Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

PERS
of MISSISSIPPI

Report on the Annual Valuation of the Public Employees' Retirement System of Mississippi

Prepared as of June 30, 2019

www.CavMacConsulting.com

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

November 12, 2019

Board of Trustees
Public Employees' Retirement System of Mississippi
429 Mississippi Street
Jackson, MS 39201-1005

Ladies and Gentlemen:

Presented in this report are the results of the annual actuarial valuation of the Public Employees' Retirement System (PERS) of Mississippi. The purpose of the valuation is to measure the System's funding progress, to determine the unfunded actuarial accrued liability amortization period beginning July 1, 2019, to determine the actuarially determined contribution (ADC) for the fiscal year ending 2021 and to calculate the ADC ratio to the fixed contribution rate for PERS as of the valuation date. The results may not be applicable for other purposes.

The date of the valuation was June 30, 2019.

The valuation was based upon data, furnished by the Executive Director and the PERS staff, concerning active, inactive and retired members along with pertinent financial information. While not verifying data at the source, the actuary performed tests for consistency and reasonableness. The complete cooperation of the PERS staff in furnishing materials requested is hereby acknowledged with appreciation.

Your attention is directed particularly to the presentation of the results on page 1 and the comments on page 10.

Since the previous valuation, the Board adopted new actuarial assumptions based on the experience investigation for the four-year period ending June 30, 2018. The results of this study were presented to the Board in April, 2019 and the Board adopted all of the demographic assumption recommendations (e.g. rates of mortality, retirement and withdrawal) and the wage and price inflation assumption recommendations at its August, 2019 meeting. In addition, the Board amended the Funding Policy at its October, 2019 meeting to reduce the long-term investment return assumption using market investment gains until it reaches the rate recommended by the actuary in the most recent experience study.

To the best of our knowledge, this report is complete and accurate. The valuation was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

The valuation was prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board. We have reviewed the actuarial methods, including the asset valuation method, and continue to believe they are appropriate for the purpose of determining employer contribution levels.

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.

3550 Busbee Pkwy, Suite 250, Kennesaw, GA 30144
Phone (678) 388-1700 • Fax (678) 388-1730
www.CavMacConsulting.com
Offices in Kennesaw, GA • Bellevue, NE

This actuarial valuation was performed to determine the adequacy of statutory contributions to fund the plan. 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 on assets. Therefore, liability amounts in this report cannot be used to assess a settlement of the obligation.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the system, and on actuarial assumptions that are, in the aggregate, internally consistent and reasonably based on the actual experience of the system.

Respectfully submitted,

Edward J. Koebel

Jonathan T. Craven

Edward J. Koebel, EA, FCA, MAAA
Chief Executive Officer

Jonathan T. Craven, ASA, EA, FCA, MAAA
Consulting Actuary

EJK/JTC:mjn

Table of Contents

Section I: Summary of Principal Results

1. This report, prepared as of June 30, 2019, presents the results of the annual actuarial valuation of the System. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below. The current valuation and reported benefit amounts reflect any benefit increases granted to retirees as of July 1, 2019.

VALUATION DATE	June 30, 2019	June 30, 2018
Active members included in valuation		
Number	150,651	150,687
Annual compensation	$ 6,144,915,630	$ 5,999,230,701
Retirees		
Number	107,844	104,973
Annual allowances	$ 2,635,004,675	$ 2,500,750,392
Assets		
Market related actuarial value	$ 28,024,611,000	$ 27,455,702,000
Market value	$ 28,206,602,000	$ 27,763,190,000
Unfunded actuarial accrued liability	$ 17,982,247,931	$ 16,940,458,907
Funded Ratio	60.9%	61.8%
Employer Fixed Contribution Rate		
Normal Cost*	1.47%	1.45%
Accrued liability	15.93	15.95
Total	17.40%	17.40%
Anticipated accrued liability payment period	36.2 years	30.9 years
Actuarially Determined Contribution Rate (ADC)		
Normal Cost*	1.47 %	1.45%
Accrued liability	17.50	16.17
Total	18.97%	17.62%
ADC Ratio to Fixed Contribution Rate	109.02%	101.26%
Unfunded actuarial accrued liability based on market value of assets	$ 17,800,256,931	$ 16,632,970,907
Funded Ratio	61.3%	62.5%
Payment Period	35.3 years	29.7 years

* Includes load for administrative expenses. See page 12 for more contribution rate detail.

2. The employer contribution rate, or Fixed Contribution Rate (FCR), of 17.40% of annual compensation for the fiscal year ending June 30, 2020 was approved by the PERS Board of Trustees at the June, 2018 Board meeting.
3. The valuation balance sheet showing the results of the valuation is provided in Section III.
4. Comments on the valuation results are given in Section IV, comments on the experience and actuarial gains and losses during the valuation year are provided in Section V and the rates of contribution payable by employers are provided in Section VI.
5. Schedule A of this report presents the development of the actuarial value of assets. The estimated investment return for the plan year ending June 30, 2019 on an actuarial value of assets basis was 7.19%, compared to the assumed rate of return for the period of 7.75%.
6. Schedule B details the actuarial assumptions and methods employed. Since the previous valuation, various economic and demographic assumptions have been revised. The changes are summarized below and shown in more detail in Schedule B:
    - The wage inflation assumption was reduced from 3.25% to 3.00%.
    - The price inflation assumption was reduced from 3.00% to 2.75%.
    - The administrative expense load was increased from 0.23% to 0.25%.
    - The rates of retirement were slightly increased for retirements under 25 years of service (below age 73 for males and age 70 for females) and also slightly increased for retirement at younger ages once a member reaches 25 years of service.
    - The withdrawal rates were increased at younger ages and during the select period (below 2 years of service).
    - The percentage of active member disabilities assumed to be in the line of duty was increased from 7% to 9%.
    - Changes were made to the Mortality Table for both healthy and disabled lives.
7. Schedule C gives a summary of the benefit and contribution provisions of the plan. There have been no changes since the previous valuation.

Section I: Summary of Principal Results

8. 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 accrued liability. In addition, this funded ratio does not have any relationship to measuring the sufficiency if the plan had to settle its liabilities.
9. The table on the following page provides a ten-year history of some pertinent figures.

Section I: Summary of Principal Results

Comparative Schedule

	Active Members				Retired Lives				Valuation Results ($ millions)		
Valuation Date June 30	Number	Payroll ($ millions)	Average Salary	% increase from previous year	Number	Active/ Retired Ratio	Annual Benefits ($ millions)	Benefits as % of Payroll	Accrued Liability	Valuation Assets	UAAL
2010	164,896	$5,764	$ 34,953	0.2	79,168	2.1	1,498.7	26.0	$ 31,400	$ 20,143	$11,257
2011	161,676	5,685	35,161	0.6	83,115	1.9	1,627.8	28.6	32,654	20,315	12,339
2012	162,311	5,858	36,090	2.6	86,829	1.9	1,752.6	29.9	34,493	19,993	14,500
2013	161,744	5,824	36,005	(0.2)	90,214	1.8	1,874.7	32.2	35,543	20,491	15,052
2014	161,360	5,835	36,159	0.4	93,504	1.7	1,998.3	34.2	37,015	22,570	14,445
2015	157,215	5,905	37,559	3.9	96,338	1.6	2,116.3	35.8	40,364	24,387	15,977
2016	154,104	6,023	39,081	4.1	99,483	1.5	2,249.0	37.3	41,997	25,185	16,812
2017	152,382	6,038	39,626	1.4	102,260	1.5	2,374.7	39.3	43,166	26,364	16,802
2018	150,687	5,999	39,813	0.5	104,973	1.4	2,500.8	41.7	44,396	27,456	16,940
2019	150,651	6,145	40,789	2.5	107,844	1.4	2,635.0	42.9	46,007	28,025	17,982

Section II: Membership Data

Data regarding the membership of the System for use as a basis for the valuation were furnished by the System's office. The following tables summarize the membership of the System as of June 30, 2019 upon which the valuation was based. Detailed tabulations of the data are given in Schedule D.

Active Members

				Group Averages		
Employers	Number of Employers	Number	Payroll	Salary	Age	Service
State Agencies	105	27,259	$1,063,710,982	$39,022	45.3	10.5
State Universities	9	17,878	1,006,586,405	56,303	43.2	9.5
Public Schools	140	60,792	2,315,173,189	38,084	44.6	10.7
Community/Junior Colleges	15	6,117	302,704,747	49,486	46.8	11.7
Counties	82	13,765	506,733,334	36,813	47.6	9.9
Municipalities	242	16,115	595,249,349	36,938	44.1	9.9
Other Political Subdivisions	261	8,725	354,757,624	40,660	44.5	8.7
Total in PERS	854	150,651	$6,144,915,630	$40,789	44.9	10.3

The total number of active members includes 77,505 vested members and 73,146 non-vested members.

Retired Lives

			Group Averages	
Type of Benefit Payment	No.	Annual Benefits	Benefit	Age
Retirement	89,811	$2,301,989,778	$25,631	70.8
Disability	6,514	126,669,144	19,446	63.0
Survivor	11,519	206,345,753	17,914	68.8
Total in PERS	107,844	$2,635,004,675	$24,433	70.1

Section II: Membership Data

Deferred Vested/Inactive Lives

Type of Member	No.	Deferred Benefits	Outstanding Refunds
Deferred Vested - Benefit Provided	14,523	$ 115,597,404	N/A
Deferred Vested – Missing Benefit	593	N/A	$ 20,556,508
Vested – Pending Retirements	1,270	36,691,782	N/A
Inactive	57,631	N/A	275,326,039
Total in PERS	74,017	$ 152,289,186	$ 295,882,547

For the liability in this valuation, deferred vested participants with benefits provided are valued assuming a retirement age of 60 for Tiers 1, 2, and 3 and age 65 for Tier 4. There are 1,270 records determined to be possible "pending retirements" based on the provided member status; these records are valued by assuming immediate benefit commencement.

Section III: Valuation Balance Sheet

The following valuation balance sheet shows the assets and liabilities of the retirement system as of the current valuation date of June 30, 2019 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2018. The items shown in the balance sheet are present values actuarially determined as of the relevant valuation date. The development of the actuarial value of assets is presented in Schedule A.

Section III: Valuation Balance Sheet

VALUATION BALANCE SHEET
SHOWING THE ASSETS AND LIABILITIES OF THE
PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI

	JUNE 30, 2019	June 30, 2018
ASSETS		
Current actuarial value of assets:		
Annuity Savings Account	$ 5,626,602,274	$ 5,570,523,721
Annuity Reserve	6,383,987,498	6,002,374,792
Employers' Accumulation Account	16,014,021,228	15,882,803,487
Total current assets	$ 28,024,611,000	$ 27,455,702,000
Future member contributions to Annuity Savings Account	$ 3,547,628,249	$ 3,544,920,132
Prospective contributions to Employer's Accumulation Account		
Normal contributions	$ 480,900,718	$ 480,533,618
Unfunded actuarial accrued liability contributions	17,982,247,931	16,940,458,907
Total prospective contributions	$ 18,463,148,649	$ 17,420,992,525
Total assets	$ 50,035,387,898	$ 48,421,614,657
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	$ 29,109,623,021	$ 27,874,364,974
Present value of benefits payable on account of active members	19,156,040,370	18,667,047,476
Present value of benefits payable on account of inactive members for service rendered before the valuation date	1,769,724,507	1,880,202,207
Total liabilities	$ 50,035,387,898	$ 48,421,614,657

Section III: Valuation Balance Sheet

BREAKDOWN OF TOTAL AND ACCRUED LIABILITIES
AS OF JUNE 30, 2019

		Total Liability		Accrued Liability
Active Members				
Retirement	$	15,785,404,146	$	13,781,078,053
Death		261,827,210		173,937,736
Disability		494,373,987		312,648,789
Termination		2,614,435,027		859,846,825
Total	$	19,156,040,370	$	15,127,511,403
Retirees				
Retirement	$	25,977,505,226	$	25,977,505,226
Survivor		1,834,840,213		1,834,840,213
Disability		1,297,277,582		1,297,277,582
Total	$	29,109,623,021	$	29,109,623,021
Deferred Vested Members		1,356,735,448		1,356,735,448
Inactive Members		412,989,059		412,989,059
Total Actuarial Values	$	50,035,387,898	$	46,006,858,931
Actuarial Value of Assets				28,024,611,000
Unfunded Actuarial Accrued Liability			$	17,982,247,931

The total liability is the present value of future benefits for all current members as of the valuation date. The accrued liability is the present value of benefits that have been accrued as of the valuation date. Since all inactive members and retirees have accrued their full benefits, the total liability and accrued liability are the same. For actives, the difference between the total liability and the accrued liability is the present value of all future accruals.

Section IV: Comments on Valuation

The valuation balance sheet gives the following information with respect to the funds of the System as of June 30, 2019.

Total Assets

The Annuity Savings Account is the fund to which are credited contributions made by members together with interest thereon. When a member retires, the amount of his or her accumulated contributions is transferred from the Annuity Savings Account to the Annuity Reserve. The Employer's Accumulation Account is the fund to which are credited employer contributions and investment income, and from which are paid all employer-provided benefits under the plan. The assets credited to the Annuity Savings Account as of the valuation date, which represent the accumulated contributions of members to that date, amounted to $5,626,602,274. The assets credited to the Annuity Reserve were $6,383,987,498 and the assets credited to the Employer's Accumulation Account totaled $16,014,021,228. Current actuarial assets as of the valuation date equaled the sum of these three funds, $28,024,611,000. Future member contributions to the Annuity Savings Account were valued to be $3,547,628,249. Prospective contributions to the Employer's Accumulation Account were calculated to be $18,463,148,649 of which $480,900,718 is attributable to service rendered after the valuation date (normal contributions) and $17,982,247,931 is attributable to service rendered before the valuation date (unfunded actuarial accrued liability contributions).

Therefore, the balance sheet shows the present value of current and future assets of the System to be $50,035,387,898 as of June 30, 2019.

Total Liabilities

The present value of benefits payable on account of presently retired members and beneficiaries totaled $29,109,623,021 as of the valuation date. The present value of future benefit payments on behalf of active members amounted to $19,156,040,370. In addition, the present value of benefits for inactive members, due to service rendered before the valuation date, was calculated to be $1,769,724,507.

Therefore, the balance sheet shows the present value for all prospective benefit payments under the System to be $50,035,387,898 as of June 30, 2019.

Section 25-11-123(a)(1) of State law requires that active members contribute 9.00% of annual compensation to the System.

Section 25-11-123(c) requires that the State contribute a certain percentage of the annual compensation of members to cover the normal contributions and a certain percentage to cover the accrued liability contributions of the System. These individual contribution percentages are established in accordance with an actuarial valuation. The PERS Board of Trustees increased the employer contribution rate from 15.75% to 17.40% of annual compensation effective for the fiscal year ending June 30, 2020. Since the amortization period is calculated on an open basis, the amortization period for the June 30, 2019 valuation is 36.2 years, compared to 30.9 years for the last valuation.

The primary reasons for the increase in the amortization period were assumption changes adopted by the Board in August 2019 and the loss due to investment earnings on an actuarial value of assets basis worse than expected (7.19% vs. 7.75%). There was also a loss due to withdrawals from PERS.

See Section VI for a reconciliation of the amortization periods from last year to this year and see Schedule E for a complete analysis of the Financial Experience.

Section V: Derivation of Experience Gains & 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, 2019 and for the previous valuation is shown below.

		2019 Results $ millions	2018 Results $ millions
(1)	UAAL* as of beginning of year	$ 16,940.5	$ 16,802.0
(2)	Total Normal cost from last valuation	646.4	652.0
(3)	Total Employee and Employer Contributions	1,619.0	1,589.0
(4)	Interest accrual: [[(1) + (2)] x .0775] - [(3) x .03875]	1,300.4	1,291.2
(5)	Expected UAAL before changes: (1) + (2) – (3) + (4)	17,268.3	17,156.2
(6)	Change due to plan amendments	0.0	0.0
(7)	Change due to new actuarial assumptions or methods	305.4	0.0
(8)	Expected UAAL after changes: (5) + (6) + (7)	$ 17,573.7	$ 17,156.2
(9)	Actual UAAL as of end of year	$ 17,982.2	$ 16,940.5
(10)	Gain/(loss): (8) – (9)	$ (408.5)	$ 215.7
(11)	Gain/(loss) as percent of actuarial accrued liabilities at start of year	(0.9)%	0.5%

*Unfunded actuarial accrued liability.

Valuation Date June 30	Actuarial Gain/(Loss) as a % of Beginning Accrued Liabilities
2014	2.6%
2015	1.4
2016	(1.4)
2017	1.1
2018	0.5
2019	(0.9)

Section VI: Required Contribution Rates

1. The valuation balance sheet gives the basis for determining the percentage rates for contributions to be made by employers to the Retirement System. The following table shows the rates of contribution payable by employers as determined from the present valuation for the 2020/2021 fiscal year and a comparison to the previous valuation results.

Contribution for	2020/2021 Fiscal Year	2019/2020 Fiscal Year
Normal Cost:		
Service retirement benefits	8.56%	8.80%
Disability benefits	0.41	0.42
Survivor benefits	0.21	0.13
Total	9.18%	9.35%
Member Contributions:	9.00%	9.00%
Less future refunds	(1.04)	(0.87)
Available for benefits	7.96%	8.13%
Employer Normal Cost	1.22%	1.22%
Administrative Expense Load	0.25%	0.23%
Unfunded Actuarial Accrued Liabilities (36.2 years level % of payroll amortization*)	15.93%	15.95%
Total Computed Employer Contribution Rate	17.40%	17.40%

*Amortization period a year ago was 30.9 years.

The Board has adopted a Fixed Contribution Rate (FCR) of 17.40% of annual compensation for the fiscal year ending June 30, 2020 and set the amortization period to open-ended. Thirty-year projections are completed after the valuation to determine if an increase or decrease in the employer contribution rate is warranted according to the metrics set forth in the funding policy. Please see Schedule F for the current funding policy.

2. The components of the change in the computed unfunded actuarial accrued liability amortization period from 30.9 years to 36.2 years are as follows:

Previously Reported Period	30.9 years
Change due to:	
Normal amortization	(1.0)
Actuarial experience	2.0
Assumption/Method changes	4.1
Plan amendments	0.0
Contribution Shortfall/(Excess)	0.2
Computed Period	36.2 years

3. One of the metrics in the Funding Policy, as shown in Schedule F, is to calculate the Actuarially Determined Contribution (ADC) based on the principle elements of the Amortization Method disclosed in the Funding Policy. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by this Funding Policy will be tested each valuation. The calculation of this basis for the past two valuations is shown below:

Funding Policy ADC Metric Test		
Valuation Date June 30	**2019**	**2018**
Actuarially Determined Contribution (ADC) rate		
Normal Cost*	1.47%	1.45%
Accrued liability	17.50	16.17
Total	18.97%	17.62%
Ratio of ADC to FCR	109.02%	101.26%
Funding Policy Metric Status	Yellow	Yellow
Anticipated accrued liability payment period	28.8 years	30.0 years

*Estimated budgeted administrative expenses are included in the normal cost rate

Section VII: Supplemental Disclosure Information

1. The following supplemental disclosure information is provided for informational purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

NUMBER OF ACTIVE AND RETIRED PARTICIPANTS
AS OF JUNE 30, 2019

GROUP	NUMBER
Retired participants and beneficiaries currently receiving benefits	107,844
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	74,017
Active Participants	150,651
Total	332,512

Section VII: Supplemental Disclosure Information

1. Another such item is the schedule of funding progress as shown below. As can be seen in column 3 of the table below, the funded ratio has remained in a narrow range since 2014. However, the unfunded actuarial accrued liability as a percentage of payroll, shown in column 6, has steadily increased over the last 10 years.

SCHEDULE OF FUNDING PROGRESS
($ Thousands)

Plan Year Ended	(1) Actuarial Value of Assets	(2) Actuarial Accrued Liability (AAL) Entry Age	(3) Funded Ratio (1)/(2)	(4) Unfunded AAL (2) – (1)	(5) Annual Covered Payroll	(6) Unfunded AAL as a Percentage of Covered Payroll (4)/(5)
06/30/10*	$20,143,426	$31,399,988	64.2%	$11,256,562	$5,763,556	195.3%
06/30/11#	20,315,165	32,654,465	62.2	12,339,300	5,684,624	217.1
06/30/12	19,992,797	34,492,873	58.0	14,500,076	5,857,789	247.5
06/30/13#	20,490,555	35,542,848	57.7	15,052,293	5,823,578	258.5
06/30/14	22,569,940	37,015,288	61.0	14,445,348	5,834,687	247.6
06/30/15#	24,387,161	40,364,584	60.4	15,977,423	5,904,827	270.6
06/30/16*#	25,185,078	41,997,513	60.0	16,812,435	6,022,533	279.2
06/30/17#	26,364,446	43,166,491	61.1	16,802,045	6,038,229	278.3
06/30/18	27,455,702	44,396,161	61.8	16,940,459	5,999,231	282.4
06/30/19#	28,024,611	46,006,859	60.9	17,982,248	6,144,916	292.6

* After change in benefit provisions.
\# After change in actuarial assumptions.

Solvency Tests
($ in Thousands)

	Actuarial Accrued Liabilities for				Portions of Accrued Liabilities Covered by Assets		
Valuation Date	(1) Accumulated Employee Contributions Including Allocated Investment Earnings	(2) Retirees and Beneficiaries Currently Receiving Benefits	(3) Active and Inactive Members Employer Financed Portion	Net Assets Available for Benefits	(1)	(2)	(3)
6/30/10	$4,266,621	$16,763,455	$10,369,912	$20,143,426	100.0%	94.7%	0.0%
6/30/11	4,356,556	18,001,718	10,296,191	20,315,165	100.0	88.7	0.0
6/30/12	4,463,252	19,547,367	10,482,254	19,992,797	100.0	79.4	0.0
6/30/13	5,053,888	20,789,551	9,699,409	20,490,555	100.0	74.3	0.0
6/30/14	5,277,944	22,033,588	9,703,756	22,569,940	100.0	78.5	0.0
6/30/15	5,379,226	24,012,624	10,972,734	24,387,161	100.0	79.2	0.0
6/30/16	5,468,859	25,390,774	11,137,880	25,185,078	100.0	77.7	0.0
6/30/17	5,534,403	26,686,958	10,945,130	26,364,446	100.0	78.1	0.0
6/30/18	5,570,524	27,874,365	10,951,272	27,455,702	100.0	78.5	0.0
6/30/19	5,626,602	29,109,623	11,270,634	28,024,611	100.0	76.9	0.0

As can be seen from the table above, the PERS plan assets currently covers 100% of the active member contribution account balances as of the valuation date but only covers about 80% of the retiree liability. This ratio had increased from 2016 through 2018, but decreased in this year's valuation. There remains zero assets to cover any employer-financed active liabilities.

Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Active Members Number	Annual Payroll	Annual Average Pay	% Increase in Average Pay
2010	868	164,896	$5,763,556,195	$34,953	0.2%
2011	872	161,676	5,684,624,214	35,161	0.6
2012	870	162,311	5,857,789,376	36,090	2.6
2013	873	161,744	5,823,577,978	36,005	(0.2)
2014	871	161,360	5,834,686,655	36,159	0.4
2015	868	157,215	5,904,827,181	37,559	3.9
2016	862	154,104	6,022,532,933	39,081	4.1
2017	861	152,382	6,038,228,708	39,626	1.4
2018	858	150,687	5,999,230,701	39,813	0.5
2019	854	150,651	6,144,915,630	40,789	2.5

Schedule of Retirants Added to and Removed From Rolls*
Last Ten Fiscal Years

	Fiscal Year Ended June 30									
Item	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Beginning of Year	76,143	79,168	83,115	86,829	90,214	93,504	96,338	99,483	102,260	104,973
Added	5,747	6,566	6,569	6,276	6,159	5,907	6,548	6,219	5,985	6,101
Removed	(2,722)	(2,619)	(2,855)	(2,891)	(2,869)	(3,073)	(3,403)	(3,442)	(3,272)	(3,230)
End of Year	79,168	83,115	86,829	90,214	93,504	96,338	99,483	102,260	104,973	107,844

*See Schedule D for a breakdown by type of retirement.

Schedule of Annual Benefit Payments Added to and Removed From Rolls
Last Seven Fiscal Years

Year Ending	2013	2014	2015	2016	2017	2018	2019
Beginning of Year	$1,752,606,759	$1,874,720,385	$1,998,322,954	$2,116,322,652	$2,249,044,704	$2,374,747,017	$2,500,750,392
Added	120,592,399	120,190,296	117,113,206	132,970,248	123,938,697	121,870,115	129,095,132
Removed	(47,237,330)	(48,955,768)	(55,158,128)	(59,603,335)	(62,470,173)	(64,186,324)	(67,416,138)
Benefit increase due to annual COLA	48,758,557	52,368,041	56,044,620	59,355,139	64,233,789	68,319,584	72,575,289
Benefit increase due to plan amendments	0	0	0	0	0	0	0
End of Year	$1,874,720,385	$1,998,322,954	$2,116,322,652	$2,249,044,704	$2,374,747,017	$2,500,750,392	$2,635,004,675

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-14	15-19	20-24	25	26-29	30	31+	TOTAL
July 1, 2018 to June 30, 2019									
Average Monthly Benefit	$476.23	$730.46	$1,156.10	$1,852.18	$2,090.55	$2,315.68	$2,469.25	$3,355.92	$1,734.50
Average Final Salary	$33,243	$36,871	$42,708	$51,686	$52,874	$55,298	$55,458	$65,639	$48,544
Number of Active Retirants	730	930	870	1,127	359	1,062	204	819	6,101
July 1, 2017 to June 30, 2018									
Average Monthly Benefit	$485.22	$722.11	$1,057.13	$1,767.43	$2,023.90	$2,173.95	$2,533.72	$3,178.78	$1,676.34
Average Final Salary	$32,660	$37,608	$39,878	$49,009	$52,289	$52,205	$57,261	$60,427	$46,987
Number of Active Retirants	672	933	849	1,047	348	1,080	192	864	5,985
July 1, 2016 to June 30, 2017									
Average Monthly Benefit	$475.88	$727.37	$1,013.30	$1,655.71	$1,947.82	$2,105.82	$2,446.29	$3,092.75	$1,632.44
Average Final Salary	$31,990	$37,033	$39,332	$47,400	$49,568	$50,461	$55,156	$59,849	$45,739
Number of Active Retirants	732	938	859	1,014	369	1,174	190	943	6,219
July 1, 2015 to June 30, 2016									
Average Monthly Benefit	$512.05	$701.11	$1,053.82	$1,638.19	$1,878.66	$2,117.88	$2,400.11	$3,196.32	$1,665.54
Average Final Salary	$31,771	$34,459	$39,422	$45,571	$46,533	$50,536	$52,472	$59,306	$44,872
Number of Active Retirants	751	997	874	1,048	402	1,204	234	1,038	6,548
July 1, 2014 to June 30, 2015									
Average Monthly Benefit	$458.27	$688.17	$977.30	$1,346.27	$1,833.91	$1,989.13	$2,217.36	$2,898.93	$1,600.68
Average Final Salary	$29,781	$33,585	$37,938	$40,770	$46,461	$48,614	$50,908	$57,019	$43,642
Number of Active Retirants	599	898	774	693	494	1,072	230	1,147	5,907

Schedule of Average Benefit Payments

	Years of Credited Service								
	0-9	10-14	15-19	20-24	25	26-29	30	31+	TOTAL
July 1, 2013 to June 30, 2014									
Average Monthly Benefit	$465.38	$712.04	$998.80	$1,383.89	$1,871.16	$1,992.51	$2,283.20	$2,954.14	$1,585.88
Average Final Salary	$31,044	$35,356	$37,962	$40,947	$47,490	$48,732	$51,456	$57,022	$43,744
Number of Active Retirants	751	945	815	663	505	1,146	232	1,102	6,159
July 1, 2012 to June 30, 2013									
Average Monthly Benefit	$442.04	$694.71	$963.61	$1,421.74	$1,924.91	$2,016.94	$2,187.80	$2,931.36	$1,563.58
Average Final Salary	$30,487	$34,404	$36,876	$41,550	$47,768	$48,862	$49,470	$56,341	$43,082
Number of Active Retirants	915	901	740	758	496	1,121	224	1,121	6,276
July 1, 2011 to June 30, 2012									
Average Monthly Benefit	$436.84	$655.76	$984.40	$1,325.25	$1,823.47	$1,956.67	$2,283.30	$2,938.26	$1,560.13
Average Final Salary	$29,120	$32,872	$37,561	$40,246	$46,050	$47,965	$51,720	$56,263	$42,606
Number of Active Retirants	1,007	867	779	736	501	1,138	260	1,281	6,569
July 1, 2010 to June 30, 2011									
Average Monthly Benefit	$455.16	$637.24	$974.84	$1,347.49	$1,791.74	$1,996.32	$2,176.08	$2,910.64	$1,578.82
Average Final Salary	$29,000	$31,063	$36,095	$39,613	$45,296	$48,620	$49,084	$55,608	$42,106
Number of Active Retirants	1,084	808	741	743	456	1,050	245	1,439	6,566
July 1, 2009 to June 30, 2010									
Average Monthly Benefit	$371.48	$620.46	$905.46	$1,239.55	$1,717.84	$1,897.84	$2,174.78	$2,833.34	$1,473.47
Average Final Salary	$26,406	$30,890	$33,781	$37,426	$43,924	$46,537	$49,426	$54,049	$40,044
Number of Active Retirants	985	773	641	627	428	867	237	1,189	5,747

Section VIII: Risk Assessment

Measuring pension obligations and actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Whenever assumptions are made about future events, there is risk that actual experience will differ from expected. Actuarial valuations include the risk that actual future measurements will deviate from expected future measurements due to actual experience that is different than the actuarial assumptions. The primary areas of risk in this actuarial valuation are.

- Investment Risk – the potential that investment returns will be different than expected.
- Longevity and Other Demographic Risks – the potential that mortality or other demographic experience will be different than expected.
- Interest Rate Risk – To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results.
- Contribution Risk – The potential that actual contributions are different than the actuarially determined contributions.

Annual actuarial valuations are performed for PERS which re-measure the assets and liabilities and the adequacy of the contribution rate. Actuarial projections are also performed every year with sensitivity testing of several factors. PERS also has experience studies performed every two years to analyze the discrepancies between actuarial assumptions and actual experience and determine if the actuarial assumptions need to be changed. Annual actuarial valuations and projections and periodic experience studies are practical ways to monitor and reassess risk. The annual projection report will assess many of the risks listed above.

Schedule A: Development of Actuarial Value of Assets

($ thousands)

	Valuation Date June 30:	2018	2019	2020	2021	2022	2023
A.	Actuarial Value Beginning of Year	$26,364,446	$27,455,702				
B.	Market Value End of Year	27,763,190	28,206,602				
C.	Market Value Beginning of Year	26,543,097	27,763,190				
D.	Cash Flow						
	D1. Contributions	1,588,970	1,619,049				
	D2. Other Revenue	0	0				
	D3. Benefit Payments	(2,609,415)	(2,747,397)				
	D4. Refunds	(124,306)	(108,042)				
	D5. Administrative Expenses	(16,264)	(16,905)				
	D6. Investment Expenses	(103,669)	(102,447)				
	D7. Net	(1,264,684)	(1,355,742)				
E.	Investment Income						
	E1. Market Total: B.-C.-D7.	2,484,777	1,799,154				
	E2. Assumed Rate	7.75%	7.75%				
	E3. Amount for Immediate Recognition	2,115,770	2,205,529				
	E4. Amount for Phased-In Recognition	369,007	(406,375)				
F.	Phased-In Recognition of Investment Income						
	F1. Current Year: 0.20*E4.	73,801	(81,275)				
	F2. First Prior Year	319,330	73,801	(81,275)			
	F3. Second Prior Year	(352,976)	319,330	73,801	(81,275)		
	F4. Third Prior Year	(239,758)	(352,976)	319,330	73,801	(81,275)	
	F5. Fourth Prior Year	439,773	(239,758)	(352,976)	319,330	73,801	(81,271)
	F6. Total Recognized Investment Gain	240,170	(280,878)	(41,120)	311,856	(7,474)	(81,271)
G.	Actuarial Value End of Year:						
	A.+D7.+E3.+F6.	$27,455,702	$28,024,611				
H.	Difference Between Market & Actuarial Values	$(307,488)	$(181,991)	$(223,111)	$88,745	$81,271	$0

The Actuarial Valuation of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, Actuarial Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Actuarial Value of Assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, actuarial value will become equal to market value.

Schedule A: Development of Actuarial Value of Assets

		Asset Summary June 30, 2019 ($ in Thousands)		
		Market Value	**Book Value**	**Actuarial Value**
1.	Assets at June 30, 2018	$27,763,190	$22,385,735	$27,455,702
2.	Contributions and Misc. Revenue	1,619,049	1,619,049	1,619,049
3.	Investment Increment	1,799,154	1,542,813	1,924,651
4.	Benefit Payments	(2,747,397)	(2,747,397)	(2,747,397)
5.	Refunds	(108,042)	(108,042)	(108,042)
6.	Expenses	(119,352)	(119,352)	(119,352)
7.	Assets at June 30, 2019 (1) + (2) + (3) + (4) + (5) + (6)	$28,206,602	$22,572,806	$28,024,611
8.	Investment Return	6.64%	7.11%	7.19%

Schedule B: Statement of Actuarial Assumptions & Methods

INTEREST RATE: 7.75% per annum, compounded annually (net of investment expense only). The expected return on assets consists of 2.75% price inflation and 5.00% real rate of return.

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed rates of separation from active service are as follows:

	Annual Rates of					
	Withdrawal and Vesting*		Death**		Disability	
Age	Male	Female	Male	Female	Male	Female
20	26.50%	32.50%	0.0483%	0.0126%	0.010%	0.009%
25	18.50	18.50	0.0567	0.0189	0.012	0.011
30	11.75	12.00	0.0630	0.0259	0.017	0.014
35	8.50	8.75	0.0714	0.0350	0.036	0.017
40	6.75	7.00	0.0893	0.0483	0.110	0.070
45	6.25	6.00	0.1218	0.0665	0.230	0.140
50	6.25	6.00	0.1764	0.0917	0.290	0.220
55	6.25	6.00	0.2594	0.1274	0.500	0.380
60	6.25	6.00	0.3980	0.1757	0.530	0.410
65	6.25	6.00	0.6353	0.2429	0.200	0.150
70	6.25	6.00	1.1655	0.4739	0.200	0.150
74	6.25	6.00	1.8942	0.8092	0.200	0.150

	Annual Rates of Service Retirements			
	Male		Female	
Age	Under 25 Years of Service***	25 Years of Service and Over***	Under 25 Years of Service***	25 Years of Service and Over***
45		22.50%		18.00%
50		15.00		13.00
55		18.25		19.00
60	10.50%	19.50	13.25%	22.25
62	20.75	32.00	19.00	37.50
65	25.00	29.50	29.25	42.50
70	20.00	25.00	24.00	25.50
75	100.00	100.00	100.00	100.00

** For all ages, rates of 33.5% for 1st year of employment and 24.0% for 2nd year.*
***Base Rates*
**** For Tier 4 members, 30 years of service.*

Schedule B: Statement of Actuarial Assumptions & Methods

SALARY INCREASES: Representative values of the assumed annual rates of salary increases are as follows:

Service	Merit & Seniority	Annual Rates of Base (Economy)	Increase Next Year
0	15.25%	3.00%	18.25%
1	5.25	3.00	8.25
2	2.75	3.00	5.75
3	1.75	3.00	4.75
4	1.25	3.00	4.25
5-7	0.75	3.00	3.75
8-27	0.25	3.00	3.25
28 and Over	0.00	3.00	3.00

DEATH AFTER RETIREMENT: The mortality table, for post-retirement mortality, used in evaluating allowances to be paid is the PubS.H-2010(B) Retiree Table with the following adjustments:

- For males, 112% of male rates from ages 18 to 75 scaled down to 105% for ages 80 to 119.
- For females, 85% of the female rates from ages 18 to 65 scaled up to 102% for ages 75 to 119.
- Projection scale MP-2018 is used to project future improvements in life expectancy generationally.

The PubT.H-2010 Disabled Retiree Table is used for disabled retirees with the following adjustments - 137% of male rates at all ages and 115% of female rates at all ages. Projection scale MP-2018 is used to project future improvements in life expectancy generationally.

PAYROLL GROWTH: 3.00% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.25% of payroll.

TIMING OF DECREMENTS AND PAY INCREASES: Middle of Year.

ACTIVE MEMBER DISABILITY ASSUMPTION: 9% of active member disabilities are assumed to be in the line of duty and 91% of active member disabilities are assume to not be in the line of duty.

ACTIVE MEMBER DEATH ASSUMPTION: 6% of active deaths are assumed to be in the line of duty and 94% of active member deaths are assumed to not be in the line of duty.

ACTIVE MEMBER WITHDRAWAL ASSUMPTION: 60% of vested participants who terminate before retirement elect to receive a deferred benefit upon attaining the eligibility requirements for retirement. They are assumed to commence their benefit at age 60 for Tiers 1, 2 and 3 and age 62 for Tier 4. The remaining 40% elect to withdraw their contributions.

FINAL AVERAGE COMPENSATION: 0.25% load on the final average compensation produced by our valuation software.

Schedule B: Statement of Actuarial Assumptions & Methods

MARRIAGE ASSUMPTION: 85% married with the husband three years older than his wife.

UNUSED SICK LEAVE: Assumed 0.50 years at retirement.

MILITARY SERVICE: Assumed that participants will have on average 0.25 years of military service at retirement.

MAXIMUM COVERED EARNINGS ASSUMPTION GROWTH: 3.00%.

AGE-LIMITED DISABILITY DECREMENTS: Assumed to turn off at age 60.

DEFERRED VESTEDS: Deferred vested benefits are assumed to commence at age 60 for Tiers 1, 2 and 3 and at age 65 for Tier 4.

ASSUMED INTEREST RATE ON EMPLOYEE CONTRIBUTIONS: 2.00%.

ASSET VALUATION METHOD: Actuarial value, as developed in Schedule A. The actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between market value and expected market value.

VALUATION METHOD: The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future interest earnings rate (currently 7.75%). The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

The employer contributions required to support the benefits of PERS 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 for pension benefits 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.

The unfunded actuarial accrued liability is determined by subtracting the current assets and the present value of prospective employer normal contributions and member contributions from the present value of expected benefits to be paid from the PERS. The accrued liability contribution amortizes the balance of the unfunded actuarial accrued liability over a period of years from the valuation date.

Schedule C: Summary of Main Benefit & Contribution Provisions

The following summary presents the main benefit and contribution provisions of the System in effect July 1, 2019, as interpreted in preparing the actuarial valuation.

DEFINITIONS

Average Compensation	Average annual covered earnings of an employee during the four highest years of service. To determine your four highest years, PERS considers these scenarios: • Four highest fiscal years of earned compensation; • Four highest calendar years of earned compensation; • Combination of four highest fiscal and calendar years of earned compensation that do not overlap; or • Final 48 months of earned compensation prior to termination of employment.
Covered Earnings	Gross salary not in excess of the maximum amount on which contributions were required.
Fiscal Year	Year commencing on July 1 and ending June 30.
Credited Service	Service while a contributing member plus additional service as described below.
Unused Sick and Vacation Leave	Service credit is provided at no charge to members for unused sick and vacation time that has accrued at the time of retirement. A payment of up to 240 hours of leave may be used in the Average Compensation definition.
Additional Service	Additional service credit may be granted for service prior to February 1, 1953, active duty military service, out-of-state service, professional leave and non-covered and retroactive service

Schedule C: Summary of Main Benefit & Contribution Provisions

The maximum covered earnings for employers and employees over the years are as follows:

EMPLOYER AND EMPLOYEE RATES OF CONTRIBUTION AND MAXIMUM COVERED EARNINGS

Fiscal Date From	Fiscal Date To	Employer Rate	Maximum Covered Earnings	Employee Rate	Maximum Covered Earnings
2/1/53	6/30/58	2.50%	$6,000	4.00%	$4,800*
7/1/58	6/30/60	2.50	9,000	4.00	7,800*
7/1/60	6/30/66	2.50	15,000	4.00	13,800*
7/1/66	6/30/68	3.00	15,000	4.50	13,800*
7/1/68	3/31/71	4.50	15,000	4.50	15,000
4/1/71	6/30/73	4.50	35,000	4.50	35,000
7/1/73	6/30/76	5.85	35,000	5.00	35,000
7/1/76	6/30/77	7.00	35,000	5.00	35,000
7/1/77	6/30/78	7.50	35,000	5.50	35,000
7/1/78	6/30/80	8.00	35,000	5.50	35,000
7/1/80	6/30/81	8.00	53,000	5.50	53,000
7/1/81	12/31/83	8.75	53,000	6.00	53,000
1/1/84	6/30/88	8.75	63,000	6.00	63,000
7/1/88	6/30/89	8.75	75,600	6.00	75,600
7/1/89	12/31/89	8.75	75,600	6.50	75,600
1/1/90	6/30/91	9.75	75,600	6.50	75,600
7/1/91	6/30/92	9.75	75,600	7.25	75,600
7/1/92	6/30/02	9.75	125,000	7.25	125,000
7/1/02	6/30/05	9.75	150,000	7.25	150,000
7/1/05	6/30/06	10.75	150,000	7.25	150,000
7/1/06	6/30/07	11.30	150,000	7.25	150,000
7/1/07	6/30/08	11.85	150,000	7.25	150,000
7/1/08	6/30/09	11.85	230,000	7.25	230,000
7/1/09	6/30/10	12.00	245,000	7.25	245,000
7/1/10	6/30/11	12.00	245,000	9.00	245,000
7/1/11	12/31/11	12.00	245,000	9.00	245,000
1/1/12	6/30/12	12.93	245,000	9.00	245,000
7/1/12	6/30/13	14.26	250,000	9.00	250,000
7/1/13	6/30/14	15.75	255,000	9.00	255,000
7/1/14	6/30/15	15.75	260,000	9.00	260,000
7/1/15	6/30/17	15.75	265,000	9.00	265,000
7/1/17	6/30/18	15.75	270,000	9.00	270,000
7/1/18	6/30/19	15.75	275,000	9.00	275,000
7/1/19	6/30/20	17.40	280,000	9.00	280,000

*From February 1, 1953 through June 30, 1968 the first $100 in monthly earnings or $1,200 in annual earnings were not covered earnings for the employee.

BENEFITS

Superannuation Retirement

Condition for Retirement	A retirement allowance is paid upon the request of any member who retires and has attained age 60 and completed at least eight years (4 years if hired prior to July 1, 2011) of membership service. A retirement allowance may also be paid upon the completion of 25 years of creditable service for members hired prior to July 1, 2011 or upon the completion of 30 years of creditable service for members hired on or after July 1, 2011.
Amount of Allowance	The annual retirement allowance payable to a member who retires is equal to: 1. A member's annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his or her retirement, plus 2. For a member hired prior to July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 25 years of creditable service plus 2-1/2% for each year of creditable service over 25 years. 3. For a member hired on or after July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 30 years of creditable service plus 2-1/2% for each year of creditable service over 30 years. There will be an actuarial reduction for each year of creditable service below 30 or for each year of age below age 65, whichever is less. For members hired prior to July 1, 2011, the minimum allowance is $120 for each year of creditable service.

Early Retirement

Condition for Retirement	For members hired on or after July 1, 2011, an actuarially reduced retirement allowance is paid upon the request of any member who retires with less than 30 years of creditable service.
Amount of Allowance	The annual actuarially reduced retirement allowance is equal to the benefit in the section above reduced for each year of creditable service below 30 or for each year in age below age 65, whichever is less.

Deferred Vested

Condition for Termination	Any member who withdraws from service prior to his or her attainment of age 60 and who has completed at least eight years (4 years if hired prior to July 1, 2007) of membership service is entitled to receive, in lieu of a refund of his or her accumulated contributions, a retirement allowance.
Amount of Allowance	The annual retirement allowance payable to a member who terminates as a deferred vested payable at age 60 is equal to: 1. A member's annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his or her retirement, plus 2. For a member hired prior to July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 25 years of creditable service plus 2-1/2% for each year of creditable service over 25 years. 3. For a member hired on or after July 1, 2011, an employer's annuity which, together with the member's annuity, is equal to 2% of his or her average compensation for each of the first 30 years of creditable service plus 2-1/2% for each year of creditable service over 30 years. There will be an actuarial reduction for each year of creditable service below 30 or for each year of age below age 65, whichever is less. For members hired prior to July 1, 2011, the minimum allowance is $120 for each year of creditable service.

Disability Retirement

Condition for Retirement	A retirement allowance is paid to a member who is totally and permanently disabled, as determined by the Board of Trustees, and has accumulated eight or more years* of membership service. * four years for those who entered the system before July 1, 2007

Amount of Allowance

For those who were active members prior to July 1, 1992, and did not elect the benefit structure outlined below, the annual disability retirement allowance payable is equal to a superannuation retirement allowance if the member has attained age 60, otherwise it is equal to a superannuation retirement allowance calculated as follows:

1. A member's annuity equal to the actuarial equivalent of his or her accumulated contributions at the time of retirement, plus
2. An employer's annuity equal to the amount that would have been payable had the member continued in service to age 60.

For those who become active members after June 30, 1992, and for those who were active members prior to July 1, 1992, who so elected, the following benefits are payable:

1. A temporary allowance equal to the greater of (a) 40% of average compensation plus 10% for each dependent child up to a maximum of 2, or (b) the member's accrued allowance. This temporary allowance is paid for a period of time based on the member's age at disability, as follows:

Age at Disability	Duration
60 and earlier	to age 65
61	to age 66
62	to age 66
63	to age 67
64	to age 67
65	to age 68
66	to age 68
67	to age 69
68	to age 70
69 and later	one year

For members hired prior to July 1, 2011, the minimum allowance is $120 per year of creditable service.

2. A deferred allowance commencing when the temporary allowance ceases equal to the greater of (a) the allowance the member would have received based on service to the termination age of the temporary allowance, but not more than 40% of average compensation, or (b) the member's accrued allowance.

For members hired prior to July 1, 2011, the minimum allowance is $120 per year of creditable service.

Effective July 1, 2004, a temporary benefit can be paid out of a member's accumulated contribution balance while the member is awaiting a determination for eligibility for disability benefits. Future disability payments, if any, would be offset by advanced payments made from the member's accumulated contributions.

Accidental Disability Retirement

Condition for Retirement: A retirement allowance is paid to a member who is totally and permanently disabled in the line of performance of duty.

Amount of Allowance: The annual accidental disability retirement allowance is equal to the allowance payable on disability retirement but not less than 50% of average compensation. There is no minimum benefit.

Accidental Death Benefit

Condition for Benefit: A retirement allowance is paid to a spouse and/or dependent children upon the death of an active member in the line of performance of duty.

Amount of Allowance: The annual retirement allowance is equal to 50% of average compensation payable to the spouse and 25% of average compensation payable to one dependent child or 50% to two or more children until age 19 (23 if a full time student). There is no minimum benefit.

Ordinary Death Benefit

Condition for Benefit: Upon the death of a member who has completed at least eight years* of membership service, a benefit is payable, in lieu of a refund of the member's accumulated contributions, to his or her spouse, if said spouse has been married to the member for not less than one year.

*four years for those who entered the system before July 1, 2007.

Amount of Allowance: The annual retirement allowance payable to the lawful spouse of a vested member who dies is equal to the greater of (i) the allowance that would have been payable had the member retired and elected Option 2, reduced by an actuarially determined factor based on the number of years the member lacked in qualifying for unreduced retirement benefits, or (ii) a lifetime benefit equal to 20% of the deceased member's average compensation, but not less than $50 per month.

In addition, a benefit is payable to dependent children until age 19 (23 if a full time student). The benefit is equal to the greater of 10% of average compensation or $50 per month for each dependent child up to 3.

Return of Contributions: Upon the withdrawal of a member without a retirement benefit, his or her contributions are returned to him or her, together with accumulated regular interest thereon.

Upon the death of a member before retirement, his or her contributions, together with the full accumulated regular interest thereon, are paid to his or her designated beneficiary, if any, otherwise, to his or her estate provided no other survivor benefits are payable.

Effective July 1, 2016, the interest rate on employee contributions shall be calculated based on the money market rate as published by the Wall Street Journal on December 31 of each preceding year with a minimum rate of one percent and a maximum rate of five percent.

Normal Form of Benefit

The normal form of benefit (modified cash refund) is an allowance payable during the life of the member with the provision that upon his or her death the excess of his or her total contributions at the time of retirement over the total retirement annuity paid to him or her will be paid to his or her designated beneficiary.

Optional Benefits

A member upon retirement may elect to receive his or her allowance in one of the following forms which are computed to be actuarially equivalent to the applicable retirement allowance.

Option 1. Reduced allowance with the provision that if the pensioner dies before he receives the value of the member's annuity as it was at the time of retirement, the balance shall be paid to his or her beneficiary.

Option 2. Upon his or her death, his or her reduced retirement allowance shall be continued throughout the life of, and paid to, his or her beneficiary.

Option 3. Upon his or her death, 50% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary and the other 50% of his or her reduced retirement allowance to some other designated beneficiary.

Option 4. Upon his or her death, 75% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary.

Option 4A. Upon his or her death, 50% of his or her reduced retirement allowance shall be continued throughout the life of, and paid to, a designated beneficiary.

Option 4B. A reduced retirement allowance shall be continued throughout the life of the pensioner, but with the further guarantee of payment to the pensioner or his or her beneficiary for a specified number of years certain.

Option 4C. A member may elect any option with the added provision that the member shall receive, so far as possible, the same total amount annually (considering both PERS and Social Security benefits) before and after the earliest age at which the member becomes eligible for a Social Security benefit. This option was only available to those who retired prior to July 1, 2004.

A member who elects Option 2, Option 4, or Option 4A at retirement may revert to the normal form of benefit if the designated beneficiary predeceases the retired member or if the retired member divorces the designated beneficiary. A member who elects the normal form of benefit or Option 1 at retirement may select Option 2, Option 4, or Option 4A to provide beneficiary protection to a new spouse if married after retirement.

A member hired prior to July 1, 2011 and who has at least 28 years of creditable service* or a member hired on or after July 1, 2011 who has at least 33 years of creditable service can select a partial lump-sum option at retirement. Under this option, the retiree has the option of taking a partial lump-sum distribution equal to 12, 24, or 36 times the base maximum monthly benefit. With each lump-sum amount, the base maximum monthly benefit will be actuarially reduced. A member selecting the partial lump-sum option may also select any of the regular options except Option 1, the prorated single-life annuity, and Option 4-C, the Social Security leveling provision. The benefit is then calculated using the new reduced maximum benefit as a starting point in applying the appropriate option factors for the reduction.

* or at least age 63 with four years of membership service for those who entered the system before July 1, 2007.

Post-Retirement Adjustments In Allowances

The allowances of retired members are adjusted annually by an amount equal to (a) 3% of the annual retirement allowance for each full fiscal year of retirement prior to the year in which the member reaches age 55*, plus (b) 3% compounded for each year thereafter beginning with the fiscal year in which the member turns age 55*.

*Age 60 for members hired on or after July 1, 2011

A prorated portion of the annual adjustment will be paid to the member, beneficiary, or estate of any member or beneficiary who is receiving the annual adjustment in a lump sum, but whose benefits are terminated between July 1 and December 1.

Schedule D: Detailed Tabulations of the Data

RECONCILIATION OF DATA RECEIVED FROM PERS

Reconciliation of Data received from PERS	Active File			Pensioner File			Total
	Active	Inactive NonVested	Inactive Vested	Retirees	Disableds	Survivors	
From PERS	153,446	55,840	14,658	89,729	6,508	11,641	331,822
Return to Active Status							
Deceased			(10)	(1)			(11)
Certain Period Ended						(127)	(127)
Added Back			60	83	6	5	154
Pay less than $100	(821)	776	45				
Not Contributing	(1,974)	1,562	360				(52)
Balance = 0		(545)					(545)
Status Change		(2)					(2)
In Retiree Status			(12)				(12)
In Disabled Status			(9)				(9)
Pending Retirees			1,270				1,270
Suspended Beneficiaries			24				24
For Valuation	150,651	57,631	16,386	89,811	6,514	11,519	332,512

Schedule D: Detailed Tabulations of the Data

STATUS RECONCILIATION FROM 2018 TO 2019

Reconciliation of Data from Last Year to This Year	Actives	Retirees	Disableds	Survivors	Inactives		Total
					Vested	Non-Vested	
As of June 30, 2018	150,687	87,277	6,506	11,190	16,578	52,763	325,001
Retirement	(3,066)	4,964	(1)		(1,897)		
Disabled	(170)	(3)	262		(86)	(3)	
Death with Survivor	(83)	(543)	(38)	794	(56)		74
Terminated Vested	(3,056)			(23)	3,121	(42)	
Terminated Non-Vested	(6,993)					6,993	
Return to Active Service	3,026	(74)	(3)		(728)	(2,221)	
Refunded	(5,457)				(504)	(3,013)	(8,974)
Death No Survivor	(87)	(1,813)	(211)	(423)	(1)	(9)	(2,544)
Benefit Ended			(1)	(97)	(48)		(146)
Removed/Cleanup	(14)				(3)	(65)	(82)
New	15,864						15,864
Pickups		3		78	10	3,228	3,319
As of June 30, 2019	150,651	89,811	6,514	11,519	16,386	57,631	332,512

Schedule D: Detailed Tabulations of the Data

Retirants & Beneficiaries as of June 30, 2019
Tabulated by Year of Retirement

Year of Retirement Ending June 30	No.	Total Annual Benefits, excluding COLA	COLA	Total Annual Benefits	Average Monthly Total Benefit
2019	4,994	$111,992,703	$91,478	$112,084,181	$1,870
2018	5,474	114,036,565	1,282,392	115,318,957	1,756
2017	5,366	109,390,605	4,440,677	113,831,282	1,768
2016	5,493	114,831,278	8,127,037	122,958,315	1,865
2015	5,098	102,913,392	10,630,546	113,543,938	1,856
2014	5,582	111,295,956	15,206,997	126,502,953	1,889
2013	5,316	105,637,827	18,142,308	123,780,135	1,940
2012	5,605	111,459,763	22,887,053	134,346,816	1,997
2011	5,500	110,948,970	26,943,262	137,892,232	2,089
2010	4,692	89,535,135	24,816,544	114,351,679	2,031
2009	3,889	73,273,036	23,081,100	96,354,136	2,065
2008	4,212	79,464,625	27,921,001	107,385,626	2,125
2007	3,940	71,743,873	27,945,447	99,689,320	2,108
2006	3,930	67,823,835	29,110,057	96,933,892	2,055
2005	3,573	63,481,354	29,861,077	93,342,431	2,177
2004	3,695	64,322,287	33,305,077	97,627,364	2,202
2003	3,347	57,829,569	32,459,481	90,289,050	2,248
2002	3,344	54,447,783	33,022,503	87,470,286	2,180
2001	3,173	52,888,533	34,592,883	87,481,416	2,298
2000	2,465	39,530,320	27,862,222	67,392,542	2,278
1999	2,097	32,238,951	24,327,539	56,566,490	2,248
1998	2,129	31,482,169	25,328,292	56,810,461	2,224
1997	2,052	29,050,648	24,975,741	54,026,389	2,194
1996	2,012	28,849,971	26,539,930	55,389,901	2,294
1995	1,571	20,449,198	19,863,712	40,312,910	2,138
1994	1,459	18,167,848	18,760,619	36,928,467	2,109
1993	1,509	19,987,314	21,841,830	41,829,144	2,310
1992	1,565	20,368,545	23,575,248	43,943,793	2,340
1991	871	10,441,395	12,921,958	23,363,353	2,235
1990	890	9,198,900	11,888,411	21,087,311	1,974
1989	323	2,876,235	3,859,874	6,736,109	1,738
1988	452	4,441,974	6,323,188	10,765,162	1,985
1987	600	6,263,038	9,679,761	15,942,799	2,214
1986	400	3,851,772	6,057,919	9,909,691	2,065
1985	228	1,968,231	3,227,973	5,196,204	1,899
1984 & Prior	998	5,962,945	11,656,995	17,619,940	1,471
Totals	107,844	$1,952,446,543	$682,558,132	$2,635,004,675	$2,036

Schedule D: Detailed Tabulations of the Data

Schedule of Retired Members by Type of Benefit

Benefits Payable June 30, 2019

Amount of Monthly Benefit**	Number of Rets.	Ret. Type 1*	Ret. Type 2*	Ret. Type 3*
$1-$500	22,191	16,566	942	4,683
501-1,000	21,466	16,177	2,151	3,138
1,001-1,500	19,069	15,741	1,645	1,683
1,501-2,000	15,741	13,985	901	855
2,001-2,500	11,642	10,694	455	493
2,501-3,000	7,003	6,544	216	243
3,001-3,500	4,384	4,117	90	177
3,501-4,000	2,371	2,217	56	98
4,001-4,500	1,488	1,403	34	51
4,501-5,000	785	743	10	32
Over 5,000	1,704	1,624	14	66
Totals	107,844	89,811	6,514	11,519

*Type of Retirement
1 – Retirement for Age & Service
2 – Disability Retirement
3 – Survivor Payment

**Reflects reduced benefit

Schedule D: Detailed Tabulations of the Data

Schedule of Retired Members by Option

Benefits Payable June 30, 2019

Amount of Monthly Benefit**	Number of Rets.	Life	Option 1	Option 2	Option 3	Option 4	Option 4A	Option 4B	Option 4C*	Option 5	PLSO 1 Year*	PLSO 2 Years*	PLSO 3 Years*
$1-$500	22,191	16,133	723	2,691	173	151	461	1,811	162	48	581	495	2,282
501-1,000	21,466	15,013	677	2,875	185	214	907	1,524	758	71	834	596	2,035
1,001-1,500	19,069	12,225	664	3,070	201	264	1,141	1,433	939	71	804	714	2,858
1,501-2,000	15,741	9,772	464	2,582	127	297	1,175	1,292	416	32	703	740	3,378
2,001-2,500	11,642	7,005	290	1,952	82	217	1,107	968	119	21	752	658	2,743
2,501-3,000	7,003	4,224	155	1,138	41	154	662	615	47	14	551	437	1,544
3,001-3,500	4,384	2,621	103	705	23	116	440	369	18	7	425	289	855
3,501-4,000	2,371	1,423	55	404	13	50	241	185	10	0	241	157	404
4,001-4,500	1,488	835	26	269	6	42	197	113	3	0	150	90	276
4,501-5,000	785	450	9	146	2	15	107	56	2	0	74	35	143
Over 5,000	1,704	817	20	401	8	73	255	130	3	0	136	77	265
Totals	107,844	70,518	3,186	16,233	861	1,593	6,693	8,496	2,477	264	5,251	4,288	16,783

<u>Option Selected</u>

Life	-	Return of Contributions
Opt. 1	-	Return of Member's Annuity
Opt. 2	-	100% Survivorship
Opt. 3	-	50%/50% Dual Survivorship
Opt. 4	-	75% Survivorship
Opt. 4A	-	50% Survivorship
Opt. 4B	-	Years Certain & Life
Opt. 4C	-	Social Security Leveling *
Opt. 5	-	Pop-Up
PLSO	-	Partial Lump Sum Option*

*Included in other options
** Reflects reduced benefit

Schedule D: Detailed Tabulations of the Data

Retirant and Beneficiary Information June 30, 2019
Tabulated by Attained Ages

Attained Age	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20					358	$1,737,980	358	$1,737,980
20 – 24					137	828,164	137	828,164
25 – 29					94	918,261	94	918,261
30 – 34			8	103,912	120	1,360,102	128	1,464,014
35 – 39			56	924,116	191	1,934,649	247	2,858,765
40 – 44	15	399,152	140	2,454,887	240	2,775,611	395	5,629,650
45 – 49	595	16,736,287	353	6,932,750	375	4,752,900	1,323	28,421,937
50 – 54	2,501	71,376,736	640	13,504,489	466	5,775,831	3,607	90,657,056
55 – 59	5,518	169,862,828	1,079	21,886,468	717	9,713,879	7,314	201,463,175
60 – 64	13,874	357,868,304	1,382	27,595,409	1,034	16,539,497	16,290	402,003,210
65 – 69	20,834	527,584,764	1,266	24,003,927	1,396	25,028,396	23,496	576,617,087
70 – 74	19,387	495,495,512	865	16,575,424	1,546	30,600,820	21,798	542,671,756
75 – 79	12,783	319,953,774	415	7,836,098	1,576	32,153,775	14,774	359,943,647
80 – 84	7,778	189,156,438	227	3,569,804	1,455	33,008,661	9,460	225,734,903
85 – 89	4,148	99,725,346	60	922,721	1,089	23,920,043	5,297	124,568,110
90 – 94	1,874	42,907,568	17	277,649	555	11,788,284	2,446	54,973,501
95	156	3,626,413	2	26,426	43	854,434	201	4,507,273
96	106	2,475,614	1	14,633	41	946,030	148	3,436,277
97	55	1,189,860	2	31,495	32	732,424	89	1,953,779
98	74	1,648,483	1	8,936	21	360,599	96	2,018,018
99	42	664,571			19	390,211	61	1,054,782
100 & Over	71	1,318,128			14	225,202	85	1,543,330
Totals	89,811	$2,301,989,778	6,514	$126,669,144	11,519	$206,345,753	107,844	$2,635,004,675

Average Age: 70.1 years
Average Age at Retirement: 59.3 years
Average Age at Death: 80.3 years
Average Years Since Retirement: 11.9 years

Schedule D: Detailed Tabulations of the Data

Total Active Members as of June 30, 2019
Tabulated by Attained Ages and Years of Service

Attained Age	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Over	Total No.	Total Payroll
Under 20	289							289	$ 5,274,470
21 to 24	6,126	43						6,169	171,580,957
25 to 29	11,503	2,577	40					14,120	478,641,868
30 to 34	7,616	6,543	2,061	51				16,271	623,271,973
35 to 39	6,429	4,671	5,964	1,957	43			19,064	793,125,502
40 to 44	5,517	3,844	3,882	4,865	1,588	25		19,721	871,280,372
45 to 49	4,971	3,521	3,696	3,653	3,970	1,187	33	21,031	946,117,233
50 to 54	4,143	3,002	3,047	2,930	2,894	2,060	556	18,632	806,199,483
55 to 59	3,581	2,814	2,847	2,924	2,800	1,589	1,222	17,777	734,133,708
60 to 64	2,153	2,018	1,976	1,762	1,558	1,065	1,037	11,569	476,348,557
65 to 69	865	794	695	571	424	273	376	3,998	163,833,580
70 & Over	437	365	371	279	217	133	208	2,010	75,107,927
Total Count	53,630	30,192	24,579	18,992	13,494	6,332	3,432	150,651	$ 6,144,915,630

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age:	44.9 years
Service:	10.3 years
Entry Age:	35 years
Annual Pay:	$40,789

Schedule E: Analysis of Financial Experience

Gains & Losses in Accrued Liabilities
Resulting from Difference Between
Assumed Experience & Actual Experience
($ Millions)

Type of Activity	$ Gain (or Loss) For Year Ending 6/30/19	$ Gain (or Loss) For Year Ending 6/30/18
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	$ 75.6	$ 85.1
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	2.0	1.4
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(0.8)	0.1
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(138.0)	(165.6)
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(33.0)	236.4
New Members. Additional unfunded accrued liability will produce a loss.	(65.8)	(60.8)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	(257.0)	254.0
Death After Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	(2.3)	20.4
Other. Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	10.8	(155.3)
Gain (or Loss) During Year From Financial Experience	$ (408.5)	$ 215.7
Non-Recurring Items. Adjustments for plan amendments, software changes, assumption changes, or method changes.	(305.4)	0.0
Composite Gain (or Loss) During Year	$ (713.9)	$ 215.7

Schedule F: Funding Policy of the Public Employees' Retirement System of Mississippi

The purpose of the funding policy is to state the overall funding goals and objectives for the Public Employees' Retirement System of Mississippi (PERS), and to document both the metrics that will be used to measure progress toward achieving those goals, and the methods and assumptions employed to develop the metrics.

The employer contribution rate for PERS will be set based on the metrics, assumptions and methods outlined in Section II and III of this policy.

I. Funding Goals and Objectives

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

- Preservation of the defined benefit structure for providing lifetime benefits to the PERS membership,
- Contribution rate stability as a percentage of payroll (Fixed Contribution Rate – FCR),
- Maintain an increasing trend in the funded ratio over the projection period with an ultimate goal of being 100% funded,
- Require clear reporting and risk analysis of the metrics by the actuary as outlined in Section II of this policy using a "Signal Light" approach to assist the Board in determining whether increases or decreases are needed in the employer contribution rate, and
- Ensure benefit improvements are funded through increases in contribution requirements in accordance with Article 14, S 272A, of the Mississippi Constitution.

II. Metrics

To track progress in achieving the outlined funding goals and objectives and to assist the Board in making a determination whether an increase or decrease in the employer contribution rate for PERS should be considered, certain metrics will be measured annually in conjunction with information provided in the actuarial valuation and projection report. As part of the annual valuation and projection reports, each metric will be calculated and assigned a "Signal Light" with the following definitions:

Status	Definition
Green	Plan passes metric and PERS' funding goals and objectives are achieved
Yellow	Plan passes metric but a warning is issued that negative experience may lead to failing status
Red	Plan fails metric and PERS must consider contribution increases

If any one of the metrics are in the Red Signal Light status in conjunction with the annual valuation report and the projection report the actuary will determine and recommend to the Board an employer contribution rate increase to consider that is sufficient enough to get all three metrics back into the Green Signal Light status. The employer contribution rate increase would be effective for the July 1st, 18 months following the completion of the projection report (e.g. if the projection report in 2019 deems an increase to be considered, then it would be effective for July 1, 2021).

The following metrics will be measured:

- **Funded Ratio** – Funded Ratio is defined as the actuarial value of assets divided by the actuarial accrued liability. One of the funding goals is to have an increasing funded ratio over the projection period with an ultimate goal of having a 100 percent funded ratio. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Funded Ratio above 80% in 2047
Yellow	Funded Ratio between 65% and 80% in 2047
Red	Funded Ratio below 65% in 2047

- **Cash flow as a percentage of assets** – Cash flow as a percentage of assets is defined as the difference between total contributions coming into the trust and the benefit payments made to retirees and beneficiaries going out of the trust as a percentage of beginning year market value of assets. Over the projection period, this percentage will fluctuate from year to year so for Signal Light testing, the net cash flow percentage over the entire projection period will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Net Cash Flow Percentage above negative 6.00% (-6.00%) during the projection period
Yellow	Net Cash Flow Percentage between negative 6.00% (-6.00%) and negative 7.75% (-7.75%) during the projection period
Red	Net Cash Flow Percentage below negative 7.75% (-7.75%) during the projection period

- **Actuarially Determined Contribution (ADC)** – ADC is defined as the contribution requirement determined by the actuary using a contribution allocation procedure based on the principal elements disclosed in Section III of this funding policy:

  1. Actuarial Cost Method
  2. Asset Smoothing Method
  3. Amortization Method

  The calculation of the ADC will be determined during the actuarial valuation and not during the projection report. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by this Funding Policy will be tested.

  The Board sets the Signal Light definition as follows:

Status	Definition
Green	ADC ratio at or below 100% of fixed contribution rate at valuation date
Yellow	ADC ratio between 100% and 110% of fixed contribution rate at valuation date
Red	ADC ratio above 110% of fixed contribution rate at valuation date

III. Assumptions and Methods

Each year, the actuary will perform an actuarial valuation and projection report for funding purposes. During the process, the actuary shall calculate all the metrics listed in Section II of this funding policy and PERS' Signal Light status for each metric. The following three major components of a funding valuation will be used:

- **Actuarial Cost Method** – This component determines the attribution method upon which the cost/liability of the retirement benefits are allocated to a given period, defining the normal cost or annual accrual rate associated with projected benefits. The Entry Age Normal Cost Method (EAN) is to be used for determination of the normal cost rate and the actuarial accrued liability for purposes of calculating the Actuarial Determined Contribution (ADC).
- **Asset Valuation Method** – This component dictates the method by which the asset value, used in the determination of the Unfunded Actuarial Accrued Liability (UAAL) and Funded Ratio, is determined. The asset valuation method to be used shall be a five-year smoothed market value of assets. The difference between the actual market value investment returns and the expected market investment returns is recognized equally over a five-year period.

- **Amortization Method** – This component prescribes, in terms of duration and pattern, the systematic manner in which the difference between the accrued liability and the actuarial value of assets is reduced. For purposes of calculating the ADC metric, the following amortization method assumptions are used**:**
  - I. Once established for any component of the UAAL, the amortization period for that component will be closed and will decrease by one year annually.
  - II. The amortization payment will be determined on a level percentage of pay basis.
  - III. The length of the amortization periods will be as follows:
    - a. Existing UAAL on June 30, 2018 – 30 years.
    - b. Annual future actuarial experience gains and losses, assumption changes or benefit enhancements or reductions – 25 years from the date of the valuation.
  - IV. If any future annual actuarial valuation indicates that PERS has a negative UAAL, the ADC shall be set equal to the Normal Cost.
- **Actuarial Assumptions** – The actuarial assumptions are used to develop the annual and projected actuarial metrics, as well as the ADC rates. The actuarial assumptions are derived and proposed by the actuary and adopted by the PERS' Board in conformity with the *Actuarial Standards of Practice*. The actuarial assumptions for this funding policy were developed using the experience for the four-year period ending June 30, 2018 (State of Mississippi Retirement Systems Experience Investigation for the Four-Year Period Ending June 30, 2018). The long-term investment return assumption adopted by the PERS' Board in conjunction with the experience investigation is 7.75 percent and will be reduced until it reaches the rate recommended by the actuary in the most recent experience study using investment gains based on the following parameters:
  - 2% Excess return over assumed rate, lower assumption by 5 basis points,
  - 5% Excess return over assumed rate, lower assumption by 10 basis points,
  - 8% Excess return over assumed rate, lower assumption by 15 basis points,
  - 12% Excess return over assumed rate, lower assumption by 20 basis points.

IV. Governance Policy/Process

Below is a list of specific actuarial and funding related studies, the frequency at which they should be commissioned by the Board and additional responsibilities related to each:

- **Actuarial Valuation (performed annually)** – The Board is responsible for the review of PERS' annual actuarial valuation report, which provides the annual funded ratio and the calculation of the ADC.
- **Projection Report (performed annually)** – The Board is responsible for the review of PERS' 30-year projection report, which will include the actuarial metrics and Signal Light status for each metric over a 30-year period.

- **Experience Analysis (performed every two years on a rolling four-year)** – The Board is responsible for ensuring that an experience analysis is performed as prescribed, review of the results of the study, and approving the actuarial assumptions and methodologies to be used for all actuarial purposes relating to the defined benefit pension plan.
- **Actuarial Audit (performed at least every five years)** – The Board is responsible for the review of an audit report performed by a new actuarial firm to provide a critique of the reasonableness of the actuarial methods and assumptions in use and the resulting actuarially computed liabilities and contribution rates.
- **Funding Policy Review (performed at least annually)** – The Board is responsible for the periodic review of this policy, but at least annually following the Projection Report and biennially following the Experience Analysis.

V. Glossary of Funding Policy Terms

- **Actuarial Accrued Liability (AAL):** The AAL is the value at a particular point in time of all past normal costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions, and participant data had always been in effect, contributions equal to the normal cost had been made, and all actuarial assumptions had been met.
- **Actuarial Cost Method:** The actuarial cost method allocates a portion of the total cost (present value of benefits) to each year of service, both past service and future service.
- **Actuarial Determined Contribution (ADC):** The potential payment to the plan as determined by the actuary using a contribution allocation procedure that, if contributed consistently and combined with investment earnings, would be sufficient to pay promised benefits in full over the long term. The ADC may or may not be the amount actually paid by the plan sponsor or other contributing entity.
- **Asset Values**:
  - **Actuarial Value of Assets (AVA):** The AVA is the market value of assets less the deferred investment gains or losses not yet recognized by the asset smoothing method.
  - **Market Value of Assets (MVA):** The MVA is the fair value of assets of the plan as reported in the plan's audited financial statements.
- **Entry Age Normal Actuarial Cost Method (EAN):** The EAN actuarial cost method is a funding method that calculates the normal cost as a level percentage of pay or level dollar amount over the working lifetime of the plan's members.
- **Funded Ratio:** The funded ratio is the ratio of the plan assets to the plan's actuarial accrued liabilities.
  - **Actuarial Value Funded Ratio:** is the ratio of the AVA to the AAL.
- **Normal Cost**: The normal cost is the cost allocated under the actuarial cost method to each year of active member service.

- **Present Value of Benefits (PVB) or total cost:** The PVB is the value at a particular point in time of all projected future benefit payments for current plan members. The future benefit payments and the value of those payments are determined using actuarial assumptions regarding future events. Examples of these assumptions are estimates of retirement and termination patterns, salary increases, investment returns, etc.
- **Surplus:** A surplus refers to the positive difference, if any, between the AVA and the AAL.
- **Unfunded Actuarial Accrued Liability (UAAL):** The UAAL is the portion of the AAL that is not currently covered by the AVA. It is the positive difference between the AAL and the AVA.
- **Valuation Date:** The valuation date is the annual date upon which an actuarial valuation is performed; meaning that the trust assets and liabilities of the plan are valued as of that date. PERS' annual valuation date is June 30.