns and salary inflation.

6.3 Cash Flow Profile

The projected 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

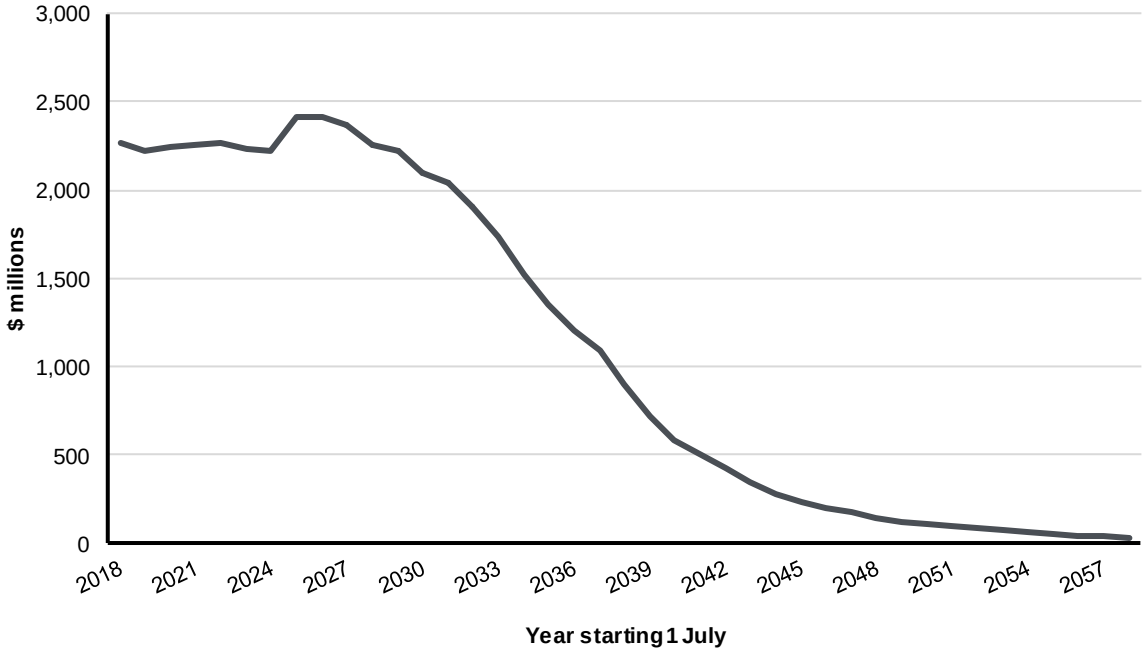


Figure 3 demonstrates that annual cash flows will remain high for some years with projected annual benefit payments over $1 billion for around twenty years and consequently that the effective “life” of the defined benefit scheme is still quite long. The relatively “unsmooth” progression during the first ten years reflects the allowances made to reflect the changes in preservation ages for members born after 1 July 1960, which are likely to relatively delay retirement benefits.

6.4 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 5.75% (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.

6.5 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 be made as last minute contributions by the State at the level of 90% of defined benefit payments (whether paid directly to a member or to an accumulation category). This proportion has reduced since the last Review, due to the effect of the strong investment return achieved within the defined benefit component of QSuper.

It should be noted that defined benefit member voluntary contributions are excluded as they are funded within the accumulation assets and that the Employer Fund 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 90% 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.

6.6 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 $10.063 billion and an overall actuarial surplus (allowing for future State contributions at the current rates) of $7.59 billion, or 22% 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 $2.934 billion and an actuarial deficit of $1.539 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 has been undertaken within the spirit of the APRA framework and consequently there is greater emphasis on the *vested benefits* liability measure than in earlier 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 2018-19 State Budget, as shown in Table 14, whilst assets are projected to provide a return consistent with Treasury's assumptions shown in Appendix C.1.1. 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 projected funding levels within the scheme.

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

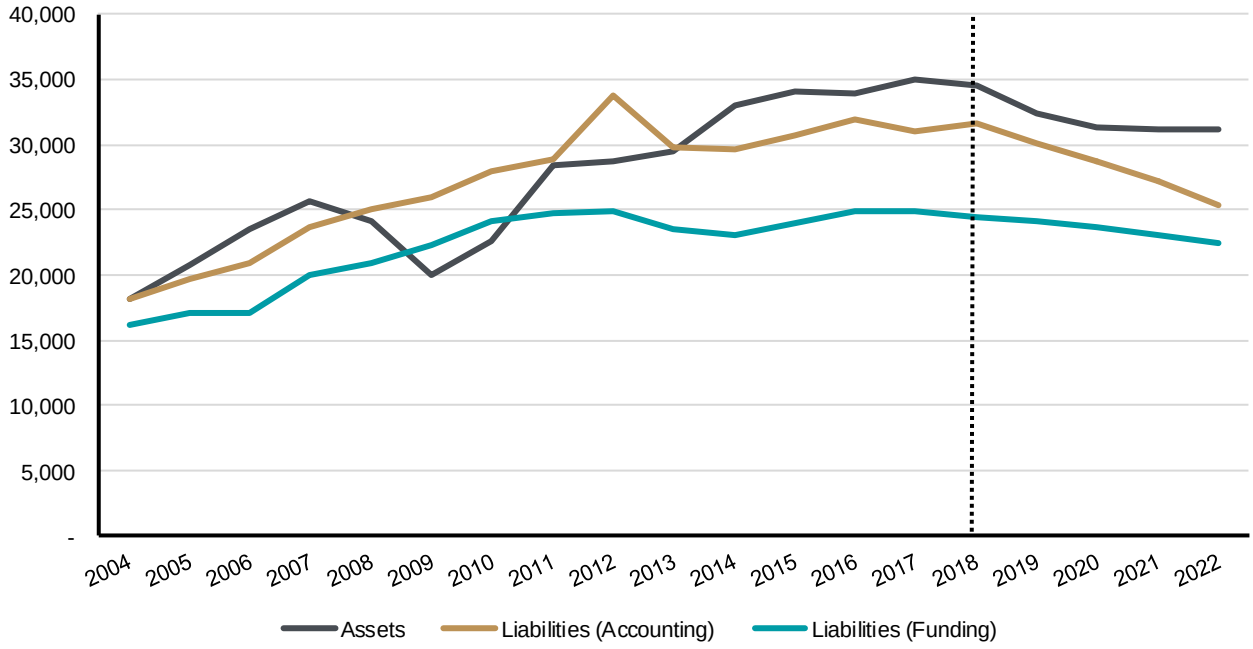


Table 14 Forecast Net Discount Rates from 2018-19 State Budget

As at 30 June	Net Discount Rate
2018	2.50%
2019	2.80%
2020	3.00%
2021	3.35%
2022	3.80%

Figure 4 indicates that, based on the assumptions described above, the accounting surplus is projected to increase and the funding basis surplus to decline slightly over the next several years, allowing for the suspension of employer contribution investment and the remaining tranches of the asset repatriation decided at the 2016-17 State Budget. Importantly, Figure 4 also demonstrates that the liabilities have already peaked in dollar terms, 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 projected to be broadly maintained from the already extremely strong position shown in this Review. This suggests that the combined funding measures over recent Budgets have reduced the overfunding of the scheme whilst still maintaining a buffer to support the funding position. 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.

6.7 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 are shown in Table 15. The legacy State and Police Categories contribution rates will remain consistent with the corresponding group in the Defined Benefit Category, also 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 overall Defined Benefit Categories.

Table 15 Employer Contribution Rates[8]

Category	Employer Contribution Rate
Defined Benefit - Standard	7.75% of Salary + 1.00 x Member Contributions
Defined Benefit - Police	6.00% of Salary + 2.00 x Member Contributions
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

[8] 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 $10,152 million as at 30 June 2017.

The balance sheets illustrated in Table 10 and Table 11 show an accrued surplus position of $10,063 million which is a decrease of $89 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 higher than the level assumed at the last Review, offset by the first tranche of the asset repatriation decided in the 2016-17 Budget. The resulting deficit has been estimated to be $533 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 $558 million.

- Salary Inflation

  The growth in salaries since the last Review was lower than assumed in the 2017 valuation, resulting in a surplus of approximately $154 million.

- Changes in the Actuarial Basis

  The actuarial valuation basis has changed from that used in the 2017 Review, with the reasons for this discussed in detail in Appendix B. The basis changes have increased the surplus by approximately $286 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 $673 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 regulated 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[9] 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 continue to 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 of the 2015 Report), 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 continue to 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 repatriations already planned and these projections will be compared with the buffer, rather than simply the position at the valuation date.

[9] See http://www.actuaries.asn.au/Library/Standards/SuperannuationEmployeeBenefits/2013/SPCIN_SPS160ShortfallLimit.pdf

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 2018, 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 2018

	Vested Benefits ($ million)	VBI
QSuper (incl Accumulation etc)	101,018	107.2%
QSuper Defined Benefit Scheme (incl deferred and pensioner members)	**27,272**	**126.7%**
Active Defined Benefit category members only	22,734	137.0%

In Reviews prior to 2016, 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

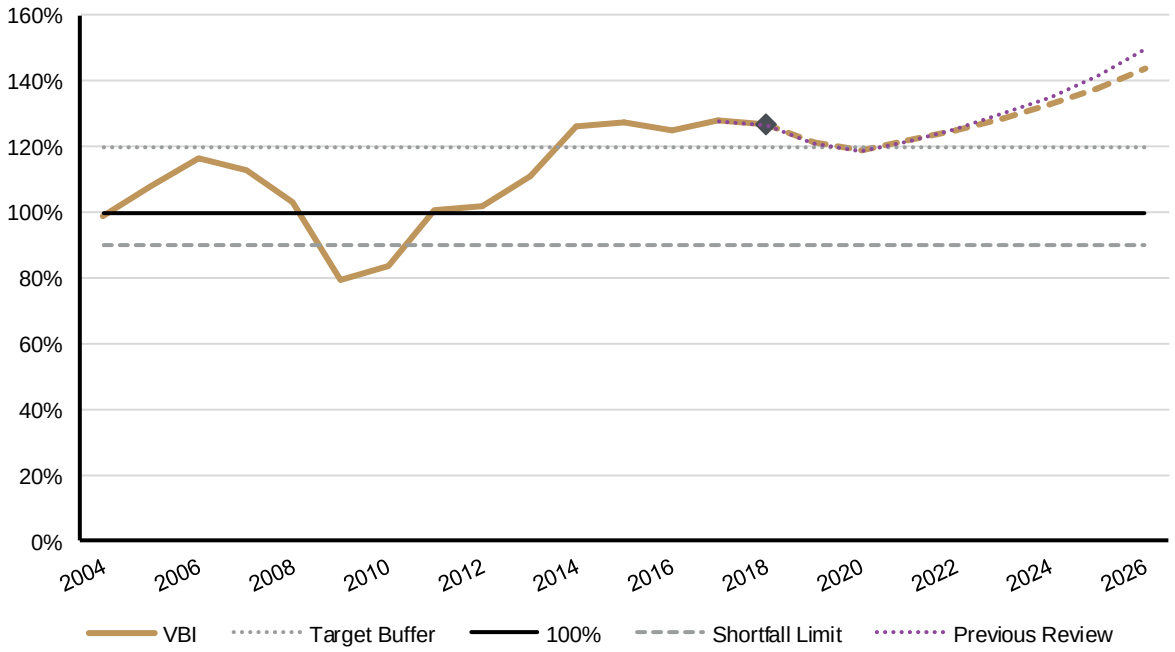
It is usual to look at the progress of the various indices from Review to Review. An increase in an index would generally indicate a strengthening of a scheme's financial position while a decrease would indicate a weakening. The corresponding vested benefit indices at the previous Review are shown in Table 17. The small declines since the last Review are substantially due to the first tranche of the asset repatriation made during 2017-18.

Table 17 VBI at 30 June 2017

	VBI at 30 June 2017
QSuper (incl Accumulation etc)	108.1%
QSuper Defined Benefit Scheme (incl deferred and pensioner members)	**127.8%**
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, based on the Treasury investment return assumptions (see Appendix C.1.1). 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



Taking into account the combination of the employer contribution suspension until 2020 and the remaining tranches of the repatriation decided as part of the 2016-17 State Budget, the funding position of the scheme is projected to decline somewhat before resuming an increasing trend, as shown in Figure 5. This demonstrates that the combined funding measures over recent Budgets are expected to reduce the overfunding of the scheme whilst still maintaining a buffer to protect against adverse experience, consistent with my previous Review.

The projections shown in Figure 5 are based on the deterministic assumptions shown in Appendix C.1.1 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**.

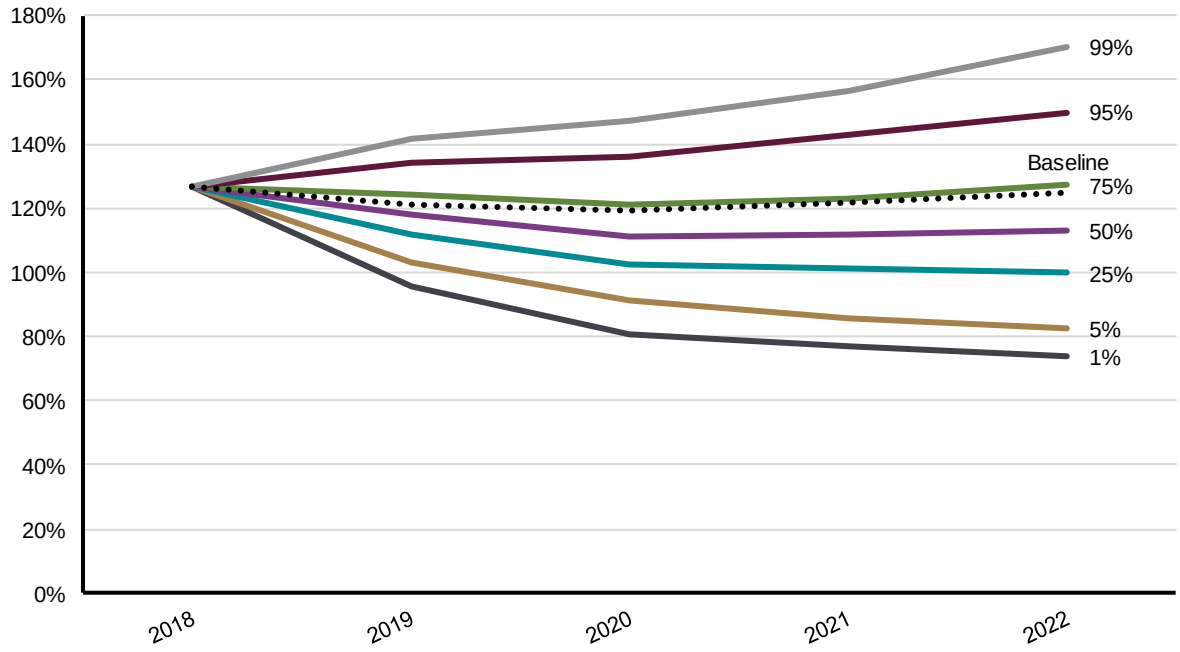
It is also worth commenting on the forecast horizon over which to assess these projections. I have continued to use four years, reflecting the Budget forward estimates and a reasonable period to allow for the models to perform at their best[10] as well as a medium term horizon for decision making that is

[10] 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.

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.

The distribution of potential outcomes for the VBI over the next four 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 four year period of 4.9% is lower than the returns assumed in the Baseline projection demonstrated in Figure 4 (see Appendix C.1.1). The median cumulative CPI and salary inflation outcomes over the period to 30 June 2022 from the QIC models are 2.3% p.a. and 3.4% p.a. respectively, which are higher than the assumptions used in this Review. The implied median real investment return above salary inflation from the QIC models is therefore 1.6% compared to the Treasury assumptions underlying the projections shown in Figure 4 and Figure 5 of 3.5%, and so the Baseline projection is higher than the median stochastic projection. Whilst the Treasury investment return assumptions represent a more optimistic view than the QIC models, I have used them for consistency with the Budget framework, within which funding decisions are to be considered (see Section 5.2).

These charts demonstrate that the vested benefits of defined benefit members are projected to remain adequately covered by the corresponding overall scheme assets throughout the forward estimates, subject of course to actual volatile investment outcomes. Based on the Treasury investment return assumptions, the projected VBI is projected to fall below the target buffer over the Budget horizon and, with the probability of the VBI falling below 100% in 2022 around 1 in 4, **existing funding management initiatives (i.e. repatriation and contribution suspension) should proceed as planned.**

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 2018 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 134.0%, compared to the equivalent ARBI at the last Review of 134.8%. 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. The observed decrease is substantially due to the first tranche of the asset repatriation during 2017-18.

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 143.3%.

The equivalent index at the last Review was 144.4%. This decrease is again substantially related to the first tranche of the asset repatriation during 2017-18.

8.4 Actuarial Value of Accrued Benefits

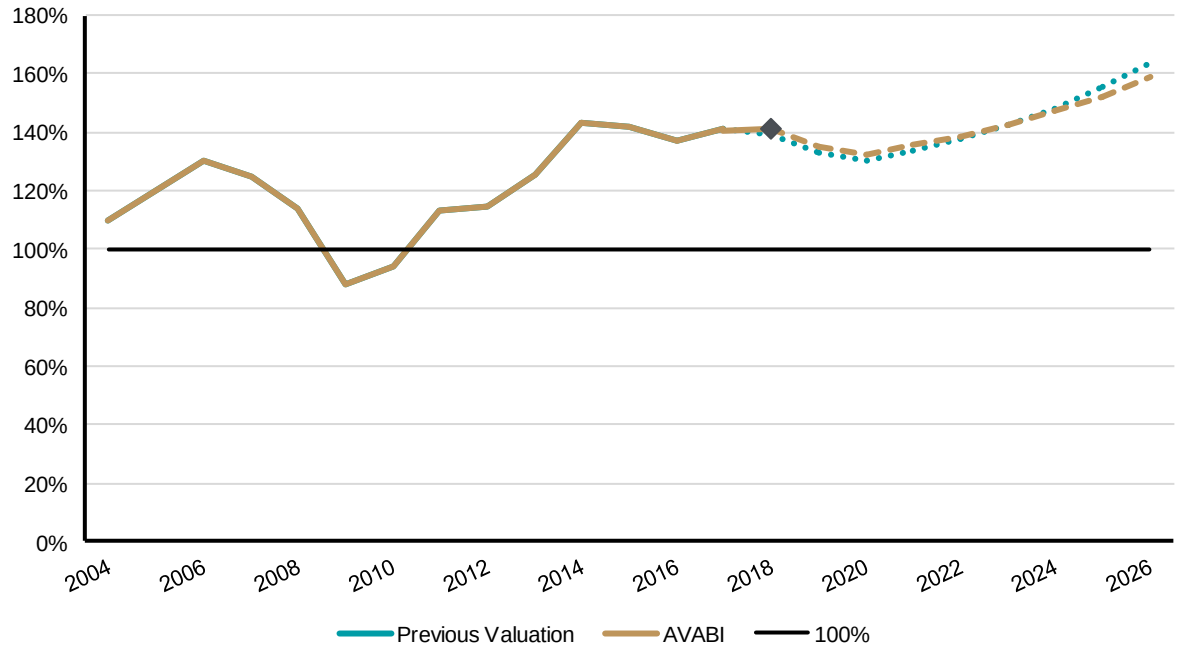
An additional funding indicator which takes into account the liability accrued from service prior to the investigation date for all types of benefit (i.e. not only age retirement) is the present value of accrued liabilities. The present value of accrued liabilities (*including* current pensions, preserved benefits, Accumulation members and adjusted for accrued taxation liabilities) on the funding basis at the investigation date was $98,232 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 110.2%. For the **defined benefits scheme only**, the AVABI at the investigation date was 141.1%, compared to 140.9% at the previous

Review. The increase in this index is largely due to the changes in the actuarial basis since the last Review, offset by the effect of the first tranche of the asset repatriation during 2017-18. 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, based on the assumptions made within this Review, the funding position is projected to remain strong for the next several years. In addition, the outlook is very similar to that shown at the last Review.

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



8.5 Summary

The funding indices have mostly decreased slightly since the last Review, primarily as a result of the first tranche of the asset repatriation during 2017-18. Their absolute levels are all high and indicative of the very strong funding position, measured on the funding basis. I have also shown the projected progress of the funding positions taking into account previously announced funding measures, demonstrating that the funding position of the scheme is projected 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 2018 were $80,188 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 2018.

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 $79,987 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 90% of defined benefit payments	Other than the above, the State to meet 90% 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 5.75%.
- The long term wage growth assumption was 3.1%.
- The long term consumer price index assumption was 2.1%.
- The weighted average term of projected defined benefit liabilities was 8.5 years.
- The relevant date for the above items was 30 June 2018.

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. The change to the investment strategy described in Section 4.2 has increased this mismatch, which 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[11] 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-appointed to the Government within one month of exit who are essentially deemed to have continued their original membership.

[11] 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.

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:

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

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

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

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

For Police members, the accruals are defined as follows:

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

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

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:

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

The prospective membership benefit for Police members is as follows:

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

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:

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

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:

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

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:

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

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:

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

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:

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

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:

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

Where,

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

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 6.4). 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:

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

$$\frac{}{62.5}$$

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:

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

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:

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

Where,

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

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 6.4). 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:

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

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:

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

(b) In any other case:

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

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:

$$Annual\ Pension = \quad 40\%\ of\ Basic\ Salary\ at\ the\ date\ of\ the\ member's\ death$$

(b) 8 or more years of membership:

The greater of the following two pensions:

$$Annual\ Pension = \quad 40\%\ of\ Basic\ Salary\ at\ the\ date\ of\ the\ member's\ death$$

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

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

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

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 6.4).

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 are undertaken out of cycle with the rest of the valuation process and reported on in the next scheduled valuation report. In order to resynchronise these reviews, we have analysed the experience from 1 July 2015 until 30 June 2017, as shown in Sections B.3 and B.4. The next such review will consider the period 1 July 2017 until 30 June 2020 and be reported in the 30 June 2021 Report.

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, based on my advice. For completeness, these assumptions are shown in Table 21.

Table 21 Accounting Financial Assumptions

Gross Discount Rate	2.6%
Net Discount Rate (allowing for investment taxation)	2.5%
Salary Inflation	3.1%
Price (CPI) Inflation	2.1%

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.

Table 22 Previous Review Funding Basis Financial Assumptions

Discount Rate (Net Investment Return)	5.5%
Salary Inflation	3.0%
Price (CPI) Inflation	2.0%

The implied real salary inflation rate was therefore 1.0% and the net real investment return was assumed to be 3.5%, with the gap between investment return and salary inflation at 2.5%.

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 6.8%. However, 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 5.6%.

At the time of setting our assumptions, QIC's asset class return models (adjusted for consistency with the Consumer Price Index (CPI) assumption used in this Review) implied a net return for the current asset portfolio described in Section 4.2 of approximately 5.7% p.a. over the next eight years and 6.0% over the next ten years. Noting the approximate duration of the defined benefit liabilities of around eight years and allowing for a small prudential margin, I have decided to assume a long term net return of **5.75%** 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 2.1% 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

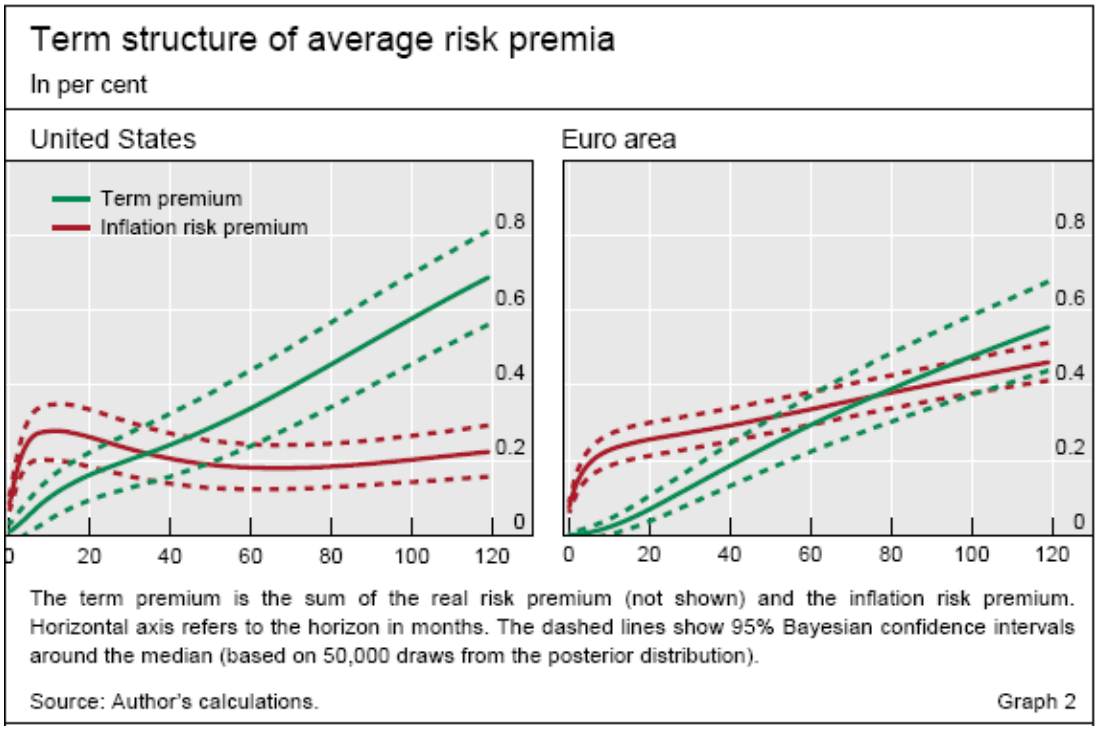
One method of determining the level of price inflation implied by the market is to consider the difference between yields on nominal and inflation-linked Commonwealth bonds of similar maturity, generally referred to as break-even inflation. Break-even inflation is not, however, an unbiased estimate of 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[12]:

Nominal Yield = Inflation-linked Yield + Expected inflation + 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.

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[13] by Peter Hördahl produced estimates of the average IRP term structure for US and Euro markets, as follows (taken from Hördahl's paper):

Figure 8 Average IRP Term Structure

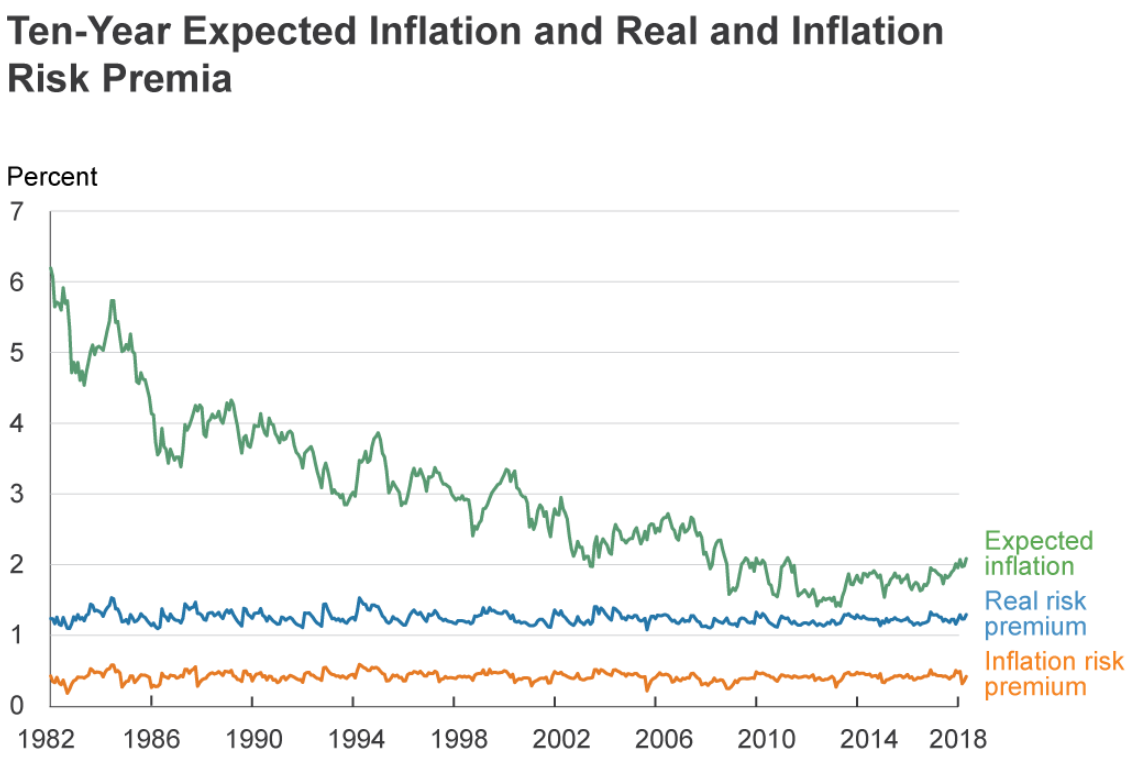


[12] See http://www.treasury.gov.au/~/media/Treasury/Publications%20and%20Media/Publications/2012/Economic%20Roundup%20Issue%202/Downloads/01_Measuring_market_inflation_exp.ashx for a comprehensive discussion.

[13] See http://www.bis.org/publ/qtrpdf/r_qt0809e.pdf

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[14]. At the time of writing, their estimates of ten-year inflation expectations and IRP were as follows:

Figure 9 Expectations of Inflation and the IRP – US Market



Source: Haubrich, Pennachi, Ritchken. 2012. "Inflation Expectations, Real Rates, and Risk Premia: Evidence from Inflation Swaps." *Review of Financial Studies*, 25(5), 2012.

Continuing the RBA's strong record of research into these issues, Hambur and Finlay[15] have built a similar model for the Australian market, with the results summarised in the charts below.

[14] See https://www.clevelandfed.org/our-research/indicators-and-data/inflation-expectations.aspx

[15] See https://www.rba.gov.au/publications/rdp/2018/pdf/rdp2018-02.pdf

Figure 10 Decomposition of Australian Nominal Commonwealth Forward Rates

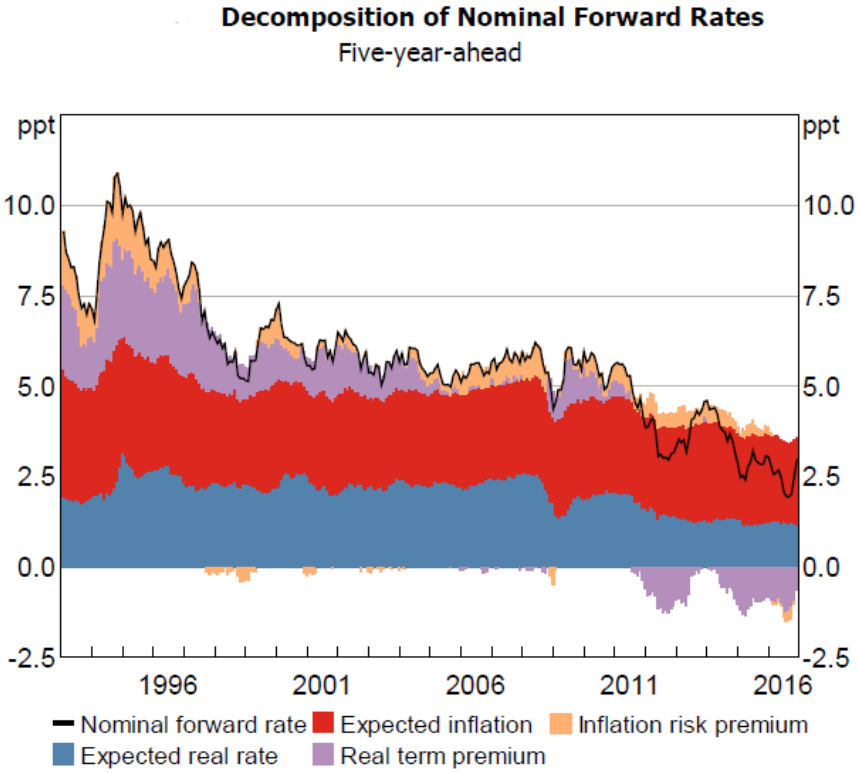


Figure 11 Expected Future Inflation Rates Implied by Commonwealth Bond Yields

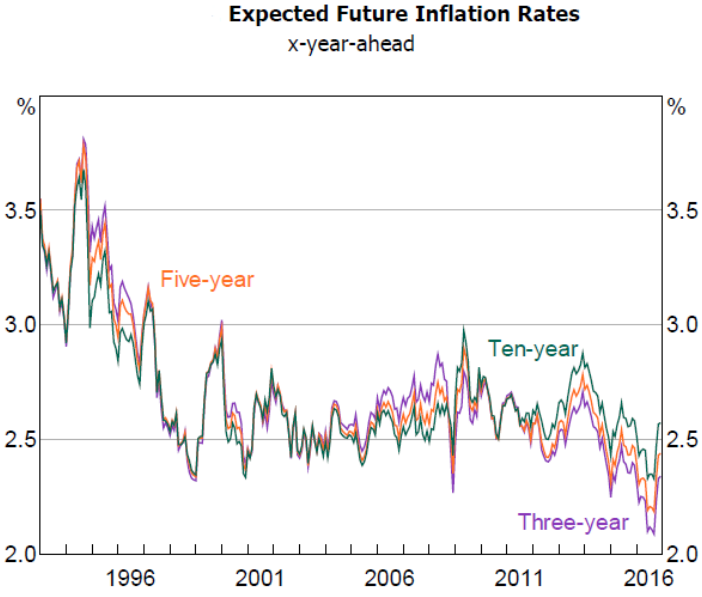
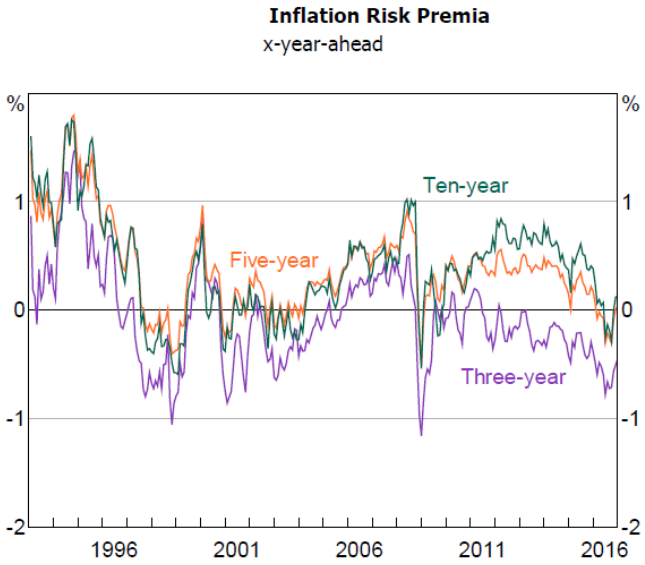


Figure 12 Estimated Inflation Risk Premia for Commonwealth Bonds



These charts demonstrate the volatility of the various components of the nominal yield over time, with even negative risk premia from time to time, all during a period where expected inflation has remained relatively stable.

A previous paper by Angus Moore of the RBA[16] has examined inflation expectations in the Australian market, including the assessment of the IRP. Extending the work of Finlay and Wende[17], Moore has produced estimates of BEI and the IRP shown in Figure 13.

[16] See https://www.rba.gov.au/publications/bulletin/2016/dec/pdf/rba-bulletin-2016-12-measures-of-inflation-expectations-in-australia.pdf

[17] See https://www.rba.gov.au/publications/rdp/2011/pdf/rdp2011-01.pdf

Figure 13 Break-even Inflation and the Inflation Risk Premium – Australian Market

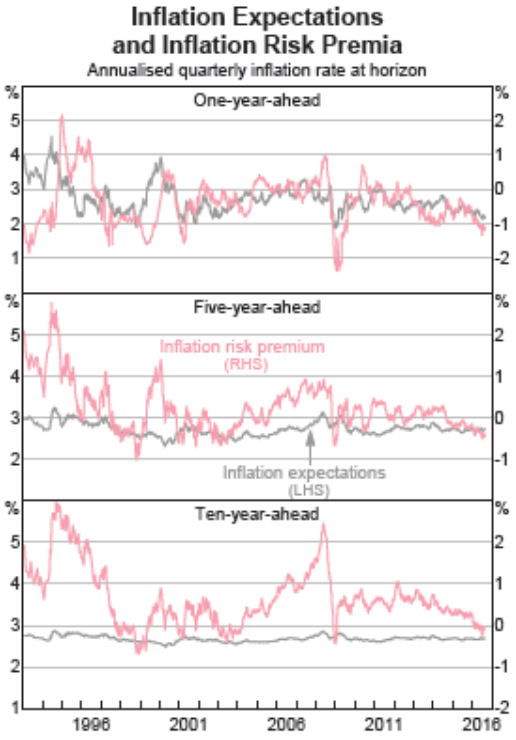
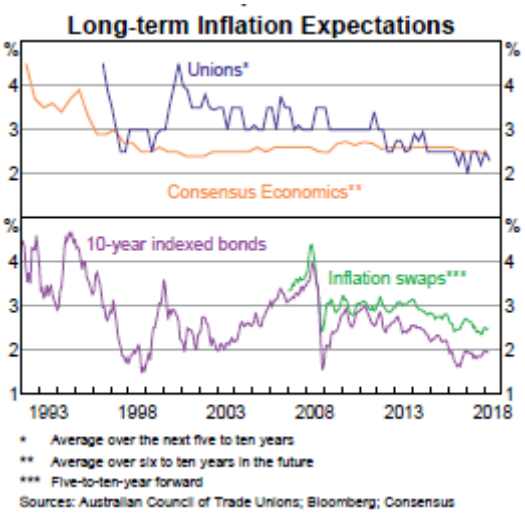


Figure 13 demonstrates the volatility of the Australian IRP over time, with a similar conclusion being reached by Evans[18] based on UK data. One final input to the consideration of inflation expectations is included in the latest Statement on Monetary Policy by the RBA[19]. The RBA's latest assessment of various measures of long-term inflation expectations is as follows:

Figure 14 Long-term Australian Inflation Expectations



[18] See https://notendur.hi.is/~ajonsson/kennsla2005/evans.pdf

[19] See https://www.rba.gov.au/publications/smp/2018/may/pdf/statement-on-monetary-policy-2018-05.pdf

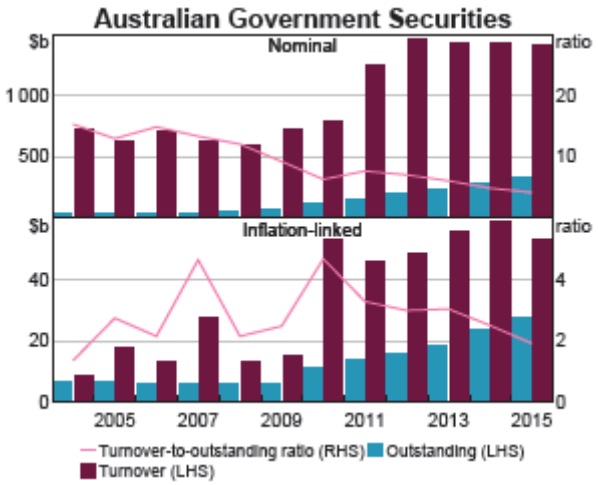
Again, whilst these latest estimates are targeting different measures, they suggest rates at the lower end of the range between two and three percent, although there is clearly considerable uncertainty.

In previous versions of this methodology, we have taken the view that it is reasonable to assume an IRP of around 25 bps and therefore reducing BEI by that amount when attempting to estimate inflation expectations. Before finalising our position, we will look further at the other adjustments often made to BEI to estimate "pure" prospective inflation.

B.2.3.1 Relative Liquidity Premium

Another factor affecting this approach for estimating inflation expectations is the so-called *scarcity* or *liquidity* bias in indexed versus nominal bonds in Australia because of the relative scarcity of the former, as shown in Figure 15, sourced from Moore's paper.

Figure 15 Relative Liquidity on Nominal and Inflation-linked Australian Bonds



Moore observes that:

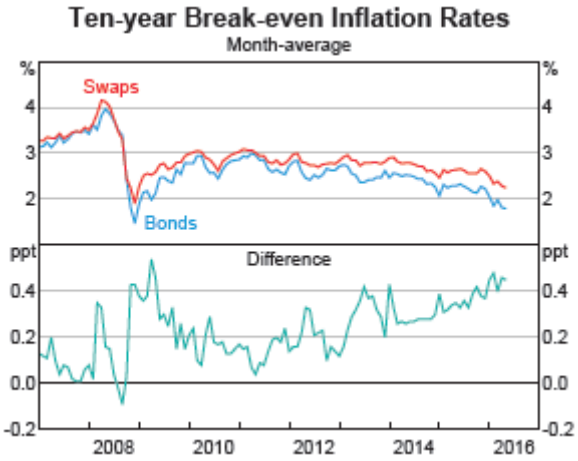
> *In theory, inflation swaps may be less affected by a liquidity premium than inflation-linked bonds; as long as a willing counterparty can be found, the swap can be created. Similarly, unlike purchasing government securities, inflation swaps involve no exchange of funds at the initiation of the contract. Despite being off-balance sheet, swaps nonetheless carry capital and leverage implications for prudential regulatory purposes. This means that balance sheet space still represents a constraint on liquidity in this market. Recent regulatory reforms, such as the Basel III leverage ratio, have made OTC derivatives (including inflation swaps) more expensive for banks (see Heath and Manning (2012) for more detail). These developments are likely to have reduced liquidity in the inflation swaps market. However, it is unclear how this should affect inflation swaps rates – whether it should raise or lower the rate depends on which side of the swap the bank is on.*

and

> *The main liquidity-related concern with inflation swaps is that the market is not particularly active and so prices are not broadly representative and are not always based on actual transactions.*

Consequently, whilst not perfect, the difference in inflation expectations between inflation swaps and BEI can provide an indication of the effect of the liquidity bias, as shown in Figure 16, which suggests that a premium should be added to BEI to reflect the effect of relative liquidity between the nominal and indexed bonds. Again however, we note the variability of the implied liquidity premium.

Figure 16 Ten Year Break-even Inflation and Swap Differential



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 declined before rising again since around 2011. Finlay and Olivan[20] attribute this difference to the scarcity bias discussed earlier and 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[12] 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.

This issue was also examined in a NERA Economic Consulting Report in March 2007[21] where they estimated that the "relative bias" in indexed versus nominal Commonwealth bonds was of the order of 20 bps in the Australian market, because of the relative scarcity of and the substantial demand for indexed bonds; i.e. indexed yields are relatively *lower* than nominals on this account and therefore a premium of 20 bps should be added to BEI to estimate "true" prospective inflation.

[20] See http://www.rba.gov.au/publications/bulletin/2012/mar/pdf/bu-0312-6.pdf

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

Another view is that the lower relative liquidity of inflation-indexed bonds means that investors require a relatively higher index-linked yield, to compensate for the greater difficulty in eventually liquidating the bond in future. However, this effect would have been included in the net position demonstrated by the NERA analysis and so presumably the liquidity bias on sale is more than offset by the relative demand/supply pressures applying to index-linked bonds.

B.2.3.2 Other Issues

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[22]. The cumulative annualised change over the two most recent quarters is lower than the breakeven rate and consequently it can be argued that the implied market estimate of *prospective* inflation should be somewhat higher than breakeven.

In previous years, we have estimated this effect to be around 10 bps per annum over the duration of the liabilities, although this adjustment obviously depends upon the difference between previous inflation and the implied prospective level. As at 30 June 2018, the difference was estimated to be 7 bps.

A final point to note is that the use of BEI as the market-consistent estimate of prospective inflation will result in consistency of liability calculations based on both nominal and inflation-linked bond yields; i.e. real cash flows discounted by indexed bond yields will have the same value as the present value of a stream of inflated cash flows discounted by nominal yields as long as the assumed level of prospective inflation is BEI, adjusting for the known past CPI effect.

B.2.3.3 Summary

In summary, there is not a single objective and widely accepted estimate of market-consistent inflation expectations. Recognising the difficulty in estimating the various adjustments necessary to isolate the "true" level of prospective inflation and their offsetting nature, this year we have continued our simplified approach by estimating the market-consistent level of price inflation over the term of the liabilities to be BEI, adjusted for the prior two quarters actual inflation as discussed above; i.e. 2.1% p.a..

B.2.4 Salary Inflation

A comparison of actual to expected increases in salaries over the investigation period is shown in Table 23.

Table 23 Observed Rates of Salary Inflation

Year Ending	Standard Males		Standard Females		Police		Total	
1 July	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
2018	2.9%	3.5%	3.0%	3.7%	3.8%	3.8%	3.0%	3.7%

From the above it would appear that total salary increases over 2017-18 were somewhat lower than those assumed. However, this analysis is based on the 2018 membership data (i.e. those members

[22] 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.

who were active at 30 June 2018) and uses the 1 July 2017 salaries provided on that data. Ordinarily, we would expect very limited change in the 1 July *2017* salary information for each surviving member between the two datasets representing the 2017 and 2018 member data. In the previous Review however, we observed a material change in the salaries, which was linked to backdated salary increases applying to substantial components of the membership. At this Review, this has not been observed and so the salary changes shown in Table 23 are meaningful.

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.

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, noting that there are no financial instruments that may be used to infer market-consistent estimates of prospective *nominal* salary inflation, particularly that underlying the liabilities considered herein.

One way of inferring prospective real salary growth is by considering past levels of salary inflation in the broader market such as Average Weekly Ordinary Time Earnings (AWOTE). The historical rates of real salary growth as measured by the excess of Queensland AWOTE over Australia All Groups CPI[23] for various periods ending in December 2017 are shown in the following table.

[23] The measure of price inflation incorporated in inflation-linked bonds is the All Groups weighted average capital cities, commonly considered as “Australia CPI”.

Table 24 Real Salary Growth[24]

Number of Years to Dec 2017	Real Qld AWOTE Increase (p.a.)
5	0.3%
10	1.4%
15	1.7%
20	1.5%
25	1.6%
30	1.4%

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 1.4% p.a. Patrick D'Arcy and Linus Gustafsson[25] of the RBA also note that 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 then 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 occurred over the last decade from the improvement in Australia's terms of trade is thus unlikely to be repeated.

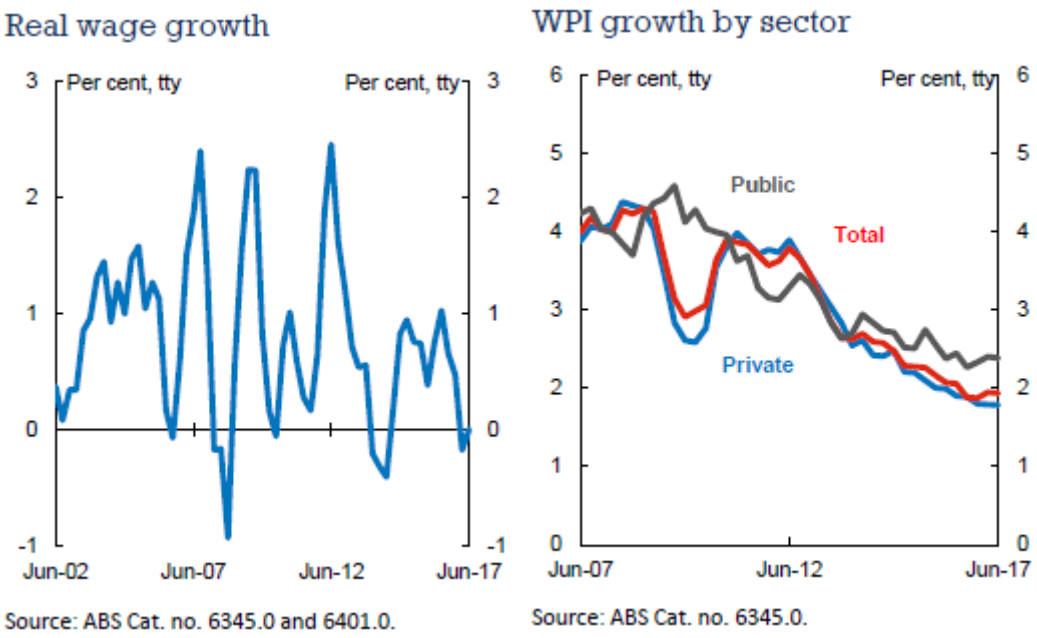
This sustained low wage growth has been further examined in a Commonwealth Treasury report[26], noting that both nominal public sector and real wages have been growing relatively slowly over recent years, as shown below:

[24] Source: ABS 6401.0 Consumer Price Index, Australia and ABS 6302.0 - Average Weekly Earnings, Australia.

[25] 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."

[26] See https://treasury.gov.au/publication/p2017-t237966/

Figure 17 Real Wage Growth and WPI Growth by Sector

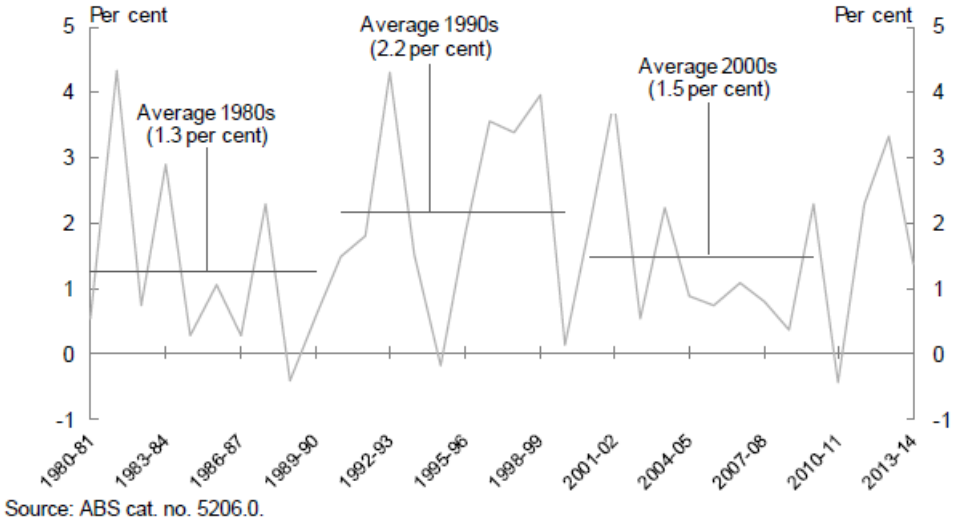


Source: ABS Cat. no. 6345.0 and 6401.0.

Source: ABS Cat. no. 6345.0.

As noted above, economic theory asserts that long-run real salary growth should be closely related to labour productivity growth[25]. The most recent Intergenerational Report[27] 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.

Figure 18 Average Labour Productivity Growth Rates

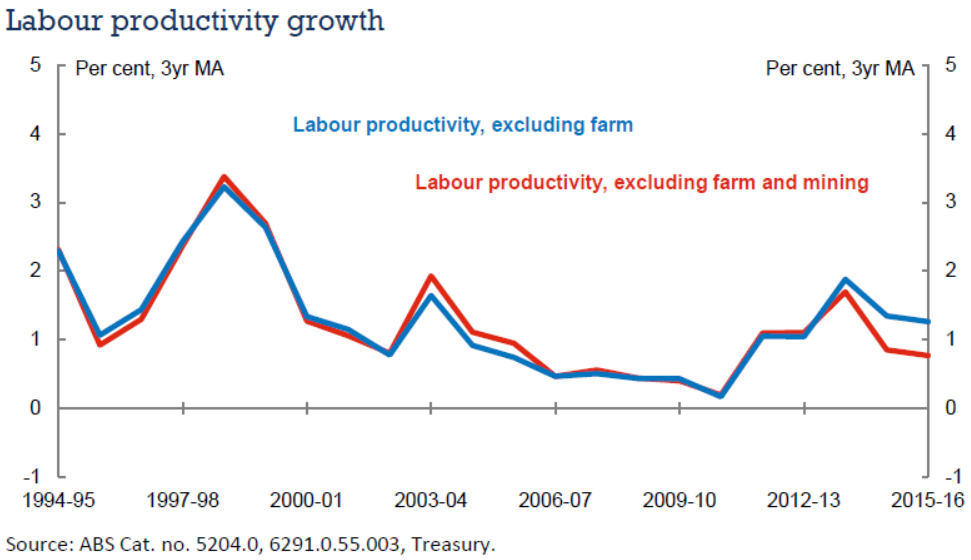


Source: ABS cat. no. 5206.0.

The Commonwealth Treasury paper also notes that recent productivity growth has been around 1% p.a., as follows:

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

Figure 19 Labour Productivity Growth Rates - Smoothed



Source: ABS Cat. no. 5204.0, 6291.0.55.003, Treasury.

Commonwealth Treasury have considered a number of potential causes underlying the subdued wage growth (underemployment, increased labour market flexibility), although there is international debate as to the broader drivers[28] Overall, whilst there is some expectation that wage inflation will increase over time, the quantum and timing is quite uncertain and the effect on real salary growth remains unclear.

Another source of information regarding real salary growth is the forecasts produced by Deloitte Access Economics[29]. Their projections for growth in various inflation measures for Queensland and Australia for the next several years are shown below.

Table 25 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
2018-19	1.9%	2.3%	2.2%	3.2%	2.4%	2.3%
2019-20	2.6%	2.7%	2.5%	3.1%	2.5%	2.2%
2020-21	3.0%	3.1%	2.8%	3.3%	2.8%	2.4%
2021-22	3.3%	3.4%	3.1%	3.5%	3.1%	2.4%
Average	2.7%	2.9%	2.7%	3.3%	2.7%	2.3%

Whilst Deloitte do not produce a Queensland AWOTE forecast, Table 25 demonstrates that the Queensland and Australian forecasts of AWE growth are somewhat similar with Queensland AWE higher than Australian forecasts. This suggests an expected level of real Queensland salary growth above Australian price inflation of around 1.0% over the forecast period.

Queensland Treasury also produces inflation forecasts as part of the Budget papers[30], as follows:

[28] See for example https://www.nytimes.com/2018/05/04/opinion/is-the-great-recession-still-holding-down-wages-wonkish.html

[29] Source: Deloitte Access Economics Business Outlook March 2018

[30] See page 33 of https://budget.qld.gov.au/files/BP2-2018-19.pdf

Table 26 Queensland Treasury Inflation Forecasts

Year	Queensland CPI	Queensland Wage Price Index
2018-19	2.00%	2.50%
2019-20	2.50%	3.00%
Average	2.25%	2.75%

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 0.50% p.a. indicated.

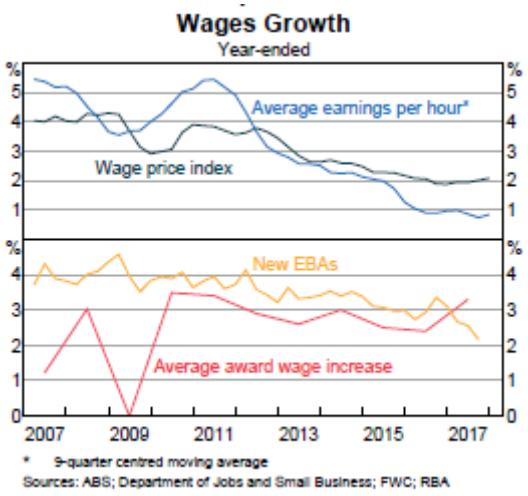
Another source of information regarding this relationship is the corresponding assumptions used by actuaries in similar contexts, as follows:

Table 27 Summary of Real Salary Growth Assumptions Used

Year	Scheme	Real Salary Growth Assumption
2013	Australia Post Superannuation Scheme	1.00%
2013	South Australian Superannuation Scheme	1.50%
2014	ASIC Superannuation Calculator	1.00%
2014	Defence Force Pension Schemes	1.50%
2014	SA Police Superannuation Scheme	1.50%
2015	NSW Report on State Finances - State Super Funds	0.00%
2015	ASIC Superannuation Calculator	1.50%
2015	Australia Post Superannuation Scheme	0.75%
2015	Victoria State Super Fund	1.50%
2015	BHP Superannuation Fund	1.50%
2016	NSW Report on State Finances - State Super Funds	1.00%
2016	ASIC Superannuation Calculator	1.50%
2016	Qantas Superannuation Fund	1.00%
2016	Commonwealth Bank Superannuation Fund	0.75%
2016	Unisuper	1.00%
2017	NSW Report on State Finances - State Super Funds	1.00%
2017	ASIC Superannuation Calculator	1.00%

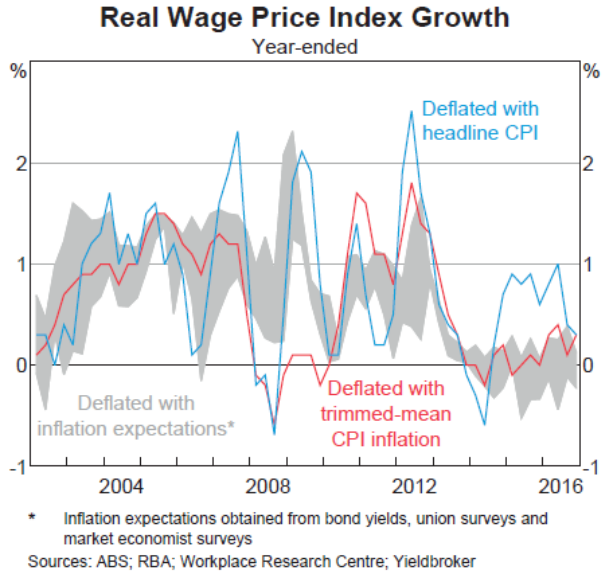
Further support for the assertion of relatively subdued wage growth going forward comes from the RBA's May 2018 Statement on Monetary Policy[19], which includes the following chart showing wage expectations:

Figure 20 Expected Wage Growth One Year Ahead



Another RBA paper[31] has also updated the history of real wage price index growth, as shown below:

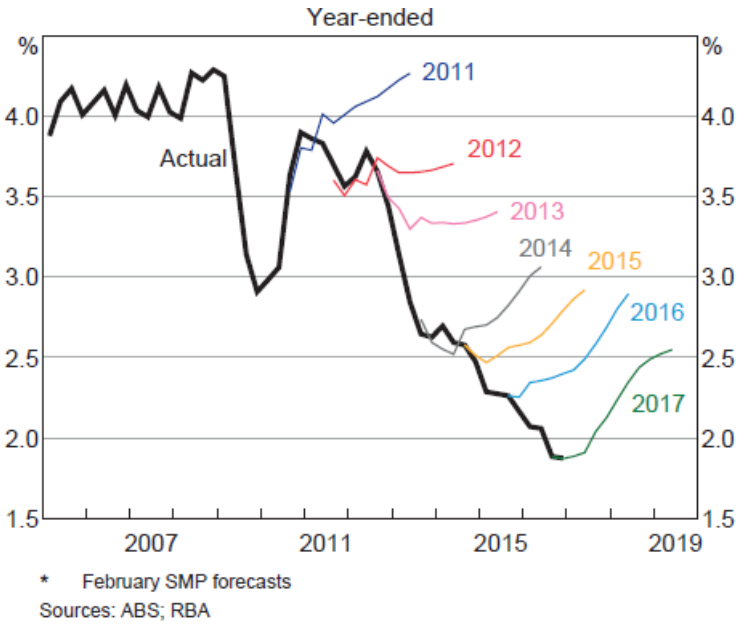
Figure 21 Real Wage Price Index Growth



It is interesting to note that real WPI growth has been a little under 1% p.a. over the last few years, with the corresponding figure based on inflation expectations around 0% p.a. That paper also showed the consistent overestimation of prospective wage price index growth for the last several years, with actual growth continually surprising on the downside, as follows:

[31] See https://www.rba.gov.au/publications/bulletin/2017/mar/pdf/bu-0317-2-insights-into-low-wage-growth-in-australia.pdf

Figure 22 Wage Price Index Forecasts



Whilst there is no guarantee that the recent subdued wage growth environment will continue over the duration of the liabilities in question, it is difficult to argue for an assumption at the higher end of commonly used assumptions.

Taking all of the above into account, we have concluded that a reasonable estimate of the level of real 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 3.1%.

We are cognisant that the wages policy underlying many existing bargaining agreements would suggest a lower salary inflation assumption than we 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 2.65% is slightly higher than the 2.5% assumed at the last Review. This is consistent with QIC's return expectations being slightly better than at the time of the previous Review.

In summary, the financial assumptions chosen for the funding basis at this Review are shown in Table 28, with the previous assumptions shown for comparison.

Table 28 Current and Previous Funding Basis Financial Assumptions

	Previous	Current
Discount Rate (Net Investment Return)	5.50%	5.75%
Salary Inflation	3.00%	3.10%
Price (CPI) Inflation	2.00%	2.10%

B.3 Promotional Increases

For the 1998 Review, the estimated actual promotional increases were calculated by considering the group of members who were present throughout the investigation period (cohort method). Estimates of salary inflation were removed from the overall salary increases so that the remaining increase represents promotional effects. However, this method assumes that the membership is in a state of equilibrium with regard to the distribution of salary levels. Whilst the Standard Defined Benefit Category was open to new entrants prior to Q2000, this assumption generally held and the cohort method was appropriate. The resulting breakdown in the equilibrium has meant that the cohort method cannot be applied after 1 July 2000.

This has meant that snapshots of the salary distribution at review dates have had to be used to analyse the promotional salary scale. The snapshot salary scale represents the cumulative effect of all the promotions that have been awarded to the membership as at the calculation date, whilst the cohort scale illustrates the promotional effects occurring over the period analysed. Because it concentrates on the more recent experience of the membership, the cohort method is generally preferred to the snapshot method, although both can assist in the analysis. In this regard, I have considered the relationship between the cohort and snapshot methods demonstrated in the 2001 and 2004 Reviews when determining whether any changes are necessary to the current assumed scales.

In previous Reviews, promotional salary scales were seen as likely to become increasingly important for the Standard Defined Benefit Category as, a priori employees who believe their promotional prospects to be better than average would be more likely to elect to join the Standard Defined Benefit Category. Consequently, the promotional salary scale would be expected to steepen over time as the membership moves towards the new equilibrium level derived from this new “type” of entrant (i.e. those who choose to join the Standard Defined Benefit Category). However, new entrant numbers have been low until the scheme was closed in 2008, so the “selection” effect described above has not been material. In addition, the membership has aged relatively and promotional salary growth at the higher ages is expected to be fairly limited so that the effect of this assumption has now lessened (see Section 6.2).

For the Police Members however, the vast majority of whom are subject to a single Collective Agreement, the cohort method described above has been able to be used to determine promotional increases over 2017-18.

The estimated promotional salary increases over the investigation period and the adopted promotional scales for this valuation are discussed below and are summarised in the service tables presented in Appendix C.

B.3.1 Promotional Increases – Standard Members

As noted above, in addition to the broader inflationary growth in salaries discussed in Section B.2.4, we also allow for salaries to progress age by age on the basis of a promotional salary scale. Figure 23 and Figure 24 illustrate the snapshot salary scales for Standard Male and Female members respectively, as at each review date during the analysis period, compared to the assumptions used in the previous Review. Consideration has been restricted to those members over age 30, as there are trivial numbers below this age and the experience is consequently quite volatile, without adding much to the analysis.

Figure 23 Promotional Increases by Age – Standard Male Members

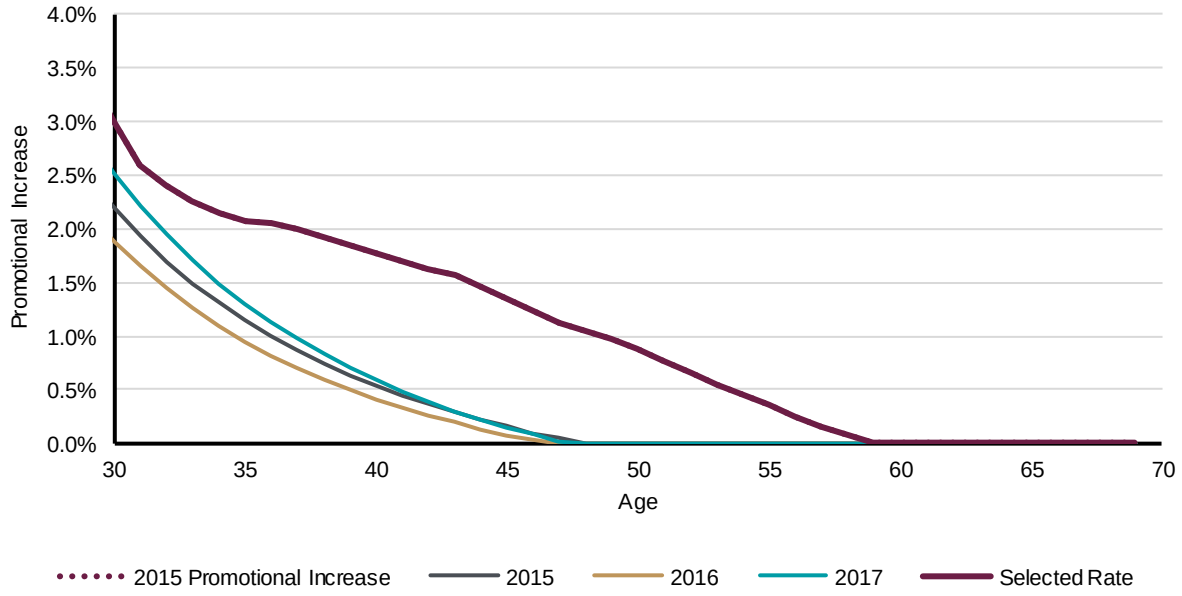
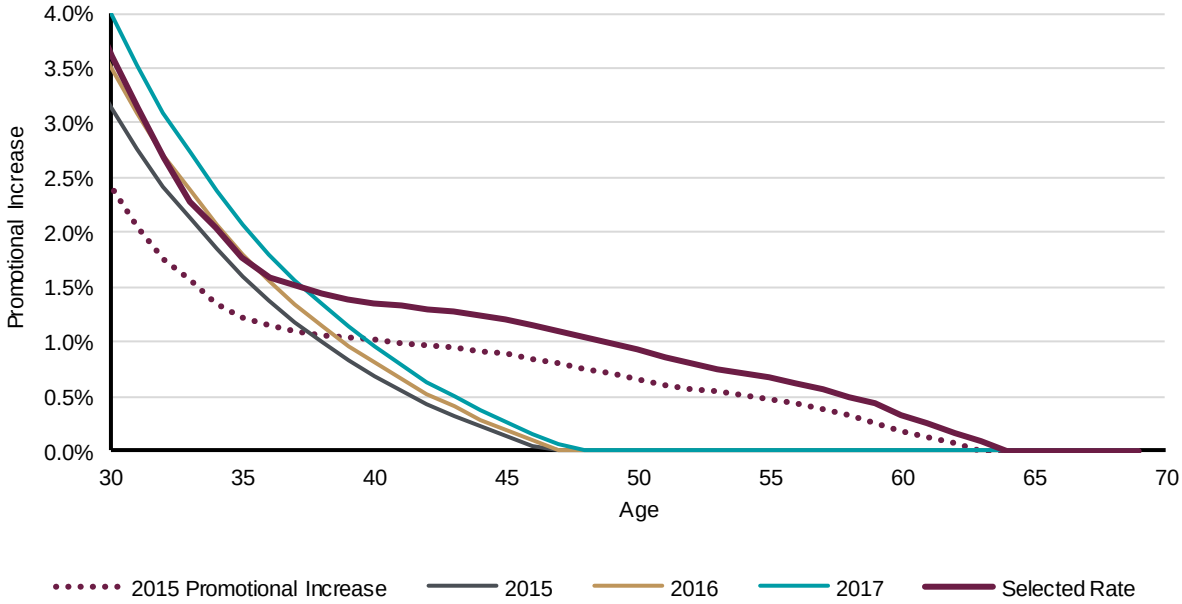


Figure 24 Promotional Increases by Age – Standard Female Members



It can be seen from the above that the snapshot salary scales above age 40 are significantly below the scales assumed in the last several Reviews, which were based on the cohort method. Noting that the Category has effectively been closed to new entrants for many years now, this is similar behaviour to that observed in 2004, where the snapshots underestimated the promotional increases based on the conceptually more accurate cohort model, as noted in that Report:

> *"The snapshot scales present a similar shape to the cohort method but at a generally lower level for ages above about 25. The similarity of the scales for the younger ages is due to the fact that most of these members will have entered the Defined Benefit Category in the last few years and so both methods give similar results. Older age groups are made up of more diverse service profiles and consequently the snapshots illustrate a mixture of promotional effects."*

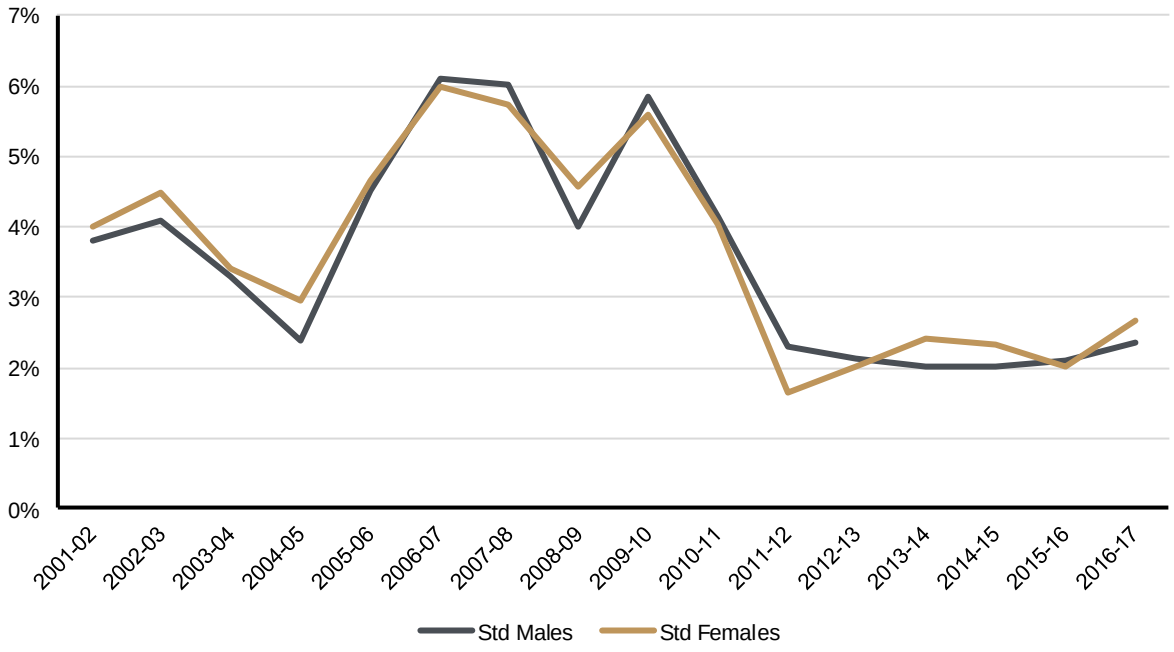
We have observed relative stability of the promotional salary experience for Standard members for several years however, there is some evidence that the promotional experience of Standard Females has increased over time, as observed in Figure 24 and in the corresponding chart in the 2015 Review. I note that the Standard Males snapshot experience has tended to be more volatile and not exhibited any consistent trends, compared to the Standard Females group. Consequently, I have again retained the promotional salary scale assumption for Standard Males.

As it is prudent not to underestimate salary growth, I have considered how to adjust the promotional salary scale assumption for Standard Females to reflect the apparent increases, recognising of course that this assumption is of declining importance as the membership continues to age. As discussed above, the cohort method provides the better model of prospective salary growth however it can only be estimated indirectly since the membership structure equilibrium was disturbed after 2000.

The method of adjusting the Standard Female salary scale is to increase the salary scale by a constant proportion, such that the implied inflationary growth during the investigation period was equivalent to the historically observed relativity to that of Standard Males.

Whilst it may be considered obvious that underlying inflation should affect Males and Females similarly, each group has a different mix of ages, service and position levels and so estimated salary inflation can differ between the two groups, even if underlying inflation is indeed consistent. We tested this hypothesis by comparing the implied inflation after removing the expected promotional growth for each group since 2000-01, as shown in Figure 25. The implied inflation levels for each membership group are similar, with no apparent trend nor consistent relativity. Consequently, we believe that the method described above produces an estimated promotional scale consistent with that underlying the cohort method. We note that it could be argued that the assumed promotional scale should be even higher, reflecting the apparent trend growth observed over the last several years. However, I have decided to await further confirmatory experience before adjusting the assumption any further, noting that there is an element of "pent up demand" being reflected in the adjustment that has been made at this Review.

Figure 25 Implied Inflationary Increases – Standard Members



B.3.2 Promotional Increases – Police Members

The promotional salary increases for Police members have been derived by subtracting the inflationary component estimated from an analysis of the relevant Certified Agreements, estimated to have averaged 3.0% p.a. over the intervaluation period, as follows.

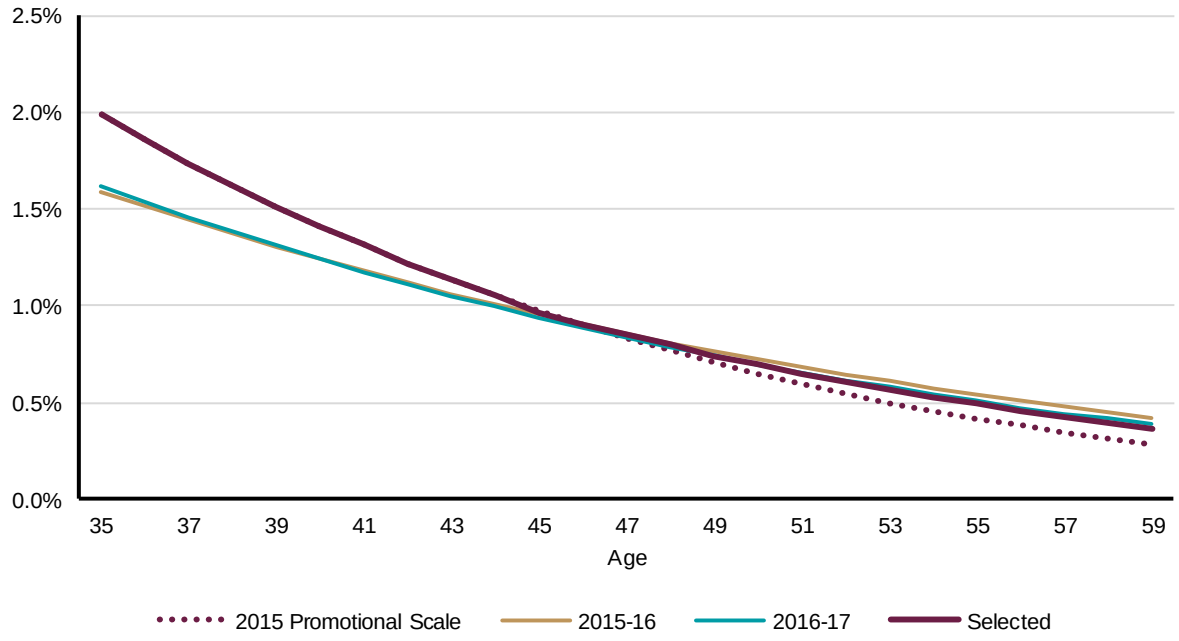
Table 29 Estimated Salary Inflation for Police Members

Year Ending 1 July	Overall Salary Increase
2016	3.0%
2017	3.0%
Average 2015-2017 (p.a.)	**3.0%**

Figure 26 shows the resulting promotional salary increases over 2015-17 as well as the 2017 salary scale assumption.

The implied promotional salary scales for 2015-16 and 2016-17 are at broadly similar levels above age 40 and below the scale assumed in the last several Reviews. However, I note that there is relatively sparse experience at these ages and so I have not made any adjustments on this account. Above age 40, the experience is a little above the previous assumption and we have decided to make a small adjustment, also reflecting the removal of the cap on promotional advancement to the top pay point included in the 2016 Certified Agreement.

Figure 26 Promotional Increases by Age – Police Members



B.4 Decrement Experience – Active Members

B.4.1 General

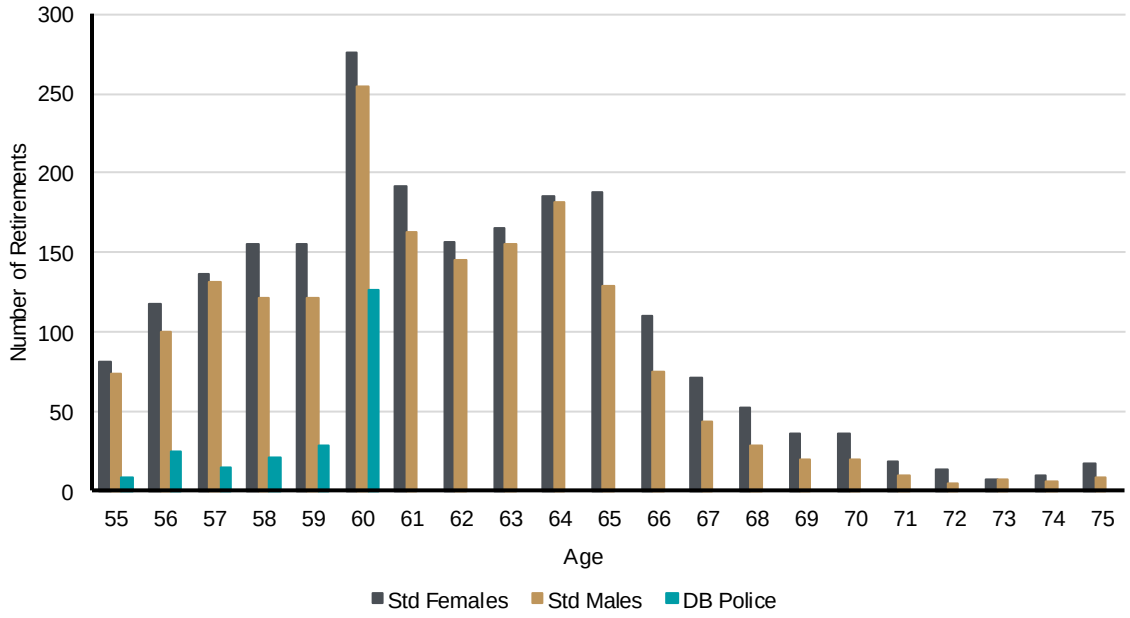
As mentioned in Section B.1, the analysis of member based experience has been performed separately for Standard Males, Standard Females and Police. The expected rates for Standard members and Police members are those assumed in the 30 June 2017 Review of QSuper.

The selected decrement rates are presented in the service tables in Appendix C.

B.4.2 Age Retirement – Normal Retirement Age

As indicated in Section A.3 there is no normal retirement date for Standard Defined Benefit Category members. In practice, the vast majority of members retire at or before age 65, however Figure 27 shows that there are still significant numbers of retirements until age 70, with quite limited numbers at higher ages. Consequently, I have retained the previous de facto normal retirement age for Standard members at age 70.

Figure 27 Age at Retirement during 2015-17



B.4.3 Age Retirement – Standard Male Members

A comparison of actual to expected retirements of Standard male members over the investigation period is contained in Table 30. The expected number of retirements has been calculated on the basis of the assumptions used in the last actuarial Review. We have also included the comparison for each individual year of the intervaluation period.

Table 30 Actual vs Expected Age Retirements – Standard Male Members

			Ratio of Actual to Expected		
Age	Actual Retirements	Expected Retirements	2015-17	2015-16	2016-17
55	74	191	39%	38%	38%
56	100	193	52%	47%	55%
57	131	187	70%	74%	64%
58	121	175	69%	63%	73%
59	121	167	72%	74%	66%
60	254	266	96%	80%	102%
61	163	185	88%	78%	89%
62	145	161	90%	81%	91%
63	155	150	103%	102%	94%
64	182	187	97%	84%	94%
65	129	167	77%	75%	70%
66	75	102	74%	67%	72%
67	44	68	65%	71%	52%
68	29	50	58%	55%	56%
69	20	37	55%	50%	53%
Total	**1,743**	**2,287**	**76%**	**73%**	**78%**

Before considering the retirement experience more closely, we note that the preservation age changes that applied from 30 June 1998 are now beginning to affect the retirement experience as those affected reach the relevant ages. For convenience, the age at which members are generally able to access their superannuation entitlements, or "preservation age" is shown in Table 31

Table 31 Preservation Age

Date of Birth	Preservation Age
Before 1 July 1960	55
1 July 1960 - 30 June 1961	56
1 July 1961 - 30 June 1962	57
1 July 1962 - 30 June 1963	58
1 July 1963 - 30 June 1964	59
After 30 June 1964	60

Prima facie, one would expect members who are now unable to access their superannuation entitlement to delay their retirement until their preservation age and so we would need to allow for this likelihood in our assumed future retirement rates as well as observing declines in the retirement experience for the affected ages.

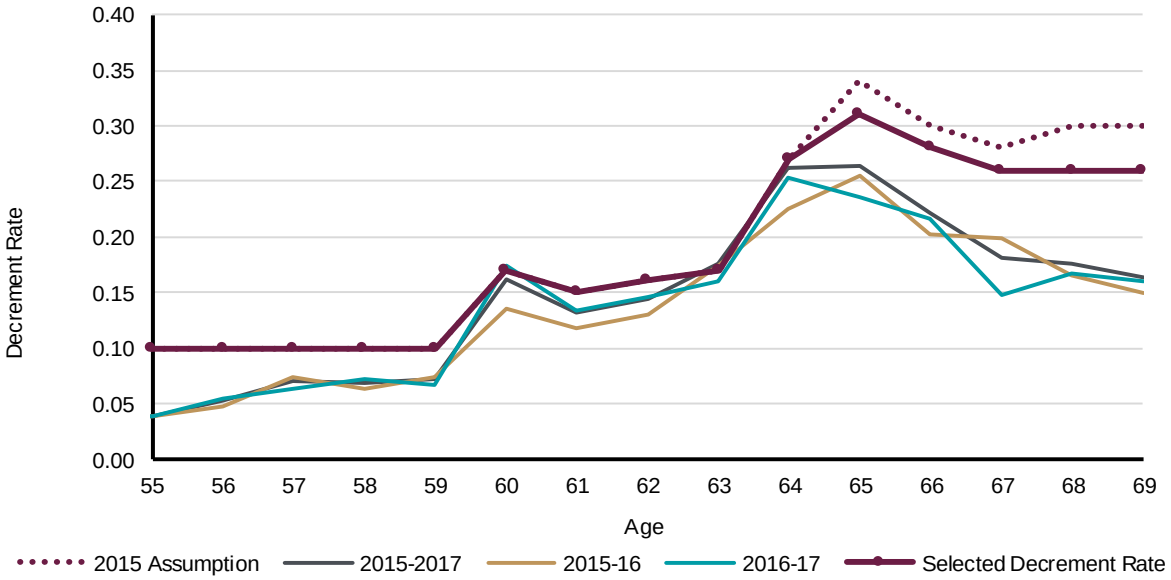
It is important to note that not *all* such members delay their retirement. During 2016-17, members born prior to 1 July 1960 must have been at least age 56 and consequently any retirements aged 55 observed in that year must have been born after 30 June 1960 and therefore unable to access their superannuation benefit immediately (presumably such members have other sources of income either by themselves or through a spouse/partner or perhaps they leave work after age 55 for specific reasons).

This can be partially observed by the relatively low number of age 55 retirements observed during the intervaluation period, noting that 2015-16 is somewhat affected by the change although not to the same extent as 2016-17, since some of the age 55 retirements during that year would have been born before 1 July 1960. The similarity of the relative numbers in both years reflects the fact that the "preservation age" effects can be swamped by normal year to year variations in retirement rates.

With regard to our assumptions for future retirement rates therefore, we need to reduce the rates for those ages prior to preservation age and then allow for the "delayed" crystallisation of defined benefit entitlements by increasing the probability of retirement at the preservation age. It is difficult to assess the proportion of retirements that will be delayed until preservation age until more experience emerges, since we only have one year of 'pure" experience and only for age 55. Consequently, we have made a judgement call to assume that, broadly consistent with the 2016-17 experience for age 55, 25% of the otherwise expected retirements will occur prior to preservation age, with the remainder delayed until preservation age.

In view of the likely temporary suppression of exit rates resulting from the retrenchment programs in 2014 and the complications caused by the issues discussed above, we have decided not to recalibrate the "base" rates below age 60, as shown in Figure 28. In practice, we have applied the decrement rates adjusted to allow for the delay described above, independently for each member grouping defined by preservation age, with the detailed rates base shown in Appendix C. Above age 60 for the Standard membership, we have reduced the assumed retirement rates somewhat, although not to the levels implied by the intervaluation experience, which is likely to be relatively suppressed subsequent to the retrenchment programs undertaken during 2013-14.

Figure 28 Age Retirement Rates – Standard Male Members



B.4.4 Age Retirement – Standard Female Members

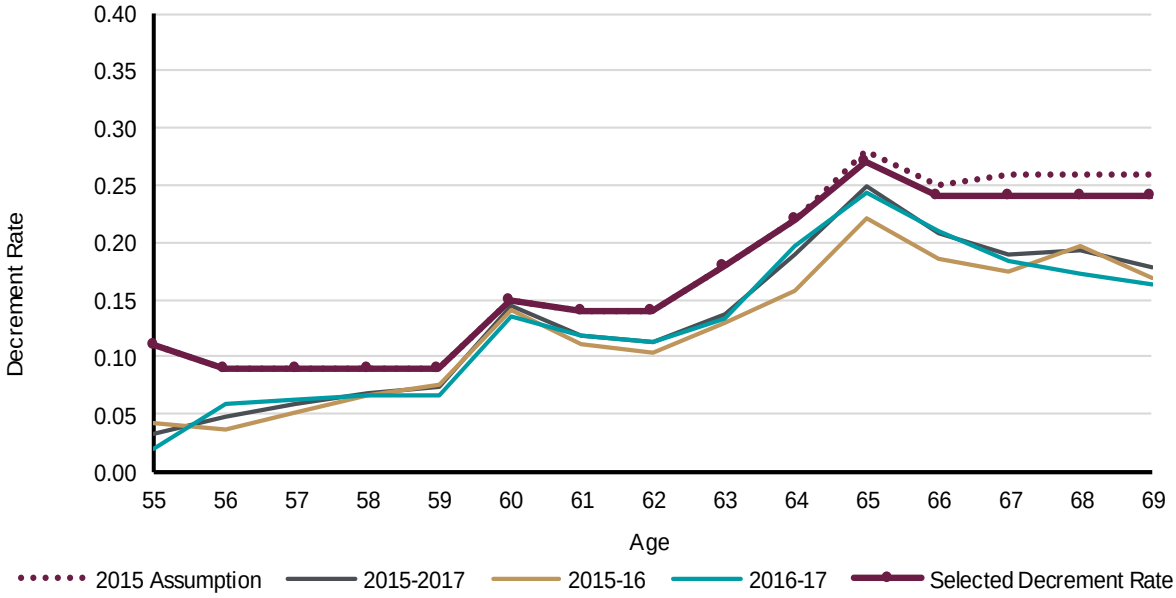
A comparison of actual to expected retirements of Standard female members over the investigation period is contained in Table 32. The expected number of retirements has been calculated on the basis of the assumptions used in the last actuarial Review. We have also included the comparison for each individual year of the intervaluation period.

Table 32 Actual vs Expected Age Retirements – Standard Female Members

			Ratio of Actual to Expected		
Age	Actual Retirements	Expected Retirements	2015-17	2015-16	2016-17
55	81	274	30%	39%	19%
56	118	221	53%	40%	66%
57	137	212	65%	57%	70%
58	155	203	76%	75%	75%
59	155	190	81%	84%	74%
60	276	287	96%	94%	90%
61	192	225	85%	80%	85%
62	156	194	80%	74%	81%
63	165	216	77%	72%	74%
64	186	216	86%	72%	89%
65	188	211	89%	79%	87%
66	110	132	83%	74%	84%
67	71	98	73%	67%	70%
68	53	71	75%	76%	66%
69	36	53	69%	65%	63%
Total	**2,079**	**2,803**	**74%**	**73%**	**77%**

The same issues regarding preservation age changes apply as for Standard Males and we have applied the same treatment, as shown in Figure 29 and shown in detail in Appendix C.

Figure 29 Age Retirement Rates – Standard Female Members



B.4.5 Age Retirement – Police Members

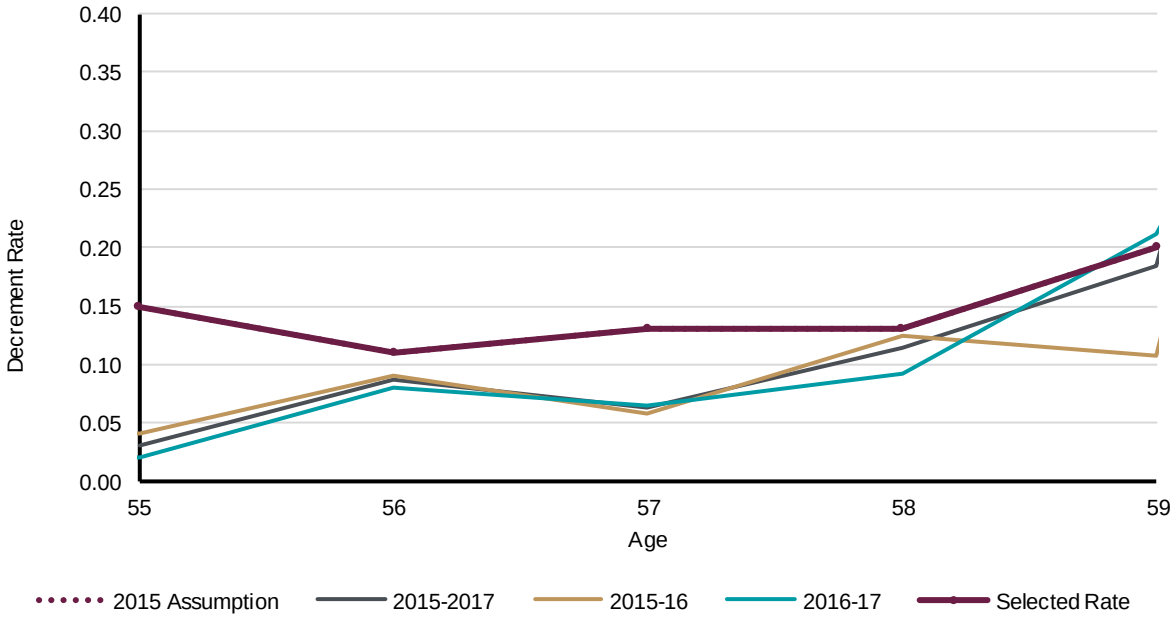
A comparison of actual to expected retirements of Police members over the investigation period is contained in Table 33. The expected number of retirements has been calculated on the basis of the assumptions used in the last actuarial Review. It will be noted that, in practice, the vast majority of members retire at or before age 60 in line with the previous experience of Police Super (see Figure 27).

Table 33 Expected vs Actual Age Retirements – Police Members

Age	Actual Retirements	Expected Retirements	Ratio of Actual to Expected
55	9	45	20%
56	25	31	79%
57	15	31	48%
58	21	24	87%
59	29	32	92%
Total	**99**	**163**	**61%**

Similarly to the Standard members, the experience is lower than expectation for Police members, however due to the effects of the previous retrenchment programs, we are reluctant to assume these lower rates will continue until further evidence emerges. Consequently, we have retained the existing base rates, as shown in Figure 30 and Appendix C, noting that the actual rates applied will vary by Preservation Age, as discussed in Section B.4.3.

Figure 30 Age Retirement Rates – Police Members



B.4.6 Mortality – Standard Male Members

A comparison of actual to expected deaths of Standard male members over the investigation period is contained in Table 34. The expected number of deaths has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 34 Actual vs Expected Mortality – Standard Male Members

Age Group	Actual Deaths	Expected Deaths	Ratio of Actual to Expected
30-34	0	0	0%
35-39	0	0	0%
40-44	3	1	205%
45-49	7	4	183%
50-54	6	8	77%
55-59	11	13	85%
60+	10	14	71%
Total	**37**	**40**	**92%**

Table 34 shows that the actual experience during the intervaluation period has been just below the previous assumption, however there is not a great deal of experience and so I have considered the previous investigation period as well, as shown in Figure 31. Given the paucity of experience and its broad consistency with the previous assumption, no change has been made for this Review.

Figure 31 Mortality Rates – Standard Male Members

B.4.7 Mortality – Standard Female Members

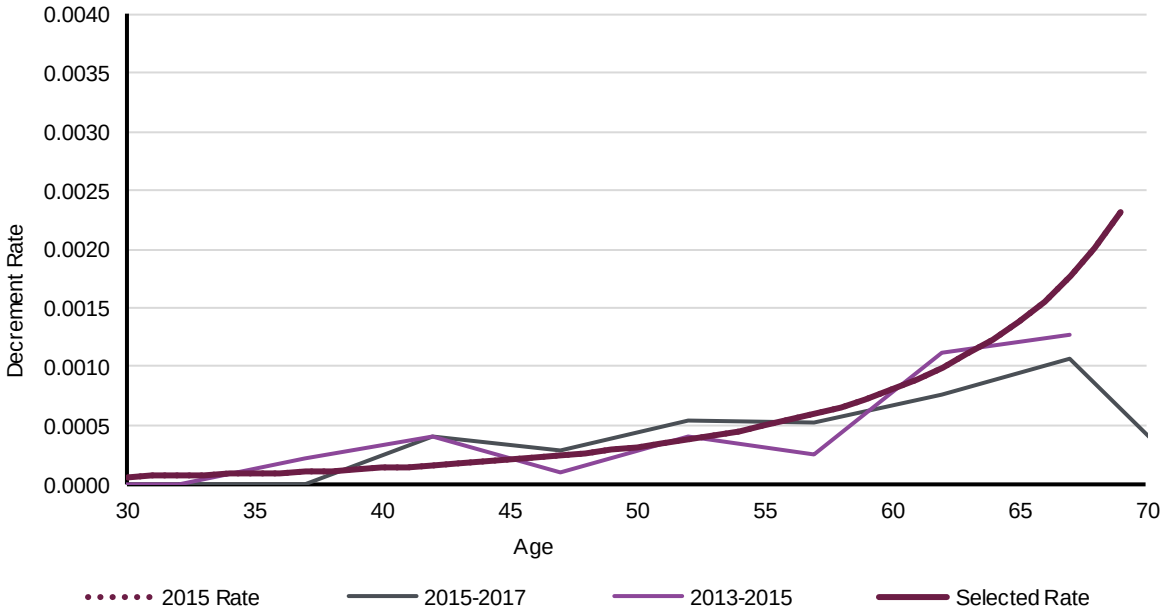
A comparison of actual to expected deaths of Standard female members over the investigation period is contained in Table 35. The expected number of deaths has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 35 Actual vs Expected Mortality – Standard Female Members

Age Group	Actual Deaths	Expected Deaths	Ratio of Actual to Expected
35-39	3	1	242%
40-44	3	3	117%
45-49	6	4	143%
50-54	6	7	89%
55-59	5	6	78%
60+	2	3	64%
Total	**25**	**24**	**103%**

The mortality experience of Standard Females has been quite similar to expectation. Taking into account the experience over the last four years shown in Figure 32, the 2015 assumption is quite consistent with that experience and so I have retained the assumption.

Figure 32 Mortality Rates – Standard Female Members



B.4.8 Mortality – Police Members

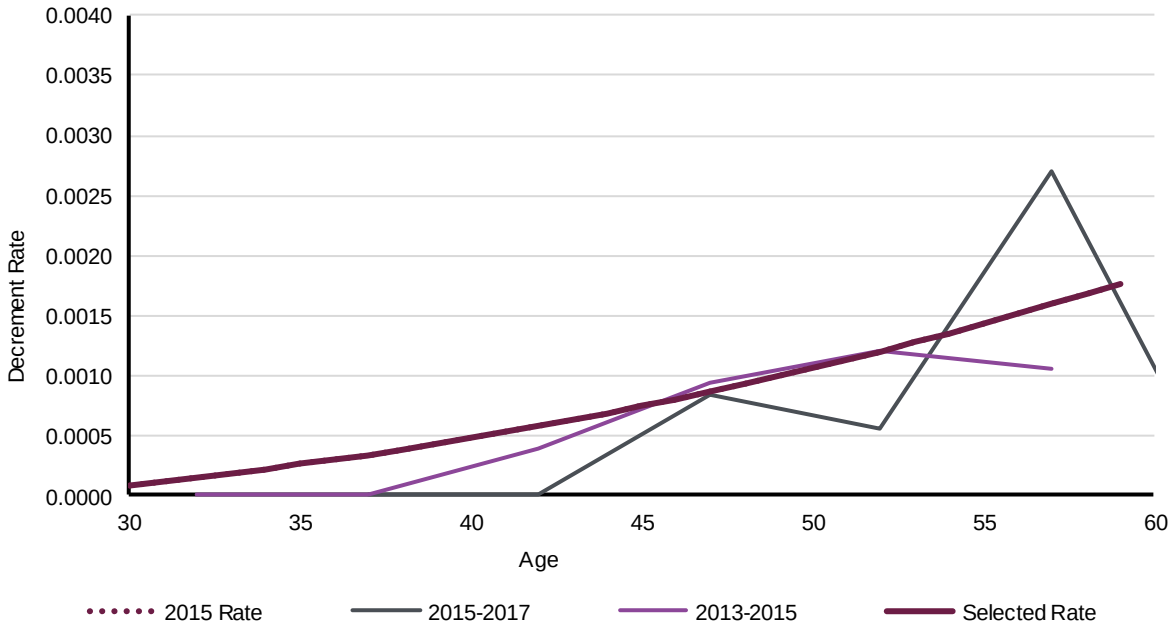
A comparison of actual to expected deaths of Police members over the investigation period is contained in Table 36. The expected number of deaths has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 36 Actual vs Expected Mortality – Police Members

Age Group	Actual Deaths	Expected Deaths	Ratio of Actual to Expected
40-44	2	2	98%
45-49	1	2	47%
50-54	3	2	173%
55-59	0	0	0%
Total	**6**	**6**	**102%**

There is very limited mortality experience for Police members and I have again considered the last four years in order to assess the merit of the previous assumption. Figure 33 demonstrates that the assumption has been broadly consistent with the scheme experience over this period and so I have retained it for this valuation.

Figure 33 Mortality Rates – Police Members



B.4.9 Permanent and Partial Disablement – Standard Male Members

A comparison of actual to expected permanent and partial disablements (PPD) of Standard Male, Standard Female and Police members during the investigation period are shown in Table 37, Table 38 and Table 39, respectively. The expected number of PPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 37 Actual vs Expected Rates of PPD – Standard Male Members

Age Group	Actual PPDs	Expected PPDs	Ratio of Actual to Expected
35-39	0	0	0%
40-44	0	1	0%
45-49	3	2	145%
50-54	0	1	0%
55-59	0	0	0%
60+	0	0	0%
Total	**3**	**5**	**60%**

Table 38 Actual vs Expected Rates of PPD – Standard Female Members

Age Group	Actual PPDs	Expected PPDs	Ratio of Actual to Expected
35-39	1	3	30%
40-44	1	4	22%
45-49	1	3	29%
50-54	0	0	0%
55-59	0	0	0%
60+	0	0	0%
Total	**3**	**11**	**27%**

Table 39 Actual vs Expected PPD Rates – Police Members

Age Group	Actual PPDs	Expected PPDs	Ratio of Actual to Expected
35-39	0	5	0%
40-44	0	3	0%
45-49	1	0	-
50-54	0	0	-
55-59	0	0	-
Total	**1**	**8**	**12%**

There is very limited PPD experience for Standard Males upon which to assess the validity of the 2015 assumption. Further, it is debatable whether the very low rates of PPD should be modelled at all. Consequently, I have decided to remove allowance for PPD decrements within the valuation basis. I will still monitor the experience however and reintroduce the PPD decrement assumption if required.

B.4.10 Total and Permanent Disablement – Standard Male Members

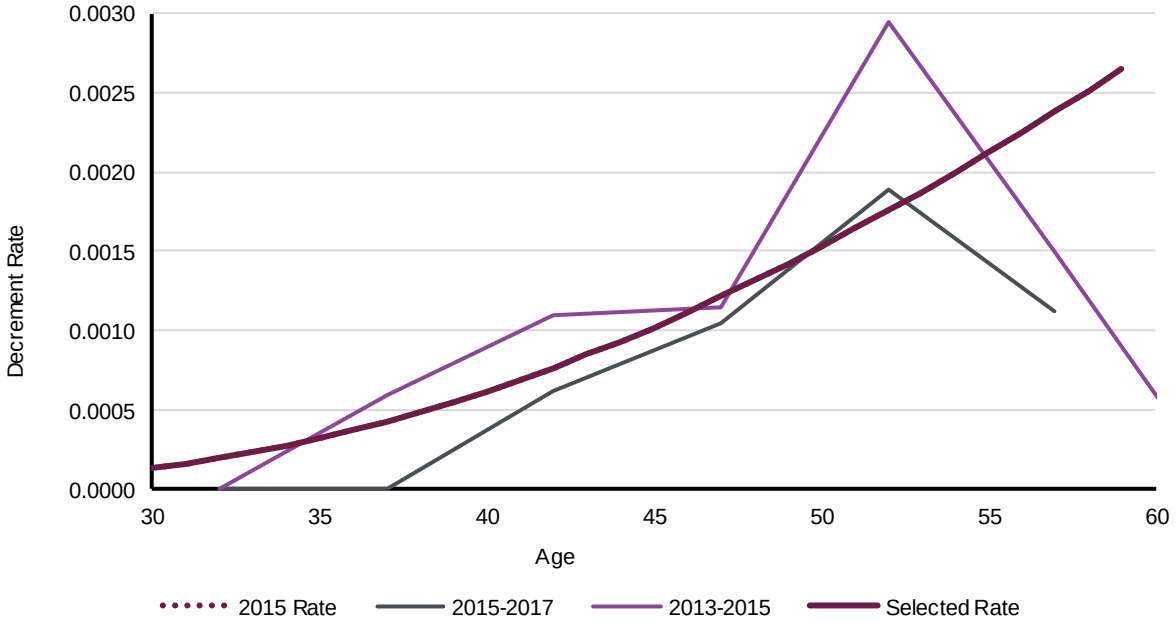
A comparison of actual to expected retirements due to total and permanent disablement (TPD) of Standard male members during the investigation period is contained in Table 40. The expected number of TPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 40 Actual vs Expected TPD Rates – Standard Male Members

Age Group	Actual TPDs	Expected TPDs	Ratio of Actual to Expected
35-39	0	0	0%
40-44	2	3	77%
45-49	6	7	85%
50-54	15	14	107%
55-59	10	21	47%
60+	0	0	0%
Total	**33**	**45**	**73%**

Table 40 shows that the actual experience during the intervaluation period has been below the previous assumption, however there is not a great deal of experience and so I have again considered the previous investigation period as well, as shown in Figure 34. This shows that the experience during the four year period has been a similar shape to the previous assumption and so I have retained the previous assumption.

Figure 34 TPD Rates – Standard Male Members



B.4.11 Total and Permanent Disablement – Standard Female Members

A comparison of actual to expected retirements due to TPD of Standard female members during the investigation period is contained in Table 41. The expected number of TPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

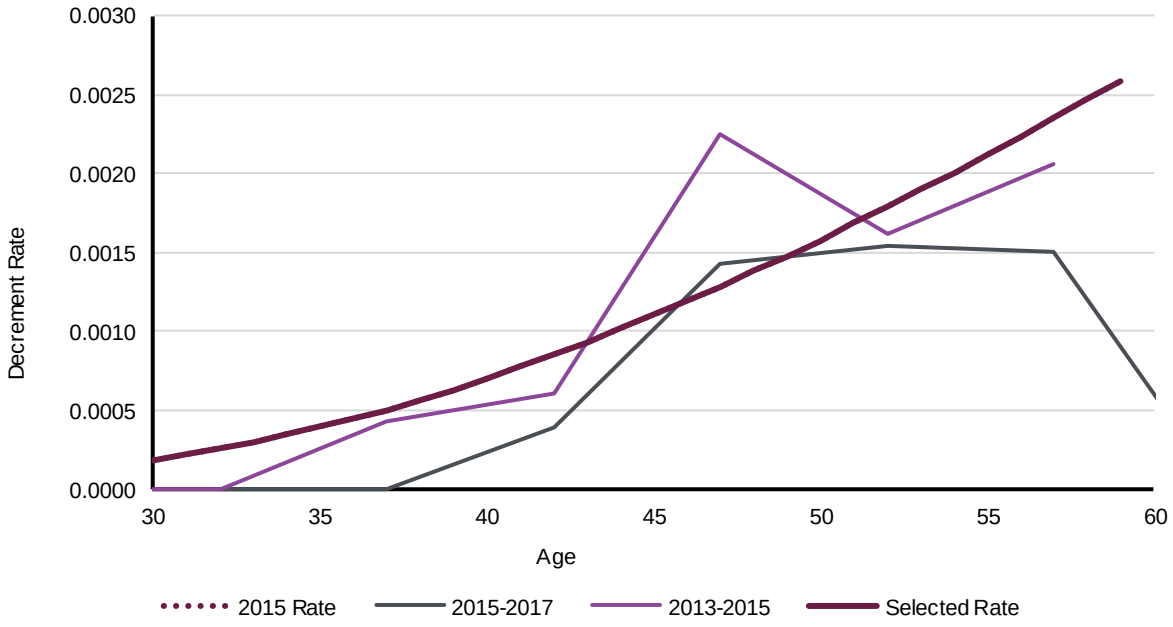
Table 41 Actual vs Expected TPD Rates – Standard Female Members

Age Group	Actual TPDs	Expected TPDs	Ratio of Actual to Expected
35-39	3	7	45%
40-44	15	14	111%
45-49	17	20	86%
50-54	17	27	64%
55-59	0	0	0%
60+	0	0	0%
Total	**52**	**67**	**78%**

The actual experience during the intervaluation period has also been below the previous assumption, however there is not a great deal of experience and so I have again considered the previous investigation period as well, as shown in Figure 35. This shows that the experience during the four

year period has been a similar shape to the previous assumption and so I have retained the previous assumption.

Figure 35 TPD Rates – Standard Female Members



B.4.12 Total and Permanent Disablement – Police Members

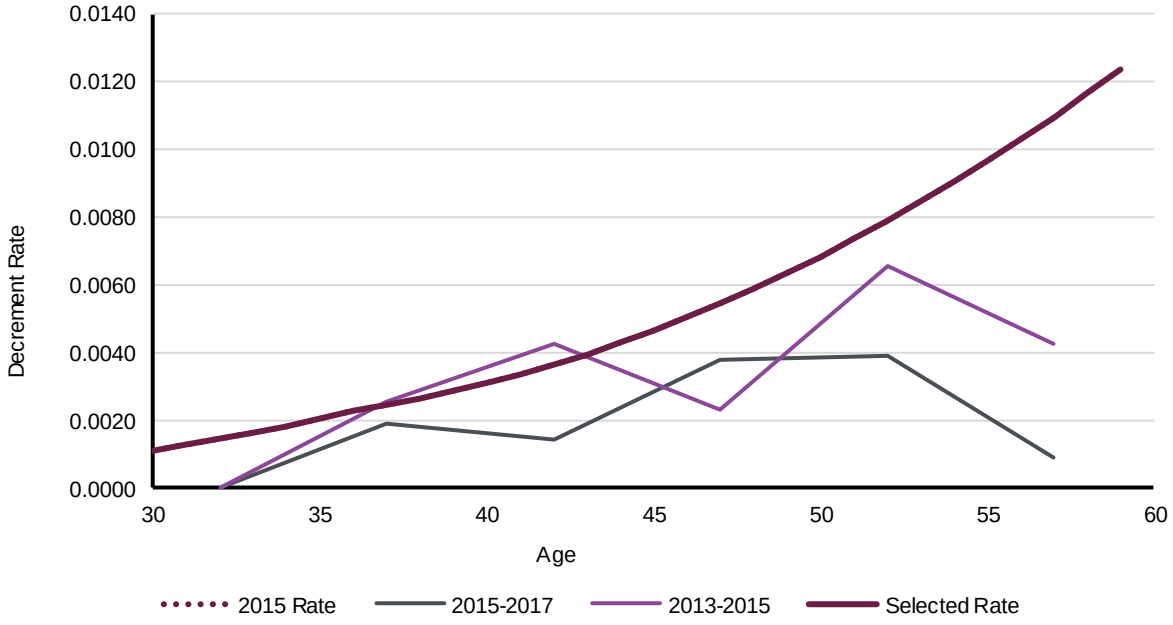
A comparison of actual to expected retirements due to TPD of Police members during the investigation period is contained in Table 42. The expected number of TPDs has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 42 Actual vs Expected TPD Rates – Police Members

Age Group	Actual TPDs	Expected TPDs	Ratio of Actual to Expected
35-39	3	8	38%
40-44	9	13	70%
45-49	7	14	50%
50-54	1	12	8%
55-59	0	0	-
Total	**20**	**47**	**43%**

The TPD rates for Police members have been much lower than expectation, as is demonstrated in Figure 36, which shows the experience for the last four years. There was a reduction at the 2015 Review, whilst another two years' experience appears to indicate that a further reduction may be appropriate, I have decided to retain the assumption and look for confirmation of this at the next experience review.

Figure 36 TPD Rates – Police Members



B.4.13 Resignation – Standard Male Members

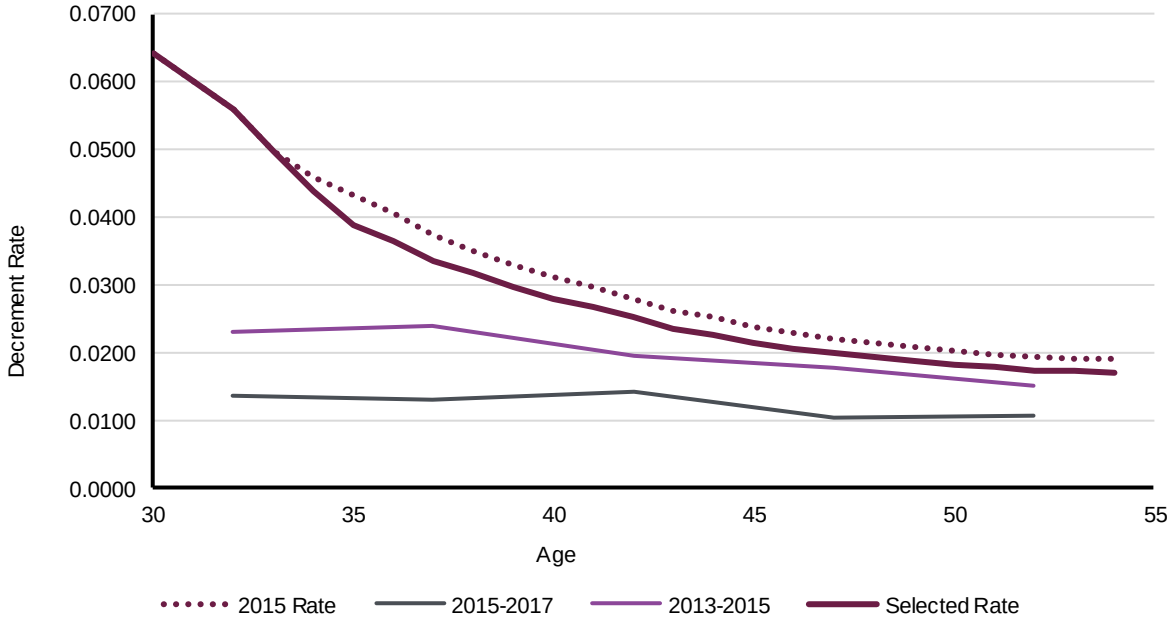
A comparison of actual to expected resignations for Standard Males over the investigation period is contained in Table 43. The expected number of resignations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 43 Actual vs Expected Resignations – Standard Male Members

Age Group	Actual Resignations	Expected Resignations	Ratio of Actual to Expected
25-29	0	0	0%
30-34	1	4	27%
35-39	11	30	37%
40-44	46	89	51%
45-49	60	127	47%
50-54	85	154	55%
Total	**203**	**405**	**50%**

Overall, the experience has been much lower than expectation, as demonstrated in Figure 37, where the experience over the last four years has been shown. Recognising the volatility at the younger ages where there is very little experience, the assumption has been reduced for this valuation to take account of recent experience.

Figure 37 Resignation Rates – Standard Male Members



B.4.14 Resignation – Standard Female Members

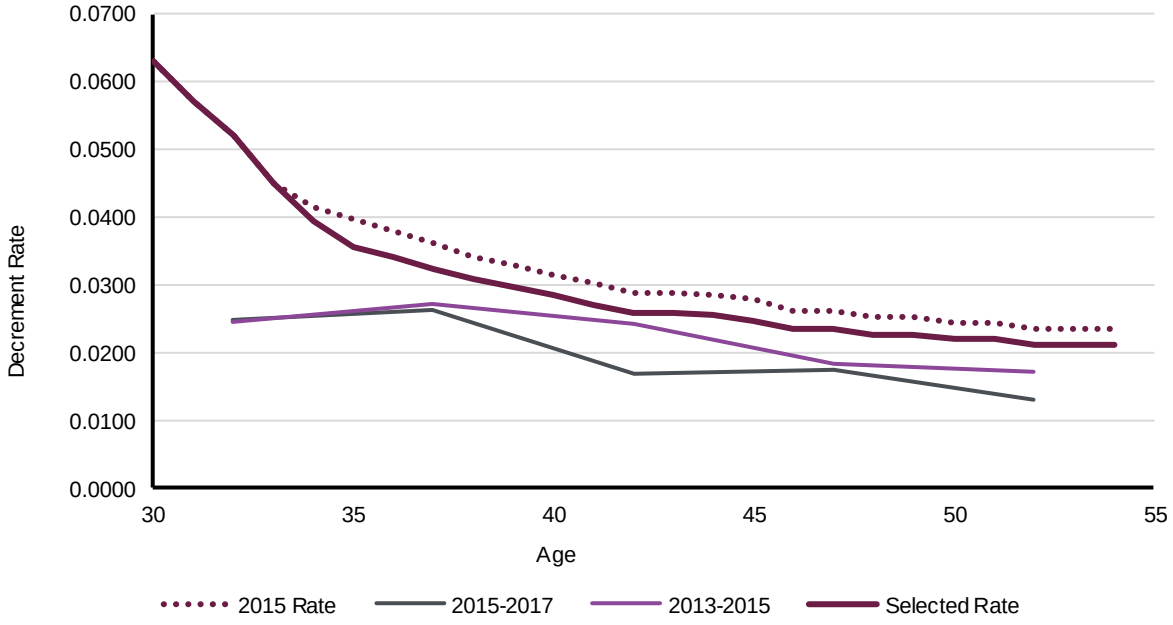
A comparison of actual to expected resignations for Standard Females over the investigation period is contained in Table 44. The expected number of resignations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 44 Actual vs Expected Resignations – Standard Female Members

Age Group	Actual Resignations	Expected Resignations	Ratio of Actual to Expected
25-29	3	6	53%
30-34	61	80	76%
35-39	130	224	58%
40-44	183	276	66%
45-49	143	264	54%
50-54	520	850	61%
Total	**1,040**	**1,700**	**61%**

Similarly to the Standard Males, the experience has been below expectation, as demonstrated in Figure 38, where the experience over the last four years has been shown. Recognising the volatility at the younger ages where there is very little experience, the assumption has been reduced for this valuation to take account of recent experience.

Figure 38 Resignation Rates – Standard Female Members



B.4.15 Resignation – Police Members

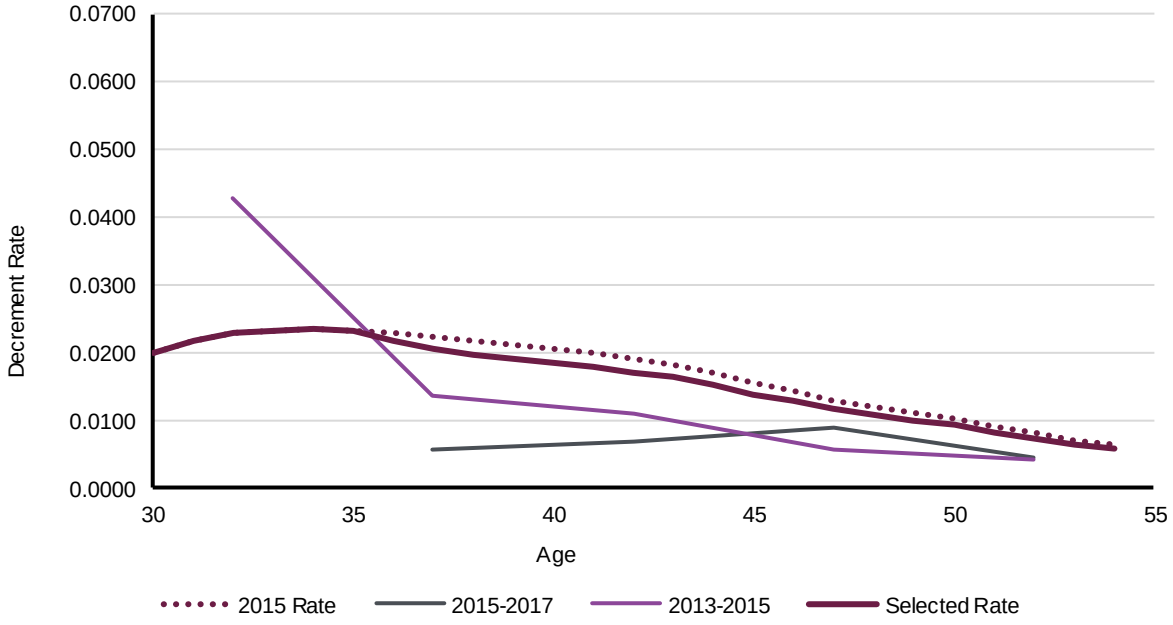
A comparison of actual to expected resignations for Police members over the investigation period is contained in Table 45. The expected number of resignations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 45 Actual vs Expected Resignations – Police Members

Age Group	Actual Resignations	Expected Resignations	Ratio of Actual to Expected
30-34	3	10	29%
35-39	14	35	40%
40-44	21	28	74%
45-49	8	13	60%
50-54	46	87	53%
Total	**92**	**175**	**53%**

Again, the overall experience has been below expectation, as demonstrated in Figure 39, where the experience over the last four years has been shown. Recognising the volatility at the younger ages where there is very little experience, the assumption has been reduced for this valuation to take account of recent experience.

Figure 39 Resignation Rates – Police Members



B.4.16 Involuntary Termination – General

Due to the ad-hoc nature of involuntary terminations, it is difficult to determine their likely future level. However, they need to be considered since the involuntary termination benefit is greater than the actuarial reserve, although the liabilities are not particularly sensitive to variations in this assumption and will become increasingly less so as the active membership continues to age. Involuntary termination includes voluntary early retirements (prior to age 55), retrenchments and redundancies.

B.4.17 Involuntary Termination Experience – Standard Male Members

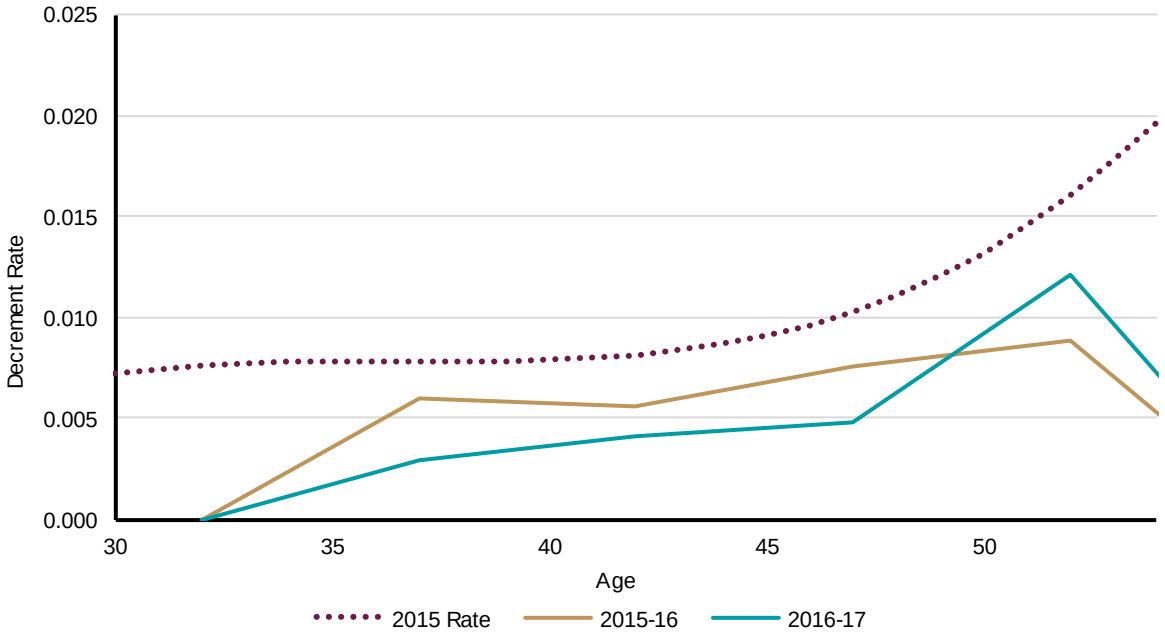
A comparison of actual to expected involuntary terminations for Standard Males under age 55 over the investigation period is contained in Table 46. The expected number of involuntary terminations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 46 Actual vs Expected Involuntary Terminations – Standard Male Members

Age Group	Actual Involuntary Terminations	Expected Involuntary Terminations	Ratio of Actual to Expected
25-29	0	0	0%
30-34	0	1	0%
35-39	4	7	61%
40-44	16	27	59%
45-49	36	61	59%
50-54	83	131	64%
Total	**139**	**225**	**62%**

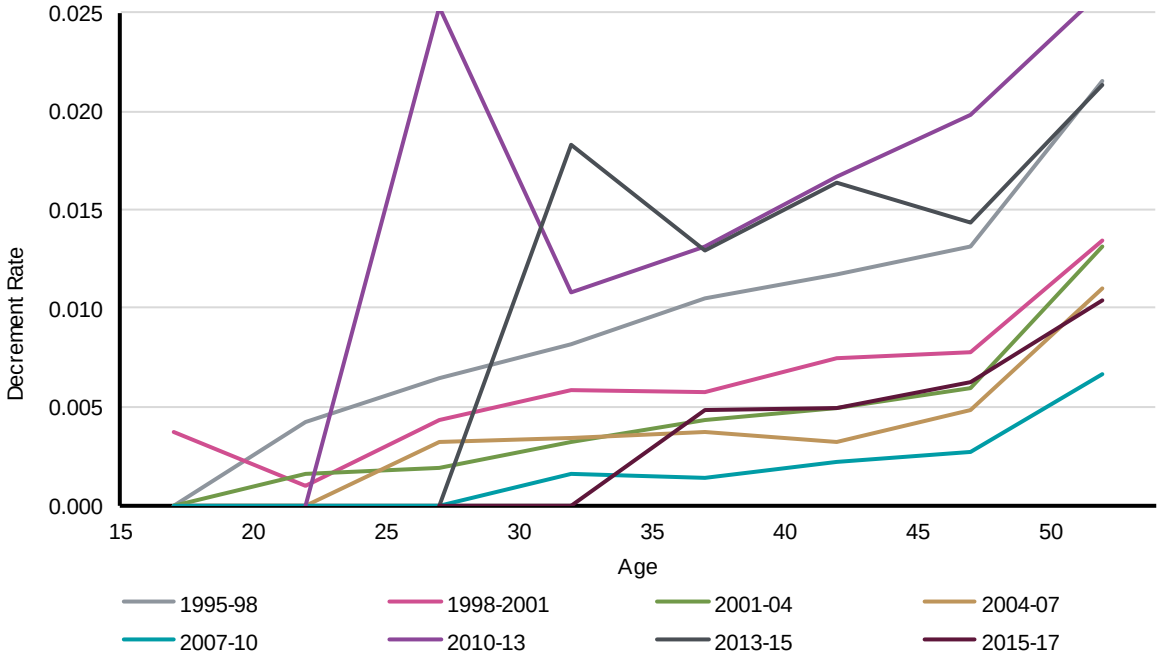
The levels of involuntary terminations over the intervaluation period have been lower than assumed in the last valuation, as illustrated in Figure 40.

Figure 40 Involuntary Termination Rates for Standard Males – 2015-17



Noting the year by year volatility of involuntary termination rates, in recent Reviews I have considered the experience over the longer term. Figure 41 shows the history since 1995, demonstrating that there is a broadly increasing trend with age but that the levels are quite volatile over time, reflecting the "one off" nature of these programs.

Figure 41 Historical Involuntary Termination Rates – Standard Male Members



On balance, I do not believe there is sufficient evidence from the latest two year period to adjust the assumption and so it has been retained.

B.4.18 Involuntary Termination Experience – Standard Female Members

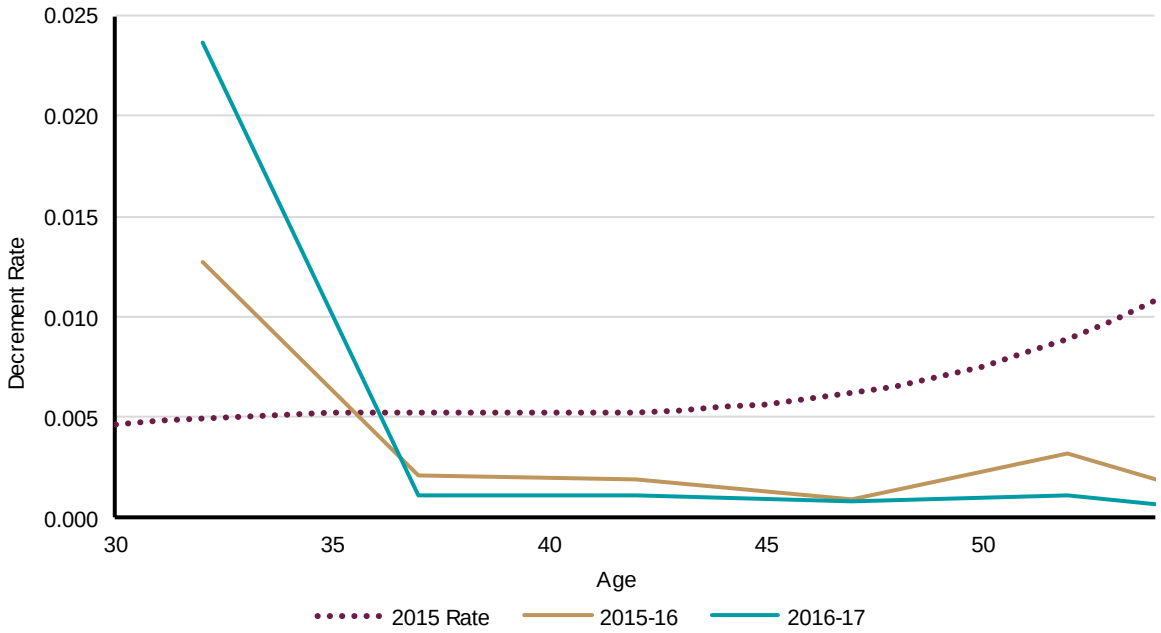
A comparison of actual to expected involuntary terminations for Standard Females under age 55 over the investigation period is contained in Table 47. The expected number of involuntary terminations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 47 Actual vs Expected Involuntary Terminations – Standard Female Members

Age Group	Actual Involuntary Terminations	Expected Involuntary Terminations	Ratio of Actual to Expected
25-29	2	1	328%
30-34	4	12	33%
35-39	12	41	30%
40-44	9	66	14%
45-49	24	100	24%
50-54	0	0	0%
Total	**51**	**219**	**23%**

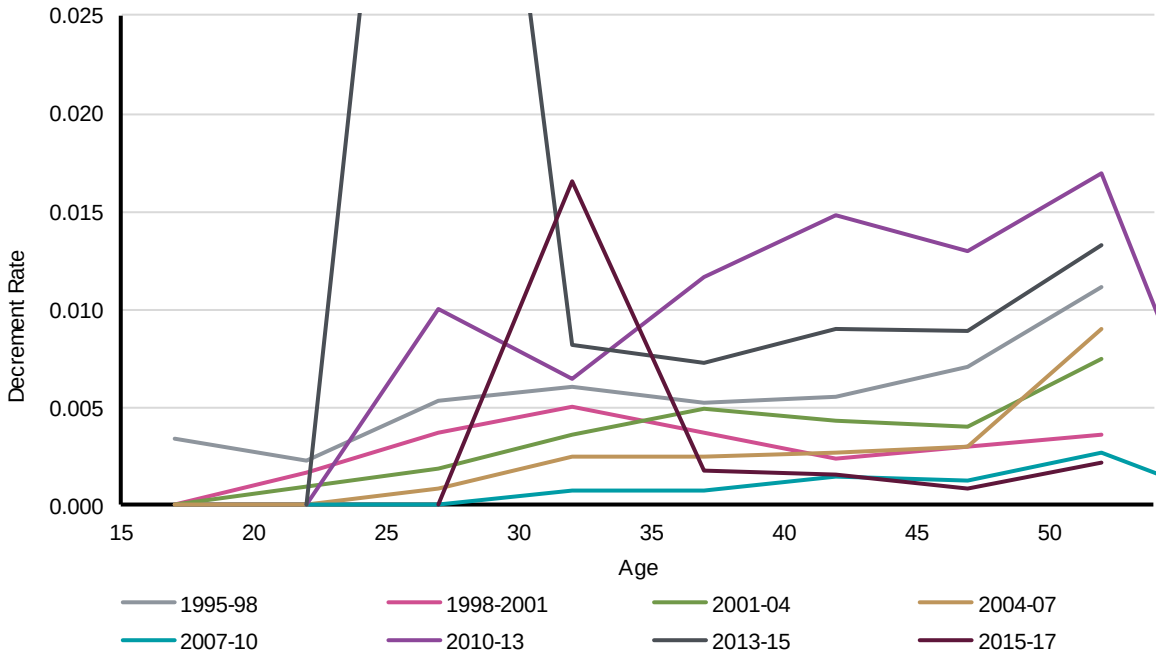
Once again, the experience is lower than expectation and this is confirmed in Figure 42, noting the very limited experience at the younger age groups.

Figure 42 Involuntary Termination Rates for Standard Females – 2015-17



Similarly to Standard Males, I have considered the longer term experience (shown in Figure 43) and do not believe that there is sufficient evidence to change the assumption, so it has been retained.

Figure 43 Historical Involuntary Termination Rates – Standard Female Members



B.4.19 Involuntary Termination Experience – Police Members

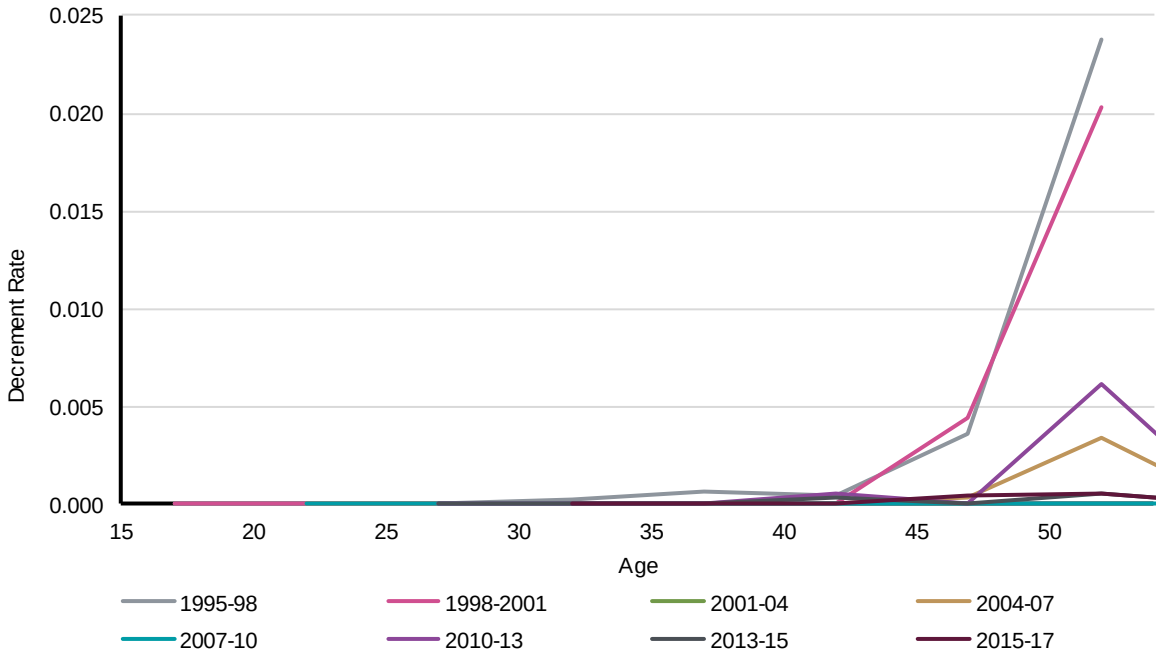
A comparison of actual to expected involuntary terminations for Police members under age 55 over the investigation period is contained in Table 48. The expected number of involuntary terminations has been calculated on the basis of the assumptions used in the last actuarial Review.

Table 48 Actual vs Expected Involuntary Terminations – Police Members

Age Group	Actual Involuntary Terminations	Expected Involuntary Terminations	Ratio of Actual to Expected
25-29	0	0	0%
30-34	0	0	0%
35-39	0	1	0%
40-44	1	4	23%
45-49	1	18	5%
50-54	0	0	0%
Total	**2**	**23**	**9%**

Whilst the number of involuntary terminations for Police is below expectation, the numbers are too small to make statistical inferences. Similarly to the other membership groups, I have considered the longer term experience (shown in Figure 44) and retained the previous assumption.

Figure 44 Involuntary Termination Rates – Police Members



B.4.20 Transfers to the Comprehensive Accumulation Category - General

The benefit offered to members of the Standard Defined Benefit Category who transfer to the Comprehensive Accumulation Category is equivalent to the Investment Linked Option (ILO) benefit payable on resignation. Since the option to transfer is available on an open-ended basis, future transfers have a similar financial effect to resignations (although it is possible for resigning members to transfer their entitlements away from QSuper, in practice this occurs rarely). As the rate of transfer does not vary significantly by member type I have considered this at an overall level.

A comparison of actual to expected transfer rates for all members under age 55 over the investigation period is contained in Table 49. The expected number of transfers has been calculated on the basis of the assumptions used in the last actuarial Review.

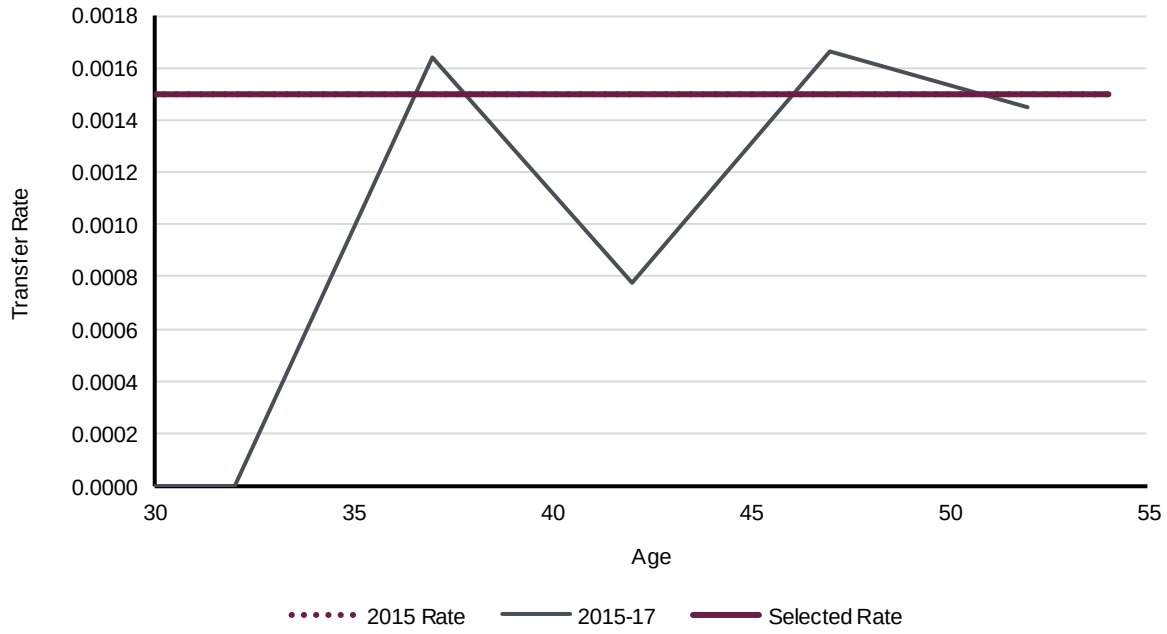
Table 49 Actual vs Expected Transfers – All Members

Age Group	Actual Transfers	Expected Transfers	Ratio of Actual to Expected
25-29	0	0	0%
30-34	5	4	115%
35-39	9	16	57%
40-44	21	24	87%
45-49	32	28	115%
50-54	10	12	84%
Total	**77**	**84**	**91%**

After the increase in transfer rates observed at the last Review, subsequent to the Deed amendment in 2013 that allowed Accumulation members to transfer their entitlements from QSuper whilst

remaining employed (portability), experience has been broadly similar to the new assumption, as shown in Figure 45. Consequently, I have decided to retain the assumption.

Figure 45 Transfer Rates – All Members



B.4.21 Family Law Splits and Transition to Retirement Pensions

As noted in Section A.1, members are able to (or may be required to) crystallise part or all of their defined benefit entitlement as a result of a Family Law split or when converting to a Transition to Retirement pension. These events effectively result in an “in-service” benefit payment as the member remains in the Standard Defined Benefit Category and continues to accrue benefits in the usual manner.

The yearly proportions of benefits crystallised under a Family Law split during the investigation period are shown in Figure 46 and the corresponding number of splits in Table 50.

Figure 46 Family Law Proportions Under Age 55 – Experience

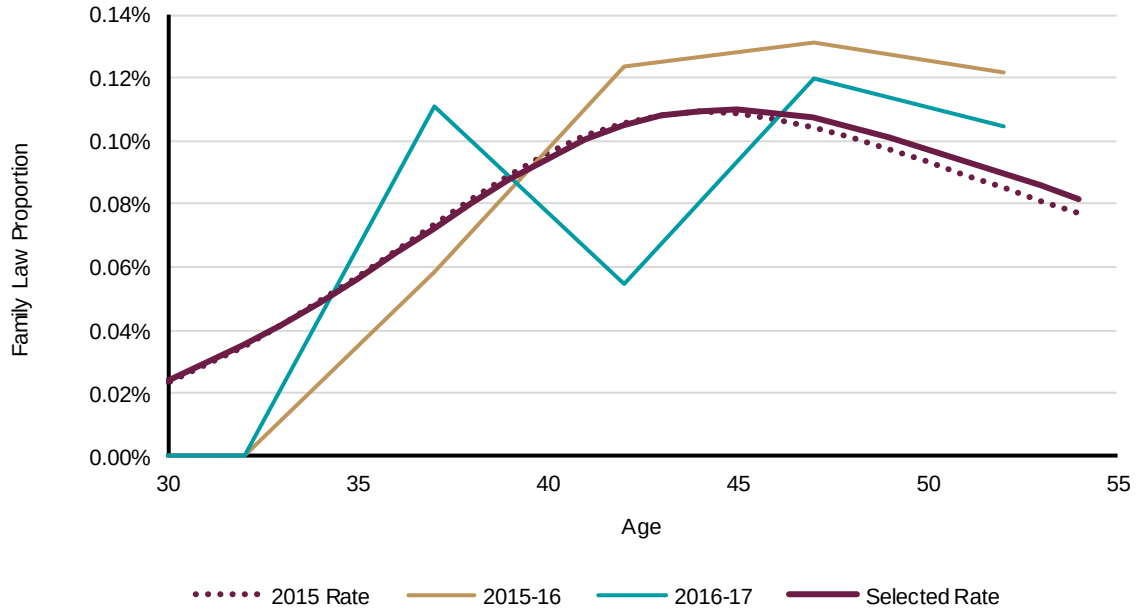


Table 50 Number of Family Law Splits – Under Age 55

Year Ending 30 June	Number of Family Law Splits
2016	87
2017	77
Total	**164**

The age based trend observed in previous Reviews continues, although at a higher level than assumed. Consequently, the assumed proportions of benefits crystallised under a Family Law split have been increased, as shown in Figure 46.

Over age 55, the annual scheme experience for Family Law splits and transition to retirement (TtR) transfers are shown in Figure 47 and the corresponding number of splits and TtR transfers in Table 51.

Figure 47 Family Law and TTR Proportions Over Age 55 – Experience

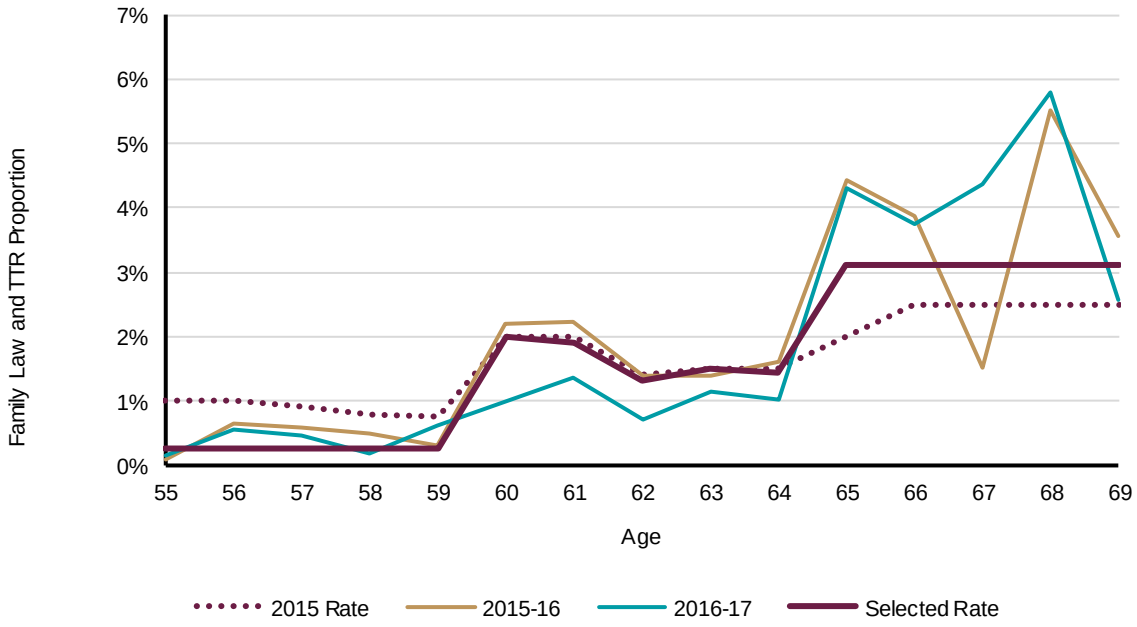


Table 51 Number of Family Law Splits and TtR Conversions - Over Age 55

Year Ending 30 June	Number of Family Law Splits	Number of TTRs
2016	30	811
2017	29	647
Total	**59**	**1,458**

The rates are broadly similar in shape over time although quite volatile and lower than assumed in the 2015 Review over most ages below age 65 and higher than that assumed over most ages above age 65. A priori, we would expect the TtR rates under age 60 to decline subsequent to the taxation changes applying from 2017-18, where such accounts lost their taxation exemption. Consequently, the assumed proportions of benefits crystallised under a Family Law split or a TtR have been adjusted to reflect more recent experience for age 60 and above with a lower rate applying below age 60, reflecting lower levels of TtR conversions, as shown in Figure 47.

B.4.22 Leaving Service – Parliamentary Category

As noted is Section B.1, the decrement assumptions for the Parliamentary Category have been based on those derived from the experience of the relevant groups within the Standard Defined Benefit Category, due to the insignificance of these liabilities in the overall context of QSuper. However, an important assumption for the Parliamentary members, which cannot be inferred from any analysis of the Standard Defined Benefit Category, is the probability of exit at each election.

It might be expected a priori that both the probability of voluntary retirement and election loss might be correlated with the number of times already elected and therefore the member's service prior to the election. However, even the relatively large number of exits at a number of recent elections does not provide a sufficiently large sample of data on which to base statistically valid inferences. A detailed

investigation of the leaving service experience for the last nine elections is shown in Table 52, noting that there had not been another election prior to the investigation date.

Table 52 Percentage of Members Exiting by Years of Service

Years of Service at Election	Election									
	1992	1995	1998	2001	2004	2006	2009	2012	2015	1992-2015
0-4	13%	19%	44%	44%	18%	0%	0%	0%	0%	22%
4-8	8%	19%	0%	20%	0%	19%	0%	0%	0%	11%
8-11	0%	0%	23%	33%	0%	7%	25%	50%	29%	22%
11+	36%	18%	39%	40%	22%	37%	38%	67%	54%	39%
Total	**17%**	**16%**	**29%**	**38%**	**15%**	**21%**	**24%**	**62%**	**45%**	**27%**

As can be seen from Table 52, there has been considerable variation in the probabilities of exit from election to election with no real trend evident. Overall though, there would appear to be justification to assume varying probabilities of exit depending on service prior to the election.

In view of the relative insignificance of this assumption for QSuper overall and the lack of any evidence from which to adjust the assumption, I have retained the previous assumption, as shown in Table 53.

Table 53 Percentage of Parliamentary Category Members Exiting at Future Elections

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

B.5 Deferred Retirement Benefit

As discussed in Section A.1.11, Standard Defined Benefit Category members receive an AWOTE indexed benefit (the deferred retirement benefit or DRB) on leaving employment prior to age 55. This benefit can be converted at any time to a cash equivalent amount (ILO) invested in the Basic Accumulation Category earning investment returns in line with the member's choice of investment strategy. The conversion involves discounting the balance of the AWOTE indexed benefit by 2.88% compound for each year below age 55.

Where the assumed real discount rate in the actuarial valuation is different from 2.88%, allowance needs to be made for the effect of the ILO, both in respect of the existing DRB population and also the future DRB members who are projected to withdraw from the Standard Defined Benefit Category.

The rates at which existing members with deferred retirement benefits have converted to the investment linked option over the investigation period are shown in Table 54.

Table 54 ILO Conversion Rates for Existing DRB Members

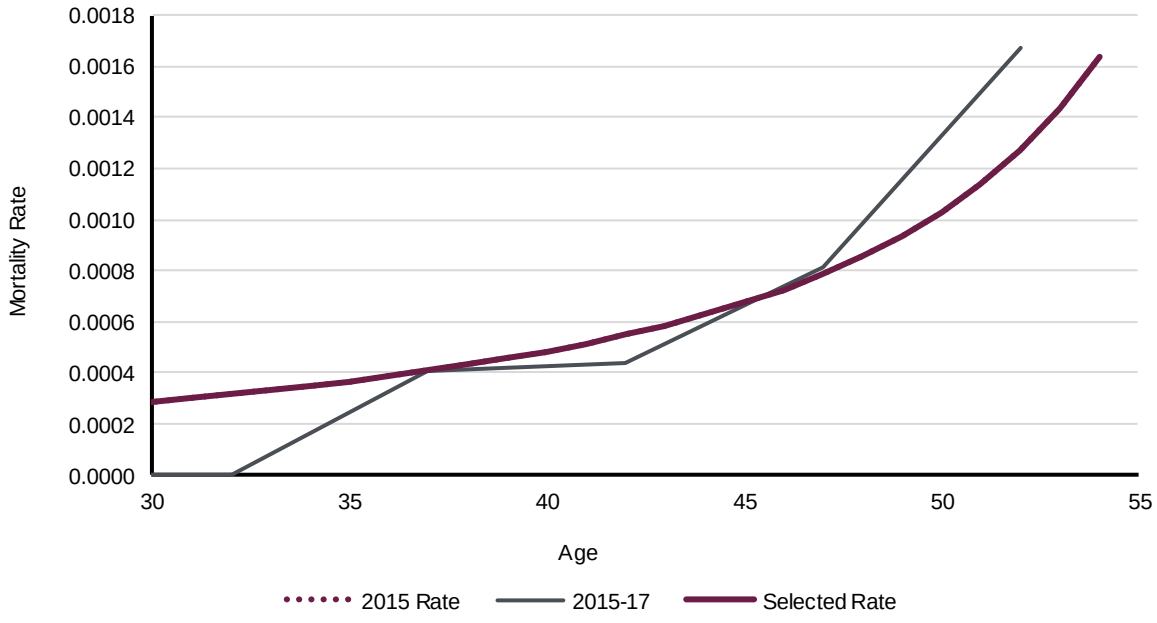
Year	Average
2015-2016	1.4%
2016-2017	1.4%
2015-2017	**1.4%**

Whilst there is some evidence to suggest that age-based rates are warranted, the additional complexity is not justified given the minimal impact on the scheme's liabilities. The rates over the inter-valuation period have been a little lower than assumed in the previous Review, at which I reduced this assumption to 1.5%. There is not sufficient evidence at this stage to further reduce the assumption and so I have retained it.

The liability for existing DRB members has been calculated by projecting their benefits with AWOTE until age 55, but allowing for the conversion of their benefits to the ILO at the assumed rate of 1.5% per year and also for the payment of the face value on death or permanent disablement prior to age 55.

The graduated rates of DRB members exiting due to mortality or disablement over the inter-valuation period have been derived and compared with the previous assumptions. The mortality rates of existing members with deferred retirement benefits are illustrated in Figure 48.

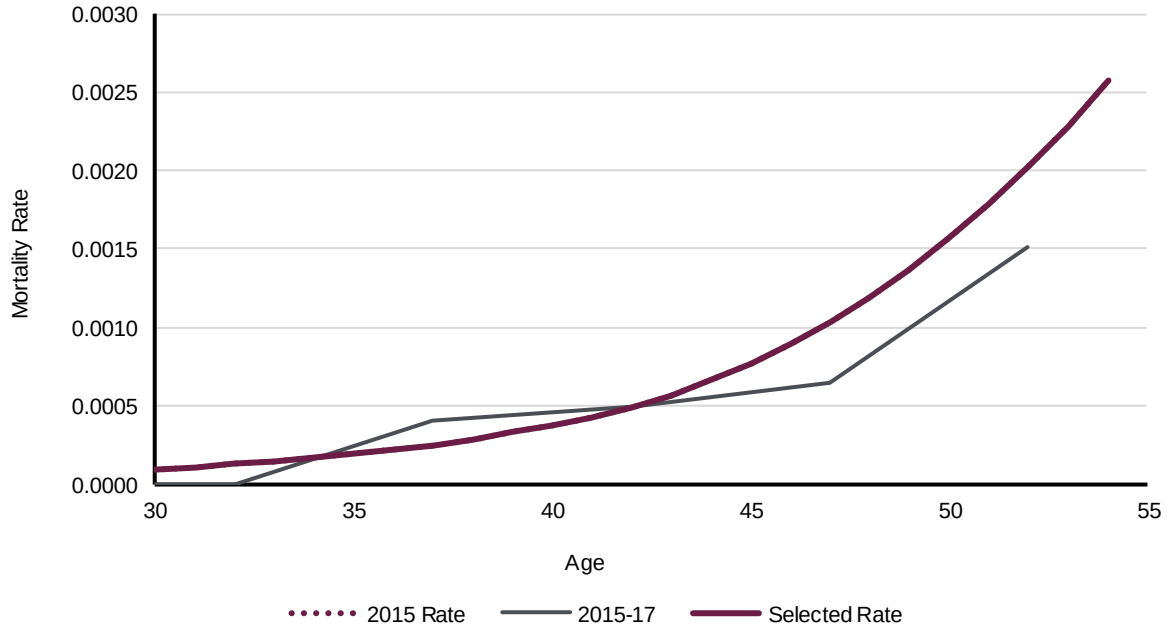
Figure 48 Mortality Rates for Existing DRB Members



Noting that the mortality rates at the younger ages are volatile due to the small numbers of DRB members at these ages, the experience during the intervaluation period has been quite consistent with the previous assumption. Consequently, it has been retained for this valuation.

The TPD rates of existing members with deferred retirement benefits are illustrated in Figure 49.

Figure 49 TPD Rates for Existing DRB Members



The TPD rates for existing DRB members have been broadly consistent with those previously assumed. Consequently, the assumed TPD rates for existing DRB members have been retained, as shown in Figure 49.

The difference between the liability in respect of existing DRB benefits at the investigation date as described above and that obtained by simply discounting the existing balances at the real investigation discount rate to age 55 measures the effect of the future ILO conversion option and the implicit insurance provided on death and TPD. Based on the membership with a DRB benefit at the investigation date, the loading necessary to allow for ILO conversion and the implicit insurance has been estimated to be 0.0%, a reduction from the assumption at the previous Review of 0.1%. Whilst the allowance for pre-age 55 death and disablement acts to increase the loading, the real discount rate at this Review is lower than that underlying the ILO and consequently conversions reduce the liability relative to the simple discounting approach, sufficient to offset the increase from death and disablement.

It has been assumed that future DRB members will have similar characteristics to the existing DRB members with regard to their propensity to subsequently convert to the ILO and their death and disablement rates. The relative increase in the liability estimated above in excess of that calculated ignoring the ILO option and the death and disablement decrements can therefore be used as a loading for projected DRB liabilities emerging on future resignations.

It is also possible to examine the experience of resigning members who have the option of converting their (default) DRB into the ILO immediately upon exit. The proportions of exiting members choosing the ILO over the investigation period are displayed in Table 55.

Table 55 Proportion of Resigning DB Members Choosing the ILO at Exit

Year	Average
2015-2016	4.8%
2016-2017	2.8%
2015-2017	**4.0%**

Whilst there is some evidence to suggest that age-based rates are warranted, the additional complexity is not justified as the impact on the scheme's liabilities is minimal. The experience over the inter-valuation period has been higher than the assumed level and so I have increased the assumption regarding the number of DB members who would select the ILO rather than the default DRB at resignation at 3.0%, up from 2.0% at the last Review.

B.6 Pensions

B.6.1 Pensioner Mortality

The mortality of pensioners has minimal impact on the overall QSuper liability and there is relatively little data. At the 2010 valuation, a broad analysis was undertaken to determine the suitability of the age ratings applied to the population mortality rates, with the results shown in Table 56. In view of the immateriality of these assumptions and the lack of data from which to justify any change, I have decided to retain the previous assumptions.

Table 56 Pensioner 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

The base mortality rates have been derived from the Queensland Life Tables 6 (Males or Females as appropriate with the Male values used for Police) as produced by the Australian Bureau of Statistics.

When valuing current and future pensions, it is prudent to allow for expected future improvements in mortality because the liabilities would otherwise be undervalued. The Australian Government Actuary published mortality improvement rates based on the last 25 and 125 years of population mortality experience in the Australian Life Tables 2010-2012. There are no definitive reasons to choose either set of rates, although I note that Mercer's study of public sector pensioner mortality[32] used the 25 year assumption when projecting forward past mortality rates in their analysis and the use of the 25 year rates in the 2015 valuation. In the absence of compelling evidence to the contrary, the 25 year expected mortality improvements have been retained for this Review. These rates are shown in Appendix C.

An assumption as to the proportion of future pensioners who are married is needed in order to value the pension entitlement of spouses. The pension is more valuable to a member when they are married due to the reversion that is paid to the spouse on the member's death. It is therefore more likely that those members who choose the pension are married. Therefore the assumption used in the last

[32] See http://actuaries.asn.au/Library/Events/FSF/2014/BoyfieldWilsonMortalityPaper140505.pdf

Review (viz. that all future pensioners are married) has been retained for this Review. Assumptions are also made regarding the proportion of spouses who would commute their pension on the death of the former member.

B.6.2 Pension Increases

There are two categories of pensions. The majority of pensions are increased annually by CPI. There are a small number of pensions that are increased annually by the change in the Parliamentary backbencher salary. Both types of pensions are increased annually in the first full fortnight in August. Pensions that are linked to CPI are increased according to the percentage increase in the Brisbane All Groups CPI for the year to the previous June quarter. Pensions that are linked to the Parliamentary backbencher salary are increased according to the percentage increase in the Parliamentary backbencher salary over the financial year. Table 57 shows the increases experienced in the last 2 years.

Table 57 Pension Increases since 30 June 2015

Year Ending 30 June	Increase in CPI linked Pensions	Increase in Salary linked Pensions
2016	3.2%	8.5%
2017	1.5%	0.0%
Average 2015-2017	**2.4%**	**4.2%**

As can be seen from Table 57, CPI linked pension increases have been higher than the average 2.0% p.a. assumed at the last Review, and similarly those linked to Parliamentary backbencher salary have been higher than the 3.0% p.a. assumption.

For this Review it has been assumed that CPI linked pensions will increase at the rate of 2.1% p.a. and salary linked pensions will increase at the rate of general salary inflation of 3.1% p.a. (as discussed in Section B.3.1).

B.6.3 Proportion Taking Pensions – Standard Defined Benefit Category

The proportion of TPD exits who selected the pension option on exiting the Standard Defined Benefit Category throughout the last two years was 43.5%. At the last Review it was assumed that 50% of members exiting due to TPD would take a pension.

Recognising the greater cost of pension benefits compared to the lump sum and the increase in consumer preferences towards pensions in recent years, I have decided to retain the previous assumption.

B.6.4 Proportion Taking Pensions – State Category

It is necessary to make an assumption as to what proportion of contributors and also what proportion of pensioner spouses will choose a pension benefit. This parameter has a significant effect on the value of the Category's liabilities and is the only one that has been investigated in detail for the State and Police categories.

A comparison of the expected and observed proportions of State Category retirees not commuting their pension entitlement is shown in Table 58. When determining the proportions taking pensions, partial commutations were assumed to be 50% on average.

Table 58 Proportion Taking Pensions – State Category[33]

Type of Pension	Number taking Full Pension	Number Fully Commuting	Number Partial Commutation	Total Number	Proportion Taking Pension	2018 Valuation Assumption	2015 Valuation Assumption
Age - Males	7	4	1	12	63%	70%	75%
Age - Females	14	8	2	24	63%	70%	75%
Age - Persons	**21**	**12**	**3**	**36**	**63%**	**70%**	75%
Ill-Health - Males	3	0	0	3	100%	80%	75%
Ill-Health - Females	1	0	0	1	100%	80%	75%
Ill-Health - Persons	**4**	**0**	**0**	**4**	**100%**	**80%**	75%
Spouse on Death of Contributor	**0**	**0**	**-**	**0**		**50%**	50%
Spouse on Death of Pensioner or Commuter	**16**	**7**	**-**	**23**	**70%**	**50%**	50%

The proportion electing pensions for Age retirement over the last two years has been below the previous valuation assumption, whilst the number of Ill-Health and reversionary pensions has been above expectation. Noting the materiality of this assumption within the overall valuation, it has nevertheless been decided to revise the previous age and ill-health pension proportions, viz

- 70% of age retirees will take the pension;
- 80% of ill-health retirees will take the pension;
- 50% of pensioner spouses will take the pension.

B.6.5 Proportion Taking Pensions – Police Category

A comparison of the expected and observed proportions of Police Category retirees not commuting their pension entitlement is shown in Table 59.

Table 59 Proportions Taking Pension – Police Category

Type of Pension	Number taking Pension	Number Fully Commuting	Number Partial Commutation	Proportion Taking Pension	2018 Valuation Assumption	2015 Valuation Assumption
Age - Males	4	3	1	56%	50%	50%
Age - Females	1	1	0	50%	50%	50%
Age - Persons	**5**	**4**	**1**	**55%**	**50%**	50%
Ill-Health - Males	0	0	0		50%	50%
Ill-Health - Females	2	0	0	100%	50%	50%
Ill-Health - Persons	**2**	**0**	**0**	**100%**	**50%**	50%
Spouse on Death of Contributor	**0**	**0**	**-**		**50%**	50%
Spouse on Death of Pensioner or Commuter	**2**	**4**	**-**	**33%**	**50%**	50%

[33] Data on the numbers of spouses partially commuting their benefits was not available.

On the basis of the scarcity of relevant experience and the effect of this parameter on the Review as a whole, it has been decided to retain the previous assumed pension proportions, viz

- 50% of age retirees will take the pension;
- 50% of ill-health retirees will take the pension;
- 50% of pensioner spouses will take the pension.

B.6.6 Proportion Taking Pensions – Parliamentary Category

The experience of the Parliamentary Category for the last 7 elections is illustrated in Table 60.

Table 60 Proportion Taking Pensions – Parliamentary Category

Election	Proportion Taking Pension
1995 or earlier exit	24.9%
1998 or earlier exit	67.3%
2001 or earlier exit	36.4%
2004 or earlier exit	79.2%
2006 or earlier exit	78.5%
2009 or earlier exit	83.4%
2012 or earlier exit	95.1%
2015 or earlier exit	75.1%

As noted in Section B.4.22, as at the valuation date there has been no election since the last Review and therefore we have retained the previous assumption of 90%.

There have not been any deaths in service and only limited numbers of deaths of pensioners. It was therefore decided to retain the assumption that all Parliamentary spouses would choose a pension; viz.100%.

B.6.7 Child and Orphan Pensions

The cost of child and orphan pensions commencing in each year as a percentage of the death benefits paid in that year for the Standard Defined Benefit Category was **1.4%** over the investigation period. The child pensions have been valued ignoring mortality and assuming that the pension continues until age 20 if a child is currently aged under 20 and until age 25 for children currently aged 20 or older. Further, the Deed provides that children who, in the opinion of the Board, have a disability as defined under the Disability Services Act 2006 are entitled to a lifetime pension, but the number of expected claims is low and considered immaterial in the context of the valuation.

The latest experience is lower than the 4% rate chosen at the last Review, however the longer term trends are considered in Figure 50, which indicate that the previous assumption should be reduced to 3% of the level of future lump sum death benefits.

Figure 50 Child Pensions as Proportion of Lump Sum Death Benefits

Due to the size of the Standard Defined Benefit Category relative to the State and Police Categories it was decided to also use this experience as the basis for the loading assumed for these Categories. It has therefore been assumed that the value of child and orphan pensions will be equivalent to 3% of the value of lump sum death benefits paid from each of these Categories.

B.7 Income Protection Benefit

In order to determine the accrued liabilities relating to income protection claims prior to the valuation result as well as the estimated incurred cost of these benefits in future, a payments per active claim (PPAC) model has been applied, separately for Standard Males and Standard Females [34]. The effects of past benefit indexation have been removed when determining the benefit as a percentage of salary and then future inflation has been explicitly projected. The model projects the number of active claims (i.e. claims in receipt of payment) and average salary per claim at any point in time and applies a benefit percentage which is dependent on the time of payment.

It should be noted that this analysis does not cover the income protection benefit provided within the Comprehensive Accumulation Category. Based on experience with the self-insurance arrangements within the Accumulation Category, I believe that the PPAC approach provides a more robust assessment of the underlying trends in claim payments and therefore justifies its additional complexity.

[34] Police members are not eligible for an income protection benefit, as the Police Service uses a sick leave bank arrangement for temporary incapacity.

B.7.1 Payments Per Active Claim Method

The payments per active claim (PPAC) projection method models the relationship between the size of monthly gross benefit payments and average salaries at claim commencement and the continuance of a claim from incident to finalisation.

Historical salaries at claim commencement are divided by the number of active claims in each development month[35] and these average salaries are then averaged again by incident month, resulting in an effective weighted average by claim activity, S_I for incident period *I*.

Historical payments are divided by the total salaries at claim commencement of active claims in each development month to produce benefit proportion values of the form:

$$BenProp_{I,t} = \frac{P_{I,t}}{S_{I,t}}$$

where

$P_{I,t}$ are the claim payments made in the period *t-1* to *t* for incident period *I,* deflated to remove the effects of CPI increases to benefits in payment at each July 1

$S_{I,t}$ are the total salaries in respect of active claims in the period *t-1* to *t* for incident period *I*

are derived from the historical experience. *BenProp* selections are then made for each development period.

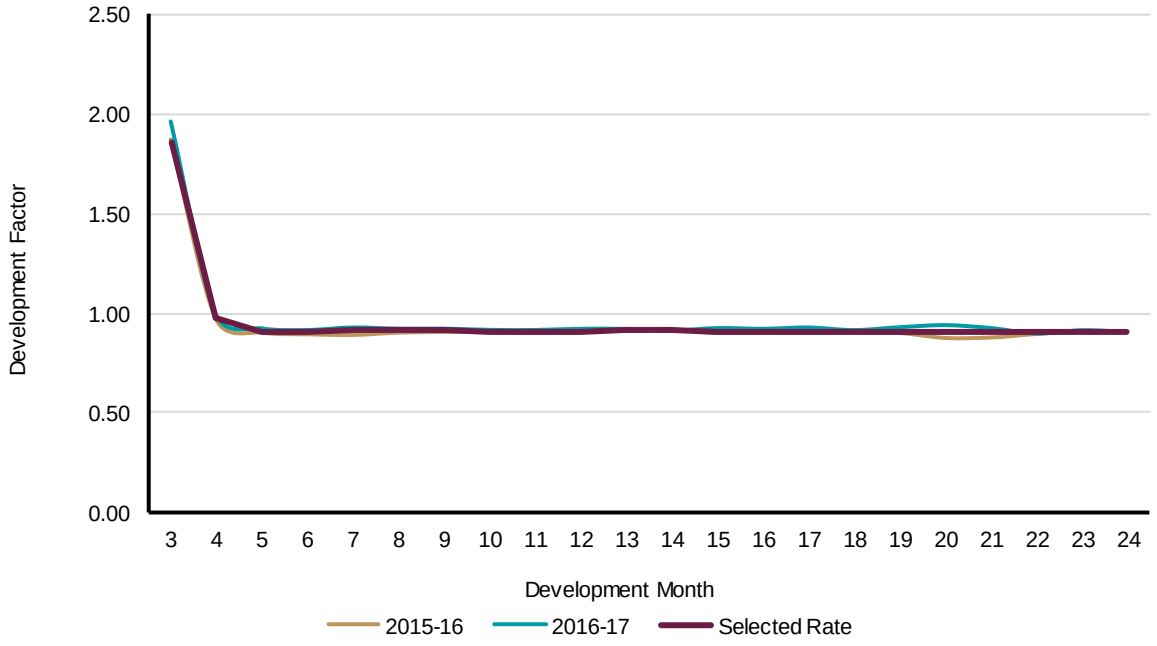
Future payments (current values) by incident period and development period are then projected by multiplying the *BenProp* selection for each development period by the average salary (S_I) for the incident period and by the projected number of future active claims. The future payments are then inflated to allow for the assumed level of CPI inflation and reduced to allow for the assumed level of recoveries to produce expected net benefit payments by incident period and development period. These projected payments are then discounted using the relevant assumption to give the estimated outstanding claims liability.

B.7.2 Claim Continuance Rates

The selected active claim number continuance rates against the experience of the last two payment years are shown in Figure 51. As noted above, continuance rates represent the proportion of claims at each development month expected to remain in force in the subsequent month. Rates have been smoothed for presentation purposes.

[35] Development month refers to the number of months since the incident date. For example, active claims between two and three months after the initial incident would be allocated to development month three.

Figure 51 Income Protection – Active Claim Continuance Rates by Payment Year



The active claim development above shows that after around 7 months, continuance rates become very stable at around 0.90 per month. Projected numbers of active claims in each future month may be derived for each month of incidence by applying the selected continuance rates to the numbers of active claims at the review date.

B.7.3 Average Salary per Active Claim

Salary is recorded at the commencement of a claim and does not change through the payment period. Consequently, any variation in the average as claims develop is due to changes in the mix of active claims. I did not observe any particular trend by development month, although the average salary rose by incident month, in line with general levels of salary growth. Consequently, average salary per active claim was modelled as an increasing function of incident month.

Figure 52 shows the change in average active claimant salary by development month, averaged over all incident months and separately for the latest incident year. Figure 53 shows the average over development periods of the average claimant salary ratio by incident month.

Perhaps not surprisingly, Figure 52 and Figure 53 both demonstrate the stability of average active claimant salary over time and I have therefore assumed no change in average salary by development month.

Figure 52 Income Protection – Ratio of Average Active Claimant Salary by Development Month

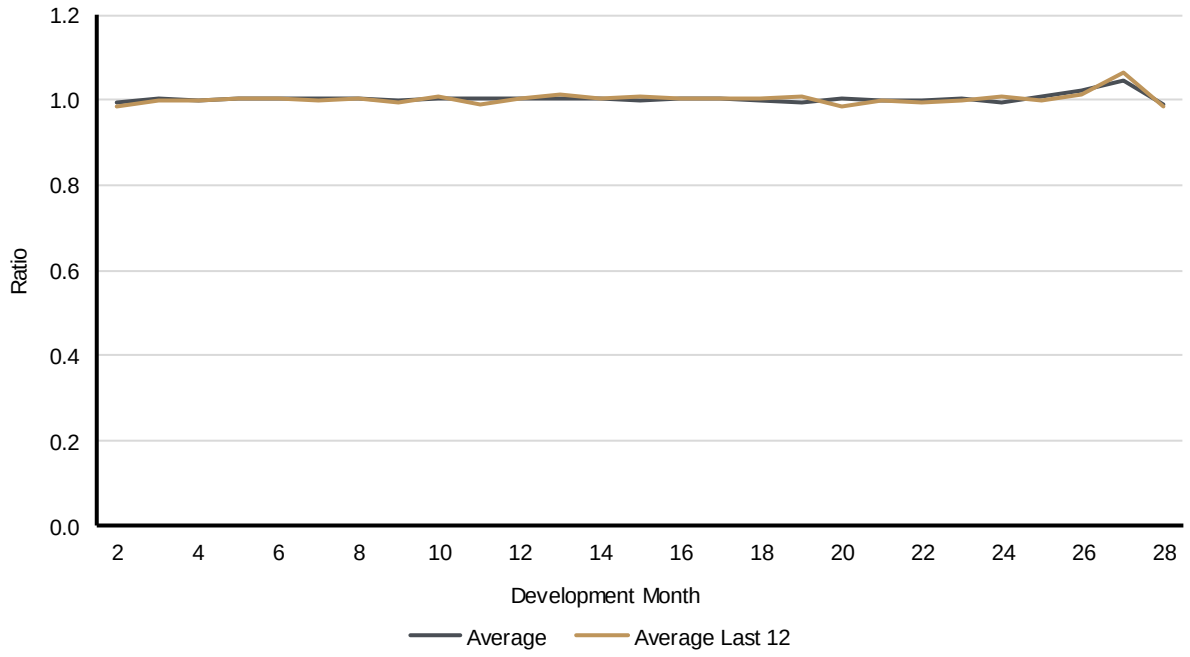


Figure 53 Average Claimant Salary Ratio by Incident Month

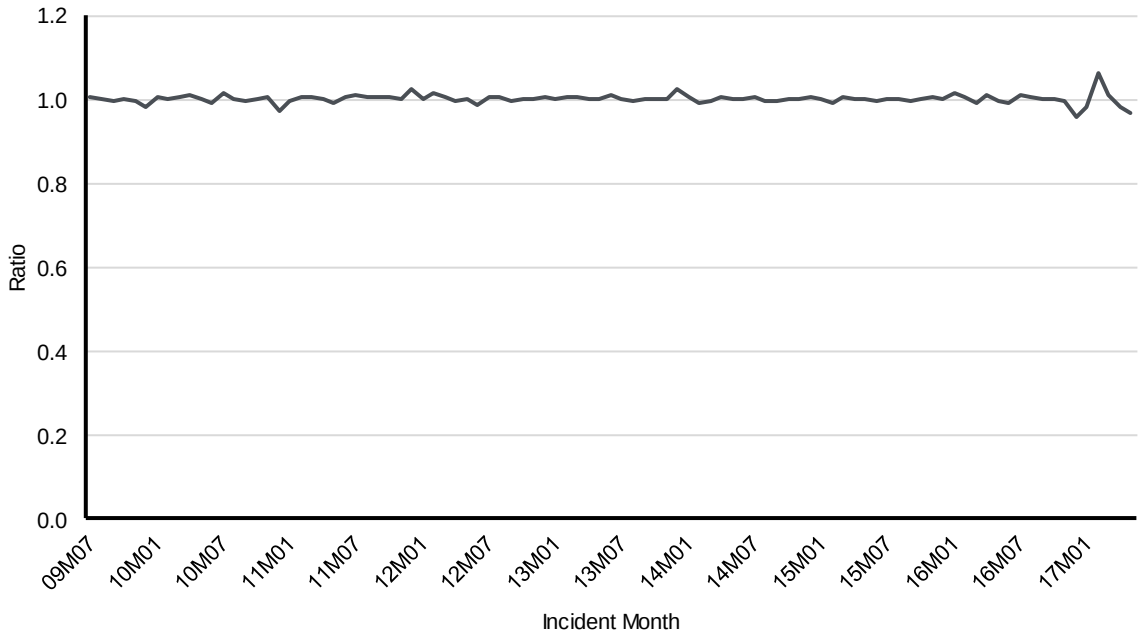
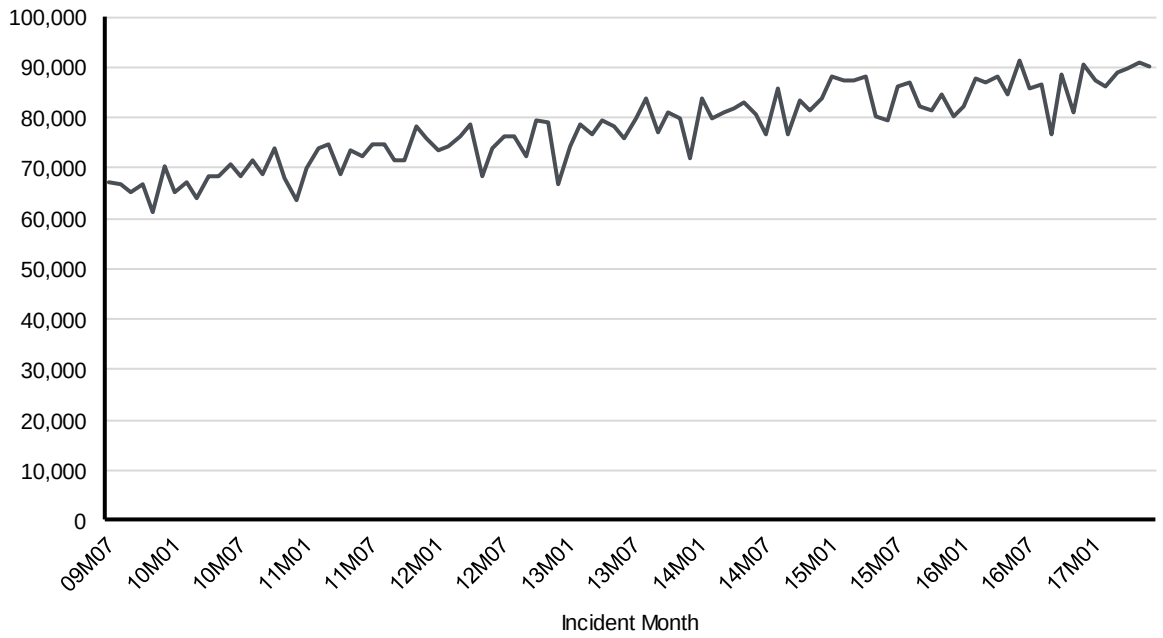


Figure 54 shows the average salaries at commencement for members receiving income protection benefits by incident month. These levels were used as the basis for the projection of benefit amounts in each future payment month.

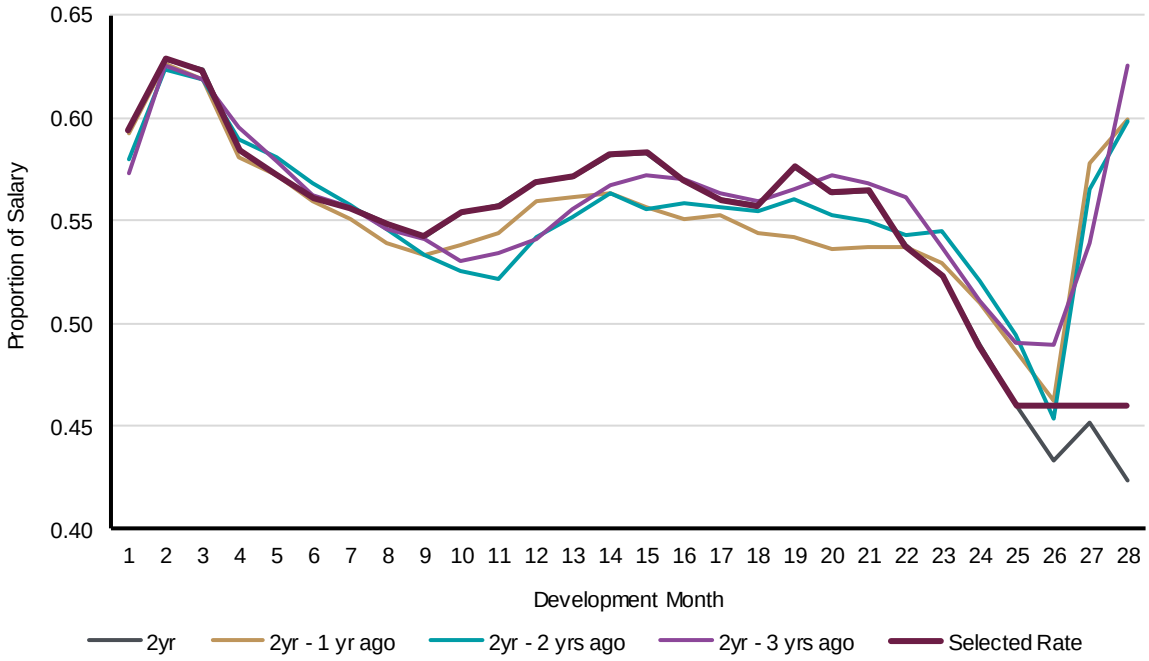
Figure 54 Average Active Claimant Salary by Incident Month



B.7.4 Benefit Percentage

The remaining factor from which to project future benefit payments is the benefit as a proportion of the assumed salary at commencement. This was derived by firstly removing the effects of inflation indexation on past benefit payments and then observing the relationship between these deflated benefit payments and the average salary of active claimants, as shown in Figure 55. The benefit percentage has a maximum of 75% of salary at commencement of claim but is usually lower on average, due to the increasing levels of rehabilitation programs, which reduce the benefit proportionately.

Figure 55 Average Benefit per Active Claim as Proportion of Average Salary



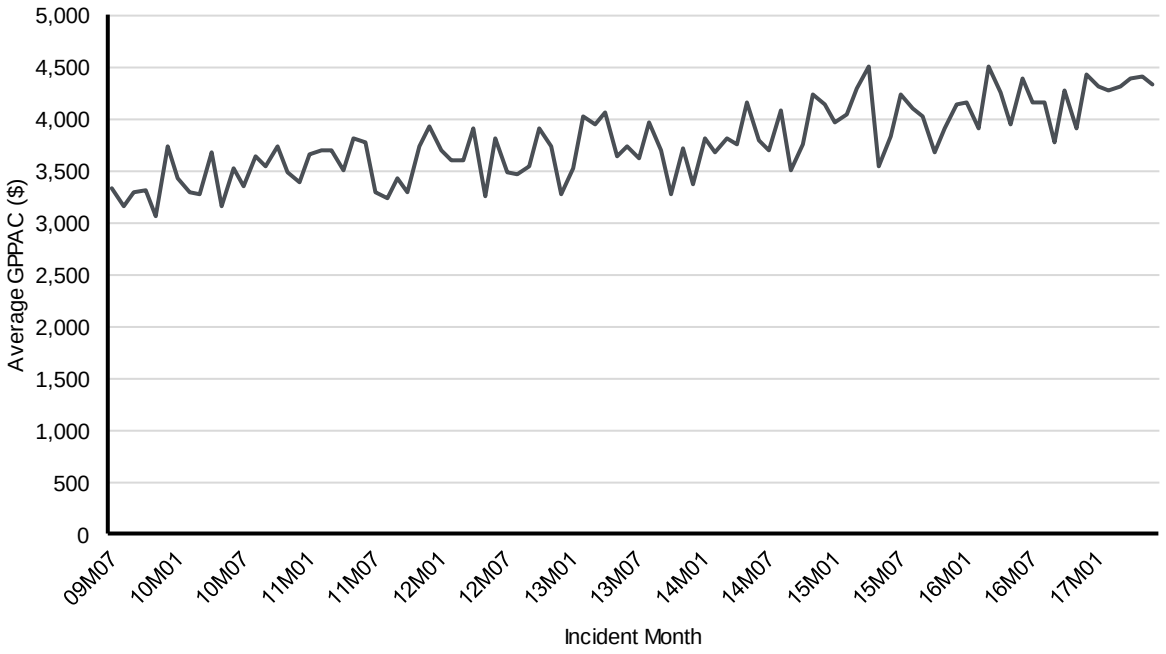
The benefit proportions have been reasonably stable over time and the averages over the most recent two year period have been chosen as the assumption going forward. The “kick up” after development month 25 in the latest two year period reflects a number of lump sum payments in respect of re-opened old claims, likely as a result of legal involvement. I have decided not to project these types of payments going forward on the basis that they are inherently difficult to predict and may reflect a one-off “catch up” of re-opened claims prompted by legal advertising etc.

B.7.5 Gross Payments per Active Claim

Using the above selections, gross (of recoveries) payments per active claims (GPPAC) by incident and development month are then able to be projected, as shown in Figure 56.

The GPPACs are then applied to the active claim projections to produce gross real benefit payments and projected inflation as at each July 1 is then added to produce gross benefit payments by incident and development month.

Figure 56 Average Gross Payments per Active Claim (GPPAC) by Incident Month



B.7.6 Recoveries

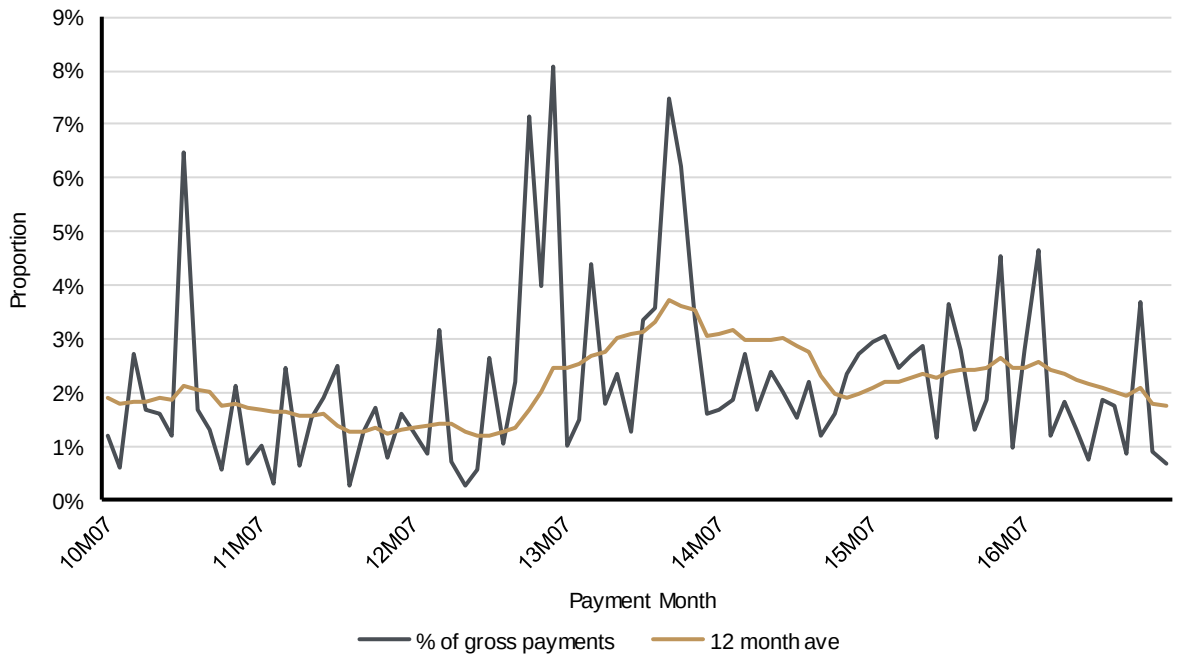
Recoveries mostly relate to payments reclaimed from members where overpayments have occurred due to unreported changes in members' status. Previously, some recoveries were made in the event of WorkCover payments; however, changes in the administrative processes over time have reduced these overpayments substantially.

Recoveries in the future have explicitly been allowed for by basing the analysis on claim payments gross of recoveries and applying an assumed rate of recoveries to apply to future gross payments excluding contribution replacement. Table 61 shows recoveries as a proportion of gross payments for the last several payment years.

Table 61 Recoveries

Payment Year	Gross Claim Payments (excl Contribution Replacement) ($m)	Recoveries ($m)	Recoveries as a Proportion of Gross Claim Payments
2011-12	29.8	0.4	1.3%
2012-13	28.7	0.7	2.5%
2013-14	25.4	0.8	3.0%
2014-15	26.4	0.5	2.0%
2015-16	27.8	0.7	2.5%
2016-17	29.5	0.5	1.8%
6 Year Weighted Average (pa.)			**2.1%**
3 Year Weighted Average (pa.)			**2.1%**

Figure 57 Recoveries as a Proportion of Gross Income Protection Payments



The long term experience has shown that recoveries are around 2% of gross claim payments, with some volatility over time. Given the delay in recognition of some recoveries, I am hesitant to overemphasise the most recent higher experience and so have chosen a level of 2% for recoveries as a percentage of future gross payments. A factor of 98% has therefore been applied to the projected gross benefit payments in order to produce the estimated net benefit payments.

B.7.7 Outstanding Claim Payments

The actual and projected claim payments for income protection based on the PPAC model described above are shown in Table 62. The outstanding claims payments in the Table exclude contribution replacement benefits.

Table 62 Actual and Projected Income Protection Claims (excl Contribution Replacement)

Incident Year	Development Year Paid ($m) 1	2	3	4+	Total ($m)	Outstanding Claims ($m)
2011-12	12.4	12.2	2.2	0.1	27.0	-
2012-13	12.3	11.4	3.0	0.3	26.9	-
2013-14	11.0	11.0	2.5	0.1	24.6	-
2014-15	11.8	12.6	3.5	**0.2**	28.2	0.2
2015-16	11.7	13.6	**3.8**	**0.2**	29.3	4.0
2016-17	11.8	**13.9**	**3.6**	**0.2**	29.5	17.7

The payments made after development year two relate to back payments for members where the claim approval process was lengthened due to pre-existing conditions, late claim lodgements or claims with broken benefit periods, i.e. go off claim and restart at a later period but related to the same incident (generally teachers around school holidays). Some development beyond the maximum two

year benefit period has been allowed for as these “late” payments do occur although they are relatively small.

B.7.8 Number of Ultimate Claims

The ultimate numbers of Income Protection claims are required to calculate claim frequencies as part of the decomposition of the ultimate claims cost. These have been derived using the chain ladder projection method, as follows:

Development factors of the form:

$$M_{i,t} = \frac{C_{i,t}}{C_{i,t-1}}$$

where $C_{i,t}$ are the cumulative claim numbers at time t for incident period i

are derived from the historical experience. Development factor selections are then made for each development period. Projected cumulative claim numbers at the end of each development period are then projected by applying the appropriate development factor. Incremental claim numbers can then be derived by taking the difference of successive cumulative values.

The incidence of claim numbers has also been considered in addition to the payments shown above. This will assist in the decomposition of overall claims cost into its constituent components as well as demonstrating the changes in underlying claim frequency over time, as shown in Table 63.

Table 63 Actual and Projected Income Protection Claim Numbers

Incident Year	Development Year Payment Commenced 1	2	3	4+	Total	Claim Frequency
2011-12	863	87	1	0	951	1.52%
2012-13	799	67	3	0	869	1.55%
2013-14	702	66	1	0	769	1.53%
2014-15	674	78	-	**0**	752	1.62%
2015-16	641	64	**1**	**0**	706	1.62%
2016-17	621	**76**	**1**	**0**	698	1.70%

B.8 Child and Orphan Benefits

Child and orphan benefits have been allowed for by increasing the costs of lump sum death benefits by 3%.

B.8.1 Components of Income Protection Cost

To understand the cost in more detail, the various components of the income protection benefits have been examined and these are shown in Table 64.

Table 64 Components of Income Protection Costs (incl Contribution Replacement Benefit)

Incident Year	Ultimate Claim Frequency	Salary Relativity^	Benefit as Proportion of Salary	Ultimate Claim Duration (weeks)	Overall Claim Cost (as % of salary)
2011-12	1.52%	0.90	56.2%	35.4	0.54%
2012-13	1.55%	0.90	56.1%	37.6	0.58%
2013-14	1.53%	0.92	54.4%	38.0	0.58%
2014-15	1.62%	0.92	55.7%	42.3	0.69%
2015-16	1.62%	0.92	56.4%	44.8	0.73%
2016-17	1.70%	0.90	57.3%	44.3	0.75%

^ This is the relativity of the average salary of claimants to that of all members covered for Income Protection benefits.

The claim cost for the 2016-17 incident year shown above may, for example, be decomposed as follows:

$$0.75\% = 1.70\% \times 0.90 \times 57.3\% \times (44.3/52.18) \times (1+CRB) \times \text{PV Factor}$$

where *CRB* is the Contribution Replacement Benefit loading of 0.067 i.e. 5%/75%; and

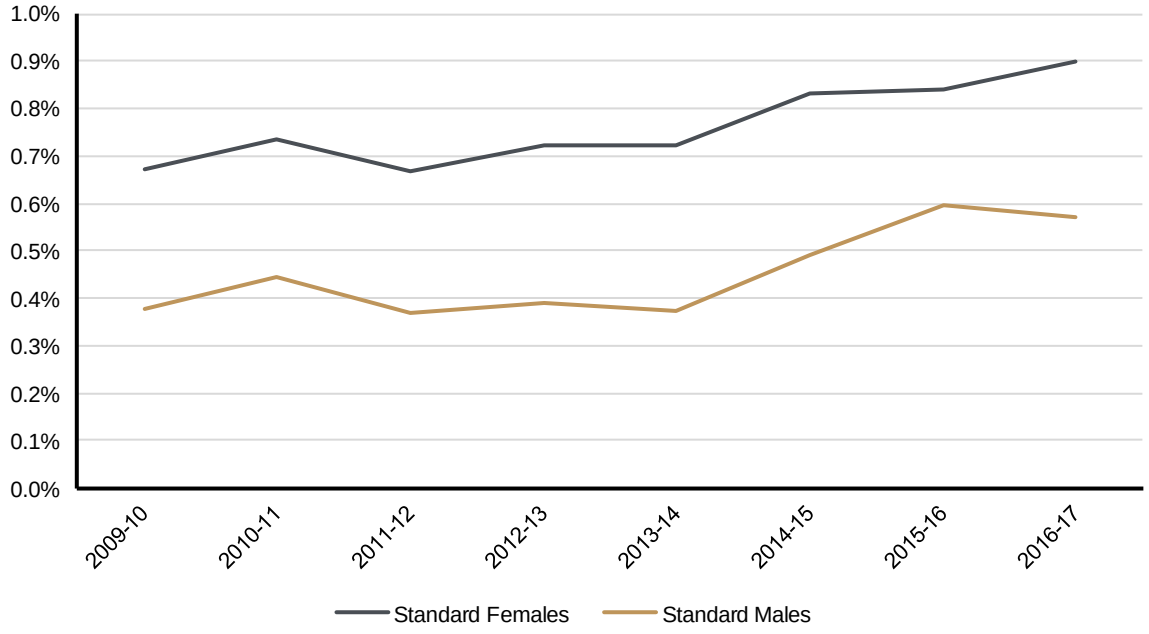
PV Factor is the factor to discount the benefits to the average date of the premium receipt and is approximately 96.6% for 2016-17. Periods during which benefits are suspended (e.g. school holidays for teachers) have been excluded in the calculations of claims duration.

Table 64 shows that the main driver of the increase in claims costs has been a combination of increasing claim duration and claim frequency, with salary relativity and rehabilitation rates (which directly impact the benefit proportion) reasonably stable. These trends are discussed further below.

B.8.2 Gender Specific Rates

As noted above, the incurred cost of the income protection benefit has been assessed separately for Standard Males and Females, as they exhibit materially different costs. Whilst the analysis shown above has been aggregated for simplicity, the claims costs for the last several years for each gender are shown in Figure 58.

Figure 58 Cost of Standard Defined Benefit Category Income Protection Benefit



Given that the insured population has been ageing over time and the increases observed within the broader group life market over recent years, the increases in overall claims costs for both genders is not surprising. As has been observed in past Reviews, Standard Females have significantly higher claim costs than Standard Males.

Analysis of the claims for the current investigation period showed that whilst costs increase in line with age, the rate of increase is significantly less than expected for salary continuance benefits offered in the wider market. As discussed in previous Reviews, this is due to the likely correlation between the level of sick leave accrued and the member's age. Given the cross subsidisation that occurs in a defined benefit scheme and the relative stability of the costs versus age, the complexity of having the costs vary by age does not seem warranted.

The cost of the Income Protection benefit over the investigation period, including an allowance for the cost of foregone member contributions whilst in payment, was 0.58% of salaries for Standard Males and 0.87% of salaries for females. This compares with the assumed rates at the last Review of 0.45% and 0.75% respectively.

In light of the trends illustrated in Figure 58 and analysis described above, it has been decided to increase the allowance for the cost of the income protection benefit to 0.60% for Standard Males and 0.90% for Standard Females.

It should be noted that Police members of the Standard Defined Benefit Category and members of the Police Category do not have access to the income protection benefit.

At the previous Review it was assumed that the cost of the income protection benefit paid to members of the State Category would be 1.30% of salaries. There are comparatively few income protection claims for the State Category due its relatively small and declining membership. Furthermore, the impact on overall QSuper liabilities is trivial and a detailed analysis was therefore not undertaken. The following approach was taken to estimate the cost of this benefit:

- Estimate the number of claims incurred in each year of "cover" (this allows for claims that are incurred but not reported at the end of each year, thus matching the claims costs to the exposure during the year);
- Estimate the average duration of claims;
- Estimate the proportion of salary represented by the average pension payment; and
- Multiply the above together and add an allowance for the contribution replacement benefit that is also paid when a member of the State Category receives the Income Protection benefit.

The estimated cost of the total income protection benefits since 2004-05 using this method is 0.95% of salaries. Whilst this is somewhat lower than the previous assumption of 1.30% of salaries, I have decided to retain the previous assumption, as the recent experience is quite sparse and costs would be expected to generally rise with the ageing of the membership.

B.9 Expenses

I have continued the practice of the previous Review in which administration expenses have been analysed separately for pensions and other benefits, with non-pension expenses expressed relative to defined benefit payments and pension and income protection expenses relative to the corresponding benefit payments.

In previous Reviews, QSL provided splits of the Administration Expenses and QInvest Financial Planning Fees between the Defined Benefit and Accumulation Categories, as shown in Table 65.

Table 65 Defined Benefit Proportion of Administration Expenses

Year Ending 30 June	DB Proportion of Administration Expenses	DB Proportion of QInvest Financial Planning Fees
2011	34.1%	17.3%
2012	32.4%	14.0%
2013	34.4%	20.8%
2014	31.2%	18.9%
2015	31.9%	17.2%
2016	29.1%	15.3%

These proportions were then applied to the Administration Fees and QInvest Financial Planning Fees from the financial statements (excluding allowance for insurance administration, which is discussed below), shown for convenience in Table 66. As noted in my previous Review, QSuper have undertaken a detailed review of their internal cost attribution methodology and are now providing direct estimates of the expenses allocated to the Defined Benefit Categories. The 2016-17 figures are shown in Table 68.

Table 66 Overall QSuper Administration Expenses and QInvest Financial Planning Fees

Year Ending 30 June	Administration Expenses ($'000)	QInvest Financial Planning Fees ($'000)
2011	83,907	14,241
2012	100,464	15,565
2013	124,940	17,061
2014	156,051	14,489
2015	174,349	16,166
2016	178,861	15,056
2017	178,255	13,787

The derived amounts of Defined Benefit expenses were then apportioned between pensions and non-pensions in line with the average funding basis liabilities for each year.

QSL have also provided a breakup of the insurance management expenses into income protection (Defined Benefit and State categories) and Death and TPD benefits, as shown in Table 67.

Table 67 QSuper Insurance Administration Expenses

Year Ending 30 June	Insurance Administration Expenses ($'000)	DB Income Protection Administration Expenses ($'000)	DB Death and TPD Administration Expenses ($'000)
2011	10,530	2,527	652
2012	13,027	2,776	844
2013	14,264	2,651	744
2014	17,461	2,680	760
2015	20,241	3,101	659
2016	32,243	4,048	997
2017	19,000	4,321	1,109

The Death and TPD costs were then added to the non-pension costs estimated above to produce the estimated allocations of administration expenses shown in Table 68.

Table 68 Administration Expense Apportionment Summary

Year Ending 30 June	Non-Pension Administration Expenses ($'000)	Pension Administration Expenses ($'000)	Income Protection Administration Expenses ($'000)
2011	27,105	1,027	2,527
2012	30,112	1,224	2,776
2013	40,485	1,922	2,651
2014	44,428	2,361	2,680
2015	49,760	2,810	3,101
2016	43,411	2,524	4,048
2017	50,636	2,981	4,321

These costs were then compared with the annual benefit payments of the relevant types to observe their relativity, as shown in Table 69 and Figure 59. Based on the trends observed in Figure 59, I have selected prospective ratios to apply to projected benefit payments in order to estimate future administration expenses, as shown in Table 70.

Table 69 Observed Administration Expense Ratios by Benefit Type

Year Ending 30 June	Non-pension Administration Expenses as Proportion of Annual Benefit Payments	Pension Administration Expenses as Proportion of Annual Pension Payments	Income Protection Administration Expenses as Proportion of Annual Income Protection Benefits
2011	1.8%	1.3%	8.5%
2012	1.5%	1.4%	9.3%
2013	1.3%	2.1%	9.3%
2014	2.1%	2.4%	10.8%
2015	3.1%	2.8%	12.0%
2016	3.0%	2.5%	14.8%
2017	3.4%	2.8%	14.4%

Figure 59 Observed Administration Expense Ratios by Benefit Type

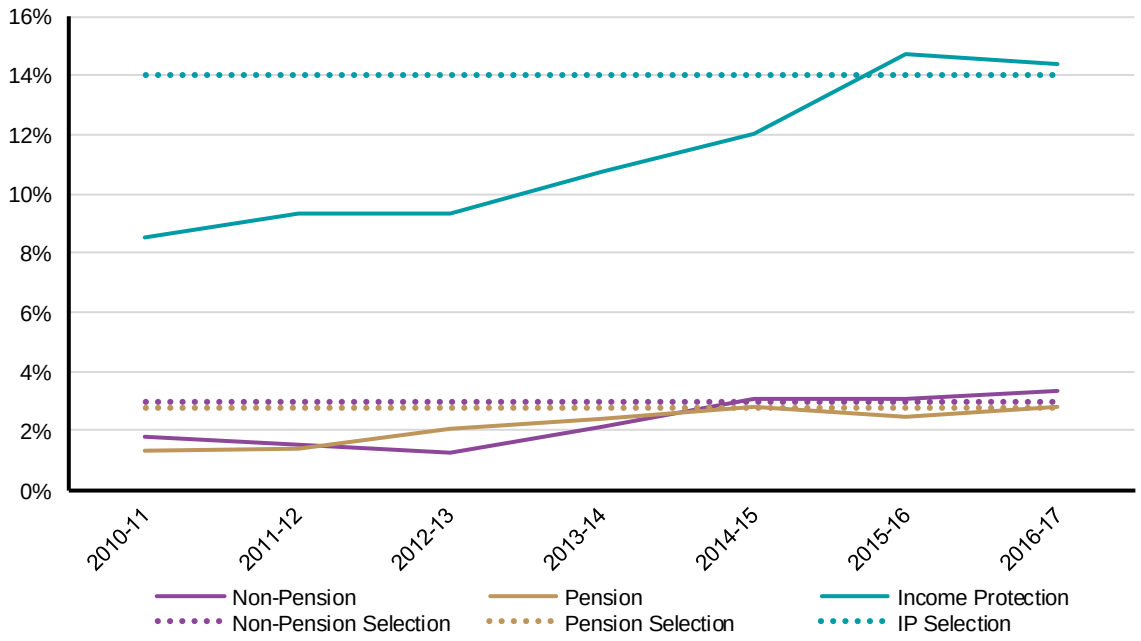


Table 70 Selected Administration Expense Ratios by Benefit Type

	Selected Ratio
Non-pension Administration Expenses as Proportion of Annual Benefit Payments	3.00%
Pension Administration Expenses as Proportion of Annual Pension Payments	2.75%
Income Protection Administration Expenses as Proportion of Annual Income Protection Benefits	14.00%

The selections have taken more account of the latest experience year, as it has been based on QSuper's internal cost attribution model, which is considered to provide a better estimate than previously as well as forming the basis for future expense assessments. It will be noted that the total amount of Administration Expenses allocated above differs from the amount shown in the Statement of Changes in Member Benefits from QSuper's Financial Statements. That figure is based on the funding policy for administration expenses set by the Board (based on asset balances), whereas the figures provided above represent the actual payments made to administer the scheme. In the long run,

the funding amount is expected to approximate the actual expense payments. Finally, I note that Figure 59 illustrates the increases in expense levels over recent years. It is of course a matter for the Board to decide the level of service provision to Defined Benefit members and the appropriate expenditure on that service.

Appendix C Investigation assumptions

C.1 Financial Assumptions

C.1.1 Investment Returns

The assumed long term earning rate on the fund's assets after tax and investment expenses is 5.75% p.a., which is used to discount expected future cash flows in the funding basis.

For consistency with the Budget framework, within which funding decisions are to be considered (see Section 5.2), the asset projections utilised in Sections 6.6, 8.1.5 and 8.4 are based on LTAAB's assumed level of net investment return during 2018-19 of 7% and Treasury's budget assumptions of 7.0% for 2019-20 and 6.5% p.a. thereafter.

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 3.1% p.a.

Salary growth due to promotion is assumed to be in accordance with the salary scale set out in the service tables (Table 74, Table 75 and Table 76).

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 2.1% 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 2018 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 2018, this was 2.6%.
- A net discount rate of 2.5% was used to determine the non-pension defined benefit obligations of QSuper as at 30 June 2018. 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 2.1%.
- 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 2018, this was 3.1%.

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 74, Table 75 and Table 76). The decrement rates for the State, Police and Parliamentary Categories are based on these rates where appropriate.

It is assumed that 3.0% of resigning Defined Benefit Category members choose the investment linked option (ILO). Subsequent conversions to an ILO and early payment on death and total and permanent disablement were not explicitly modelled, although a loading was estimated to allow for the implicit insurance provided and the ILO option. In practice, the loading was found to be negligible and so no further adjustment was made.

The assumption as to the probability of leaving at future elections for the Parliamentary Category is shown in Table 71.

Table 71 Parliamentary Category – Proportion Assumed to Leave at Future Elections

Years of Service at Election	Probability of Exit at Election
0-4	n/a
4-8	n/a
8-11	n/a
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 77.

C.2.3 Pensioners

The base mortality rates for all Defined Benefit, State, Police and Parliamentary Category pensioners are those of Queensland Life Tables 2014-2016 (Males or Females, as appropriate) with age ratings varying by the type of pension as shown in Table 72.

Table 72 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 73.

Table 73 Mortality Improvement Rates

	Annual Percentage Improvement in Mortality	
Age	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

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 – 70% of age retirees, 80% 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;

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 3.00% of benefit payments and income protection administration expenses will be 14.00% of income protection payments.

C.4 Income Protection Benefit

The income protection benefit is expected to cost 0.60% of salaries for Standard Males and 0.90% 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 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.6 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.7 Service and Decrement Tables

Table 74 Service Table – Standard Male Members

		Number leaving within one year of attaining age x as a result of					
Age x	Number Attaining Age x	PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	Family Law/ TtR Rate
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	0.0002
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	0.0004
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	0.0006
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	0.0009
42	21,541	182	9	16	630	520	0.0010
43	20,703	180	10	17	568	528	0.0010
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	0.0011
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	0.0010
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	0.0009
55	13,054	1,303	15	26	0	595	0.0008
56	11,709	1,169	15	25	0	597	0.0025
57	10,501	1,048	14	24	0	599	0.0025
58	9,414	940	14	22	0	600	0.0025
59	8,438	842	14	21	0	600	0.0025
60	7,561	1,284	13	0	0	600	0.0025
61	6,264	939	12	0	0	600	0.0200
62	5,314	849	11	0	0	600	0.0190
63	4,454	756	10	0	0	600	0.0133
64	3,688	995	8	0	0	600	0.0150
65	2,686	912	6	0	0	600	0.0143
66	1,768	529	4	0	0	600	0.0313
67	1,234	345	3	0	0	600	0.0313
68	885	265	3	0	0	600	0.0313
69	618	185	2	0	0	600	0.0313
70	431	431	0	0	0	600	0.0313

Table 75 Service Table – Standard Female Members

		Number leaving within one year of attaining age x as a result of					
Age x	Number Attaining Age x	PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	Family Law/ TtR Rate
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	0.0002
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	0.0004
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	0.0006
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	0.0009
42	22,569	127	4	19	682	356	0.0010
43	21,737	125	4	20	656	360	0.0010
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	0.0011
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	0.0010
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	0.0009
55	13,970	1,535	6	28	0	392	0.0008
56	12,400	1,114	6	27	0	394	0.0025
57	11,253	1,011	6	25	0	396	0.0025
58	10,210	917	6	24	0	397	0.0025
59	9,262	832	6	23	0	399	0.0025
60	8,401	1,260	6	0	0	400	0.0025
61	7,135	998	6	0	0	401	0.0200
62	6,130	858	6	0	0	401	0.0190
63	5,267	948	5	0	0	401	0.0133
64	4,314	949	5	0	0	401	0.0150
65	3,361	940	4	0	0	401	0.0143
66	2,417	604	3	0	0	401	0.0313
67	1,810	470	3	0	0	401	0.0313
68	1,337	347	2	0	0	401	0.0313
69	987	256	2	0	0	401	0.0313
70	729	729	0	0	0	401	0.0313

Table 76 Service Table – Police Members

		Number leaving within one year of attaining age x as a result of					
Age x	Number Attaining Age x	PPD/ Retrenchment/ Age Retirement	Death	TPD	Resignation/ Transfer to Accumulation	Salary Scale	Family Law/ TtR Rate
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	0.0002
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	0.0004
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	0.0006
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	0.0009
42	62,779	170	37	226	1,164	224	0.0010
43	61,183	162	39	240	1,083	227	0.0010
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	0.0011
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	0.0010
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	0.0009
55	44,966	6,708	60	400	0	249	0.0008
56	37,798	4,132	54	367	0	250	0.0025
57	33,244	4,295	48	340	0	251	0.0025
58	28,560	3,688	44	311	0	251	0.0025
59	24,517	4,869	39	273	0	252	0.0025
60	19,337	19,337	0	0	0	253	0.0025

Table 77 Decrement Table – DRB Members

	Rate of leaving as a result of		
Age	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 6.5, as new pensions emerge for the defined benefit categories, they are funded by a transfer from the Employer Fund equal to 90% 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 78 Pension Factors to Determine Value of New Pensions for Funding Purposes (to age 60)

	CPI Indexed			Salary Indexed		
Age Last Birthday	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	26.554	26.347	26.160	33.911	33.510	33.213
17	26.481	26.267	26.071	33.761	33.349	33.040
18	26.406	26.184	25.979	33.608	33.182	32.864
19	26.329	26.098	25.885	33.451	33.012	32.684
20	26.249	26.008	25.789	33.289	32.837	32.501
21	26.167	25.915	25.690	33.124	32.656	32.314
22	26.081	25.818	25.588	32.955	32.471	32.122
23	25.993	25.718	25.483	32.781	32.280	31.926
24	25.901	25.614	25.374	32.602	32.083	31.725
25	25.806	25.506	25.261	32.419	31.882	31.518
26	25.707	25.393	25.143	32.230	31.675	31.306
27	25.604	25.277	25.022	32.036	31.462	31.088
28	25.497	25.156	24.895	31.837	31.244	30.863
29	25.386	25.030	24.764	31.632	31.019	30.632
30	25.271	24.900	24.628	31.421	30.788	30.395
31	25.152	24.765	24.486	31.205	30.552	30.152
32	25.027	24.625	24.340	30.983	30.308	29.903
33	24.899	24.479	24.188	30.754	30.057	29.646
34	24.765	24.328	24.031	30.520	29.800	29.383
35	24.627	24.171	23.868	30.279	29.535	29.113
36	24.483	24.007	23.700	30.031	29.263	28.837
37	24.334	23.838	23.525	29.776	28.983	28.552
38	24.179	23.662	23.344	29.515	28.696	28.260
39	24.018	23.480	23.156	29.246	28.401	27.961
40	23.851	23.290	22.961	28.970	28.098	27.653
41	23.678	23.094	22.759	28.686	27.786	27.337
42	23.498	22.890	22.549	28.395	27.466	27.013
43	23.312	22.678	22.333	28.096	27.138	26.680
44	23.118	22.459	22.108	27.789	26.801	26.340
45	22.918	22.232	21.877	27.473	26.455	25.991
46	22.710	21.996	21.636	27.149	26.100	25.633
47	22.494	21.753	21.388	26.817	25.736	25.266
48	22.271	21.501	21.131	26.476	25.364	24.890
49	22.039	21.241	20.865	26.126	24.982	24.506
50	21.799	20.971	20.591	25.767	24.591	24.112
51	21.551	20.692	20.309	25.400	24.190	23.711
52	21.295	20.404	20.018	25.023	23.781	23.300
53	21.030	20.107	19.718	24.638	23.361	22.882
54	20.756	19.800	19.410	24.243	22.932	22.455
55	20.473	19.483	19.093	23.839	22.494	22.020
56	20.180	19.156	18.768	23.426	22.046	21.577
57	19.879	18.818	18.434	23.004	21.588	21.126
58	19.567	18.471	18.091	22.573	21.120	20.667
59	19.246	18.112	17.738	22.131	20.643	20.199
60	18.915	17.743	17.376	21.680	20.156	19.723

Table 79 Pension Factors to Determine Value of New Pensions for Funding Purposes (over age 60)

	CPI Indexed			Salary Indexed		
Age Last Birthday	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	18.574	17.364	17.006	21.221	19.659	19.240
62	18.222	16.974	16.626	20.751	19.154	18.749
63	17.861	16.573	16.236	20.273	18.640	18.251
64	17.488	16.163	15.838	19.784	18.118	17.745
65	17.105	15.744	15.431	19.287	17.588	17.231
66	16.712	15.314	15.015	18.780	17.051	16.711
67	16.308	14.876	14.590	18.265	16.507	16.184
68	15.895	14.428	14.156	17.741	15.957	15.651
69	15.471	13.973	13.716	17.211	15.401	15.115
70	15.038	13.510	13.269	16.672	14.841	14.574
71	14.596	13.041	12.817	16.127	14.278	14.030
72	14.146	12.566	12.359	15.577	13.712	13.485
73	13.688	12.086	11.897	15.022	13.144	12.938
74	13.223	11.602	11.431	14.462	12.577	12.390
75	12.752	11.115	10.962	13.899	12.010	11.843
76	12.274	10.628	10.491	13.334	11.447	11.299
77	11.792	10.141	10.020	12.768	10.888	10.757
78	11.307	9.656	9.549	12.202	10.336	10.220
79	10.818	9.177	9.080	11.637	9.793	9.688
80	10.329	8.705	8.613	11.075	9.261	9.162
81	9.840	8.241	8.151	10.517	8.742	8.644
82	9.353	7.787	7.695	9.966	8.237	8.137
83	8.871	7.346	7.248	9.423	7.749	7.642
84	8.396	6.918	6.812	8.892	7.278	7.163
85	7.930	6.507	6.390	8.373	6.827	6.701
86	7.475	6.113	5.983	7.871	6.397	6.258
87	7.034	5.738	5.593	7.387	5.990	5.835
88	6.609	5.383	5.221	6.922	5.607	5.435
89	6.201	5.049	4.869	6.479	5.247	5.057
90	5.812	4.736	4.538	6.057	4.910	4.703
91	5.444	4.441	4.228	5.660	4.595	4.373
92	5.096	4.162	3.941	5.287	4.299	4.067
93	4.771	3.900	3.676	4.939	4.021	3.787
94	4.467	3.653	3.433	4.615	3.759	3.531
95	4.182	3.419	3.211	4.313	3.512	3.298
96	3.918	3.200	3.009	4.033	3.282	3.085
97	3.670	2.996	2.820	3.771	3.068	2.888
98	3.437	2.807	2.643	3.527	2.871	2.703
99	3.220	2.634	2.477	3.299	2.689	2.529
100	3.018	2.474	2.320	3.088	2.523	2.367

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 80 List of Data Sources

Name of File	Date	Category	Description
Contributors			
Appendix 1 Defined Benefit Category - Active Members.txt	30/07/2018	Defined Benefit	Membership details of active members at 30 June 2018
Appendix 11 Defined Benefit Category - Salary Reduction.txt	6/08/2018	Defined Benefit	Details of members who had salary reduction benefits at 30 June 2018
Appendix 4 Police Category - Active Members.txt	26/07/2018	Police	Membership details of active members at 30 June 2018
Appendix 3 State Category - Active Members.txt	26/07/2018	State	Membership details of active members at 30 June 2018
Actuary data - Appendix 5 - Active Members 30-6-18 Final.xls	13/07/2018	Parliamentary	Membership details of active members at 30 June 2018
Appendix 2 Accumulation Category - Members.txt	6/08/2018	Accumulation	Membership details of accumulation members at 30 June 2018
Appendix 9 Income Account (Allocated Pensions) - Members.txt	6/07/2018	Income Account	Membership details of income account based members at 30 June 2018
Pensioners			
Appendix 12 Defined Benefit Category - Pensioners.txt	13/07/2018	Defined Benefit	Pensions in payment at 30 June 2018 and pensioner movements in 2017-18 financial year
Actuary Data - Appendix 14 - Parliamentary Category - Pensioners 30062018 Final.xls	19/07/2018	Parliamentary	Pensions in payment at 30 June 2018 and pensioner movements in 2017-18 financial year
Appendix 12 Police Category - Pensioners.txt	13/07/2018	Police	Pensions in payment at 30 June 2018 and pensioner movements in 2017-18 financial year
Appendix 12 State Category - Pensioners.txt	13/07/2018	State	Pensions in payment at 30 June 2018 and pensioner movements in 2017-18 financial year
Appendix 13 Fire Category - Pensioners.txt	6/07/2018	Fire	Pensions in payment at 30 June 2018 and pensioner movements in 2017-18 financial year
Appendix 12 State and Police Commuters 2018.xls	13/07/2018	State & Police	Pensions in payment at 30 June 2018 and pensioner movements in 2017-18 financial year
Deferred Members			
Appendix 10 Deferred Retirement Benefit - Members.txt	6/07/2018	Defined Benefit	Membership details at 30 June 2018
Preserved Members			
Actuary Data - Appendix 8 - Preserved Members 30-06-2018.xls	6/07/2018	Parliamentary	Membership details at 30 June 2018
Appendix 6 State Category - Preserved Members.txt	26/07/2018	State	Membership details at 30 June 2018
Appendix 7 Police Category - Preserved Members.txt	26/07/2018	Police	Membership details at 30 June 2018
Assets			
QSuper Fund - Annual Financial Report - 30 June 2018 v4.0.pdf	26/09/2018		Audited financial statements as at 30 June 2018
QIC QTC balances for SAO 17-18.xlsx	29/08/2018		Consolidated fund assets as at 30 June 2018
Qld Govt ALM - Jun 18 QTR v3.xls	27/09/2018		Defined Benefit/Accumulation asset split for financial year 2017-18

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 2018

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 2018

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 2017 to 30 June 2018
- 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 2018

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 2018

Defined Benefit Category Members - Actives at 30 June 2018

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 2018
- 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 2018, 2017, 2016 & 2015 Review Date Salary and 2018 OTE Salary

- Low ($5k) or High ($1m) 1 July 2018, 2017, 2016 & 2015 Review Date Salary and 2018 OTE Salary
- High (100%) DB Salary Increase in 2015-16, 2016-17 and 2017-18 financial year
- Missing or High (9.45 DB Standard, 11 DB Police, 2.0 ATM) Accrued Multiple & ATM at 30 June 2018
- 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 2018
- High ($1.5m) Voluntary Contribution Balance at 30 June 2018
- 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
- 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
- Imputed the standard Member Contribution Rate if Member Contribution Rate was less than the minimum allowable
- If Service for Prospective Benefit is greater than calculated Service, amend Date Joined field
- If Low or Missing Salary, use the previous years' Salary, otherwise impute an average Salary
- If Low OTE Salary, use the 1 July Review Date Salary
- 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

Police Category Members - Actives at 30 June 2018

- Low (18) or High (60) Age at 30 June 2018
- 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 2018
- Low ($10k) OTE Salary at 30 September 2017
- Low ($500) Accumulation Balance at 30 June 2018
- High ($90k) Annual Pension Amount at 30 June 2018
- High ($900k) Lump Sum Payable on Retirement at 30 June 2018
- Missing or Zero Vested Benefit at 30 June 2018
- 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 2018

- Low (16) or High (65) Age at 30 June 2018
- 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 2018 Review Date Salary
- Low ($10k) OTE Salary at 30 September 2017
- Low ($500) Accumulation Balance at 30 June 2018
- Low ($0) Member Contribution Balance at 30 June 2018
- High Portability Service (15), Reduced Service (12) or Additional Service (25) at 30 June 2018
- 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 2018
- Missing or Zero Vested Benefit at 30 June 2018
- 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

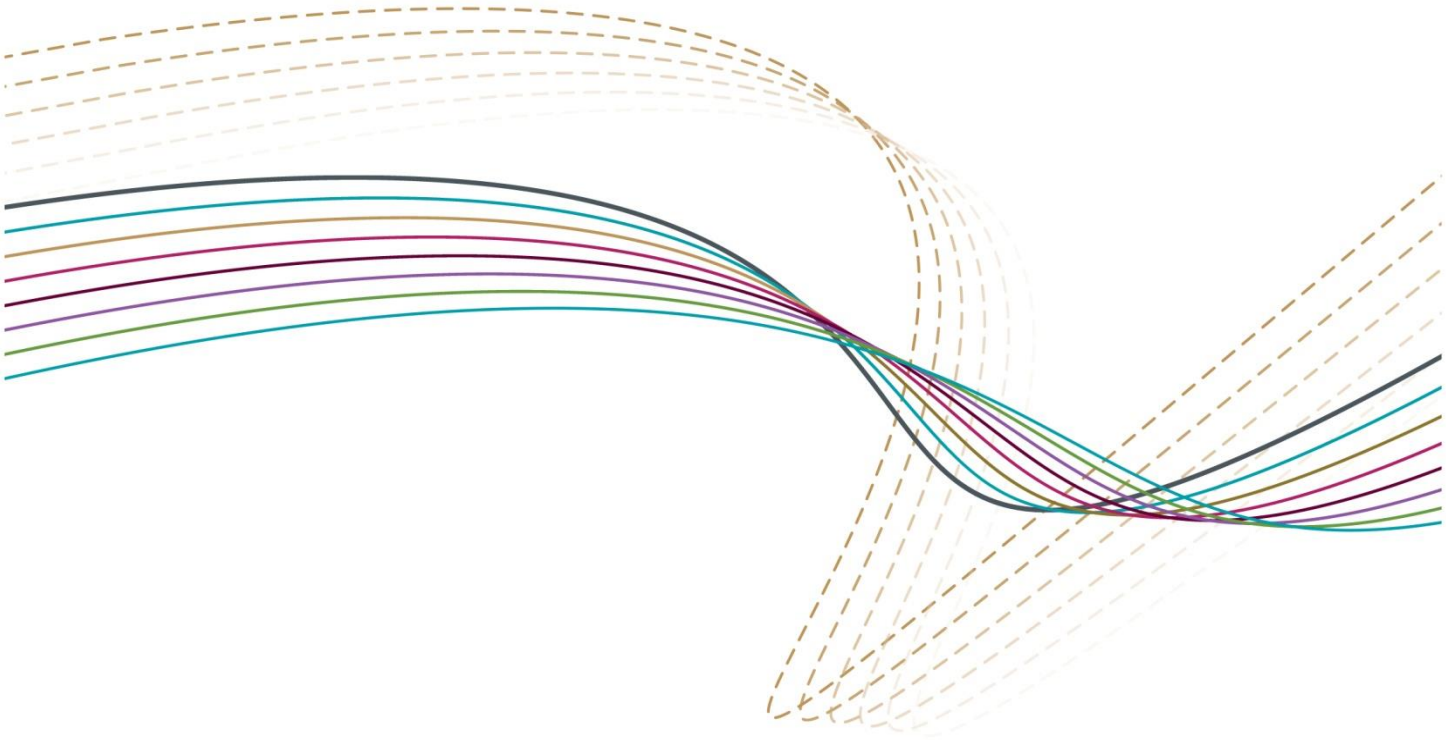
Aggregate checks were performed on the main components of the liability to confirm that the movement in the liability was reasonable.

Parliamentary Category Members - Actives at 30 June 2018

- Low (18) or High (70) Age at 30 June 2018
- 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 2018
- Low ($1m) or High ($3m) Accumulated Own Salary at 30 June 2018
- Low ($1m) or High ($3m) Accumulated Backbencher Salary at 30 June 2018
- Total Accumulated Own Salary is less than Total Accumulated Backbencher Salary as at 30 June 2018

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



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