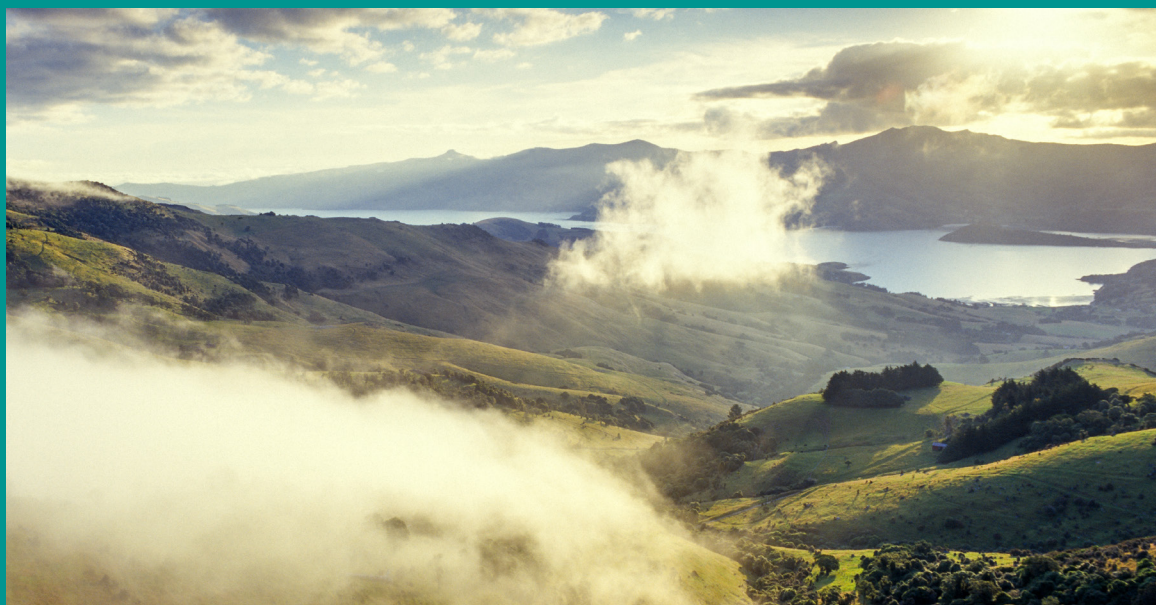


Report on the



GOVERNMENT SUPERANNUATION FUND
Te Pūtea Penihana Kāwanatanga

ACTUARIAL VALUATION **as at 30 June 2017**



2017

Presented to the House of Representatives pursuant to section 94
of the Government Superannuation Fund Act 1956

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1. Introduction

This Report has been prepared for the Government Superannuation Fund Authority (the **Authority**). Limitations relating to the use of this Report are set out in Section 10.

The previous actuarial valuation report, as at 30 June 2016, was prepared by Matthew Burgess, FNZSA, FIAA, of Russell Investments Employee Benefits Pty Ltd and dated 8 December 2016.

The requirement for actuarial valuations of the Government Superannuation Fund (the **Fund**) is set out under Section 94 of the Government Superannuation Fund Act 1956 (the **Act**). This states that the Authority must obtain an actuarial report that examines the financial position of the Fund as at dates determined by the Minister of Finance but no more than three years apart.

The report must show the financial position of the Fund as at the valuation date and the probable annual contributions required by the Fund to provide benefits falling due within the next three years without affecting or having recourse to the actuarial reserve appertaining to the contributors' contributions.

Under Section 95 of the Act the Authority must certify, after receiving advice from an actuary, as to the share of benefit payments to be met from the Fund assets. The Authority must also certify, after receiving advice from an actuary, the payments to be made to the Fund by employers whose employees are paid from money that is not public money (**funding employers**).

Therefore, the purpose of this Report is to:

1. evaluate the unfunded liability of the Fund in respect of past service as at 30 June 2017;
2. calculate the proportion of benefits payable from the Fund that is to be met from the Fund assets;
3. calculate the probable annual contributions required by the Crown to cover a proportion of the benefits payable over the next five years; and
4. make recommendations in respect of contributions to the Fund to be made by employers of contributors to the Fund with effect from 1 July 2018.

Our report also provides a summary of the data used to calculate the above results, details of the assumptions and methodology adopted and a summary of the benefit design for each of the schemes within the Fund.

2. The Fund

The Fund is established under the Act, as amended from time to time, which governs a number of separate superannuation schemes. We used the version of the Act reprinted on 1 July 2017.

In accordance with Section 19H of the Act, each of the schemes in the Fund must be treated as if it is registered on the register of managed investment schemes under the Financial Markets Conduct Act 2013 as a superannuation scheme, but Part 4 of that Act does not apply.

The schemes established under the Act are:

Scheme	Part of the Act
Government Service Superannuation (Old General)	Part 2
New Government Service Superannuation (New General)	Part 2A
Armed Forces	Part 3A
Judges and Solicitor-General	Part 5A
Parliamentary	Part 6
Police	Part 6A
Prisons Service	Part 6B

Members under Part 2 or Part 2A of the Act who are or were employed by the Public Services of the Cook Islands, Niue or Tokelau are valued separately and described as “Islands” in this report.

The Judges and Solicitor-General scheme and the Parliamentary scheme are managed on a fully pay-as-you-go basis. The remainder of the schemes are managed on a partially funded basis.

Contributions from members and funding employers (employers whose employees are paid from money which is not public money) are paid into the Fund and invested. For non-funding employers the employer contributions are paid to the Crown.

Benefits are paid partly from the assets of the Fund and partly by the Crown.

The level of employer contributions and the proportion of the benefits payable from the Fund assets are reviewed at each statutory valuation of the Fund.

The schemes have been closed to new members since 1 July 1992, apart from Islands members who were able to join up until 1995.

3. Membership Data

The membership data required to produce our actuarial calculations was provided by the Fund Administrator, Datacom Employer Services Limited and is effective as at 30 June 2017. During the 2016-17 year, the administration of the Scheme was transferred to the Authority's new administration system. The 30 June 2017 membership data has been produced from the new system.

After the implementation of the new system in late 2016 we carried out a review of 30 June 2016 data files produced by the new system compared with the 30 June 2016 data files provided to us last year from the existing system. We concluded that the new system produced data which was consistent with the existing system and which was sufficient for our valuation work. There are, however, some differences between the systems. One particular difference is the removal of the 'Leave without Pay' status (**LWOP**) under the new system. These members were previously treated as inactive, but are now treated as active. We do not consider this will have a material impact on the past service liability, because, as inactive members, these members were generally assumed to be eligible to commence a pension immediately (or at age 51, if later). Where possible, we placed checks on the data to ensure internal consistency between 30 June 2016 data and 30 June 2017 data. We also reconciled the movements in contributors and pensioners between 30 June 2016 and 30 June 2017.

At 30 June 2017 there were 3,997 contributors with total salaries of \$411.6 million. There were 45,279 current and suspended pensioners with total pensions of \$860.7 million per annum as at 30 June 2017 and 4,115 deferred pensioners.

We did not perform data checks in respect of the groups of members commonly known as Inactives(1) and Inactives(2). More information on these groups is set out in Appendix A. These are members who have ceased contributing to the Fund, but have not yet received an entitlement, and for some of whom insufficient data is available. The impact on the overall liabilities of the Fund from these two inactives groups is modest in relative terms and therefore we are comfortable to make an approximation in the 30 June 2017 valuation. There were 1,570 Inactives(1) and 2,789 Inactives(2) members at 30 June 2017. The number of Inactives(1) has reduced materially from 30 June 2016 because members on leave without pay have been reclassified as actives. Movements in membership of the contributors and inactives groups of the Fund by scheme are shown below.

Scheme	30 June 2016	Retirements	Withdrawals	Deaths	Refunds	Transfer	30 June 2017
Armed Forces	130	5	-	1	-	-	124
General (ex Islands)	7,995	553	1	49	19	8	7,365
Islands	629	38	-	1	5	-	585
Police	257	18	-	-	-	-	239
Prisons Service	40	4	-	-	1	-	35
Judges	4	1	-	-	-	-	3
Parliamentary	5	-	-	-	-	-	5
Total	9,060	619	1	51	25	8	8,356

The movements in the contributors and inactives data for the 2016/17 year are summarised below.

	30 June 2016 category (From)	30 June 2017 category (To)			
		Contributors	Inactives (1)	Inactives (2)	Exits
Contributors	4,324	3,746	63	-	515
Inactives(1)	1,927	251	1,503	19	154
Inactives(2)	2,809	-	4	2,770	35
Total	9,060	3,997	1,570	2,789	704

Many of the exits shown in the above table will have commenced a pension or become entitled to a deferred pension. New pensions also commence from the previous pensioners, for example a reversionary pension may become payable on the death of a retirement pensioner.

The movements in the pensioner membership, including deferred pensioners, over the year were as follows.

Pensioners at 30 June 2016	50,143
<i>Less</i> pensioners ceasing to receive pensions	(2,051)
<i>Plus</i> new pensioners commencing	1,302
Pensioners at 30 June 2017	49,394

For former Armed Forces members with deferred pensions which have not yet commenced, the pension amount held on the administration system is the pension amount calculated at the date of deferral with indexation to the current date. When valuing the liability for these pensioners we then allow for indexation from 30 June 2017 to the date of commencement of the pension using the assumed future rates of Consumer Price Index (**CPI**) increase.

Key summary membership statistics are provided in Appendix A. Also, Appendix B includes a summary of circumstances where assumptions were necessary to complete our calculations because of the nature of the data.

In our opinion, the data we received was sufficient to carry out this valuation of the Fund.

4. Fund Accounts and Assets

Assets

The net assets of the Fund had a market value of \$4,271 million at 30 June 2017. This figure was obtained from audited financial statements as at 30 June 2017. The information includes the market value of the Fund assets, contributions, benefit payments and expenses information over the period since 30 June 2016.

Asset values in respect of prior years have been taken from the audited accounts included in the Annual Report of the Fund.

The transactions of the Fund for the year ending 30 June 2017 together with the prior year's figures for comparative purposes are summarised in the following table.

Year ending 30 June:	2016 \$M*	2017 \$M*
Opening balances	4,087	3,961
<i>Plus:</i>		
Member contributions	33	27
Funding employers	18	18
Government contributions	706	690
Investment income (pre-tax)	104	562
<i>Less:</i>		
Pensions paid	846	848
Commutations	20	19
Refunds and payments on death	5	7
Tax provision	74	72
Operating costs	43	41
Closing balances	3,961	4,271

*Totals may not add up due to rounding.

The accuracy of our results is dependent upon the accuracy of the underlying data provided. We are confident of the sufficiency and reliability of the information provided for the purposes of this report. We consider that the use of the market value of assets is consistent with the assumptions used in determining the discount rate for valuing liabilities. There are no material contingent liabilities included in the asset value of which we are aware.

Investments

The Authority, under Section 15J(2) of the Government Superannuation Fund Act 1956, is responsible for investing the assets in a prudent, commercial basis. The Authority has set an Investment Objective which is to maximise the Fund's excess return relative to the New Zealand Government Stock

Return Index (before tax), with no more than a one in four chance of under-performing New Zealand Government Stock by a cumulative 10% measured over rolling ten year periods.

The Authority has determined that the long term strategic asset allocation (also known as the Target Portfolio) for the investments of the Fund is as follows. As at 30 June 2017 the asset allocation was as set out in the Statement of Investment Policies, Standards and Procedures dated 17 May 2017.

Asset Class	Proportion
New Zealand equities	9.6%
International equities	55.0%
Global fixed interest	16.5%
Catastrophe risk assets	6.0%
Life settlement assets	3.7%
Multi-asset class	4.2%
Style premia fund	5.0%
Total	100.0%

At 30 June 2017 the assets of the Fund were invested as shown below. The investment policy allows the Authority to take temporary positions away from the Target Portfolio, within specified limits.

Asset Class	Proportion of total assets at 30 June 2016	Proportion of total assets at 30 June 2017
New Zealand equities (including property)	10.1%	9.4%
International equities	46.3%	56.0%
Fixed interest	13.7%	12.1%
Commodities	2.0%	1.8%
Multi asset and global tactical asset allocation	7.9%	nil
Insurance linked assets	9.9%	8.3%
Style premia fund	nil	4.9%
Short term investments and cash *	10.1%	7.5%
Total	100.0%	100.0%

* Also includes Derivatives, Prepayments, Receivables and Liabilities.

•• Totals may not add up due to rounding.

Market risk means that the investment returns could be volatile. The investment portfolio includes normal investment risks of investing in the listed asset classes, but I am not aware of any other material risks posed by the assets.

Within these asset classes the Fund utilises a range of specialist investment managers. These are listed in the table below.

New Zealand equities	Devon Funds Management Direct Capital Management Limited (NZ private equity) Harbour Asset Management Limited Pencarrow Private Equity Management Limited (NZ private equity) Pioneer Capital Management Limited (NZ private equity)
International equities	Arrowstreet Capital Limited Partnership Lazard Asset Management, LLC Makena Capital Management (Cayman), LLC Marathon Asset Management, LLP PanAgora Asset Management, Inc Pzena Investment Management, LLC StepStone Group LP (global private equity)
New Zealand property	Willis Bond and Company Management Limited
Fixed interest	Ashmore Investment Management Limited Brandywine Global Investment Management, LLC Pacific Investment Management Company, LLC Wellington Management Australia Pty Ltd
Style premia fund	AQR Capital Management, LLC
Multi assets	Makena Capital Management (Cayman), LLC
Insurance linked assets	Apollo Global Management, LLC Credit Suisse Securities (Europe) Limited Fermat Capital Management, LLC Nephila Capital Ltd
New Zealand private infrastructure	HRL Morrison and Company
Currency management	ANZ Bank New Zealand Limited State Street Global Advisors, Australia, Limited
Commodities	AMP Capital Investors (NZ) Limited

In our opinion, given the circumstances of the Fund, in particular the long term nature of the benefits and the partially funded status, the assets and the investment strategy are within the range of what is suitable for the purposes of the Fund.

Investment Return

The long term after tax investment return was assumed to be 5.0% p.a. for the purposes of the 30 June 2016 statutory valuation. The estimated return for the 2016/17 year was 12.65%. This has been estimated using the formula $2I/(A + B - I)$, where I is investment income less tax provisions, A is the opening balance and B is the closing balance. The estimate is after tax and before investment costs so that it can be compared to the investment return assumed for the financial year to 30 June 2017.

The Fund's annual report as at 30 June 2017 states that the investment return for the year was 13.9% before tax and after investment fees. The Fund switched to a before tax investment objective from 1 July 2014 and hence investment returns are now reported on a before tax basis.

Returns for prior years, as reported in the Fund's annual reports were:

Fund return (before tax)	
Year ended 30 June 2016	2.1%
Year ended 30 June 2015	13.3%
Year ended 30 June 2014*	10.8%

* From the beginning of the 2014/15 year the Fund switched to a before tax investment objective and the returns for the 2014/15 and 2015/16 years are reported on that basis. Returns reported for prior years are on an after tax basis.

5. Fund Experience

Salary Increases

The average salary increases for the year for contributors at 30 June 2017 are shown in the table below, segregated by scheme. The expected increase, based on last year's actuarial assumptions was 2.5% plus an assumed promotional salary increase based on a member's scheme and age. As General scheme members make up about 90% of the total salary roll for active members, the majority of members had salary increases which were close to expected. Therefore the liabilities have increased broadly in line with expectations.

Scheme	Actual salary increase
Armed Forces	3.3%
General	2.5%
Islands	6.2%
Police	3.4%
Prisons Service	1.2%
Judges and Solicitor-General	1.7%
Parliamentary	2.5%

Pension Increases

Most pensions increased by 1.42% in the 2016/17 year. This increase was based on the increase in the CPI over the year ended 31 December 2016 of 1.34% added to the increase in the CPI over the year ended 31 December 2015 of 0.08%. (As the CPI increase for the year ended 31 December 2015 was lower than the 0.5% threshold used to determine when pension increases are granted, the vast majority of pensioners did not receive an increase in the 2015/16 year. The 0.08% increase was added to the CPI increase at December 2016, when determining the pension increase to apply in the 2016/17 year.) The overall pension increase was close to the assumed rate of 1.47%, which has resulted in the value of the liabilities increasing at close to the expected rate.

Demographic

The demographic experience of the Fund over the three year period to 30 June 2015 was reviewed as part of the 30 June 2015 statutory valuation and changes were made to some assumptions used for that valuation. For this report we have retained the current assumptions. The next review of the demographic assumptions will be carried out in 2018.

Pensioner Mortality

In 2015 a review was carried out of the pensioner mortality over the three year period to 30 June 2014, and revised mortality rates were implemented for the 30 June 2015 statutory valuation. For this current valuation we have retained the assumptions for pensioner mortality as used for the 30 June 2015 and 30 June 2016 statutory valuations.

Employer Contributions

The employer contributions paid in the 2016/17 year were based on recommendations in the 30 June 2015 statutory valuation report, for non-funded employers, and separate advice provided in December 2015 for funding employers. We are not in a position to check whether contributions were paid in accordance with the recommendations, particularly for non-funding employers, where the contributions are paid directly to Treasury. However, from the Fund's perspective the key funding mechanism is the Crown contribution, determined as described in Section 6. From the financial statements we were able to confirm that the Crown contribution for 2016/17 was in accordance with recommendations.

In total the contributions received from funding employers in 2016/17 were of the order that we expected.

Administration Expenses

The administration expenses of the Fund for the 2016/17 year were \$9.737 million, as set out in the financial statements. This represents 0.23% of the year end assets.

Using the method described in Section 6, expenses incurred during the 2016/2017 year were funded based on our recommendations in a letter dated 15 October 2015. The expenses are funded partly by the Crown and partly by a portion of the funding employers' contributions. From the financial statements we were able to confirm that the expense funding was in the order that we expected.

6. Valuation Methodology

All members have been valued individually using Willis Towers Watson's proprietary software. Each member's age, gender, category of membership, salary, service, deferred pension, current pension, and/or contributions have been taken into consideration.

Valuing the Fund's liabilities involves projecting the benefits payable in future to members and their dependants. Benefits are payable on retirement, death, leaving service, ill health or on withdrawal from the Fund and are calculated using membership at the valuation date. The amount of the entitlement typically depends on the length of membership, the level of salary in the years leading up to the event and the pension increases subsequently given (in the case of the pension entitlements).

A summary of the main entitlements for each scheme is provided in Appendix C. This summary has been reviewed and agreed by the Authority.

Past Service Liabilities

The Past Service Liabilities for the Fund are calculated by projecting these payments, using assumptions about the likelihood of an entitlement becoming payable at any future date (the demographic assumptions) and about members' future salary growth and pension increases (the financial assumptions). The projected payments are discounted back to the valuation date using the assumed discount rate.

The benefits for contributors are apportioned to past service as follows:

- Retirement/Death/Medical Retirement: the benefit calculated only with service to the valuation date, with allowance for future salary increases to the assumed date of exit.
- Resignation: For deferred retiring allowances, the benefit calculated only with service to the valuation date, with allowance for future salary increases to the assumed date of exit and increased in line with CPI to date of payment; for immediate lump sums, the member contributions with interest to the date of payment assuming no further contributions.

For pensioners, inactive and deferred members the entire benefit relates to past service.

Unfunded Liabilities

The Unfunded Liabilities are then calculated as the difference between the Past Service Liabilities and the Fund assets.

Crown Contributions

The Crown makes contributions to the Fund which are equal to:

- the benefit payments arising from members of the Judges and Solicitor-General scheme and the Parliamentary scheme, which are both funded on a pay-as-you-go basis, after deducting member contributions for the period;
- a proportion of the benefit payments arising from other members, with the amount determined by deducting from the total benefit payments in respect of the relevant members the amount received from funding employers and the Fund Share; and
- a proportion of the Fund's expenses, with the balance met by the funding employers.

Fund Share of Benefits

The Fund Share of Benefits is the proportion of benefits arising, excluding benefit payments from the Judges and Solicitor-General scheme and the Parliamentary scheme, which are paid from the Fund.

This proportion is calculated as the ratio of the Fund assets plus expected future member contributions to the total Fund liabilities in respect of past and expected future service. It is calculated using the IPSAS 25 accounting basis, i.e. using the net of tax risk-free discount rates determined by Treasury. The Fund Share of Benefits is expected to be reasonably stable over time, but will vary from year to year based on changes to assumptions and experience. For example, a higher than expected investment return would be expected to increase the Fund Share of Benefits.

This calculation methodology has been used for many years and is one of a number of reasonable approaches that could be adopted. The Fund Share of Benefits is updated annually to reflect the actual experience of the Fund, which ensures that over time the Crown contributions are adjusted ensuring all benefit payments will be funded.

Employer Contribution Rates

Funding employers (employers whose employees are paid from money which is not public money) make employer contributions to the Fund. Non-funding employers do not make employer contributions to the Fund, but the Government requires employer contributions to be made to the Crown.

The method used for determining the employer contribution rates is to use the Standard Contribution Rates calculated using the Attained Age Method. This method calculates the employer contributions required to fund benefits accruing to contributory members over potential future service by:

- calculating the amount of all benefits expected to be paid in the future in respect of the current Fund members, based on potential future service, and allowing for all the contingencies under which benefits can be paid (retirement, death, ill health or resignation), the probabilities of these contingencies arising and for future salary increases;
- projecting future pension benefits allowing for increases arising from cost of living adjustments and for probabilities of survival;
- discounting the stream of expected future benefit and pension payments to determine the present value of future liabilities;
- similarly, discounting the projected stream of expected future member contributions to determine the present value of these contributions and then offsetting this amount from the present value of future liabilities above;
- dividing this net future liability by the present value of 1% of future members' salaries to derive the Standard Contribution Rate; and
- grossing up the calculated rate to allow for Employer Superannuation Contribution Tax (**ESCT**) for the schemes where the tax applies.

In fully funded superannuation schemes where this method is used, the Standard Contribution Rate is usually adjusted to allow for any difference between the scheme assets and past service liabilities. However, since 1 July 2008 employer contributions have been calculated using the Standard Contribution Rates without adjustment. This means that the Standard Contribution Rates are only

adjusted for emerging experience to the extent future assumptions are updated. Crown contributions will reduce (or increase) to the extent that emerging experience is better (or worse) than expected.

Up until 30 June 2008 the Standard Contribution Rates were adjusted with reference to the surplus or deficit of the notional fund for each scheme, calculated commencing 1 July 1992, when the Fund was largely closed to new entrants. The significant reduction in the value of assets as a result of the global financial crisis, combined with the reduced number of contributors made it difficult for stable contribution rates to be maintained under this approach.

The exception to this is the Prisons Service scheme, which continues to have a high notional surplus and for which no contributions are currently necessary.

A consequence of the approach is that for funding employers, there is likely to be a cross subsidy to or from the Crown because of differences between assumptions and experience. The Fund Share of Benefits will adjust over time to reflect the differences ensuring all benefits are funded. For the funding employers the Standard Contribution Rates are calculated based on only their own employees. The approach is intended to fully fund members' benefits by the time they leave employment.

The non-funding employer contribution rates are calculated based on all members of the relevant scheme. No allowance for expenses is included in the non-funding employer contribution rates.

7. Assumptions

Financial assumptions

The key financial assumptions are the rate of return on assets (or discount rate), and the rates of salary growth and pension increases.

Discount Rate – Statutory Basis

The valuation of the Fund on the statutory basis provides a picture of the financial condition of the Fund and a determination of the employer contribution rates on an ongoing basis. Therefore a discount rate based on a realistic best estimate assumption of the expected return on assets is required.

The expected return on assets is based on modelling carried out by Russell Investment's¹ in-house capital markets team. The modelling derives a set of expected real returns for each of the major asset classes in which the Fund invests and is combined with the price inflation assumption to develop nominal returns. The discount rate has allowed for the effects of taxation and is expressed net of New Zealand tax. No adjustments for investment expenses were made as they are met by the Crown and the funding employers. The discount rate is calculated based on the long term strategic asset allocations and long term expectations of investment returns net of taxation at the valuation date. The long term strategic asset allocation for the Fund is set out in the Section 4 of this report.

Based on this methodology the discount rate assumption is 5.0% p.a., net of tax. The discount rate assumption for the statutory valuation as at 30 June 2016 was also 5.0% p.a., net of tax.

Discount Rate – Fund Share Basis

In accordance with established practice, the discount rates for the Fund Share basis are calculated by reference to market prices for Government stock as at the valuation date but are reduced for estimated investment tax.

The discount rates for this valuation and the previous statutory valuation are set out in Appendix B. The rates for this valuation are higher than the rates used for the previous valuation at all durations to 2054, with the long term rate from 2055 being the same.

Pension Increases

The pension increase assumption is linked to expected increases in the CPI. For the purposes of certain accounting valuations Treasury publishes assumptions relating to CPI increases. In our opinion it is reasonable to also use these assumptions for this valuation. The CPI increase assumptions released in July 2017 relate to years ending 30 June. As at 30 June 2017, the assumed CPI increases based on the Treasury rates are 1.67% p.a. until 2037, gradually increasing to 2.0% p.a. from 2048.

For the 30 June 2016 statutory valuation the assumed CPI increases were 1.47% p.a. until 2033, gradually increasing to 2.0% p.a. from 2055.

The assumption of major significance in the valuation of the Fund's liabilities is the long term difference (or 'gap') between the assumed discount rate and the assumed rate of future pension increases.

¹ Russell Investment Group Limited is the Fund's investment adviser.

These two assumptions offset each other in their financial effect, hence the difference between the rates is important rather than the absolute values ascribed to them. The greater the assumed gap, the lower the value placed on the liabilities.

The assumed 'gap' for this valuation is 3.33% for the year ending 30 June 2018, gradually decreasing to 3.0% p.a. from 1 July 2048 onwards. The gap for the 30 June 2016 statutory valuation was 3.53% p.a. for the year ending 30 June 2017, gradually decreasing to 3.0% from 1 July 2055 onwards. In isolation, this means that the value of liabilities will be higher than the liability would be if the 30 June 2016 basis was used.

Salary Growth

The salary inflation assumption is based on market expectations of price inflation and on consideration of Treasury's expected range for inflation, together with an allowance for the margin of salary inflation over price inflation. The salary assumption adopted is a flat salary increase of 2.5% p.a., which is the same as that used for the statutory valuation as at 30 June 2016. In addition, an age-based scale of promotional salary increases has been used, as set out in Appendix B, which is also the same as adopted for the 30 June 2016 statutory valuation.

Demographic Assumptions

The demographic assumptions used are the same as used in the most recent statutory valuation as at 30 June 2016.

The pensioner mortality is one of the most financially significant assumptions and the assumptions were derived based on the experience of the Fund's pensioners as described in the 30 June 2015 statutory valuation.

Expenses

The expenses of the administration and investment management of the Fund are currently met in part by the funding employers, with the balance paid by the Crown as provided by Section 15E of the Act. An allowance for future expenses has been made in the calculations of the contribution rates for funding employers.

Recommendations on the apportionment of expenses between Crown and funding employers for the year ending 30 June 2018 were made in my report dated 29 November 2016. It was recommended that the Crown should meet 90% of the expenses of the Authority relating to investment management and administration, with the balance to be met by funding employers. In addition it was recommended that the expenses to be met by funding employers are recouped through a loading of 3.1% of salaries in the recommended contribution rates (2.1% of salary for Islands members).

We have provided advice to the Authority on the apportionment of expenses for the year to 30 June 2019. Full details of our calculations and recommendations are set out in a separate report dated 18 September 2017. In summary, our recommendations are that the share of expenses to be met by the Crown and by funding employers are 91% and 9% respectively and that the expenses to be met by funding employers is met by a loading of 3.3% of salaries in the recommended contribution rates (2.2% where ESCT does not apply).

Appendix B sets out a summary of the key financial and demographic assumptions adopted.

8. Results

Total Service Liabilities

The valuation balance sheet at 30 June 2017 under each basis is set out below.

	Statutory valuation \$M*	Fund Share valuation \$M*
Total Service Liabilities		
Armed Forces	4	5
General (excluding Islands)	2,233	3,229
Islands	74	112
Police	200	293
Prisons Service	13	17
Judges and Solicitor-General	7	9
Parliamentary	7	9
Current pensioners	9,860	12,592
Deferred pensioners	796	1,263
Total Liabilities	13,192	17,529
Assets		
Value of Fund Assets	4,271	4,271
Present value of future member contributions		
Armed Forces	0	0
General (excluding Islands)	97	109
Islands	3	3
Police	3	3
Prisons Service	0	0
Judges and Solicitor-General	0	0
Parliamentary	0	0
Total Assets	4,374	4,386
Present value of amounts to be funded by Government contributions and funding employer contributions	8,818	13,142
Fund Share of Benefits		25.4%

* Totals may not add up due to rounding.

The Fund Share of Benefits is calculated as the ratio of the value of assets plus the value of future member contributions to the value of total liabilities. For this calculation the liabilities and contributions in respect of the Judges and Solicitor-General scheme and the Parliamentary scheme are excluded. The liabilities for these two schemes (including pensioner liabilities) are \$277 million and the value of contributions is nil (when rounded to the nearest million).

The Fund Share of Benefits calculated at the 2016 valuation was 22.4%. The calculation above shows that the Fund Share of Benefits at 30 June 2017 has increased to 25.4%. This is primarily due to the strong investment returns over the year and the increase in the real discount rates used to value the liabilities as at 30 June 2017 compared with those used at 30 June 2016. The increase in real discount rates on the Fund share basis reflects the increase in bond yields over the year and results in a lower value being placed on the Fund's liabilities. Other changes will have had smaller impacts.

Past Service Liabilities

The valuation results at 30 June 2017 are:

	Statutory valuation \$M*	Fund Share valuation \$M*
Past Service Liabilities		
Armed Forces	4	5
General	1,992	2,857
Islands	64	96
Police	193	281
Prisons Service	12	17
Judges and Solicitor-General	7	9
Parliamentary	7	9
Total Contributors and Inactives	2,278	3,274
Current pensioners	9,860	12,592
Deferred pensioners	796	1,263
Total Pensioners	10,656	13,855
All Past Service Liabilities	12,934	17,129
Assets	4,271	4,271
Unfunded Past Service Liabilities	8,663	12,858

* Totals may not add up due to rounding.

The relationship between the past service liabilities and the assets is unlikely to change materially by the date of the next investigation, if the actuarial assumptions are borne out in practice. Almost all of the past service liability in respect of contributors is in respect of retirement benefits.

The change in the Past Service Liabilities (**PSL**) on the statutory basis over the 2016/17 year is detailed below.

	\$M*	\$M*
PSL at 30 June 2016		12,835
Expected change:		
Service cost (including member contributions)	54	
Interest cost	622	
Benefit payments	(916)	(240)
Experience (gains)/losses		102
Assumption changes:		
Financial (CPI assumption change)	237	
Financial (Discount rate change)	0	
Financial (Salary increase assumption)	0	
Demographic	0	
		237
PSL at 30 June 2017		12,934

*Totals may not add up due to rounding.

The corresponding movement in the assets over the year was:

	\$M*	\$M*
Assets at 30 June 2016		3,961
Expected change:		
Return on assets	193	
Contributions	727	
Benefit payments	(916)	4
Experience gains/(losses):		
Investment		296
Other		10
Assets at 30 June 2017		4,271

*Totals may not add up due to rounding.

The movement of the unfunded past service liability (actuarial deficit) on the statutory basis over the year is, therefore:

	\$M*	\$M*
Unfunded PSL at 30 June 2016		8,874
Expected change:		
Service cost	54	
Interest cost	622	
Return on assets	(193)	
Contributions	(727)	(244)
Experience (gains)/losses:		
Assets	(306)	
Liabilities	102	(204)
Change in basis:		
Financial (CPI assumption change)	237	
Financial (Discount rate change)	0	
Financial (Salary increase assumption)	0	
Demographic	0	237
Unfunded PSL at 30 June 2017		8,663

*Totals may not add up due to rounding.

Vested Benefits

Vested benefits are calculated as the amount payable in the event that all contributors ceased membership as at the valuation date. For this purpose, I have assumed that:

- for all schemes other than Armed Forces, contributors with at least 10 years contributory service will receive a deferred retiring allowance commencing at age 50 if they are currently under age 50, otherwise an immediate pension,
- for all schemes other than Armed Forces, contributors with less than 10 years contributory service will receive an immediate withdrawal benefit (there are very few members in this situation),
- all contributors in the Armed Forces scheme with at least 20 years contributory service receive an immediate retirement pension and other Armed Forces contributors receive an immediate withdrawal benefit, and
- the pension benefits have been valued using the same assumptions about commutation as were used to value the past service liabilities on the statutory basis, as set out in Appendix B.

The vested benefit values are shown in the following table. The ratio of vested benefits to past service liabilities is also shown.

Group	Vested Benefits \$M*	As a percentage of past service liability
Contributors and Inactives:		
Armed Forces	4	100%
General	2,127	107%
Islands	65	102%
Police	186	96%
Prisons Service	12	100%
Judges and Solicitor-General	7	100%
Parliamentary	7	100%
Total Contributors and Inactives	2,409	106%
Pensioners:		
Current Pensioners	9,860	100%
Deferred Pensioners	796	100%
Total Pensioners	10,656	100%
Grand Total	13,064	101%
Less Assets	4,271	
Shortfall	8,793	

* Totals may not add up due to rounding.

The relationship between the vested benefits and the assets is unlikely to change materially by the date of the next investigation.

The implications of the Fund winding up have not been considered in this report due to the nature of the Fund. The Act has no wind up provision. Benefits are underwritten by the Crown. Given the partially funded nature of the Fund, its assets would not be sufficient to pay accrued benefits or to outsource liabilities.

Projected Subsidy

A projection of the amount of Government contributions under the Fund Share basis, before any offset for contributions by funding employers and excluding expenses, has been made for the next five years assuming that experience will match the valuation assumptions. The results of the projection are shown below.

Year ending 30 June	Projected subsidy \$M
2018	717
2019	684
2020	688
2021	690
2022	690

Employer Contributions – Funding Employers

The information produced by our valuation software enables us to carry out calculations on an employer by employer basis and calculate a Standard Contribution Rate based solely on the members employed by each employer.

The contribution rates for the funding employers for the year commencing 1 July 2017 are set out in the 30 June 2016 statutory valuation report dated 8 December 2016.

We have calculated the contribution rates for funding employers for the year commencing 1 July 2018 under the methodology and assumptions set out in sections 6 and 7. There are a small number of employers who have pre-existing arrangements whereby the Crown has provided that the contribution rates are capped at either 10% or 12% of salary.

To avoid small changes in contribution rates from year to year it has been the standard practice agreed with the Authority to leave an employer's contribution rate unchanged if the most recently calculated rate is within 0.3% of the existing rate. This approach has again been taken.

A sample of average contribution rates at selected ages is set out in the following table. In general the contribution rate of a funding employer can be calculated by weighting together the contribution rates based on the age of their employees. The rates in the table are inclusive of ESCT at 33%.

Age nearest	Males	Females
50	17.0%	17.1%
55	17.6%	17.7%
57	17.9%	17.9%
59	18.0%	18.1%
61	18.0%	18.1%
63	18.0%	18.0%
65	17.5%	17.3%
67	17.1%	17.1%

The rates have increased from those applicable for the 2017/2018 year primarily because of the lower real discount rate applied and the increase in the expense loading.

At most ages there is only a small variation in contribution rates between employees of the same age. However, at ages above 60 the actual contribution rate for an individual at a particular age may differ materially from the average rate at that age, particularly if the individual has had a recent significant change in salary. In this case, if the number of employees of a funding employer is small the calculated contribution rate may differ from the rate that would be estimated based only on the average contribution rates.

Due to a change to the methodology for valuing future contributions in the 2016 valuation the calculated contribution rates for 2017/18 were generally higher than the 2016/17 rates. In 2016 the Authority adopted a smoothing approach for the increase in contributions. The approach allows for the impact of the change in methodology to be phased in by way of a cumulative 0.5% of salary per year until the higher rates are attained, which has occurred at 30 June 2017 for a small number of funded employers. Under this approach the contribution rates for funding employers for 2018/19 will lie in the range of 13.8% to 17.4% of salary.

Employer Contributions – Islands

The four employers of the Islands members are funding employers. We have continued the existing practice to treat the Islands members as a single group for the purposes of calculating the employer contribution rates.

Consistent with the previous actuarial investigation, an allowance for expenses has been included in the recommended contribution rate for the Islands group of members. The expense loading is 2.2% of salaries (net of ESCT) for the 2018/19 year and the calculated contribution rate is 16.8% for Islands members.

As described above for the funding employers, under the smoothing approach the contribution rate for 2018/19 is 16.1%.

For comparison, the contribution rate for the 2017/2018 year is 15.0% of salaries.

Employer Contributions – Non-funding Employers

The calculated Standard Contribution Rates for non-funding employers, inclusive of ESCT, for the different schemes from 1 July 2018 are shown in the following table. Using the approach adopted by the Authority, the table includes the rates after smoothing for the impact of the change in methodology as described above for funding employers.

Scheme	Non-funding employer contribution rates
Armed Forces	15.4%
General	13.4%
Police	16.8%
Prisons Service	Nil

For comparison the contribution rates for the 2017/18 year are 14.2% for the Armed Forces scheme, 12.4.% for the General scheme, 16.0% for the Police scheme and nil for the Prisons scheme. The rates have increased due to a decrease in the real return and the impact of the smoothing.

In recent years the recommended contribution rate for the Armed Forces scheme has been a smoothed rate based on the current rate and the calculated standard contribution rate. This approach was agreed with the Authority to reduce volatility in the contribution rate which could arise given the very small number of active members and the fact that all members remaining have reached the point at which they could retire with an immediate pension.

The contribution rates may change from year to year depending on changes to assumptions and the emerging experience of each group of Fund members.

The Judges and Solicitor-General scheme and the Parliamentary scheme are both funded on a pay-as-you-go basis and therefore there are no recommended contribution rates for these schemes.

The notional fund in respect of the Prisons Service scheme continues to have a large surplus and no contributions are currently necessary. The notional fund position for the Prisons Service scheme at 30 June 2017 is as follows:

Notional fund:	\$98.7 million
Past service liability:	\$12.5 million

Sensitivity of Results

As explained earlier in the report the value of the liabilities is highly influenced by the size of the gap between the discount rate and the assumed rate of future inflation, whether salary inflation or price inflation. To illustrate the impact of a change in the gap we have re-valued the past service liabilities using discount rates of 6.0% p.a. and 4.0% p.a., whilst keeping all other assumptions unchanged.

The results are shown in the following table.

	Statutory basis (5.0% discount rate) \$M*	6.0% discount rate \$M*	4.0% discount rate \$M*
Contributors and Inactives	2,278	1,986	2,641
Current Pensioners	9,860	9,057	10,798
Deferred Pensioners	796	660	972
Total past service liabilities	12,934	11,703	14,410
Assets	4,271	4,271	4,271
Unfunded liability	8,663	7,432	10,139

* Totals may not add up due to rounding.

We have also carried out an analysis to show the impact of a 1% increase and a 1% decrease in the assumed CPI inflation rate, whilst keeping all other assumptions unchanged.

	Statutory basis \$M*	1% increase in assumed CPI rate \$M*	1% decrease in assumed CPI rate \$M*
Contributors and Inactives	2,278	2,574	2,028
Current Pensioners	9,860	10,767	9,071
Deferred Pensioners	796	971	658
Total past service liabilities	12,934	14,312	11,757
Assets	4,271	4,271	4,271
Unfunded liability	8,663	10,041	7,486

* Totals may not add up due to rounding.

These sensitivity analyses are not intended to show the full range of possible outcomes, but are intended to demonstrate that outcomes are highly dependent on future experience.

9. Material Risks

The purpose of this section of this report is to identify the material risks for the Fund which are associated with the actuarial assumptions or actuarial management of the Fund, of which we are aware as Actuary. We also comment on the way in which the identified financial risks are being managed by the Authority.

The material risks are:

Increasing Life Expectancy

The Fund's liabilities relate almost wholly to current and future pensioners. The assumptions regarding pensioner mortality that were used for this valuation allow for future improvements in mortality. However, a future breakthrough in medical diagnosis or treatment which leads to a significant increase in life expectancy could increase the Fund's liabilities and require increased employer and Crown contributions.

Mortality experience should continue to be monitored at least every three years, in conjunction with relevant population data, to assess whether the current assumptions remain valid.

Investment Risk

The risk faced by the Fund is that the investment returns earned on the assets will not be as high as expected over the long term. This means that the Crown's share of benefit payments might need to increase.

The Authority has set an Investment Objective which is to maximise the Fund's excess return relative to the New Zealand Government Stock Return Index (before tax) with no more than a one in four chance of under-performing New Zealand Government Stock by a cumulative 10% measured over rolling ten year periods.

The Fund has a strategy of using diversified investment vehicles, and requires investment managers to themselves invest in a range of underlying securities. Given the level of diversification in the underlying investments, the Fund is unlikely to suffer any significant loss from underperformance by the failure of an individual underlying security.

The Authority has a comprehensive Statement of Investment Policies Standards and Procedures in place for the governance and management of the assets held by the Fund.

Inflation

The Fund's liabilities for active members are linked to salary and therefore a higher than expected rate of inflation could have a negative impact on the required contribution amounts. Salary increases should continue to be monitored at each valuation.

Similarly, pension liabilities are linked to the CPI and increases above those assumed could lead to an increase in Crown contributions.

Liquidity Risk

The majority of the Fund's liabilities relate to current and future pensions which we expect to be paid out over a very long time frame. As the benefit payments are largely covered by Crown and employer contributions the amount of assets required to be redeemed to meet benefits is relatively small and is quite stable over time. Therefore the Fund is unlikely to be faced with a need to redeem an unexpectedly large amount.

Furthermore, the Authority's Statement of Investment Policies Standards and Procedures includes a number of policies addressing liquidity risk.

In the very long term, as the Fund begins to decline in size, we would expect the assets to move gradually to a predominantly liquid position.

Self Insurance

By self insuring the death and ill health benefits, the Fund runs the risk of higher than expected claims occurring. However given the high average age of current active members the value of death or ill health benefits are not materially different from the value of retirement benefits.

Furthermore, in the event of a pandemic affecting the general population the effect of an increase in deaths amongst active members is likely to be offset to some extent by deaths among the current pensioners.

Other

The Fund faces a variety of operational, legislative and other risks which may in some circumstances lead to cost increases. There are also benefit options able to be elected by retiring contributing members and current pensioners that can increase benefit payments.

We understand that the Authority monitors and takes action on such risks as part of the risk management framework.

10. Statements and Certifications

Fund Share of Benefits

The results in Section 8, carried out using valuation discount rates derived from those used for valuations for Crown Account purposes, shows a Fund Share proportion of 25.4%. The 2016 valuation resulted in a proportion of 22.4%. As the valuation result is sensitive to the level of actual investment returns received and the assumed discount rates used, I consider the Fund Share of Benefits proportion should be increased to 25.4%.

In terms of Section 95(1) of the Act I advise that the proportion of benefits calculated as being provided by member contributions into the Fund is 25.4% for the 2018/19 year.

Funding employer contribution rates

Contributions for the year commencing 1 July 2018 have been calculated on an employer by employer basis, based solely on the members employed by each employer.

In terms of Section 95(2) of the Act I advise that the Standard Contribution Rates, as from 1 July 2018, for those employers of contributors whose salaries are payable out of money that is not public money is:

- for contributors who are members under Part 2 or Part 2A of the Act and employed by the Public Services of the Cook Islands, Niue or Tokelau, 16.8% of contributor salaries, exclusive of ESCT; and
 - for contributors who are members under Part 2 or Part 2A of the Act, excluding those employed by the Public Services of the Cook Islands, Niue or Tokelau, contributions calculated on an employer by employer basis based only on the contributors employed by that employer.
- Contribution rates include ESCT and an allowance for expenses.

A sample of average contribution rates at selected ages is set out in the following table and for most employers the contribution rate can be calculated by weighting these rates based on the age of their employees who are contributory members. The rates in the table are inclusive of ESCT at 33%.

Age nearest	Males	Females
50	17.0%	17.1%
55	17.6%	17.7%
57	17.9%	17.9%
59	18.0%	18.1%
61	18.0%	18.1%
63	18.0%	18.0%
65	17.5%	17.3%
67	17.1%	17.1%

My advice is that the Authority require the relevant employers to contribute at the Standard Contribution Rates for 2018/19, or alternatively adopt a smoothing approach to allow for the phasing in

of the impact of the change in methodology noted earlier in the report. One smoothing approach, which the Authority adopted for the 2017/2018 year, is to allow for the impact of the change in methodology by way of a cumulative 0.5% of salary per year until the higher rates are attained. Under this approach the contribution rates for funding employers for 2018/19 would lie in the range of 13.8% to 17.4% of salary and the contribution rate for the Islands scheme would be 16.1%.

Non-funding employer contribution rates

The non-funding employers are required to budget for the superannuation contributions as if such contributions were payable to the Fund. These employer contribution rates do not include an allowance for a share of expenses as this is paid directly.

The calculated Standard Contribution Rates for non-funding employers, inclusive of ESCT, for the different schemes from 1 July 2018 are shown in the following table. Using the approach adopted by the Authority, the table includes the rates after smoothing for the impact of the change in methodology as described above for funding employers.

Scheme	Non-funding employer contribution rates
Armed Forces	15.4%
General	13.4%
Police	16.8%
Prisons Service	Nil

My advice is based on the premise that the Authority will continue its practice of adopting the smoothed rates. In accordance with my professional obligations as a Fellow of the New Zealand Society of Actuaries, I make the following statements:

- In carrying out this valuation as required by the Act, in my view I have no conflict with any other of my professional activities.
- I am not aware of any material developments to the Fund or any external events that have had a material effect on the results of the investigation.
- I am not aware of any material events subsequent to the date of the current investigation.
- The Fund has no arrangements for external insurance of the benefits payable on death or disability. Having regard to the size of the Fund, the employer sponsors of the Fund and the nature of the benefits payable on death or disability, it is my view that there is no need for the Fund to hold such insurance.
- In completing this report I have had regard to Professional Standard No. 40 - Actuarial Reporting for Superannuation Schemes - issued by the New Zealand Society of Actuaries. The valuation method and the financial, economic and demographic assumptions have been determined in accordance with the professional judgement of the actuary preparing the report.
- I am not aware of any discrepancy between the Act and subsequent Amendments and the practice of the Authority which would have a material bearing on the results of this investigation.
- The next valuation will be carried out as at 30 June 2018.

Reliances and Limitations

This report was prepared for you in the context of actuarial requirements under the Act, under the terms of our agreement with you dated 23 March 2017. It may not be suitable for use in any other context or for any other purpose and we accept no responsibility for any such use.

This report was prepared solely for the use of the Authority on the basis agreed with you. It was not prepared for use by any other party and may not address their needs, concerns or objectives. We note that the report will be available publicly on the Authority's web site. We do not assume any responsibility, or accept any duty of care or liability to any third party who may obtain a copy of this report and any reliance placed by such party on it is entirely at their own risk.

In preparing this report we have relied on information and data provided to us verbally, electronically and/or in writing by the Fund Administrator and the Authority. We have relied on all the data and information provided, including Fund provisions, membership data and asset information, as being complete and accurate. We have not independently verified the accuracy or completeness of the data or information provided, but we have performed limited checks for consistency.

The content and accuracy of this report are dependent on the completeness and accuracy of the information provided to us. Although independent verification of this information was not undertaken, we have reviewed the information for reasonableness and consistency with our knowledge of the Fund.

In our opinion, all calculations are in accordance with applicable legislative requirements, and the procedures followed and the results presented conform with applicable actuarial standards of practice.



Matthew Burgess FNZSA, FIAA
Actuary to the Fund
Senior Consultant, Willis Towers Watson
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Australia
ABN 45 002 415 349
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This report has been peer reviewed in accordance with Willis Towers Watson Professional Excellence procedures.



Louise Campbell FNZSA, FIAA
Senior Consultant, Willis Towers Watson

10 November 2017

Appendix A: Summary of membership data

The following tables summarise the membership data as at 30 June 2017 received from the Fund Administrator.

Contributors

A summary of the membership data in respect of contributors split by scheme is as follows:

Scheme	Gender	Age Group	Number of Members	Average Age	Average Membership	Average FTE ¹ Salary (\$)
Armed Forces			4	51.2	33.1	120,270
	Female		2	47.2	28.4	115,084
	Female	35 to 44	1	*	*	*
	Female	45 to 54	1	*	*	*
	Male		2	55.2	37.8	125,457
	Male	35 to 44	-	-	-	-
	Male	45 to 54	1	*	*	*
	Male	55 to 64	1	*	*	*
General			3,536	60.2	31.1	108,187
	Female		1,374	60.0	28.7	97,210
	Female	35 to 44	3	44.0	14.8	83,244
	Female	45 to 54	271	52.0	24.8	95,452
	Female	55 to 64	849	60.2	29.7	97,824
	Female	65 and over	251	68.0	29.6	97,198
	Male		2,162	60.3	32.7	115,163
	Male	35 to 44	3	44.5	25.2	101,229
	Male	45 to 54	309	52.2	27.9	105,250
	Male	55 to 64	1,508	60.2	33.4	114,025
	Male	65 and over	342	67.9	34.0	129,256
Islands			296	51.5	29.5	33,614
	Female		154	51.2	29.4	31,814
	Female	35 to 44	21	43.4	24.2	32,415
	Female	45 to 54	93	49.8	28.4	32,164
	Female	55 to 64	38	58.1	34.4	30,036
	Female	65 and over	2	67.0	40.5	43,020
	Male		142	51.8	29.5	35,566
	Male	35 to 44	15	43.0	23.6	36,947
	Male	45 to 54	84	50.2	29.2	34,847
	Male	55 to 64	42	57.8	32.2	36,827
	Male	65 and over	1	*	*	*

Scheme	Gender	Age Group	Number of Members	Average Age	Average Membership	Average FTE ¹ Salary (\$)
Police			130	52.3	28.7	116,104
	Female		26	51.3	28.0	111,795
	Female	35 to 44	-	-	-	-
	Female	45 to 54	23	50.7	28.0	113,480
	Female	55 to 64	3	56.1	28.0	98,882
	Male		104	52.5	28.8	117,181
	Male	45 to 54	76	50.5	28.2	121,119
	Male	55 to 64	28	58.2	30.7	106,492
Prison Service			23	61.9	29.8	72,261
	Female		2	60.9	28.8	94,999
	Female	45 to 54	-	-	-	-
	Female	55 to 64	2	60.9	28.8	94,999
	Male		21	62.0	29.9	70,095
	Male	45 to 54	3	53.3	20.0	65,680
	Male	55 to 64	13	61.6	30.9	72,864
	Male	65 and over	5	68.4	33.3	65,545
Judges and Solicitor-General						
	Male		3	67.4	26.1	361,833
	Male	55 to 64	1	*	*	*
	Male	65 and over	2	69.2	25.2	334,500
Parliamentary[^]						
	Male		5	60.4	29.2	160,024
	Male	45 to 54	1	*	*	*
	Male	55 to 64	3	61.1	29.8	160,024
	Male	65 and over	1	*	*	*
All Schemes			3,997	59.3	30.9	102,982

¹ Full-Time Equivalent

Note: In the above table, * signifies that where there was only one member in the age band and the statistics are not shown for privacy reasons.

[^] Back bench salaries are disclosed for Parliamentary members.

Inactives

Inactives are members who have ceased contributing to the Fund, but have not yet received an entitlement, and for whom insufficient data is available. These members are split into three groups according to the data available to calculate entitlements:

- Inactives(1A) are members with less than 10 years membership, or with a salary of nil or \$1.
- Inactives(1B) are members with at least 10 years membership and a salary.
- Inactives(2) are members for whom neither salary nor contribution information was available in order to estimate entitlements.

A summary of the Inactives(1) membership data as at 30 June 2017 is as follows:

Inactives(1A) (Withdrawal Benefit)	Number of Members	Average Age	Average Membership	Average Withdrawal Benefit (\$)
Armed Forces	24	57.0	2.1	936
General	763	59.8	3.3	2,506
Islands	127	50.2	2.3	845
Police	5	64.8	3.7	2,952
Prison Service	1	*	*	*
Grand Total	920	58.5	3.1	2,236

Inactives(1B) (Deferred Pension)	Number of Members	Average Age	Average Membership	Average Deferred Pension (\$ p.a.)
Armed Forces	1	*	*	*
General	507	58.1	19.4	13,533
Islands	33	51.8	18.1	5,092
Police	104	58.8	31.6	33,747
Prison Service	5	62.3	33.3	28,148
Grand Total	650	57.9	21.4	16,450

In addition, there were 2,789 Inactives(2) members as at 30 June 2017.

Pensioners

A summary of the pensioner membership data as at 30 June 2017 is as follows:

	Deferred pensions			Retirement pensions		
	Number	Average Age	Average Pension * (\$p.a.)	Number	Average Age	Average Pension (\$p.a.)
Females	361	51.3	12,700	6,787	73.4	17,379
Under age 25						
Age 25 to 49	160	47.2	12,566	2	48.7	4,131
Age 50 to 59	201	54.6	12,806	331	57.0	14,818
Age 60 to 69				2,171	66.1	19,474
Age 70 to 79				2,815	74.3	16,919
Age 80 and over				1,468	86.2	15,759
Males	3,754	53.2	13,050	25,545	74.6	23,877
Under age 25						
Age 25 to 49	1,058	47.1	13,530	10	46.7	3,520
Age 50 to 59	2,696	55.6	12,862	700	57.2	20,982
Age 60 to 69				7,519	65.8	23,529
Age 70 to 79				10,465	74.8	24,709
Age 80 and over				6,851	85.9	23,316
Grand Total	4,115	53.1	13,019	32,332	74.4	22,513

* Pension amounts disclosed for Armed Forces include indexation from the date of deferral to 30 June 2017 based on the actual increase in the CPI for the relevant period.

	Spousal and dependant pensions		
	Number	Average Age	Average Pension (\$p.a.)
Females	12,562	80.2	10,384
Under age 25	24	13.4	3,113
Age 25 to 49	41	44.3	4,926
Age 50 to 59	290	56.8	7,810
Age 60 to 69	1,516	66.1	9,236
Age 70 to 79	3,845	75.5	10,170
Age 80 and over	6,846	87.5	10,925
Males	385	71.4	6,129
Under age 25	23	15.2	3,307
Age 25 to 49	20	41.1	5,146
Age 50 to 59	21	56.4	5,260
Age 60 to 69	61	66.1	6,275
Age 70 to 79	121	74.8	6,716
Age 80 and over	139	86.6	6,294
Grand Total	12,947	80.0	10,257

Appendix B: Summary of actuarial assumptions

FINANCIAL ASSUMPTIONS

The financial assumptions which we have adopted are shown below.

Discount rates (Fund Share):

Year ended 30 June	Discount rate p.a. Fund Share 2017	Discount rate p.a. Fund Share 2016
2018	1.42%	1.40%
2019	1.70%	1.39%
2020	1.92%	1.46%
2021	2.08%	1.56%
2022	2.23%	1.66%
2023	2.37%	1.77%
2024	2.48%	1.89%
2025	2.59%	2.02%
2026	2.68%	2.15%
2027	2.76%	2.26%
2028	2.82%	2.35%
2029	2.89%	2.44%
2030	2.95%	2.51%
2031	3.01%	2.57%
2032	3.06%	2.61%
2033	3.11%	2.64%
2034	3.15%	2.67%
2035	3.20%	2.71%
2036	3.23%	2.74%
2037	3.27%	2.78%
2038	3.28%	2.82%
2039	3.30%	2.85%
2040	3.31%	2.89%
2041	3.33%	2.92%
2042	3.34%	2.96%
2043	3.36%	3.00%
2044	3.37%	3.03%
2045	3.38%	3.07%
2046	3.40%	3.10%

Year ended 30 June	Discount rate p.a. Fund Share 2017	Discount rate p.a. Fund Share 2016
2047	3.41%	3.14%
2048	3.42%	3.18%
2049	3.42%	3.21%
2050	3.42%	3.25%
2051	3.42%	3.28%
2052	3.42%	3.32%
2053	3.42%	3.36%
2054	3.42%	3.39%
2055 onwards	3.42%	3.42%

Discount rate (Statutory): 5.0% p.a.

CPI: 1.67% p.a. for each year until 30 June 2037, gradually increasing to 2.0% p.a. in the year ending 30 June 2048, and remaining at 2.0% p.a. thereafter.

Salary increases: 2.5% p.a.

Armed Forces deferred pensioners: For former Armed Forces members with deferred pensions which have not yet commenced, the pension amount held on the administration system is the pension amount calculated at the date of deferral, with indexation to the current date. When valuing the liability for these pensioners we then allow for indexation from 30 June 2017 to the date of commencement of the pension using the assumed future rates of CPI increase.

DEMOGRAPHIC ASSUMPTIONS

Promotional salary increases

In addition to salary increases from general salary inflation, age related promotional increases have been assumed. Specimen rates are as follows:

Salary increases at each age							
Age	General schemes	Islands	Armed Forces	Judges	Parliamentary	Police	Prisons Service
30	1.50%	1.00%	1.500%	2.00%	2.00%	2.250%	3.50%
35	1.25%	1.00%	1.125%	1.40%	1.40%	2.188%	2.60%
40	1.00%	1.00%	0.750%	0.95%	0.95%	2.125%	2.00%
45	0.75%	1.00%	0.375%	0.70%	0.70%	2.063%	0.50%
50	0.50%	-	-	0.25%	0.25%	2.000%	-
55	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-

In-service decrements

Specimen rates for the General schemes are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit					
Age	Male Death	Female Death	Resignation	Age Retirement	Ill-health Retirement
35	4	2	700	-	4
40	5	3	400	-	4
45	7	5	300	-	23
50	10	7	200	300	41
55	17	12	-	500	60
60	28	20	-	1,000	-
65	48	31	-	3,500	-

Specimen rates for the Islands are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit					
Age	Male Death	Female Death	Resignation	Age Retirement	Ill-health Retirement
35	13	7	400	-	5
40	16	9	430	-	10
45	22	16	280	-	20
50	34	25	100	1,000	45
55	56	40	-	1,600	85
60	94	65	-	3,000	-
65	-	-	-	10,000	-

Specimen rates (which include age and membership based rates) for the Armed Forces scheme are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit			
Age	Male Death	Female Death	Ill-health Retirement
35	5	3	5
40	6	4	0
45	9	6	0
50	14	10	0
55	22	16	0
60	38	26	0

Number out of 10,000 members with membership X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit		
Membership	Resignation	Age Retirement
15	100	-
20	-	6,000
25	-	5,125
30	-	4,250
35	-	3,375
40	-	2,500

Specimen rates for the Judges and Solicitor-General scheme are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit					
Age	Male Death	Female Death	Resignation	Age Retirement	Ill-health Retirement
35	5	3	-	-	-
40	6	4	-	-	-
45	9	6	-	-	-
50	14	10	-	-	-
55	22	16	-	-	-
60	38	26	-	-	-
65	64	41	-	2,000	-

Specimen rates for the Parliamentary scheme are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit					
Age	Male Death	Female Death	Resignation ¹	Age Retirement ²	Ill-health Retirement
35	5	3	2,500	-	-
40	6	4	2,500	-	-
45	9	6	2,500	-	-
50	14	10	2,500	-	-
55	22	16	-	-	-
60	38	26	-	-	-

¹ Assumed 25% of Parliamentary members under age 50 resign every three years coinciding with election years.

² Members aged over 50 with at least 9 years' service are assumed to retire immediately.

Specimen rates for the Police scheme are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit					
Age	Male Death	Female Death	Resignation	Age Retirement	Ill-health Retirement
35	5	3	20	-	600
40	6	4	-	-	600
45	9	6	-	-	600
50	14	10	-	250	300
55	-	-	-	10,000	-

Specimen rates for the Prisons Service scheme are as follows:

Number out of 10,000 members aged X at the beginning of the year assumed to leave the Fund during the year for the following modes of exit					
Age	Male Death	Female Death	Resignation	Age Retirement	Ill-health Retirement
35	5	3	2,000	-	5
40	6	4	1,400	-	10
45	9	6	800	-	50
50	14	10	450	300	100
55	22	16	200	500	150
60	-	-	-	10,000	-

Pensioner mortality

The underlying mortality for pensioners is based on experience over the period from 1 July 2011 to 30 June 2014.

Specimen rates are as follows:

Number assumed to die out of 10,000 at each age		
Age	Males	Females
65	74	55
70	126	80
75	217	140
80	452	307
85	825	591
90	1,631	1,347

In addition, we have made the following adjustments for mortality improvement:

- An allowance for past improvements (from 31 December 2012 to 30 June 2017) at the rate of 2.5% per annum at ages up to 75 and progressively smoothed to 1.0% per annum at ages above 83.

- An allowance for future improvements (from 30 June 2017 onwards) at the rate of 2.5% per annum at ages up to 75 and progressively smoothed to 1.0% per annum at ages above 83.

As an illustration of the impact of the future mortality improvements, life expectancies at age 60 for sample members are shown below:

Sample Pensioners	Life expectancy at age 60
Male aged 60 at 30 June 2017	27.4
Female aged 60 at 30 June 2017	29.7
Male aged 50 at 30 June 2017	28.7
Female aged 50 at 30 June 2017	30.8

Proportion of members with a spouse or partner

It was assumed the percentage of members with a spouse or partner gradually reduces as members age. Specimen rates are as follows:

% of members with a spouse or partner at each age		
Age	Male	Female
35	68	69
40	72	71
45	75	72
50	76	72
55	78	71
60	77	68
65	76	63
70	74	54
75	71	42
80	63	27

Expenses

The administration and investment expenses of the Fund are currently met in part by the funding employers, with the balance paid by the Crown as provided by Section 15E of the Act. An allowance for future expenses was incorporated in the employer contributions recommended for funding employers in this report.

The expenses for the financial year ended 30 June 2018 have been estimated by the Authority and beyond that date have been assumed to remain proportional to the value of assets.

Age difference and length of relationship between pensioners and their spouses or partners

It has been assumed that male pensioners were three years older than their spouse or partner while, for female pensioners, it was assumed they were three years younger than their spouse or partner.

It was assumed the length of the relationship between pensioners and their spouses or partners was such that 50% of the pension reverts to the spouse or partner upon the pensioner's death.

Assumed mix of lump sums/pensions

Members were assumed to take their entitlements as a combination of lump sum and pension as follows:

Percentage of pension entitlements taken							
	General schemes	Islands	Armed Forces	Judges	Parliamentary	Police	Prisons Service
Retirement	90%	75%	100%	75%	75%	100%	75%
Death (spouse pension)	100%	100%	100%	100%	100%	100%	100%
Invalidity	88%	75%	75%	n/a	n/a	88%	75%

Upon resignation, the percentage of members assumed to elect to receive a deferred retiring allowance is as follows:

Scheme	Percentage of resigned members assumed to elect to receive a deferred retiring allowance
General	75%
Islands	50%
Armed Forces ¹	100%
Judges and Solicitor General	n/a
Parliamentary ²	100%
Police	20%
Prisons Service	20%

¹ eligible after 20 years of service

² eligible after 9 years of service

It is assumed that Parliamentary members will commute 25% of their deferred retiring allowance entitlements. In all other cases, no commutation is assumed.

Other Assumptions

- Where a member has a part time fraction recorded in the 30 June 2017 data file that fraction is assumed to apply to all future service.
- The impact of past periods of part time service is summarised in the average part time factor supplied in the member data.
- For members who have ceased contributions for a period and then re-commenced contributing, we have been advised that the date of commencement of service provided in the data has already been adjusted by the administrator to reflect the alterations to contributory service required under Section 61R of the Act.

Assumptions used for Inactive Contributors

We have split the inactive contributors membership group into Inactives(1) and Inactives(2).

The Inactives(1) group is in respect of contributors who have ceased to be members and have not received an entitlement from the Fund, but for whom salary or contribution information is available. We have valued these members assuming they receive either an immediate refund of contributions (if less than 10 years membership, or with a salary of nil or \$1) or are entitled to a deferred pension (if more than 10 years membership and have a salary). The liability in respect of the members entitled to a deferred pension has been valued using the same method as that used for the 30 June 2016 statutory valuation, i.e. commencement of pension from the later of current age and age 51 and no mortality in deferment.

When valuing the liability for these deferred pensions we have increased the salary amount provided in the administration data file to allow for indexation from the date of suspension of membership to 30 June 2017, based on the actual increase in the CPI for the relevant period. We then allow for indexation from 30 June 2017 to the date of commencement of the pension using the assumed future rates of CPI increase.

The assumption that all inactive members with less than 10 years membership receive an immediate lump sum has the effect of bringing forward benefits that will, in practice, not be paid until later years and leads to a spike in the projected benefit payment amount for the 2017/18 year. Similarly, those inactive members with more than 10 years membership who are over the eligibility age to receive an immediate pension, are assumed to begin receiving the pension immediately.

The Inactives(2) group is in respect of contributors who ceased active membership prior to full computerisation of Fund membership records, but includes contributors for whom no reliable valuation data is available. We have taken an approach consistent with that used for the 30 June 2016 statutory valuation and have not valued these members for this valuation, on the basis that these members appear to have very little service and so their liabilities are likely to be covered by the prudent assumptions used in valuing the Inactives(1) group, described above.

Suspended pensioners

There are of the order of 490 pensioners who have a suspended pension – indicated by a suspension code in the data file. This excludes former Armed Forces members who have a deferred pension. For the majority of the suspended pensions it is possible that the pension could be reinstated in the future. We have taken a conservative approach and assumed that all suspended pensions are reinstated immediately, and have valued the liabilities accordingly.

For some types of suspension the pensioner (or his or her dependant) would be entitled to back payment of past pension amounts if the pension is reinstated. We have not allowed for these payments, but consider these are likely to be more than offset by the conservative approach described above.

Pension elections

Pensioners have various options available in respect of structuring the terms of their pension or assigning part of their pension to another person. These options are implemented using sets of actuarial factors which are intended to result in no change to the Fund's liabilities. However, over time, actual experience will be different to expected so the emerging liability will also be different from

that assumed. No allowance has been made for any selection that may occur where members who exercise certain options do so based on their individual circumstances. To the extent that pensioners have already exercised these options, and they are not included in the membership data, they will not be reflected in our calculations.

Appendix C: Summary of entitlements

A summary of the entitlements of the seven schemes is set out below:

Membership	Part 2 / Old GS	Employees in Government service electing to join before 30 April 1985
	Part 2A / New GS	Employees in Government service electing to join before 30 June 1992 (1995 for Islands)
	Part 3A / AF	Members of the Armed Forces joining prior to 30 June 1992
	Part 5A and 5B / Judges	Judges and Associate Judges appointed prior to 30 June 1992
	Part 6 / MPs	Members of Parliament initially elected prior to 30 June 1992
	Part 6A / Police	Members of the Police joining prior to 30 June 1992
	Part 6B / PS	Members of the Prisons Service joining prior to 30 June 1992
Member Contributions	Old GS	6% if < 30 at date of joining 7% if 30-34 8% if 35-39 9% if 40-44 10% if 45-49 11% if >50 Some members may have elected, prior to 1 March 1970, to contribute at 1% less than the rates above. All members can elect to contribute at 6% for an entitlement reduced in the same proportion that 6% bears to the standard rate.
	New GS	6.5%
	AF	7.6%
	Judges	8%, until reach 16 years of service, then 0%.
	MPs	11%, until reach 20 years of service, then 8%
	Police	7.5%
	PS	8.5% (may cease contributing after 32 years)

Contributory Service	Old and New GS	Actual contributory service for all members
	AF	Actual contributory service plus any accrued leave at date of discharge or release
	Judges	Aggregate of all periods of contributory service as a Judge, temporary Judge or Associate Judge
	MPs	Actual contributory service as a member of Parliament
	Police	For members who joined before 1 May 1985 and 55 or over at retirement, then service is calculated as potential service up to age 60, further increased by 1/7 th , to a maximum of 40 years. For all other members, 125% of actual contributory service as a member of the Police, to a maximum of 40 years If actual contributory service is greater than 40 years, actual contributory service applies.
	PS	125% of actual contributory service as a member of the Prison Service, to a maximum of 40 years If actual contributory service is great than 40 years, actual contributory service applies.

Final Salary	All except Old GS, Judges and MPs	The lesser of salary in the last 12 months and the average of the last 5 years' salary, adjusted for CPI to date of exit.
	Old GS	Average of the last 5 years' salary
	Judges	Salary at date of resignation or date of retirement
	MPs	Salary payable to a backbencher at the date on which the retiring allowance first becomes payable.

Retirement Entitlement Eligibility	Old GS	Age 65, or age 60 and 40 years of service, or age 50 and 20 years of service with employer consent (other requirements apply to members of NZ Railways Corp or the Police, and certain females)
	New GS	Age 60 or age 50 with 10 years of service and employer consent
	AF	20 years of service, with at least 10 years in AF
	Judges	68 years or over 50 with 10 years of service
	MPs	Over 50 with at least 9 years of service
	Police	over 50 with 10 years of service with employer consent
	PS	58 years or 50 years with 8 years of service and employer consent

Retirement Allowance Multiple	Old GS	70% of 1/60 th per year of service up to 40 years plus 120 th per year of service after 40 years. For members of the Island schemes, the 70% factor is not applied.
	New GS	1.05% per year of service adjusted for retirement before or after age 60 (add 0.0168% per year between age 60 and 65, subtract 0.0336% per year between age 55 and 60, subtract 0.0168% per year below 55). For members of the Island schemes, all accrual rates are divided by 70%.
	AF	1.05% per year of service
	Judges	70% of 1/24 th (less 1/750 th per year if age under 55) per year of service, to a maximum of 70% of 2/3rds.
	MPs	70% of (1/30 th per year of service up to 20 plus 1/120 th per year of service over 20)
	Police	1.05% per year of service adjusted for retirement before age 55 (subtract 0.0336% per year between age 50 and 55)
	PS	1.05% per year of service adjusted for retirement before age 58 (subtract 0.0168% per year before age 53, subtract 0.0336% per year between age 53 and 58)

Retirement Entitlement	All parts except AF and MPs	Retirement allowance pension calculated at date of exit as Final Salary times Retirement Allowance Multiple. Pensions in payment are increased annually with CPI in April each year. Commutation of up to 25% of the pension is optional.
	AF and MPs	Retirement allowance pension calculated at date of exit as Final Salary times Retirement Allowance Multiple. Pensions in payment are increased annually with CPI. Commutation of up to 25% of the pension is optional. Members may defer their pension to age 55 or 60 for an additional lump sum.

Medical Retirement Entitlement	All except MPs	Retirement allowance calculated as per normal retirement at date of medical retirement.
	MPs	No special entitlement is payable on medical retirement

Death while Active with spouse	All parts except Old GS and MPs	<p>Either:</p> <p>A. The greater of:</p> <ul style="list-style-type: none"> a. One year's salary at date of death b. Refund of member contributions with interest <p>B. 50% of the retirement allowance received if member had medically retired (option to commute part of members pension)</p>
	Old GS	<p>Either:</p> <p>A. The greater of:</p> <ul style="list-style-type: none"> a. 50% of the retirement allowance received if member had retired on date of death b. \$390 pa <p>B. Refund of member contributions</p>
	MPs	<p>Before 9 years of service, refund of two times member contributions without interest.</p> <p>With 9 or more years of service, either:</p> <p>A. The greater of:</p> <ul style="list-style-type: none"> a. One year's salary at date of death b. Refund of two times member contributions without interest <p>B. 50% of the retirement allowance received if member was eligible to retire at date of death (option to commute part of the member's pension)</p>

Death without spouse	All parts except Old GS and MPs	Return of member contributions with interest, less any pension payments already paid
	Old GS	Refund of member contributions without interest, less any pension payments already paid and any child allowance payments paid or payable.
	MPs	Return of two times member contributions without interest, less any pension payments already paid.

Death as Pensioner with spouse	All parts except Old GS and MPs	<p>Either:</p> <p>A. Up to 50% of the pension reverts to an eligible spouse dependant on the length of the relationship.</p> <p>B. Return of member contributions with interest, less any pension payments already paid</p>
	Old GS	<p>Either:</p> <p>A. The greater of:</p> <ol style="list-style-type: none"> Up to 50% of pension reverts to an eligible spouse dependant on the length of the relationship. \$390 pa if married before beginning pension, otherwise \$0. <p>B. Refund of member contributions, less any pension payments received</p>
	MPs	<p>Either:</p> <p>A. Up to 50% of the pension reverts to an eligible spouse dependant on the length of the relationship.</p> <p>B. Return of two times member contributions without interest, less any pension payments already paid</p>
Death – Child Allowance	All parts	<p>Any member who dies leaving a child or children under 16 years (or are otherwise dependent on the deceased), each child receives an annual allowance of \$1,000 increased with CPI since 1982 until they reach age 16 or 18 if in full time education.</p> <p>Child allowances are paid in addition to any other death entitlements, except for Old GS where child allowances are deducted from the return of contributions on death without spouse, but are paid in addition to other death entitlements.</p>
Resignation	All parts except MPs, and Old scheme	<p>Refund of member contributions with interest; or</p> <p>With 10 or more years of service (8 years if PS), deferred retiring allowance payable from age 50 or later (this option is not available to AF), or</p> <p>With 10 or more years of service (8 years if PS), transfer value rolled into other superannuation fund equal to: Refund of member contributions with interest x (100%+10% per year of service from 10 to 20)</p>
	MPs	<p>Refund of two times member contributions without interest</p> <p>If have more than 9 years of service and less than 50 on resignation, then entitled to a deferred pension payable from age 50 based on an ordinary MPs salary at that age and also commute some to a lump sum to be taken immediately.</p>
Withdrawal	All parts	<p>A. Refund of member contributions without interest (not available to MPs, AF, Police and Judges); or</p> <p>B. If join another employer subsidised scheme and have sufficient service, entitled to a deferred pension from age 50.</p>

Death after resignation or withdrawal with spouse	All parts except MPs	A. Refund of member contributions with interest; or B. 50% pension, where pension is calculated using Final Salary at date of exit/withdrawal, then increased with CPI to date of death.
	MPs	Two times member contributions without interest If ceased before age 50 and has more than 9 years of service, then entitlement of 50% spouse pension is payable from death if die before age 50 or from pension commencement age if chose to defer pension to 55 or 60.
Death after resignation or withdrawal without spouse	All parts except MPs	Refund of member contributions with interest to date of death
	MPs	Two times member contributions without interest

Additional Entitlements

Some Parts have entitlements on leave of absence without pay and temporary cessation of contributions. Entitlements are discounted per year of suspended service.

Members can surrender up to 50% of their retirement allowance to provide a pension for another person (the assignee). The value of the entitlement is actuarially determined so that the value of the entitlement is unchanged. The assignee's pension also increases with CPI and ceases on the assignee's death.

