



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve



**Teachers' Retirement System
of the State of Kentucky
Report of the Actuary on the
Annual Valuation of the
Retiree Medical and Life
Insurance Plans**

Prepared as of June 30, 2018





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

November 12, 2018

Board of Trustees
Teachers' Retirement System of the
State of Kentucky
479 Versailles Road
Frankfort, KY 40601-3800

Members of the Board:

This report covers the Retiree Medical Plan funded by the Medical Insurance Fund (MIF) and OPEB liabilities related to the Life Insurance Plan funded by the Life Insurance Fund (LIF). Cavanaugh Macdonald Consulting, LLC (CMC) has submitted the results of the annual actuarial valuation prepared as of June 30, 2018. While not verifying the data at source, the actuary performed tests for consistency and reasonability.

The valuation indicates a total actuarially determined contribution of 5.82% as of percentage of active member payroll for the MIF payable for the fiscal year ending June 30, 2019 is required to support the benefits of the Kentucky Employees' Health Plan (KEHP) and the Medicare Eligible Health Plan (MEHP). Of this amount, 2.775% of payroll is estimated to be paid by University members and 3.750% of payroll is estimated to be paid by all other members, leaving 3.045% and 2.070% respectively, as the remaining actuarially determined contribution. This actuarially determined contribution reflects the actuarial value of assets of the MIF and an 8.00% discount rate for valuing liabilities.

The initial per capita costs of health care and the rates of health care inflation used to project the per capita health care costs have been revised since the previous valuation to reflect recent experience and revised expectations. Additionally, the results of the valuation include a change to the KEHP dependent subsidies offered to retirees who retired prior to July 1, 2010.

The Life Insurance Plan valuation indicates a total actuarially determined contribution of 0.06% of active member payroll payable for the fiscal year ending June 30, 2021 is required to support the benefits of the LIF. This actuarially determined contribution reflects the actuarial value of assets of the LIF and a 7.50% discount rate for valuing liabilities.

The promised benefits of the Retiree Medical and Life Insurance Plans are included in the actuarially calculated contribution rates that are developed using the entry age normal actuarial cost method. Five-year market related value of plan assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded actuarial accrued liability that is being amortized by regular annual contributions as a level percentage of payroll within a 22-year period for the Retiree Medical Plan and a 26-year period for the Life Insurance Plan, on the assumption that payroll will increase by 3.50% annually. The assumptions recommended by the actuary and adopted by the Board are in aggregate reasonably related to the experience under the Retiree Medical and Life Insurance Plans and to reasonable expectations of anticipated experience under the Retiree Medical and Life Insurance Plans.



Board of Trustees
November 12, 2018
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CMC has prepared the trend information shown in the Schedule of Funding Progress in the Financial Section of the Annual Report and Section VII shown in the Actuarial Section of the Annual Report.

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries and have 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 Retiree Medical and Life Insurance Plans and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the Plans.

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.

This actuarial valuation was performed to determine the recommended funding amount for the System. The asset values used to determine unfunded liabilities and funded ratios are not market values, but less volatile market-related values. A smoothing technique is applied to market values to determine the market-related values. The unfunded liability amounts and funded ratios using the market value of assets would be different. The interest rate used for determining liabilities is based on the expected return of assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.

In our opinion, if the contributions to the Medical Insurance Fund continue at the current statutorily required levels, the funded ratio of the Retiree Medical Plan will continue to increase, and the ability of the MIF to fund the benefits called for under the Retiree Medical Plan will improve.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'Alisa Bennett'.

Alisa Bennett, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, appearing to read 'Edward J. Koebel'.

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

AB:bs



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**TEACHERS' RETIREMENT SYSTEM
OF THE STATE OF KENTUCKY
REPORT OF THE ACTUARY ON THE ANNUAL VALUATION
OF THE RETIREE MEDICAL AND LIFE INSURANCE PLANS
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 results of the previous valuation are summarized below:

MEDICAL INSURANCE FUND
(Dollar amounts in \$1,000's)

Valuation Date	June 30, 2018	June 30, 2017
Number of active members	72,205	72,130
Annual salaries	\$ 3,605,116	\$ 3,563,584
Number of deferred vested members	7,337	7,410
Number of annuitants in medical plans	40,230	39,497
Number of spouses and beneficiaries in medical plans*	<u>7,595</u>	<u>7,189</u>
Total	47,825	46,686
Assets:		
Market value	\$ 1,190,281	\$ 963,269
Actuarial value	\$ 1,213,918	\$ 985,694
Unfunded actuarial accrued liability	\$ 2,126,791	\$ 2,706,025
Funded Ratio based on Actuarial Value of Assets	36.3%	26.7%
Amortization period (years)	22	23
Discount rate	8.00%	8.00%

**Spouses of post-65 retirees and surviving spouses of deceased retirees with a date of death on or after July 1, 2002 pay 100% of the full contribution. 100% of the full contribution for non-Medicare eligible dependents is paid through a combination of payments from beneficiaries and the State. The non-Medicare dependent subsidy amount drops to two thirds in 2019 and one third in 2020.*



MEDICAL INSURANCE FUND CONTRIBUTION RATES FOR UNIVERSITY MEMBERS

Valuation Date	June 30, 2018		June 30, 2017	
Contribution for fiscal year ending:	June 30, 2019		June 30, 2018	
	Hired prior to 7/1/08	Hired on or after 7/1/08	Hired prior to 7/1/08	Hired on or after 7/1/08
Normal	1.78%	1.78%	1.94%	1.94%
Accrued liability	<u>4.04</u>	<u>4.04</u>	<u>5.07</u>	<u>5.07</u>
Total	5.82%	5.82%	7.01%	7.01%
Member	2.775%	2.775%	2.775%	2.775%
Employer	2.775	1.775	2.775	1.775
State	<u>0.270</u>	<u>1.270</u>	<u>1.460</u>	<u>2.460</u>
Total	5.820%	5.820%	7.010%	7.010%

MEDICAL INSURANCE FUND CONTRIBUTION RATES FOR SCHOOL DISTRICT EMPLOYEES (NON-FEDERAL)

Valuation Date	June 30, 2018		June 30, 2017	
Contribution for fiscal year ending:	June 30, 2019		June 30, 2018	
	Hired prior to 7/1/08	Hired on or after 7/1/08	Hired prior to 7/1/08	Hired on or after 7/1/08
Normal	1.78%	1.78%	1.94%	1.94%
Accrued liability	<u>4.04</u>	<u>4.04</u>	<u>5.07</u>	<u>5.07</u>
Total	5.82%	5.82%	7.01%	7.01%
Member	3.750%	3.750%	3.750%	3.750%
Employer	3.000	3.000	3.000	3.000
State	<u>(0.930)</u>	<u>(0.930)</u>	<u>0.260</u>	<u>0.260</u>
Total	5.820%	5.820%	7.010%	7.010%



MEDICAL INSURANCE FUND CONTRIBUTION RATES FOR OTHER EMPLOYEES

Valuation Date	June 30, 2018		June 30, 2017	
Contribution for fiscal year ending:	June 30, 2019		June 30, 2018	
	Hired prior to 7/1/08	Hired on or after 7/1/08	Hired prior to 7/1/08	Hired on or after 7/1/08
Normal	1.78%	1.78%	1.94%	1.94%
Accrued liability	<u>4.04</u>	<u>4.04</u>	<u>5.07</u>	<u>5.07</u>
Total	5.82%	5.82%	7.01%	7.01%
Member	3.750%	3.750%	3.750%	3.750%
Employer	3.750	2.750	3.750	2.750
State	<u>(1.680)</u>	<u>(0.680)</u>	<u>(0.490)</u>	<u>0.510</u>
Total	5.820%	5.820%	7.010%	7.010%

LIFE INSURANCE FUND (Dollar amounts in \$1,000's)

Valuation Date	June 30, 2018	June 30, 2017
Number of active members	72,205	72,130
Annual salaries	\$3,605,116	\$3,563,584
Number of vested former members	8,814	8,525
Number retirees in Life Insurance Plan	49,422	48,225
Assets:		
Market value	\$84,462	\$87,777
Actuarial value	\$93,808	\$95,730
Unfunded actuarial accrued liability*	\$18,663	\$13,339
Funded Ratio based on Actuarial Value of Assets	83.4%	87.8%
Amortization period (years)	26	27
Discount rate	7.50%	7.50%
Contribution for fiscal year ending:	June 30, 2021	June 30, 2020
Normal	0.03%	0.03%
Accrued liability	<u>0.03</u>	<u>0.02</u>
Total	0.06%	0.05%

* Includes liability for death in active service. This amount could be segregated from the OPEB liability and assets could be split for active and post-employment purposes. However, since this could be administratively burdensome and since death in active service liabilities can be considered de minimis, we will consider the entire liability an OPEB liability under GASB 74 and 75.



2. The valuation indicates combined member, employer, and State contributions of 5.82% of active member payroll would be sufficient to support the current benefits of the Retiree Medical Plan and State contributions of 0.06% of active member payroll would be sufficient to support the current benefits of the Life Insurance Plan. Comments on the valuation results as of June 30, 2018 are given in Section IV and further discussion of the contribution levels is set out in Sections VI and VII.
3. Schedule B shows the development of the actuarial value of assets. The assumed investment rate of return is 8.00% for MIF and 7.50% for LIF.
4. Schedule D of this report outlines the full set of actuarial assumptions and methods employed in the current valuation. Since the previous valuation, the initial per capita costs of health care and the rates of health care inflation used to project the per capita health care costs have been revised to reflect recent experience.
5. Provisions of the System, as summarized in Schedule F, were taken into account in the current valuation. Since the previous valuation, there has been a change to the KEHP dependent subsidies offered to retirees. The premium subsidy for KEHP-participating members who retired prior to July 1, 2010 was restored for the June 30, 2017 valuation. In 2019, TRS will contribute two-thirds of the non-single premium and in 2020, TRS will contribute one-third of the non-single premium.
6. The funded ratio shown in the Summary of Principal Results, is the ratio of actuarial value of assets to the actuarial accrued liability. The funded status would be different based on the market 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 the payment of the unfunded actuarial accrued liability. In addition, this funded ratio does not have any relationship to measuring the sufficiency if the plan had to settle its liabilities.



SECTION II - MEMBERSHIP DATA

1. Data regarding the membership of the Retiree Medical and Life Insurance Plans for use as a basis of the valuation were furnished by the System's office. The following tables summarize the membership of the System as of June 30, 2018, upon which the valuation was based. Detailed tabulations of the data are given in Schedule F.

ACTIVE MEMBERS AS OF JUNE 30, 2018

Group	Number	Annual Salaries (\$1,000's)
University Full Time hired before 7/1/2008	1,578	\$ 118,570
University Full Time hired after 7/1/2008	1,579	83,582
Non-University Full Time hired before 7/1/2008	34,000	2,259,772
Non-University Full Time hired after 7/1/2008	22,526	1,065,810
Non-University Part Time hired before 7/1/2008	2,098	18,041
Non-University Part Time hired after 7/1/2008	<u>10,424</u>	<u>59,341</u>
Total	72,205	\$ 3,605,116

2. The following tables show the number of retired members and their beneficiaries receiving health care as of the valuation date as well as average ages.

RETIREEES RECEIVING HEALTH BENEFITS AS OF JUNE 30, 2018

	Under 65	Over 65	Total
Number	10,707	29,523	40,230
Average Age	60.0	74.0	70.3

SPOUSES RECEIVING HEALTH BENEFITS AS OF JUNE 30, 2018

	Under 65	Over 65	Total
Number	2,813	4,782	7,595
Average Age	59.0	74.9	69.0

3. The Retiree Medical Plan valuation 7,337 deferred vested members eligible for health care at age 60 and the Life Insurance Plan valuation includes 8,814 deferred vested members eligible for retiree life insurance at age 60.



SECTION III - ASSETS

1. As of June 30, 2018, the market value of MIF assets held by the Retiree Medical Plan amounted to \$1,190,280,808 and the market value of LIF assets held by the Life Insurance Plan amounted to \$84,462,256.
2. The five-year market related value of MIF assets used for valuation purposes as of June 30, 2018 was \$1,213,917,592 and the five-year market related value of LIF assets used for valuation purposes as of June 30, 2018 was \$93,466,093. Schedule B shows the development of the actuarial value of assets as of June 30, 2018.
3. Schedule C shows the receipts and disbursements for the year preceding the valuation date and a reconciliation of the asset balances for the MIF and the LIF.

SECTION IV - COMMENTS ON VALUATION

1. Schedule A of this report outlines the results of the actuarial valuation. The valuation was prepared in accordance with the actuarial assumptions and the actuarial cost method, which are described in Schedule D.
2. The valuation shows the Retiree Medical Plan has an actuarial accrued liability of \$1,648,393,959 for benefits expected to be paid on account of the present active membership, based on service to the valuation date. The liability on account of deferred vested members amounts to \$38,605,041. The liability on account of benefits payable to retirees and covered spouses amounts to \$1,653,709,895. The total actuarial accrued liability of the Retiree Medical Plan amounts to \$3,340,708,895. Against these liabilities, the Retiree Medical Plan has present assets for valuation purposes of \$1,213,917,592. When this amount is deducted from the actuarial accrued liability of \$3,340,708,895, there remains \$2,126,791,303 as the unfunded actuarial accrued liability for the Retiree Medical Plan.
3. The normal contribution is equal to the actuarial present value of benefits accruing during the current year. The normal contribution for the Retiree Medical Plan is determined to be \$64,032,400, or 1.78% of payroll.



4. The valuation shows that the Life Insurance Plan has an actuarial accrued liability of \$18,254,598 for benefits expected to be paid on account of the present active membership, based on service to the valuation date. The liability on account of deferred vested members amounts to \$3,708,587. The liability on account of benefits payable to retirees amounts to \$90,507,319. The total actuarial accrued liability of the Life Insurance Plan amounts to \$112,470,504. This amount includes liability for death in active service. The liability for death in active service could be segregated from the OPEB liability and assets could be split for active and post-employment purposes. As this could be administratively burdensome and, as death in active service liabilities can be considered de minimis, we will consider the entire liability an OPEB liability under GASB 75 and 75. Against these liabilities, the Life Insurance Plan has present assets for valuation purposes of \$93,808,352. When this amount is deducted from the actuarial accrued liability of \$112,470,504, there remains \$18,662,152 as the unfunded actuarial accrued liability for the life insurance plan.
5. The normal contribution is equal to the actuarial present value of benefits accruing during the current year. The normal contribution for the life insurance plan is determined to be \$1,182,249, or 0.03% of payroll.



SECTION V – DERIVATION OF EXPERIENCE GAINS AND LOSSES

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is assumed that gains and losses will be in balance over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain (loss) for the year ended June 30, 2018 is shown below (\$1,000's).

Experience Gain/(Loss)* of the:		Medical Insurance Fund	Life Insurance Fund
(1)	UAAL as of 6/30/2017	\$2,706,025	\$13,339
(2)	Normal cost from last valuation	69,128	994
(3)	Expected employer contributions	249,742	1,768
(4)	Interest accrual: [(1) + (2) - (3)] x .08 for MIF, .075 for LIF	<u>202,033</u>	<u>942</u>
(5)	Expected UAAL before changes: (1) + (2) - (3) + (4)	\$2,727,444	\$13,507
(6)	Change due to benefit provisions	0	0
(7)	Change due to new actuarial assumptions	0	0
(8)	Change due to claim experience	<u>(659,751)</u>	<u>0</u>
(9)	Expected UAAL after changes: (5) + (6) + (7) + (8)	\$2,067,692	\$13,507
(10)	Actual UAAL as of 6/30/2018	2,126,791	18,663
(11)	Total gain/(loss): (9) - (10)	(59,099)	(5,156)
(a)	Contribution and investment gain/(loss)	<u>57,161</u>	<u>(5,748)</u>
(b)	Experience gain/(loss) (11) - (11a)	(116,260)	592
(12)	Accrued liabilities as of 6/30/2017	\$3,691,719	\$109,069
(13)	Experience gain/(loss) as percent of actuarial accrued liabilities at start of year (11b) / (12)	(3.1%)	0.5%

* Rows labeled as a change, rather than a gain/(loss), are expressed as negative if the UAAL is decreased and positive if the UAAL is increased.



SECTION VI – CONTRIBUTIONS PAYABLE UNDER THE PLANS

1. Sections 161.420 and 161.550 of the Kentucky Revised Statutes provide the amounts employers and the State are required to contribute to the Medical Insurance Fund. These contribution amounts vary by date of membership and employee type.

Employer Percentage of Payroll Contribution Made to Medical Insurance Fund					
University Employees		School District Employees (Non-Federal)*		Other Employees	
Hired Before 7/1/2008	Hired On or After 7/1/2008	Hired Before 7/1/2008	Hired On or After 7/1/2008	Hired Before 7/1/2008	Hired On or After 7/1/2008
2.775	1.775	3.000	3.000	3.750	2.750

** In addition to the amounts contributed by School Districts on behalf of Non-Federal employees, the State contributes 0.75%.*

2. For the fiscal year ending June 30, 2019, member contributions will be 2.775% for University employees and 3.750% for all other members. Based upon the amortization of the unfunded actuarial accrued liability over a 22-year period as a level percentage of payroll, the valuation indicates employer and State contributions of 3.045% of payroll for University employees and 2.070% of payroll for all other members.
3. The State is scheduled to contribute 0.05% of salary to the Life Insurance Fund for the fiscal year ending June 30, 2020. Based upon the amortization of the unfunded actuarial liability over a 26-year period as a level percentage of payroll, CMC's valuation indicates a contribution of 0.06% for the fiscal year ending June 30, 2021 is required to support sufficiently the benefits of the Life Insurance Plan.



REQUIRED CONTRIBUTION RATES

Medical Insurance Fund For Fiscal Year Ending June 30, 2019						
Normal	1.78%					
Accrued Liability	<u>4.04</u>					
Total	5.82%					
	University Employees		School District Employees (Non-Federal)		Other Employees	
	Hired prior to 7/1/08	Hired on or after 7/1/08	Hired prior to 7/1/08	Hired on or after 7/1/08	Hired prior to 7/1/08	Hired on or after 7/1/08
Member	2.775%	2.775%	3.750%	3.750%	3.750%	3.750%
Employer	2.775	1.775	3.000	3.000	3.750	2.750
State	<u>0.270</u>	<u>1.270</u>	<u>(0.930)</u>	<u>(0.930)</u>	<u>(1.680)</u>	<u>(0.680)</u>
Total	5.820%	5.820%	5.820%	5.820%	5.820%	5.820%

Life Insurance Fund For Fiscal Year Ending June 30, 2021	
Normal	0.03%
Accrued Liability	<u>0.03</u>
Total	0.06%
Member	0.00%
State	<u>0.06</u>
Total	0.06%

4. The valuation indicates that a total normal contribution of 1.78% of payroll is required to meet the cost of benefits currently accruing under the Retiree Medical Plan and 0.03% of payroll is required to meet the cost of benefits currently accruing under the Life Insurance Plan. The difference between the total contribution and the normal contribution remains to be applied toward the liquidation of the unfunded actuarial accrued liability. This accrued liability payment is 4.04% of payroll for the Retiree Medical Plan and 0.03% of payroll for the Life Insurance Plan.
5. The unfunded actuarial accrued liability amounts to \$2,126,791,303 for the Retiree Medical Plan and \$18,662,152 for the Life Insurance Plan as of the valuation date. An accrued liability contribution rate of 5.07% of payroll for the Retiree Medical Plan and 0.03% of payroll for the Life Insurance Plan is sufficient to amortize the unfunded actuarial accrued liabilities over a 22-year period for the Retiree Medical Plan and a 26-year period for the Life Insurance Plan, based on the assumption that the payroll will increase by 3.50% annually.



SECTION VII - COMMENTS ON LEVEL OF FUNDING

1. The System's monthly contribution for retirees who opt into the Retiree Medical Plan is based upon date of hire, date of attaining age 65, and years of service at retirement. Additionally, beneficiary contributions may vary by date of hire, date of attaining age 65, years of service at retirement, plan election, Medicare eligibility, and tobacco use. Beneficiary contributions for dependents are targeted to be 100% of the cost of expected claims and/or insured premiums for spouses age 65 and older. Historically, this target has been achieved. 100% of the full cost for non-Medicare eligible dependents is paid through a combination of payments from beneficiaries and the State on a current disbursement basis. Current employer and State contributions have been determined to be sufficient to fund the cost of the benefits to be provided. Benefits for university, school district (non-Federal), and other members are identical, although active employee contributions collected from university, school district (non-Federal), and other members differ. A listing of active member Retiree Medical Plan contributions by fiscal year, date of membership, and employer type is provided in Schedule E.
2. This valuation provides the contributions required to fund sufficiently the Retiree Medical Plan and to ensure the future solvency of the Medical Insurance Fund. For University employees, a member contribution of 2.775% of payroll together with employer and State contributions of 3.045% of payroll are required to meet the cost of benefits currently accruing and provide for the amortization of the unfunded actuarial accrued liability over a period of 22 years. For the remaining membership, a member contribution of 3.750% of payroll together with employer and State contributions of 2.070% of payroll is required to meet the cost of benefits currently accruing and provide for the amortization of the unfunded actuarial accrued liability over a period of 22 years.



SECTION VIII - ACCOUNTING INFORMATION

1. The information required under Governmental Accounting Standards Board (GASB) Statements No. 74 and 75 will be issued in separate reports. The following information is provided for informational purposes only.

NUMBER OF ACTIVE AND RETIRED MEMBERS IN RETIREE MEDICAL PLAN AS OF JUNE 30, 2018	
GROUP	NUMBER
Retirees currently receiving health benefits	40,230
Spouses of retirees currently receiving health benefits	7,595
Terminated employees entitled to benefits but not yet receiving benefits	7,337
Active plan members	<u>72,205</u>
Total	127,367

NUMBER OF ACTIVE AND RETIRED MEMBERS IN LIFE INSURANCE PLAN AS OF JUNE 30, 2018	
GROUP	NUMBER
Retirees	49,422
Terminated employees	8,814
Active plan members	<u>72,205</u>
Total	130,441



SCHEDULE OF FUNDING PROGRESS
Medical Insurance Fund
(Dollar amounts in \$1,000's)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Annual Salary (c)	UAAL as a Percentage of Covered Payroll ((b - a) / c)
6/30/2012	338,746	3,594,540	3,255,794	9.4	3,479,567	93.6
6/30/2013	412,185	3,521,073	3,108,888	11.7	3,480,066	89.3
6/30/2014	508,913	3,194,689	2,685,776	15.9	3,486,327	77.0
6/30/2015	637,839	3,525,584	2,887,745	18.1	3,515,113	82.2
6/30/2016 ¹	795,055	3,634,073	2,839,018	21.9	3,537,226	80.3
6/30/2017	985,694	3,691,719	2,706,025	26.7	3,563,584	75.9
6/30/2018	1,213,918	3,340,709	2,126,791	36.3	3,605,116	58.9

¹Reflects change in decrement and participation assumptions.

SCHEDULE OF FUNDING PROGRESS
Life Insurance Fund
(Dollar amounts in \$1,000's)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Annual Salary (c)	UAAL as a Percentage of Covered Payroll ((b - a) / c)
6/30/2012	92,241	91,398	(843)	100.9	3,479,567	(0.02)
6/30/2013	94,863	94,325	(538)	100.6	3,480,066	(0.02)
6/30/2014	96,130	97,354	1,224	98.7	3,486,327	0.04
6/30/2015	97,186	98,739	1,553	98.4	3,515,113	0.04
6/30/2016 ¹	97,269	106,059	8,790	91.7	3,537,226	0.25
6/30/2017	95,730	109,069	13,339	87.8	3,563,584	0.37
6/30/2018	93,808	112,471	18,663	83.4	3,605,116	0.52

¹Reflects change in decrement and participation assumptions.



2. The information presented in the required supplementary schedules 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	22 Years Retiree Medical Plan	
	26 Years Life Insurance Plan	
Asset Valuation Method	5-Year Smoothed Market	
Actuarial Assumptions:		
Investment Rate of Return*	8.00% Retiree Medical Plan	
	7.50% Life Insurance Plan	
	Pre-Medicare**	Medicare
Medical Trend Assumption	7.50%	5.50%
Ultimate Trend Rate	5.00%	5.00%
Year of Ultimate Trend Rate	2024	2021

*Includes price inflation at 3.00%.

**Alternate trend rates were used for Medicare Part B premiums and are disclosed in Schedule D.

SCHEDULE OF EMPLOYER CONTRIBUTIONS - Medical Insurance Fund

Fiscal Year Ending Date	Actuarially Determined Contribution (a)	Actual Employer Contribution (b)	RDS Contribution (c)	Total Contribution (b) + (c)	Percentage of ADC Contributed [(b) + (c)] / (a)
6/30/2013	\$186,725,823	\$166,611,420	\$0	\$166,611,420	89.2%
6/30/2014	159,583,400	162,568,395	0	162,568,395	101.9
6/30/2015	106,606,132	168,084,353	0	168,084,353	157.7
6/30/2016	97,982,580	221,966,705	0	221,966,705	226.5
6/30/2017	102,854,017	180,375,986	0	180,375,986	175.4
6/30/2018	118,837,620	187,102,413	0	187,102,413	157.4

SCHEDULE OF EMPLOYER CONTRIBUTIONS - Life Insurance Fund

Fiscal Year Ending Date	Actuarially determined Contribution (a)	Actual Employer Contribution (b)	Percentage of ADC Contributed (b) / (a)
6/30/2013	\$1,739,908	\$1,680,495	96.6%
6/30/2014	1,044,959	1,006,091	96.3
6/30/2015	1,050,216	1,019,519	97.1
6/30/2016	1,057,851	1,037,769	98.1
6/30/2017	1,065,122	1,049,683	98.6
6/30/2018	1,075,305	1,058,329	98.4



SCHEDULE A

RESULTS OF THE VALUATION AS OF JUNE 30, 2018
(Dollar amounts in \$1,000's)

	Medical Insurance Fund	Life Insurance Fund
PAYROLL	\$ 3,605,116	\$ 3,605,116
ACTUARIAL ACCRUED LIABILITY		
Present value of prospective benefits payable in respect of:		
(a) Present active members	\$ 1,648,394	\$ 18,255
(b) Present terminated vested members	38,605	3,709
(c) Present retired members and covered spouses	<u>1,653,710</u>	<u>90,507</u>
(d) Total actuarial accrued liability	\$ 3,340,709	\$ 112,471
PRESENT ASSETS FOR VALUATION PURPOSES	\$ 1,213,918	\$ 93,808
UNFUNDED ACTUARIAL ACCRUED LIABILITY	\$ 2,126,791	\$ 18,663
CONTRIBUTIONS:	Fiscal Year Ending June 30, 2019	Fiscal Year Ending June 30, 2021
Normal	1.78%	0.03%
Accrued Liability	<u>4.04</u>	<u>0.03</u>
Total	5.82%	0.06%



SCHEDULE A
(continued)

**MEDICAL INSURANCE FUND
SOLVENCY TEST**
(Dollar amounts in millions)

Valuation Date	(1) Active Member Contributions	(2) Retirants And Beneficiaries	(3) Active Members (Employer Financed Portion)	Valuation Assets	Portion of Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
6/30/2013	n/a	\$2,001.8	\$1,519.3	\$412.2	n/a	21	0
6/30/2014	n/a	1,771.9	1,422.8	508.9	n/a	29	0
6/30/2015	n/a	1,982.2	1,543.4	637.8	n/a	32	0
6/30/2016	n/a	1,950.9	1,683.2	795.1	n/a	41	0
6/30/2017	n/a	1,985.1	1,706.6	985.7	n/a	50	0
6/30/2018	n/a	1,692.3	1,648.4	1,213.9	n/a	72	0

**LIFE INSURANCE FUND
SOLVENCY TEST**
(Dollar amounts in millions)

Valuation Date	(1) Active Member Contributions	(2) Retirants And Beneficiaries	(3) Active Members (Employer Financed Portion)	Valuation Assets	Portion of Accrued Liabilities Covered by Assets		
					(1)	(2)	(3)
6/30/2012	n/a	75.2	16.2	92.2	n/a	100	105
6/30/2013	n/a	78.1	16.2	94.9	n/a	100	104
6/30/2014	n/a	81.0	16.3	96.1	n/a	100	93
6/30/2015	n/a	82.7	16.0	97.2	n/a	100	91
6/30/2016	n/a	89.0	17.1	97.3	n/a	100	49
6/30/2017	n/a	92.1	17.0	95.7	n/a	100	21
6/30/2018	n/a	94.2	18.3	93.8	n/a	99	0



SCHEDULE B

**DEVELOPMENT OF THE ACTUARIAL VALUE OF ASSETS
MEDICAL INSURANCE FUND**

AS OF JUNE 30, 2018

(1)	Actuarial Value of Assets Beginning of Year	\$	985,694,300
(2)	Market Value of Assets End of Year	\$	1,190,280,808
(3)	Market Value of Assets Beginning of Year	\$	963,269,031
(4)	Cash Flow		
	a. Contributions	\$	375,563,335
	b. Benefit Payments		218,765,152
	c. Administrative Expense		<u>1,747,561</u>
	d. Net: (4)a – (4)b – (4)c	\$	155,050,622
(5)	Investment Income		
	a. Market total: (2) – (3) – (4)d	\$	71,961,155
	b. Assumed Rate		8.00%
	c. Amount for Immediate Recognition: [(3) x (5)b] + [(4)d x (5)b x 0.5]		<u>83,263,547</u>
	d. Amount for Phased-In Recognition: (5)a – (5)c	\$	(11,302,392)
(6)	Phased-In Recognition of Investment Income		
	a. Current Year: 0.20 x (5)d	\$	(2,260,479)
	b. First Prior Year		6,277,740
	c. Second Prior Year		(12,827,105)
	d. Third Prior Year		(7,773,884)
	e. Fourth Prior Year		<u>6,492,851</u>
	f. Total Recognized Investment Gain	\$	(10,090,877)
(7)	Actuarial Value of Assets End of Year: (1) + (4)d + (5)c + (6)f	\$	1,213,917,592
(8)	Difference Between Market & Actuarial Values: (2) – (7)	\$	(23,636,784)
(9)	Rate of Return on Actuarial Value:		6.71%



SCHEDULE B
(Continued)

**DEVELOPMENT OF THE ACTUARIAL VALUE OF ASSETS
LIFE INSURANCE FUND**

AS OF JUNE 30, 2018

(1)	Actuarial Value of Assets Beginning of Year	\$	95,730,467
(2)	Market Value of Assets End of Year	\$	84,462,256
(3)	Market Value of Assets Beginning of Year	\$	87,777,405
(4)	Cash Flow		
a.	Contributions	\$	1,058,329
b.	Benefit Payments		5,452,920
c.	Administrative Expense		<u>30,979</u>
d.	Net: (4)a – (4)b – (4)c	\$	(4,425,570)
(5)	Investment Income		
a.	Market total: (2) – (3) – (4)d	\$	1,110,421
b.	Assumed Rate		7.50%
c.	Amount for Immediate Recognition: [(3) x (5)b] + [(4)d x (5)b x 0.5]		<u>6,417,347</u>
d.	Amount for Phased-In Recognition: (5)a – (5)c	\$	(5,306,926)
(6)	Phased-In Recognition of Investment Income		
a.	Current Year: 0.20 x (5)d	\$	(1,061,385)
b.	First Prior Year		(1,150,797)
c.	Second Prior Year		(353,444)
d.	Third Prior Year		(941,279)
e.	Fourth Prior Year		<u>(406,987)</u>
f.	Total Recognized Investment Gain	\$	(3,913,892)
(7)	Actuarial Value of Assets End of Year: (1) + (4)d + (5)c + (6)f	\$	93,808,352
(8)	Difference Between Market & Actuarial Values: (2) – (7)	\$	(9,346,096)
(9)	Rate of Return on Actuarial Value:		2.64%

**SCHEDULE C**

**MEDICAL INSURANCE FUND
SUMMARY OF RECEIPTS AND DISBURSEMENTS
(Market Value)**

	For the Year Ending	
	June 30, 2018	June 30, 2017
Receipts for the Year		
Contributions		
Members Statutory	\$130,777,471	\$128,819,243
Payment by Retired Members	<u>57,683,452</u>	<u>57,941,968</u>
Total Members	\$188,460,923	\$186,761,211
State Statutory Contributions	\$ 22,424,350	\$ 22,042,563
Employer Contributions	106,143,410	104,879,255
State Contributions	<u>58,534,652</u>	<u>53,454,168</u>
Total Employer	\$187,102,412	\$180,375,986
Grand Total	\$375,563,335	\$367,137,197
Recovery Income	0	0
Net Investment Income	<u>76,840,513</u>	<u>95,452,597</u>
TOTAL	\$452,403,848	\$462,589,794
Disbursements for the Year		
Administrative Expense	1,747,561	1,538,574
Medical Insurance Expense	<u>218,765,152</u>	<u>231,563,156</u>
TOTAL	\$220,512,713	\$233,101,730
Excess of Receipts over Disbursements	\$231,891,135	\$229,488,064
Reconciliation of Asset Balances		
Asset Balance as of the Beginning of the Year	\$958,389,673*	\$733,780,967
Excess of Receipts over Disbursements	<u>231,891,135</u>	<u>229,488,064</u>
Asset Balance as of the End of the Year	<u>\$1,190,280,808</u>	<u>\$963,269,031</u>

*Adjustment at beginning of the year.



SCHEDULE C
(Continued)

LIFE INSURANCE FUND
SUMMARY OF RECEIPTS AND DISBURSEMENTS
(Market Value)

	For the Year Ending	
	June 30, 2018	June 30, 2017
Receipts for the Year		
Contributions		
Members	\$ 0	\$ 0
State	896,974	881,703
Employer	<u>161,355</u>	<u>167,980</u>
Total	\$ 1,058,329	\$ 1,049,683
Net Investment Income	<u>1,110,421</u>	<u>915,497</u>
TOTAL	\$ 2,168,750	\$ 1,965,180
Disbursements for the Year		
Benefit Payments	\$ 5,452,920	\$ 5,151,013
Refunds to Members	0	0
Medical Insurance Payments	0	0
Miscellaneous, including expenses	<u>30,979</u>	<u>27,690</u>
TOTAL	\$ 5,483,899	\$ 5,178,703
Excess of Receipts over Disbursements	\$ (3,315,149)	\$ (3,213,523)
Reconciliation of Asset Balances		
Asset Balance as of the Beginning of the Year	\$ 87,777,405	\$ 90,990,928
Excess of Receipts over Disbursements	<u>(3,315,149)</u>	<u>(3,213,523)</u>
Asset Balance as of the End of the Year	<u>\$ 84,462,256</u>	<u>\$ 87,777,405</u>



SCHEDULE D

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

The rates of retirement, disability, mortality, termination, salary increases, and rates of future benefit participation used in the valuation were selected based on the actuarial experience study prepared as of June 30, 2015, submitted to and adopted by the Board on September 19, 2016. The health care cost trend rates, and expected plan costs were determined by the actuary based on recent experience.

VALUATION DATE: June 30, 2018

DISCOUNT RATE: 8.00% per annum, compounded annually for the Medical Insurance Fund
7.50% per annum, compounded annually for the Life Insurance Fund

HEALTH CARE COST TREND RATES: Following is a chart detailing health care trend assumptions.

Fiscal Year Ended	Annual Trend Rate		
	Medicare Part B	Under Age 65	Ages 65 and Older
2019	2.63%	7.50%	5.50%
2020	4.70	7.00	5.25
2021	4.63	6.50	5.00
2022	4.88	6.00	5.00
2023	5.88	5.50	5.00
2024	5.71	5.00	5.00
2025	5.00	5.00	5.00
2026	5.41	5.00	5.00
2027	5.93	5.00	5.00
2028	5.62	5.00	5.00
2029	5.37	5.00	5.00
2030	5.12	5.00	5.00
2031 and beyond	5.00	5.00	5.00

AGE RELATED MORBIDITY: For retirees ages 65 and older, per capita health care costs are adjusted to reflect expected health care cost changes related to age. The increase to the net incurred health care claims is assumed to be:

Participant Age	Annual Increase
65 – 69	3.0%
70 – 74	2.5
75 – 79	2.0
80 – 84	1.0
85 - 89	0.5
90 and over	0.0

For the retiree health care liabilities of those under age 65, the current premium charged by the Kentucky Employees' Health Plan (KEHP) is used as the base cost and is projected forward using the health care trend assumption. No implicit rate subsidy is calculated or recognized as the implicit rate subsidy is deemed the responsibility of the KEHP. Under Actuarial Standard of Practice No. 6 (ASOP No. 6), aging subsidies (or implicit rate subsidies) should be recognized, as



SCHEDULE D
(Continued)

the differences in health care utilization and cost due to age have been demonstrated and well quantified. The impact of aging on a valuation's results can be as significant as the use of mortality, trend, and discounting. It has been the long-standing position that the responsibility for compliance with GASB Statement No. 43, when it relates to KEHP implicit subsidies, rests with KEHP, not the System, as the System has no operational authority over KEHP. As such, KEHP implicit subsidies are excluded from the OPEB valuation process of the Retiree Medical Plan. As GASB 74 and 75 prohibit such a deviation from ASOP No. 6, additional consideration to the current treatment of KEHP implicit rate subsidies may be needed in the future. Valuing the KEHP implicit subsidies will increase the actuarial accrued liability for GASB 74 and 75 purposes.

RETIREE MEDICAL PLAN COSTS: Assumed per capita health care costs were based on past experience and trended based on the assumptions. Following are charts detailing retiree per capita assumptions. These amounts include medical, drug, and administrative costs and represent the amount that the System pays as the full contribution amount. An additional \$7.44 per month is paid to the Department of Employee Insurance (DEI) and is not included in the under age 65 costs listed below. For retirees ages 65 and older, the average costs shown are normalized to age 65 and then age adjusted in calculating liabilities.

Monthly Under Age 65 (KEHP) Full Costs as of January 1, 2019				
Tier Elected	LivingWell CDHP	LivingWell PPO	LivingWell Basic CDHP	LivingWell Limited HDP
Single	\$ 709.46	\$ 729.34	\$ 682.80	\$ 607.54
Parent Plus	978.50	1,037.08	940.64	865.08
Couple	1,333.64	1,589.10	1,450.02	1,327.16
Family	1,489.76	1,767.60	1,615.30	1,477.04
Family C-R	818.96	876.68	800.94	730.90

Average Monthly System Full Costs and Contributions			
Year	Under Age-65 (KEHP) Contributions	Ages 65 and Older (MEHP) Full Costs	Ages 65 and Older (MEHP) Contributions
CY 2008	484	278	278
CY 2009	545	301 ¹	301
CY 2010	594	373 ¹	373
CY 2011	626	289 ¹	289
CY 2012	622	270 ²	270
CY 2013	635	294 ²	294
CY 2014	679	290 ²	290
CY 2015	669	240 ²	240
CY 2016	681	260 ²	260
CY 2017	680	252 ²	252
CY 2018	688	258 ²	258
CY 2019	691	226 ³	226

¹ Under GASB 45, cost reductions for the amount of the Medicare Part D Retiree Drug Subsidy could not be taken into account in the gross cost calculations.

² 2,257 current, Medicare-eligible benefit recipients have been identified by the client to be ineligible for premium-free Medicare Part A benefits. For these individuals, the full cost of coverage is, on average, \$575 per month. It is assumed 9% of current retirees under the age of 65 who were hired prior to 4/1/1986 will be ineligible for premium-free Medicare Part A benefits upon reaching Medicare eligibility (age 65) and 0% of these retirees will cover a spouse. All active members are assumed to have begun contributing to Medicare as of 4/1/1986 and are assumed eligible for premium-free Medicare Part A benefits.

³ Blended basis, includes increased costs for retirees without premium-free Medicare Part A. All active members are assumed to have begun contributing to Medicare as of 4/1/1986 and are assumed eligible for premium-free Medicare Part A benefits.



SCHEDULE D
(Continued)

CURRENT RETIREE MEDICAL PLAN PARTICIPATION: Actual census data and current plan elections (including waivers) provided by the System were used for those retirees currently participating in the Retiree Medical Plan. Current participants are assumed to maintain their current Retiree Medical Plan coverage until they are no longer eligible.

ANTICIPATED RETIREE MEDICAL PLAN PARTICIPATION: The assumed annual rates of health care plan participation for future retirees are as follows:

Years of Service	Member Participation		
	Entered System Before 7/1/2002	Entered System After 6/30/2002 and Before 7/1/2008	Entered System After 6/30/2008
5-9.99	20%	20%	Not Eligible
10-14.99	49	20	Not Eligible
15-19.99	70	41	41%
20-24.99	91	61	61
25-25.99	91	76	76
26-26.99	91	84	84
27 or more	91	91	91

ANTICIPATED RETIREE MEDICAL PLAN ELECTIONS: The assumed rates of plan election for future retirees participating in the KEHP plans are provided in the following table. As the assumed plan election rates are estimates and actual results may be materially different, this assumption will need to be revised as experience evolves.

LivingWell CDHP	LivingWell PPO	LivingWell Basic CDHP	LivingWell Limited HDP
42%	50%	5%	3%

SPOUSE COVERAGE IN RETIREE MEDICAL PLAN: Actual census data and current plan elections were used for MEHP and KEHP covered spouses (including beneficiaries) of current retirees. For spouses of future retirees, 25% of future male retirees are assumed to cover their spouse and 15% of future female retirees are assumed to cover their spouse. Male retirees are assumed to be three years older than their spouse and female retirees are assumed to be one year younger than their spouse.

DISABLED DEPENDENT CHILDREN IN RETIREE MEDICAL PLAN: The liability associated with disabled dependent children was determined to be de minimis and was therefore excluded from this valuation.



SCHEDULE D
(Continued)

WITHDRAWAL ASSUMPTION: Future vested members who terminate employment prior to retirement are assumed to elect to withdraw their contributions based upon their age and service at termination of employment as follows:

Rates of Withdrawal Upon Termination of Employment			
Age at Termination of Employment	Years of Service		
	5 - 10	10 - 15	15+
Under Age 55	20%	15%	10%
Ages 55+	10%	10%	10%

All vested members who terminate employment prior to retirement are assumed to elect to withdraw their contributions prior to receiving a pension benefit based upon their service as follows:

Rates of Withdrawal Prior to Receiving a Pension Benefit			
Years of Service			
5 - 10	10 - 15	15 - 27	27+
25%	15%	10%	25%

All vested members who terminate employment prior to retirement and who are assumed to elect to receive a pension benefit are assumed to begin receiving their benefit at age 60.

PAYROLL GROWTH: 3.50% per annum, compounded annually.

PRICE INFLATION: 3.00% per annum, compounded annually.

AFFORDABLE CARE ACT (ACA): The impact of the Affordable Care Act (ACA) was addressed in this valuation. Review of the information currently available did not identify any specific provisions of the ACA that are anticipated to significantly impact results. While the impact of certain provisions such as the potential future implementation of the excise tax on high-value health insurance plans (if applicable), mandated benefits and participation changes due to the individual mandate should be recognized in the determination of liabilities, overall future plan costs and the resulting liabilities are driven by the assumed rate of health care inflation (i.e., trend). The trend assumption forecasts the anticipated increase to initial per capita costs, taking into account health care cost inflation, increases in benefit utilization, government-mandated benefits, and technological advances. Given the uncertainty regarding the ACA's implementation (e.g., the impact of excise tax on high-value health insurance plans, changes in participation resulting from the implementation of state-based health insurance exchanges), continued monitoring of the ACA's impact on the Retiree Medical Plan's liability will be required.

ASSET VALUATION METHOD: Five-year market related actuarial value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected actuarial value of assets, based on the ultimate assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected actuarial value. The ultimate assumed valuation rate of return is assumed to be 8.00% for the Medical Insurance Fund and 7.50% for the Life Insurance Fund.



SCHEDULE D
(Continued)

ACTUARIAL COST METHOD: 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, of each active member's expected benefit at retirement or death is determined, based on his/her age, service, and gender. 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/her terminating with a service, disability or survivor's benefit. 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 deferred vested members to obtain the present value of all expected benefits payable from the System on account of the present group of members and beneficiaries.

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.

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/her anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his/her behalf.

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.



SCHEDULE D
(Continued)

SEPARATIONS FROM SERVICE: Representative values of the assumed annual rates of salary increases, death, disability, withdrawal, service retirement and early retirement are as follows:

MALES								
Age	Annual Rate of							
	SALARY*	DEATH	DISABILITY	WITHDRAWAL			RETIREMENT	
				Years of Service			Before 27 Years of Service	After 27 Years of Service**
				0 – 4	5 – 9	10+		
20	7.20%	0.019%	0.01%	11.00%				
25	6.40	0.021	0.01	11.00	3.00%			
30	5.40	0.025	0.01	11.00	3.00	3.00%		
35	4.70	0.043	0.04	12.00	3.50	1.40		
40	4.20	0.060	0.09	12.00	4.50	1.40		
45	3.80	0.084	0.20	12.00	4.50	1.30		17.0%
50	3.70	0.119	0.30	14.00	4.50	1.90		17.0
55	3.50	0.202	0.58	15.00	4.50	2.40	5.0%	45.0
60	3.50	0.340	0.75	15.00	4.00	2.40	13.0	35.0
62	3.50	0.419	0.75	15.00	3.80	2.40	15.0	25.0
65	3.50	0.565	0.75	15.00	3.50	2.40	20.0	25.0
70	3.50	0.913	0.75	20.00	0.00	0.00	20.0	20.0
75	3.50	1.556	0.75	20.00	0.00	0.00	100.0	100.0

FEMALES								
Age	Annual Rate of							
	SALARY*	DEATH	DISABILITY	WITHDRAWAL			RETIREMENT	
				Years of Service			Before 27 Years of Service	After 27 Years of Service**
				0 – 4	5 – 9	10+		
20	7.20%	0.007%	0.01%	9.00%				
25	6.40	0.008	0.01	9.00	4.00%			
30	5.40	0.010	0.03	12.00	4.00	1.65%		
35	4.70	0.018	0.06	12.00	4.00	1.50		
40	4.20	0.026	0.12	12.00	4.00	1.30		
45	3.80	0.042	0.25	13.00	4.00	1.20		15.0%
50	3.70	0.062	0.44	13.00	5.00	1.50		18.0
55	3.50	0.096	0.65	15.00	5.00	2.00	5.5%	50.0
60	3.50	0.157	0.85	15.00	5.00	2.00	14.0	40.0
62	3.50	0.197	0.85	15.00	4.60	2.00	14.0	40.0
65	3.50	0.287	0.85	15.00	4.00	2.00	22.0	35.0
70	3.50	0.495	0.85	15.00	0.00	0.00	20.0	35.0
75	3.50	0.831	0.85	15.00	0.00	0.00	100.0	100.0

* Includes wage inflation at 3.5% per annum.

** Plus 7.5% in year when first eligible for unreduced retirement with 27 years of service.



SCHEDULE D
(Continued)

DEATHS AFTER RETIREMENT: The RP-2000 Combined Mortality Table projected to 2025 using scale BB (set forward two years for males and one year for females) is used for death after service retirement and beneficiaries. The RP-2000 Disabled Mortality Table (set forward two years for males and seven 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 September 19, 2016, the numbers of expected future deaths are 15-19% less than the actual number of deaths that occurred during the study period for healthy retirees and 13-17% 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:

Age	Annual Rate of Death After			
	Service Retirement		Disability Retirement	
	Male	Female	Male	Female
45	0.1609%	0.1135%	2.3306%	1.2482%
50	0.2474	0.1718	2.9279	1.5650
55	0.4246	0.2658	3.4400	1.7807
60	0.6985	0.4409	3.5881	2.3164
65	1.1300	0.8100	3.8275	3.1687
70	1.8697	1.3739	4.7566	4.4032
75	3.2147	2.2899	6.3153	6.0857
80	5.5160	3.7551	8.3527	8.4679
85	9.5631	6.3873	10.9122	12.7572
90	17.2787	11.2476	17.2787	19.4718
95	27.1263	18.1190	27.1263	24.2074



SCHEDULE E

SUMMARY OF MAIN PLAN PROVISIONS AS INTERPRETED FOR VALUATION PURPOSES

ELIGIBILITY FOR ACCESS TO RETIREE MEDICAL PLAN COVERAGE:

Service Retirement: For employees hired prior to July 1, 2008, Retiree Medical Plan coverage eligibility is attained when an employee retires, which is possible after the completion of 27 years of service or attainment of age 55 and 5 years of service with reduced pension benefits. For employees hired on or after July 1, 2008, employees may retire after the completion of 27 years of service, the attainment of age 55 and 10 years of service with reduced pension benefits, or the attainment of age 60 and 5 years of service with unreduced pension benefits, but must complete a minimum of 15 years of service to be eligible for Retiree Medical Plan coverage.

Disability Retirement: Disabled employees hired prior to July 1, 2008 with at least 5 years of service, who are totally and permanently incapable of being employed as a teacher, are eligible for Retiree Medical Plan coverage upon approval for TRS disability retirement benefits. Disabled employees hired after July 1, 2008 must have 15 years of service to be eligible for Retiree Medical Plan coverage upon approval for TRS disability retirement benefits.

Members and dependents under age 65 and eligible for Medicare due to a disability after January 1, 2013 are only eligible to enroll in the MEHP. Under age 65 members who retired prior to Jan. 1, 2013, are grandfathered from this requirement and allowed a choice of KEHP or MEHP coverage. Actual census data and current plan elections were used for current disabled retirees. All future disabled members under the age of 65 with Medicare are placed on the MEHP and not the KEHP. This has been consistently applied since 2013.

Survivors: Spouses of employees who die in service while eligible to retire, as well as survivors of service and disabled retirees, are eligible for Retiree Medical Plan coverage if elected within 30 days of the employee's/retiree's death with no future remarriage. Otherwise, survivor is not eligible for Retiree Medical Plan coverage.

Spousal Shared Risk Waiver for MEHP: Beginning in 2013, eligible spouses who waive the MEHP coverage, will no longer have the opportunity to enroll during any annual MEHP open enrollment so most spousal waivers on the MEHP are now permanent waivers unless a KTRS specific qualifying event is met. This does not apply to the KEHP. This MEHP eligibility rule became necessary to mitigate spousal adverse selection with zero premium Medicare Advantage plans on the individual and open market.

Termination: For employees hired prior to July 1, 2008 and who terminated with at least 5 years of service, Retiree Medical Plan coverage eligibility is attained at age 60 with unreduced pension benefits. For employees hired on or after July 1, 2008 and who terminated with at least 15 years of service, Retiree Medical Plan coverage eligibility is attained at age 60 with unreduced pension benefits.

Reemployed Retirees: Retirees who return to work in an agency that participates in KEHP are required to terminate their coverage through the System. Additionally, if a retiree returns to work somewhere that does not participate in the KEHP, but offers health insurance, the retiree must terminate System coverage unless the employer coverage is of lesser value. For valuation purposes, active employees identified as currently receiving retiree health care through the System are valued as retirees.



SCHEDULE E
(Continued)

COVERED MEMBER RETIREE MEDICAL PLAN CONTRIBUTIONS:

Under Age 65 Retiree Shared Responsibility Contribution: Effective July 1, 2010, retirees under the age of 65 began a three-year phase-in of the Shared Responsibility Contribution. This contribution reduces the applicable amount of the full contribution provided by the System to retirees, by adjusting the Shared Responsibility Contribution amount by 100% less the appropriate percentage from the Retiree Percentage Contribution table below. Effective July 1, 2012, the full Shared Responsibility Contribution equals the Standard Medicare Part B premium paid by retirees ages 65 and older.

Monthly Under Age 65 Shared Responsibility Contribution Timeline			
Effective Date	Medicare Part B Monthly Cost	Formula	Shared Responsibility Contribution
July 1, 2010	\$110.50	$(1/3 \times \$110.50)$	\$ 37.00
January 1, 2011	115.40	$(1/3 \times 115.40)$	39.00
July 1, 2011	115.40	$(2/3 \times 115.40)$	77.00
January 1, 2012	99.90	$(2/3 \times 99.90)$	66.00
July 1, 2012	99.90	99.90	99.90
January 1, 2013	104.90	104.90	104.90
January 1, 2014	104.90	104.90	104.90
January 1, 2015	104.90	104.90	104.90
January 1, 2016	121.80	121.80	121.80
January 1, 2017	134.00	134.00	134.00
January 1, 2018	134.00	134.00	134.00
January 1, 2019	135.50	135.50	135.50

Retiree Years of Service Percentage Contribution: Retirees contribute the following percentages based on years of service at retirement, which are then applied to the Retiree Contribution Rate Basis:

Retiree Percentage Contribution*				
Year of Service	Entered System Before 7/1/2002		Entered System After 6/30/2002 and Before 7/1/2008	Entered System After 6/30/2008
	Age 65 or Older and Covered Before 1/1/2005	Age 65 After or Covered After 12/31/2004		
5 – 9.99	30%	75%	90%	Not Eligible
10 – 14.99	20	50	75	Not Eligible
15 – 19.99	10	25	55	55%
20 – 24.99	0	0	35	35
25 – 25.99	0	0	10	10
26 – 26.99	0	0	5	5
27 or more	0	0	0	0

*0% for disabled retirees that retired prior to 1/1/2002



SCHEDULE E
(Continued)

COVERED MEMBER RETIREE MEDICAL PLAN CONTRIBUTIONS (CONTINUED):

Monthly Retiree Contribution Rate Basis Effective January 1, 2019					
Tier Elected	Under Age 65 (KEHP)				Ages-65 and Older (MEHP)
	LivingWell CDHP	LivingWell PPO	LivingWell Basic CDHP	LivingWell Limited HDP	
Single	\$660.04	\$646.96	\$656.60	\$583.96	\$226.00
Parent Plus	\$851.84	\$802.26	\$878.24	\$808.92	n/a
Couple	\$1,029.02	\$1,060.74	\$1,189.96	\$1,093.10	n/a
Family	\$1,131.64	\$1,105.34	\$1,303.24	\$1,196.18	n/a
Family C-R	\$738.64	\$719.12	\$771.84	\$704.70	n/a

Under Age 65 Retiree Plan Cost Contribution: An additional contribution according to the table below is required to be paid by retirees under the age of 65 based upon the plan elected:

Monthly Under Age 65 Plan Cost Contribution* Effective January 1, 2019				
Tier Elected	LivingWell CDHP	LivingWell PPO	LivingWell Basic CDHP	LivingWell Limited HDP
Single	\$49.42	\$82.38	\$26.20	\$23.58
Parent Plus	\$126.66	\$234.82	\$62.40	\$56.16
Couple	\$304.62	\$528.36	\$260.06	\$234.06
Family	\$358.12	\$662.26	\$312.06	\$280.86
Family C-R	\$80.32	\$157.56	\$29.10	\$26.20

* Does not include the additional contribution required to be paid by retirees under the age of 65 who use tobacco (\$40 for Single or Family Cross-Reference, and \$80 for Parent Plus, Couple or Family). Also, this does not include the additional contribution required to be paid by retirees under the age of 65 who do not complete their LivingWell Promise, which is an additional \$40 per month for all levels of coverage—single, parent +, couple, and family. Approximately 600 retirees did not complete their LivingWell Promise for 2017.



SCHEDULE E
(Continued)

COVERED MEMBER MEDICAL PLAN CONTRIBUTIONS (CONTINUED):

Spouse Contributions: 100% of the full cost for non-Medicare eligible dependents is paid through a combination of payments from beneficiaries and the State. Spouses of current post-65 retirees and surviving spouses of deceased retirees with a date of death on or after July 1, 2002 pay 100% of the full contribution. Spouses of active members who died while eligible to retire prior to July 1, 2002, are provided the same subsidy by the System that would have been provided to the retiree for the lifetime of the spouse, or until remarriage. Spouses of active members who die while eligible to retire on or after July 1, 2002 or later pay 100% of the full contribution.

Survivors: Spouses of employees who die in service while eligible to retire, as well as survivors of service and disabled retirees, are eligible for Retiree Medical Plan coverage if elected within 30 days of the employee's/retiree's death with no future remarriage. Otherwise, survivor is not eligible for Retiree Medical Plan coverage.

Spousal Shared Risk Waiver for MEHP: Beginning in 2013, eligible spouses who waive the MEHP coverage, will no longer have the opportunity to enroll during any annual MEHP open enrollment so most spousal waivers on the MEHP are now permanent waivers unless a KTRS specific qualifying event is met. This does not apply to the KEHP. This MEHP eligibility rule became necessary to mitigate spousal adverse selection with zero premium Medicare Advantage plans on the individual and open market.

Monthly Surviving Spouse Contribution Effective January 1, 2019					
Tier Elected by Surviving Spouse	Under Age 65 (KEHP)				Ages 65 and Older (MEHP)
	LivingWell CDHP	LivingWell PPO	LivingWell Basic CDHP	LivingWell Limited HDP	
Single	\$716.90	\$736.78	\$690.24	\$614.98	\$226.00
Parent Plus	985.94	1,044.52	948.08	872.52	n/a

SYSTEM RETIREE MEDICAL PLAN CONTRIBUTIONS: The System Contribution Rate Basis is determined annually by the System; and the full cost is projected based on historical claims data. For retirees, the following percentages are based on years of service at retirement and are then applied to the System Contribution Rate Basis:

Percentage of System Contribution Rate Provided to Retirees*				
Year of Service	Entered System Before 7/1/2002		Entered System After 6/30/2002 and Before 7/1/2008	Entered System After 6/30/2008
	Age 65 or Older and Covered Before 1/1/2005	Age 65 After or Covered After 12/31/2004		
5 – 9.99	70%	25%	10%	Not Eligible
10 – 14.99	80	50	25	Not Eligible
15 – 19.99	90	75	45	45%
20 – 24.99	100	100	65	65
25 – 25.99	100	100	90	90
26 – 26.99	100	100	95	95
27 or more	100	100	100	100

*100% for disabled retirees that retired prior to 1/1/2002



SCHEDULE E
(Continued)

SYSTEM RETIREE MEDICAL PLAN CONTRIBUTIONS (CONTINUED):

Monthly Retiree Contribution Rate Basis Effective January 1, 2019					
Tier Elected	Under Age 65 (KEHP)				Ages-65 and Older (MEHP)
	LivingWell CDHP	LivingWell PPO	LivingWell Basic CDHP	LivingWell Limited HDP	
Single	\$660.04	\$646.96	\$656.60	\$583.96	\$226.00
Parent Plus	\$851.84	\$802.26	\$878.24	\$808.92	n/a
Couple	\$1,029.02	\$1,060.74	\$1,189.96	\$1,093.10	n/a
Family	\$1,131.64	\$1,105.34	\$1,303.24	\$1,196.18	n/a
Family C-R	\$738.64	\$719.12	\$771.84	\$704.70	n/a

**Irrespective of a participating retiree's service, an additional \$7.44 per month is paid by the System to the Department of Employee Insurance (DEI) for KEHP coverage.*

ACTIVE MEMBER RETIREE MEDICAL PLAN CONTRIBUTIONS: Actively employed members make payroll contributions to the Medical Insurance Fund based upon the following schedule:

Active Member Percentage of Payroll Contribution Made to Medical Insurance Fund

Active Member Percentage of Payroll Contribution Made to Medical Insurance Fund					
University Employees		School District Employees (Non-Federal)		Other Employees	
Hired Before 7/1/2008	Hired On or After 7/1/2008	Hired Before 7/1/2008	Hired On or After 7/1/2008	Hired Before 7/1/2008	Hired On or After 7/1/2008
2.775	2.775	3.750	3.750	3.750	3.750



SCHEDULE E
(Continued)

LIFE INSURANCE PLAN BENEFITS:

(1) Effective July 1, 2000, the Teachers' Retirement System shall:

- (a) Provide a life insurance benefit in a minimum amount of five thousand dollars (\$5,000) for its members who are retired for service or disability. This life insurance benefit shall be payable upon the death of a member retired for service or disability to the member's estate or to a party designated by the member on a form prescribed by the retirement system; and
- (b) Provide a life insurance benefit in a minimum amount of two thousand dollars (\$2,000) for its active contributing members. This life insurance benefit shall be payable upon the death of an active contributing member to the member's estate or to a party designated by the member on a form prescribed by the retirement system.

Note: Members employed on a substitute or part-time basis and working at least 69% of a full contract year in a single fiscal year will be eligible for a life insurance benefit for the balance of the fiscal year or the immediately succeeding fiscal year under certain conditions. For non-vested members employed on a substitute or part-time basis, the life insurance benefit is provided if death occurs as the result of a physical injury on the job. For vested members employed on a substitute or part-time basis, death does not have to be the result of a physical injury on the job for life insurance benefits to be provided.



SCHEDULE F

TABLE 1
ACTIVE MEMBER AGE AND SERVICE TABLE AS OF JUNE 30, 2018

Distribution of Active Members as of June 30, 2018 by Age and Service Groups

Attained Age	Completed Years of Service								
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	>= 35	Total
24 & under	3,356								3,356
Total Pay	73,197,998								73,197,998
Avg. Pay	21,811								21,811
25 to 29	5,728	1,663	5						7,396
Total Pay	203,495,638	82,568,556	187,852						286,252,046
Avg. Pay	35,526	49,650	37,570						38,704
30 to 34	2,675	4,547	1,612	3					8,837
Total Pay	86,293,957	232,507,874	93,615,745	171,059					412,588,635
Avg. Pay	32,259	51,134	58,074	57,020					46,689
35 to 39	2,254	2,127	4,670	1,452	8				10,511
Total Pay	66,909,314	110,685,191	282,452,313	94,329,491	434,996				554,811,305
Avg. Pay	29,685	52,038	60,482	64,965	54,375				52,784
40 to 44	1,783	1,360	2,099	4,041	1,099	6			10,388
Total Pay	50,536,837	70,800,804	127,327,260	271,875,642	78,592,555	466,037			599,599,135
Avg. Pay	28,344	52,059	60,661	67,279	71,513	77,673			57,720
45 to 49	1,481	1,082	1,507	2,140	3,650	1,019	4		10,883
Total Pay	38,192,866	57,257,531	91,642,244	141,344,490	258,449,408	75,036,251	337,145		662,259,935
Avg. Pay	25,789	52,918	60,811	66,049	70,808	73,637	84,286		60,853
50 to 54	1,235	656	968	1,242	1,603	1,883	341	9	7,937
Total Pay	26,561,350	32,743,609	58,414,733	82,215,623	112,128,856	141,021,748	26,428,299	771,555	480,285,773
Avg. Pay	21,507	49,914	60,346	66,196	69,949	74,892	77,502	85,728	60,512
55 to 59	1,517	465	610	913	1,003	726	265	33	5,532
Total Pay	25,011,517	20,976,754	35,767,841	58,954,988	70,939,328	56,218,141	23,218,735	2,581,322	293,668,626
Avg. Pay	16,487	45,111	58,636	64,573	70,727	77,435	87,618	78,222	53,085
60 to 64	1,679	344	305	482	483	390	106	47	3,836
Total Pay	21,246,589	12,139,654	17,529,572	31,791,751	34,076,493	28,894,613	8,938,762	3,162,631	157,780,065
Avg. Pay	12,654	35,290	57,474	65,958	70,552	74,089	84,328	67,290	41,131
65 & over	2,137	525	189	194	199	147	76	62	3,529
Total Pay	18,319,211	10,686,323	8,081,622	12,048,328	13,626,663	11,374,461	5,370,666	5,164,995	84,672,269
Avg. Pay	8,572	20,355	42,760	62,105	68,476	77,377	70,667	83,306	23,993
Total	23,845	12,769	11,965	10,467	8,045	4,171	792	151	72,205
Total Pay	609,765,277	630,366,296	715,019,182	692,731,372	568,248,299	313,011,251	64,293,607	11,680,503	3,605,115,787
Avg. Pay	25,572	49,367	59,759	66,182	70,634	75,045	81,179	77,354	49,929

Average Age: 43.5

Average Service: 10.9



SCHEDULE F

(Continued)

**TABLE 2
SCHEDULE OF TOTAL ACTIVE MEMBER VALUATION DATA**

Valuation Date	Number	Annual Payroll	Annual Average Pay	Percentage Increase in Average Pay
6/30/2018	72,205	\$3,605,115,787	\$49,929	1.06%
6/30/2017	72,130	3,563,584,342	49,405	0.35
6/30/2016	71,848	3,537,226,348	49,232	1.19
6/30/2015	72,246	3,515,113,126	48,655	2.45
6/30/2014	73,407	3,486,326,799	47,493	2.12
6/30/2013	74,831	3,480,066,406	46,506	1.51
6/30/2012	75,951	3,479,567,004	45,813	1.33

**TABLE 3
ELIGIBLE DEFERRED VESTED MEMBERS AS OF JUNE 30, 2018
MALE AND FEMALE DEMOGRAPHIC BREAKDOWN**

Attained Age	Medical Insurance Fund			Life Insurance Fund		
	Number of		Total Number	Number of		Total Number
	Males	Females		Males	Females	
Under 30	1	0	1	15	26	41
30-34	51	195	246	158	570	728
35-39	284	904	1,188	378	1,071	1,449
40-44	300	876	1,176	350	1,024	1,374
45-49	327	1,147	1,474	361	1,298	1,659
50-54	264	975	1,239	287	1,071	1,358
55-59	230	823	1,053	254	884	1,138
60 & Over	253	707	960	294	773	1,067
Total	1,710	5,627	7,337	2,097	6,717	8,814



SCHEDULE F
(Continued)

TABLE 4
ALL RETIREES AND SPOUSES RECEIVING HEALTH CARE BENEFITS AS OF JUNE 30, 2018
MALE AND FEMALE DEMOGRAPHIC BREAKDOWN

Attained Age	Number of		Total Number
	Males	Females	
Under 40	7	6	13
40-44	25	26	51
45-49	101	165	266
50-54	446	1,075	1,521
55-59	954	3,109	4,063
60-64	1,688	5,918	7,606
65-69	2,962	8,757	11,719
70-74	3,092	6,598	9,690
75-79	2,073	4,013	6,086
80-84	1,257	2,340	3,597
85-89	602	1,412	2,014
90-94	210	712	922
95-99	37	197	234
100 and over	2	41	43
Total	13,456	34,369	47,825



SCHEDULE F
(Continued)

TABLE 5
SCHEDULE OF RETIRANTS, BENEFICIARIES AND SURVIVORS ADDED TO AND REMOVED FROM ROLLS*

Medical Insurance Fund									
Fiscal Year Ending June 30	Number of Members Added to Rolls	Number of Spouses** Added to Rolls	Total Number Added to Rolls	Number of Members Removed from Rolls	Number of Spouses** Removed from Rolls	Total Number Removed from Rolls	Number of Members on Rolls at the End of the Year	Number of Spouses** on Rolls at the End of the Year	Total Number on Rolls at the End of the Year
2012	1,996	702	2,698	1,029	616	1,645	36,000	7,008	43,008
2013	1,853	664	2,517	1,076	619	1,695	36,777	7,053	43,830
2014	1,663	638	2,301	1,165	660	1,825	37,275	7,031	44,306
2015	1,990	731	2,721	1,190	633	1,823	38,075	7,129	45,204
2016	2,045	726	2,771	1,305	674	1,979	38,815	7,181	45,996
2017	1,835	699	2,534	1,153	691	1,844	39,497	7,189	46,686
2018	1,903	828	2,731	1,170	422	1,592	40,230	7,595	47,825

*Reflects members, spouses, and beneficiaries participating in a health care plan.

**Includes spouses, beneficiaries, and surviving spouses.

TABLE 6
SCHEDULE OF RETIRANTS, BENEFICIARIES AND SURVIVORS ADDED TO AND REMOVED FROM ROLLS*

Life Insurance Fund								
Fiscal Year Ending June 30	Number Added to Rolls	Life Insurance Benefit (\$1,000's)	Number Removed from Rolls	Life Insurance Benefit (\$1,000's)	Number on Rolls at the End of the Year	Life Insurance Benefit (\$1,000's)	Increase in Life Insurance Benefit	Average Life Insurance Benefit
2012	2,364	11,820	880	4,400	42,602	213,010	3.61	5,000
2013	2,195	10,975	952	4,760	43,845	219,225	2.92	5,000
2014	1,964	9,820	954	4,770	44,855	224,275	2.30	5,000
2015	2,270	11,350	1,641	8,205	45,484	227,420	1.40	5,000
2016	2,394	11,970	807	4,035	47,071	235,355	3.49	5,000
2017	2,175	10,875	1,021	5,105	48,225	241,125	2.45	5,000
2018	2,605	13,025	1,408	7,040	49,422	247,110	2.48	5,000

*The life insurance benefit is payable upon the death of only members retired for service or disability. Numbers do not include life insurance benefits payable upon the death of an active contributing member.