Government Employees Pension Fund

Statutory actuarial valuation as at 31 March 2018

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November 2018

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EXECUTIVE SUMMARY

Introduction

1. This statutory actuarial valuation of the Government Employees Pension Fund *("GEPF" / "the fund")* was performed as at 31 March 2018. The previous statutory actuarial valuation was performed as at 31 March 2016.

Membership

2. The valuation of the fund was based on the membership data set out below. The corresponding statistics at the previous valuation date have been provided for comparison.

	31 March 2016		31 March 2018	
Active membership	**Number**	**Pensionable emoluments (R'm)**	**Number**	**Pensionable emoluments (R'm)**
Services	223 108	48 436	233 751	58 721
Other	1 062 318	236 360	1 048 072	272 637
Total	**1 285 426**	**284 797**	**1 281 823**	**331 358**
Pensioners	**Number**	**Annual pensions (R'm)**	**Number**	**Annual pensions (R'm)**
Retirees	266 480	26 192	286 831	34 434
Dependants	146 624	6 958	154 794	8 348
Subtotal	**413 104**	**33 150**	**441 625**	**42 782**
Deferred pensioners	9	0.23	8	0.17
Total	**413 113**	**33 150**	**441 633**	**42 782**

Financial position of the fund

3. The financial position of the fund as at 31 March 2018 is summarised below. The corresponding statistics at the previous valuation date have been provided for comparison.

Financial position of the fund	31 March 2016 R'm	31 March 2018 R'm
Fair value of assets	**1 629 923**	**1 800 068**
Accrued service liabilities		
Active member liability	1 029 889	1 171 396
S-case and exits in progress liability	12 063	11 673
Pensioner liability	349 805	451 487
Child Pensions Provision	0	10 535
Deferred pensioner liability	0.4	0.5
Data reserve	7 724	8 785
Discriminatory practices reserve	7 695	8 763
Total accrued service liabilities	**1 407 177**	**1 662 640**
Balance of assets before contingency reserves	**222 746**	**137 428**
Minimum funding level	**115.8%**	**108.3%**
Contingency reserves		
Mortality improvement reserve	41 340	48 259
Pension increase reserve (past service)	178 860	161 883
Pension increase reserve (future service)	125 268	108 751
Solvency reserve	301 581	402 000
Total value of contingency reserves	**647 048**	**720 893**
Balance of assets after contingency reserves	**(424 302)**	**(583 464)**
Long-term funding level	**79.3%**	**75.5%**

4. The GEPF funding policy adopted by the board of trustees defines the ***long-term funding level*** as a funding level determined using solvency reserves and other contingency reserves which the trustees deem realistic in the long term (without undue margins of conservatism). The ***minimum funding level*** is defined as a funding level determined excluding any contingency reserves. The funding policy requires the trustees to take steps to ensure that the minimum funding level is always above 90% and to strive to maintain a long-term funding level at or above 100%.

5. The long-term funding level was 75.5% at the valuation date, based on fully funded contingency reserves. At the previous valuation the long-term funding level was 79.3%. However, by reducing the level of the contingency reserves to the level that is affordable, at 19.1% of the recommended level, the funding level is 100% at the valuation date.

6. The minimum funding level at the valuation date, which is determined as the funding level excluding any contingency reserves, would therefore exceed 100% at 108.3%. At the previous valuation the minimum funding level was 115.8%.

Future service contribution rates

7. For the purpose of this valuation, contributing members are categorised as follows:

"Services", which relates to members of the South African National Defence Force (SANDF), South African Police Service (SAPS), Correctional Services (CS) and the State Security Agency (SSA).

"Other", which relates to members not employed by the above employers.

Recommended contribution rate by employer group

8. The recommended employer contribution rate required to meet the cost of benefits accruing after the valuation date is set out below. The corresponding statistics at the previous valuation date have been provided for comparison.

Employer contribution rates by employer group	% of pensionable emoluments			
	31 March 2016		31 March 2018	
	Services	Other	Services	Other
Funded benefits	26.8%	22.0%	26.1%	21.6%
Fund expenses	0.3%	0.3%	0.3%	0.3%
Less: Member contributions	(7.5%)	(7.5%)	(7.5%)	(7.5%)
Recommended employer contribution rate	**19.6%**	**14.8%**	**18.9%**	**14.4%**
Current employer contribution rate	**16.0%**	**13.0%**	**16.0%**	**13.0%**
Excess / (shortfall)	**(3.6%)**	**(1.8%)**	**(2.9%)**	**(1.4%)**

Cost of additional pensionable service for Services members

9. We have also considered the effect on the contribution rate in respect of members of *Services* members, who qualify for a 25% enhancement to their years of pensionable service in excess of ten years. The results are shown in the table below:

Employer contribution rates by employer group	% of pensionable emoluments			
	31 March 2016		31 March 2018	
	Including 25%	Excluding 25%	Including 25%	Excluding 25%
Funded benefits	26.8%	22.6%	26.1%	20.9%
Fund expenses	0.3%	0.3%	0.3%	0.3%
Less: Member contributions	(7.5%)	(7.5%)	(7.5%)	(7.5%)
Recommended employer contribution rate	**19.6%**	**15.4%**	**18.9%**	**13.7%**
Actual employer contribution rate	16.0%	16.0%	16.0%	16.0%
Excess / (shortfall)	**(3.6%)**	**0.6%**	**(2.9%)**	**2.3%**

10. As indicated in the results above, the effect of the service enhancement in respect of *Services* members amounts to approximately 5.2% of pensionable emoluments. This is higher than the difference in contributions payable by the *Services* employers (16%) and *Other* employers (13%) but highlights the appropriateness of the difference in contribution rate based on the benefit enhancement. The residual difference can be explained by the differing decrement assumptions between the two categories of members.

5% equity risk premium allowance

11. For purposes of testing the appropriateness of the current level of contributions as at 31 March 2018, a 5% equity risk premium over the long-term bond yield assumption, instead of the 3% premium assumed in the valuation, was considered. The use of this assumption for determining the future funding requirements must be seen as a risk budgeting exercise for the employer. To the extent that, over the long term, equities earn a risk premium of 5% over bonds (and experience is as assumed), the required level of contributions at the rates below would be adequate. It should, however, be appreciated that the higher the assumed equity risk premium, the lower will be the required contribution rates, but that this also carries a greater risk of requiring additional contributions into the future should experience not be in line with that assumed.

Contribution rates by employer group	31 March 2018 % of pensionable emoluments	
	Services	**Other**
Recommended employer contribution rate (as shown above)	18.9%	14.4%
Adjustment to required contribution rate	(4.9%)	(4.3%)
Recommended employer contribution rate (as adjusted)	**14.0%**	**10.1%**
Actual employer contribution rate	16.0%	13.0%
Excess / (shortfall)	**2.0%**	**2.9%**

12. Based on a 5% equity risk premium assumption, the required contribution rate is 14% for *Services* employers and 10.1% for *Other* employers. On this basis, there is an excess contribution of 2% for *Services* employers and an excess contribution of 2.9% for *Other* employers.

13. We would suggest that the trustees and the employer not rely on the fund's assets earning this higher equity risk premium over the long term and that the required employer contribution rate should be considered in terms of the valuation basis, i.e. using a 3% equity risk premium.

Findings and recommendations

14. As at 31 March 2018 the assets of the fund were sufficient to cover the best estimate liabilities in full, with a funding level of 108.3%. The current position therefore meets the trustees' targeted minimum funding level of 90%.

15. The fund does not have sufficient assets to cover the recommended solvency reserve and other contingency reserves in full. Allowing for the full solvency reserve and other contingency reserves reflects a long-term funding level of 75.5%. An amount of R137 428 million is available to cover these reserves, which implies that 19.1% of the recommended reserves are funded.

16. An employer contribution rate of 18.9% and 14.4% of total pensionable emoluments is required respectively for *Services* and *Other* members to finance the benefits which are expected to accrue over the period between the current valuation date and the next valuation date (31 March 2020). These contribution rates are inclusive of the cost of death in service lump sum benefits, funeral benefits and the cost of administration expenses.

17. The employer currently contributes at a rate of 16% of total pensionable emoluments for *Services* members and 13% for *Other* members. For the purpose of testing the appropriateness of the current level of contributions, a 5% equity risk premium over the long bond yield assumption has been considered. On this basis, the required contribution rate is 14% for *Services* members and 10.1% for *Other* members, resulting in an excess contribution of 2% for *Services* members and 2.9% for *Other* members. This does, however, require an appreciation by the employer of the risks mentioned in paragraph 11 above, and we would recommend that this be communicated to the employer.

18. The cost of the service enhancement in respect of *Services* members amounts to approximately 5.2% of pensionable emoluments. This is higher than the current difference in contributions paid in respect of *Services* and *Other* members but highlights the appropriateness of the difference in contribution rates.

19. The level of contributions should be monitored as part of each actuarial valuation of the fund to ensure that it is in line with the adopted funding level policy.

20. In line with rule 7.2 of the fund's rules, which states that the employer contributions should be sufficient to ensure that the fund is able to meet its obligations at all times, subject to a minimum funding level of 90%, the funding policy adopted by the trustees requires the trustees to ensure that the minimum funding level is above 90%. This can therefore be viewed as the primary funding objective of the fund. The employer contribution rate must be determined by the employer in consultation with the trustees and the Minister of Finance, with due regard to the recommendations of the most recent actuarial valuation of the fund. The funding policy also states that the trustees should strive to maintain the long-term funding level at or above 100%. The long-term funding level of the fund at the valuation date was 75.5% with a minimum funding level of 108.3%. As at the valuation date the fund meets the minimum funding level, but as the contingency reserves are only partially funded, does not meet its long-term funding objectives.

21. We recommend that the F(Z) and A(X) factors that are used to calculate actuarial interest, as well as the F(X) factors that are used in the purchase of service calculations, be reviewed after each actuarial valuation of the Fund. This will enable the trustees to determine whether the basis produces factors which are sufficiently different to warrant a change in the factors used by the fund. These factors are attached in Appendix 8.

22. We recommend that the key demographic assumptions used for the fund be monitored through an experience analysis exercise every three to five years.

23. On the basis that the fund has met its funding objectives and that the current contributions are expected to cover the cost of future benefits with specific reference to the risks mentioned in paragraph 11 above as well as the fact that the contingency reserves are only 19.1% funded, we can confirm that the fund was in a sound financial condition as at 31 March 2018.

1. INTRODUCTION

We are pleased to present to the trustees of the GEPF this statutory actuarial valuation as at 31 March 2018 (*"the valuation date"*). This report sets out the results of the statutory valuation of the fund as at 31 March 2018 and includes an analysis of the financial progress of the fund since 31 March 2016 *("the previous valuation date")*. The period between the previous valuation date and the current valuation date is referred to hereinafter as the valuation period.

This report has been prepared in accordance with the Government Employees Pension Law, 1996 as amended ("the GEP Law"), which requires that the fund's financial condition to be investigated and reported upon by a valuator at least once in every three years. It is, however, the practice of the fund to have actuarial valuations performed biennially.

Registration and operation

1.1 The fund was established in 1973, changing its name to the Government Employees Pension Fund in 1996.

1.2 The fund operates on defined benefit principles. In terms of the rules of the fund, members contribute at a rate of 7.5% of pensionable emoluments, with the employer being responsible for the balance of the cost of providing fund benefits in terms of the rules. A brief summary of the fund benefits, contributions and expenses is set out in Appendix 1.

1.3 The previous statutory valuation was carried out by Willis Towers Watson as at 31 March 2016. At that date, the fund reflected a minimum funding level (assets divided by liabilities – excluding solvency reserves and contingency reserves) of 115.8%, which exceeded the trustees' targeted minimum funding level of 90%. The long-term funding level (assets divided by liabilities including recommended solvency reserves and contingency reserves) was 79.3%, which was below the trustees' targeted long-term funding level of 100%.

1.4 The purpose of this valuation is to investigate the financial soundness of the fund in terms of the funding objectives in terms of the fund's funding policy.

1.5 For the purposes of this valuation, contributing members are categorised as follows:

"Services", which relates to members of the South African National Defence Force (SANDF), South African Police Service (SAPS), Correctional Services (CS), National Intelligence Agency (NIA) and the South African Secret Service (SASS)

"Other", which relates to members not employed by the above members.

1.6 The purpose of the valuation is therefore:

- to determine whether the existing assets of the fund are sufficient to cover the fund's liabilities accrued to the valuation date;
- to determine whether the funding level meets the minimum funding requirement as outlined in rule 7.2 of the fund's rules and the requirements of the funding level policy adopted by the fund;

- to investigate and report on actual experience of the fund since the previous valuation;
- to review the assumptions used in light of actual experience and industry developments;
- to recommend an employer contribution rate to meet the cost of benefits accruing in the future;
- to assess the necessity for, and quantum of, any contingency reserves; and
- to perform the basis for consideration by the trustees of the pension increases to be granted to pensions in payment over the period to the next valuation.

Valuation data

1.7 In compiling this report, we have relied upon the accuracy and completeness of information made available to us by the administrators, the Government Pensions Administration Agency *("GPAA" / "the administrator")*, and external parties. Except where expressly stated in the report, we have not independently verified the accuracy of the facts or the basis of the information supplied to us.

1.8 The results of the statutory valuation depend on the accuracy of:

- the membership data;
- the information on the assets, as supplied by the relevant sources; and
- the financial statements for the valuation period.

Reasonableness checks have been performed on the above and we are satisfied with the general accuracy and completeness of the data provided and with its suitability for purposes of this statutory valuation. Further information regarding the reasonableness checks performed is set out in Appendix 2.

1.9 The trustees and the employer must ensure that any significant fund events (e.g. large scale retrenchments) which occurred during the valuation period as well as thereafter have been reported to the actuary, to ensure that the financial impact of such events on the fund is taken into account in determining the fund's position at the valuation date.

Capacity, brief and professional guidance

1.10 This report has been prepared by Alexander Forbes Financial Services (Pty) Ltd *("Alexander Forbes")* in accordance with the instructions of the fund's trustees. This report has been prepared solely for the benefit of the trustees of the fund in my capacity as the valuator to the fund and as an employee of Alexander Forbes. The information contained in this report and in all documents referred to in this report is confidential.

1.11 Our investigations have been undertaken to comply with the requirements of section 16 of the Act, and are in accordance with the requirements of the Registrar of Pension Funds. The report has been prepared in accordance with Standard of Actuarial Practice (*"SAP")* 201 issued by the Actuarial Society of South Africa *("ASSA")*, and, where relevant, the guidance provided by the Pension Fund ("*PF*") Circulars published by the FSCA has been considered.

1.12 Throughout this report any values that have been determined are, except where otherwise stated, in accordance with our view of the most probable future experience. Our specific assumptions and other reliances and limitations are documented in the following sections and supporting appendices. These sections and appendices are an integral part of this report.

1.13 Alexander Forbes does not accept any liability to any persons, other than the trustees, in connection with this report or its related enquiries. We accept no liability in respect of any matter outside the scope and limitations of this report and purpose for which it is prepared.

1.14 This report may not be disclosed and / or relied upon in whole or in part to / by any person other than the trustees or quoted in any other context without prior written consent. Any person, other than the trustees to whom this report is addressed, who receives a draft or copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with us or any third party, does so on the basis that they acknowledge the source of this report and accept that they may not rely on it for any purpose whatsoever and that we owe a duty of care only to the trustees. Any portion of this report, if reproduced or transmitted, must include a reference to the full report and to this clause.

1.15 This report has been prepared as at 31 March 2018 and covers the valuation period given above. Unless specifically stated to the contrary, it does not take into account any events subsequent to the valuation date.

1.16 As part of our standard valuation procedure this report has been peer reviewed by another qualified actuary in the employment of African Origins Actuarial Solutions.

2. DEVELOPMENTS SINCE THE PREVIOUS VALUATION DATE

Rules and amendments

2.1 A rule amendment, effective 1 October 2017, was gazetted (General Notice 775 of 2017, Government Gazette 41151). The rule amendment makes provision for: an increase in the funeral benefit to R15 000; and minimum benefits. In particular, that the gratuity paid on discharge is subject to a minimum of the benefit payable on resignation or discharge resulting from misconduct or ill-health occasioned by the member's own doing or for a reason not specifically mentioned in the rules.

2.2 A rule amendment, effective 18 May 2018, was gazetted (General Notice 258 of 2018, Government Gazette 41634). This rule amendment allows for the differentiation of the applicable periods and provisions for benefits due to voluntary and compulsory demilitarisation in respect SANDF members.

2.3 A rule amendment, effective 1 June 2018, was gazetted (General Notice 314 of 2018, Government Gazette 41673). This rule amendment makes provision for the replacement of the orphan's pensions with child's pensions, at a higher level of 25% of the main member's pension.

Pension increases

2.4 The pension increases granted to pensioners during the valuation period were as follows:

Date of increase	Increase	CPI (for the year ended 30 November)	Increase as % of CPI
1 April 2016	5.3%	4.8%	110.4%
1 April 2017	6.6%	6.6%	100.0%
1 April 2018	5.5%	4.6%	119.6%

2.5 Proportionate increases were granted to pensions in payment that had been in payment for less than twelve months at the time that an increase was granted. The pension increases detailed above have been taken into account in the valuation of the liabilities of the fund as at 31 March 2018.

Salary increases

2.6 The table below sets out the salary adjustments over the valuation as based on the Public Service Co-ordinating Bargaining Council ("PSCBC") multi-term agreements:

Date of increase	Increase
1 April 2016	7.6%
1 April 2017	7.3%
1 April 2018	6.5%

2.7 The adjustment effective 1 April 2018 reflects the corresponding increase for salary levels 8-10, as specified in Circular No.10 of 2018.

2.8 The salary increases detailed above have been taken into account in the valuation of the liabilities of the fund as at 31 March 2018.

Contributions

2.9 The contributions paid by the members and employer during the valuation period were as follows:

Contribution rates	% of pensionable emoluments
Member contributions	7.5%
Employer contributions	
Services	16.0%
Other	13.0%

The recommended employer contribution rate at the previous valuation date was 19.6% of pensionable emoluments for *Services* members and 14.8% for *Other* members.

Administration and actuarial services

2.10 The fund was administered by the Government Pensions Administration Agency during the valuation period.

2.11 The valuator to the fund at the previous valuation date was Howard Buck. I have replaced Howard Buck in this capacity through a resolution of the board of trustees, effective 1 April 2018.

Any other events relevant to the valuation

2.12 Over the previous inter-valuation period, the fund updated its Actuarial Interest factors to reflect the results of the 2014 valuation. These factors were implemented with effect from 1 April 2015. We understand that some parties felt that the consultation process was not in terms of the fund's rules and have litigated against the fund to reverse the implementation of these factors. The litigation process is currently still underway.

Should the fund be successful in defending its actions, there will be no adverse financial impact on the fund. Should the parties be successful, there may well be an impact on the financial position of the fund, with such impact determined by the actual decision awarded against the fund.

3. BENEFIT STRUCTURE

Active members

3.1 A summary of the current benefit structure, in terms of the registered rules of the fund, is included in Appendix 1.

Pensioners: pension increase policy

3.2 The trustees have adopted a formal pension increase policy in order to give effect to section 25 of the GEP Law and GEPF rule 23, to establish the pension increase that is affordable and to guide the trustees in their determination of the annual pension increase. According to rule 23, the fund aims to grant minimum pension increases, if affordable, of 75% of inflation subject to a minimum pension of 75% of the original pension increases with full inflation.

3.3 The GEPF Pension Increase Policy effective from 1 April 2013 states that in making their pension increase recommendation:

"8.2.1.1 The B&A Committee will recommend an inflation related increase, comprising of the Basic Increase and, possibly, a Further Inflation Related Increase. In considering the Further Inflation Related Increase, the B&A Committee may take account of the National Treasury's forward estimate of inflation, or anticipated general increases in public service salaries, or increases in social grants, as well as the balance in the Notional Pensioner Account.

8.2.1.2 If the full Basic Increase cannot be granted because of the affordability provision in 10 below, a proportionate share will be granted.

8.2.1.3 The B&A Committee may recommend one or more of a Catch-up Increase and a Supplementary Increase, in addition to the inflation related increase in 8.2.1.1"

3.4 In addition, the pension increase policy states that the trustees may approve a pension increase recommendation provided that, after the recommended increase, the fund's funding level is higher than the minimum funding level, or where the employer has committed to paying such amounts as will increase the funding level to the minimum funding level, after the recommended increase, within the next three years.

3.5 In order to allow the trustees greater discretion in granting pension increases of 100% of CPI at times when they may not be affordable and also not to create the unreasonable expectation that pension increases will always be 100% of CPI, an additional reserve has been established.

4. MEMBER DATA

The valuation of the fund at 31 March 2018 was based on the membership detailed below. Further statistics, including a reconciliation of the current membership with that present at the previous valuation date, are provided in Appendix 2. The trustees should verify that the statistics correspond with the actual membership of the fund.

Contributing members

4.1 Membership statistics in respect of active members at the valuation date are provided in the table below (the corresponding statistics at the previous valuation date have been provided for comparison):

	31 March 2016	31 March 2018	Change
Services			
Number of members	223 108	233 751	10 643
Salary-weighted average age	42.3 years	43.0 years	0.7 years
Salary-weighted average past service	17.4 years	17.7 years	0.3 years
Total pensionable emoluments (R'm)	48 436	58 721	21.2%
Average pensionable emoluments (R)	217 099	251 212	15.7%
Other			
Number of members	1 062 318	1 048 072	(14 246)
Salary-weighted average age	45.4 years	45.8 years	0.4 years
Salary-weighted average past service	14.9 years	14.9 years	0.0 years
Total pensionable emoluments (R'm)	236 360	272 637	15.3%
Average pensionable emoluments (R)	222 495	260 132	16.9%
Total			
Number of members	**1 285 426**	**1 281 823**	**(3 603)**
Salary-weighted average age	**44.9 years**	**45.3 years**	**0.4 years**
Salary-weighted average past service	**15.3 years**	**15.4 years**	**0.1 years**
Total pensionable emoluments (R'm)	**284 797**	**331 358**	**16.3%**
Average pensionable emoluments (R)	**221 558**	**258 505**	**16.7%**

4.2 The number of active members has decreased from 1 285 426 to 1 281 823 over the valuation period. At the same time there was an increase in the salary weighted average age of the fund's membership from 44.9 years to 45.3 years.

4.3 During the valuation period, the pensionable emoluments of members who contributed to the fund throughout the valuation period increased by an average of 9.4% per annum. The actual salary increases for members present at both the current and the previous valuation dates was lower than that assumed at the previous valuation date (i.e. 10.7% per annum, including an allowance for merit increases).

Pensioners

4.4 Details of the active and suspended pensioners and annual pension statistics at the valuation date are provided in the table below (the corresponding statistics at the previous valuation date have been provided for comparison):

Group	31 March 2016	31 March 2018	Change
Retirees			
Number	266 480	286 831	20 351
Total annual pensions (R'm)	26 192	34 434	31.5%
Average annual pension (R)	98 290	120 050	22.1%
Dependants			
Number	146 624	153 590	6 966
Total annual pensions (R'm)	6 958	8 334	19.8%
Average annual pension (R)	47 454	54 263	14.3%
Orphan pensioners			
Number	0	1 204	1 204
Total annual pensions (R'm)	0	14	n/a
Average annual pension (R)	0	11 439	n/a
Total			
Number	**413 104**	**441 625**	**28 521**
Total annual pensions (R'm)	**33 150**	**42 782**	**29.1%**
Average annual pension (R)	**80 246**	**96 875**	**20.7%**

The pensioner statistics above exclude 12 652 pensioners and dependants at 31 March 2018 (and 15 252 at 31 March 2016) that were inferred from retirements and deaths in the valuation data, but for whom no individual data were provided. Of the 12 652 such cases at 31 March 2018, 12 034 were reflected as retirements or dependants of members who died in service and 618 were reflected as dependants of pensioners who died. Of the 15 252 such cases at 31 March 2016, 11 380 were reflected as retirements or dependants of members who died in service and 3 872 were reflected as dependants of pensioners who died.

4.5 At 31 March 2018 there were 441 625 pensioners with total annual pensions (including increases up to 1 April 2018) of R42 782 million per annum.

4.6 During the valuation period, annual pensions increased by an average of 6.0% per annum. This is lower than the rate of increase in annual pensions assumed at the previous valuation date, i.e. 6.6% per annum.

4.7 The pension-weighted average age of the group (excluding child pensions) decreased from 67.30 to 66.82 years.

Deferred pensioners

4.8 Details of the deferred pensioners and annual deferred pension statistics at the valuation date are provided in the table below (the corresponding statistics at the previous valuation date have been provided for comparison):

	31 March 2016	31 March 2018	Change
Number	9	8	-1
Total annual deferred pensions (R'000)	231	170	-26.4%
Average annual deferred pension (R)	25 667	21 250	-17.2%

5. ASSETS

Details of the fund's investments and cash flows over the valuation period were provided as part of the financial statements.

Asset classes

5.1 The table below shows the breakdown of the fund's invested assets by asset class at the valuation date (corresponding values from the previous valuation of the fund have been provided for comparison):

Asset class	31 March 2016		31 March 2018	
	Market value (R'm)	Proportion	Market value (R'm)	Proportion
Local equities	950 529	58.1%	1 025 149	56.8%
Local property	10 524	0.6%	14 297	0.8%
Local fixed interest	526 393	32.1%	563 089	31.3%
Money market	9 794	0.6%	30 228	1.7%
Loans	22 162	1.4%	44 244	2.5%
Equipment	3	0.0%	2	0.0%
Collective investment schemes	213	0.0%	660	0.0%
Foreign investments	117 975	7.2%	124 150	6.9%
Total investments	**1 637 595**	**100.0%**	**1 801 819**	**100.0%**

Adjustments

5.2 Certain adjustments must be made to the fund's investment values to take account of outstanding debtors and creditors as well as cash on hand at the valuation date. These adjustments as extracted from the fund's financial statements as at the valuation date, are as follows. (Corresponding values from the previous valuation of the fund have been provided for comparison).

	31 March 2016 R'm	31 March 2018 R'm
Total investments	1 637 595	1 801 819
Cash at bank	10 264	22 197
Sundry debtors:		
Accounts receivable	11 625	7 530
Contributions receivable	4 336	3 711
Funding loan	7	7
Transfer receivable	2	1
Sundry creditors:		
Accounts payable	(1 927)	(3 650)
Benefits payable	(27 122)	(30 872)
Financial liabilities	(4 198)	-
Provisions	(5)	(8)
Unclaimed benefits	(653)	(668)
Total assets after adjustments	**1 629 923**	**1 800 068**

5.3 A consolidated revenue and expenditure account (at market value), for the period 1 April 2016 to 31 March 2018 is shown in appendix 3.

Valuation of assets

5.4 For purposes of this statutory actuarial valuation, the assets have been taken into account at 100% of fair (or market) value and no investment margin has been set aside. Therefore the assets of the fund have been taken into account at R1 800 068 million as at the valuation date. This is consistent with the valuation methodology applied to the valuation of the fund's liabilities.

Fund returns

5.5 The investment return earned on the fund's assets is approximated by the change in the Notional Portfolio Index *("NPI")*. The NPI is calculated on a monthly basis and is based on the estimated returns earned by the fund, as provided by the fund's asset consultants. The return in each financial year is rebased to reflect the returns approximated by the market values and cash flows reflected in the annual financial statements. This investment return (net of investment manager fees) earned over the valuation period is set out in the table below:

5.6 I have estimated the gross annualised money-weighted yields earned on the various portfolios and the overall fund for the valuation period, as follows:

Financial year	Net return
1 April 2016 to 31 March 2017	4.05%
1 April 2017 to 31 March 2018	8.96%
Annualised	**6.49%**

5.7 The yield of 6.49% per annum should be considered in the context of the 12.5% per annum assumed in the previous statutory valuation report.

Investment strategy

5.8 The trustees of the fund in consultation with the employers are responsible for the investment of the fund's assets, and need to ensure that the investment strategy of the fund remains appropriate given the nature of the fund's liabilities. In respect of occupational funds, Board Notice 149 of 2010 issued by the Registrar of Pension Funds requires the actuary to the fund to comment on the appropriateness of the fund's asset strategy relative to its liabilities as part of the valuation report.

5.9 In this regard it should be noted that the fund's entire investment portfolio is managed on a market-linked basis, which means that the returns are expected to be volatile and, in particular, there may be negative returns for some periods. The fund's assets are invested in a mixture of asset classes, including South African equities, bonds, property, and cash and international assets.

5.10 A relatively high proportion of these assets is invested in equities and property. These are 'real' assets in the sense that over the long term they are expected to deliver an investment return above (and linked to) the rate of price inflation. This asset class provides a reasonable match to the find's liabilities which are closely linked to future salary and pension inflation (which in turn are linked to price inflation).

5.11 Other factors that the trustees and the employers should consider include:

- The employer 'underwrites' the fund in the sense that the employer would be obliged to pay a higher rate of contributions or lump sum amounts to the fund in the event that it was under funded, to the extent that it is unable to meet its ongoing benefit obligations.

- As long as the fund continues in its current form, its liabilities are long term, in that benefits are not paid out to members until the point at which they retire, die or leave. It is therefore appropriate also to adopt a long-term view with regard to the fund's investment strategy. On this basis it is reasonable to invest a significant proportion of the fund's assets in equities, which are generally expected to deliver a higher long-term investment return than the other asset classes in which the fund invests.

- Following from the above point, and whilst the funding level is currently above the minimum funding level, the fund is currently not able to set aside the full recommended solvency reserve and contingency reserves to protect the fund in the case of adverse investment performance, improvements in pensioner mortality and other contingencies.

- A feature of equity investment is that the capital value of the investments can be volatile in the short term. A consequence of the fund's investment strategy is that there may be times when there are significant falls in the fund's value of assets. The amount allocated to the solvency reserve (had it been fully funded) would provide a margin to protect the fund against such volatility, but given the level of funding of that reserve, may not be sufficient.

- The fund does not have a separate and specific asset strategy in place for the assets backing pensioner liabilities. Typically, such a strategy would involve a higher exposure to South African bonds (including inflation-linked bonds), and a reduction in equity exposure, compared to the current strategy. It is our understanding that the investment strategy adopted for the overall fund assets has been based on a weighted average of the investment strategy applicable to in-service members and to pensioners.

- The fund holds a lower percentage of foreign assets than might otherwise be suggested purely in terms of the risk diversification of assets.

- The trustees and the employers should continue to consider the appropriateness of the assets in the light of the nature of the fund, the employer covenant, the current funding level, the desired level of future pension increases and the required and affordable contribution rates by the employers.

- Taking the above factors into account, the current asset strategy of the fund remains reasonable as at the valuation date in relation to the liability profile of the fund. The strategy, however, does imply that the fund ideally needs to hold reasonable investment risk contingency reserves (solvency reserves) in order to have an acceptable probability of being able to meet the reasonable benefit expectations of in-service members and pensioners without calling on the employers to fund the effect of any volatility in the level of the assets.

- As such we are satisfied with the structure of the assets backing these liabilities and that the matching of the assets with these liabilities is, in our opinion, adequate.

6. VALUATION METHOD AND BASIS

6.1 This statutory actuarial valuation has been conducted on the basis of the benefits, contributions and other provisions of the rules as they stood at the valuation date, and allowing for the benefit improvements detailed in section 2. These are summarised in Appendix 1.

6.2 An appropriate method and basis need to be chosen to value the liabilities of the fund. These should be consistent with the objectives of the valuation, as outlined in section 1.

6.3 We have maintained the approach that was used to set the basis at the last valuation date. This valuation has been undertaken on a best estimate basis, together with an explicit provision for a solvency reserve.

6.4 We have used the **projected unit** method to value the expected liabilities of the fund. This method separates the benefits accrued to the valuation date (the past service liabilities) from those expected to accrue in future (the future service liabilities). Allowance is made for expected salary and pension increases and for interest accrual to the member's anticipated date of withdrawal, death or retirement. This is discussed in more detail in Appendix 4.

6.5 A brief summary of assumptions for the valuation of the liabilities is provided in the table below (the corresponding assumptions at the previous valuation date have been provided for comparison).

6.6 It should be noted that actual experience is likely to differ from the assumptions below. The actual cost of benefit provision will ultimately depend on the actual financial and demographic experience of the fund.

BEST ESTIMATE	**31 March 2016**	**31 March 2018**
Financial assumptions		
Long term discount rate	12.5%	11.2%
Inflation	8.3%	6.5%
Salary inflation (before merit scale)	9.3%	7.5%
Net pre-retirement discount rate	2.93%	3.44%
Affordable pension increases	6.6%	5.2%
Net-post retirement discount rate	5.53%	5.70%
Demographic assumptions		
Mortality		
- Pre-retirement	refer appendix 4	refer appendix 4
- Post-retirement	refer appendix 4	refer appendix 4
Withdrawal	no allowance	no allowance
Ill-health	refer appendix 4	refer appendix 4
Spouse's age difference	Male spouse 4 years older than female spouse	Male spouse 4 years older than female spouse
Percentage married	refer appendix 4	refer appendix 4

SOVENCY RESERVE (Discontinuance basis)	**31 March 2016**	**31 March 2018**
Financial assumptions		
Long term discount rate	10.2%	8.9%
Inflation	8.8%	7.0%
Salary inflation	7.1% plus merit salary scale	5.8% plus merit salary scale
Net pre-retirement discount rate	2.89%	2.93%
Affordable pension increases	7.0%	5.6%
Net-post retirement discount rate	2.99%	3.13%

7. VALUATION RESULTS

7.1 In order to determine the level of solvency of the fund, it is necessary to compare the total assets of the fund with the total liabilities. The fund is solvent when the value of the assets is equal to or greater than the value of the liabilities, i.e. a funding level of 100% or greater. The funding level is the ratio of the value of the assets to the value of the liabilities of the fund at the valuation date.

7.2 The results of the statutory valuation of the fund as at 31 March 2018 are detailed in the table below. Corresponding values from the previous valuation of the fund have been provided for comparison.

Financial position of the fund	**31 March 2016 R'm**	**31 March 2018 R'm**
Fair value of assets	**1 629 923**	**1 800 068**
Accrued service liabilities		
Active member liability	1 029 889	1 171 396
Retirement	*900 861*	*1 013 694*
Death in service	*87 157*	*111 124*
Ill-health	*41 872*	*46 579*
S-case and exits in progress liability	12 063	11 673
Pensioner liability	349 805	451 487
Male pensioners	*138 088*	*168 859*
Female pensioners	*138 498*	*181 220*
Widowers	*7 643*	*9 157*
Widows	*65 577*	*72 626*
Male Orphan Pensioners	*0*	*36*
Female Orphan Pensioners	*0*	*39*
Late Pensioner Adjustment*	*0*	*19 550*
Child Pension Provision	0	10 535
Deferred pensioner liability	0.4	0.5
Data reserve	7 724	8 785
Discriminatory practices reserve	7 695	8 763
Total accrued service liabilities	**1 407 177**	**1 662 640**
Balance of assets before contingency reserves	**222 746**	**137 428**
Minimum funding level	**115.8%**	**108.3%**
Contingency reserves		
Mortality improvement reserve	41 340	48 259
Pension increase reserve (past service)	178 860	161 883
Pension increase reserve (future service)	125 268	108 751
Solvency reserve**	301 581	402 000
Total value of contingency reserves	**647 048**	**720 893**
Balance of assets after contingency reserves	**(424 302)**	**(583 464)**
Long-term funding level	**79.3%**	**75.5%**

**The Late Pensioner Adjustment allows for a delay in setting up a pensioner payment record in respect of active members who exited during the valuation period. This was previously recorded under other liability values.*

***Solvency reserve provided by Riscura*

7.3 The above results (i.e. in respect of service up to 31 March 2018 and allowing for future salary increments in the case of contributors and future pension increases in respect of prospective and incumbent pensioners) reflect an accrued surplus of R137 428 million on the best estimate valuation basis, before any contingency reserves. This corresponds to a funding level of 108.3%, which meets the trustees' targeted ***minimum funding level*** of 90%. At the previous valuation the minimum funding level was 115.8%

7.4 The ***long-term funding level*** (i.e. the funding level after allowing for solvency reserves and other contingency reserves) is 75.5% at the valuation date. This is below the trustees' targeted long-term funding level of 100%. The fund can therefore only afford to hold R137 428 million, or 19.1%, of the full recommended solvency reserves and contingency reserves of R720 893 million. At the previous valuation the long-term funding level was 79.3%.

Analysis of change in financial position

7.5 In order to assist in understanding the financial impact that various items have had on the fund, we have prepared an analysis of the change in the fund's financial position (Appendix 5). This analysis investigates the extent to which actual experience has diverged from that assumed in the previous valuation basis.

Reserve accounts

7.6 The reserve accounts are discussed in more detail in appendix 6.

Comment in terms of APN 205

7.7 Whilst the value of the liabilities is based on best estimate assumptions, where relevant, and the solvency and other contingency reserves established by the trustees on my advice allow for some fluctuations in asset values and / or unexpected changes in liabilities, there is no guarantee that these reserves will prove sufficient in practice. Conversely, it is possible that the reserves may prove to be more than sufficient.

7.8 If the reserves prove to be insufficient, management action will be required to rectify the position. This may involve, inter alia, the reduction in future benefit accruals, an increase in the required contribution rate or, in the event of liquidation of the fund, the possibility of a debt to the employer. If the reserves prove to be excessive then the balance of assets would have been understated. The uncertainty of the adequacy or otherwise of the reserves held is unavoidable and the actual outcome can only be determined when the fund ceases to have any further liabilities.

8. FUTURE SERVICE CONTRIBUTION RATE

Employer contribution rate during the valuation period

8.1 The recommended employer contribution rate to meet the balance of the cost of benefits accruing after 31 March 2016 (as per the previous statutory valuation), was 19.6% of pensionable emoluments for *Services* members and 14.8% for *Other* members.

8.2 The employer contributed at 16% of pensionable emoluments for *Services* members and 13% for *Other* members during the valuation period.

Recommended employer contribution rate for future service benefits as at the valuation date

8.3 The recommended employer contribution rate for benefits accruing after 31 March 2018, without having regard to the funding level of the fund, calculated on the best estimate valuation basis, is set out below. The corresponding statistics at the previous valuation date have been provided for comparison.

Employer contribution rates by employer group	% of pensionable emoluments			
	31 March 2016		31 March 2018	
	Services	Other	Services	Other
Funded benefits				
Retirement benefits	20.8%	18.4%	19.8%	17.5%
Death benefits	3.2%	2.3%	3.8%	2.7%
Ill health benefits	2.2%	0.7%	1.9%	0.7%
Mortality improvement	0.6%	0.6%	0.5%	0.6%
Total funded benefits	**26.8%**	**22.0%**	**26.1%**	**21.6%**
Fund expenses	0.3%	0.3%	0.3%	0.3%
Less: Member contributions	(7.5%)	(7.5%)	(7.5%)	(7.5%)
Recommended employer contribution rate	**19.6%**	**14.8%**	**18.9%**	**14.4%**
Current employer contribution rate	16.0%	13.0%	16.0%	13.0%

The required contribution rate has decreased due to the increase in the weighted average age of the membership and the weakening of the valuation assumptions, in particular the decrease in assumed future interest rates due to the decrease in bond returns.

8.4 In my opinion, in light of the size of the fund and the potential impact of HIV/AIDS, the current self-insurance arrangements with respect to the death and disability benefits are appropriate. It should be noted that the cost of risk benefits could increase even if the age, sex and salary profile remains stable, due to for instance the impact of HIV/AIDS.

Cost of additional pensionable service for *Services* members

8.5 We have also considered the effect on the contribution rate in respect of members of *Services* members, who qualify for a 25% enhancement to their years of pensionable service in excess of ten years. The results are shown in the table below:

	% of pensionable emoluments	
	Including 25%	**Excluding 25%**
Funded benefits	**26.1%**	**20.9%**
Retirement benefits	*19.8%*	*15.8%*
Death benefits	*3.8%*	*3.7%*
Ill-health benefits	*1.9%*	*0.9%*
Mortality improvement	*0.5%*	*0.5%*
Fund expenses	0.3%	0.3%
Less: Member contributions	(7.5%)	(7.5%)
Recommended employer contribution rate	**18.9%**	**13.7%**
Actual employer contribution rate	16.0%	16.0%
Excess / (shortfall)	**(2.9%)**	**2.3%**

8.6 As indicated in the results above, the effect of the service enhancement in respect of *Services* members amounts to approximately 5.2% of pensionable emoluments. This is higher than the difference in contributions payable by the *Services* employers (16%) and *Other* employers (13%) but highlights the appropriateness of the difference in contribution rate based on the benefit enhancement. The residual difference can be explained by the differing decrement assumptions between the two categories of members.

Findings and Recommendations

8.7 For a fund governed in terms of the Pension Funds Act, the employer is required to contribute at the required rate determined by the valuator of the fund, or for any contribution shortfall to be funded from an employer surplus account in the fund.

8.8 The nature of the Government Employees Pension Fund is somewhat different in that it is governed in terms of the GEP Law and the covenant of the employer is much stronger in terms of being able to meet any funding shortfall in the future.

8.9 The trustees and the employer need to jointly determine the pace of funding, i.e. the employer contribution rate, and an acceptable level of funding, both in the short term and the long term for the fund.

8.10 It should be noted that the shortfall between the required employer contribution rate (an average of 15.2% of pensionable salaries) and the current actual employer contribution rate (an average of 13.5% of pensionable salaries) amounts to some R5.6 billion per annum or some 0.34% of the Fund's liabilities.

8.11 If the employer continues to contribute at the current rate, the shortfall is therefore expected to reduce the funding level by 0.34% per annum.

5% equity risk premium allowance

8.12 For purposes of testing the appropriateness of the current level of contributions as at 31 March 2018, a 5% equity risk premium over the long-term bond yield assumption was considered. The use of this assumption for determining the future funding requirements must be seen as a risk budgeting exercise for the employer. To the extent that, over the long term, equities earn a risk premium of 5% over bonds (and experience is as assumed), the required level of contributions at the rates below would be adequate. It should, however, be appreciated that the higher the assumed equity risk premium, the lower will be the required contribution rates, but that this also carries a greater risk of requiring additional contributions into the future should experience not be in line with that assumed.

Contribution rates by employer group	**31 March 2018 % of pensionable emoluments**	
	Services	**Other**
Recommended employer contribution rate (as shown above)	**18.9%**	**14.4%**
Adjustment to required contribution rate	(4.9%)	(4.3%)
Recommended employer contribution rate (as adjusted)	**14.0%**	**10.1%**
Actual employer contribution rate	16.0%	13.0%
Excess / (shortfall)	**2.0%**	**2.9%**

8.13 Based on the 5% equity risk premium assumption the required contribution rate is 14% for *Services* members and 10.1% for *Other* members. On this basis there is an excess contribution of 2% for *Services* members and an excess contribution of 2.9% for *Other* members. This does, however, require an appreciation by the employer of the associated risks mentioned above, and we would recommend that this is communicated to the employer. The excess contributions can also be applied to increase the level of funding of the contingency reserves.

8.14 We would suggest that the trustees and the employer should not rely on the fund's assets earning this higher equity risk premium over the long-term and that the required employer contribution rate should be considered in terms of the valuation bass i.e. using a 3% equity risk premium.

9. SUMMARY AND RECOMMENDATIONS

Summary

9.1 The statutory actuarial valuation of the fund as at the valuation date was based on 1 281 283 active members with pensionable emoluments totalling R331 358 million and 441 625 pensioners with annual pensions totalling R42 782 million and 8 deferred pensioners.

9.2 The adjusted value of the fund's available assets at 31 March 2018 was R1 800 068 million and its accrued liabilities were R1 662 640 million.

9.3 The valuation thus disclosed excess liabilities of R137 428 million and an accrued funding level of 108.3% on the best estimate valuation basis as at 31 March 2018. The fund is accordingly financially sound on the minimum funding basis at the valuation date.

Findings and recommendations

9.4 As at 31 March 2018 the assets of the fund were sufficient to cover the best estimate liabilities in full, with a funding level of 108.3%. The current position therefore meets the trustees' targeted minimum funding level of 90%.

9.5 The fund does not have sufficient assets to cover the recommended solvency reserve and other contingency reserves in full. Allowing for the full solvency reserve and other contingency reserves reflects a long-term funding level of 75.5%. An amount of R137 428 million is available to cover these reserves, which implies that 19.1% of the recommended reserves are funded.

9.6 An employer contribution rate of 18.9% and 14.4% of total pensionable emoluments is required respectively for *Services* and *Other* members to finance the benefits which are expected to accrue over the period between the current valuation date and the next valuation date (31 March 2020). These contribution rates are inclusive of the cost of death in service lump sum benefits, funeral benefits and the cost of administration expenses.

9.7 The employer currently contributes at a rate of 16% of total pensionable emoluments for *Services* members and 13% for *Other* members. For the purpose of testing the appropriateness of the current level of contributions, a 5% equity risk premium over the long bond yield assumption has been considered. On this basis, the required contribution rate is 14% for *Services* members and 10.1% for *Other* members, resulting in an excess contribution of 2% for *Services* members and 2.9% for *Other* members. This does, however, require an appreciation by the employer of the risks mentioned in paragraph 8.12 above, and we would recommend that this be communicated to the employer.

9.8 The cost of the service enhancement in respect of *Services* members amounts to approximately 5.2% of pensionable emoluments. This is higher than the current difference in contributions paid in respect of *Services* and *Other* members but highlights the appropriateness of the difference in contribution rates.

9.9 The level of contributions should be monitored as part of each actuarial valuation of the fund to ensure that it is in line with the adopted funding level policy.

9.10 In line with rule 7.2 of the fund's rules, which states that the employer contributions should be sufficient to ensure that the fund is able to meet its obligations at all times, subject to a minimum funding level of 90%, the funding policy adopted by the trustees requires the trustees to ensure that the minimum funding level is above 90%. This can therefore be viewed as the primary funding objective of the fund. The employer contribution rate must be determined by the employer in consultation with the trustees and the minister of finance, with due regard to the recommendations of the most recent actuarial valuation of the fund. The funding policy also states that the trustees should strive to maintain the long-term at or above 100%. The long-term funding level of the fund at the valuation date was 75.5% with a minimum funding level of 108.3%. As at the valuation date the fund meets the minimum funding level, but as the contingency reserves are only partially funded, does not meet its long-term funding objectives.

9.11 We recommend that the F(Z) and A(X) factors that are used to calculate actuarial interest, as well as the F(X) factors that are used in the purchase of service calculations, be reviewed after each actuarial valuation of the Fund. This will enable the Trustees to determine whether the basis produces factors which are sufficiently different to warrant a change in the factors used by the Fund. These factors are attached in appendix 8.

9.12 We are satisfied with the suitability of the fund's investment strategy, the nature of the assets of the fund and that the matching of the assets with the liabilities is, in our opinion, adequate.

9.13 Given the current financial condition and size of the fund, the self-insurance of death and ill-health retirement risks remains appropriate.

9.14 We recommend that the key demographic assumptions used for the Fund be monitored through an experience analysis exercise every three to five years.

9.15 On the basis that the Fund has met its funding objectives and that the current contributions are expected to cover the cost of future benefits with specific reference to the risks mentioned in paragraph 8.12 above as well as the fact that the contingency reserves are only 19.1% funded, we can confirm that the Fund was in a sound financial condition as at 31 March 2018.

Andre Ronald Pienaar

Fellow of the Actuarial Society of South Africa and the Institute and Faculty of Actuaries in my capacity as the valuator of the fund and as an employee of Alexander Forbes Financial Services

Sandile Mbili

Fellow of the Actuarial Society of South Africa

in my capacity as peer review actuary and as a director of African Origins Actuarial Solutions

For the purposes of professional regulation the primary professional regulator of the signatories to this report is the Actuarial Society of South Africa.

November 2018

ALEXANDERFORBES
Securing your financial well-being

APPENDIX 1: SUMMARY OF BENEFITS AND CONTRIBUTIONS

A summary of the main benefits is given below. Full details are contained in the registered rules of the fund. Where there are special cases or benefits for particular members, these have been taken into account in the valuation.

Definitions

1. **Actuarial interest:**

For a member younger than 55 years:

N(adj) x FS x F(Z), where:

N(adj) = member's adjusted service at termination date, and

F(Z) = a factor determined by the board of trustees and the minister of finance acting on the advice of the actuary.

and

For a member older than 55 years:

G + (A x A(X)), where:

A(X) = a factor determined by the board of trustees and the minister of finance acting on the advice of the actuary.

A and G are in this case always calculated using the formulae for members with 10 years of service or more.

Actuarial interest is always at least equal to the cash resignation benefit, which is summarised in paragraph A1.29.

2. **Annuity (A):**

Less than 10 years of pensionable service:

nil

10 or more years of pensionable service:

1/55 of FS for each year of service, plus R360 per annum.

3. **Annuity increases:** Determined by the board of trustees acting on the advice of the actuary.

4. **Final salary (FS):** Average pensionable emoluments during the last 24 months of pensionable service.

5. **Gratuity (G):** ***Less than 10 years of pensionable service:***

15.5% of FS for each year of pensionable service.

10 or more years of pensionable service:

6.72% of FS for each year of pensionable service.

6. **Pension age:** In accordance with service conditions. For the purposes of this valuation, retirement was assumed to occur in line with the specified retirement decrement tables.

7. **Pensionable emoluments:** The basic annual salary plus any other emoluments recognised as pensionable.

8. **Pensionable service:** Period since commencing service with the employer during which contributions were paid, including any additional service purchased and excluding any periods of leave-without-pay not allowed for in the rules.

9. **Potential service:** Period from commencement of pensionable service until the normal retirement date at pension age.

10. **Prospective service:** Period from the current age until the pension age.

Normal retirement benefit

Less than 10 years of pensionable service:

11. A gratuity equal to a member's actuarial interest

10 or more years of pensionable service:

12. A gratuity of G and an annuity of A.

13. The gratuity is increased by 12% for members of the SANDF who are younger than 53 years at retirement.

14. In the case of *Services* members, pensionable service is increased by 25% for each year of pensionable service completed in excess of 10.

Early retirement benefit

15. As for normal retirement, but reduced by 1/3% for each complete month by which early retirement date precedes normal retirement date.

Late retirement benefit

16. With employer approval. Benefit is as for normal retirement.

Ill-health retirement benefit

Less than 10 years of pensionable service:

17. A gratuity of 1.33 x G

10 or more years of pensionable service:

18. A gratuity of G and an annuity of A.

19. Pensionable service is increased by the smaller of 5 years, 1/3 of pensionable service completed and prospective service.

20. The gratuity is increased by 12% for members of the SANDF who are younger than 53 years at retirement.

21. In the case of *Services* members, pensionable service is also increased by 25% for each year of pensionable service completed in excess of 10.

22. Effective 1 October 2017, the ill-health benefit is subject to a minimum of the resignation benefit.

Death in service benefit

Less than 10 years of pensionable service:

23. A gratuity of the greater of FS (as defined in paragraph 4 above) and actuarial interest.

10 or more years of pensionable service:

24. A gratuity of 5 x A + G.

25. Pensionable service is increased by the smaller of 5 years, 1/3 of pensionable service completed and prospective service.

26. In the case of *Services* members, pensionable service is also increased by 25% for each year of pensionable service completed in excess of 10.

10 or more years of potential service:

27. A spouse's pension of 50% x A.

28. Pensionable service is based on full potential service.

29. In the case of *Services* members, pensionable service is also increased by 25% for each year of pensionable service in excess of 10.

Orphan's pension:

30. Where a child becomes an orphan on the death of the member or the subsequent death of the surviving spouse, a pension of 10% of the member's annuity becomes payable, subject to a minimum amount determined by the trustees, which cannot be less than R200 per month. The benefit remains payable until age 18, age 22 if the child is a full time student, for life in the case of a financially dependent disabled child. Effective 1 June 2018, the orphan's pension has been amended to a child's pension, and increased to a higher level of 25% of the main member's pension.

Death benefit after retirement

31. A spouse's pension of 50% x A, unless the member elected a reduced pension or gratuity with a 75% spouse's annuity.

32. An orphan's pension of 10% (from 1 June 2018 a child's pension of 25%) of the member's pension. If the orphan's pension becomes payable on the death of a surviving spouse who was in receipt of a spouse's pension, the orphan's pension is increased by the ratio of the spouse's pension at the date of his or her death to the initial spouse's pension. Effective 31 March 2009, the benefit is subject to a minimum amount determined by the trustees, which cannot be less than R200 per month. The benefit remains payable until age 18, age 22 if the child is a full time student for life in the case of a financially dependent disabled child.

33. If death occurs within the 5 years following retirement, a gratuity is payable equal to the balance of 5 years' annuity payments (excluding the R360 per annum pension).

Funeral benefit

34. A funeral benefit of R15 000 on the death of a member, pensioner or spouse and R6 000 on the death of an eligible child or stillborn child. The funeral benefit was increased effective 1 June 2018.

Discharge benefit

35. On discharge due to abolition of post or in the interest of the employer, the benefit is as for ill-health retirement.

Resignation benefit

36. On discharge due to misconduct or resignation or ill-health occasioned by own doing, a gratuity of:

 7.5% x FS x pensionable service.

 The benefit is increased by 10% for each completed year of pensionable service between 5 and 15.

37. The benefit is subject to a minimum of the member's actuarial interest.

Injury on duty benefits

38. The rules specify various gratuities and annuities which are payable. These are, however, paid directly by the state and are not funded. They have therefore been ignored for the purpose of this valuation.

Contribution rates

39. Members contribute at a rate of 7.5% of pensionable emoluments

40. The employer contributes at a rate of 16% of pensionable emoluments for *Services* members and 13% for *Other* members.

41. Additional costs to the fund resulting from the granting of early retirement or discharge benefits, other than due to ill-health, are borne by the government, the employer or both.

42. The cost or benefit improvements for specific groups of members are borne by their employers.

Expenses and other costs

43. Running expenses are borne by the fund.

Note

44. The above summary outlines the main benefits as they apply to the majority of members. Certain members (directors general, teachers and SANDF members with long service, etc.) may be subject to special provisions, which have not been listed above. We understand that the number of such members is not significant in terms of the overall membership of the fund.

APPENDIX 2: MEMBER STATISTICS

Contributory membership at the valuation date

1. The contributory membership changed as follows over the valuation period:

	Number of members
Active members at 31 March 2016	**1 285 426**
Opening adjustments	13 426
Entrants	110 405
Exits	
Adjustments	(3 766)
Withdrawal	(69 372)
Retirement	(42 291)
Ill-health	(2 381)
Death	(4 861)
Transfer	(4 763)
Active members at 31 March 2018	**1 281 823**

The opening adjustment reflects members who were not present in the 31 March 2016 valuation data but who had service dates prior to 1 April 2016.

2. A summary of the membership data on which the valuation was based is set out below:

Age at 31 March 2018	Number of members	Pensionable emoluments (R'000)
< 20	49	6 225
20 – 24	19 058	3 663 885
25 – 29	101 126	20 999 018
30 – 34	165 250	35 237 555
35 – 39	178 234	39 570 541
40 – 44	196 825	49 190 830
45 – 49	228 212	63 646 863
50 – 54	204 526	61 191 868
55 – 59	143 102	44 174 053
60 - 64	44 843	13 498 312
65+	598	179 671
Total	**1 281 823**	**331 358 820**

3. The number of active members contained in this report differs from the report of the board of trustees reflected in the fund's unaudited financial statements at the valuation date. The report reflects the active membership as 1 273 125. We were not provided with a specific listing of the members included in that figure. For the purposes of our valuation, the administrator provided a listing of members as at 31 March 2018, including exits over the preceding year. In arriving at the membership

shown above, we excluded any appropriate exits. Erroneous records were queried and excluded, after receiving appropriate confirmation from the administrator.

Pensioners

4. A reconciliation of the change in the number of active pensioners over the valuation period is provided below:

	Retirees	Dependants	Total
Number at 31 March 2016	**266 480**	**146 624**	**413 104**
Retirements	36 797	-	36 797
New Dependants	-	10 588	10 588
Appearance	6 351	8 281	14 632
Deaths	(21 149)	(9 570)	(30 719)
Suspended over 5 years	(1 489)	(1 140)	(2 629)
Ceased to be eligible	(52)	(96)	(148)
Pension type corrections	(107)	107	-
Number at 31 March 2018	**286 831**	**154 794**	**441 625**

The pensioner statistics above exclude 12 652 pensioners and dependants at 31 March 2018 (and 15 252 at 31 March 2016) that were inferred from retirements and deaths in the valuation data, but for whom no individual data were provided. Of the 12 652 such cases at 31 March 2018, 12 034 were reflected as retirements or dependants of members who died in service and 618 were reflected as dependants of pensioners who died. Of the 15 252 such cases at 31 March 2016, 11 380 were reflected as retirements or dependants of members who died in service and 3 872 were reflected as dependants of pensioners who died.

5. A summary of the membership data on which the valuation was based is set out below:

Age at 31 March 2018	Number of pensioners	Pensions (R'000)
<20	1 175	13 343
20 – 24	40	1 002
25 – 29	257	13 544
30 – 34	1 338	74 681
35 – 39	3 834	216 752
40 – 44	9 778	555 875
45 – 49	18 411	1104 319
50 – 54	24 408	1553 173
55 – 59	41 715	3774 897
60 - 64	85 078	11081 645
66 - 69	89 210	9905 975
70 - 74	63 721	5558 385
75 - 79	50 453	4097 606

80 - 84	29 723	2620 610
85 - 89	15 403	1491 486
90 - 94	5 524	582 790
95 - 99	1 361	124 535
100+	196	11 636
Total	**441 625**	**42 782**

6. At 31 March 2018 there were 441 625 pensioners, with pensions (including increases up to 1 April 2018) of R42 782 million per annum.

7. As at 31 March 2018 there were 8 deferred members, with total pensionable emoluments of R170 000 per annum.

Reasonableness checks performed

8. A large number of tests were carried out on the reasonableness and consistency of the data, including the following:

- a reconciliation of the number of members and pensioners at the valuation date and the previous valuation date, with the movements in membership reported
- reasonableness tests on the salary and pension amounts, and the various membership dates (dates of joining, dates of pensionable service and dates of exit)
- identifying any missing or invalid data fields
- reviewing the fund's annual financial statements
- reconciling exiting members with the claims paid in the annual financial statements
- calculation of the fund's investment returns
- a review of the levels of actual and projected fund expenses

9. The table below provides a summary of the data issues in respect of the 31 March 2018 active member data that were queried with the administrator:

Data issue	Number of records
Duplicates	5
Exit data incomplete	**9 128**
Exit mode, but no exit date	184
Exit date, but no exit mode	93
Exit mode not identifiable (all confirmed as exits)	8 851
Member movements	**53 313**
Not in 2016 data, but PSD before 1 April 2016	13 505
In 2016 data but not in 2018 data, no exit record	14 421
Active members with records in pensioner data	136
New pensioners with no corresponding exit records	25 251
Missing fields	**75**
Gender (not discernible from ID)	40
DOB (not discernible from ID)	35
Mismatches:	**74 881**
Gender: ID vs indicated	2 165
DOB: ID vs indicated	27
Employee category: employer code vs employer type fields	72 689
Inconsistency: 2016 vs 2018 valuation data	**62 405**
Gender	1 016
DOB	221
PSD	58 131
Employee category	3 037
Age	**4 464**
Younger than 16 at PSD	19
Over normal retirement age	4 445
Salaries	**60 282**
Salary: nil or low (< R500 p.a)	12 696
Salary changes: >50% or decrease	47 586

A description of the various items follows:

Duplicates

10. We understand that the member number in respect of records should be unique. The administrator confirmed that all duplicates on member number were to be removed.

Exit data incomplete

11. Where records had either an exit mode or exit date specified (but not both), the administrator confirmed which records should be allowed for as exits. The majority of such records were confirmed to be exits before the valuation date.

Member movements

12. In respect of new records with service dates prior to the previous valuation date, the administrator confirmed that the majority of these records should be included in the active membership and that the service dates were indeed correct.

13. The administrator confirmed that all records where members were present in the 2016 valuation data, but not in the 2018 valuation data, and where no exit records could be identified, should be excluded from the active membership – being either exits in progress or exits.

14. Furthermore, some pensioner records were identified as having corresponding active records. The administrator confirmed that all these active records should be excluded for valuation purposes, and that only the pensioner records should be valued.

15. The administrator also confirmed that all new pensioners with no corresponding exit records that were identified should be included in the pensioner data to be valued.

Missing fields

16. For the majority of records where either dates of birth or gender were missing and could not be identified from the ID number, the administrator confirmed the data to be used for valuation purposes. A small number of these records were highlighted by the administrator as needing to be excluded from the valuation data.

Mismatches

17. Where there were mismatches in the member details indicated by two different fields, the administrator confirmed which field was to be used for valuation purposes.

Inconsistencies

18. Any inconsistency in member details between the 31 March 2016 and 31 March 2018 valuation data were queried with the administrator. The administrator confirmed which details were to be used for valuation purposes. In the majority of cases, the administrator confirmed that the 2018 data was correct and changes were the result of data corrections.

Age

19. Records where members appeared to be unexpectedly young at their dates of commencing service as well as members in the active data who were identified as being older than their expected retirement ages, as at the valuation date, were queried with the administrator. In respect of erroneous service dates, the administrator provided corrected data. In respect of members over their anticipated retirement ages, the administrator confirmed that the majority of such records were to be kept in the active membership.

Salaries

20. For all cases where either nil or low salaries were identified, the administrator confirmed that either no data was available, or that no other information was available to confirm the salaries currently on

record. For valuation purposes, we have assumed the average salaries in respect of the relevant employee category ("Services" or "Other") in respect of members with nil salaries. With regard to salaries below R83 000 per annum, we have adjusted the salaries to reflect the minimum salary of R83 000. The minimum salary of R83 000 is consistent with the minimum salary of R72 000 per annum used as at 31 March 2016 together with average salary increases granted during the inter-valuation period.

Certification

21. In spite of the various data issues highlighted above, I am satisfied with the general accuracy and completeness of the data provided and with its suitability for purposes of this statutory valuation.

APPENDIX 3: CONSOLIDATED REVENUE ACCOUNT

	Fund account Rm	Reserve accounts Rm	Total Rm
Opening balance as at 31 March 2016	**1 622 072**	**7 852**	**1 629 923**
Reversal of prior year adjustments	(4 415)	-	(4 415)
Revised opening balance	**1 617 656**	**7 852**	**1 625 508**
Income			
Member contributions	48 550	-	48 550
Purchase Periods of Service (GEPF Members)	54	-	54
Purchase Periods of Service (Divorce Benefits)	1 298	-	1 298
Purchase Periods of Service (Past Discriminatory Members)	33	-	33
Employer contributions	87 436	-	87 436
Interest on outstanding contributions	2	-	2
Transfers from other funds	798	-	798
Other Income	996	-	996
Expenses	**(2 013)**	**-**	**(2 013)**
Benefits			
Pensions	(76 560)	-	(76 560)
Gratuities	(28 638)	-	(28 638)
Withdrawal benefits	(58 012)	-	(58 012)
Retrenchment benefits	(417)	-	(417)
Transfers out	(382)	-	(382)
Ciskei strikers	-	(20)	(20)
Orphans benefits	(95)	-	(95)
Death benefits	(13 442)	-	(13 442)
Funeral benefits	(435)	-	(435)
Interest paid to members	(4 561)	-	(4 561)
Interest paid to dormant members	(0)	-	(0)
Divorce benefits	(5 531)	-	(5 531)
Unclaimed benefits	(5)	-	(5)
Other Interest	(7)	-	(7)
Sub total	**1 566 724**	**7 832**	**1 574 555**
Investment income	225 513	-	225 513
Transfers between accounts	(1 092)	1 092	-
Closing balance as at 31 March 2018	**1 791 145**	**8 923**	**1 800 068**

APPENDIX 4: FUNDING METHOD, VALUATION BASES AND ASSUMPTIONS

FUNDING METHOD

Introduction

1. This statutory actuarial valuation was considered in two parts:

- pensionable service up to the valuation date ("past service"); and
- pensionable service after the valuation date ("future service").

Valuation methodology in respect of accrued benefits: past service liabilities

Active members

2. The fund's financial position at the valuation date with respect to the active members has been assessed by comparing the value of assets with the value of member liabilities. The liabilities for members have been calculated using the **projected unit** method. At the previous valuation date the same funding method was used.

3. The past service liability in respect of active members at the valuation date was calculated by estimating the benefits expected to become payable in respect of service that had accrued up to the valuation date. Allowance was made for future salary increases to the date of retirement (or earlier exit) and pension increases after retirement. These projected benefits were then discounted back to the valuation date, thus producing the past service liability at the valuation date.

Pensioners

4. The liability in respect of pensioners was calculated as the present value of the expected payments in respect of these pensions, including allowance for future pension increases on a basis consistent with the pension increase policy and with communication to pensioners.

5. The benefits in respect of suspended pensioners have been valued on the same basis as those of active pensioners. Factors were then applied to these calculated liabilities to allow for the reducing probability that pensions will recommence after they have been in suspension for several years.

6. The following factors were applied:

Period of suspension	Factor applied
Less than 12 months	100%
12 to 23 months	80%
24 to 35 months	60%
36 to 47 months	40%
48 to 59 months	20%
60 months and more	0%

7. These factors are believed to be reasonable in relation to Alexander Forbes' best estimate assumptions.

Deferred pensioners

8. The liability in respect of the deferred pensioners was calculated as the present value of the expected payments in respect of these pensions, including allowance for future pension increases, on a basis consistent with the pension increase policy and with communication to pensioners.

Notional pensioner accumulation amount

9. The fund is not governed by the Pension Funds Act and there are no requirements in terms of the rules of the fund to separate "pensioner assets" from the other assets of the fund. The calculation of the notional pensioner accumulation amount is therefore included in this report for illustrative purposes and should the fund fall under the Pension Funds Act in future.

10. The "notional pensioner accumulation amount" is calculated by:

- determining the fair value equivalent of each pensioner's liability at retirement date (and at the commencement date of any spouse's pension in the case of the spouse of a pensioner who died prior to the valuation date);
- for each deferred pensioner the fair value equivalent should instead be determined at the date of termination of service;
- allowing for any contingent benefits payable in the event of the death of a pensioner and deferred pensioner;
- deducting any commutation and pension payments made prior to the valuation date;
- adding the value of any special increases that have been granted to pensioners and deferred pensioners which were funded otherwise than through the returns earned on the assets backing the pensioner and deferred pensioner liabilities; and
- accumulating the above to the valuation date using the investment returns earned on the assets backing the pensioner and deferred pensioner liabilities.

11. The above calculation was performed for each pensioner and deferred pensioner who was alive at the valuation date.

12. In order to calculate the notional pensioner accumulation amount, the following assumptions were required:

- The starting value from the last valuation was used;

- (No deductions were made from the starting value for decease pensioners
- Assumed expenses in respect of pensioners were allowed for

13. The notional pensioner accumulation amount amounted to R544 921 million at the valuation date and was 26% higher than the pensioner and deferred pensioner liabilities calculated on a best estimate basis, but is only 88% of the pensioner liabilities plus full recommender serves for pensioners. This compares to an amount of R370.6 billion at 31 March 2016, being 140.6% of the minimum funding level and 98.5% of the long-term funding level.

Valuation methodology in respect of benefits accruing after the valuation date: future service liabilities

Projected unit method of funding

14. The future service contribution rate was calculated by estimating the additional liabilities expected to accrue over the 2 years following the valuation date, but allowing for future salary increases to the date of retirement (or earlier exit) and dividing by the present value of the pensionable emoluments expected over the ensuing 2 years. Allowance has been made for assumed future salary and pension increases, mortality and investment returns.

15. The objective of this funding method is that at the end of the 2 years the additional assets accumulated will equal the increase in the past service liabilities, if the valuation assumptions are borne out in practice.

16. This method of funding effectively assumes that the composition of the fund by age, salary and gender will remain relatively stable over the 2 years with withdrawals, deaths and retirements being replaced by younger new entrants. If the salary-weighted average age of the fund decreases (increases) then, all other things being equal, the future contribution rate will decrease (increase).

17. Under the attained age method of funding, which is typically used for a fund closed to new members, the recommended contribution will be greater than under the projected unit method. The rate determined using the attained age method does not increase as the existing membership ages, unless it is recalculated at consecutive valuation dates. The recommended minimum contribution rate is that using the projected unit method, but the employer may elect to pay a higher rate.

Death in service and funeral benefits: current cost

18. The accrued portions of the death in service spouses' and orphans' pension benefits have been valued as past service liabilities. The balance of these benefits and the lump sum death in service and funeral benefits are costed annually.

Administration and ad hoc expenses

19. We have made a current cost estimate of the fund's administration fees and expected ad hoc expenses for the purpose of determining the recommended employer contribution rate. The current cost estimate was based on actual fees and expenses paid during the last 2 years, expressed as a percentage of pensionable emoluments of all members over the same period.

BASES AND ASSUMPTIONS

Explanation of "best estimate" assumptions

20. The Financial Sector Conduct Authority (*"FSCA"*) issued PF Circular 117, which details the principles to be adopted in setting the valuation basis, especially for surplus apportionment valuations. Whilst the surplus legislation does not apply to the fund, the principles underlying this circular are accepted as best practice in South Africa and therefore should be considered. The circular also covers the use of "*best estimate*" assumptions.

21. The following are relevant extracts from the circular:

" 1. "Best estimate" assumptions

"Best estimate" assumptions should be used in the determination of the accrued liabilities and should be motivated with reference to the experience of the fund or similar funds or to statistics published or endorsed for use by the Actuarial Society of South Africa.

1.1. Subject to the exception in 4.1 below, the actuarial assumptions should be "best-estimate assumptions".

1.2. No deliberate margins of conservation should be included in the assumption.

1.3. The assumptions should be motivated by reference to any of the following:

- *the experience of the fund, taking into account of the size of the fund and underlying trends in that experience where the actuary deems it appropriate to do so;*
- *statistical evidence relating to*
    - *funds in general, or*
    - *relevant published annuitant or in-service mortality or morbidity, including the effect of HIV/AIDS, or*
    - *an investigation performed within a firm of valuators in respect of funds advised by that firm where that evidence may relate to demographic items or to economic items such as the equity premium; or*
- *yields on classes of government or corporate bonds which, in terms of the actuarial method used by the valuator, determine the discount or inflation rates assumed at the valuation date.*

The valuator should include the motivation in the report, and, should make a copy of any investigation used in this motivation available to the Registrar, upon request.

Published mortality and morbidity investigations will include investigations published by ASSA, the Institute, Faculty and Society of Actuaries, and any statutory or industry body in South Africa or in other jurisdictions where the experience may be similar to that in South Africa or may be adjusted to be so similar.

1.4. The use of "best-estimate" assumptions may result in a strengthening of the assumptions as used at the previous statutory actuarial valuation. This is acceptable provided it has been motivated as set out above."

The fund's best estimate assumptions

22. We have again adopted a "best estimate" assumption basis for this statutory actuarial valuation, as explained below. The assumptions used for the valuation of the fund as at the previous valuation date have been provided for comparison.

Valuation of assets

23. Assets have been valued at 100% of market or fair value. This is consistent with the assumptions used at the previous valuation date.

Valuation of liabilities

Net pre-retirement discount rate

24. For this valuation the investment return assumption (9.4%) was derived from the yield curve at the valuation date, taking into account the duration of the fund's active member liabilities. It was considered reasonable to apply the same yield to both the active members and pensioners as the impact of using different valuation bases was small.

25. The allocation of the fund's assets to equities is around 60%. The equity risk premium has been calculated as 3.0% x 60% = 1.8% per annum.

26. No allowance has been made for investment fees since it was assumed that the active return earned from active asset management will equal the investment fees charged.

27. The final assumption was 9.4% + 1.8% = 11.2% per annum.

28. The net pre-retirement rate was set at 12.5% per annum at the previous valuation date.

Expected future inflation

29. Expected future inflation was set with reference to conventional and inflation-linked bond yields, where:

Inflation = conventional bond yield - inflation-linked bond yield – inflation risk premium (0.5% per annum)

30. The inflation risk premium reflects that investors in conventional bonds will expect a higher prospective real return since their real return is less certain than an investor in inflation-linked bonds.

Therefore, the expected future inflation on 31 March 2018

= 9.4% -2.4% - 0.5%
= 6.5% per annum

31. The assumption in respect of expected future inflation was set at 8.3% per annum at the previous valuation date.

General salary escalation

32. On the basis of an Alexander Forbes Financial Services investigation into national salary experience, we have assumed that salaries increase at an average rate of 1% in excess of the increase in expected future inflation, i.e. at a rate of 7.5% per annum.

The best estimate financial assumptions are summarised in the table below:

	31 March 2016	31 March 2018
Yield on nominal bond of appropriate duration	10.7%	9.4%
Less yield on real bond	(1.9%)	(2.4%)
Less inflation risk premium	(0.5%)	(0.5%)
Long-term inflation	**8.3%**	**6.5%**
Pre-retirement		
Return on nominal bond	10.7%	9.4%
Equity risk premium	1.8%	1.8%
Net pre-retirement discount rate (A)	**12.5%**	**11.2%**
Long-term inflation	8.3%	6.5%
Excess over inflation	1.0%	1.0%
Salary inflation (B)	**9.3%**	**7.5%**
Real pre-retirement discount rate [(1+A)/(1+B)-1]	**2.93%**	**3.44%**
Post-retirement		
Long-term investment return (A)	12.5%	11.2%
Pension increases (C)	6.6%	5.2%
Net post-retirement discount rate [(1+A)/(1+C)-1]	**5.53%**	**5.70%**

Promotional salary increases

33. In addition, the impact of merit or promotional salary increases is taken into account based on the following table:

Age	Services	Other
20	3.6%	5.4%
25	3.6%	5.4%
30	3.0%	4.0%
35	2.9%	2.8%
40	2.0%	2.1%
45	1.4%	1.7%
50	1.3%	1.5%
55	1.3%	1.4%

34. The assumptions detailed above are consistent with those used at the previous valuation date.

Net post-retirement discount rate

35. The trustees have adopted a formal pension increase policy in order to give effect to section 25 of the GEP Law and GEPF rule 23, to establish the pension increase that is affordable and to guide the trustees in their determination of the annual pension increase. According to rule 23, the fund aims to grant minimum pension increases, if affordable, of 75% of inflation subject to a minimum pension of 75% of the original pension increases with full inflation. We have assumed that this is equal to an average provision for pension increases of 80% of the assumed increase in price inflation, as pensioners who reach the minimum of 75% of their original pension plus full inflation must get full inflationary increases thereafter.

36. Given that the inflation assumption is set at 6.5% per annum, this implies that pension increases of 5.2% per annum are targeted by the pension increases policy. It would therefore be appropriate to use a net post-retirement discount rate of 5.7% per annum (1.112 / 1.052 -1) at the valuation date.

37. The net post-retirement discount rate adopted by the trustees in the previous valuation was 5.53% per annum.

38. We are satisfied as to the reasonable expectation that the targeted pension increases are sustainable in light of the assumptions used and the investment strategy adopted.

Results on alternative "bond based approach":

39. The FSCA now requires, in terms of the PF Notice No. 2 of 2016, the Notice on Financial Soundness, 2016, that where a fund uses the "risk premium approach" for a valuation, it must also show the results on the more conservative "bond based approach".

40. Whilst the fund is not subject to the requirements of the Pension Funds Act, 1956 and the notices thereto, we have considered the notice thereto, we have considered the intention behind the notice and the implications that it may have on the fund, were the fund to comply with the notice or fall under the ambit of the Act.

41. In terms of the bond based approach, the appropriate pre-retirement rate would be the return on long term bonds of appropriate duration, being 9.4% as at 31 March 2018.

42. The expected future inflation assumption is then set by subtracting the effective yield on inflation-linked bonds of the same duration from the yield on long term bonds of the same duration, and allowing for an inflation risk premium (0.5%). The expected future inflation assumption would therefore be 6.5% per annum (9.4% -2.4% - 0.5%). The expected salary increase assumption, before merit salary increase, would therefore be 7.5% per annum (6.5% + 1.0%), and the net pre-retirement discount rate 1.77% (1.094 / 1.075 – 1).

43. In terms of the bond based approach, the appropriate post-retirement rate would be the return on long term bonds of appropriate duration at the valuation date, being 9.4% as at 31 March 2018, over the pension increase target of 80.0% of inflation - so (1.094 / 1.052) - 1 = 4.0%.

44. The comparative valuation results would be:

Valuation approach	Assets R'm	Liabilities R'm	Minimum Funding level
Risk premium approach	1 800 068	1 662 640	108.3%
Bond based approach	1 800 068	2 157 193	83.4%

Pre-retirement mortality

45. We propose to retain the assumptions used in the previous valuation. A sample of the independent decrement rates used is provided in the table below:

Age	Male Services	Female Services	Male Other	Female Other
20	0.09%	0.14%	0.08%	0.12%
25	0.23%	0.15%	0.13%	0.17%
30	0.38%	0.16%	0.22%	0.20%
35	0.47%	0.17%	0.32%	0.22%
40	0.54%	0.17%	0.41%	0.22%
45	0.59%	0.21%	0.51%	0.23%
50	0.69%	0.27%	0.63%	0.27%
55	0.84%	0.32%	0.83%	0.33%
60	1.01%	0.37%	1.06%	0.40%
65	1.20%	0.45%	1.27%	0.49%

46. In terms of APN 206, detailed allowance for the effect of HIV/AIDS morbidity and mortality should be included in a valuation where there is adequate information to facilitate modelling the effect of the epidemic on membership and where the cost of such an approach can be justified. There is not adequate information available for fund members, and the cost of the investigation is not believed to be justified. No direct allowance has therefore been included for the effect of HIV/AIDS on the liabilities of fund members, although the trustees should be aware that the contribution in respect of

unapproved lump sum death benefits could increase in the future as a result of the impact of HIV/AIDS.

Post-retirement mortality

47. We propose to retain the assumptions used in the previous valuation. A sample of the independent decrement rates used is provided in the table below:

Age	Males	Females
50	2.24%	1.20%
55	2.24%	1.18%
60	2.26%	1.27%
65	2.28%	1.56%
70	3.24%	2.19%
75	4.85%	3.37%
80	7.44%	5.46%
85	12.01%	8.97%
90	18.60%	14.59%

Withdrawal

48. Consistent with previous valuations, no allowance was made for exiting the fund, other than by way of death or retirement.

Ill-health retirement rates

49. We propose to retain the assumptions used in the previous valuation. A sample of the independent decrement rates used is provided in the table below:

Age	Male Services	Female Services	Male Other	Female Other
20	0.00%	0.00%	0.00%	0.00%
25	0.01%	0.00%	0.00%	0.00%
30	0.01%	0.01%	0.00%	0.00%
35	0.06%	0.05%	0.02%	0.02%
40	0.13%	0.11%	0.05%	0.05%
45	0.24%	0.22%	0.09%	0.08%
50	0.41%	0.40%	0.17%	0.14%
55	0.73%	0.61%	0.30%	0.27%
60	0.89%	0.51%	0.28%	0.26%
65	0.00%	0.00%	0.00%	0.00%

Retirement rates (in good health)

50. We propose to retain the assumptions used in the previous valuation. A sample of the independent decrement rates used is provided in the table below:

Age	Male Services	Female Services	Male Other	Female Other
55	8.83%	8.83%	1.75%	2.62%
56	3.01%	3.01%	1.75%	2.62%
57	2.84%	2.84%	1.72%	2.48%
58	2.67%	2.67%	1.91%	2.55%
59	5.33%	5.33%	2.05%	2.70%
60	80.77%	80.77%	13.49%	19.86%
61	20.15%	20.15%	8.16%	13.66%
62	20.15%	20.15%	7.85%	12.46%
63	20.15%	20.15%	7.45%	12.03%
64	20.15%	20.15%	12.05%	12.20%
65	37.74%	37.74%	78.62%	82.74%

Spouse's age difference

51. We have assumed that husbands are 4 years older than their wives. This is consistent with the assumption used at the previous valuation date.

Proportion married

52. We propose to retain the assumptions used in the previous valuation. These assumptions are provided in the table below:

Age	Proportion married
20	25.0%
25	32.5%
30	46.0%
35	65.00
40	80.0%
45	92.5%
50	97.5%
55	97.5%
60+	97.5%

Commutation

53. On retirement, a gratuity is payable on top of the pension benefit. No commutation of the pension is therefore allowed.

Orphans' / Children's pensions

54. For current active members, an implicit allowance has been made in the valuation for the liability in respect of contingent future children's pensions by assuming a spouse's pension of 54% instead of 50%. For current pensioners, the actual current orphans' pensions were valued until age 22, and the resulting liability multiplied by 3.

Solvency reserving basis

55. Historically an asset-liability matching ("*ALM*") approach has been used for calculating solvency reserves. Alternative approaches, such as the discontinuance matching strategy and bond basis approach, are permissible.

ALM approach

56. The level of the solvency reserve that could be established in the fund as a buffer against investment volatility has been determined by the asset consultants, Riscura, using an ALM basis. This approach has been used in each valuation of the fund since 2006.

57. In setting the reserve, a value-at-risk measure of a 10% probability of becoming insolvent over a three-year time horizon was used.

58. Using this approach the solvency reserve at the valuation date was determined as R402 billion.

Discontinuance matching strategy

59. The FSCA's PF Circular 117 outlines an alternative basis for setting up solvency reserves within funds. The discontinuance matching approach allows for a 0.5% reduction in the pre- and post-retirement discount rates for the reasonable cost of implementing and maintaining a matched investment strategy.

60. The solvency reserve has been calculated as the difference between:

- the past service liabilities calculated on the assumption that the fund has implemented a matched investment strategy; and
- the past service liabilities calculated on the best estimate valuation basis.

61. In effect, the solvency reserve represents the difference in past service liabilities on a conservative basis and the liabilities on a realistic basis.

62. At the valuation date, index-linked bonds were trading at an average yield of 2.4%. The average yield on long dated nominal bonds at this date was 9.4%.

63. The maximum allowance for future inflation when determining the solvency reserve is the difference between the nominal and index-linked bond yields, i.e. 9.4% - 2.4% = 7.0%.

64. For the purpose of the above calculations, the yields were estimated from the yield curve at the valuation date, taking consideration of the fund's active member and pensioner liabilities.

65. The solvency basis so derived is set out below:

	31 March 2016	31 March 2018
Yield on nominal bond of appropriate duration	10.7%	9.4%
Less yield on real bond	(1.9%)	(2.4%)
Less inflation risk premium	-	-
Long-term inflation	**8.8%**	**7.0%**
Pre-retirement		
Return on nominal bond	10.7%	9.4%
Equity risk premium	-	-
Cost of implementing and maintaining matching strategy	(0.5%)	(0.5%)
Net pre-retirement discount rate (A)	**10.2%**	**8.9%**
Long-term inflation	8.8%	7.0%
Excess over inflation *	(1.7%)	(1.2%)
Salary inflation (B)	**7.1%**	**5.8%**
Real pre-retirement discount rate [(1+A)/(1+B)-1]	**2.89%**	**2.93%**
Post-retirement		
Long-term investment return (A)	10.2%	8.9%
Pension increases (C)	7.0%	5.6%
Net post-retirement discount rate [(1+A)/(1+C)-1]	**2.99%**	**3.13%**

* The real salary increase in excess of inflation has been set at a level that ensure a 1.0% net pre-retirement discount rate at age 40, after factoring in the *Other* members' promotional salary scale. This is an artificial limitation on the solvency reserve in accordance with PF 117. Should the rate not be limited in this manner, the discontinuance matched approach would yield a far higher reserve than is calculated based on the above.

66. On the discontinuance matching method, the solvency reserve amounts to R482 186 million.

Bond basis

67. The bond basis is essentially the discontinuance matching approach, but the prescribed basis is typically weaker as an assumption regarding an inflation risk premium is permitted in terms of the bond basis. Note, however, that the discontinuance matched approach described above has an artificial limitation on the strength of the basis, and as a result the liability on the bond basis may be higher than on the discontinuance matched approach.

68. We have retained the 0.5% inflation risk premium used in the best estimate basis. We believe that this is reasonable and would ensure consistency in calculation over subsequent valuations if the same inflation risk premium is used in both calculations. The only difference between the bond basis and the best estimate basis is the equity risk premium that is used in the best estimate basis.

APPENDIX 5: ANALYSIS OF CHANGE IN FINANCIAL POSITION

1. The valuation of the fund as at 31 March 2018 disclosed excess assets of R137 428 million on the best estimate valuation basis over the minimum funding basis liabilities. The previous valuation at 31 March 2016 revealed excess assets of R22 747 million. The overall change in financial position during the valuation period was therefore a deterioration of R85 318.

2. The analysis of the change in financial position is summarised below and discussed in further detail thereafter.

Change in financial position	R'm
Excess assets at 31 March 2016	**222 746**
Interest on surplus at previous valuation	59 167
Investment income	(225 163)
Withdrawals	3 195
Pensioner mortality experience	5 472
Deaths in service	(6 275)
Retirements	(6 230)
Salary increases	25 944
Benefit improvements	(11 715)
Contribution shortfall	(13 654)
Pension increases	2 145
Expenses	(72)
Change in S-Case provision	391
Change in valuation basis	81 468
Miscellaneous items	9
Surplus at 31 March 2018	**137 428**

Interest on excess assets at 31 March 2016

3. At 31 March 2016 the fund reflected excess assets of R222 747 million. With interest at the previous valuation rate of 12.5% per annum to 31 March 2018, the surplus would have been R281 914 million. This implies an increase in the excess assets of some R59 167 million.

Investment income

4. It was assumed that the assets of the fund would earn 12.5% per annum. Over the valuation period the fund earned approximately 6.49% per annum on the market value of assets. This resulted in a substantial strain of R225 163 million.

Withdrawals

5. On withdrawal, members are paid their Actuarial Interest based on a set of factors derived from the valuation results at a previous valuation date. The smoothing of the Actuarial Interest factors, to ensure consistency in the accrual of benefits from one age to the next, will result in a profit,

particularly at the younger ages, where the valuation liabilities includes promotional increases in salaries to a greater extent than the Actuarial Interest factors. A release of R3 195 million occurred.

Pensioner mortality experience

6. More pensioners died than expected over the valuation period, causing a release of some R5 472 million. The experience of the pensioners should be investigated as part of the next demographic investigation and if it is found that the mortality assumptions need to be adjusted to reflect a different underlying experience in the Fund, it should be considered at that time.

Deaths in service

7. A strain arose due the excess of the death benefits paid over the liability values being held in respect of those deaths exceeding the release due to the lower than expected number of deaths. We suspect, however, that the number of deaths was understated, which could mean that the strain was actually higher.

Retirements

8. A strain arose due the excess of the retirement benefits paid over the liability values being held in respect of those members who retired.

Salary increases

9. Actual salary increases granted during the valuation period, for members who were present at both valuation dates, averaged 9.4% per annum and were lower than the 10.7% per annum salary increases anticipated by the previous valuation assumptions. This resulted in a release of R25 944 million.

Benefit improvements

10. The increase in the funeral benefit (R 1 180 million) and the introduction of children's pensions (R10 535 million) resulted in a greater liability for future benefit payments.

Contribution shortfall

11. The contributions paid into the fund were lower than those required to fund the benefits accruing over the valuation period. This resulted in a strain of R13 654 million.

Pension increases

12. Pension increases of approximately 6.0% per annum on average were granted during the valuation period, whereas the valuation basis made allowance for increases of approximately 6.6% per annum. This led to a release of approximately R2 145 million.

Expenses

13. The previous valuation assumed that administration expenses would be approximately 0.3% of active member pensionable emoluments per annum. A strain of R72 million arose due to the fact that expenses were slightly higher than assumed.

Change in S-Case provision

14. A comparison of the S-case provision with what was expected based on a build-up from the previous valuation resulted in a release.

Change in valuation basis

15. This item relates to changes in the economic assumptions used in the valuation. Both the real pre-retirement discount rate and the net post-retirement discount rate were increased. The combined effect was a reduction in liabilities of some R81 468 million.

Miscellaneous items

16. There are various items of profits and strains produced by other miscellaneous sources, including membership movements and data changes. These items have not been quantified separately, but in total produce a release of some R9 million.

APPENDIX 6: LIABILITIES AND RESERVES

Data reserve

1. Following an analysis of the data received for the valuation we would recommend that the data reserve for members be maintained in line with the practice applied in previous valuations.

2. A data reserve of 0.75% of the active member liability, or some R8 785 million, has been held at the valuation date. This is consistent with the approach used in the previous valuation.

Discriminatory practices reserve

3. We have maintained the reserve in respect of previous discriminatory practices, being the accumulated value of 1% of the funding level in 1998.

4. The value of this reserve, as per the fund's financial statements, was R8 923 million at the valuation date. The change in the value of the reserve is shown in the table below:

Discriminatory practices reserve (Rmillions)	Other Past discriminatory practices reserve	General assistants reserve	Ciskei strikers reserve	Total
Opening balance (as at 31 March 2016)	**7 588**	**107**	**-**	**7 695**
Plus: Investment returns	-	-	-	-
Plus: Transfer from net investment return to reserves	312	8	9	330
Less: Benefits paid	-	-	(9)	(9)
Balance (as at 31 March 2017)	**7 900**	**115**	**-**	**8 015**
Plus: Investment returns	-	-	-	-
Plus: Transfer from net investment return to reserves	739	9	11	759
Less: Benefits paid	-	-	(11)	(11)
Closing balance	**8 639**	**124**	**-**	**8 763**

5. The sum of the above reserve accounts amounts to R8 763 million, differing from the financial statements by R160.8 million (the Ciskei Striker's Reserve as reflected in the financial statements). To date, the Fund has at the point of paying a benefit to an exiting member impacted by the Ciskei Strike, debited the reserve account to reflect the additional benefit paid. In practice, members have already been credited in full with the additional service and in order to be consistent with the liability (which reflects the full service), this portion of the reserve account should be released.

Mortality improvement reserve

6. Significant improvements in mortality have been observed internationally and it is likely that we will follow a similar pattern in South Africa. The improvements in the mortality rates at older ages are attributable to advances in science, medicine and living conditions. It is appropriate to include an explicit allowance for mortality improvements in this valuation as was done in the previous valuation.

Mortality improvements for active members

7. In order to make allowance for future mortality improvements, we have assumed post-retirement mortality rates for active members in line with the best estimate basis, but rated down two and a half years (i.e. we have assumed that a future pensioner is two and a half years younger that their actual age, which allows for a longer expected lifetime). This allowance for post-retirement mortality improvements amounted to R32 841 million at the valuation date.

Mortality improvements for current pensioners

8. We have assumed mortality rates for active members in line with the best estimate basis, but rated down one and a half year (i.e. we have assumed that a pensioner is one and a half year younger that their actual age). This allowance for mortality improvements amounted to R15 418 million at the valuation date.

100% CPI pension increase reserve

9. The trustees of the fund have decided to set up an explicit reserve to enable them to exercise greater discretion in granting future pension increases in line with inflation. Based on the pension increase policy of the fund, the valuation basis allows for pension increases of 80% of CPI (being the targeted increase of 75% of CPI plus a margin for the purchasing power catch-up needed to ensure that 75% of the original pension maintains 100% of CPI increases).

10. The pension increase reserve has been established to provide for the possibility of granting pension increases at 100% of CPI. Separate reserves provide for the increase in the active member and pensioner liabilities and the present value of the increase in contribution rates that would be required for future pension increases of 100% at CPI. Establishing an explicit reserve allows the trustees to target this level of increase without changing the valuation basis, which assumes a pension increase target if 80% of CPI.

11. The 100% CPI pension increase reserve amounted to R270 634 million at the valuation date and is made up as follows:

100% CPI pension increase reserve	R'm
Active members	111 360
Pensioners	50 523
Future service contribution rate	108 751
Total	**270 634**

Solvency reserve

Solvency reserve for reporting purposes (ALM approach)

12. As noted in section 6 of the main report, the solvency reserve has been based on an asset-liability approach using the solvency reserve calculated by Riscura, and this is again the approach recommended for this valuation. The recommended reserve at the valuation date was R402 billion (R301.58 billion at 31 March 2016).

Solvency reserve based on the discontinuance matching (DCM) strategy approach

13. Using this approach instead, the recommended solvency reserve would be as follows:

Solvency reserve (DCM)	31 March 2016 R'm	31 March 2018 R'm
Active members (including S-cases)	254 542	363 430
Pensioners (including deferreds)	88 407	118 756
Total	**342 949**	**482 186**

Solvency reserve based on the bond basis approach

14. Using this approach instead, the recommended solvency reserve would be as follows:

Solvency reserve (Bond Basis)	31 March 2016 R'm	31 March 2018 R'm
Active members (including S-cases)	377 542	420 560
Pensioners (including deferreds)	55 041	73 993
Total	**432 583**	**494 553**

Comparison of the different solvency reserve approaches

15. A comparison of the results under the different approaches is provided below:

Solvency reserve	ALM R'm	DCM R'm	Bond basis R'm
Active members (including S-cases)	not provided*	363 430	420 560
Pensioners (including deferreds)	not provided*	118 756	73 993
Total	**402 000**	**482 186**	**494 553**

**The ALM approach does not provide a split of the solvency reserve between active members and pensioners.*

Summary of contingency reserves

16. The table below provides a summary of the recommended reserves and the amounts held at the current and previous valuation dates:

Contingency reserve accounts	31 March 2016 Recommended R'm	31 March 2016 Held R'm	31 March 2018 Recommended R'm	31 March 2018 Held R'm
Fully funded and considered part of the minimum funding level:				
Data reserve	7 724	7 724	8 785	8 785
Discriminatory practices reserve	7 695	7 695	8 763	8 763
Fully funded reserves	**15 419**	**15 419**	**17 548**	**17 548**
Funded to the level affordable and considered part of the long-term funding level:				
Mortality improvement reserve	41 340	14 231	48 259	8 279
100% CPI pension increase reserve	304 127	104 697	270 634	46 428
Solvency reserve	301 581	103 819	402 000	82 721
Partially funded reserves	**647 048**	**222 747**	**720 893**	**137 428**
Combined reserves	**662 467**	**238 166**	**738 441**	**154 976**

17. As can be seen from the table above, the Data Reserve and the Discriminatory Practices Reserve have been funded in full whilst the rest have been funded to the extent affordable, that is 19.1% as at the valuation date (some 34.4% at the previous valuation).

18. I am satisfied that:

- the balance of the contingency reserves is not greater than that which is reasonably required in terms of the contingency in respect of which the accounts have been established; and
- the overall amount set aside in contingency reserve accounts is not unreasonable.

APPENDIX 7: SENSITIVITY ANALYSIS

The fund's liabilities have been calculated on best estimate assumptions. The effect of a 1% change in the main assumptions on the financial position and the required contribution rate is illustrated below:

Minimum funding level

Assumption	-1%	Central	+1%
Investment return	94.0%	108.3%	123.6%
Salary increases	114.9%	108.3%	101.6%
Pension increases	115.7%	108.3%	101.0%

Required contribution rate

Assumption	-1%	Central	+1%
Investment return	19.2%	15.2%	12.1%
Salary increases	13.1%	15.2%	17.7%
Pension increases	14.1%	15.2%	16.5%

APPENDIX 8: ACTUARIAL INTEREST FACTORS

The actuarial interest factors have been updated to reflect the revised results of the statutory actuarial valuation of the fund as at 31 March 2018. In particular the change in basis since the previous valuation date warrants the need for a new set of actuarial interest factors. The relevant factors are set out in the tables below.

F(Z) factors applicable to members under the age of 55 years

Age	Current (from the 2014 valuation)		Proposed	
	Services	Other	Services	Other
20	0.2251	0.1677	0.2097	0.2042
21	0.2252	0.1686	0.2097	0.2045
22	0.2254	0.1694	0.2097	0.2055
23	0.2255	0.1702	0.2097	0.2062
24	0.2257	0.1719	0.2099	0.2061
25	0.2259	0.1735	0.2097	0.2061
26	0.226	0.1752	0.2099	0.2061
27	0.2262	0.1768	0.2101	0.2059
28	0.2264	0.1785	0.2104	0.2057
29	0.2268	0.1801	0.2105	0.2054
30	0.2271	0.1818	0.2109	0.2051
31	0.2275	0.1834	0.2113	0.2048
32	0.2279	0.1851	0.2116	0.2044
33	0.2282	0.1873	0.2117	0.2041
34	0.2286	0.1895	0.2119	0.2037
35	0.2291	0.1917	0.2119	0.2034
36	0.2296	0.1939	0.2117	0.2030
37	0.2301	0.1961	0.2116	0.2027
38	0.2308	0.1983	0.2113	0.2026
39	0.2316	0.2005	0.2113	0.2031
40	0.2323	0.2027	0.2112	0.2036
41	0.2331	0.2062	0.2119	0.2043
42	0.2339	0.208	0.2129	0.2052
43	0.2348	0.2102	0.2140	0.2063
44	0.2366	0.2125	0.2156	0.2074
45	0.2385	0.215	0.2177	0.2089
46	0.2406	0.2176	0.2198	0.2104
47	0.2432	0.2204	0.2221	0.2121
48	0.2458	0.2233	0.2243	0.2138
49	0.2485	0.2263	0.2266	0.2157
50	0.2514	0.2294	0.2290	0.2177
51	0.2545	0.2331	0.2317	0.2197
52	0.2575	0.2369	0.2344	0.2218
53	0.261	0.241	0.2373	0.2241
54	0.2662	0.2451	0.2402	0.2266

A(X) factors applicable to members age 55 years and older

Age	Current (from the 2014 valuation)		Proposed	
	Services	Other	Services	Other
55	13.703	12.3302	14.3131	13.2402
56	13.5063	12.1524	14.0531	13.0978
57	13.1791	12.0555	13.7860	12.9467
58	12.8107	11.9641	13.5118	12.7865
59	12.467	11.7526	13.2303	12.6168
60	12.0244	11.5293	12.9415	12.4376
61	12.0484	11.8003	12.6454	12.2484
62	12.0728	11.9488	12.3422	12.0493
63	11.9756	11.9136	12.0326	11.8407
64	11.8137	11.7826	11.7172	11.6230
65	11.6517	11.6517	11.3961	11.3961
66	11.4185	11.4185	11.1602	11.1602
67	11.1792	11.1792	10.9180	10.9180
68	10.9343	10.9343	10.6700	10.6700
69	10.6852	10.6852	10.4164	10.4164
70	10.4312	10.4312	10.1574	10.1574
71	10.1745	10.1745	9.8935	9.8935
72	9.9148	9.9148	9.6256	9.6256
73	9.652	9.652	9.3546	9.3546
74	9.3874	9.3874	9.0809	9.0809
75	9.1217	9.1217	8.8055	8.8055
76	8.8568	8.8568	8.5296	8.5296
77	8.5939	8.5939	8.2538	8.2538
78	8.3336	8.3336	7.9790	7.9790
79	8.0772	8.0772	7.7067	7.7067
80	7.8259	7.8259	7.4396	7.4396

These actuarial interest factors are discussed in a separate report ***("Actuarial interest factors following the 31 March 2018 valuation"***) accompanying this statutory actuarial valuation.

Once these factors have been approved by the trustees, following any required consultation process, they should be used for the calculation of the appropriate benefit payments.

APPENDIX 9: VALUATION OF PENSIONER LIABILITIES ON AN ALTERNATIVE BASIS

1. The valuation basis agreed to by the trustees is a combination of the technically correct separate bases for the active and pensioner members, based on their own calculated liability durations.

2. We were also requested to show the pensioner liabilities using the pensioner only basis. The difference between the assumptions is as follows:

	Combined basis	Pensioner only basis
Yield on nominal bond of appropriate duration	9.40%	8.90%
Less yield on real bond	(2.40%)	(2.30%)
Less inflation risk premium	(0.50%)	(0.50%)
Long-term inflation	**6.50%**	**6.10%**
Pre-retirement		
Return on nominal bond	9.40%	8.90%
Equity risk premium	1.80%	1.80%
Net pre-retirement discount rate (A)	**11.20%**	**10.70%**
Long-term inflation	6.50%	6.10%
Excess over inflation	1.00%	1.00%
Salary inflation (B)	**7.50%**	**7.10%**
Real pre-retirement discount rate [(1+A)/(1+B)-1]	**3.44%**	**3.36%**
Post-retirement		
Long-term investment return (A)	11.20%	10.70%
Pension increases (C)	5.20%	4.90%
Net post-retirement discount rate [(1+A)/(1+C)-1]	**5.70%**	**5.53%**

3. The impact on the pensioner liabilities would be as follows:

Pensioner liabilities	Combined basis R'm	Pensioner only basis R'm
Male pensioners	168 859	180 012
Female pensioner	181 220	193 006
Widows	9 157	77 952
Widowers	72 626	9 780
Orphans/children	75	77
Late adjustment	19 550	19 550
Total	**451 487**	**480 377**

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