ACTUARIAL SECTION

Buck 500 Plaza Drive
Secaucus, New Jersey 07096-1533

May 23, 2018

Board of Trustees
Pennsylvania Public School Employees' Retirement System
5 North 5th Street
Harrisburg, Pennsylvania 17101-1905

Re: Actuary's Certification Letter

Members of the Board:

An actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) is performed annually to measure the ongoing costs and progress towards the funding goals of the Retirement System over time. The most recent actuarial valuation was completed as of June 30, 2017. 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 percentage of pay amortization schedules required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code) as amended by Act 2010-120, which requires amortization over 24 years of the unfunded accrued liability as of June 30, 2010, and of each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any increases in the unfunded liability arising from legislation enacted after June 30, 2010, are to be amortized over 10 years.

The contribution policy of the Retirement System is set by statute. The Commonwealth's General Assembly has the authority to amend the benefit terms and funding policy for the System by passing bills in the Senate and House of Representatives and sending them to the Governor for approval.

Based on the June 30, 2017 actuarial valuation, a total contribution rate of 33.43% (32.60% Pension plus 0.83% Premium Assistance) of payroll payable by employers for FY2018/2019, 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 Act 120 minimum employer pension rate is the employer pension normal cost rate of 7.59%.

As required by the Retirement Code, 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, as the basis for the contribution rate for fiscal year 2018/2019.

Act 5 of 2017 was passed in June of 2017. Under this legislation, effective immediately, Class TE and Class TF members became eligible to elect a cost neutral Option 4 lump sum distribution of all or a portion of the member's accumulated contributions at retirement.

Act 5 of 2017 restricted 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 developed in the June 30, 2017 valuation.

There were no other legislative or administrative changes made to the benefits payable by PSERS since the prior valuation.

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.

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As required under Section 8502(j) of the Retirement Code, experience studies are performed for PSERS every five years, the most recent having been made as of June 30, 2015. This valuation was prepared on the basis of the demographic and economic assumptions that were recommended on the basis of the July 1, 2010 – June 30, 2015 Experience Review and approved by the Board of Trustees at its June 10, 2016 meeting, which includes a 7.25% per annum rate of investment return.

In our opinion, the actuarial assumptions used for funding purposes are reasonably related to the experience of the System and to reasonable long-term expectations. These assumptions were selected in accordance with applicable Actuarial Standards of Practice published by the Actuarial Standards Board.

The actuarial assumptions and methods used by PSERS for financial reporting meet the requirements set forth in Governmental Accounting Standards Board (GASB) Statement No. 67. The Health Insurance funding provisions of the Retirement Code differ from the GASB 74 disclosure requirements. For funding purposes, the actuarial liability equals the assets in the health insurance account, and a contribution is determined to provide for solvency of the account through the third fiscal year following the valuation date. For GASB 74 purposes the Health Insurance actuarial liability and normal cost requirements are determined under the entry age actuarial cost method. The entry age actuarial cost method meets the GASB 74 requirements for determining actuarial liability and normal cost and is the cost method specified by the Retirement Code for the PSERS pension plan.

The Retirement System reported the individual data for members of the Retirement System as of the valuation date to the actuaries. 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.

Future actuarial measurements may differ significantly from current measurements due to plan 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 plan provisions or applicable law. An analysis of the potential range of future results is beyond the scope of this valuation.

In our opinion, the attached schedules of valuation results fairly represent the status of the Public School Employees' Retirement System and present an accurate view of historical data. The underlying assumptions and methods used for both funding and GASB disclosure purposes are consistent with the statutory specifications and represent a best estimate of the aggregate future experience of the Retirement System.

The following supporting schedules in the Actuarial Section were prepared by Buck Global, LLC (Buck) formerly Conduent HR Consulting, LLC (Conduent) as of the date of the issuance of the June 30, 2017 valuation report:

- Summary of Results of Actuarial Valuation as of June 30, 2017
- History and Projection of Contribution Rates and Funded Ratios
- Summary of Actuarial Assumptions and Methods
- Schedule of Active Member Valuation Data
- Schedule of Retired Members and Beneficiaries Added To and Removed From Rolls
- Solvency Test for Pensions
- Schedule of Funding Progress for Pensions
- Analysis of Past Financial Experience - Reconciliation of Employer Contribution Rates

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In addition, Buck prepared the "Schedule of Changes in the Employer Net Pension Liability," "Schedule of Employer Net Pension Liability," "Schedule of Employer Pension Contributions," "Schedule of Changes in the Employer Net OPEB Liability," "Schedule of Employer Net OPEB Liability," and the "Schedule of Employer Premium Assistance Contributions" in the Financial Section.

This report was prepared solely for the Pennsylvania Public School Employees' Retirement System for the purposes herein stated and may not be appropriate to use for other purposes. Buck does not intend to benefit and assumes no duty or liability to other parties who receive this work. Use of this report for any other purposes or by anyone other than PSERS and 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. The attached pages should not be provided without a copy of this cover letter. Buck should be asked to review any statement to be made on basis of the results contained in this report. Buck will accept no liability for any such statement made without prior review by Buck.

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.

Respectfully submitted,

David L. Driscoll

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Senior Consultant

SUMMARY OF RESULTS OF ACTUARIAL VALUATION AS OF JUNE 30, 2017 ($ Amounts in Thousands)

	Item	June 30, 2017	June 30, 2016
	Member Data		
1.	Number of Members		
	a) Active Members	255,945	257,080
	b) Vestees[1]	24,515	23,437
	c) Annuitants, Beneficiaries and Survivor Annuitants[2]	230,014	224,828
	d) Total	510,474	505,345
2.	Annualized Salaries[3]	$ 13,033,919	$ 12,851,289
3.	Annual Annuities	$ 5,816,388	$ 5,666,392
	Valuation Results		
4.	Present Value of Future Pension Benefits		
	a) Active Members	$ 62,725,773	$ 61,864,737
	b) Inactive Members and Vestees	1,944,846	1,829,457
	c) Annuitants, Beneficiaries and Survivor Annuitants	56,184,146	55,314,858
	d) Total	$ 120,854,765	$ 119,009,052
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	$ 19,005,948	$ 19,019,651
6.	Pension Accrued Liability		
	a) Active Members (4a) – (5c)	$ 43,719,825	$ 42,845,086
	b) Inactive Members and Vestees	1,944,846	1,829,457
	c) Annuitants, Beneficiaries and Survivor Annuitants	56,184,146	55,314,858
	d) Total	$ 101,848,817	$ 99,989,401
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%
	Employer Annual Funding Requirement	**Fiscal 2018/2019**	**Fiscal 2017/2018**
15.	Employer Contribution Rate Calculated by Actuary		
	a) Normal	7.59%	7.70%
	b) Unfunded Accrued Liability	25.01	24.04
	c) Preliminary Pension Rate	32.60%	31.74%
	d) Health Insurance	0.83	0.83
	e) Total Rate[4] = (15)(c) + (15)(d)	33.43%	32.57%

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%.

HISTORY OF CONTRIBUTION RATES AND FUNDED RATIOS

Fiscal Year Ending June	Appropriation Payroll (thousands)	Contribution Rates[1]							
		Employee	Employer Normal Cost	Employer Unfunded Liability	Preliminary Employer Pension	Final Employer Pension[4]	Employer Health Insurance	Total Employer	Funded Ratio
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[2]	12,899,000	7.32	7.35	(3.72)	3.63	4.00	0.78	4.78	75.1
2011[2,3]	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[5]	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	56.3
2018[6]	13,449,000	7.54	7.70	24.04	31.74	31.74	0.83	32.57	*
2019	13,775,000	7.57	7.59	25.01	32.60	32.60	0.83	33.43	*

1. 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 and the Employer Health Insurance Rate.
2. 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.
3. Act 2010-46 recertified the fiscal year ended June 30, 2011 pension rate from 7.58% to 5.00%.
4. The Final Employer Pension rate is limited by the Act 2010-120 pension rate collars for fiscal years 2012 through 2016.
5. 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%.
6. 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%.

* Not Available

DESCRIPTION OF ACTUARIAL ASSUMPTIONS AND METHODS

ASSUMPTIONS

Investment Rate of Return: 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 T-E and Class T-F members' Option 4 partial withdrawal of accumulated member contributions.

Discount Rate for GASB 67 Accounting: 7.25% as of June 30, 2016 and June 30, 2017. Rates were determined in accordance with the methods prescribed in GASB Statement No. 67.

Discount Rate for GASB 74 Accounting: 2.71% as of June 30, 2016 and 3.13% as of June 30, 2017. This rate represents the S&P 20-Year Municipal Bond Rate. Rates were determined in accordance with the methods prescribed in GASB Statement No. 74.

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

	Annual Rate of:						
		Withdrawal					
Age	Non-Vested Withdrawal	Less Than 10 Years of Service	10 or More Years of Service	Death[1]	Disability	Early Retirement[2]	Superannuation Retirement
MALES							
25	14.85%	5.70%	2.57%	0.041%	0.020%		
30	12.74	3.37	2.57	0.039	0.020		
35	13.39	3.21	1.50	0.044	0.058		
40	14.49	3.97	1.34	0.050	0.116		
45	14.42	4.53	1.37	0.084	0.160		19.16%
50	14.31	4.45	1.92	0.138	0.284		19.16
55	12.17	4.43	3.38	0.233	0.442	18.57%	26.59
60	12.43	5.58	5.57	0.379	0.582	14.42	30.87
65				0.700	0.087		21.39
69				1.067	0.135		19.34
FEMALES							
25	13.41%	7.47%	5.02%	0.013%	0.018%		
30	13.81	6.05	4.02	0.017	0.023		
35	14.22	5.53	2.85	0.024	0.055		
40	11.79	4.87	1.60	0.032	0.096		
45	11.54	4.51	1.65	0.051	0.135		15.00%
50	11.66	4.43	2.06	0.088	0.229		15.00
55	11.75	4.38	3.11	0.133	0.368	18.59%	10.02
60	12.25	5.97	6.40	0.196	0.360	17.05	35.77
65				0.327	0.082		22.23
69				0.443	0.115		22.79

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

DESCRIPTION OF ACTUARIAL ASSUMPTIONS AND METHODS
(Continued)

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 Buck 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 Buck Modified 2015 projection scale adjusted for credibility. This base mortality table will then be projected on a generational basis using the Buck Modified 2015 projection scale 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 to the valuation date with the Buck Modified 2015 projection scale.

These base mortality tables will then be projected on a generational basis using the Buck 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 Buck 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, 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 for 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

DESCRIPTION OF ACTUARIAL ASSUMPTIONS AND METHODS
(Continued)

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. Future increases in the unfunded accrued liability due to legislation will be amortized over a 10-year period, 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 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 of 2010, the final contribution rate cannot be 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.

Actuarial Cost Method for GASB 74 Accounting for Health Insurance: The actuarial liability and service cost are determined under the entry age actuarial cost method.

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.

SCHEDULE OF ACTIVE MEMBERS
VALUATION DATA

Valuation as of June 30	Number of Participating Employers	Number of Active Members	Annual Compensation (Thousands)	Average Compensation	% Increase in Average
2017	775	255,945	$ 13,033,919	$ 50,924	1.87%
2016	781	257,080	12,851,289	49,989	2.46
2015	784	259,868	12,678,213	48,787	1.79
2014	784	263,312	12,620,862	47,931	1.92
2013	782	267,428	12,577,105	47,030	1.17
2012	773	273,504	12,714,371	46,487	0.52
2011	747	279,152	12,910,043	46,247	1.99
2010	747	282,041	12,788,847	45,344	1.26
2009	742	279,701	12,524,593	44,779	2.43
2008	739	272,690	11,921,469	43,718	1.16

SCHEDULE OF RETIRED MEMBERS AND BENEFICIARIES ADDED TO AND REMOVED FROM ROLLS

Valuation Date as of June 30	Added to Rolls		Removed from Rolls		Rolls at End of Year		% Increase in Annual Allowance	Average Annual Allowance
	Number	Annual Allowance (Millions)	Number	Annual Allowance (Millions)	Number	Annual Allowance[1] (Millions)		
2017	12,876	$ 274.2	7,690	$ 102.1	230,014	$ 5,816.4	2.65 %	$ 25,287
2016	12,686	267.1	7,633	93.5	224,828	5,666.4	2.64	25,203
2015	15,017	297.3	9,142	91.7	219,775	5,520.6	3.39	25,119
2014	15,225	300.5	8,878	84.9	213,900	5,339.5	3.74	24,962
2013	16,404	377.6	10,866	83.7	207,553	5,147.1	5.63	24,800
2012	14,579	332.7	7,186	66.6	202,015	4,872.9	4.78	24,122
2011	16,228	453.7	6,540	76.4	194,622	4,650.8	7.17	23,897
2010	12,649	372.8	5,678	77.6	184,934	4,339.6	8.59	23,466
2009	9,651	314.9	5,228	74.4	177,963	3,996.3	4.85	22,456
2008	10,911	345.3	5,397	73.9	173,540	3,811.5	8.18	21,963

1. Reflects changes in annuities for continuing payees due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS SCHEDULE OF RETIRED MEMBERS ADDED TO AND REMOVED FROM ROLLS

Valuation Date as of June 30	Added to Rolls		Removed from Rolls		Rolls at End of Year		% Increase in Annual Premium Assistance	Average Annual Premium Assistance
	Number[2]	Annual Premium Assistance (Millions)	Number[2]	Annual Premium Assistance (Millions)	Number[2]	Annual Premium Assistance (Millions)		
2017	5,821	$ 4.4	3,806	$ 2.9	147,511	$ 111.5	1.36%	$ 1,200
2016	5,758	4.4	3,516	2.7	145,496	110.0	0.00	1,200
2015	6,516	5.0	3,635	2.8	143,254	110.0	0.46	1,200
2014	4,969	3.9	2,289	1.8	140,373	109.5	0.37	1,200
2013	6,759	5.4	2,364	1.9	137,693	109.1	3.31	1,200
2012	5,751	4.6	1,372	1.1	133,298	105.6	3.43	1,200
2011	8,185	6.5	2,074	1.6	128,919	102.1	4.93	1,200
2010	6,709	5.3	2,323	1.8	122,808	97.3	3.73	1,200
2009	6,285	5.0	3,079	2.4	118,422	93.8	2.74	1,200
2008	8,792	7.0	6,050	4.8	115,216	91.3	2.47	1,200

2. Number of retired members eligible to participate in the Health Insurance Premium Assistance; 63% of eligible retirees are assumed to elect premium assistance as of June 30, 2016 to June 30, 2017; 64% of eligible retirees are assumed to elect premium assistance as of June 30, 2015; 65% of eligible retirees are assumed to elect premium assistance as of June 30, 2014; 66% of eligible retirees are assumed to elect premium assistance for the periods June 30, 2007 to June 30, 2013.

SOLVENCY TEST FOR PENSIONS
COMPARATIVE SUMMARY OF ACCRUED LIABILITY AND ACTUARIAL VALUE OF ASSETS
($ Amounts in Thousands)

Valuation as of June 30	Accrued Liabilities for			Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed		(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
2011	12,242,308	45,648,780	27,749,295	59,141,131	100	100	5
2010	11,850,031	40,284,383	26,871,014	59,306,848	100	100	27
2009	11,087,345	37,112,318	27,321,073	59,781,575	100	100	42
2008	10,532,683	34,617,953	25,695,001	60,922,157	100	100	61

SCHEDULE OF FUNDING PROGRESS FOR PENSIONS[1]
($ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll	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	58,227,622	87,760,660	29,533,038	66.3	12,714,371	232.3
2011	59,141,131	85,640,383	26,499,252	69.1	12,910,043	205.3
2010	59,306,848	79,005,428	19,698,580	75.1	12,788,847	154.0
2009	59,781,575	75,520,736	15,739,161	79.2	12,524,593	125.7
2008	60,922,157	70,845,637	9,923,480	86.0	11,921,469	83.2

1. The amounts reported above include assets and liabilities for Pensions.

ANALYSIS OF PAST FINANCIAL EXPERIENCE
RECONCILIATION OF EMPLOYER CONTRIBUTION RATES

Fiscal Year Ending June 30	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Effective Prior Year Contribution Rate	32.57%	30.03%	25.84%	21.40%	16.93%	12.36%	8.65%	5.64%	4.78%	4.76%
Prior Year Adjustment for Legislation	N/A	N/A	2.82	5.47	7.82	10.15	10.27	2.58	(0.37)	(0.69)
Net Change Due to:										
Change in Normal Rate	(0.11)	(0.23)	(0.07)	(0.08)	(0.11)	(0.09)	(0.22)	0.04	0.00	(0.02)
Payroll Growth and Liability Experience	(0.17)	0.96	0.14	0.58	0.68	0.72	(0.21)	0.40	(0.03)	0.33
Investment Loss/(Gain)	1.22	1.08	0.83	0.66	0.81	0.78	0.59	1.94	2.04	(1.71)
Health Insurance Contribution Change	0.00	0.01	(0.01)	(0.06)	(0.03)	0.07	0.21	0.01	(0.14)	0.02
Assumption/Method Change	(0.08)	0.44	N/A	N/A	N/A	N/A	3.04	N/A	1.94	1.72
Act 40 4.00% Floor[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.37
Act 120 Funding Reforms	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.31	N/A	N/A
Act 5 Benefit and Funding Reforms	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Amortization of Prior Legislation Deferrals	0.00	0.28	0.48	0.69	0.77	0.76	0.18	N/A	N/A	N/A
Legislation Deferrals:										
Act 46 Rate Cap[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	(2.58)	N/A
Act 120 Collar[3]	N/A	N/A	N/A	(2.82)	(5.47)	(7.82)	(10.15)	(10.27)	N/A	N/A
Actual Contribution Rate:	33.43%	32.57%	30.03%	25.84%	21.40%	16.93%	12.36%	8.65%	5.64%	4.78%

1. Act 2003-40 amended the Retirement Code to increase the Employer Pension Rate Floor from 1% to 4%.
2. Act 2010-46 recertified the fiscal year ending June 30, 2011 pension rate from 7.58% to 5.00%.
3. The Final Employer Pension rate is limited by the Act 2010-120 pension rate collar. 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 2017, the actuarially required contribution rate is less than the collared rate and the final contribution rate is the actuarially determined contribution rate, provided that the final contribution rate is not less than the employer normal contribution rate.