

# Pennsylvania Public School Employees' Retirement System

Actuarial Valuation  
June 30, 2017



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May 23, 2018

Board of Trustees  
Pennsylvania Public School Employees'  
Retirement System  
5 North 5th Street  
Harrisburg, PA 17101

Ladies and Gentlemen:

This report presents the results of the annual actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) as of June 30, 2017.

The valuation takes into account all of the promised benefits to which members are entitled as of June 30, 2017, including pension and survivor benefits, and as required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code) is the basis for the contribution rate for fiscal year 2018/2019.

As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were recommended on the basis of an Experience Review covering the period from July 1, 2010 to June 30, 2015 and adopted by the Board of Trustees at their June 10, 2016. As mandated by the Retirement Code, these assumptions will remain in effect for valuation purposes until such time as the Board of Trustees adopts revised assumptions.

Reporting requirements of GASB Statements No. 67 and No. 68 took effect for PSERS at the June 30, 2014 and June 30, 2015 reporting dates, respectively. Also, reporting requirements of GASB Statements No. 74 and No. 75 took, or will take, effect for PSERS at the June 30, 2017 and June 30, 2018 reporting dates, respectively. These requirements are addressed in separate reports.

#### **Assets and Membership Data**

The Retirement System provided the individual data for members used in the valuation. While we did not verify the data at their source, we did perform tests for internal consistency and reasonableness. The amount of assets in the trust fund taken into account in the valuation was based on statements prepared for us by the Retirement System. The accuracy of the results presented in this report is dependent on the accuracy of the data.

#### **Funding Adequacy**

The valuation results indicate that the employer contribution rate for fiscal year 2018/2019 is 33.43%. As of June 30, 2017, the total funded ratio of the plan (for Pensions and Health Insurance combined) is 56.3%, based on the accrued liability and actuarial value of assets calculated under the funding requirements of Section 8328 of the Retirement Code. Unless stated otherwise, references to "funded ratio" and "unfunded accrued liability" are measured on an actuarial value of assets basis. It should be noted that if the same measurements were made using the market value of assets, different funded ratios and unfunded accrued liabilities would result. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

### Financial Results and Membership Data

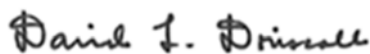
Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are shown in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Comprehensive Annual Financial Report (CAFR), and also prepared the trend data schedules included in the Financial Section of the CAFR.

Future actuarial measurements may differ significantly from current measurements due to System experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in System provisions or applicable law. Liability models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

Use of this report for any other purpose, or by anyone other than the Board of Trustees or the staff of PSERS or employers or its auditors, may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Conduent should be asked to review any statement to be made on the basis of the results contained in this report. Conduent will accept no liability for any such statement made without prior review by Conduent.

David L. Driscoll is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. Edward Quinn and Salvador Nakar are Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions concerning it.

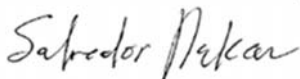
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# The Pennsylvania Public School Employees' Retirement System

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## Executive Summary

This report presents the actuarial valuation as of June 30, 2017 for the Pennsylvania Public School Employees' Retirement System.

The principal valuation results include:

- The employer contribution rate for fiscal year 2018/2019, which is 33.43% (32.60% Pension plus 0.83% Premium Assistance).
- The Act 120 minimum employer pension rate is the normal cost rate of 7.59%.
- The total funded ratio of the plan determined as of June 30, 2017 under the funding requirements of Section 8328 of the Retirement Code is 56.3%, which is based on the accrued liability and the actuarial value of assets for Pensions and Health Insurance as of that date.
- The determination and analysis of actuarial experience in the year ending June 30, 2017, which consisted of a net experience loss of \$1.434 billion.
- In accordance with the Act 120-2010 Class T-E and Class T-F "shared-risk" contribution provision, the contribution rates for Class T-E and Class T-F members shall remain at 7.50% and 10.30%, respectively, since:
  - The time-weighted rate of return, net of fees, for the six-year period ending June 30, 2017 is 6.69%, as calculated by Aon Hewitt. The time-weighted rate of return, net of fees, is greater than 6.46% (the average annual interest rate adopted by the Board over the six-year period less 1.00%), and
  - The contribution rates for Class T-E and Class T-F members are currently at 7.50% and 10.30%, respectively.

The Act 120-2010 member shared-risk contribution rates are discussed on page 9.

- Annual disclosures as of June 30, 2017 in accordance with Statements No. 25 and 27 of the Governmental Accounting Standards Board (GASB). Statements No. 25 and 27 of the GASB have been superseded by Statements No. 67 and 68, respectively. Information that would have been required to be disclosed under Statements No. 25 and 27 has been included in this report at the request of PSERS staff for informational purposes only. Disclosures in accordance with Statements Nos. 67 and 68 have been provided in separate reports.

The valuation was completed based upon membership and financial data submitted by the Retirement System. Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are included in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Comprehensive Annual Financial Report (CAFR), and also prepared the trend data schedules included in the Financial Section of the CAFR.

## **Changes Since Last Year**

### Legislative and Administrative Changes

The benefit provisions and contribution provisions are summarized in Table 13. Act 5 of 2017 was passed in June of 2017. Under this legislation, effective immediately, Class TE and Class TF members are eligible to elect a cost neutral Option 4 lump sum distribution of all or a portion of the member's accumulated contributions at retirement. This results in a decrease of \$0.007 billion in the System's unfunded accrued liability.

PSERS staff updated the data as of June 30, 2017 for 5,089 retired members who elected a Joint and Survivor optional form of payment at retirement and whose contingent beneficiaries have subsequently predeceased the members. This data update decreased the System's unfunded accrued liability by \$0.156 billion.

There were no other legislative or administrative changes since the prior valuation.

### Actuarial Assumptions and Methods

The actuarial assumptions and methods are outlined in Table 12. As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared using demographic and economic assumptions that were recommended on the basis of the Experience Review covering the period from July 1, 2010 to June 30, 2015 and adopted by the Board at their June 10, 2016 meeting. These are the same assumptions used for the prior valuation.

Act 5 of 2017 imposed a restriction on the actuarial value of assets to be no less than 70% and no more than 130% of the market value of assets. This modification had no effect on the System's unfunded accrued liability as of the June 30, 2017 valuation. The Act 5-2017 constraints on the actuarial value of assets are discussed on page 15.

There have been no other changes in the demographic or economic assumptions from those used in the prior valuation.

We have reviewed the assumptions and methods used in completing the June 30, 2017 actuarial valuation and believe that they are reasonable and in compliance with the applicable standards.

### **Contribution Rates**

The results of the valuation as of June 30, 2017 determine the employer contribution rate for fiscal year 2018/2019. The calculated employer contribution rate for the 2018/2019 fiscal year is 33.43% and the Board of Trustees certified this rate at their December 8, 2017 meeting.

The average contribution rate payable by the members is 7.57%. The average member contribution rate of 7.57% is a pay-weighted average of member rates that vary based on date of hire and Class membership. Effective January 1, 2002, the employee contribution rate for members who elected to have prior school service and intervening military service converted to Class T-D service increased by 1.25% to 7.50%. Anyone who enrolled after July 1, 2001 and before July 1, 2011 is a member of Class T-D. Any employee who becomes a member after June 30, 2011 is a Class T-E member or, alternatively, may elect to become a Class T-F member. The base contribution rate for Class T-E members is 7.50% of compensation. The base contribution rate for Class T-F members is 10.30% of compensation. Class T-E and Class T-F members are subject to a "shared-risk" employee contribution rate, as discussed on page 8.

### Reasons for Change in the Rate Calculated by the Actuary

The employer contribution rate calculated by the actuary increased from 32.57% for fiscal year 2017/2018 to 33.43% for fiscal year 2018/2019. The reconciliation of the employer contribution rates by source is as follows:

• FY 2017/2018 employer contribution rate	32.57%
• Decrease due to change in normal rate	(0.11)
• Net decrease due to payroll growth and liability experience <sup>1</sup>	(0.17)
• Increase due to actuarial loss on assets	1.22
• Act 5 of 2017 <sup>2</sup>	0.00
• Retiree data cleanup	(0.08)
• Change in health insurance contribution rate	<u>0.00</u>
• FY 2018/2019 employer contribution rate	33.43%

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<sup>1</sup> Reflects increase from appropriation payroll higher than expected and liability gains.

<sup>2</sup> Effective immediately, Class TE and Class TF members are eligible to elect a cost neutral Option 4 lump sum distribution of all or a portion of the member's accumulated contributions at retirement.



## Summary of Principal Results

Summarized below are the principal financial results for the Public School Employees' Retirement System based upon the actuarial valuation as of June 30, 2017. Comparable results from the June 30, 2016 valuation are also shown.

Item	June 30, 2017	June 30, 2016
<b>Demographics</b>		
Active Members		
• Number	255,945	257,080
• Average Annual Pay	\$ 50,924	\$ 49,989
Annuitants		
• Number <sup>1</sup>	230,014	224,828
• Average Annual Benefit Payment	\$ 25,287	\$ 25,203
<b>Contribution Rates (as a Percentage of Payroll)</b>		
	(Fiscal Year 2018/2019)	(Fiscal Year 2017/2018)
Employer Contribution Rate:		
• Total Pension Rate Calculated by Actuaries <sup>2</sup>	32.60%	31.74%
• Health Insurance Contribution Rate	<u>0.83</u>	<u>0.83</u>
• Total Contribution Rate	33.43%	32.57%
• Total Contribution Rate Certified by Board	33.43%	32.57%
• Member Average Contribution Rate	<u>7.57</u>	<u>7.54</u>
• Total Rate	41.00%	40.11%
<b>Funded Status<sup>3</sup></b>		
• Accrued Liability	\$ 101,972.6 Mil	\$ 100,114.0 Mil
• Actuarial Value of Assets	57,460.6	57,390.1
• Market Value of Assets	53,279.1	49,956.6
• Unfunded Accrued Liability		
• Actuarial Value of Assets	\$ 44,512.0	\$ 42,723.9
• Market Value of Assets	48,693.5	50,157.4
• Funded Ratio		
• Actuarial Value of Assets	56.3%	57.3%
• Market Value of Assets	52.2%	49.9%

1. Excludes 2,141 and 1,181 beneficiaries as of June 30, 2017 and June 30, 2016, respectively, who are only entitled to a pending lump sum distribution.
2. The Act 120 minimum pension rate for the June 30, 2017 valuation is 7.59% and for the June 30, 2016 valuation is 7.70%.
3. Pensions and Health Insurance combined.

## Five-Year History of Principal Financial Results

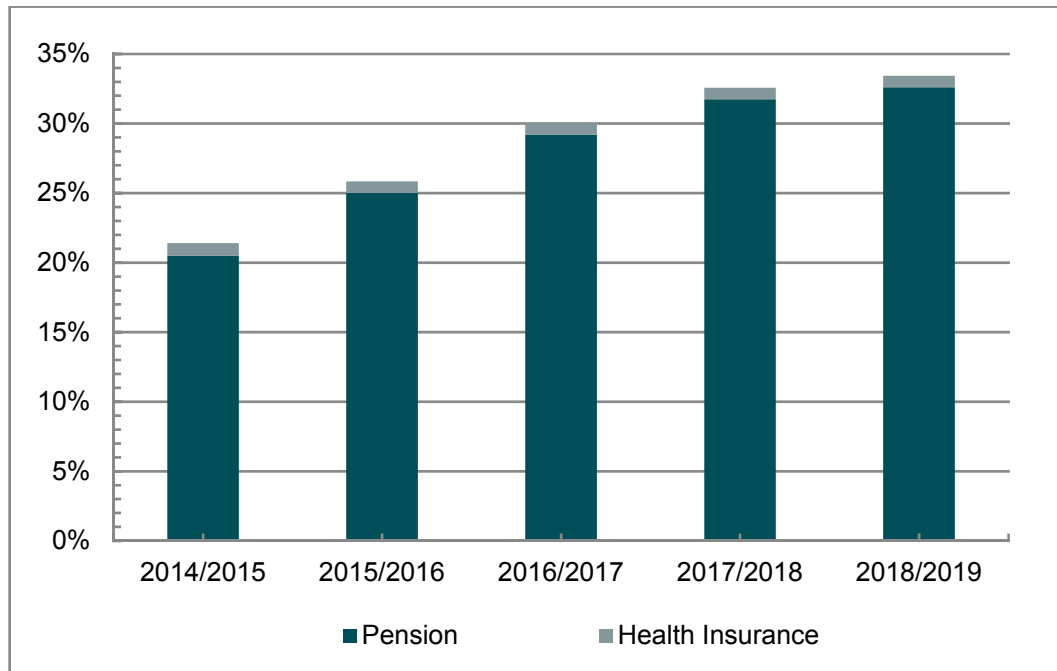
### Five-Year History of Contribution Rates (As a % of Payroll)

Fiscal Year	Member Contributions	Employer Contributions				
		Normal Cost	Unfunded Accrued Liability	Health Insurance	Preliminary Employer Contribution	Final Employer Contribution <sup>1</sup>
2018/2019	7.57%	7.59%	25.01%	0.83%	33.43%	33.43%
2017/2018	7.54	7.70	24.04	0.83	32.57	32.57
2016/2017	7.52	8.31	20.89	0.83	30.03	30.03
2015/2016	7.49	8.38	19.44	0.84	28.66	25.84 <sup>2</sup>
2014/2015	7.46	8.46	17.51	0.90	26.87	21.40 <sup>2</sup>

1. Certified by the Board.
2. Reflects Act 120 Pension Collar.

The following chart shows a five-year history of employer contribution rates:

### Five-Year History of Employer Contribution Rates



## Funded Ratio

The financing objective of the Retirement System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method; and
- Liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 2010-120 and Act 2017-5, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010 and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability due to benefit enhancements will be funded over 10 years based on level-percent-of-pay amortization.
- As directed by Act 2010-120, the minimum employer pension contribution rate will be the normal cost rate.

The total contribution rate of 33.43% of payroll payable by employers, when taken together with the contributions payable by the members, current assets, and expected future asset returns, is sufficient to achieve the financing objective.

The Retirement System's total funded ratio on this funding basis is measured by comparing the actuarial value of assets (based on a phased-in, 10-year moving average market value) to the accrued liability. The accrued liability for pensions is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active employees. The accrued liability for Health Insurance equals the assets in the Health Insurance account.

On this basis, the Retirement System's total funded ratio (for Pensions and Health Insurance combined) is 56.3% as of June 30, 2017. This funded ratio is based on an actuarial value of assets of \$57.46 billion and an accrued liability of \$101.97 billion. The funded ratio for Pensions alone is 56.3% as of June 30, 2017, based on an actuarial value of assets of \$57.34 billion, and an accrued liability of \$101.85 billion.

### Reasons for Change in the Total Funded Ratio

The total funded ratio decreased from 57.3% as of June 30, 2016 to 56.3% as of June 30, 2017. This decrease is primarily due to returns below expected levels on assets measured at actuarial value, which is a 10-year moving average of the market value. The System had a net actuarial gain due to demographic experience, which offset the loss incurred due to investment return. Table 6 provides an analysis of the change in the unfunded accrued liability as of June 30, 2017.

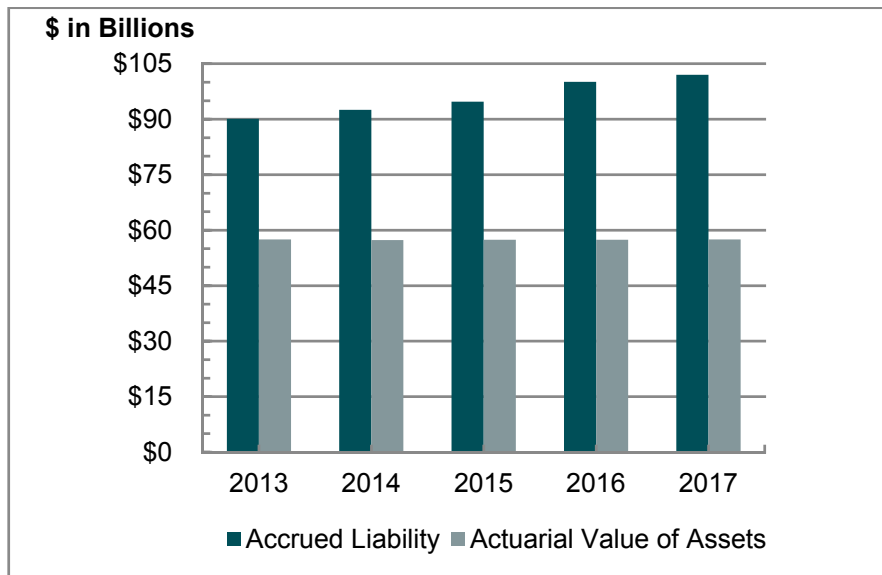
**Five-Year History of Total Funded Ratio<sup>1</sup>**  
(\$ Amounts in Millions)

<b>Valuation as of June 30</b>	<b>Accrued Liability</b>	<b>Actuarial Value of Assets</b>	<b>Unfunded Accrued Liability</b>	<b>Funded Ratio</b>
2017	\$ 101,972.6	\$ 57,460.6	\$ 44,512.0	56.3%
2016	100,114.0	57,390.1	42,723.9	57.3
2015	94,697.4	57,361.6	37,335.8	60.6
2014	92,465.0	57,343.9	35,121.1	62.0
2013	90,052.2	57,453.6	32,598.6	63.8

1. For Pensions and Health Insurance (under the funding provisions of the Retirement Code).

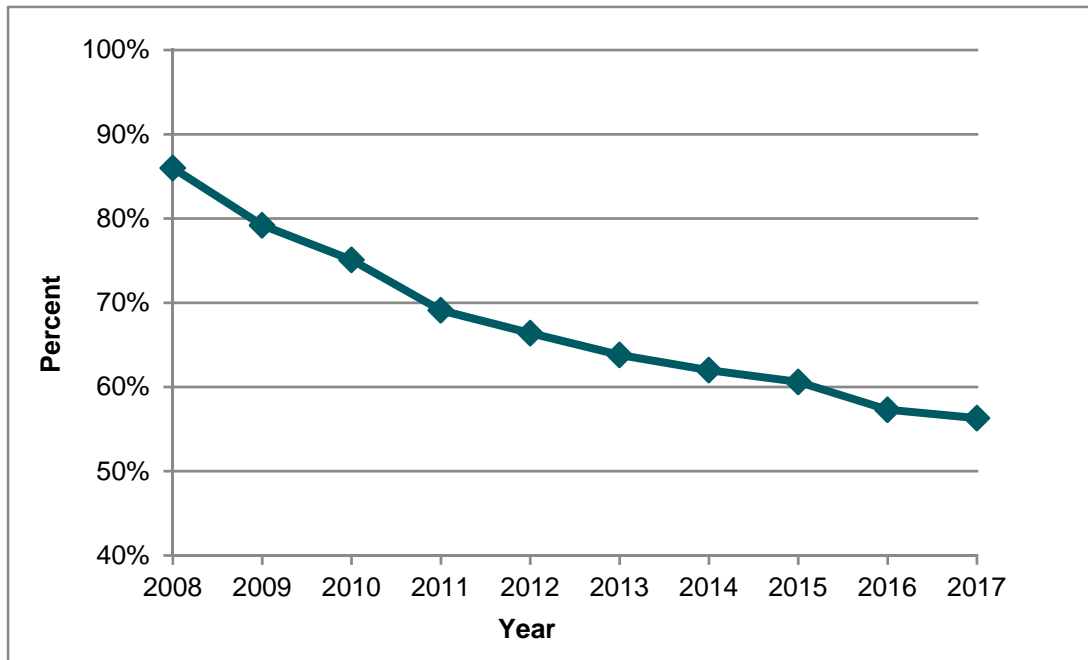
The following chart shows a five-year history of the accrued liability and the actuarial value of assets:

**Five-Year History of Accrued Liability and Actuarial Value of Assets**



The following chart shows a ten-year history of the total funded ratio based on actuarial value of assets for Pensions and Health Insurance:

**Ten-Year History of Total Funded Ratio (2008 – 2017)**



**Act 120-2010 Class T-E and Class T-F shared risk contributions**

Commencing with the annual actuarial valuation for the period ending June 30, 2014, and every three years thereafter, the Board compares the actual investment rate of return, net of fees, to the annual interest rate adopted by the Board for the calculation of the normal contribution rate, based on the market value of assets, for the prior ten-year period. Until the Retirement System has accumulated a ten-year period of investment rate of return experience following June 30, 2011, the look-back period used in this calculation will begin not earlier than June 30, 2011.

If the actual time-weighted investment rate of return, net of fees, is less than the annual interest rate adopted by the Board by an amount of 1% or more, the shared risk contribution rate of Class T-E and T-F members will increase by 0.5%. If the actual time-weighted investment rate of return, net of fees, is equal to or exceeds the annual interest rate adopted by the Board, the shared risk contribution rate of Class T-E and T-F members will decrease by 0.5%. The total member contribution rate for Class T-E members shall not be less than 7.5%, nor more than 9.5%. The total member contribution rate for Class T-F members shall not be less than 10.3%, nor more than 12.3%. If the Retirement System's total funded ratio based on the actuarial value of assets is at least 100% as of the measurement date, the shared risk contribution rate shall be zero. If the annual interest rate adopted by the Board for the calculation of the normal contribution rate is changed during the period used to determine the shared risk contribution rate, the Board, with the advice of the actuary, shall determine the applicable rate during the entire period, expressed as an annual rate. For any fiscal year in which the employer contribution rate is lower than the final contribution rate under section 8328(h), the total member contribution rate for Class T-E and T-F members shall be prospectively reset to the basic contribution rate. There shall be no increase in the member contribution rate if there has not been an equivalent increase to the employer contribution rate over the previous three-year period.

The time-weighted market rates of return net of fees, for the six-year period ending June 30, 2017 were as follows:

Valuation as of June 30	Time-Weighted Rate of Return (Market Value) <sup>1</sup>
2017	10.14%
2016	1.29
2015	3.04
2014	14.91
2013	7.96
2012	3.43
Six-Year Average	6.69%

1. As provided by the Retirement System's investment consultant.

The time-weighted rate of return, net of fees, for the six-year period ending June 30, 2017 is 6.69%, as calculated by Aon Hewitt. Since the time-weighted rate of return exceeded 6.46% (the average of the annual interest rate adopted by the Board over the six-year period less 1.00%), the contribution rates for Class T-E and Class T-F members shall remain at 7.50% and 10.30%, respectively, for the period July 1, 2018 to June 30, 2021.

## Rate of Return

The investment return of the trust fund (i.e., total return including both realized and unrealized gains and losses) for fiscal years 2008/2009 through 2016/2017 is shown in the table below.

The rate of return on market value reflects the investment earnings on the market value of assets from the beginning of the fiscal year to the end of the fiscal year.

Fiscal Year	Rate of Return Based on Market Value <sup>1</sup>
2016/2017	10.1%
2015/2016	1.3
2014/2015	3.0
2013/2014	14.9
2012/2013	8.0
2011/2012	3.4
2010/2011	20.4
2009/2010	14.6
2008/2009	-26.5

1. Provided by PSERS' investment consultants (Aon Hewitt for fiscal years 2013/2014 - 2016/2017 and Wilshire Associates for prior years).

Table 1

Summary of Results of Actuarial Valuation as of June 30, 2017  
(\$ Amounts in Thousands)

Item	June 30, 2017	June 30, 2016
<b>Member Data</b>		
1. Number of Members		
a) Active Members	255,945	257,080
b) Vesteest <sup>1</sup>	24,515	23,437
c) Annuitants, Beneficiaries and Survivor Annuitants <sup>2</sup>	230,014	224,828
d) Total	<u>510,474</u>	<u>505,345</u>
2. Annualized Salaries (\$ Amounts in Thousands) <sup>3</sup>	\$ 13,033,919	\$ 12,851,289
3. Annual Annuities (\$ Amounts in Thousands)	\$ 5,816,388	\$ 5,666,392
<b>Valuation Results</b>		
4. Present Value of Future Pension Benefits		
a) Active Members	\$ 62,725,773	\$ 61,864,737
b) Inactive Members and Vesteest	1,944,846	1,829,457
c) Annuitants, Beneficiaries and Survivor Annuitants	56,184,146	55,314,858
d) Total	<u>\$ 120,854,765</u>	<u>\$ 119,009,052</u>
5. Present Value of Future Pension Normal Cost		
a) Active Members	\$ 9,849,017	\$ 9,737,924
b) Employer	9,156,931	9,281,727
c) Total	<u>\$ 19,005,948</u>	<u>\$ 19,019,651</u>
6. Pension Accrued Liability		
a) Active Members (4a) - (5c)	\$ 43,719,825	\$ 42,845,086
b) Inactive Members and Vesteest	1,944,846	1,829,457
c) Annuitants, Beneficiaries and Survivor Annuitants	56,184,146	55,314,858
d) Total	<u>\$ 101,848,817</u>	<u>\$ 99,989,401</u>
7. Health Insurance Assets for Premium Assistance	\$ 123,743	\$ 124,563
8. Total Accrued Liability for Funding (6) + (7)	\$ 101,972,560	\$ 100,113,964
9. Actuarial Value of Assets	\$ 57,460,599	\$ 57,390,069
10. Funded Status (9) / (8)	56.3 %	57.3 %
11. Unfunded Accrued Liability (8) - (9)	\$ 44,511,961	\$ 42,723,895
12. Total Normal Cost Rate	15.16 %	15.24 %
13. Member Contribution Rate	7.57 %	7.54 %
14. Employer Normal Cost Rate (12) - (13)	7.59 %	7.70 %
<b>Employer Annual Funding Requirement</b>		
15. Employer Contribution Rate Calculated by Actuaries	<b>Fiscal 2018/2019</b>	<b>Fiscal 2017/2018</b>
a) Normal Cost	7.59 %	7.70 %
b) Unfunded Accrued Liability	25.01	24.04
c) Preliminary Pension Rate	<u>32.60</u> %	<u>31.74</u> %
d) Health Insurance	0.83	0.83
e) Total Rate <sup>4</sup> = (15c) + (15d)	<u>33.43</u> %	<u>32.57</u> %

1. Excludes 123,574 and 120,083 inactive members and non-members as of June 30, 2017 and June 30, 2016, respectively, who are no longer participating and are valued for their accumulated deductions only.

2. Excludes 2,141 and 1,181 beneficiaries as of June 30, 2017 and June 30, 2016, respectively, who are only entitled to a pending lump sum distribution.

3. The salaries shown represent an annual rate of pay for members who were in active service on the valuation date.

4. The Act 120 minimum pension rate for the June 30, 2017 valuation is 7.59% and for the June 30, 2016 valuation is 7.70%.



**Table 2**

**Summary of Sources of Employer Contribution Rate as of June 30, 2017**  
 (\$ Amounts in Thousands)

	Funding Period (Years)	Beginning July 1	Initial Liability	6/30/2017 Outstanding Balance	Annual Payment	
					Amount	Percent <sup>1</sup>
1. Amortization of:						
a) Act 120 Fresh Start Unfunded Accrued Liability and Asset Method Change	24	2011	\$ 16,279,283	\$ 18,047,420	\$ 1,480,764	10.75 %
b) 2010 Experience	24	2011	3,419,297	3,776,126	309,825	2.25 %
c) 2011 Experience	24	2012	564,642	619,532	48,926	0.35 %
d) 2011 Assumption Changes	24	2012	4,592,397	5,038,833	397,929	2.89 %
e) 2012 Experience	24	2013	2,372,550	2,603,836	198,452	1.44 %
f) 2013 Experience	24	2014	2,707,494	2,965,082	218,618	1.59 %
g) 2014 Experience	24	2015	2,170,432	2,366,742	169,180	1.23 %
h) 2015 Experience	24	2016	1,941,277	2,103,682	146,077	1.06 %
i) 2016 Experience	24	2017	2,666,236	2,859,538	193,231	1.40 %
j) 2016 Assumption Changes	24	2017	2,521,326	2,704,122	182,729	1.32 %
k) 2017 Experience	24	2018	1,433,915	1,433,915	100,406	0.73 %
l) 2017 Act 5 <sup>2</sup>	24	2018	(6,867)	<u>(6,867)</u>	<u>(481)</u>	<u>0.00 %</u>
Total Amortization Payments				\$ 44,511,961	\$ 3,445,656	25.01 %
2. Employer Normal Cost Rate						<u>7.59 %</u>
3. Pension Rate (1) + (2) <sup>3</sup>						32.60 %
4. Health Insurance Rate						<u>0.83 %</u>
5. Final Total Employer Contribution Rate Calculated by Actuary: (3) + (4)						33.43 %

1. Based on Estimated Employer Payroll for Fiscal Year Ending 2019 of \$ 13,775,000.

2. Effective immediately, Class TE and Class TF members are eligible to elect a cost neutral Option 4 lump sum distribution of all or a portion of the member's accumulated contributions at retirement.

3. Cannot be less than the Act 120 Fiscal Year 2019 Minimum Employer Pension Rate (Employer Normal Cost Rate) of 7.59%.

Table 3

Determination of Health Insurance Contribution Rate for Fiscal Year 2018/2019  
(\$ Amounts in Thousands)

Item				
1.	June 30, 2017 Balance in Health Insurance Account		\$ 123,743	
2.	Estimated Fiscal 2017/2018 Contribution			
	(a) Contribution Rate Certified in 2016 Valuation		0.83%	
	(b) Estimated Fiscal 2017/2018 payroll		\$ 13,449,000	
	(c) Estimated Contribution = (a) x (b)		\$ 111,627	
3.	Estimated Number of Annuitants who:	Are Eligible	Elect Coverage	
	(a) Fiscal 2017/2018	149,000	93,870	
	(b) Fiscal 2018/2019	151,000	95,130	
	(c) Fiscal 2019/2020	152,800	96,264	
4.	Estimated Disbursements:	Administration	Assistance	Total
	(a) Fiscal 2017/2018	\$ 2,411	\$ 112,644	\$ 115,055
	(b) Fiscal 2018/2019	1,910	114,156	116,066
	(c) Fiscal 2019/2020	<u>2,006</u>	<u>115,517</u>	<u>117,523</u>
	(d) Total	\$ 6,327	\$ 342,317	\$ 348,644
5.	Required Fiscal 2018/2019 Contribution (4d) – (1) – (2c)		\$ 113,274	
6.	Required Health Insurance Contribution Rate			
	(a) Estimated 2018/2019 Payroll		\$ 13,775,000	
	(b) Required Health Insurance Contribution Rate (5) / (6a) (rounded up)		0.83%	

Notes:

1. Current estimates of fiscal 2017/2018 membership payroll and all administrative expenses were provided by PSERS staff.
2. 63% of eligible annuitants are assumed to elect coverage. This is the same coverage election rate used in the prior valuation.
3. Premium Assistance payments equal \$100 per month per eligible annuitant who elected coverage.

Table 4

Summary of Market Value of Plan Assets as of June 30, 2017  
(\$ Amounts in Thousands)

<b>Market Value</b>	
1. Market Value of Assets as of June 30, 2016	\$ 49,956,623
2. Contributions During Fiscal 2016/2017	4,957,605
3. Disbursements During Fiscal 2016/2017	6,583,808
4. Investment Return During Fiscal 2016/2017	
a) Investment Return (Net of Investment Expenses)	\$ 4,996,025
b) Administrative Expenses	<u>47,366</u>
c) Investment Return After Expenses (a) - (b)	\$ 4,948,659
5. Market Value of Assets as of June 30, 2017 (1) + (2) - (3) + (4c)	\$ 53,279,079
6. Rate of Return (per Aon Hewitt)	10.14 %
<b>Asset Allocation by Account</b>	
1. Members' Savings Account	\$ 15,500,215
2. Annuity Reserve Account	56,184,146
3. State Accumulation Account	(18,529,025)
4. Health Insurance Account	<u>123,743</u>
5. Total (1) + (2) + (3) + (4)	\$ 53,279,079

Table 5

Derivation of Actuarial Value of Assets as of June 30, 2017  
(\$ Amounts in Thousands)

1. Market Value of Assets as of June 30, 2017							\$	53,279,079
2. Determination of Deferred Gain (Loss)								
		Return on Assets			Recognized			Deferred
Fiscal								
<u>Year</u>	<u>Actual</u>	<u>Expected</u>	<u>Difference</u>		<u>Amount</u>	<u>% Deferred</u> <sup>3</sup>		<u>Amount</u>
2016/2017	\$ 4,948,659	\$ 4,101,830	\$ 846,829		\$ 84,683	90.00%	\$	762,146
2015/2016	426,974	4,220,500	(3,793,526)		(379,353)	80.00%		(3,034,821)
2014/2015	1,284,258	4,202,212	(2,917,954)		(291,795)	70.00%		(2,042,568)
2013/2014	7,057,089	4,193,490	2,863,599		286,360	60.00%		1,718,160
2012/2013	4,086,520	4,239,172	(152,652)		(15,265)	50.00%		(76,326)
2011/2012	1,057,435	4,303,637	(3,246,202)		(324,620)	40.00%		(1,298,481)
2010/2011	9,207,766	4,609,422	4,598,344		459,834	30.00%		1,379,503
2009/2010	6,100,499	4,651,504	1,448,995		144,900	20.00%		289,799
2008/2009	(16,237,298)	4,900,688	(21,137,986)		(1,878,932)	8.89%		(1,878,932)
2007/2008	(1,816,980)	4,728,472	(6,545,452)		(490,910)	0.00%		0
			\$ (28,036,005)		\$ (2,405,098)		\$	(4,181,520)
3. Preliminary Actuarial Value of Assets <sup>1,2</sup> (1) - (2)							\$	57,460,599
4. 70% of the Market Value of Assets (1) x 70%							\$	37,295,355
5. 130% of the Market Value of Assets (1) x 130%							\$	69,262,803
6. Actuarial Value of Assets: (3) not less than (4) and not greater than (5)							\$	57,460,599

1. The amounts reported include assets for both Pension and Health Insurance.
2. The rate of return on the actuarial value of assets was 3.00%. This investment return is based on the change in the actuarial value of assets from the June 30, 2016 valuation to the June 30, 2017 valuation. The actuarial value of assets developed above is a rolling ten-year average. The impact of investment gains and losses is not fully realized in the year the gain or loss arose but is smoothed in over a ten-year period.
3. The percentage amounts shown are rounded. The corresponding Deferred Amounts reflect the use of unrounded percentages.

Table 6

Analysis of Change in Unfunded Accrued as of June 30, 2017<sup>1</sup>  
(\$ Amounts in Thousands)

Item	Amount
1. Unfunded Accrued Liability at June 30, 2016	\$ 42,723,895
2. Interest Credit to June 30, 2017	3,191,323
3. Expected Contributions Toward Unfunded Accrued Liability	<u>2,830,306</u>
4. Expected Unfunded Accrued Liability at June 30, 2017 (1) + (2) - (3)	\$ 43,084,912
5. Actual Unfunded Accrued Liability at June 30, 2017	<u>44,511,961</u>
6. Increase (Decrease) from Expected (5) - (4)	\$ 1,427,049
7. Reasons for Increase (Decrease)	
(a) Experience Losses (Gains)	
(i) Loss from Investment Return on Actuarial Value of Assets	\$ 2,405,098
(ii) Loss from New Entrants and Pickups	290,054
(iii) Gain from Salary Increases Less than Expected	(486,091)
(iv) Gain from Mortality Experience	(77,014)
(v) Gain Terminations (retirement/disability/terminations) Experience	(127,024)
(vi) Gain from FY2017 retiree form of payment data update <sup>2</sup>	(156,029)
(vii) Gain from Data/Miscellaneous	<u>(415,078)</u>
Subtotal	\$ 1,433,916
(c) Change due to Act 5 Class T-E and Class T-F cost neutral Option 4 partial lump sum withdrawal	<u>(6,867)</u>
(d) Grand Total	\$ 1,427,049

1. The amounts reported include assets and liabilities for Pensions only.
2. PSERS Staff updated the data as of June 30, 2017 to reflect contingent beneficiaries who had predeceased the member and member had elected a Joint and Survivor Option

**Table 7**

**Schedule of Funding Progress for Pensions<sup>1</sup>**  
 (\$ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll <sup>2</sup>	Unfunded Accrued Liability as a Percentage of Covered Payroll
2017	\$ 57,336,856	\$ 101,848,817	\$ 44,511,961	56.3 %	\$ 13,033,919	341.5 %
2016	57,265,506	99,989,401	42,723,895	57.3	12,851,289	332.4
2015	57,240,946	94,576,710	37,335,764	60.5	12,678,213	294.5
2014	57,231,799	92,352,983	35,121,184	62.0	12,620,862	278.3
2013	57,353,262	89,951,816	32,598,554	63.8	12,577,105	259.2
2012	58,227,623	87,760,660	29,533,037	66.3	12,714,371	232.3

1. The amounts reported above include assets and liabilities for Pensions.
2. The salaries shown represent an annual rate of pay for the year ended June 30<sup>th</sup> for members who were in active service on June 30<sup>th</sup>.

The above schedule is not required by current GASB standards for pension plans. The information is provided for historical perspective as PSERS has transitioned to GASB Statement No. 67.

Table 8

**Solvency Test for Pensions  
Comparative Summary of Accrued Liability and  
Actuarial Value of Assets  
(\$ Amounts in Thousands)**

Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
					(1)	(2)	(3)
2017	\$ 15,500,215	\$ 56,184,146	\$ 30,164,456	\$ 57,336,856	100 %	74 %	0 %
2016	14,907,731	55,314,858	29,766,812	57,265,506	100	77	0
2015	14,079,658	52,739,489	27,757,563	57,240,946	100	82	0
2014	13,554,229	51,425,295	27,373,459	57,231,799	100	85	0
2013	13,089,342	49,979,444	26,883,030	57,353,262	100	89	0
2012	12,535,442	47,511,912	27,713,306	58,227,622	100	96	0

**Table 9**

**Schedule of Employer Contributions For Pensions**  
(\$ Amounts in Thousands)

Fiscal Year Ended June 30	Actuarially Determined Contribution	Actual Contributions Related to the Actuarially Determined Contribution	Contribution Deficiency (Excess)	Percentage Contributed
2017	\$ 3,824,908	\$ 3,824,908	\$ 0	100.0%
2016	3,540,304	3,181,438	358,866	89.9%
2015	3,289,615	2,596,731	692,884	78.9%
2014	2,965,715	1,992,084	973,631	67.2%

Valuation date: Actuarially determined contributions are calculated as of the June 30 preceding the fiscal year in which contributions are made. That is, the contribution calculated as of the June 30, 2016 actuarial valuation will be made during the fiscal year ended June 30, 2018.

**Schedule of Employer Contributions For Postemployment Benefits Other Than Pensions**  
(\$ Amounts in Thousands)

Fiscal Year Ended June 30	Actuarially Determined Contribution	Actual Contributions Related to the Actuarially Determined Contribution	Contribution Deficiency (Excess)	Percentage Contributed
2017	\$ 125,694	\$ 110,985	\$ 14,709	88.3%
2016	129,494	113,307	16,187	87.5%

Valuation date: Actuarially determined contributions are calculated as of the June 30 preceding the fiscal year in which contributions are made. That is, the contribution calculated as of the June 30, 2016 actuarial valuation will be made during the fiscal year ended June 30, 2018.

The Actuarially Determined Contribution is based on the Entry Age Normal Accrued Liability and assets as of the valuation date and a 30-year amortization of the unfunded accrued liability. See the Information Required Under Governmental Accounting Standards Board Statement No. 74 as of June 30, 2017 (published September 17, 2017) for additional information.



Table 10

History and Projection of Contribution Rates and Funded Ratios<sup>1</sup>

Fiscal Year Ending June	Budgeted Appropriation Payroll (thousands)	Contribution Rates <sup>2</sup>								Funded Ratio
		Employee	Employer Normal Cost	Employer Unfunded Liability	Preliminary Employer Pension	Final Employer Pension <sup>5</sup>	Act 5 Employer DC	Employer Health Insurance	Total Employer	
2008	\$ 12,881,244	7.25 %	6.68 %	(0.24) %	6.44 %	6.44 %		0.69 %	7.13 %	86.0 %
2009	12,500,000	7.29	6.68	(3.37)	3.31	4.00		0.76	4.76	79.2
2010 <sup>3</sup>	12,899,000	7.32	7.35	(3.72)	3.63	4.00		0.78	4.78	75.1
2011 <sup>3 4</sup>	13,510,000	7.34	8.08	(0.50)	7.58	5.00		0.64	5.64	69.1
2012	14,112,000	7.37	8.12	10.15	18.27	8.00		0.65	8.65	66.4
2013 <sup>6</sup>	14,297,000	7.40	8.66	12.99	21.65	11.50		0.86	12.36	63.8
2014	13,720,000	7.43	8.57	15.25	23.82	16.00		0.93	16.93	62.0
2015	13,482,000	7.46	8.46	17.51	25.97	20.50		0.90	21.40	60.6
2016	13,375,000	7.49	8.38	19.44	27.82	25.00		0.84	25.84	57.3
2017	13,549,000	7.52	8.31	20.89	29.20	29.20		0.83	30.03	<b>56.3</b>
2018 <sup>7</sup>	13,449,000	7.54	7.70	24.04	31.74	31.74		0.83	32.57	55.5
<b>2019</b>	<b>13,775,000</b>	<b>7.57</b>	<b>7.59</b>	<b>25.01</b>	<b>32.60</b>	<b>32.60</b>		<b>0.83</b>	<b>33.43</b>	56.5
2020	13,979,861	7.57	7.38	26.48	33.86	33.86	0.09 %	0.84	34.79	57.6
2021	14,202,716	7.57	7.23	27.02	34.25	34.25	0.18	0.83	35.26	58.3
2022	14,449,061	7.46	6.99	27.61	34.60	34.60	0.26	0.82	35.68	59.4
2023	14,714,166	7.37	6.76	28.41	35.17	35.17	0.34	0.81	36.32	60.6

- The projection of contribution rates is based on the assumption that there are no changes in demographic assumptions, no changes in benefit provisions, and no actuarial gains or losses other than gains or losses on the actuarial value of assets that result from recognizing currently deferred gains or losses on the market value of assets. In addition, a constant active population is assumed with future new members having same demographic characteristics of new members during the period 7/1/2014 to 6/30/2017. Further it is assumed that new members through June 30, 2019 are Class T-E members and after June 30, 2019, it is assumed that 65% of new members elect Class T-G, membership, 30% elect Class T-H membership and 5% elect DC Only participation under Act 5.
- In general, the Preliminary Employer Pension Rate equals the sum of the rates for the Employer Normal Cost and the Unfunded Liability; and the Final Employer Pension Rate is the greater of the Preliminary Pension Rate and any Pension Rate Floor or Collar stated in the Retirement Code. The Total Employer Rate is the sum of the Final Employer Pension Rate, Act 5 Employer DC Rate and the Employer Health Insurance Rate.
- At its January 2009 meeting, the Board voted to reduce the interest rate from 8.50% to 8.25% for the June 30, 2008 valuation and to 8.00% for subsequent valuations.
- Act 2010-46 recertified the fiscal year ended June 30, 2011 pension rate from 7.58% to 5.00%.
- The Final Employer Pension rate is limited by the Act 2010-120 pension rate collars for fiscal years 2012 through 2016.
- Revised actuarial assumptions based on a five-year experience review ended June 30, 2010 were used to determine the contributions for the fiscal year ending June 30, 2013 and thereafter, which include an interest rate of 7.50%.
- Revised actuarial assumptions based on a five-year experience review ended June 30, 2015 were used to determine the contributions for the fiscal year ending June 30, 2018 and thereafter, which include an interest rate of 7.25%.

Table 11

## History and Projection of Annuitants, Beneficiaries, Survivor Annuitants and Active Members

Valuation as of June 30	New Annuitants During the Year <sup>1</sup>	Annuitant Deaths During the Year	Annuitants at End of Year	Beneficiaries and Survivor Annuitants at End of Year	Total Annuitants, Beneficiaries and Survivor Annuitants	Active Members
2008			165,091	8,449	173,540	272,690
2009			169,919	8,044	177,963	279,701
2010			176,210	8,724	184,934	282,041
2011			183,665	10,957	194,622	279,152
2012			190,560	11,455	202,015	273,504
2013			197,735	11,469	209,204	267,428
2014			203,756	10,144	213,900	263,312
2015			209,266	10,509	219,775	259,868
2016			214,019	10,809	224,828	257,080
<b>2017</b>			<b>218,886</b>	<b>11,128</b>	<b>230,014</b>	<b>255,945</b>
2018	13,721	4,613	227,994	11,502	239,496	255,945
2019	12,156	4,764	235,386	11,856	247,242	255,945
2020	11,553	4,914	242,025	12,186	254,211	255,945
2021	10,799	5,057	247,767	12,492	260,259	255,945
2022	10,288	5,200	252,855	12,775	265,630	255,945
2023	9,807	5,337	257,325	13,038	270,363	255,945

1. The number for the fiscal year of the projection reflects the assumption that all active members age 74 and above, and that all vested inactive members who have reached superannuation age retire immediately.

Table 12

Description of Actuarial Assumptions and Methods

Assumptions

**Interest Rate:** 7.25% per annum, compounded annually (adopted as of June 30, 2016). The components are 2.75% for inflation and 4.50% for the real rate of return. Actuarial equivalent benefits are determined based on an interest rate of 4% per year (since 1960) except, in accordance with Act 5-2017, an interest rate of 7.25% per year is used for Class-TE and Class T-F members' Option 4 partial withdrawal of accumulated member contributions.

**Separation from Service:** Illustrative rates of assumed separation from service are shown in the following table (adopted as of June 30, 2016).

Age	Annual Rate of:						
	Withdrawal less than 5 Years of Service	Withdrawal		Death <sup>1</sup>	Disability	Early Retirement <sup>2</sup>	Superannuation Retirement
		Between 5 and 10 Years of Service	10 or More Years of Service				
<b>Males</b>							
25	14.85%	5.70%	2.57%	.041%	.020%		
30	12.74	3.37	2.57	.039	.020		
35	13.39	3.21	1.50	.044	.058		
40	14.49	3.97	1.34	.050	.116		
45	14.42	4.53	1.37	.084	.160		19.16%
50	14.31	4.45	1.92	.138	.284		19.16
55	12.17	4.43	3.38	.233	.442	18.57%	26.59
60	12.43	5.58	5.57	.379	.582	14.42	30.87
65				.700	.087		21.39
69				1.067	.135		19.34
<b>Females</b>							
25	13.41%	7.47%	5.02%	.013%	.018%		
30	13.81	6.05	4.02	.017	.023		
35	14.22	5.53	2.85	.024	.055		
40	11.79	4.87	1.60	.032	.096		
45	11.54	4.51	1.65	.051	.135		15.00%
50	11.66	4.43	2.06	.088	.229		15.00
55	11.75	4.38	3.11	.133	.368	18.59%	10.02
60	12.25	5.97	6.40	.196	.360	17.05	35.77
65				.327	.082		22.23
69				.443	.115		22.79

1. These base mortality tables will then be projected on a generational basis using the Conduent Modified 2015 projection scale from 2013 to the valuation date and thereafter.
2. Early Retirement – Age 55 with 25 years of service, but not eligible for Superannuation retirement.

**Death after Retirement:**

Male annuitants: RP-2014 male mortality table adjusted backward to 2006 with the MP-2014 improvement scale and projected to the valuation date with the Conduent Modified 2015 projection scale.

Female Annuitants: RP-2014 female mortality table adjusted backward to 2006 with the MP-2014 mortality improvement scale, projected to 2013 with the Conduent Modified 2015 projection scale adjusted for credibility. This base mortality table will then be projected on a generational basis using the Conduent Modified 2015 projection scale from 2013 to the valuation date.

Disabled annuitants: RP-2014 male and female disabled mortality tables adjusted backward to 2006 with the MP-2014 mortality improvement scale and projected from 2013 to the valuation date with the Conduent Modified 2015 projection scale.

The above base mortality tables are projected on a fully generational basis using the Conduent Modified 2015 projection scale from the valuation date.

For determination of actuarial equivalence, a unisex table based on the above base tables, with weightings of 25% of male and 75% of female mortality probabilities, is utilized. This table is then projected on a generational basis to 2020 using the Conduent Modified 2015 projection scale.

**Salary Increase:** Effective average of 5.00% per annum, compounded annually (adopted as of June 30, 2016). The components are 2.75% for inflation, and 2.25% for real wage growth and merit or seniority increases. Representative values are as follows:

Age	Annual Rate of Salary Increase
20	10.25%
30	7.75
40	5.75
50	3.75
55	3.25
60	3.25
65	3.25
70	3.25

**Payroll Growth:** A 3.50% per annum payroll growth assumption is used to liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 2010-120 and Act 2017-5, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010 and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability due to benefit enhancements will be funded over 10 years based on level-percent-of-pay amortization.

**Miscellaneous:**

Annuity Optional Forms Assumption for Retiring Active Members:

- 50% will elect Maximum Straight Life Annuity (MSLA)
- 20% will elect OPTION 1 (Straight life annuity with guaranteed payments equal to present value of MSLA)
- 20% will elect OPTION 2 (100% Joint and Survivor with males 3 years older than females)
- 10% will elect OPTION 3 (50% Joint and Survivor with males 3 years older than females)
- 0% will elect OPTION 4 annuity

Option 4 Lump Sum Elections: 80% of Class T-C, Class T-D, Class T-E and Class T-F members are assumed to elect a refund of contributions and a reduced annuity.

Withdrawal Annuity: 90% of members are assumed to commence payment immediately and 10% are assumed to defer payment to superannuation age.

**Health Insurance:**

Elections: 63% of eligible retirees are assumed to elect premium assistance.

Administrative Expenses: Assumed equal to 2% of contributions made during the year.

**Summary of Changes since the June 30, 2016 Valuation:**

Effectively immediately, Act 5-2017 allowed Class T-E and Class T-F members partial withdrawals of their accumulated member contributions upon retirement. An interest rate of 7.25% per year is used as the basis for actuarial equivalence this purpose.

**Methods**

**Calculations:** The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system, and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System.

**Asset Valuation Method:** A ten-year moving market average (five-year moving market average prior to June 30, 2010) value of assets that recognizes the 7.25% (7.50% prior to June 30, 2016, 8.25% prior to June 30, 2009, and 8.50% prior to June 30, 2008) actuarial expected investment return immediately and spreads the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets over a period of ten years. The averaging period is being phased-in from fiscal year 2007/2008. The actuarial value of assets can be no less than 70% and no more than 130% of the market value of assets

**Actuarial Cost Method for Pension Funding:** Entry Age Normal Cost Method (modified slightly as of June 30, 2005 to use a pay-weighted average normal contribution rate). The results of each June 30 valuation normally determine the employer contribution rate for the second succeeding fiscal year. Act 120 revised the funding method effective with the June 30, 2010 valuation. Act 120 mandated that the outstanding balance of the unfunded accrued liability as of June 30, 2010, including changes in the unfunded accrued liability due to the funding reforms of Act 120, be amortized over a 24-year period, as a level percent of pay, beginning July 1, 2011. Future valuation gains and losses, and changes in the unfunded accrued liability resulting from changes in actuarial assumptions and methods, are amortized over a 24-year period, as a level percent of pay. As provided by Act 5-2017, future increases in the unfunded accrued liability due to benefit enhancement legislation will be amortized over 10-year periods, as a level percent of pay. Act 120 also modified the employer pension contribution requirements by imposing collars on the rate at which employer contributions may rise from year to year. For the fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014 the pension contribution rate can be no more than 3%, 3.5% and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with the fiscal year ending June 30, 2017, the actuarially required contribution rate is less than the collared rate and the final contribution rate is the actuarially determined contribution rate. However, as provided by Act 120-2010, the final contribution rate is not less than the employer normal contribution rate.

**Actuarial Cost Method for Health Insurance Funding:** The actuarial liability equals the assets in the health insurance account, and the results of the June 30 valuation determine the contribution rate for the second succeeding fiscal year. The rate so determined is the rate necessary to establish reserves sufficient to cover administrative expenses and provide premium assistance payments for all participating eligible annuitants during the third fiscal year that follows the valuation date.

**Summary of Changes since the June 30, 2016 Valuation:**

Act 5-2017 imposed a restriction on the actuarial value of assets to be no less than 70% and no more than 130% of the market value of assets.

**Data**

**Census and Assets:** The valuation was based on members of the Retirement System as of June 30, 2017 and does not take into account future members. All census data was supplied by the Retirement System and was subject to reasonable consistency checks. The actuaries adjust the data to account for service and pay earned by members on or before the valuation that is not reported by the Retirement System until after the actuarial valuation is performed. Asset data was supplied by the Retirement System.

Table 13

Summary of Benefit and Contribution Provisions

**Membership**

For valuation purposes, all employees are considered to be full coverage. All employees who become members on and after January 1, 1966 are members of the dual coverage group. Dual coverage members contribute to both PSERS and to Social Security.

**Benefits**

**Superannuation Annuity**

Eligibility Age 62, or age 60 with 30 years of service, or 35 years of service regardless of age. For Class T-E and Class T-F members, age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service

Amount 2.5% of final average salary times years of school service and intervening military service. 2% of final average salary for non-school service, for members who did not elect Class T-D coverage, and for Class T-E members. Minimum of \$100 per year of service. "Final average salary" means the highest average annual salary for any 3 years of service.

Annual salary is subject to a limit of \$200,000, as adjusted under Section 401(a)(17) of the Internal Revenue Code. As of June 30, 2017, the adjusted limit is \$270,000.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E and Class T-F members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

**Early Retirement Annuity**

Eligibility Age 55 with 25 years of service.

Amount Accrued benefit as of date of retirement, reduced 1/4% for each month by which commencement of payments precedes Superannuation Age.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E and Class T-F members, the maximum benefit is equal to the lesser of the limit

established by Section 415 of the Internal Revenue Code or 100% of final average salary.

### **Withdrawal Annuity**

Eligibility	5 years of service. For Class T-E and Class T-F members, ten years of service.
Amount	Accrued benefit deferred to superannuation retirement age or an actuarially reduced benefit payable immediately.

### **Disability Annuity**

Eligibility	5 years of service.
Amount	The standard single life annuity if the total number of years of credited service is greater than 16.667, otherwise the standard single life annuity multiplied by the lesser of the following ratios: $(Y^*/Y)$ or $(16.667/Y)$ where Y is the number of years of credited service and Y* is the total years of credited service if the member were to continue as a school employee until superannuation retirement age (or at current age, if later). Minimum of \$100 per year of service.

### **Return of Contributions**

Eligibility	Death or separation from service and member does not qualify for other benefits.
Amount	Refund of accumulated deductions includes interest (less annuity payments received prior to death in the case of a retired member).

### **Death Benefit**

Eligibility	Death of an active member or vestee who was eligible to receive an annuity.
Amount	The present value of the annuity that would have been effective if the member retired on the day before death. Option 1 assumed payable if no other option elected.

### **Normal and Optional Forms of Benefits**

Normal Form (Maximum):	Life annuity with a guaranteed payment equal to member contributions with interest.
Option 1:	Reduced benefit with refund of balance of present value of annuity at retirement over payments received. If balance is less than \$5,000, benefit is paid in lump sum; otherwise, beneficiary may elect annuity and/or lump sum.



- Option 2: Joint and 100% survivorship annuity.
- Option 3: Joint and 50% survivorship annuity.
- Option 4: Benefit of equivalent actuarial value, including lump sum payment of member contributions.

### **Health Care Premium Assistance**

- Eligibility** Retired members who:
- (a) have 24½ or more years of service, or
  - (b) are disability annuitants, or
  - (c) have 15 or more years of service and who both terminated school service and retired after attaining superannuation age and
  - (d) participate in the PSERS health options program or in an employer-sponsored health insurance program.
- Amount** Participating eligible annuitants receive health insurance premium assistance payments from the Health Insurance Account equal to the lesser of \$100 per month or the actual monthly premium. All administrative expenses necessary to operate the health insurance premium assistance program are to be funded by the Health Insurance Account. The Health Insurance Account is credited with contributions of the Commonwealth and the employers.

### **Contributions**

- By Members** Members who elected coverage under Class T-D and who were most recently enrolled prior to July 22, 1983 contribute at a rate of 6½% of compensation, while members who elected coverage under Class T-D and who were most recently enrolled on or after July 22, 1983 contribute at a rate of 7½% of compensation. Members who did not elect coverage under Class T-D and who were most recently enrolled prior to July 22, 1983 contribute at a rate of 5¼% of compensation, while members who did not elect coverage under Class T-D and who were most recently enrolled on or after July 22, 1983 and prior to July 1, 2001 contribute at a rate of 6¼% of compensation. Anyone who enrolls or re-enrolls on or after July 1, 2001 automatically has coverage under class T-D for subsequent school service and subsequent intervening military service, and must contribute at a rate of 7½% of compensation.

The base contribution rate for Class T-E members is 7½% of compensation. The base contribution rate for Class T-F members is 10.3% of compensation. Class T-E and Class T-F members are subject to a

"shared-risk" employee contribution rate. Members benefit when investments of the fund are doing well and share some of the risk when investments underperform. The member contribution rate will stay within the specified range allotted for Class T-E or Class T-F members, but could increase or decrease every three years starting July 1, 2015 depending on investment performance. The member contribution rate can never go below the base rate of 7.5% for Class T-E members and 10.3% for Class T-F members, nor above 9.5% for Class T-E members and 12.3% for class T-F members. If the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return based on the prior ten-year period, the member contribution rate will decrease by .5%. Likewise, the member contribution rate will increase by .5% if the investment rate of return (less investment fees) during the ten-year period is 1.0% or more below the assumed rate of return. If the Retirement System is fully funded at the time of the comparison, the member contribution rate reverts to the base rate for the Class. There shall not be an increase in the member contribution rate if there has not been an equivalent increase in the employer contribution rate over the previous three-year period. Until a full ten-year look back period is available, the investment return measurement period will begin on July 1, 2011.

By Commonwealth and  
School Districts

Balance of required contribution determined as normal contribution, accrued liability contribution, supplemental annuity contribution, experience adjustment factor and premium assistance contribution, is funded by the Commonwealth and the School District.

**Table 14**

**Summary of Membership Data as of June 30, 2017**  
 (\$ Amounts in Thousands)

**Total Active Members<sup>1</sup>**

Item	Male	Female	Total
Number of Members	69,905	186,040	255,945
Total Annual Salaries <sup>6</sup>	\$ 3,940,441	\$ 9,093,478	\$ 13,033,919
Average Age <sup>7</sup>	45.0	45.3	45.2
Average Service <sup>7</sup>	11.7	11.3	11.4

<sup>1</sup>. Excludes 148,089 inactive members and vestees.

**Class T-C Members<sup>2</sup>**

Item	Male	Female	Total
Number of Members	830	2,617	3,447
Total Annual Salaries <sup>6</sup>	\$ 53,391	\$ 124,761	\$ 178,152
Average Age <sup>7</sup>	50.3	52.9	52.3
Average Service <sup>7</sup>	20.9	19.0	19.4

<sup>2</sup>. Excludes 29,378 inactive members and vestees.

**Class T-D Members<sup>3</sup>**

Item	Male	Female	Total
Number of Members	49,531	135,300	184,831
Total Annual Salaries <sup>6</sup>	\$ 3,281,621	\$ 7,541,818	\$ 10,823,439
Average Age <sup>7</sup>	47.1	47.7	47.6
Average Service <sup>7</sup>	15.4	14.4	14.7

<sup>3</sup>. Excludes 80,483 inactive members and vestees.

<sup>6</sup>. The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2017 for members who were in active service on June 30, 2017.

<sup>7</sup>. Average completed years of age and service.

**Table 14**  
(Continued)

**Summary of Membership Data as of June 30, 2017**  
(\$ Amounts in Thousands)

**Class T-E Members<sup>4</sup>**

Item	Male	Female	Total
Number of Members	16,253	40,200	56,453
Total Annual Salaries <sup>6</sup>	\$ 466,922	\$ 1,130,898	\$ 1,597,820
Average Age <sup>7</sup>	39.3	38.0	38.4
Average Service <sup>7</sup>	1.9	2.1	2.0

<sup>4.</sup> Excludes 36,589 inactive members.

**Class T-F Members<sup>5</sup>**

Item	Male	Female	Total
Number of Members	3,291	7,923	11,214
Total Annual Salaries <sup>6</sup>	\$ 138,507	\$ 296,001	\$ 434,508
Average Age <sup>7</sup>	39.2	37.0	37.7
Average Service <sup>7</sup>	2.5	2.4	2.4

<sup>5.</sup> Excludes 1,639 inactive members.

<sup>6.</sup> The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2017 for members who were in active service on June 30, 2017.

<sup>7.</sup> Average completed years of age and service.

**Table 14  
(Continued)**

**Summary of Membership Data as of June 30, 2017  
(\$ Amounts in Thousands)**

**Total Annuitants and Beneficiaries<sup>1</sup>**

Item	Number	Annual Annuities <sup>2</sup>	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	209,715	\$ 5,479,348	\$ 26,128	70.7
Survivors and Beneficiaries	11,128	156,000	\$ 14,019	75.8
Disabled Annuitants	<u>9,171</u>	<u>181,040</u>	\$ 19,740	64.6
<b>Total</b>	<b>230,014</b>	<b>\$ 5,816,388</b>	<b>\$ 25,287</b>	<b>70.7</b>

**New Annuitants and Beneficiaries**

**Who Retired Between July 1, 2016 and June 30, 2017**

Item	Number <sup>3</sup>	Annual Annuities <sup>2</sup>	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	10,213	\$ 248,891	\$ 24,370	60.8
Survivors and Beneficiaries	3,072	16,008	\$ 5,211	66.2
Disabled Annuitants	<u>360</u>	<u>9,017</u>	\$ 25,048	54.3
<b>Total</b>	<b>13,645</b>	<b>\$ 273,917</b>	<b>\$ 20,075</b>	<b>61.8</b>

1. The median annual benefit payable to all annuitants and beneficiaries is \$20,405.
2. The annuities shown in the tables above represent the annual amount payable as of July 1, 2017 for participants who were in payment on June 30, 2017.
3. Excludes 1,201 newly reported annuitants who retired prior to June 30, 2016 and 168 members who retired after June 30, 2016 but died prior to June 30, 2017.

**Table 14  
(Continued)**

**Distribution of Annuitants, Beneficiaries, and Survivors by Annual Pension Amount  
As of June 30, 2017**

1. All annuitants, beneficiaries, and survivors

Annual Pension Amount	Number	Average Years of Service
Under \$10,000	81,723	12
\$10,000 - \$19,999	32,178	21
\$20,000 - \$29,999	26,154	27
\$30,000 - \$39,999	28,534	30
\$40,000 - \$49,999	27,409	32
\$50,000 - \$59,999	18,123	34
\$60,000 - \$69,999	8,969	35
\$70,000 - \$79,999	3,978	36
\$80,000 - \$89,999	1,482	37
\$90,000 - \$99,999	681	37
\$100,000 or more	783	38
Total	230,014	23

2. Excludes annuitants, beneficiaries, and survivors with no service on file

Annual Pension Amount	Number	Average Years of Service
Under \$10,000	78,743	13
\$10,000 - \$19,999	30,319	23
\$20,000 - \$29,999	25,237	28
\$30,000 - \$39,999	28,092	31
\$40,000 - \$49,999	27,153	33
\$50,000 - \$59,999	17,980	34
\$60,000 - \$69,999	8,911	35
\$70,000 - \$79,999	3,958	36
\$80,000 - \$89,999	1,475	37
\$90,000 - \$99,999	677	37
\$100,000 or more	777	38
Total	223,322	24

**Exhibit I**

**Active Membership Data as of June 30, 2017**

**Number and Average Annual Salary**

Age	Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25	6,550 \$24,662	43 \$33,830								6,593 \$24,722
25-29	15,689 \$36,619	4,160 \$50,971	48 \$39,847							19,897 \$39,627
30-34	8,703 \$34,848	13,652 \$55,405	6,013 \$63,185	23 \$54,040						28,391 \$50,750
35-39	7,016 \$28,212	6,331 \$53,222	15,321 \$67,104	4,202 \$75,627	22 \$43,719					32,892 \$57,210
40-44	7,230 \$24,426	4,549 \$44,782	6,826 \$63,820	11,576 \$78,908	2,553 \$85,212	22 \$61,386				32,756 \$59,479
45-49	7,840 \$22,681	5,545 \$36,973	6,151 \$54,461	7,337 \$73,337	8,916 \$85,807	1,965 \$83,490	34 \$52,805			37,788 \$57,870
50-54	6,205 \$21,768	5,275 \$33,023	6,425 \$43,920	5,559 \$57,153	4,294 \$76,418	5,079 \$83,145	1,741 \$80,577	43 \$55,612		34,621 \$52,057
55-59	4,912 \$20,602	4,341 \$30,999	6,167 \$40,873	6,586 \$49,267	4,350 \$61,383	3,017 \$73,253	2,891 \$82,818	604 \$73,566	21 \$53,035	32,889 \$48,201
60-64	3,160 \$18,722	2,638 \$29,923	3,509 \$39,472	4,350 \$47,685	3,423 \$56,484	2,209 \$62,733	948 \$68,448	665 \$81,308	210 \$76,022	21,112 \$45,040
Over 64	2,491 \$14,204	1,637 \$22,161	1,411 \$31,935	1,247 \$40,486	857 \$47,446	653 \$50,099	347 \$55,341	151 \$63,079	212 \$80,340	9,006 \$31,795
<b>Total</b>	69,796 \$27,545	48,171 \$44,416	51,871 \$55,877	40,880 \$65,329	24,415 \$74,246	12,945 \$75,705	5,961 \$78,108	1,463 \$75,475	443 \$76,999	255,945 \$50,925

**Exhibit II**

**The Number of Average Annual Annuity as of June 30, 2017**

**Retired on Account of Superannuation, Early Retirement and Those  
in Receipt of Withdrawal Annuities**

Age	Years of Service									Total
	0-4 <sup>1</sup>	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 50		4,810	1,546	417	132	29	2			6,936
		\$893	\$2,794	\$7,065	\$14,024	\$21,265	\$21,005			\$2,025
50-54		1,664	1,118	485	248	170	55	16	1	3,757
		\$1,193	\$2,745	\$6,601	\$14,001	\$23,843	\$34,487	\$43,819	\$9,498	\$4,894
55-59		1,705	1,592	995	599	909	1,682	769	14	8,265
		\$1,644	\$3,266	\$8,005	\$15,200	\$33,273	\$47,801	\$54,937	\$53,009	\$21,616
60-64	89	2,446	3,336	2,809	2,775	3,585	6,470	5,315	251	27,076
	\$1,993	\$3,017	\$5,610	\$12,309	\$21,546	\$34,450	\$48,450	\$59,720	\$58,783	\$32,860
65-69	679	3,263	5,788	5,081	5,144	6,506	12,731	11,931	1,219	52,342
	\$1,746	\$3,851	\$6,057	\$13,070	\$22,079	\$32,095	\$45,007	\$57,492	\$68,107	\$33,996
70-74	1,252	2,609	5,030	4,289	4,212	4,998	12,220	8,756	1,179	44,545
	\$1,232	\$3,491	\$5,018	\$10,698	\$18,420	\$28,086	\$38,142	\$52,606	\$66,234	\$29,285
75-79	1,145	1,669	3,029	2,990	2,997	3,535	6,723	4,957	918	27,963
	\$938	\$2,899	\$4,470	\$8,831	\$14,652	\$22,659	\$32,618	\$41,756	\$57,106	\$23,193
80-84	652	1,030	2,266	2,143	2,491	2,693	3,582	2,507	903	18,267
	\$742	\$2,277	\$3,711	\$6,971	\$11,616	\$18,844	\$28,235	\$36,648	\$43,727	\$18,523
85-89	412	663	1,617	1,681	1,964	2,012	2,063	1,470	702	12,584
	\$737	\$1,845	\$3,420	\$6,275	\$11,228	\$17,476	\$25,151	\$34,332	\$42,258	\$16,436
Over 89	322	466	1,177	1,334	1,373	1,269	874	816	349	7,980
	\$1,149	\$1,617	\$3,406	\$6,339	\$10,620	\$15,616	\$20,850	\$26,777	\$36,636	\$12,637
Total	4,551	20,325	26,499	22,224	21,935	25,706	46,402	36,537	5,536	209,715
	\$1,129	\$2,327	\$4,645	\$9,959	\$17,089	\$26,975	\$39,338	\$51,399	\$56,172	\$26,128

1. Includes 14 annuitant records with no service information provided.



Exhibit III

The Number and Average Annual Annuity as of June 30, 2017

Beneficiaries and Survivor Annuitants

Age	Years of Service								Total
	0-9 <sup>1</sup>	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 50	211	23	16	15	20	12	8	2	307
	\$12,767	\$4,568	\$3,855	\$4,526	\$7,964	\$13,730	\$16,349	\$13,592	\$7,272
50-54	149	9	14	17	9	6	4	6	214
	\$18,711	\$2,100	\$4,248	\$7,088	\$10,816	\$10,527	\$23,041	\$13,791	\$9,058
55-59	316	18	21	17	17	14	9	9	421
	\$30,042	\$4,088	\$7,039	\$8,067	\$11,426	\$13,395	\$11,738	\$11,817	\$11,765
60-64	621	29	38	49	43	34	29	11	854
	\$28,714	\$5,412	\$6,062	\$7,486	\$14,792	\$16,836	\$19,017	\$13,993	\$15,921
65-69	1,044	44	32	38	48	100	78	10	1,394
	\$24,359	\$4,246	\$6,076	\$8,770	\$14,149	\$17,044	\$22,426	\$12,794	\$19,664
70-74	1,066	49	57	58	60	174	129	26	1,619
	\$27,987	\$2,910	\$5,706	\$9,528	\$12,650	\$17,958	\$22,835	\$13,613	\$18,057
75-79	1,034	68	79	66	78	161	167	47	1,700
	\$18,159	\$3,567	\$6,314	\$8,048	\$13,673	\$18,061	\$20,707	\$20,490	\$15,317
80-84	947	89	81	87	83	170	128	88	1,673
	\$14,024	\$3,029	\$4,330	\$7,426	\$10,816	\$13,164	\$18,124	\$22,290	\$12,340
85-89	797	90	117	99	98	141	143	85	1,570
	\$13,329	\$3,258	\$4,258	\$7,270	\$9,140	\$12,670	\$14,215	\$19,174	\$11,054
Over 89	548	109	91	112	109	137	182	88	1,376
	\$11,893	\$2,583	\$4,182	\$6,269	\$8,112	\$9,881	\$11,866	\$16,366	\$9,153
Total <sup>2</sup>	6,733	528	546	558	565	949	877	372	11,128
	\$15,527	\$3,354	\$5,032	\$7,486	\$11,096	\$14,861	\$17,726	\$18,405	\$14,019

1. Includes 6,608 beneficiary or survivor annuitant records with no service information provided.

2. In addition, there are 2,141 beneficiaries who are only entitled to a pending lump sum distribution.

Exhibit IV

The Number and Average Annual Annuity as of June 30, 2017

Retired on Account of Disability

Age	Years of Service								Total	
	0-4	5-9 <sup>1</sup>	10-14	15-19	20-24	25-29	30-34	35-39		40+
Under 50	183	181	125	50	3					542
	\$15,514	\$19,911	\$25,863	\$37,685	\$52,240					\$21,581
50-54	184	192	127	111	95	8				717
	\$12,399	\$15,186	\$22,254	\$33,585	\$44,276	\$47,859				\$22,790
55-59	288	329	303	237	168	69	2			1,396
	\$10,554	\$14,191	\$19,602	\$30,155	\$40,916	\$44,121	\$41,573			\$22,060
60-64	400	470	385	353	276	124	1	1		2,010
	\$9,802	\$13,344	\$17,340	\$25,743	\$37,501	\$46,433	\$53,592	\$39,130		\$20,961
65-69	320	354	294	334	383	202	3	4		1,894
	\$8,197	\$11,235	\$16,673	\$24,422	\$34,490	\$46,852	\$38,986	\$22,504		\$22,460
70-74	182	264	215	229	238	107	6	1		1,242
	\$6,745	\$9,384	\$12,530	\$20,438	\$29,095	\$38,142	\$34,795	\$49,884		\$17,990
75-79	112	169	156	137	90	24		1		689
	\$5,155	\$7,823	\$9,970	\$15,787	\$24,786	\$30,806		\$10,189		\$12,478
80-84	65	106	84	63	45	9	3			375
	\$5,095	\$6,799	\$8,472	\$14,200	\$20,112	\$25,109	\$43,058			\$10,449
85-89	42	68	43	39	21	2		1		216
	\$3,642	\$5,710	\$8,142	\$12,006	\$19,357	\$26,110		\$54,601		\$8,671
Over 89	18	26	15	12	13	5	1			90
	\$3,751	\$6,368	\$8,218	\$8,482	\$16,870	\$20,401	\$24,751			\$8,936
Total	1,794	2,159	1,747	1,565	1,332	550	16	8		9,171
	\$9,510	\$12,270	\$16,606	\$24,463	\$34,146	\$43,363	\$38,524	\$30,477		\$19,740

1. Includes 2 annuitant records with no service information provided.

**Exhibit V**

**Annuitant and Beneficiary Membership Data as of June 30, 2017**

**Number and Average Annual Benefit  
Excludes Partial Lump Sum Payments**

Age Last Birthday	Number	Annual Benefit (Thousands)	Average Annual Benefit
<b>Annuitants (Normal, Early and Withdrawal)</b>			
Under 60	18,958	\$ 211,092	\$ 11,135
60 - 64	27,076	889,718	32,860
65 - 69	52,342	1,779,443	33,996
70 - 74	44,545	1,304,504	29,285
75 - 79	27,963	648,550	23,193
Over 79	38,831	646,041	16,637
Total	209,715	\$ 5,479,348	\$ 26,128
<b>Survivors and Beneficiaries</b>			
Under 60	942	\$ 9,124	\$ 9,686
60 - 64	854	13,596	15,920
65 - 69	1,394	27,412	19,664
70 - 74	1,619	29,234	18,057
75 - 79	1,700	26,040	15,318
Over 79	4,619	50,594	10,953
Total	11,128	\$ 156,000	\$ 14,019
<b>Disabled Annuitants</b>			
Under 60	2,655	\$ 58,833	\$ 22,159
60 - 64	2,010	42,131	20,961
65 - 69	1,894	42,539	22,460
70 - 74	1,242	22,344	17,990
75 - 79	689	8,598	12,479
Over 79	681	6,595	9,684
Total	9,171	\$ 181,040	\$ 19,740
<b>Grand Total Average Annual Benefit</b>	230,014	\$ 5,816,388	\$ 25,287

**Exhibit VI**

**10-Year History of Membership Data**

**Active Members**

Valuation as of June 30	Number of Active Members	Percentage Change in Membership	Total Annualized Payroll (Thousands) <sup>1</sup>	Percentage Change in Payroll
2017	255,945	(0.44%)	\$ 13,033,919	1.42%
2016	257,080	(1.07%)	12,851,289	1.37%
2015	259,868	(1.31%)	12,678,213	0.45%
2014	263,312	(1.54%)	12,620,862	0.35%
2013	267,428	(2.22%)	12,577,105	(1.08%)
2012	273,504	(2.02%)	12,714,371	(1.52%)
2011	279,152	(1.02%)	12,910,043	0.95%
2010	282,041	0.84%	12,788,847	2.11%
2009	279,701	2.57%	12,524,593	5.06%
2008	272,690	3.28%	11,921,469	4.48%

1. The salaries shown represent an annual rate of pay for the year ending June 30<sup>th</sup> for members who were in active service on June 30<sup>th</sup>.

**Exhibit VI**  
(Continued)

**10-Year History of Membership Data**

**The Number and Annual Annuities of Annuitant and Survivor Annuitant Members**

Year Ended June 30	Number	Annual Annuities <sup>1</sup> (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2017	230,014	\$ 5,816.4	\$ 25,287	12,876	\$ 274.2	7,690	\$ 102.1	2.31%	2.65%
2016	224,828	5,666.4	25,203	12,686	267.1	7,633	93.5	2.30%	2.64%
2015	219,775	5,520.6	25,119	15,017	297.3	9,142	91.7	2.75%	3.39%
2014	213,900	5,339.5	24,962	15,225	300.5	8,878	84.9	3.06%	3.74%
2013	207,553	5,147.1	24,800	16,404	377.6	10,866	83.7	2.74%	5.63%
2012	202,015	4,872.9	24,121	14,579	332.7	7,186	66.6	3.80%	4.78%
2011	194,622	4,650.8	23,897	16,228	453.7	6,540	76.4	5.24%	7.17%
2010	184,934	4,339.6	23,466	12,649	372.8	5,678	77.6	3.92%	8.59%
2009	177,963	3,996.3	22,456	9,651	314.9	5,228	74.4	2.55%	4.85%
2008	173,540	3,811.5	21,964	10,911	345.3	5,397	73.9	3.28%	8.18%

1. The annual annuities added and deleted are for the annuitants and survivor annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

**10-Year History of Membership Data**

**The Number and Annual Annuities of Annuitant Members**

Year Ended June 30	Number	Annual Annuities <sup>2</sup> (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2017	218,886	\$ 5,660.4	\$ 25,860	11,942	\$ 257.9	7,075	\$ 95.8	2.27%	2.54%
2016	214,019	5,520.0	25,792	11,807	249.8	7,054	88.1	2.27%	2.54%
2015	209,266	5,383.3	25,725	12,624	279.2	7,114	86.5	2.70%	3.30%
2014	203,756	5,211.4	25,577	12,915	283.9	6,894	80.0		

2. The annual annuities added and deleted are for the annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

**Exhibit VII**

**Detailed Tabulations of the Data**

Table 1

The Number and Annual Salaries of Members in Active Service Distributed  
by Age as of June 30, 2017

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
17	31	\$ 113,465	14	\$ 22,493	45	\$ 135,958
18	55	287,586	34	192,090	89	479,676
19	123	1,247,286	91	1,041,133	214	2,288,419
20	176	2,157,755	165	1,961,278	341	4,119,033
21	259	3,150,426	263	3,150,180	522	6,300,606
22	332	5,623,632	520	9,847,916	852	15,471,548
23	550	13,347,460	1,281	37,516,996	1,831	50,864,456
24	791	21,640,433	1,908	61,692,107	2,699	83,332,540
25	919	27,506,180	2,352	84,793,890	3,271	112,300,070
26	986	33,819,988	2,706	102,635,017	3,692	136,455,005
27	1,140	41,583,432	3,001	120,521,263	4,141	162,104,695
28	1,124	43,854,885	3,157	133,294,961	4,281	177,149,846
29	1,169	50,648,983	3,343	149,808,640	4,512	200,457,623
30	1,361	62,859,636	3,670	173,565,341	5,031	236,424,977
31	1,513	72,672,487	4,006	195,468,851	5,519	268,141,338
32	1,630	84,553,903	4,157	211,215,701	5,787	295,769,604
33	1,587	86,418,166	4,290	223,659,360	5,877	310,077,526
34	1,658	91,198,069	4,519	239,232,783	6,177	330,430,852
35	1,847	106,910,298	4,686	255,921,830	6,533	362,832,128
36	1,879	111,613,682	4,788	263,021,786	6,667	374,635,468
37	1,900	118,199,785	4,767	266,970,539	6,667	385,170,324
38	1,906	118,581,515	4,745	265,050,838	6,651	383,632,353
39	1,810	118,190,368	4,564	257,275,352	6,374	375,465,720
40	1,924	125,215,403	4,664	263,222,959	6,588	388,438,362
41	1,893	127,281,668	4,551	255,529,476	6,444	382,811,144
42	1,822	124,575,815	4,606	260,862,841	6,428	385,438,656
43	1,879	129,560,345	4,654	258,440,694	6,533	388,001,039
44	1,955	135,783,946	4,808	267,814,349	6,763	403,598,295
45	2,091	143,983,066	5,317	291,856,484	7,408	435,839,550
46	2,222	152,438,420	5,918	324,247,552	8,140	476,685,972
47	2,003	139,138,937	5,775	317,788,426	7,778	456,927,363
48	1,964	134,814,116	5,527	291,060,408	7,491	425,874,524
49	1,827	124,945,584	5,144	266,531,059	6,971	391,476,643
50	1,774	115,620,530	5,149	259,495,802	6,923	375,116,332
51	1,818	118,385,012	4,934	242,576,878	6,752	360,961,890
52	1,745	108,950,022	5,257	248,352,417	7,002	357,302,439
53	1,776	112,900,942	5,309	247,832,801	7,085	360,733,743
54	1,706	103,308,153	5,153	244,852,705	6,859	348,160,858
55	1,681	98,171,875	5,219	241,955,673	6,900	340,127,548
56	1,675	98,741,624	5,303	242,598,909	6,978	341,340,533

**Table 1**  
(Continued)

**The Number and Annual Salaries of Members in Active Service Distributed  
by Age as of June 30, 2017**

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
57	1,553	\$ 88,891,208	4,902	\$ 218,974,125	6,455	\$ 307,865,333
58	1,560	84,455,063	4,797	220,333,541	6,357	304,788,604
59	1,518	81,109,261	4,681	210,057,454	6,199	291,166,715
60	1,395	74,816,188	4,411	196,109,442	5,806	270,925,630
61	1,248	63,327,301	3,837	171,807,022	5,085	235,134,323
62	1,107	52,524,412	2,977	127,409,574	4,084	179,933,986
63	918	41,150,888	2,481	104,525,517	3,399	145,676,405
64	774	35,954,963	1,964	83,255,459	2,738	119,210,422
65	626	25,554,754	1,375	53,111,473	2,001	78,666,227
66	462	18,430,369	933	34,260,519	1,395	52,690,888
67	363	13,560,944	714	23,897,639	1,077	37,458,583
68	343	10,658,145	542	15,881,349	885	26,539,494
69	291	8,533,551	476	13,327,025	767	21,860,576
70	263	7,682,613	420	11,786,546	683	19,469,159
71	168	4,186,644	202	5,591,820	370	9,778,464
72	157	4,205,082	181	4,137,022	338	8,342,104
73	137	3,239,407	181	3,719,879	318	6,959,286
74	125	3,193,278	144	3,185,924	269	6,379,202
75	89	2,239,905	130	2,526,631	219	4,766,536
76	73	1,395,615	100	1,853,283	173	3,248,898
77	61	1,311,372	56	1,048,500	117	2,359,872
78	36	867,415	50	1,067,723	86	1,935,138
79	34	840,587	50	879,431	84	1,720,018
80	29	607,774	38	563,940	67	1,171,714
81	25	561,757	25	360,480	50	922,237
82	17	305,460	16	207,950	33	513,410
83	14	411,220	18	300,476	32	711,696
84	7	178,025	6	153,988	13	332,013
85	5	124,030	10	103,943	15	227,973
86	5	113,065	6	143,938	11	257,003
87	1	15,161	2	17,077	3	32,238
<b>Total</b>	<b>69,905</b>	<b>\$ 3,940,440,335</b>	<b>186,040</b>	<b>\$ 9,093,478,468</b>	<b>255,945</b>	<b>\$ 13,033,918,803</b>



Table 2

The Number and Annual Salaries of Members in Active Service Distributed by Years of Credited Service as of June 30, 2017

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
0	4,967	\$ 63,254,988	8,345	\$ 112,766,841	13,312	\$ 176,021,829
1	5,594	143,660,940	14,218	360,677,106	19,812	504,338,046
2	3,697	119,106,216	10,455	311,209,189	14,152	430,315,405
3	3,108	117,250,788	9,000	300,963,065	12,108	418,213,853
4	2,774	114,804,911	7,638	278,808,922	10,412	393,613,833
5	2,200	95,633,688	6,672	250,818,483	8,872	346,452,171
6	2,093	96,997,738	6,351	251,810,502	8,444	348,808,240
7	2,360	116,373,099	7,176	304,719,424	9,536	421,092,523
8	2,461	128,208,780	7,742	348,275,112	10,203	476,483,892
9	2,679	147,456,249	8,437	399,247,083	11,116	546,703,332
10	2,663	156,046,466	8,482	417,343,841	11,145	573,390,307
11	2,589	156,674,876	8,202	424,184,203	10,791	580,859,079
12	2,644	168,982,545	8,003	431,985,067	10,647	600,967,612
13	2,689	179,233,107	7,701	428,723,976	10,390	607,957,083
14	2,290	156,586,051	6,608	378,629,115	8,898	535,215,166
15	2,218	156,191,864	6,602	383,640,903	8,820	539,832,767
16	2,158	155,238,770	6,340	379,916,374	8,498	535,155,144
17	2,028	151,363,578	6,362	391,226,771	8,390	542,590,349
18	2,414	190,547,318	5,851	377,072,014	8,265	567,619,332
19	2,048	162,352,841	4,859	323,083,791	6,907	485,436,632
20	1,940	160,474,917	4,339	295,850,831	6,279	456,325,748
21	1,567	129,134,229	3,638	253,796,990	5,205	382,931,219
22	1,367	113,804,668	3,289	232,706,675	4,656	346,511,343
23	1,183	98,148,745	2,909	210,560,591	4,092	308,709,336
24	1,418	119,417,082	2,765	198,828,837	4,183	318,245,919
25	910	74,746,138	2,075	153,059,390	2,985	227,805,528
26	794	63,043,281	1,941	140,094,285	2,735	203,137,566
27	840	66,685,854	1,772	129,494,820	2,612	196,180,674
28	796	63,664,949	1,691	124,388,221	2,487	188,053,170
29	641	53,164,660	1,485	111,658,018	2,126	164,822,678
30	592	48,110,659	1,191	90,380,818	1,783	138,491,477
31	513	41,775,376	1,026	79,234,218	1,539	121,009,594
32	410	33,216,328	757	58,389,992	1,167	91,606,320
33	314	25,445,172	560	43,114,829	874	68,560,001
34	252	19,130,403	346	26,801,254	598	45,931,657
35	150	10,911,589	237	17,961,861	387	28,873,450
36	142	10,802,272	209	16,342,818	351	27,145,090
37	111	8,387,855	186	13,743,946	297	22,131,801
38	88	6,881,628	169	12,048,718	257	18,930,346
39	55	4,706,864	116	8,632,076	171	13,338,940

**Table 2  
(Continued)**

**The Number and Annual Salaries of Members in Active Service Distributed by  
Years of Credited Service as of June 30, 2017**

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
40	42	\$ 3,720,780	63	\$ 4,732,965	105	\$ 8,453,745
41	38	3,120,705	62	4,745,637	100	7,866,342
42	12	1,135,224	45	2,781,976	57	3,917,200
43	19	1,520,822	32	2,494,801	51	4,015,623
44	12	1,105,531	26	2,103,315	38	3,208,846
45	10	909,002	13	946,315	23	1,855,317
46	6	524,969	13	867,056	19	1,392,025
47	2	150,525	11	570,497	13	721,022
48	2	135,457	10	646,180	12	781,637
49			5	375,735	5	375,735
50	1	38,870	3	183,142	4	222,012
51	1	94,747	2	79,432	3	174,179
52	1	147,697	5	358,146	6	505,843
53						
54						
55			1	51,222	1	51,222
56	1	112,895	2	210,860	3	323,755
57						
58	1	105,629			1	105,629
59			1	43,714	1	43,714
60						
61			1	96,505	1	96,505
<b>Total</b>	<b>69,905</b>	<b>\$3,940,440,335</b>	<b>186,040</b>	<b>\$9,093,478,468</b>	<b>255,945</b>	<b>\$ 13,033,918,803</b>

Table 3

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2017**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
26	1	\$ 505	3	\$ 7,076	4	\$ 7,581
27	11	5,978	6	1,729	17	7,707
28	15	8,622	3	2,072	18	10,694
29	14	10,309	20	10,807	34	21,116
30	18	17,548	33	16,811	51	34,359
31	35	25,820	52	33,350	87	59,170
32	51	44,547	80	56,089	131	100,636
33	48	42,125	85	64,867	133	106,992
34	57	53,121	133	111,457	190	164,578
35	99	99,505	137	130,697	236	230,202
36	83	100,163	155	196,991	238	297,154
37	114	146,811	160	191,425	274	338,236
38	114	185,284	217	273,302	331	458,586
39	138	217,973	221	336,365	359	554,338
40	121	257,511	222	327,010	343	584,521
41	125	245,174	261	373,329	386	618,503
42	121	225,413	267	371,190	388	596,603
43	122	272,103	298	498,625	420	770,728
44	135	337,191	312	650,032	447	987,223
45	160	416,035	314	675,039	474	1,091,074
46	168	508,074	396	833,228	564	1,341,302
47	189	741,868	436	912,987	625	1,654,855
48	184	748,236	418	1,203,724	602	1,951,960
49	153	642,903	431	1,414,162	584	2,057,065
50	195	950,690	458	1,590,457	653	2,541,147
51	215	1,223,512	484	1,589,514	699	2,813,026
52	198	1,098,657	524	2,022,772	722	3,121,429
53	216	1,929,831	601	2,425,217	817	4,355,048
54	248	2,193,576	618	3,364,095	866	5,557,671
55	307	4,860,715	772	8,275,237	1,079	13,135,952
56	377	7,538,898	938	14,112,752	1,315	21,651,650
57	495	12,498,581	1,112	20,116,604	1,607	32,615,185
58	567	16,692,785	1,296	27,863,053	1,863	44,555,838
59	733	23,656,190	1,668	43,043,352	2,401	66,699,542
60	920	33,644,474	2,301	69,496,579	3,221	103,141,053
61	1,048	40,043,975	2,792	88,267,576	3,840	128,311,551
62	1,383	51,772,281	3,910	121,599,122	5,293	173,371,403
63	1,698	60,322,672	5,033	153,997,251	6,731	214,319,923
64	2,079	80,049,642	5,912	190,524,586	7,991	270,574,228
65	2,466	93,734,008	7,040	235,378,780	9,506	329,112,788
66	2,971	114,133,946	7,835	255,370,167	10,806	369,504,113
67	2,976	115,510,082	7,526	245,628,545	10,502	361,138,627
68	3,348	129,227,736	7,374	232,963,173	10,722	362,190,909
69	3,585	134,061,307	7,221	223,435,378	10,806	357,496,685
70	4,179	149,839,346	7,759	227,787,464	11,938	377,626,810
71	3,617	124,642,670	6,207	171,489,810	9,824	296,132,480
72	2,939	96,079,082	4,871	130,089,089	7,810	226,168,171

**Table 3  
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2017**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annunities	Number	Annunities	Number	Annunities
73	2,767	\$ 87,615,203	4,631	\$ 116,336,652	7,398	\$ 203,951,855
74	2,873	89,283,100	4,702	111,341,842	7,575	200,624,942
75	2,793	85,474,190	4,364	98,192,519	7,157	183,666,709
76	2,175	61,588,496	3,859	83,781,385	6,034	145,369,881
77	1,877	52,216,383	3,371	68,105,561	5,248	120,321,944
78	1,719	43,255,620	3,174	60,166,821	4,893	103,422,441
79	1,603	40,471,122	3,028	55,298,219	4,631	95,769,341
80	1,532	37,866,697	2,714	46,367,458	4,246	84,234,155
81	1,400	34,444,567	2,606	42,762,936	4,006	77,207,503
82	1,275	29,398,731	2,418	36,223,293	3,693	65,622,024
83	1,126	26,095,860	2,157	32,400,869	3,283	58,496,729
84	1,060	24,422,942	1,979	28,374,795	3,039	52,797,737
85	1,038	23,977,684	2,018	29,072,468	3,056	53,050,152
86	874	21,145,826	1,964	29,262,120	2,838	50,407,946
87	798	17,118,676	1,713	24,149,067	2,511	41,267,743
88	642	13,153,366	1,558	20,133,164	2,200	33,286,530
89	490	10,094,685	1,489	18,729,801	1,979	28,824,486
90	440	8,652,749	1,282	15,849,693	1,722	24,502,442
91	375	7,034,468	1,107	13,296,398	1,482	20,330,866
92	298	5,495,733	845	9,093,340	1,143	14,589,073
93	223	4,167,610	738	7,992,858	961	12,160,468
94	152	2,324,988	544	5,356,033	696	7,681,021
95	108	1,662,593	482	4,667,231	590	6,329,824
96	69	1,173,889	366	3,670,856	435	4,844,745
97	51	816,933	268	2,615,465	319	3,432,398
98	24	379,456	163	1,668,013	187	2,047,469
99	24	299,267	147	1,682,051	171	1,981,318
100	9	139,946	108	1,020,972	117	1,160,918
101	7	48,896	55	604,126	62	653,022
102	3	64,763	40	436,857	43	501,620
103	2	19,673	20	223,279	22	242,952
104	1	27,976	12	139,185	13	167,161
105	1	9,183	6	93,750	7	102,933
106	1	15,242	4	34,189	5	49,431
107			4	42,264	4	42,264
108			1	25,679	1	25,679
<b>Total</b>	<b>66,866</b>	<b>\$ 2,031,013,988</b>	<b>142,849</b>	<b>\$ 3,448,334,146</b>	<b>209,715</b>	<b>\$ 5,479,348,134</b>

**Table 3  
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2017**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

<u>OPTION</u>	<u>MALE</u>		<u>FEMALE</u>	
Maximum	32,214	\$ 972,631,758	83,842	\$ 2,001,433,340
1	10,470	244,135,079	31,715	608,864,481
2	15,297	453,933,629	16,313	445,674,765
3	7,447	293,039,105	10,078	354,660,900
4	<u>1,438</u>	<u>67,274,417</u>	<u>901</u>	<u>37,700,660</u>
	66,866	\$ 2,031,013,988	142,849	\$ 3,448,334,146

**DEFINITIONS OF OPTIONS**

- Option 1 A life annuity to the member with a guaranteed payment to the beneficiary equal to the present value of the total maximum single life annuity less any amounts paid to the member prior to death.
  
- Option 2 A joint and one hundred percent (100%) survivor annuity payable during the lifetime of the member with the full amount of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.
  
- Option 3 A joint and fifty percent (50%) survivor annuity payable during the lifetime of the member with one-half of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.
  
- Option 4 A life annuity to the member with a special death benefit other than the normal option 1, 2, or 3 death benefit.

Note: The Option 4 totals above only reflect annuity elections that differ from the Maximum annuity or Options 1, 2 or 3. The Option 4 totals do not reflect Option 4 elections to withdraw accumulated deductions.

Table 4

**The Number and Annual Annuities of Beneficiaries and Survivor Annuitants  
as of June 30, 2017**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
7	1	\$ 1,534			1	\$ 1,534
8						
9						
10	1	3,741			1	3,741
11			1	\$ 1,534	1	1,534
12						
13						
14						
15						
16	2	4,036			2	4,036
17	1	1,898	2	10,923	3	12,821
18			2	4,388	2	4,388
19	2	11,957	1	9,605	3	21,562
20	2	3,275	1	8,672	3	11,947
21						
22			2	4,814	2	4,814
23	2	17,708			2	17,708
24			2	9,620	2	9,620
25			3	30,329	3	30,329
26	3	19,923	2	18,704	5	38,627
27	2	118,597	3	7,344	5	125,941
28	5	24,013	4	22,733	9	46,746
29	1	4,049	1	3,484	2	7,533
30	8	82,209	3	25,735	11	107,944
31	2	2,839	1	5,316	3	8,155
32	1	21,281	7	87,104	8	108,385
33	5	22,393	3	20,253	8	42,646
34	3	18,257	3	42,716	6	60,973
35	4	49,695	4	25,667	8	75,362
36	5	29,161	3	10,745	8	39,906
37	6	35,469	2	9,340	8	44,809
38	3	3,031	8	66,359	11	69,390
39	12	93,089	6	23,048	18	116,137
40	6	22,015	5	17,434	11	39,449
41	3	9,392	9	63,257	12	72,649
42	7	102,070	8	69,973	15	172,043
43	7	27,200	10	63,437	17	90,637
44	6	23,376	8	27,804	14	51,180
45	5	37,238	6	46,218	11	83,456
46	3	3,945	15	111,097	18	115,042
47	7	39,932	10	108,900	17	148,832
48	7	57,048	19	193,578	26	250,626
49	13	65,232	18	126,772	31	192,004
50	13	72,185	26	213,910	39	286,095

**Table 4  
(Continued)**

**The Number and Annual Annuities of Beneficiaries and Survivor Annuitants  
as of June 30, 2017**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
51	12	\$ 78,040	30	\$ 280,631	42	\$ 358,671
52	10	97,503	28	334,788	38	432,291
53	13	62,379	41	408,780	54	471,159
54	11	113,755	30	276,369	41	390,124
55	10	101,552	44	412,065	54	513,617
56	19	159,595	50	684,543	69	844,138
57	19	217,818	59	745,446	78	963,264
58	23	281,855	78	719,860	101	1,001,715
59	22	222,033	97	1,408,428	119	1,630,461
60	30	255,797	103	1,491,490	133	1,747,287
61	42	487,270	102	1,664,176	144	2,151,446
62	33	570,088	141	2,354,654	174	2,924,742
63	37	607,972	141	2,404,819	178	3,012,791
64	59	935,792	166	2,824,386	225	3,760,178
65	76	1,659,188	162	2,760,371	238	4,419,559
66	83	1,579,790	175	3,282,997	258	4,862,787
67	70	1,255,633	185	3,919,340	255	5,174,973
68	85	1,925,529	223	4,522,422	308	6,447,951
69	94	2,013,323	241	4,493,494	335	6,506,817
70	95	1,957,611	281	5,185,787	376	7,143,398
71	93	1,630,619	238	4,317,949	331	5,948,568
72	65	1,274,734	230	4,235,657	295	5,510,391
73	78	1,577,884	196	3,552,663	274	5,130,547
74	86	1,432,386	257	4,068,308	343	5,500,694
75	93	1,765,153	260	4,116,115	353	5,881,268
76	83	1,514,146	261	4,157,291	344	5,671,437
77	56	922,730	287	4,070,188	343	4,992,918
78	57	863,174	247	3,737,979	304	4,601,153
79	62	1,061,934	294	3,830,844	356	4,892,778
80	66	698,682	271	3,459,895	337	4,158,577
81	66	931,636	297	3,652,295	363	4,583,931
82	64	629,742	276	3,541,930	340	4,171,672
83	54	779,204	279	3,334,396	333	4,113,600
84	39	460,993	261	3,156,166	300	3,617,159
85	51	528,218	252	3,044,916	303	3,573,134
86	53	576,442	308	3,424,635	361	4,001,077
87	52	538,029	277	3,073,377	329	3,611,406
88	43	480,864	248	2,900,334	291	3,381,198
89	32	337,733	254	2,449,902	286	2,787,635
90	37	403,374	231	2,237,990	268	2,641,364
91	39	351,855	202	1,949,428	241	2,301,283
92	39	444,414	166	1,683,652	205	2,128,066
93	36	322,294	144	1,205,720	180	1,528,014
94	26	221,172	103	891,716	129	1,112,888
95	15	126,769	79	699,810	94	826,579
96	18	166,057	65	609,478	83	775,535

**Table 4  
(Continued)**

**The Number and Annual Annuities of Beneficiaries and Survivor Annuitants  
as of June 30, 2017**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
97	7	\$ 58,128	45	\$ 383,828	52	\$ 441,956
98	6	43,726	29	185,213	35	228,939
99	4	32,004	31	235,921	35	267,925
100	1	2,405	18	119,500	19	121,905
101	3	17,693	11	71,139	14	88,832
102	2	15,099	6	48,349	8	63,448
103	1	11,358	6	19,697	7	31,055
104			2	17,497	2	17,497
105						
106			1	16,032	1	16,032
107			2	1,693	2	1,693
<b>Total</b>	2,418	\$ 35,830,962	8,710	\$ 120,169,000	11,128	\$ 155,999,962



Table 5

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2017**

**Retired on Account of Disability**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
30			1	\$ 20,032	1	\$ 20,032
32			2	44,346	2	44,346
33			5	119,111	5	119,111
34	1	\$ 11,686	5	110,949	6	122,635
35	6	88,521	2	45,363	8	133,884
36	2	41,507	3	53,807	5	95,314
37	4	64,301	5	104,543	9	168,844
38	3	45,824	7	158,325	10	204,149
39	3	62,097	12	251,115	15	313,212
40	3	68,848	17	414,428	20	483,276
41	10	187,132	20	366,218	30	553,350
42	1	8,756	19	426,167	20	434,923
43	4	55,389	27	543,047	31	598,436
44	11	227,889	33	628,647	44	856,536
45	9	145,844	33	657,832	42	803,676
46	8	232,551	42	924,809	50	1,157,360
47	24	652,506	52	1,424,782	76	2,077,288
48	21	529,409	63	1,157,947	84	1,687,356
49	35	714,457	49	1,108,617	84	1,823,074
50	26	685,651	70	1,518,266	96	2,203,917
51	33	693,861	65	1,695,686	98	2,389,547
52	40	1,012,119	94	2,109,180	134	3,121,299
53	55	1,480,051	134	2,741,728	189	4,221,779
54	59	1,335,989	141	3,067,865	200	4,403,854
55	65	1,490,585	144	3,014,207	209	4,504,792
56	58	1,439,192	174	3,563,624	232	5,002,816
57	69	1,931,463	211	4,359,901	280	6,291,364
58	121	3,003,598	213	4,482,625	334	7,486,223
59	100	2,259,260	241	5,251,216	341	7,510,476
60	110	2,518,455	230	4,648,944	340	7,167,399
61	128	2,609,036	268	5,265,839	396	7,874,875
62	122	2,715,506	289	6,134,107	411	8,849,613
63	122	2,753,914	302	6,381,623	424	9,135,537
64	141	3,039,825	298	6,063,489	439	9,103,314
65	122	2,949,558	286	6,336,500	408	9,286,058
66	117	2,852,609	274	6,329,050	391	9,181,659
67	97	2,018,292	260	5,891,121	357	7,909,413
68	139	3,294,230	261	5,645,775	400	8,940,005
69	97	2,213,927	241	5,008,445	338	7,222,372
70	105	2,455,599	253	4,748,811	358	7,204,410
71	93	1,783,823	206	3,637,433	299	5,421,256
72	58	1,278,207	148	2,415,892	206	3,694,099
73	55	1,097,852	119	1,926,123	174	3,023,975
74	67	1,102,992	138	1,896,902	205	2,999,894
75	47	681,473	151	2,028,274	198	2,709,747

Table 5  
(Continued)

The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2017

Retired on Account of Disability

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
76	31	\$ 396,247	113	\$ 1,345,317	144	\$ 1,741,564
77	36	563,942	101	1,057,673	137	1,621,615
78	31	483,311	68	847,381	99	1,330,692
79	32	380,825	79	813,410	111	1,194,235
80	24	272,987	73	857,789	97	1,130,776
81	20	241,479	50	573,784	70	815,263
82	15	167,168	59	515,425	74	682,593
83	18	187,116	57	551,329	75	738,445
84	16	190,039	43	361,198	59	551,237
85	8	66,597	50	509,892	58	576,489
86	12	120,915	35	254,207	47	375,122
87	3	37,963	33	228,426	36	266,389
88	7	104,204	25	207,683	32	311,887
89	8	91,942	35	251,054	43	342,996
90	7	137,494	16	87,886	23	225,380
91	4	49,972	17	148,357	21	198,329
92	3	32,734	9	51,809	12	84,543
93	2	11,890	8	64,898	10	76,788
94			8	76,632	8	76,632
95			5	39,610	5	39,610
97	1	4,614	1	5,731	2	10,345
98			1	2,321	1	2,321
99			3	39,128	3	39,128
100			1	17,829	1	17,829
101			2	17,743	2	17,743
104			1	8,053	1	8,053
<b>Total</b>	2,669	\$ 57,375,223	6,502	\$ 123,664,781	9,171	\$ 181,040,004

## Exhibit VIII

### Glossary

<b>Accrued Liability</b>	The difference between (a) the present value of future plan benefits, and (b) the present value of future normal cost. It is the portion of the present value of future plan benefits attributable to service accrued as of the valuation date. Sometimes referred to as “actuarial accrued liability”.
<b>Accrued Service</b>	The service credited under the plan that was rendered before the date of the actuarial valuation.
<b>Actuarial Assumptions</b>	Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
<b>Actuarial Cost Method</b>	A mathematical budgeting procedure for allocating the dollar amount of the “present value of future plan benefits” between the present value of future normal cost and the accrued liability. Sometimes referred to as the “actuarial funding method”.
<b>Actuarial Equivalent</b>	A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.
<b>Actuarial Value of Assets</b>	The value of current plan assets recognized for valuation purposes. Based on a smoothed market value that recognizes investment gains and losses over a period of ten years.
<b>Amortization</b>	Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
<b>Experience Gain (Loss)</b>	A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.
<b>Normal Cost</b>	The annual cost assumed, under the actuarial funding method, for current and subsequent plan years. Sometimes referred to as “current service cost”.
<b>Present Value</b>	The amount of funds presently required to provide a payment or series of payments in the future. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
<b>Unfunded Accrued Liability</b>	The difference between the actuarial accrued liability and actuarial value of assets.