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May 15, 2019

Dr. L. C. Evans
Executive Director
Teachers Retirement System of Georgia
Suite 100, Two Northside 75
Atlanta, GA 30318

Dear Dr. Evans:

Enclosed are 25 bound copies and one unbound copy of the "Teachers Retirement System of Georgia Report of the Actuary on the Valuation Prepared as of June 30, 2018".

The valuation indicates that employer contributions at the rate of 19.06% of compensation are sufficient to support the benefits of the System. The valuation takes into account the effect of all amendments to the System enacted through the 2018 Session of the General Assembly.

Please let us know if there are any questions concerning the report.

Sincerely yours,

John J. Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

Cathy Turcot
Principal and Managing Director

Edward Koebel, EA, FCA, MAAA
Principal and Consulting Actuary

Enclosure

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Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

Teachers Retirement System of Georgia

TEACHERS RETIREMENT SYSTEM OF GEORGIA

REPORT OF THE ACTUARY ON THE VALUATION PREPARED AS OF JUNE 30, 2018

www.CavMacConsulting.com

May 15, 2019

Board of Trustees
Teachers Retirement System of Georgia
Suite 100, Two Northside 75
Atlanta, GA 30318

Members of the Board:

Section 47-3-23 of the law governing the operation of the Teachers Retirement System of Georgia provides that the actuary shall make annual valuations of the contingent assets and liabilities of the Retirement System on the basis of regular interest and the tables last adopted by the Board of Trustees. We have submitted the report giving the results of the actuarial valuation of the System prepared as of June 30, 2018. The report indicates that annual employer contributions at the rate of 19.06% of compensation for the fiscal year ending June 30, 2021 are sufficient to support the benefits of the System. Our firm, as actuary, is responsible for all of the actuarial trend data in the financial section of the annual report and the supporting schedules in the actuarial section of the annual report.

The valuation reflects a change from the smoothed valuation interest rate methodology that has been in effect since June 30, 2009, to a constant interest rate method. In conjunction with the change in methodology, the long-term assumed rate of return in assets (discount rate) has been changed from 7.50% to 7.25%, and the assumed annual rate of inflation has been reduced from 2.75% to 2.50%. We have made proposed changes to the Board's funding policy to reflect these changes to the valuation assumptions and methods.

In our opinion, the valuation is complete and accurate, and the methodology and assumptions are reasonable as a basis for the valuation. The valuation takes into account the effect of all amendments to the System enacted through the 2018 Session of the General Assembly. In preparing the valuation, the actuary relied on data provided by the System. While not verifying data at the source, the actuary performed tests for consistency and reasonableness.

The System is funded on an actuarial reserve basis. The actuarial assumptions recommended by the actuary and adopted by the Board are both individually and in the aggregate reasonably related to the experience under the System and to reasonable expectations of anticipated experience under the System. The assumptions and methods used for financial reporting purposes meet the parameters set by Actuarial Standards of Practice (ASOPS). The funding objective of the plan is that contribution rates over time will remain level as a percent of payroll. The valuation method used is the entry age normal cost method. The normal contribution rate to cover current cost has been determined as a level percent of payroll. Gains and losses are reflected in the unfunded accrued liability, which is amortized as a level percent of payroll in accordance with the funding policy adopted by the Board.

The Plan and the employers are required to comply with the financial reporting requirements of GASB Statements No. 67 and 68. The necessary disclosure information is provided in separate supplemental reports.

We have provided the following information and supporting schedules for the Actuarial Section of the Comprehensive Annual Financial Report:

- Summary of Actuarial Assumptions and Methods
- Schedule of Active Members
- Schedule of Retirees and Beneficiaries Added to and Removed from Rolls
- Schedule of Funding Progress
- Analysis of Financial Experience

The System is being funded in conformity with the minimum funding standard set forth in Code Section 47-20-10 of the Public Retirement Systems Standards Law. In our opinion, the System is operating on an actuarially sound basis. Assuming that contributions to the System are made by the employer from year to year in the future at the rates recommended on the basis of the successive actuarial valuations, the continued sufficiency of the retirement fund to provide the benefits called for under the System may be safely anticipated.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. Use of these computations for purposes other than meeting these requirements may not be appropriate.

This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that 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 reasonably based on the actual experience of the System.

Sincerely yours,

John J. Garrett

John J. Garrett, ASA, FCA, MAAA
Principal and Consulting Actuary

Cathy Turcot

Cathy Turcot
Principal and Managing Director

Edward J. Koebel

Edward Koebel, EA, FCA, MAAA
Principal and Consulting Actuary

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TEACHERS RETIREMENT SYSTEM OF GEORGIA
REPORT OF THE ACTUARY
ON THE VALUATION
PREPARED AS OF JUNE 30, 2018

SECTION I - SUMMARY OF PRINCIPAL RESULTS

1. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below (all dollar amounts are in thousands):

Valuation Date	**June 30, 2018**	**June 30, 2017**
Number of active members	226,039	222,902
Annual earnable compensation	$ 11,704,334	$ 11,333,997
Number of retired members and beneficiaries	127,300	122,687
Annual allowances	$ 4,773,703	$ 4,531,290
Assets:		
Fair value	$ 75,532,925	$ 71,340,972
Actuarial value	75,024,364	71,212,660
Unfunded actuarial accrued liability	$ 21,880,889	$ 24,768,371
Blended amortization period (years)	25.6	27.1
Funded ratio based on Actuarial Value of Assets	77.4%	74.2%
Contributions for Fiscal Year Ending	**June 30, 2021**	**June 30, 2020**
Member contribution rate	6.00%	6.00%
Actuarially Determined Employer Contribution Rates (ADEC):		
Normal*	7.25%	7.77%
Unfunded actuarial accrued liability	11.81	13.37
Total	19.06%	21.14%

*The normal contribution includes administrative expenses of 0.25% of payroll.

2. The valuation takes into account the effect of amendments of the System enacted through the 2018 session of the General Assembly. The major benefit and contribution provisions of the System as reflected in the current valuation are summarized in Schedule H. There have been no changes since the previous valuation.

3. Comments on the valuation results as of June 30, 2018 are given in Section IV and further discussion of the employer contribution levels is provided in Section V.

4. Schedule D of this report outlines the full set of actuarial assumptions and asset method used to prepare the current valuation. The valuation reflects a change from the smoothed valuation interest rate methodology that has been in effect since June 30, 2009, to a constant interest rate method. In conjunction with the change in methodology, the long-term assumed rate of return in assets (discount rate) has been changed from 7.50% to 7.25%, and the assumed annual rate of inflation has been reduced from 2.75% to 2.50%. We have made proposed changes to the Board's funding policy shown in Schedule F to reflect these changes to the valuation assumptions and methods.

6. The entry age actuarial cost method was used to prepare the valuation. Schedule E contains a brief description of this method.

7. The funded ratio shown in the Summary of Principal Results is the ratio of the actuarial value of assets to the accrued liability and would be different if based on fair value of assets. The funded ratio is an indication of progress in funding the promised benefits. Since the ratio is less than 100%, there is a need for additional contributions toward payment of the unfunded actuarial accrued liability. In addition, this funded ratio does not have any relationship to measuring sufficiency if the plan had to settle its liabilities.

SECTION II - MEMBERSHIP

1. The data we received for the 2018 valuation was provided by the Retirement System. While not verifying the data at its source, we performed tests for consistency and reasonableness.

2. The following table shows the number of teachers and their annual earnable and average compensation as of June 30, 2018 on whose account benefits may be payable under the Retirement System. The annual compensation for each active member was provided by the Retirement System and was used without adjustment.

THE NUMBER AND ANNUAL EARNABLE AND AVERAGE COMPENSATION OF ACTIVE MEMBERS AS OF JUNE 30, 2018

TOTAL NUMBER	ANNUAL COMPENSATION ($1,000's)	AVERAGE COMPENSATION
226,039	$11,704,334	$51,780

The results of the valuation include liabilities for 106,439 terminated employees not yet receiving benefits.

3. The following table shows the number of beneficiaries on the roll as of June 30, 2018, together with the amount of their annual retirement allowances payable under the System as of that date.

THE NUMBER AND ANNUAL RETIREMENT ALLOWANCES OF BENEFICIARIES ON THE ROLL AS OF JUNE 30, 2018

GROUP	NUMBER	ANNUAL RETIREMENT ALLOWANCES ($1,000's)
Service Retirements	114,413	$ 4,468,166
Disability Retirements	4,572	102,631
Beneficiaries of Deceased Active and Retired Members	8,315	202,906
Total	127,300	$ 4,773,703

SECTION III - ASSETS

1. The retirement law provides for the maintenance of two funds for the purpose of recording the financial transactions of the System; namely, the Annuity Savings Fund and the Pension Accumulation Fund.

   (a) Annuity Savings Fund

   The Annuity Savings Fund is the fund to which are credited all contributions made by members together with regular interest thereon. When a member retires, or if a death benefit allowance becomes payable to his beneficiary, his accumulated contributions are transferred from the Annuity Savings Fund to the Pension Accumulation Fund. The annuity which these contributions provide is then paid from the Pension Accumulation Fund. On June 30, 2018, the value of assets credited to the Annuity Savings Fund amounted to $9,350,031,000.

   (b) Pension Accumulation Fund

   The Pension Accumulation Fund is the fund to which all income from investments and all contributions made by employers of members of the System and by the State for members of local retirement funds are credited. All retirement allowance and death benefit allowance payments are disbursed from this fund. Upon the retirement of a member, or upon his death if a death benefit allowance is payable, his accumulated contributions are transferred from the Annuity Savings Fund to this fund to provide the annuity portion of the allowance. On June 30, 2018, the fair value of assets credited to the Pension Accumulation Fund amounted to $66,182,894,000.

2. As of June 30, 2018, the total fair value of assets amounted to $75,532,925,000 as reported by the auditor of the System. The actuarial value of assets as of June 30, 2018 was determined to be $75,024,364,000 based on a 5-year smoothing of investment gains and losses. Schedule B shows the development of the actuarial value of assets.

3. Schedule C shows receipts and disbursements of the System for the two years preceding the valuation date and a reconciliation of the fund balances at fair value.

SECTION IV – COMMENTS ON VALUATION

1. Schedule A of this report contains the valuation balance sheet which shows the present and prospective assets and liabilities of the System as of June 30, 2018 (all amounts are in thousands).

2. The valuation balance sheet shows that the System has total liabilities of $108,709,054, of which $58,993,494 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members and $49,715,560 is for the prospective benefits payable on account of present active and inactive members and members entitled to deferred vested benefits. Against these liabilities, the System has total present assets for valuation purposes of $75,024,364 as of June 30, 2018. The difference of $33,684,690 between the total liabilities and the total present assets represents the present value of contributions to be made in the future. Of this amount, $5,532,465 is the present value of future contributions expected to be made by members to the Annuity Savings Fund, and the balance of $28,152,225 represents the present value of future contributions payable by the employer.

3. The employer contributions to the System consist of normal contributions and unfunded actuarial accrued liability (UAAL) contributions. The valuation indicates that employer normal contributions at the rate of 7.25% of payroll are required, in addition to member contributions, to provide the benefits of the System for the average new member.

4. Prospective normal contributions, excluding administrative expenses, have a present value of $6,271,336. When this amount is subtracted from $28,152,225, which is the present value of the total future contributions to be made by the employer, there remains $21,880,889 as the amount of future UAAL contributions.

5. The funding policy adopted by the Board, as shown in Schedule F, provides that the UAAL as of June 30, 2013 (Transitional UAAL) will be amortized as a level percent of pay over a closed period equal to the amortization period determined in the valuation preceding the adoption of the funding policy not to exceed 30 years. In each subsequent valuation all benefit changes, assumption and method changes and experience gains and/or losses that have occurred since the previous valuation will determine a New Incremental UAAL. Each New Incremental UAAL will be amortized as a level percent of payroll over a closed 30-year period from the date it is established.

6. The total UAAL contribution rate is 11.81% of payroll, determined in accordance with the Board's funding policy. The UAAL contribution rate has been calculated on the assumption that the aggregate amount of the accrued liability contribution will increase by 3.00% each year.

7. Schedule G of this report shows the amortization schedules for the Transitional UAAL and New Incremental UAALs.

8. The following table shows the components of the total UAAL and the derivation of the UAAL contribution rate in accordance with the funding policy:

TABLE 4

TOTAL UAAL AND UAAL CONTRIBUTION RATE
(Dollar amounts in thousands)

	UAAL	REMAINING AMORTIZATION PERIOD (YEARS)	AMORTIZATION PAYMENT
Transitional	$14,565,895	25	$973,217
New Incremental 6/30/2014	(166,620)	26	(10,886)
New Incremental 6/30/2015	3,473,494	27	222,205
New Incremental 6/30/2016	6,234,892	28	391,028
New Incremental 6/30/2017	934,532	29	57,526
New Incremental 6/30/2018	(3,161,304)	30	(191,199)
Total UAAL	$21,880,889		$1,441,891
Blended amortization period (years)			25.6
Estimated payroll			$12,208,766
UAAL contribution rate			11.81%

SECTION V – CONTRIBUTIONS PAYABLE BY EMPLOYERS

1. The Teachers Retirement System funding policy provides for periodic employer contributions at rates which, expressed as a percent of annual covered payroll, are sufficient to provide resources to pay benefits when due without being increased for future generations of taxpayers.
2. The retirement law provides that the contributions of employers shall be a percentage of the compensation of active members consisting of a normal contribution rate and an unfunded actuarial accrued liability (UAAL) contribution rate as determined by actuarial valuation.
3. Normal contributions include 0.25% of compensation that is required to meet the expenses of administering the System.
4. Based on the total employer contribution rate of 19.06% of payroll, the UAAL contribution rate is 11.81% of payroll, which will amortize the UAAL in accordance with the Board's funding policy. The interest rate used to amortize the UAAL is 7.25%.
5. The following table summarizes the employer contribution rates, which were determined by the June 30, 2018 valuation and are recommended for use.

ACTUARIALLY DETERMINED EMPLOYER CONTRIBUTION RATES (ADEC)
FOR FISCAL YEAR ENDING JUNE 30, 2021

CONTRIBUTION	PERCENTAGE OF ACTIVE MEMBERS' COMPENSATION
Normal	7.25%
Unfunded Actuarial Accrued Liability	11.81
Total	19.06%

SECTION VI – ACCOUNTING INFORMATION

The information required under Governmental Accounting Standard Board (GASB) Statements No. 67 and No. 68 will be issued in separate reports. The following information is provided for informational purposes only.

1. The following is a distribution of the number of employees by type of membership:

**NUMBER OF ACTIVE AND RETIRED MEMBERS
AS OF JUNE 30, 2018**

GROUP	NUMBER
Retirees and beneficiaries currently receiving benefits	127,300
Terminated employees not yet receiving benefits	106,439
Active plan members	226,039
Total	459,778

2. The schedule of funding progress is shown below.

SCHEDULE OF FUNDING PROGRESS
(Dollar amounts in thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) - Entry Age (b)	Unfunded AAL (UAAL) (b – a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b – a) / c)
6/30/2013	$58,594,837	$72,220,865	$13,626,028	81.1%	$9,924,682	137.3%
6/30/2014	62,061,722	75,772,117	13,710,395	81.9	9,993,686	137.2
6/30/2015	65,514,119	82,791,010	17,276,891	79.1	10,347,332	167.0
6/30/2016	68,161,710	91,721,775	23,560,065	74.3	10,783,277	218.5
6/30/2017	71,212,660	95,981,031	24,768,371	74.2	11,333,997	218.5
6/30/2018	75,024,364	96,905,253	21,880,889	77.4	11,704,334	186.9

3. The following shows the schedule of employer contributions.

Year Ending	Actuarially Determined Employer Contribution (ADEC)	Percentage Contributed
6/30/2013	$ 1,180,469	100%
6/30/2014	1,270,963	100
6/30/2015	1,406,706	100
6/30/2016	1,580,532	100
6/30/2017	1,654,844	100
6/30/2018	2,018,724	100

4. The information presented above was determined as part of the actuarial valuation at June 30, 2018. Additional information as of the latest actuarial valuation follows.

Valuation date	6/30/2018
Actuarial cost method	Entry age
Amortization method	Level percent of pay, closed
Remaining amortization period	25.6 years
Asset valuation method	5-year smoothed fair
Actuarial assumptions:	
Investment rate of return (discount rate)*	7.25%
Projected salary increases*	3.00 – 8.75%
Cost-of-living adjustments	3.00% Annually

** Includes inflation at 2.50%*

SECTION VII – EXPERIENCE

1. Section 47-3-23 of the act governing the operation of the System provides that as an aid to the Board in adopting service and mortality tables, the actuary will prepare an experience investigation at least once in each 5-year period. The last investigation was prepared for the 5-year period ending June 30, 2014 and, based on the results of the investigation, new rates of separation, mortality and salary increase were adopted by the Board on November 18, 2015. The next experience investigation will be prepared for the 4-year period July 1, 2014 through June 30, 2018.

2. The following table shows the estimated gain or loss from various factors that resulted in a decrease of $2,887,482,000 in the unfunded actuarial accrued liability from $24,768,371,000 to $21,880,889,000 during the fiscal year ending June 30, 2018.

ANALYSIS OF THE CHANGE IN UNFUNDED ACTUARIAL ACCRUED LIABILITY
(Dollar amounts in millions)

ITEM	AMOUNT OF INCREASE/ (DECREASE)
Interest (7.00%) added to previous UAAL	$ 1,733.8
Accrued liability contribution	(1,261.0)
Experience (Gain)/Loss:	
Valuation asset growth	(925.3)
Pensioners' mortality	(32.4)
Turnover and retirements	266.2
New entrants	161.2
Salary increases	(103.6)
Interest smoothing	(2,744.0)
Assumption and Method changes	(133.4)
Miscellaneous	151.0
Total Change in UAAL	$ (2,887.5)

3. The following is a brief description of the items contributing to the change in the unfunded actuarial accrued liability (UAAL) for the year:

Interest: The increase in the UAAL due to interest based on the assumed rate in effect for the year was $1,733.8 million (7.00% assumed for July 1, 2017 through June 30, 2018).

Accrued Liability Contribution: The decrease due to the contribution made during the year that was allocated to amortization of the UAAL was $1,261.0 million. This is the portion of the total employer contribution received during the year in excess of the employer normal cost.

Valuation Asset Growth: The decrease in the UAAL due to valuation asset growth for the year ending June 30, 2018 is $925.3 million. This gain represents the difference between the expected actuarial value of assets and the actuarial value of assets. The expected actuarial value of assets is determined by adding the actuarial value of assets from the prior valuation, non-investment related cash flow during the year and interest expected to be earned during the year at the assumed rate (7.00%).

Pensioner Mortality: The decrease in the UAAL due to pensioner mortality for the year is $32.4 million. This is primarily due to more members dying during the year than anticipated based on the mortality tables adopted by the Board.

Turnover and Retirements: There was an increase in the UAAL due to turnover and retirements during the year of $266.2 million. This loss occurred because the number of actual terminations was less than expected and the number of service retirements and disability retirements were greater than expected based on the assumed probabilities adopted by the Board. In addition, this item includes the impact of benefits for new retired members that were greater than anticipated based on the prior year's valuation data (this includes unexpected service increases due to sick leave conversion and service purchase and unanticipated salary increases in the year of retirement).

New Entrants: The increase in the UAAL due to new entrants was $161.2 million. This represents the accrued liability at the valuation date for new entrants hired during the year. This includes members who returned to service with prior service credit.

Salary Increases: There was a decrease in the UAAL of $103.6 million because the salary increases actually received by active members during the year were less than those anticipated based on the assumed salary increase rates adopted by the Board.

Interest Smoothing: There was a decrease in the UAAL of $2,744.0 million due to the interest smoothing methodology used to determine liabilities prior to the change in interest rate methodology. The decrease in liability occurred because the assumed interest rate during the first 23 years of the look forward increased from 7.00% to 7.26%.

Assumption and Method Changes: There was a decrease in the UAAL of $133.4 million due to the elimination of the interest smoothing methodology and the reductions in the long-term discount rate and the inflation assumption.

Miscellaneous: Other items contributing to the change in the UAAL totaled to an increase in the UAAL of $151.0 million. This includes all gains or losses not specified above. One such item is the loss that occurred for members who purchased service at less than full actuarial cost (such as withdrawn service). Another item is a loss that occurred because the data received to prepare the valuation was different than expected from the previous year (items such as birth dates or service for active members and birth dates, options, or benefit amounts for retired members).

SCHEDULE A

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE TEACHERS RETIREMENT SYSTEM OF GEORGIA
AS OF JUNE 30, 2018
(Dollar amounts in thousands)

ASSETS		
Actuarial value of assets		$ 75,024,364
Present value of future member contributions to Annuity Savings Fund		5,532,465
Present value of future employer contributions to the Pension Accumulation Fund:		
Normal contributions	$ 6,271,336	
Unfunded actuarial accrued liability contributions	21,880,889	
Total Prospective Employer Contributions		28,152,225
Total Assets		$ 108,709,054
LIABILITIES		
Present value of prospective benefits payable on account of present retired members and beneficiaries of deceased members		$ 58,993,494
Present value of prospective benefits payable on account of present active and inactive members and members entitled to deferred vested benefits		49,715,560
Total Liabilities		$ 108,709,054

SCHEDULE B

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS
(Dollar amounts in thousands)

(1)		Actuarial Value Beginning of Year*	$ 71,185,006
(2)		Fair Value End of Year	75,532,925
(3)		Fair Value Beginning of Year*	71,313,318
(4)		Cash Flow	
	(a)	Contributions	2,764,298
	(b)	Benefit Payments	4,775,981
	(c)	Administrative Expenses	15,865
	(d)	Investment Expenses	46,444
	(e)	Net: (4)(a) - (4)(b) - 4(c) - 4(d)	(2,073,992)
(5)		Investment Income	
	(a)	Fair Total: (2) - (3) - (4)(e)	6,293,599
	(b)	Assumed Rate	7.50%
	(c)	Amount for Immediate Recognition: [(3) x (5)(b)] + {[(4)(a) - (4)(b) – 4(c)] x (5)(b) x 0.5} + (4)(d)	5,318,910
	(d)	Amount for Phased-In Recognition: 5(a) - (5)(c)	974,689
(6)		Phased-In Recognition of Investment Income	
	(a)	Current Year: 5(d) / 5	194,938
	(b)	First Prior Year	627,423
	(c)	Second Prior Year	(824,442)
	(d)	Third Prior Year	(504,571)
	(e)	Fourth Prior Year	1,101,092
	(f)	Total Recognized Investment Gain	594,440
(7)		Preliminary Value End of Year: (1) + (4)(e) + 5(c) + (6)(f)	$ 75,024,364
(8)		Corridor	
	(a)	75% of Fair Value: 0.75 x (2)	$ 56,649,694
	(b)	125% of Fair Value: 1.25 x (2)	$ 94,416,156
(9)		Actuarial Value End of Year: (7), but not less than (8)(a) and not greater than (8)(b)	$ 75,024,364
(10)		Difference Between Fair & Actuarial Values: (2) - (9)	$ 508,561
(11)		Rate of Return on Actuarial Value	8.36%

*Adjusted from the June 30, 2017 valuation due to a one-time prior period adjustment made in accordance with the implementation of GASB 75.

SCHEDULE C

SUMMARY OF RECEIPTS AND DISBURSEMENTS
(Dollar amounts in thousands)

	YEAR ENDING	
Receipts for the Year	June 30, 2018	June 30, 2017
Contributions:		
Member	$ 745,574	$ 716,233
Employer	2,014,308	1,648,669
Non-Employer	4,416	6,175
Subtotal	$ 2,764,298	$ 2,371,077
Investment Income (Net of Investment Expenses)	1,521,874	1,449,035
Unrealized Appreciation/(Depreciation)	4,725,281	6,522,642
TOTAL	$ 9,011,453	$ 10,342,754
Disbursements for the Year		
Benefit Payments	$ 4,699,920	$ 4,461,124
Refunds to Members	76,061	76,296
Administrative Expenses	15,865	16,773
TOTAL	$ 4,791,846	$ 4,554,193
Excess of Receipts over Disbursements	$ 4,219,607	$ 5,788,561
Reconciliation of Asset Balances		
Asset Balance as of the Beginning of Year (Fair Value)	$ 71,313,318*	$ 65,552,411
Excess of Receipts over Disbursements	4,219,607	5,788,561
Asset Balance as of the End of Year (Fair Value)	$ 75,532,925	$ 71,340,972

*Adjusted from the June 30, 2017 valuation due to a one-time prior period adjustment made in accordance with the implementation of GASB 75.

SCHEDULE D

OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS

All assumptions, with the exception of the discount rate, payroll growth and the inflation component of the rates of salary increases, were adopted by the Board on November 18, 2015.

INVESTMENT RATE OF RETURN (Discount Rate): 7.25% per annum, net of investment expenses, compounded annually (including inflation of 2.50%).

SALARY INCREASES*:

Service	Annual Rate	Service	Annual Rate	Service	Annual Rate
0	8.75 %	7	4.25 %	14	3.25 %
1	7.25	8	3.75	15	3.25
2	5.75	9	3.75	16	3.00
3	5.25	10	3.50	17	3.00
4	5.00	11	3.50	18	3.00
5	5.00	12	3.50	19	3.00
6	5.00	13	3.50	20 or more	3.00

*includes price inflation component of 2.50% and a real rate of salary increase component of 0.50%

SERVICE RETIREMENT:

	Annual Rate			
	Male		Female	
AGE	Less than 30 years of service	30 or more years of service	Less than 30 years of service	30 or more years of service
50	3.5 %	60.0 %	3.0 %	55.0 %
55	5.0	40.0	5.5	37.0
60	20.0	36.0	25.0	43.0
61	18.0	32.0	25.0	43.0
62	26.0	36.0	25.0	43.0
63	22.0	33.0	25.0	43.0
64	22.0	32.0	25.0	43.0
65	30.0	30.0	31.0	31.0
66	32.0	32.0	33.0	33.0
67	30.0	30.0	30.0	30.0
68	30.0	30.0	30.0	30.0
69	28.0	28.0	30.0	30.0
70	30.0	30.0	30.0	30.0

SEPARATION BEFORE SERVICE RETIREMENT:

	Annual Rate of				
Age	Death*	Disability	Withdrawal Years of Service		
			0-4	5-9	10+
			Male		
20	0.0320%	0.0135%	25.00%	-	-
25	0.0349	0.0135	17.00	12.00%	-
30	0.0412	0.0210	13.50	7.00	8.00%
35	0.0717	0.0330	13.50	6.00	3.00
40	0.1001	0.0550	13.00	6.00	2.50
45	0.1399	0.0900	12.00	6.00	2.30
50	0.1983	0.1700	11.00	5.50	2.50
55	0.2810	0.3000	11.00	5.50	3.00
60	0.4092	-	12.00	5.50	-
64	0.5330	-	13.00	6.50	-
			Female		
20	0.0177%	0.0100%	28.00%	-	-
25	0.0192	0.0130	13.50	16.00%	-
30	0.0245	0.0140	13.50	8.00	6.00%
35	0.0441	0.0190	13.00	7.00	3.50
40	0.0655	0.0390	11.00	6.50	3.00
45	0.1043	0.0650	10.50	6.00	2.30
50	0.1555	0.1400	10.00	5.00	2.40
55	0.2228	0.3400	10.00	5.00	2.75
60	0.3058	-	10.50	5.50	-
64	0.4015	-	13.00	6.50	-

** The RP-2000 Employee Mortality Table projected to 2025 with projection scale BB is used for death prior to service retirement.*

DEATHS AFTER RETIREMENT: The RP-2000 White Collar Mortality Table projected to 2025 with projection scale BB (set forward 1 year for males) is used for death after service retirement and beneficiaries. The RP-2000 Disabled Mortality Table projected to 2025 with projection scale BB (set forward two years for males and four years for females) is used for death after disability retirement. There is a margin for future mortality improvement in the tables used by the System. Based on the results of the most recent experience study adopted by the Board on November 18, 2015, the numbers of expected future deaths are 8-11% less than the actual number of deaths that occurred during the study period for healthy retirees and 9-11% less than expected under the selected table for disabled retirees. Representative values of the assumed annual rates of death after service retirement and after disability retirement are shown below:

	Annual Rate of Death After			
	Service Retirement		Disability Retirement	
Age	Men	Women	Men	Women
40	0.0889%	0.0598%	2.0938%	0.6911%
45	0.1352	0.0942	2.3306	0.9865
50	0.2136	0.1474	2.9279	1.4019
55	0.3478	0.2281	3.4400	1.6567
60	0.5197	0.3638	3.5881	1.9670
65	0.9071	0.6397	3.8275	2.6129
70	1.4666	1.1229	4.7566	3.6157
75	2.5894	1.9017	6.3153	5.0131
80	4.5768	3.1857	8.3527	6.9358
85	8.0034	5.4864	10.9122	9.6851
90	15.1656	9.5675	17.2787	15.3358
95	25.0467	16.0813	27.1263	21.4644

COST OF LIVING: Increases of 1.5% semi-annually.

PAYROLL GROWTH ASSUMPTION: 3.00%

ADMINISTRATIVE EXPENSES: 0.25% of active members' payroll included in normal contribution.

ASSET METHOD: Actuarial Value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the fair value of assets and the expected fair value of assets, based on the investment rate of return. In accordance with the funding policy adopted by the Board, the actuarial value was set equal to the fair value as of June 30, 2013. The amount recognized each year beginning June 30, 2014 will be based on 5-year smoothing of assets, where 20% of the difference between fair value and expected fair value will be recognized each year. The actuarial value of assets is limited to a range between 75% and 125% of the fair value of assets.

PERCENTAGE MARRIED: 100% of active members were assumed to be married with the husband 4 years older than his wife.

UNUSED SICK LEAVE: 1.25% load on liabilities for members who retire on early retirement and for members who retire with unreduced retirement before 30 years of service and a 1.75% load for members who retire with 30 or more years of service.

TERMINATING VESTED MEMBERS: Prior to age 50, 40% of active vested members who terminate are assumed to elect a refund in lieu of a benefit; on or after age 50, 20% of active vested members who terminate are assumed to elect a refund in lieu of a benefit. Benefits are assumed to begin at age 60.

SCHEDULE E

ACTUARIAL COST METHOD

1. The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future (currently 7.25%), of each active member's expected benefit at retirement or death is determined, based on his age, service, sex and compensation. The calculations take into account the probability of a member's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service, disability or survivor's benefit. Future salary increases and post-retirement cost-of-living adjustments are also anticipated. The present value of the expected benefits payable on account of the active members is added to the present value of the expected future payments to retired members and beneficiaries and inactive members to obtain the present value of all expected benefits payable from the System on account of the present group of members and beneficiaries.
2. The employer contributions required to support the benefits of the System are determined following a level funding approach, and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.
4. The unfunded actuarial accrued liability is determined by subtracting the present value of prospective employer normal contributions and member contributions, together with the current actuarial value of assets held, from the present value of expected benefits to be paid from the System.

<u>**SCHEDULE F**</u>

FUNDING POLICY OF THE TRS BOARD OF TRUSTEES

The purpose of the funding policy is to state the overall funding objectives for the Teachers Retirement System of Georgia (the "System"), the benchmarks that will be used to measure progress in achieving those goals, and the methods and assumptions that will be employed to develop the benchmarks. It is intended that the funding policy will remain unchanged until the objectives below are met.

I. Funding Objectives

The goal in requiring employer and member contributions to the System is to accumulate sufficient assets during a member's employment to fully finance the benefits the member is expected to receive throughout retirement. In meeting this objective, the System will strive to meet the following funding objectives:

- To develop a pattern of contribution rates expressed as a percentage of member payroll as measured by valuations prepared in accordance with applicable State laws and the principles of practice prescribed by the Actuarial Standards Board.
- To maintain an increasing funded ratio (ratio of actuarial value of assets to actuarial accrued liabilities) that reflects a trend of improved actuarial condition. The long-term objective is to attain a 100% funded ratio over a reasonable period of future years.
- To maintain adequate asset levels to finance the benefits promised to members and to monitor the future demand for liquidity.
- To promote intergenerational equity for taxpayers with respect to contributions required for the benefits provided by the System.

II. Measures of Funding Progress

To track progress in achieving the System's funding objectives, the following measures will be determined annually as of the actuarial valuation date (with due recognition that a single year's results may not be indicative of long-term trends):

Funded ratio
The funded ratio, defined as the actuarial value of assets divided by the actuarial accrued liability, should increase over time, before adjustments for changes in benefits, actuarial methods, and/or actuarial assumptions.

Unfunded Actuarial Accrued Liability (UAAL)

- Transitional UAAL - The UAAL established as of the initial valuation date for which this funding policy is adopted shall be known as the Transitional UAAL.
- New Incremental UAAL - Each subsequent valuation will produce a New Incremental UAAL consisting of all benefit changes, assumption and method changes and experience gains and/or losses that have occurred since the previous valuation.
- Total UAAL - In each valuation year, this is the sum of the remaining balance of the Transitional UAAL and the remaining balance of each New Incremental UAAL.

UAAL Amortization Period

- The Transitional UAAL will be amortized over a closed period equal to the amortization period determined in the valuation preceding the adoption of the funding policy not to exceed 30 years.
- Each New Incremental UAAL shall be amortized over a closed 30-year period.

Employer Contribution Rates

- Employer Normal Contribution Rate – the contribution rate determined as of the valuation date each year based on the provisions of Georgia Code Section 47-3-43.
- In each valuation subsequent to the adoption of this funding policy, the required employer contribution rate will be determined by the summation of the employer Normal Contribution Rate, a contribution rate for administrative expenses, the amortization rate for the Transitional UAAL and the individual amortization rate for each of the New Incremental UAAL bases.

Stability of Employer Contribution Rates

The valuation methodology, including the amortization of the UAAL would be expected to maintain reasonably stable contribution rates. In each valuation, a single equivalent UAAL amortization period will be determined equal to the number of years that the sum of all of the individual amortization payments for the Transitional UAAL and each New Incremental UAAL determined above would be expected to fully amortize the Total UAAL. The employer contribution rate established in the prior valuation can be maintained provided that the payment of this rate results in a reduction from the prior valuation of at least one-year to the single equivalent UAAL amortization period.

III. Methods and Assumptions

The annual actuarial valuations providing the measures to assess funding progress will utilize the actuarial methods and assumptions last adopted by the Board based upon the advice and recommendation of the System's actuary. These include the following primary methods and assumptions:

- The actuarial cost method used to develop the benchmarks will be the Entry Age Normal actuarial cost method.
- The long-term investment rate of return assumption will based on the discount rate adopted by the Board of Trustees.
- The actuarial value of assets will be set equal to the market value of assets as of the valuation date immediately preceding the adoption of this funding policy. The actuarial value of assets in subsequent valuations will be determined by recognizing the annual differences between actual and expected market value of assets over a 5-year period.

In order to insure the sufficiency of long-term funding of benefits, the annual employer contribution rate determined in each actuarial valuation shall not be less than the employer normal cost contribution rate plus a contribution rate for administrative expenses.

The actuary shall conduct an investigation into the System's experience at least every five years and utilize the results of the investigation to form the basis for recommended assumptions and methods.

IV. Funding Policy Progress

The Board will periodically have actuarial projections of the valuation results performed to assess the current and expected future progress towards the overall funding goals of the System. These periodic projections will provide the expected valuation results over at least a 30-year period. The projected measures of funding progress and the recent historical trend provided in valuations will provide important information for the Board's assessment of the System's funding progress.

SCHEDULE G

AMORTIZATION OF TRANSITIONAL UAAL
(Dollar amounts in thousands)

Valuation Date	Balance of Transitional UAAL	Expected UAAL Contribution
6/30/2013	$ 13,626,028	$ 779,710
6/30/2014	13,868,270	808,949
6/30/2015	14,099,441	885,395
6/30/2016	14,271,505	914,170
6/30/2017	14,427,698	943,880
6/30/2018	**14,565,895**	**973,217**
6/30/2019	14,648,705	1,002,414
6/30/2020	14,708,322	1,032,486
6/30/2021	14,742,189	1,063,461
6/30/2022	14,747,536	1,095,365
6/30/2023	14,721,368	1,128,226
6/30/2024	14,660,441	1,162,073
6/30/2025	14,561,251	1,196,935
6/30/2026	14,420,007	1,232,843
6/30/2027	14,232,615	1,269,828
6/30/2028	13,994,651	1,307,923
6/30/2029	13,701,341	1,347,161
6/30/2030	13,347,527	1,387,575
6/30/2031	12,927,648	1,429,203
6/30/2032	12,435,700	1,472,079
6/30/2033	11,865,209	1,516,241
6/30/2034	11,209,196	1,561,728
6/30/2035	10,460,134	1,608,580
6/30/2036	9,609,914	1,656,838
6/30/2037	8,649,795	1,706,543
6/30/2038	7,570,363	1,757,739
6/30/2039	6,361,475	1,810,471
6/30/2040	5,012,211	1,864,785
6/30/2041	3,510,811	1,920,729
6/30/2042	1,844,616	1,978,351
6/30/2043	0	0

SCHEDULE G
(Continued)

AMORTIZATION OF 2014 NEW INCREMENTAL UAAL
(Dollar amounts in thousands)

Valuation Date	Balance of New Incremental UAAL 6/30/2014	Expected UAAL Contribution
6/30/2014	$ (157,875)	$ (9,034)
6/30/2015	(160,681)	(9,903)
6/30/2016	(162,829)	(10,225)
6/30/2017	(164,816)	(10,557)
6/30/2018	**(166,620)**	**(10,886)**
6/30/2019	(167,814)	(11,212)
6/30/2020	(168,768)	(11,549)
6/30/2021	(169,455)	(11,895)
6/30/2022	(169,845)	(12,252)
6/30/2023	(169,907)	(12,620)
6/30/2024	(169,605)	(12,998)
6/30/2025	(168,904)	(13,388)
6/30/2026	(167,761)	(13,790)
6/30/2027	(166,133)	(14,204)
6/30/2028	(163,975)	(14,630)
6/30/2029	(161,233)	(15,069)
6/30/2030	(157,854)	(15,521)
6/30/2031	(153,777)	(15,986)
6/30/2032	(148,940)	(16,466)
6/30/2033	(143,272)	(16,960)
6/30/2034	(136,700)	(17,469)
6/30/2035	(129,142)	(17,993)
6/30/2036	(120,512)	(18,533)
6/30/2037	(110,716)	(19,088)
6/30/2038	(99,655)	(19,661)
6/30/2039	(87,218)	(20,251)
6/30/2040	(73,291)	(20,859)
6/30/2041	(57,746)	(21,484)
6/30/2042	(40,448)	(22,129)
6/30/2043	(21,252)	(22,793)
6/30/2044	0	0

SCHEDULE G
(Continued)

AMORTIZATION OF 2015 NEW INCREMENTAL UAAL
(Dollar amounts in thousands)

Valuation Date	Balance of New Incremental UAAL 6/30/2015	Expected UAAL Contribution
6/30/2015	$ 3,338,131	$ 202,141
6/30/2016	3,386,350	208,710
6/30/2017	3,431,616	215,493
6/30/2018	**3,473,494**	**222,205**
6/30/2019	3,503,117	228,871
6/30/2020	3,528,222	235,737
6/30/2021	3,548,281	242,810
6/30/2022	3,562,721	250,094
6/30/2023	3,570,925	257,597
6/30/2024	3,572,220	265,325
6/30/2025	3,565,881	273,284
6/30/2026	3,551,124	281,483
6/30/2027	3,527,097	289,927
6/30/2028	3,492,884	298,625
6/30/2029	3,447,493	307,584
6/30/2030	3,389,853	316,811
6/30/2031	3,318,805	326,316
6/30/2032	3,233,103	336,105
6/30/2033	3,131,398	346,188
6/30/2034	3,012,236	356,574
6/30/2035	2,874,049	367,271
6/30/2036	2,715,146	378,289
6/30/2037	2,533,705	389,638
6/30/2038	2,327,760	401,327
6/30/2039	2,095,196	413,367
6/30/2040	1,833,730	425,768
6/30/2041	1,540,907	438,541
6/30/2042	1,214,082	451,697
6/30/2043	850,406	465,248
6/30/2044	446,812	479,206
6/30/2045	0	0

SCHEDULE G
(Continued)

AMORTIZATION OF 2016 NEW INCREMENTAL UAAL
(Dollar amounts in thousands)

Valuation Date	Balance of New Incremental UAAL 6/30/2016	Expected UAAL Contribution
6/30/2016	$ 6,065,039	$ 367,269
6/30/2017	6,152,648	379,205
6/30/2018	**6,234,892**	**391,028**
6/30/2019	6,295,894	402,759
6/30/2020	6,349,587	414,841
6/30/2021	6,395,091	427,287
6/30/2022	6,431,448	440,105
6/30/2023	6,457,623	453,309
6/30/2024	6,472,492	466,908
6/30/2025	6,474,840	480,915
6/30/2026	6,463,351	495,342
6/30/2027	6,436,601	510,203
6/30/2028	6,393,052	525,509
6/30/2029	6,331,039	541,274
6/30/2030	6,248,766	557,512
6/30/2031	6,144,289	574,238
6/30/2032	6,015,512	591,465
6/30/2033	5,860,172	609,209
6/30/2034	5,675,826	627,485
6/30/2035	5,459,838	646,310
6/30/2036	5,209,367	665,699
6/30/2037	4,921,347	685,670
6/30/2038	4,592,475	706,240
6/30/2039	4,219,190	727,427
6/30/2040	3,797,654	749,250
6/30/2041	3,323,734	771,727
6/30/2042	2,792,977	794,879
6/30/2043	2,200,589	818,726
6/30/2044	1,541,406	843,287
6/30/2045	809,870	868,586
6/30/2046	0	0

SCHEDULE G
(Continued)

AMORTIZATION OF 2017 NEW INCREMENTAL UAAL
(Dollar amounts in thousands)

Valuation Date	Balance of New Incremental UAAL 6/30/2017	Expected UAAL Contribution
6/30/2017	$ 921,225	$ 55,785
6/30/2018	**934,532**	**57,526**
6/30/2019	944,760	59,252
6/30/2020	954,003	61,029
6/30/2021	962,140	62,860
6/30/2022	969,035	64,746
6/30/2023	974,544	66,688
6/30/2024	978,510	68,689
6/30/2025	980,763	70,750
6/30/2026	981,119	72,872
6/30/2027	979,378	75,058
6/30/2028	975,325	77,310
6/30/2029	968,726	79,629
6/30/2030	959,329	82,018
6/30/2031	946,862	84,479
6/30/2032	931,031	87,013
6/30/2033	911,518	89,623
6/30/2034	887,980	92,312
6/30/2035	860,046	95,081
6/30/2036	827,318	97,934
6/30/2037	789,364	100,872
6/30/2038	745,721	103,898
6/30/2039	695,888	107,015
6/30/2040	639,325	110,225
6/30/2041	575,450	113,532
6/30/2042	503,638	116,938
6/30/2043	423,214	120,446
6/30/2044	333,451	124,060
6/30/2045	233,566	127,782
6/30/2046	122,718	131,615
6/30/2047	0	0

SCHEDULE G
(Continued)

AMORTIZATION OF 2018 NEW INCREMENTAL UAAL
(Dollar amounts in thousands)

Valuation Date	Balance of New Incremental UAAL 6/30/2018	Expected UAAL Contribution
6/30/2018	**$ (3,161,304)**	**$ (191,199)**
6/30/2019	(3,199,299)	(196,935)
6/30/2020	(3,234,313)	(202,843)
6/30/2021	(3,265,957)	(208,929)
6/30/2022	(3,293,810)	(215,197)
6/30/2023	(3,317,415)	(221,652)
6/30/2024	(3,336,275)	(228,302)
6/30/2025	(3,349,853)	(235,151)
6/30/2026	(3,357,566)	(242,206)
6/30/2027	(3,358,784)	(249,472)
6/30/2028	(3,352,824)	(256,956)
6/30/2029	(3,338,948)	(264,665)
6/30/2030	(3,316,357)	(272,605)
6/30/2031	(3,284,189)	(280,783)
6/30/2032	(3,241,510)	(289,206)
6/30/2033	(3,187,313)	(297,882)
6/30/2034	(3,120,511)	(306,819)
6/30/2035	(3,039,929)	(316,023)
6/30/2036	(2,944,301)	(325,504)
6/30/2037	(2,832,258)	(335,269)
6/30/2038	(2,702,328)	(345,327)
6/30/2039	(2,552,919)	(355,687)
6/30/2040	(2,382,319)	(366,358)
6/30/2041	(2,188,679)	(377,348)
6/30/2042	(1,970,010)	(388,669)
6/30/2043	(1,724,167)	(400,329)
6/30/2044	(1,448,840)	(412,339)
6/30/2045	(1,141,542)	(424,709)
6/30/2046	(799,595)	(437,450)
6/30/2047	(420,115)	(450,574)
6/30/2048	0	0

SCHEDULE H

SUMMARY OF MAIN PLAN PROVISIONS
AS INTERPRETED FOR VALUATION PURPOSES

The Teachers Retirement System of Georgia began operation as of January 1, 1945. The System is supported by the joint contributions of the members and their employers. All teachers employed by an agency of and within the State of Georgia are eligible for membership in the System. The State makes contributions for certain retired members of local funds and certain benefits are payable by the System to them or on their account.

The following summary describes the main benefit and contribution provisions of the System as interpreted for the valuation.

1 - DEFINITIONS

"Prior service" means service rendered prior to January 1, 1945 for which credit is allowed. "Creditable service" means the sum of membership service and prior service. "Earnable compensation" means the full rate of compensation that would be payable to a member teacher if he worked the full normal working time and shall include compensation paid to a member by an employer from grants or contracts made by outside agencies with the employer. "Employer" means the State of Georgia, the county or independent board of education, the State Board of Education, the Board of Regents of the University System of Georgia, or any other agency of and within the State by which a teacher is paid.

2 - BENEFITS

MEMBERS OF THE RETIREMENT SYSTEM

Service Retirement Benefit

Condition for Allowance	Any member may retire on a service retirement allowance upon the attainment of age 60 and the completion of 10 years of creditable service or upon the completion of 25 years of creditable service.

Amount of Allowance

The service retirement allowance consists of:

(a) An annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his retirement; and

(b) A pension which, together with the annuity, will provide a total annual allowance equal to 2.00% of the member's average annual compensation during the two consecutive years of his creditable service as a contributing member producing the highest such average, multiplied by the number of years of his creditable service limited to 40 years.

If the member has less than 30 years of creditable service and has not attained age 60 at the time of retirement, his allowance is reduced by the lesser of 1/12 of 7% for each month that retirement precedes age 60 or 7% for each year or fraction of a year by which the member has less than 30 years of creditable service at the time of retirement.

The minimum service retirement allowance is $17 per month for each year of creditable service, not to exceed 40 years of such service.

In no event will a teacher who was a member on June 30, 1961 receive a smaller retirement allowance than he would have received under the benefit provisions of the System in effect on that date.

Disability Retirement Benefit

Condition for Allowance

A disability retirement allowance is payable to any member who becomes permanently incapacitated, mentally or physically, for the further performance of duty, after having rendered 10 or more years of creditable service.

Amount of Allowance

If a member qualifies for either service retirement or disability retirement and a service retirement calculation exceeds the amount that he would receive on disability, he shall receive a service retirement allowance. Otherwise he receives a disability retirement allowance determined as a service retirement allowance on the basis of the member's creditable service and compensation up to the time of disability, but with no reduction for age.

Death Benefit

Condition for Allowance	A death benefit is payable on account of a member who dies after having completed 10 or more years of creditable service provided there is a named living beneficiary.
Amount of Allowance	The death benefit is the amount which would have become payable to the member's beneficiary had the member retired on the date of his death on either a service retirement allowance or a disability retirement allowance, whichever is larger, and died after an election of Option 2 had become effective.

Vesting Benefit

Condition for Allowance	A member who withdraws from service prior to attaining age 60 after having rendered at least 10 years of creditable service and who elects to leave his accumulated contributions in the System is eligible for a vesting retirement allowance upon application therefore upon the attainment of age 60 or at any time thereafter.
Amount of Allowance	The vesting allowance is determined as a service retirement allowance on the basis of the member's creditable service and compensation up to the time of withdrawal from service and on the basis of his age at the time the allowance commences.

Return of Contributions Prior to Retirement	Upon a member's withdrawal from service or death prior to retirement, his accumulated contributions together with the accumulated interest are returned to him, or are paid to his designated beneficiary or estate, provided no other benefit is payable under the System.
Return of Contributions After Retirement Under Maximum Plan	Benefits are payable to a member retired on service or disability for the remainder of his lifetime under the maximum plan. In the event total monthly benefits paid at the time of death are less than the contributions which the member made to the System, the difference between the benefits paid and the amount of contributions is refunded to the member's designated beneficiary or estate, provided no optional allowance has been selected.

Optional Allowances

Upon retirement, any member may elect to convert the retirement allowance otherwise payable to him, except any additional pension payable under the minimum provision, to a reduced retirement allowance of equivalent actuarial value in one of the following optional forms:

Option 1. If he dies before receiving in annuity payments the amount of his accumulated contributions at retirement, the balance is paid to his designated beneficiary or to his estate; or

Option 2. Upon his death his reduced retirement allowance is continued throughout the life of and paid to his designated beneficiary; or

Option 2 Pop-up. A member may elect Option 2 with the added provision that in the event the designated beneficiary predeceases the member, the retirement allowance payable to the member after the designated beneficiary's death shall be equal to the retirement allowance which would have been payable had the member not elected the option; or

Option 3. Upon his death one-half of his reduced retirement allowance is continued throughout the life of and paid to his designated beneficiary; or

Option 3 Pop-up. A member may elect Option 3 with the added provision that in the event the designated beneficiary predeceases the member, the retirement allowance payable to the member after the designated beneficiary's death shall be equal to the retirement allowance which would have been payable had the member not elected the option; or

Option 4. A reduced retirement allowance payable during the life of the retired member, with the provision that upon his death some other benefit shall be payable; provided that the total value of such benefits is the actuarial equivalent of the retirement allowance he would have received without optional modification and provided the benefit is approved by the Board of Trustees; or

Option 5. A reduced retirement allowance together with a partial lump sum distribution not to exceed the sum of 36 months of the member’s monthly retirement allowance that would have been payable if this option was not elected. This option may be elected with any other option described above. This option is not available to disability retirements or members subject to the minimum benefit formula.

Cost-of-Living Adjustment

The retirement allowances of members or of any beneficiary of a member who died in service will be subject to adjustment as of each January 1 and July 1 based upon the change in the average CPI during the previous six-month period. The maximum increase in retirement allowances for any such six-month period will be 1-1/2%. If the CPI decreases, no reduction in allowance will be made for the first 2-1/2% of a reduction and retirement allowances will not be reduced below the amounts initially paid upon retirement.

In addition, for members who retired prior to January 1, 2013, a one-time 3% increase on the first $37,500 of members' allowances is made at retirement. Members who retire on or after January 1, 2013 do not receive this increase.

A member who retires prior to age 60 with less than 30 years of creditable service is not eligible for post-retirement adjustments until such time as the member reaches age 60 or would have obtained 30 years of creditable service, whichever occurs earlier.

3 - CONTRIBUTIONS

By Members

Each member contributes 6.00% of his earnable compensation. However, no contributions are payable after the attainment of age 65 and the completion of 40 years of creditable service unless the member elects to continue to make contributions. Members may elect to cease making contributions after the completion of 40 years of creditable service.

By Employers

The employer contributes at a specified percentage of active member payroll determined annually by actuarial valuation.

SCHEDULE I

THE NUMBER AND AVERAGE ANNUAL COMPENSATION OF ACTIVE MEMBERS BY AGE AND SERVICE AS OF JUNE 30, 2018

Age	Years of Service										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25	351	3,778	11								4,140
Avg. Pay	20,038	31,658	29,190								30,666
25 to 29	534	16,445	3,227	14							20,220
Avg. Pay	23,754	37,675	45,739	43,830							38,598
30 to 34	372	10,876	9,745	3,296	10						24,299
Avg. Pay	27,281	39,173	48,810	55,245	43,911						45,038
35 to 39	308	9,249	6,114	10,942	2,800	9					29,422
Avg. Pay	28,740	40,335	50,379	58,026	64,443	51,566					51,178
40 to 44	301	8,106	5,180	7,658	8,958	2,174	12				32,389
Avg. Pay	30,046	40,904	50,147	57,424	66,569	71,045	58,619				55,315
45 to 49	295	7,453	5,250	7,488	6,778	8,085	2,151	19			37,519
Avg. Pay	29,461	41,207	48,328	54,975	63,314	72,537	73,606	51,108			57,466
50 to 54	206	5,485	4,063	6,395	5,258	4,565	4,857	882	8		31,719
Avg. Pay	31,307	40,901	46,336	51,201	57,091	65,866	73,619	72,697	48,434		55,784
55 to 59	159	3,781	2,946	5,178	4,980	4,293	3,141	1,428	208	8	26,122
Avg. Pay	30,003	40,812	46,276	49,477	54,045	58,472	65,571	73,732	73,372	53,646	53,545
60 to 64	72	1,886	1,757	2,866	2,765	2,442	1,734	744	278	53	14,597
Avg. Pay	29,796	39,020	45,865	48,936	53,807	57,372	61,990	68,075	81,212	74,685	52,759
65 to 69	27	537	583	884	770	612	449	281	124	57	4,324
Avg. Pay	31,852	41,560	44,878	49,621	55,219	60,089	65,624	66,228	98,694	91,317	55,046
70 & up	11	195	137	242	196	175	133	99	54	46	1,288
Avg. Pay	42,345	33,505	40,042	49,689	50,220	58,484	71,272	75,826	92,594	135,913	56,542
Total Count	2,636	67,791	39,013	44,963	32,515	22,355	12,477	3,453	672	164	226,039
Avg. Pay	26,989	39,210	48,238	54,462	60,797	66,213	69,647	71,574	82,535	96,613	51,780

Average Age: 44.49 Average Service: 10.92

NUMBER OF RETIRED MEMBERS
AND THEIR BENEFITS BY AGE

Age	Number of Members	Total Annual Benefits	Average Annual Benefits
Under 50	35	$ 1,037,144	$ 29,633
50 – 54	1,509	60,126,224	39,845
55 – 59	5,852	255,396,170	43,643
60 – 64	19,641	691,734,925	35,219
65 – 69	30,377	1,130,605,919	37,219
70 – 74	25,818	1,037,152,278	40,172
75 – 79	15,372	638,969,724	41,567
80 – 84	8,482	353,556,811	41,683
85 – 89	4,858	203,383,335	41,866
90 – 94	1,900	76,683,111	40,360
95 & Over	569	19,520,558	34,307
Total	114,413	$ 4,468,166,199	$ 39,053

NUMBER OF BENEFICIARIES
AND THEIR BENEFITS BY AGE

Age	Number of Members	Total Annual Benefits	Average Annual Benefits
Under 25	172	$ 1,830,110	$ 10,640
25 – 29	170	1,922,225	11,307
30 – 34	234	2,930,637	12,524
35 – 39	342	4,028,479	11,779
40 – 44	388	5,035,802	12,979
45 – 49	446	6,511,861	14,601
50 – 54	437	7,187,004	16,446
55 – 59	522	9,540,991	18,278
60 – 64	718	15,625,090	21,762
65 – 69	1,015	26,141,647	25,755
70 – 74	1,060	30,467,506	28,743
75 – 79	975	30,440,686	31,221
80 – 84	837	27,374,559	32,706
85 – 89	606	20,235,801	33,392
90 – 94	298	10,468,016	35,128
95 & Over	95	3,165,897	33,325
Total	8,315	$ 202,906,311	$ 24,402

NUMBER OF DISABLED RETIREES
AND THEIR BENEFITS BY AGE

Age	Number of Members	Total Annual Benefits	Average Annual Benefits
Under 50	282	$ 4,715,277	$ 16,721
50 – 54	428	8,851,565	20,681
55 – 59	772	15,654,250	20,278
60 – 64	1,082	23,338,882	21,570
65 – 69	855	20,991,848	24,552
70 – 74	621	15,938,676	25,666
75 – 79	302	7,498,549	24,830
80 – 84	126	3,086,647	24,497
85 – 89	71	1,774,006	24,986
90 – 94	29	674,319	23,252
95 & Over	4	107,056	26,764
Total	4,572	$ 102,631,075	$ 22,448

SCHEDULE J

CAFR SCHEDULES

Active Members				
Fiscal Year	Number of Members	Annual Payroll (000's)	Average Pay	% Increase
2009	226,537	$ 10,641,543	$ 46,975	3.6%
2010	222,020	10,437,703	47,012	0.1%
2011	216,137	10,099,278	46,726	-0.6%
2012	213,648	10,036,023	46,975	0.5%
2013	209,854	9,924,682	47,293	0.7%
2014	209,828	9,993,686	47,628	0.7%
2015	213,990	10,347,332	48,354	1.5%
2016	218,193	10,783,277	49,421	2.2%
2017	222,902	11,333,997	50,847	2.9%
2018	226,039	11,704,334	51,780	1.8%

Retirants and Beneficiaries								
Fiscal Year	Added to Roll		Removed from Roll		Roll – End of Year		% Increase In Annual Allowances	Average Annual Income
	Number of Members	Annual Allowances (000's)	Number of Members	Annual Allowances (000's)	Number of Members	Annual Allowances (000's)		
2009	5,543	$ 245,006	1,768	$ 45,116	82,358	$ 2,630,321	8.2 %	$ 31,938
2010	6,383	279,009	1,763	46,853	86,978	2,862,477	8.8	32,910
2011	7,136	295,192	1,937	55,062	92,177	3,102,607	8.4	33,659
2012	7,055	298,471	1,915	55,565	97,317	3,345,513	7.8	34,377
2013	7,937	322,853	1,983	59,453	103,271	3,608,913	7.9	34,946
2014	7,078	291,066	2,195	68,324	108,154	3,831,655	6.2	35,428
2015	7,207	306,751	2,237	72,818	113,124	4,065,588	6.1	35,939
2016	7,225	312,063	2,392	80,359	117,957	4,297,292	5.7	36,431
2017	7,189	318,594	2,459	84,596	122,687	4,531,290	5.4	36,934
2018	7,345	341,242	2,732	98,829	127,300	4,773,703	5.3	37,500

Solvency Test							
	Aggregate Accrued Liabilities For				Portion of Accrued Liabilities Covered by Assets		
Fiscal Year	(1) Active Member Contributions (000's)	(2) Retirants and Beneficiaries (000's)	(3) Active Members (Employer-Financed Portion) (000's)	Actuarial Value of Assets (000's)	(1)	(2)	(3)
2009	$ 6,382,932	$ 31,450,727	$ 21,616,457	$ 53,438,604	100.0%	100.0%	72.2%
2010	6,705,274	34,264,548	22,622,215	54,529,416	100.0	100.0	59.9
2011	6,973,343	37,271,020	21,734,277	55,427,716	100.0	100.0	51.5
2012	7,242,569	39,759,145	21,346,964	56,262,332	100.0	100.0	43.4
2013	7,480,767	43,152,402	21,587,696	58,594,837	100.0	100.0	36.9
2014	7,815,630	45,841,742	22,114,745	62,061,722	100.0	100.0	38.0
2015	8,153,958	50,251,964	24,385,088	65,514,119	100.0	100.0	29.1
2016	8,522,267	55,186,998	28,012,510	68,161,710	100.0	100.0	15.9
2017	8,936,010	57,659,259	29,385,762	71,212,660	100.0	100.0	15.7
2018	9,350,031	58,993,494	28,561,728	75,024,364	100.0	100.0	23.4