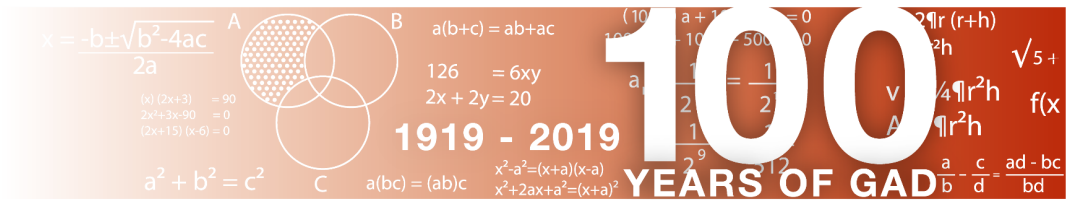




Government
Actuary's
Department



Local Government Pension Scheme Scotland

**Review of the actuarial valuations of funds as at 31 March 2017
pursuant to Section 13 of the Public Service Pensions Act 2013**

Appendices

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Appendix A: Compliance

A.1 In this appendix we set out checks we conducted to determine whether the actuarial valuations of the Local Government Pension Scheme (Scotland) ('LGPS S') funds have been completed in accordance with the scheme regulations.

Statement of Compliance

A.2 GAD selected one fund as a representative example from each of the firms of actuarial advisors. The following statements of compliance were contained within the chosen reports by each firm:

Table A1: Statement of Compliance

Fund	Statement of Compliance
North East Scotland (Mercer)	This report is addressed to the Administering Authority of the North East Scotland Pension Fund ("the Administering Authority") and is provided to meet the requirements of Regulation 60 of the Local Government Pension Scheme (Scotland) Regulations 2014 (as amended) ("the Regulations").
Strathclyde Pension Fund No 1 (Hymans Robertson)	Glasgow City Council ("the Administering Authority") has commissioned us to carry out a formal actuarial valuation of the Strathclyde Pension Fund No 1 Fund ("the Fund") as at 31 March 2017 to fulfil their obligations under Regulation 60 of The Local Government Pension Scheme (Scotland) Regulations 2014 ("the Regulations").
Tayside (Barnett Waddingham)	In accordance with Regulation 60 of the Local Government Pension Scheme (Scotland) Regulations 2014 (as amended) (the Regulations), we have been asked by Dundee City Council to prepare an actuarial valuation of the Tayside Pension Fund (the Fund) as at 31 March 2017 as part of their role as the Administering Authority to the Fund.

Compliance with valuation regulations

Actuarial Valuation Reports Regulation 60 (1 - 2)

A.3 Regulation 60 (1) requires the administering authority to obtain an actuarial valuation report on the assets and liabilities of each of its pension funds, including a rates and adjustments certificate, as at 31st March 2017 and on 31st March in every subsequent valuation year. Regulation 60 (2) requires that the above documents be obtained by the first anniversary of the date at which the valuation is made, namely, 31 March 2018 in the case of the 2017 valuation.

Publication

A.4 Each chosen fund was published in accordance with regulations. The following table sets out dates of publication of the actuarial report.

Table A2: Publication Date

Fund	Publication Date
North East Scotland (Mercer)	28 March 2018
Strathclyde Pension Fund No 1	29 March 2018
Tayside (Barnett Waddingham)	28 March 2018

Demographic Assumptions

A.5 Regulation 60 (3) states that the actuarial valuation report must contain a statement of the demographic assumptions that have been used in the valuation and must show how these assumptions reflect the experience that has actually occurred during the period since the last valuation. Each valuation report contains a section on demographic assumptions. The following table lists the demographic assumption that one may expect in an actuarial valuation report and indicates which reports provided this assumption.

Table A3: Demographic Assumptions

Demographic	North East Scotland (Mercer)	Strathclyde Pension Fund No 1 (Hymans Robertson)	Tayside (Barnett Waddingham)
Pre-retirement mortality	✓	✓	✓
Post-retirement mortality	✓	✓	✓
Dependant mortality	✓	✓	✓
Ill health retirement	✓	✓	✓
Normal health retirements	✓	✓	✓
Withdrawal	✓	✓	✓
Family details (partners and dependants)	✓	✓	✓
50:50 option take-up	✓	✓	✓
Commutation	✓	✓	✓

Local Experience

- A.6 The regulation requires that the reports “must *show how* the assumptions relate to the events which have actually occurred in relation to members of the Scheme since the last valuation.” Most reports have *stated that* the assumptions have been updated to reflect experience. All funds have shown differences between expectations and experiences for the inter-valuation period, and the impact of these differences on the funding position. We note that this information may be contained in supporting (non-public) reports/advice.

Contribution Rates

- A.7 Regulation 60 sets out that employer contributions are separated into two components: primary rates which meet the cost of ongoing accrual for current active members and secondary rates, which are mainly established to repay deficit or eliminate surplus over a given period (the deficit/surplus recovery period).
- A.8 Regulation 60 (6) states that when setting the contribution rates the actuary must have regard to—
- the existing and prospective liabilities arising from circumstances common to all those bodies,
 - the *desirability* of maintaining as nearly constant a common rate as possible,
 - the current version of the administering authority’s funding strategy mentioned in regulation 56 (funding strategy statements), and
 - the *requirement* to secure the solvency of the pension fund and the long-term cost efficiency of the Scheme, so far as relating to the pension fund.
- A.9 Regulation 60 (4) states that the rates and adjustments certificate must specify both the primary rate of the employer’s contribution and the secondary rate of the employer’s contribution, for each year of the period of three years beginning with 1st April in the year following that in which the valuation date falls.
- A.10 Each valuation report must set out Primary and Secondary employer contribution rates.

Primary Rates

- A.11 Regulation 60 (5) defines the primary rate of an employer’s contribution as “the amount in respect of the cost of future accruals which, in the actuary’s opinion, should be paid to a fund by all bodies whose employees contribute to it so as to secure its solvency”, and specifies that this must be expressed as a percentage of the pay of their employees who are active members.
- A.12 The following table shows the primary rate of employer contribution for each administering authority’s whole fund:

Table A5: Primary Contribution Rates

Fund	Primary rate of Employer Contribution
North East Scotland (Mercer)	22.0%
Strathclyde Pension Fund No 1 (Hymans Robertson)	27.1%
Tayside (Barnett Waddingham)	21.5%

- A.13 Each primary rate of employer contribution has been calculated to cover the cost of future benefits accrued by their employees. Each valuation also provides a breakdown of the primary rate for each employer.

Secondary Rates

- A.14 Regulation 60 (7) states that the secondary contribution rate may be expressed as either a percentage or a monetary amount. Each valuation provides a secondary rate for each employer (expressed as a cash amount and/or percentage of pay for each employer). The secondary rates of employer contributions for each valuation have been defined to be adjustments to the primary rate as required. In all cases, the secondary rates have been provided for the next three years for each employer.

The following table shows the primary and secondary rates for all the funds (except Scottish Homes), together with the actual pensionable payroll at the valuation date 31 March 2017.

Table A6: Whole Fund Primary and Secondary Contribution Rates

Fund	Actuary	Primary Contribution Rate	Secondary Contribution Rate			Actual pensionable payroll as at 31/3/17
			2018/19	2019/20	2020/21	£m
Strathclyde No 1 Fund	Hymans Robertson	27.10%	-7.50%	-7.50%	-7.50%	1,924
Lothian	Hymans Robertson	31.80%	-£76m	-£76m	-£75m	669
North East Scotland	Mercer	22.00%	-2.6%	-2.6%	-2.6%	472
Tayside	Barnett Waddingham	21.50%	-4.4% -£19m	-4.4% -£19m	-4.4% -£20m	409
Fife Council	Hymans Robertson	20.50%	+£11m	+£11m	+£12m	292
Falkirk Council	Hymans Robertson	18.70%	+£8.5m	+£10m	+£12m	287
The Highland Council	Hymans Robertson	17.80%	+£4m	+£4m	+£4m	205

Fund	Actuary	Primary Contribution Rate	Secondary Contribution Rate			Actual pensionable payroll as at 31/3/17
			2018/19	2019/20	2020/21	£m
Dumfries and Galloway Council	Hymans Robertson	21.80%	-£99k	-£102k	-£105k	92
Scottish Borders Council	Barnett Waddingham	20.60%	-2.6%	-2.6%	-2.6%	75
Shetland Islands Council	Hymans Robertson	22.10%	-1.5%	-1.5%	-1.5%	61
Orkney Islands Council	Hymans Robertson	20.70%	-2.5%	-3.1%	-3.7%	37
Strathclyde No 3 Fund	Hymans Robertson	53.30%	-53.3%	-53.3%	-53.3%	3
Aberdeen City Council Transport Fund	Mercer	58.50%	-25.5%	-25.5%	-25.5%	2

Rates and Adjustments Certificate Regulation 60 (8)

A.15 Regulation 60 (8) states that the rates and adjustments certificate must contain a statement of the assumptions on which the certificate is given as respects— (a) the number of members who will become entitled to payment of pensions under the provisions of the Scheme; and (b) the amount of the liabilities arising in respect of such members, during the period covered by the certificate.

A.16 In the following table we set out where the assumptions for each valuation can be found.

Table A7: Location of assumptions

Fund	Statement in Rates and Adjustments Certificate	Location of assumptions in Valuation Report
North East Scotland (Mercer)	✓	Appendix A
Strathclyde Pension Fund No 1 (Hymans Robertson)	✓	Appendix C
Tayside (Barnett Waddingham)	✓	Appendix 2

A.17 All three Rates and Adjustments Certificates do contain a statement detailing the assumptions on which the certificate has been given and where to find them.

Regulation 60 (9)

- A.18 Regulation 60 (9) States that the administering authority must provide the actuary preparing a valuation or a rates and adjustments certificate with the consolidated revenue account of the fund and such other information as the actuary requests.
- A.19 Each valuation shows evidence of having received relevant data from the administering authority, including cash flows for the years 2015, 2016 and 2017.

Appendix B: Consistency

B.1 In this appendix we set out analysis we undertook in relation to whether the actuarial valuations were carried out in a way which is not inconsistent with other valuations completed under the scheme regulations. This appendix contains comments on the key information contained in valuation reports, which feeds into our comments on presidential consistency.

Key Information

B.2 Based on one report from each actuarial firm, table B1 sets out the outcomes for key information that we would expect to see in each valuation.

Table B1: Key Information

Demographic	Tayside (Barnett Waddingham)	Strathclyde Pension Fund No 1 (Hymans Robertson)	North East Scotland (Mercer)
Funding Level (assets/liabilities)	107%	105%	107%
Market Value of Assets	£3.2b*	£19.7b	£3.8b
Value of Liabilities	£2.9b	£18.8b	£3.6b
Surplus (Deficit)	£0.2b	£0.9b	£0.2b
Deficit Recovery End Point	N/A	N/A	2034**
Primary Contribution Rate (average for the fund)	21.5%	27.1%	22.0%
Secondary Contribution Rate (average for the fund)	-4.4%	-7.5%	-2.6%
Employee Contribution Rate	6.1%	Not given	6.1%
Discount Rate(s)	4.5%	3.7%***	4.15%
Life expectancies	Not given	Given	Given

* Smoothed as used in valuation

** Derived from deficit recovery period. Only applied to employers with a shortfall. Average period for spreading surplus is 24 years.

*** Pre-retirement. Post-retirement rate = 3.3%

B.3 Most information was included for most funds, with some exceptions. All firms of actuarial advisors provide a detailed breakdown of the secondary contribution rates by employer for each of the next three years in their Rates and Adjustments Certificates.

Appendix C: Solvency

C.1 In this appendix we set out the analysis we undertook in relation to whether the rate of employer contributions to the LGPS S pension fund is set at an appropriate level to ensure the solvency of the pension fund. This appendix contains a description of:

- Solvency considerations
- Mapping of solvency considerations to measures adopted
- Methodology used for solvency measures
- Table of outcomes for each fund

Potential for Default

C.2 In the context of LGPS Scotland:

- Our understanding based on confirmation from SPPA is that, in contrast to employers in the private sector, there is no insolvency regime for local authorities
- Therefore, for the purposes of our analysis we will assume that local authority sponsors cannot default on their pension liabilities through failure
- For funds with local authority employers, members' benefits are therefore dependent on the assets of the scheme and future contributions from employers including local authorities

Solvency considerations

C.3 In assessing whether the conditions for solvency are met, we will have regard to:

Risks already present:

- funding level on the SAB standard basis
- whether or not the fund continues to be open to new members. If the fund is closed to new members or is highly mature, we will focus on the ability to meet additional cash contributions

Emerging risks:

- the cost risks posed by changes to the value of scheme assets (to the extent that these are not matched by changes to the scheme liabilities)

Solvency Measures

C.4 For the 2017 exercise, we have used the following three metrics to test solvency.

Table C.1: 2017 Solvency measures

Consideration	Measure Used
Risks already present:	
The relative ability of the fund to meet its accrued liabilities	SAB funding level: A fund's funding level using the SAB standard basis, as set out in Appendix F
The extent to which the fund continues to be open to new members. If a fund is closed to new members or is highly mature, we will focus on the ability to meet additional cash contributions	Open fund: Whether the fund is open to new members
The proportion of scheme employers without tax raising powers or without statutory backing	Not measured*: the level of non-statutory members (The proportion of members within the fund who are/were employed by an employer without tax raising powers or statutory backing)
Emerging risks:	
The cost risks posed by changes to the value of scheme assets (to the extent that these are not matched by changes to the scheme liabilities)	Asset shock: The change in average employer contribution rates expressed as a percentage of payroll after a 15% fall in value of return-seeking assets

- C.5 *Our investigation for the 2014 Dry Run report showed the level of non-statutory members (the proportion of members within the fund who are/were employed by an employer without tax raising powers or statutory backing) was below 20% for all open funds. In view of that analysis, we decided this is not a solvency risk for the open funds. The level is 100% at this valuation for the closed funds.
- C.6 Emerging risk measures require assumptions. We used best estimate assumptions for this purpose, details of which can be found in Appendix F. Details of the methods used to calculate scores under each measure and the criteria used to assign a colour code can be found in this chapter.

Solvency measures – methodology

- C.7 This Appendix details the methodology behind the measures used to assess a fund's solvency position. Some of the measures listed below were calculated using the best estimate basis, which is a market consistent set of assumptions. For more information on this best estimate basis please see Appendix F.

SAB funding level: A fund's funding level using the SAB standard basis

- C.8 This measure highlights possible risks to a fund as a result of assets being significantly lower than liabilities, where liabilities are those estimated on the SAB standard basis detailed in Appendix F.
- C.9 A fund in deficit will need to pay additional contributions in order to meet the liabilities that have already been accrued.
- C.10 This measure assesses the relative funding levels of individual funds.

Open fund: Whether the fund is open to new members

- C.11 A scheme that is closed to new members will be closer to maturity than a scheme which is still open. This creates a possible risk to sponsoring employees as there is less scope to make regular contributions and receive investment returns on those contributions. Additionally, if the scheme funding level falls, the reduced time to maturity of the scheme means that additional contributions must be spread over a shorter timeframe and could be more volatile as a result.
- C.12 Following recent mergers between funds, there are only three remaining closed funds. One of those, Scottish Homes, is backed by a Scottish Government guarantee. Solvency is therefore not a concern for that fund.
- C.13 Tayside Transport fund merged with the open Tayside Pension Fund in June 2017. It was included in the valuation of the Tayside Pension Fund as at 31 March 2017. Lothian Buses Pension Fund merged with the open Lothian Pension Fund in January 2019. Lothian Buses' liability value at the valuation date, measured on the SAB standard basis, was 6% of those of the Lothian Pension Fund. Its funding level in the valuation was 121% on the ongoing basis, and 89% on a gilts basis. The fund was not included in the Lothian Pension Fund valuation as at 31 March 2017.
- C.14 Strathclyde Pension No 3 fund and Aberdeen City Council Transport Fund are the other remaining closed funds. These two funds have agreed to a merger, expected to complete by the end of 2019. The Strathclyde No 3 fund will merge into the Aberdeen City Council Transport Fund.

Asset shock: The change in average employer contribution rates as a percentage of pensionable pay after a 15% fall in value of return-seeking assets

- C.15 This measure shows the effect on total employer contribution rates of a one-off decrease in the value of a fund's return seeking assets equal to 15% of the value of those assets expressed as a percentage of pensionable pay. Defensive assets are assumed to be unaffected.
- C.16 For the purposes of this measure, we have restated liabilities on the best estimate basis. We have standardised deficit recovery periods using a period of 20 years to ensure results are comparable. Where a fund is in surplus under the best estimate basis, the surplus is assumed to be paid back to the employer over a period of 20 years.
- C.17 Return-seeking asset classes are assumed to be:
- Overseas Equities;
 - UK Equities;
 - Other Investments
 - Property
 - Other return seeking assets

Defensive asset classes are assumed to be:

- Cash;
 - Gilts; and
 - Corporate Bonds
 - Other defensive assets
- C.18 We calculated the emerging deficit from the shock following a 15% fall in return seeking assets:

$$\text{New Deficit} = (\text{Pre} - \text{stress asset value minus post stress asset value})$$

We spread this over 20 years of annual payments and express as a percentage of pensionable pay

$$\frac{\text{New Deficit}}{\bar{a}_{20} \times \text{pensionable pay}}$$

Where: (overleaf)

- new deficit is calculated on the best estimate basis as at 31 March 2017
- \bar{a}_{20} is a continuous annuity over the 20-year deficit recovery period at the rate of interest equal to $\frac{1+i}{1+e} - 1$.
- i is the nominal discount rate assumption on the best estimate basis.
- e is the general earnings inflation assumption on the best estimate basis

C.19 A fund is allocated a red colour code if its result is above 7.5%, an amber colour code if its result is above 5% and a green colour code otherwise.

Funds in Surplus after shock

C.20 The asset shocks reduced the funding level of the scheme on the best estimate basis. However, if the fund was in surplus post-shock (that is, the funding level was in excess of 100% after the shock) we did not flag the fund. All the funds remained in surplus on the best estimate basis after the shock. For information, we have shown the effect of the asset shock on contribution levels.

Appendix D: Long-term Cost Efficiency

D.1 We developed a series of relative and absolute considerations to help assess whether the contributions met the aims of section 13 under Long-term Cost Efficiency. This appendix contains a description of:

- Mapping of long-term cost efficiency considerations to measures adopted
- Methodology used for long-term cost efficiency measures
- Table of outcomes for each fund

Table D1: Long-term Cost Efficiency Considerations and Measures

Consideration	Measure Used
Relative considerations:	
The implied deficit recovery period	Deficit Period: Implied deficit recovery period calculated on a best estimate basis
The investment return required to achieve full funding	Required Return: The required investment return rates to achieve full funding in 20 years' time on a best estimate basis
Contributions from funds not in deficit are not likely to lead to a deficit arising in the future when assessed on the best estimate basis	Surplus retention: The average employer rate set at the 2017 valuation for a fund must be greater than the SCR on the best estimate basis
Absolute Considerations:	
The extent to which the required investment return above is less than the estimated future return being targeted by a fund's investment strategy	Return Scope: The required investment return rates as calculated in required return, compared with the fund's expected best estimate future returns assuming current asset mix maintained
The extent to which any deficit recovery plan can be reconciled with, and can be demonstrated to be a continuation of, the previous deficit recovery plan, after allowing for actual fund experience	Deficit Reconciliation: Confirmation that the deficit period can be demonstrated to be a continuation of the previous deficit recovery plan, after allowing for actual fund experience.

D.2 The analyses and calculations carried out under these long-term cost efficiency measures are approximate and they rely on the accuracy of the data provided.

- D.3 Although the calculations are approximate, we consider them sufficient for the purposes of identifying which funds are a cause for concern. While the measures should not represent targets, these measures help us determine whether a more detailed review is required; for example, we would have concern where multiple measures are triggered amber for a given fund.

Long-term cost efficiency measures – methodology

- D.4 We detail the methodology behind the measures used to assess a fund’s long-term cost efficiency position below. Some of the measures listed were calculated using a best estimate set of assumptions. For more information on this best estimate basis please see Appendix F.

Deficit period: The implied deficit recovery period calculated on a best estimate basis

- D.5 The calculations are done on a best estimate basis.
- D.6 The implied deficit recovery period on the standardised best estimate basis was found by solving the following equation for x:

$$\bar{a}_x = \frac{\text{Deficit on BE basis}}{\text{Annual deficit recovery payment on standardised BE basis}}$$

- D.7 Where:

- x is the implied deficit recovery period.
- \bar{a}_x is a continuous annuity over x years at the rate of interest equal to $\frac{1+i}{1+e} - 1$.
- i is the nominal discount rate assumption on the best estimate basis.
- e is the general earnings inflation assumption on the best estimate basis.
- The deficit on the best estimate basis is as at 31 March 2017.
- The annual deficit recovery payment on the best estimate basis is calculated as the difference between the average employer contribution rate for the years 2018/19 – 2020/21, allowing for both contributions paid as a percentage of salary and fixed monetary contributions into the fund, where deficit contributions are fixed (i.e. the fixed monetary contributions, if any, have been converted so that they are quoted as a percentage of salary roll), and the employer standard contribution rate on the best estimate basis for the years 2018/19 – 2020/21 (which is assumed to be equal to the future cost of accrual of that particular fund).

- D.8 Funds that were in surplus or where the implied deficit recovery period was less than 10 years were flagged as green. Those with recovery periods greater than 10 years were flagged as amber. If there were any funds that were paying contributions at a level that would result in an increase in deficit, they would have been flagged as red.

Required return: The required investment return rates to achieve full funding in 20 years' time on the best estimate basis

D.9 No flags were raised under this measure.

D.10 The following assumptions were made for the purposes of this calculations:

- Time 0 is 31 March 2017.
- Time 20 is 31 March 2037.
- A_0 is the value of the fund's assets at time 0, and was obtained from the data provided by the local firms of actuarial advisors.
- A_{20} is the value of the fund's assets at time 20.
- L_0 is the value of the fund's liabilities at time 0, and was obtained from the data provided by the local firms of actuarial advisors.
- L_{20} is the value of the fund's liabilities at time 20.
- C_0 is one year's employer contributions paid from time 0.
- C_{0-20} is the total employer contributions payable over the period time 0 – 20, assumed to occur mid-way between time 0 and time 20 (i.e. at time 10).
- B_0 is the value of one year's benefits paid from time 0.
- B_{0-20} is the total value of benefits payable over the period time 0 – 20, assumed to occur mid-way between time 0 and time 20 (i.e. at time 10).
- SCR_0 is the standard contribution rate payable from time 0 to time 1 and was calculated by restating the standard contribution rates on the local fund bases using the best estimate basis.
- SCR_{0-20} is the standard contribution rate payable from time 0 – 20, assumed to occur mid-way between time 0 and time 20 (i.e. at time 10).
- Sal_0 is the salary roll at time 0 and was obtained from the data provided by the local firms of actuarial advisors.
- i is the nominal discount rate assumption on the best estimate basis.
- e is the general earnings assumption on the best estimate basis.
- x is the required investment return that is to be calculated.

D.11 The membership profile is assumed to be constant.

- D.12 The assets and liabilities at time 20 were then equated and the resulting quadratic equation solved to find the required rate of investment return to achieve full funding, ie:

$$A_{20} - L_{20} = 0$$

Where:

- $A_{20} = [A_0 \times (1 + x)^{20}] + [(C_{0-20} - B_{0-20}) \times (1 + x)^{10}]$
- $L_{20} = [L_0 \times (1 + i)^{20}] + [(SCR_{0-20} - B_{0-20}) \times (1 + i)^{10}]$
- $C_{0-20} = C_0 \times 20 \times (1 + e)^{10}$
- $B_{0-20} = B_0 \times 20 \times (1 + e)^{10}$
- $SCR_{0-20} = Sal_0 \times SCR_0 \times 20 \times (1 + e)^{10}$

- D.13 Where the required investment return was higher than two times the nominal discount rate on the best estimate basis (i.e. $2 \times i$ where $i = 4.96\%$) funds would be classified as red. Where the investment return was higher than i the fund would be classified as amber. Funds were classified as green if the required return was less than i .

Surplus retention: contributions from funds not in deficit are not likely to lead to a deficit arising in the future.

- D.1 All the funds were in surplus on the best estimate basis. They were paying sufficient contributions to cover ongoing accrual of benefits on that basis.
- D.2 The fund would need to pay sufficient contributions after allowing for future costs of accrual, such that:

$$Avg\ ER\ cont\ rate\ paid - ER\ SCR\ on\ MC\ basis > 0$$

Where:

- The average employer contribution rate is for the year 2017/18, allowing for both contributions paid as a percentage of salary and fixed monetary contributions into the fund where deficit contributions are fixed (that is, the fixed monetary contributions, if any, have been converted so that they are quoted as a percentage of salary roll).
 - The employer standard contribution rate on the best estimate basis is for the year 2017/18. It is assumed that the standard contribution rate is equal to the future cost of accrual of that fund.
- D.3 The data required for each of the funds to carry out the above calculation was provided by their respective firms of actuarial advisors.

Return scope: The required investment return rates as calculated in required return, compared with the fund's expected best estimate future returns assuming current asset mix maintained

- D.4 The required investment return, (x), calculated in the required return measure was compared against the best estimate investment return expected from the fund's assets held on 31 March 2017.
- D.5 The asset data used in this calculation was provided by each fund's respective firm of actuarial advisors.
- D.6 Funds where the best estimate future returns were higher than the required investment return by 0.5% or more were flagged as green. Those funds where this difference was between 0% and 0.5% would be flagged as amber, whilst those where the best estimate returns were lower than the required investment returns were flagged as red.

Deficit reconciliation: Confirmation that the deficit period can be demonstrated to be a continuation of the previous deficit recovery plan, after allowing for actual fund experience

- D.7 This measure is used to monitor the change in the deficit recovery end point set locally by the fund at each valuation and what the underlying reasons are for any adverse changes in this period.
- D.8 This measure considers the following:
- Whether contributions have decreased since the previous valuations (reducing the burden on current tax payers)
 - Whether the deficit recovery end point has moved further into the future, compared with the previous valuation (increasing the burden on future tax payers)

Funds where both of the above have occurred are flagged amber; otherwise funds are flagged green.

Appendix E: Data provided

- E.1 At the request of the Scottish Public Pensions Agency ('SPPA') the Government Actuary's Department ('GAD') has collected data from each fund's 2017 valuation report. These actuarial funding valuations were conducted by three firms of actuarial advisors:
- Barnett Waddingham
 - Hymans Robertson
 - Mercer
- E.2 Data was received from the relevant local actuary for all 15 pension funds.
- E.3 Limited checks, consisting of spot checks to make sure that data entries appear sensible, have been performed by GAD and the data received appears to be of sufficient quality for the purpose of analysing the 2017 valuation results. These checks do not represent a full, independent audit of the data supplied. The analysis contained in this report relies on the general completeness and accuracy of the information supplied by the administering authority or their firms of actuarial advisors.
- E.4 Unless otherwise stated the data detailed above has been used to inform the analysis contained in the LGPS Scotland Section 13 2017 Report.
- E.5 The information provided to GAD is, in many instances, more detailed than that provided in the actuarial valuation reports.
- E.6 There was some inconsistency in the format of information provided to GAD. For example, membership details were not always split by gender as requested. However, this did not have a material impact on the analysis that GAD was able to complete (we assumed the average male female breakdown for these funds).

Contribution rate data

- E.8 Primary and secondary rates have now replaced Common Contribution Rates (CCRs) in legislation. We now have data that gives an overview of total employer contributions to the fund, which we have used. In contrast, CCRs from 2014 valuations did not always reflect employer contribution rates actually paid, so primary and secondary rates are more useful. However, we have also compared contribution rates between 2014 and 2017 valuations. There is a transitional issue, as 2014 valuations CCRs don't always reflect average employer contribution rates and alternative data were not available.

Data specification

1) MEMBERSHIP DATA

Data split by gender.

- a) Active members: number of members, average age (weighted as appropriate), average period of membership, total rate of annual actual pensionable pay at 31 March 2017 and 31 March 2014, total rate of annual FTE pensionable pay at 31 March 2017 and 31 March 2014,
- b) Pensionable pay definition, has the 2009 or 2015 definition been used to assess pensionable pay for both 31 March 2017 and 31 March 2014
- c) Deferred members: number of members, average age (weighted as appropriate), total annual preserved pension revalued to 31 March 2017 for both 31 March 2017 and 31 March 2014. Note this should exclude undecided members.
- d) Pensioners (former members): number of members, average age (weighted as appropriate), total annual pensions in payment at 31 March 2017 and 31 March 2014
- e) Pensioners (dependants including partners and children): number of members, average age (weighted as appropriate), total annual pensions in payment at 31 March 2017 and 31 March 2014

2) ASSETS

These are split to provide information for 31 March 2017 and 31 March 2014

- a) Value of Assets (market value)
- b) Actual Asset Distribution split into the following:
 - i) Proportion of assets held in Bonds (fixed interest government bonds, fixed interest non-government bonds, inflation linked bonds)
 - ii) Proportion of assets held in Equities (UK equities, overseas equities, unquoted or private equities)
 - iii) The rest in Property*, Insurance Policies, Fully insured annuities, Deferred or immediate fully insured annuities, Hedge funds, Cash and net current assets, Commodities, ABC arrangements, Infrastructure - debt type, Infrastructure* - equity type "Other" investments – defensive**, "Other" investments - return seeking
 - * Please provide information on whether local housing stock is held within the property portfolio, and any future plans to add this asset class.
 - ** Please provide details of infrastructure projects undertaken since 1 April 2014, and further plans to increase this on a separate sheet.
- c) Value of assets used in valuation
- d) Is a smoothed asset value used? If Yes, an explanation is included

3) LIABILITIES AND FUTURE CONTRIBUTION RATE

These are split to provide information for 31 March 2017 and 31 March 2014;

- a) Past Service Liability – split between Actives, Deferred, Pensioners and Total
- b) Funding Level
- c) Surplus / Deficit
- d) Deficit Recovery Period

Future contribution rates

- e) Primary contribution rate
- f) If Primary Contribution Rate include deficit recovery contributions
- g) Secondary Contribution Rate
- h) Assumed member contribution yield
- i) Expenses, split by administration and investment (if not included implicitly in discount rate)
- j) Pensionable Pay definition (2009 or 2015 scheme definition)
- k) Is a smoothed liability value used? If Yes, an explanation is included

4) REVENUE ACCOUNTS

- a) Value of assets at last valuation (after any smoothing or other adjustments)
- b) Value of assets at this valuation (after any smoothing or other adjustments)
- c) Total Income: Employee contributions, normal employer contributions, special employer contributions, transfers in, investment income, other income
- d) Total Expenditure: Pensions paid, retirement lump sums paid, other lump sums paid, transfers out, investment expenses, administration expenses, other outgoings

5) AVERAGE EMPLOYER CONTRIBUTION RATE

For years 2018/19, 2019/20 and 2020/21

- a) Total projected pay (£)
- b) Average employer contribution rate, current benefit accrual (%pay)
- c) Total deficit contributions payable (where expressed as a fixed monetary amount (£))
- d) Projected total deficit contributions (where expressed as a percentage of pay (% pay))
- e) Total deficit contributions (£)
- f) Total deficit contributions (expressed as a % of pay) (% pay)
- g) Average employer contribution rate (% pay)
- h) Pensionable Pay definition (2009 or 2015 scheme definition)

6) DOCUMENTATION REQUIRED

- a) Valuation Report @ 31 March 2017
- b) Relevant related reports
- c) Compliance Extract
- d) Statement of Investment Strategy
- e) Funding Strategy Statement
- f) Other

Explanatory notes

- 1 **Membership data:** Accrued pensions should include the 2017 Pension Increase Order. Undecided members should be excluded from the deferred members table.
- 3 **Liabilities and future contribution rates:** The assumed member contribution yield is the contribution yield that members are assumed to pay over the valuation period. It will vary by authority due to the tiered member contribution rates. The primary and secondary contribution rates were set up following the Dry Run, however we are requesting the equivalent rates as at the 2014 valuation. The primary rate is defined as the future service cost excluding expenses. The secondary rate is defined as contributions with regards to surplus or deficit contributions excluding expenses.
- 5 **Average employer contribution rate:** The average employer contribution rate should be calculated as projected employer contributions in 2018/19 divided by projected pensionable pay in 2018/19. The rate for 2019/20 and 2020/21 should be calculated by the same method. We request the following:
 - 5a **Projected pay (£):** Total projected pay (£): For all employers in the fund
 - 5b **Average employer contribution rates – current benefit accrual (% pay):** weighted average of cost of current accruals (net of employee contributions)
 - 5c **Total deficit contributions payable** (where fixed monetary amount) (£): Sum of deficit contribution where expressed as a fixed monetary amount. Ignore deficit contributions paid as a proportion of pay for this item

- 5d** **Projected total deficit contributions payable** (where expressed as a percentage of pay) (%): Projected payment in % terms – will require an assumption about projected pay. Ignore deficit contribution paid as a fixed monetary amount
- 5e** **Total deficit contributions** (£): The sum of 5c) and the equivalent 5d) fixed amount (which is calculated by multiplying 5d) and the total projected pay 5a)
- 5f** **Total deficit contributions expressed a percentage of pay** (% pay): Row 5e) re-expressed as a percentage of pay by dividing by projected pay across the whole fund (i.e. 5e divided by 5a)
- 5g** **Average employer contribution rate** (% pay): Sum of 5b) and 5f)

Since projected pensionable pay (5a)) acts only as the weightings in these weighted averages, it is acceptable to use a simple projection of pensionable pay (e.g. based on actual pensionable pay at 31 Mar 2017 with a simple factor for increases up to 2021).

Appendix F: Assumptions

F.1 Each section of analysis contained in the main report is based on one of three sets of assumptions:

- The local fund assumptions, as used in the fund's 2017 actuarial valuation
- The LGPS England and Wales SAB standardised set of assumptions
- A best estimate set of assumptions

F.2 Details of local fund assumptions can be found in each fund's 31 March 2017 actuarial valuation report. See the table below for details of the E&W SAB standardised basis and the best estimate basis. We have highlighted differences.

Table F1: E&W SAB standard basis¹ and Best Estimate basis

ASSUMPTION	<i>E&W SAB standard basis</i>	<i>Best Estimate basis</i>
methodology	Projected Unit with 1-year control period	Projected Unit with 1-year control period
rate of pension increases	2% per annum	2.1% per annum
public sector earnings growth	3.5% per annum	4.1% per annum
discount rate	5.06% per annum	4.96% per annum
pensioner baseline mortality	Set locally based on Fund experience	
mortality improvements	Long-term reduction in mortality rates of 1.5% per annum	
changes to state pension age	As legislated	
age retirement	Set locally based on Fund experience	
ill health retirement rates	Set locally based on Fund experience	
withdrawal rates	Set locally based on Fund experience	
death before retirement rates	Set locally based on Fund experience	
promotional salary scales	None	Set locally based on Fund experience
commutation	SAB future service cost assumption of 65% of the maximum allowable amount.	
family statistics	Set locally based on Fund experience	

¹ Details can be found in the E&W Scheme Advisory Board's Cost Management Process of 5 February 2015 at: <http://www.lgpsboard.org/images/PDF/CMBDANov2016/AI5-SABCMP2.pdf>

Standardised basis

- F.3 The purpose of the SAB standard basis is to enable cross comparison of funds. The local valuations for each fund use financial assumptions specific to that fund, and so the funding levels (assets divided by liabilities) on the local fund bases are not directly comparable. The SAB standard basis uses market values of assets and a fixed discount rate for all funds, which allows for comparison of relative funding levels on a standard basis.
- F.4 The SAB standard basis does not value assets and liabilities consistently, and so it is not suitable for funds to use for their funding valuations and cannot be seen as a 'target' or 'minimum funding requirement' basis. As a result, it is not appropriate to use the SAB standard basis to:
- assess whether a fund is fully funded or has a deficit (whether the funding level on the SAB standard basis is more or less than 100% is irrelevant, only the SAB standard basis funding level relative to other funds is meaningful)
 - Compare funding levels at 2019 with the previous valuation at 2016
- F.5 Because of this there is a wide range of assumptions from which a reasonable basis could be chosen – what matters is that funds use consistent bases.

Best estimate basis

- F.6 The financial assumptions for the best estimate basis are based on GAD's neutral assumptions for long-term inflation measures and asset returns, and the split of LGPS Scotland assets held as at 31 March 2017. These neutral assumptions are not deliberately optimistic nor pessimistic and do not incorporate adjustments to reflect any desired outcome. We believe there is around a 50% chance of outcomes being better and a 50% chance of outcomes being worse than these assumptions imply.
- F.7 Future asset returns are uncertain and there is a wide range of reasonable views on what future asset returns will be and therefore the best estimate discount rate should be. We have presented GAD's house view above, but there are other reasonable best estimate bases which may give materially different results.

Appendix G: Section 13 of the Public Service Pensions Act 2013²

13 Employer contributions in funded schemes

- (1) This section applies in relation to a scheme under section 1 which is a defined benefits scheme with a pension fund.
- (2) Scheme regulations must provide for the rate of employer contributions to be set at an appropriate level to ensure—
 - (a) the solvency of the pension fund, and
 - (b) the long-term cost-efficiency of the scheme, so far as relating to the pension fund.
- (3) For that purpose, scheme regulations must require actuarial valuations of the pension fund.
- (4) Where an actuarial valuation under subsection (3) has taken place, a person appointed by the responsible authority is to report on whether the following aims are achieved—
 - (a) the valuation is in accordance with the scheme regulations;
 - (b) the valuation has been carried out in a way which is not inconsistent with other valuations under subsection (3);
 - (c) the rate of employer contributions is set as specified in subsection (2).
- (5) A report under subsection (4) must be published; and a copy must be sent to the scheme manager and (if different) the responsible authority.
- (6) If a report under subsection (4) states that, in the view of the person making the report, any of the aims in that subsection has not been achieved—
 - (a) the report may recommend remedial steps;
 - (b) the scheme manager must—
 - (i) take such remedial steps as the scheme manager considers appropriate, and
 - (ii) publish details of those steps and the reasons for taking them;
 - (c) the responsible authority may—
 - (i) require the scheme manager to report on progress in taking remedial steps;
 - (ii) direct the scheme manager to take such remedial steps as the responsible authority considers appropriate.
- (7) The person appointed under subsection (4) must, in the view of the responsible authority, be appropriately qualified.

² <http://www.legislation.gov.uk/ukpga/2013/25/section/13>

Appendix H: Extracts from other relevant regulations

Regulations 56 and 60 of ‘The Local Government Pension Scheme (Scotland) Regulations 2014³’

Funding strategy statement

- 56**—(1) An administering authority must, after consultation with such persons as it considers appropriate, prepare, maintain and publish a written statement setting out its funding strategy.
- (2) The statement must be published no later than 31st March 2016.
- (3) The authority must keep the statement under review and, after consultation with such persons as it considers appropriate, make such revisions as are appropriate following a material change in its policy set out in the statement, and if revisions are made, publish the statement as revised.
- (4) In preparing, maintaining and reviewing the statement, the administering authority must have regard to—
- (a) the guidance set out in the document published in March 2004 by CIPFA, the Chartered Institute of Public Finance and Accountancy and called “CIPFA Pensions Panel Guidance on Preparing and Maintaining a Funding Strategy Statement (Guidance note issue No. 6)”⁽¹⁾; and
- (b) the statement of investment principles published by the administering authority under regulation 12 of the Local Government Pension Scheme (Management and Investment of Funds) (Scotland) Regulations 2010.

Actuarial valuations of pension funds

- 60**—(1) An administering authority must obtain—
- (a) an actuarial valuation of the assets and liabilities of each of its pension funds as at 31st March 2017 and on 31st March in every third year afterwards;
- (b) a report by an actuary in respect of the valuation; and
- (c) a rates and adjustments certificate prepared by an actuary.
- (2) Each of those documents must be obtained before the first anniversary of the date (“the valuation date”) as at which the valuation is made or such later date as the Scottish Ministers may agree.
- (3) A report under paragraph (1)(b) must contain a statement of the demographic assumptions used in making the valuation; and the statement must show how the assumptions relate to the events which have actually occurred in relation to members of the Scheme since the last valuation.
- (4) A rates and adjustments certificate is a certificate specifying—

³ <http://www.legislation.gov.uk/ssi/2014/164/contents/made>

(a) the primary rate of the employer's contribution; and

(b) the secondary rate of the employer's contribution,

for each year of the period of three years beginning with 1st April in the year following that in which the valuation date falls.

(5) The primary rate of an employer's contribution is the amount in respect of the cost of future accruals which, in the actuary's opinion, should be paid to a fund by all bodies whose employees contribute to it so as to secure its solvency, expressed as a percentage of the pay of their employees who are active members.

(6) The actuary must have regard to—

(a) the existing and prospective liabilities arising from circumstances common to all those bodies;

(b) the desirability of maintaining as nearly constant a common rate as possible;

(c) the current version of the administering authority's funding strategy mentioned in regulation 56 (funding strategy statements); and

(d) the requirement to secure the solvency of the pension fund and the long-term cost efficiency of the Scheme, so far as relating to the pension fund.

(7) The secondary rate of an employer's contributions is any percentage or amount by which, in the actuary's opinion, contributions at the primary rate should, in the case of a Scheme employer, be increased or reduced by reason of any circumstances peculiar to that employer.

(8) A rates and adjustments certificate must contain a statement of the assumptions on which the certificate is given as respects—

(a) the number of members who will become entitled to payment of pensions under the provisions of the Scheme; and

(b) the amount of the liabilities arising in respect of such members,

during the period covered by the certificate.

(9) The administering authority must provide the actuary preparing a valuation or a rates and adjustments certificate with the consolidated revenue account of the fund and such other information as the actuary requests.

Appendix I: Allocation of Scottish local authorities to LGPS Scotland administering authorities

Scottish local government consists of 32 local authorities. These participate in the LGPS Scotland through eleven administering authorities. The local authorities are allocated across these administering authorities as shown below.

LGPS Administering Authorities, funds and allocation of local authorities

Glasgow City Council

Strathclyde Pension Fund

Glasgow City Council
Argyle and Bute Council
East Ayrshire Council
North Ayrshire Council
South Ayrshire Council
West Dunbartonshire Council
East Dunbartonshire Council
North Lanarkshire Council
South Lanarkshire Council
East Renfrewshire Council
Renfrewshire Council
Inverclyde Council

City of Edinburgh Council

Lothian Pension Fund

City of Edinburgh Council
Midlothian Council
West Lothian Council
East Lothian Council

Aberdeen City Council

North East Scotland Pension Fund

Aberdeen City Council
Aberdeenshire Council
Moray Council

Dundee City Council

Tayside Superannuation Fund

Dundee City Council

Angus Council
Perth and Kinross Council

Scottish Borders Council

Scottish Borders Pension Fund

Scottish Borders Council

Dumfries & Galloway Council

Dumfries and Galloway Pension Fund

Dumfries and Galloway Council

Falkirk Council

Falkirk Council Pension Fund

Falkirk Council
Stirling Council
Clackmannanshire Council

Fife Council

Fife Council Pension Fund

Fife Council

Highland Council

Highland Council Pension Fund

Highland Council
Western Isles Council

Shetland Islands Council

Shetland Islands Pension Fund

Shetland Islands Council

Orkney Islands Council

Orkney Islands Pension Fund

Orkney Islands Council