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, 2022

www.CavMacConsulting.com

Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

November 1, 2022

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 as of the valuation date,
- To determine the unfunded actuarial accrued liability amortization period beginning July 1, 2022 using the current Fixed Contribution Rate (FCR) of 17.40% of payroll,
- To determine the actuarially determined contribution (ADC) for the fiscal year beginning July 1, 2024 using the assumptions and methods in the Board's funding policy,
- To project the System's funding progress for the next thirty years and provide clear reporting and risk analysis of the funding metrics as outlined in the Board's funding policy using a "Signal Light" approach, and
- To assist the Board in determining whether an increase or decrease is needed in the Fixed Contribution Rate.

The results may not be applicable for other purposes. The date of the valuation was June 30, 2022.

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 valuation results on page 1 and the projection results on pages 6 and 7. Since the funding metrics are in a "Red Light" status as of this valuation, we recommend to the PERS Board that the Fixed Contribution Rate (FCR) be increased from 17.40% to 22.40% of annual compensation beginning July 1, 2024.

Since the previous valuation, some minor changes to the valuation were made in conjunction with the actuarial audit performed this year. No changes were made to the actuarial assumptions or plan provisions since the previous valuation.

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.

In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

Future actuarial measurements may differ significantly from the current measurements 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. An analysis of the potential range of future measurements is provided in Section XI of this report.

This actuarial valuation was performed to determine the adequacy of the Board approved contribution rate 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.

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 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

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

Ben Mobley

Ben Mobley, ASA, FCA, MAAA
Consulting Actuary

Table of Contents

Section I: Executive Summary

1. This report, prepared as of June 30, 2022, 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, 2022.

VALUATION DATE	June 30, 2022	June 30, 2021
Investment Return Assumption	**7.55%**	**7.55%**
Active members included in valuation		
Number	144,416	145,673
Annual compensation	$ 6,454,760,163	$ 6,246,076,841
Retirees		
Number	114,462	112,158
Annual allowances	$ 3,005,526,105	$ 2,875,483,858
Assets		
Market related actuarial value	$ 31,873,200,000	$ 30,768,251,000
Market value of assets (MVA)	$ 30,791,115,000	$ 35,216,597,000
Unfunded actuarial accrued liability (UAAL)	$ 20,126,942,746	$ 19,436,044,743
Funded Ratio based on actuarial value	61.3%	61.3%
Employer Fixed Contribution Rate (FCR)		
Normal Cost*	1.60%	1.77%
Accrued liability	15.80	15.63
Total	17.40%	17.40%
Payment period based on the FCR	48.8 years	50.9 years
Actuarially Determined Contribution (ADC) Rate		
Normal Cost*	1.60%	1.77%
Accrued liability	20.12	19.72
Total	21.72%	21.49%
Amortization period for ADC	25.6 years	26.7 years
ADC Ratio to Fixed Contribution Rate	124.83%	123.51%
Unfunded actuarial accrued liability based on MVA	$ 21,209,027,746	$ 14,987,698,743
Funded Ratio based on market value	59.2%	70.1%
Payment period based on the FCR	62.5 years	25.8 years

* Includes load for administrative expenses. See Section VI for more contribution rate detail.

2. The valuation balance sheet showing the results and liabilities of the System is provided in Section III.
3. 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 and Section VII.
4. Schedule A of this report presents the development of the assets. The estimated investment return for the plan year ending June 30, 2022 on a market value of assets basis was (8.64)% and on an actuarial value of assets basis was 8.49%. These can be compared to the assumed rate of return for the period of 7.55%.
5. Schedule B details the actuarial assumptions and methods employed. There have been no changes since the previous valuation. However, some minor changes to the valuation were made in conjunction with the actuarial audit performed this year.
6. Schedule C provides a summary of the benefit and contribution provisions of the plan. There have been no changes since the previous valuation.
7. 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 is different based on the market value of assets. The funding 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.
8. The employer contribution rate, or Fixed Contribution Rate (FCR), of 17.40% of annual compensation has been the contribution rate for employers since July 1, 2019. As shown on page 1 of the report, the amortization period to pay off the Unfunded Actuarial Accrued Liability (UAAL) using the FCR is almost 49 years, which is a snapshot view of the UAAL as of the valuation date of June 30, 2022. However, this snapshot calculation of the amortization period does not take into consideration the smoothing in of the investment experience that the System will encounter over the next four years. The majority of this anticipated experience over the next four years will be negative.

9. In addition, as shown on page 1 of the report, the Actuarially Determined Contribution (ADC) Rate for the 2022 valuation year is 21.72% of annual compensation and the ratio of the ADC to the FCR (21.72% to 17.40%) is calculated at 124.83% as of June 30, 2022. Per the Board's Funding Policy, which is provided in Schedule F, this actuarial metric is in the Red Status as the ratio exceeds 110%.

10. The projection results, shown beginning in Section IX, allow the Board to see a forecast of the System's funding progress over time, allow the Board to review the funding goals and benchmarks outlined in the funding policy, and provide the status of the metrics/targets in the Funding Policy that determines whether or not a contribution rate increase should be recommended. The objective of the current funding policy is to accumulate sufficient assets during a member's employment to fully finance the benefit the member receives throughout retirement. In order to reach that objective, some goals and benchmarks were established as follows:

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

11. For PERS, if any one of the following metrics are in the Red Signal Light status in conjunction with the annual valuation report and the projection report, the actuary shall determine and recommend to the Board an employer contribution rate increase to consider that is sufficient to get all three metrics back into the Green Signal Light status.

- Funded Ratio – 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% 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 – 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 5.80% (-5.80%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.80% (-5.80%) and negative 7.55% (-7.55%) during the projection period
Red	Net Cash Flow Percentage below negative 7.55% (-7.55%) during the projection period

Section I: Executive Summary

- Actuarially Determined Contribution (ADC) – defined as the contribution requirement determined by the actuary using a contribution allocation procedure based on the principal elements disclosed in Section III of the 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. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by the 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
Yellow	ADC ratio between 100% and 110% of fixed contribution rate
Red	ADC ratio above 110% of fixed contribution rate

12. A summary of the estimated metrics from the projection results for the next five years and in the long-term are shown in the following two tables below. More details will be shown beginning in Section IX but as you can see from the first table below, the funded ratio and cash flow percentage decline over the next five years while the amortization period and ADC/FCR ratio both increase over the next five years.

Valuation Year	UAAL ($ in Millions)	Funded Ratio	Amortization Period	Cash Flow %	ADC/FCR Ratio
2022	$20,127	61.3%	49 years	(5.2)%	124.8%
2023	$20,656	61.1%	52 years	(5.4)%	128.7%
2024	$21,164	60.9%	53 years	(5.6)%	132.1%
2025	$21,428	61.2%	52 years	(5.8)%	134.2%
2026	$23,032	59.0%	68 years	(6.0)%	143.6%
2027	$23,530	58.8%	68 years	(6.2)%	147.2%

Metrics	2022 Baseline Projection (7.55%)	2022 Status	2021 Baseline Projection (7.55%)	2021 Status
Funding Ratio in 2047	48.6%	Red	93.5%	Green
Cash Flow as a Percentage of Assets	(7.8)%	Red	(5.6)%	Green
ADC/FCR Ratio from 2022 Valuation	124.8%	Red	118.4%	Red
ADC/FCR Ratio from 2023 Valuation	128.7%	Red	113.3%	Red

As shown above, all three of the metrics are in the "Red Status" for the 2022 valuation and projections, and per the Funding Policy, the actuary should recommend an increase in the Fixed Contribution Rate (FCR). Although the Actuarially Determined Contribution (ADC) for the 2022 valuation is 21.72%, there is still negative investment experience that will be recognized in the smoothing of assets over the next four valuations that will most likely lead to higher ADC rates. **Therefore, our recommendation to the PERS Board is to increase the FCR from 17.40% to 22.40% beginning July 1, 2024**. This increase will improve the projected funding ratio, the cash flow outlook and the ADC/FCR Ratio immediately and get all three metrics to "Green Status" within one year.

Section I: Executive Summary

The table below shows the metrics with an FCR of 22.40% of annual compensation beginning July 1, 2024.

Metrics	2022 Projection with 22.40% FCR (7.55%)	2022 Status
Funding Ratio in 2047	86.1%	Green
Cash Flow as a Percentage of Assets	-5.4%	Green
ADC/FCR Ratio from 2022 Valuation	124.8%	Red
ADC/FCR Ratio from 2023 Valuation	100.0%	Green

The Board should continue to review the Sensitivity Analysis section of this report during the fiscal year to understand the volatility that may occur in the projections if investment experience is more or less than expected going forward.

13. The table on the following page provides a ten-year history of some pertinent figures.

Section I: Executive Summary

Comparative Schedule

Valuation Date June 30	Active Members				Retired Lives				Valuation Results ($ millions)		
	Number	Payroll ($ millions)	Average Salary	% increase from previous year	Number	Active/ Retired Ratio	Annual Benefits ($ millions)	Benefits as % of Payroll	Actuarial Accrued Liability	Valuation Assets	UAAL
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
2020	149,855	6,287	41,957	2.9	109,881	1.4	2,755.6	43.8	47,354	28,629	18,725
2021	145,673	6,246	42,877	2.2	112,158	1.3	2,875.5	46.0	50,204	30,768	19,436
2022	144,416	6,455	44,696	4.2	114,462	1.3	3,005.5	46.6	52,000	31,873	20,127

The active membership declined for the tenth consecutive year while the number of retirees increased by 2.1% for the 2022 fiscal year. The ratio of actives to retirees remained at 1.3 for the 2022 fiscal year. The Unfunded Actuarial Accrued Liability (UAAL) increased by $691 million for this valuation.

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, 2022 upon which the valuation was based. Detailed tabulations of the data are given in Schedule D.

Active Members

Employers	Number of Employers	Number	Payroll	Group Averages		
				Salary	Age	Benefit Service
State Agencies	106	24,466	$1,098,269,192	$44,890	46.2	10.8
State Universities	9	16,774	1,020,004,907	60,809	43.5	9.7
Public Schools	140	60,787	2,522,338,521	41,495	44.6	10.7
Community/Junior Colleges	15	5,761	298,907,368	51,885	47.0	11.7
Counties*	88	14,486	587,889,282	40,583	47.3	9.7
Municipalities	242	15,404	626,517,397	40,672	44.3	9.7
Other Political Subdivisions	259	6,738	300,833,496	44,647	45.3	8.9
Total in PERS	859	144,416	$6,454,760,163	$44,696	45.1	10.4

*There are 82 counties; however, 3 counties have multiple agencies.

The total number of active members includes 74,747 vested members and 69,669 non-vested members.

Retired Lives

Type of Benefit Payment	No.	Annual Benefits	Group Averages	
			Benefit	Age
Retirement	95,976	$2,637,790,742	$27,484	71.5
Disability	6,251	130,179,459	20,825	64.8
Survivor	12,235	237,555,904	19,416	68.7
Total in PERS	114,462	$3,005,526,105	$26,258	70.8

Section II: Membership Data

Deferred Vested/Inactive Lives

Type of Member	No.	Deferred Benefits	Outstanding Refunds
Deferred Vested - Benefit Provided	14,956	$ 131,436,076	N/A
Deferred Vested – Missing Benefit	1,040	N/A	$ 41,872,981
Vested – Pending Retirements	860	26,354,284	N/A
Inactive	74,034	N/A	367,616,082
Total in PERS	90,890	$ 157,790,360	$ 409,489,063

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 860 records determined to be possible "pending retirements" based on the provided member status; these records are valued by assuming benefits are payable in the upcoming plan year.

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, 2022 and, for comparison purposes, as of the immediately preceding valuation date of June 30, 2021. 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, 2022	June 30, 2021
ASSETS		
Current actuarial value of assets:		
Annuity Savings Account	$ 5,749,288,725	$ 5,728,172,130
Annuity Reserve	7,450,550,558	7,074,949,003
Employers' Accumulation Account	18,673,360,717	17,965,129,867
Total current assets	$ 31,873,200,000	$ 30,768,251,000
Future member contributions to Annuity Savings Account	$ 3,967,906,879	$ 3,787,600,399
Prospective contributions to Employer's Accumulation Account		
Normal contributions	$ 462,108,152	$ 627,058,288
Unfunded actuarial accrued liability contributions	20,126,942,746	19,436,044,743
Total prospective contributions	$ 20,589,050,898	$ 20,063,103,031
Total assets	$ 56,430,157,777	$ 54,618,954,430
LIABILITIES		
Present value of benefits payable on account of present retired members and beneficiaries	$ 33,106,302,835	$ 31,821,654,514
Present value of benefits payable on account of active members	21,300,507,616	20,764,222,444
Present value of benefits payable on account of inactive members for service rendered before the valuation date	2,023,347,326	2,033,077,472
Total liabilities	$ 56,430,157,777	$ 54,618,954,430

Section III: Valuation Balance Sheet

BREAKDOWN OF TOTAL AND ACTUARIAL ACCRUED LIABILITIES
AS OF JUNE 30, 2022

	Total Liability		Actuarial Accrued Liability	
Active Members				
Retirement	$	18,523,445,419	$	16,032,882,595
Death		292,605,723		204,859,539
Disability		427,951,512		279,093,171
Termination		2,056,504,962		353,657,280
Total	$	21,300,507,616	$	16,870,492,585
Retirees				
Retirement	$	29,760,659,436	$	29,760,659,436
Survivor		2,041,318,082		2,041,318,082
Disability		1,304,325,317		1,304,325,317
Total	$	33,106,302,835	$	33,106,302,835
Deferred Vested Members		1,490,304,007		1,490,304,007
Inactive Members		533,043,319		533,043,319
Total Actuarial Values	$	56,430,157,777	$	52,000,142,746
Actuarial Value of Assets				31,873,200,000
Unfunded Actuarial Accrued Liability			$	20,126,942,746

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, 2022.

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 $5,749,288,725. The assets credited to the Annuity Reserve were $7,450,550,558 and the assets credited to the Employer's Accumulation Account totaled $18,673,360,717. Current actuarial assets as of the valuation date equaled the sum of these three funds, $31,873,200,000. Future member contributions to the Annuity Savings Account were valued to be $3,967,906,879. Prospective contributions to the Employer's Accumulation Account were calculated to be $20,589,050,898 of which $462,108,152 is attributable to service rendered after the valuation date (normal contributions) and $20,126,942,746 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 $56,430,157,777 as of June 30, 2022.

Total Liabilities

The present value of benefits payable on account of presently retired members and beneficiaries totaled $33,106,302,835 as of the valuation date. The present value of future benefit payments on behalf of active members amounted to $21,300,507,616. In addition, the present value of benefits for inactive members, due to service rendered before the valuation date, was calculated to be $2,023,347,326.

Therefore, the balance sheet shows the present value for all prospective benefit payments under the System to be $56,430,157,777 as of June 30, 2022.

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

Section IV: Comments on Valuation

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 beginning July 1, 2019. The employer contribution rate of 17.40% of annual compensation is expected to continue through the fiscal year ending June 30, 2024. Since the amortization period is calculated on an open basis, the amortization period for the June 30, 2022 valuation is 48.8 years, compared to 50.9 years for the previous valuation. The primary reason for the decrease in the amortization period was due to the higher than anticipated payroll increases for 2022, which was more than the payroll growth scale used in the level percent of payroll amortization methodology.

In addition, there was a total loss on the unfunded actuarial accrued liability for the fiscal year ending June 30, 2022 of around $380 million (shown on the next page) which was primary due to greater than expected salary increases and withdrawal losses. These losses were partially offset by a gain in investment earnings on the actuarial value of assets basis greater than expected (8.49% vs. 7.55%).

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) match 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. Details on the derivation of the experience gain/(loss) for the year ended June 30, 2022 and for the previous valuation is shown below.

		2022 Valuation $ Millions	2021 Valuation $ Millions
(1)	UAAL* as of beginning of year	$ 19,436.0	$ 18,725.3
(2)	Total Normal cost from last valuation	686.7	667.9
(3)	Total Employee and Employer Contributions	1,826.4	1,764.6
(4)	Interest Rate (Beginning of Year)	7.55%	7.75%
(5)	Interest accrual: [[(1) + (2)] x (4)] - [(3) x ((4) / 2)]	1,450.3	1,434.5
(6)	Expected UAAL before changes: (1) + (2) – (3) + (5)	19,746.6	19,063.1
(7)	Change due to plan amendments	0.0	0.0
(8)	Change due to new actuarial assumptions or methods	0.0	1,405.0
(9)	Expected UAAL after changes: (6) + (7) + (8)	$ 19,746.6	$ 20,468.1
(10)	Actual UAAL as of end of year	$ 20,126.9	$ 19,436.0
(11)	Gain/(loss): (9) – (10)	$ (380.3)	$ 1,032.1
(12)	Gain/(loss) as percent of actuarial accrued liabilities at start of year	(0.8)%	2.2%

*Unfunded actuarial accrued liability.

Valuation Date June 30	Actuarial Gain/(Loss) as a % of Beginning Accrued Liabilities
2017	1.1%
2018	0.5
2019	(0.9)
2020	(1.0)
2021	2.2
2022	(0.8)

Section VI: Fixed Contribution Rate (FCR)

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 and a comparison to the previous valuation results.

Contribution for	2022 Valuation	2021 Valuation
Total Normal Cost:		
Service retirement benefits	9.76%	9.92%
Disability benefits	0.35%	0.35%
Survivor benefits	0.21%	0.22%
Total	10.32%	10.49%
Less Member Contributions:	9.00%	9.00%
Employer Normal Cost	1.32%	1.49%
Administrative Expense Load	0.28%	0.28%
Total Employer Normal Cost Rate	1.60%	1.77%
Unfunded Actuarial Accrued Liability Rate (48.8 years level % of payroll amortization*)	15.80%	15.63%
Total Employer Fixed Contribution Rate	17.40%	17.40%

* Amortization period a year ago was 50.9 years.

2. The Board maintained a Fixed Contribution Rate (FCR) of 17.40% of annual compensation for the fiscal year ending June 30, 2024 and kept the amortization period to open-ended. Thirty-year projections are completed 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 the projection results beginning in Section IX.

Section VI: Fixed Contribution Rate (FCR)

3. The components of the change in the computed unfunded actuarial accrued liability amortization period from 50.9 years to 48.8 years are as follows:

Previously Reported Period	50.9 years
Change due to:	
Normal amortization	(1.0)
Actuarial experience	(1.3)
Assumption/Method changes	0.0
Plan amendments	0.0
Contribution Shortfall/(Excess)	0.2
Computed Period	48.8 years

Section VII: Actuarially Determined Contribution Rate (ADC)

1. One of the metrics in the Funding Policy, as shown in Schedule F, is to calculate the Actuarially Determined Contribution (ADC) based on the principal 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 Funding Policy provides that the unfunded actuarial accrued liability as of June 30, 2018 (Transitional UAAL) will be amortized as a level percentage of payroll over a closed 30-year period. In each subsequent valuation, all benefit changes, assumption and method changes, and experience gains and/or losses that have occurred since the previous valuation will combine to determine a New Incremental UAAL. Each New Incremental UAAL will be amortized as a level percentage of payroll over a closed 25-year period from the date it is established.

2. The following table shows the components of the total Unfunded Actuarial Accrued Liability (UAAL) and the derivation of the UAAL Contribution Rate in accordance with the funding policy as of the valuation date:

TOTAL UAAL AND UAAL CONTRIBUTION RATE
($ in Thousands)

Date Established	Original UAAL Balance	Remaining UAAL Balance	Remaining Amortization Period	Amortization Payment
June 30, 2018	$16,940,459	$17,730,801	26 years	$1,192,511
June 30, 2019	784,879	795,833	22 years	58,614
June 30, 2020	524,319	529,560	23 years	38,035
June 30, 2021	506,599	508,783	24 years	35,697
June 30, 2022	561,966	561,966	25 years	38,576
Total		$20,126,943		$1,363,433
Estimated Payroll				$6,775,673
UAAL Amortization Contribution Rate				20.12%

3. The calculation of Actuarial Determined Contribution (ADC) for the past two valuations is shown below:

Funding Policy ADC Metric Test		
Valuation Date June 30	**2022**	**2021**
Actuarially Determined Contribution (ADC) rate		
Normal Cost*	1.60%	1.77%
Accrued liability	20.12	19.72
Total	21.72%	21.49%
Ratio of ADC to FCR of 17.40%	124.83%	123.51%
Funding Policy Metric Status	**Red**	**Red**
Anticipated accrued liability payment period	25.6 years	26.7 years

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

Since the Ratio of ADC to FCR is above 110% and the Metric Status is in the "Red Status" for the 2022 valuation, per the Funding Policy, the actuary should recommend an increase to the FCR. The anticipated smoothing in of the negative investment experience for the fiscal year ending June 30, 2022 will worsen this ratio over the projection period. Therefore, we recommend an increase in the Fixed Contribution Rate from 17.40% to 22.40% of annual compensation beginning July 1, 2024. This will get the metric status back to a "Green Light" status. More details can be found in the Projection section of this report beginning in Section IX. The Board should continue to review the Sensitivity Analysis section of this report during the fiscal year to understand the volatility that may occur in the projections if investment experience is less than expected going forward.

Section VIII: 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, 2022

GROUP	NUMBER
Retired participants and beneficiaries currently receiving benefits	114,462
Terminated participants and beneficiaries entitled to benefits but not yet receiving benefits	90,890
Active Participants	144,416
Total	349,768

Section VIII: 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. This is mainly due to the annual covered payroll not growing as anticipated over most years during this period.

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)
06/30/13#	$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
06/30/20	28,629,205	47,354,464	60.5	18,725,259	6,287,441	297.8
06/30/21#	30,768,251	50,204,296	61.3	19,436,045	6,246,077	311.2
06/30/22	31,873,200	52,000,143	61.3	20,126,943	6,454,760	311.8

* 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)
6/30/13	$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
6/30/20	5,710,182	30,220,083	11,424,199	28,629,205	100.0	75.8	0.0
6/30/21	5,728,172	31,821,655	12,654,469	30,768,251	100.0	78.7	0.0
6/30/22	5,749,289	33,106,303	13,144,551	31,873,200	100.0	78.9	0.0

As can be seen from the table above, the PERS plan assets currently cover 100% of the active member contribution account balances as of the valuation date but only cover about 79% of the retiree liability. This ratio increased from 2016 through 2018,decreased from 2019 through 2020 and increased again in 2021 and 2022. No assets remain to cover any employer-financed active liabilities.

Section VIII: Supplemental Disclosure Information

Schedule of Active Member Valuation Data

Valuation Date	Number of Employers	Active Members: Number	Active Members: Annual Payroll	Active Members: Annual Average Pay	Active Members: % Increase in Average Pay
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
2020	853	149,855	6,287,441,467	41,957	2.9
2021	855	145,763	6,246,076,841	42,877	2.2
2022	859	144,416	6,454,760,163	44,696	4.2

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

	Fiscal Year Ended June 30									
Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Beginning of Year	86,829	90,214	93,504	96,338	99,483	102,260	104,973	107,844	109,881	112,158
Added	6,276	6,159	5,907	6,548	6,219	5,985	6,101	5,645	6,502	6,634
Removed	(2,891)	(2,869)	(3,073)	(3,403)	(3,442)	(3,272)	(3,230)	(3,608)	(4,225)	(4,330)
End of Year	90,214	93,504	96,338	99,483	102,260	104,973	107,844	109,881	112,158	114,462

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

Section VIII: Supplemental Disclosure Information

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

Year Ending	2016	2017	2018	2019	2020	2021	2022
Beginning of Year	$2,116,322,652	$2,249,044,704	$2,374,747,017	$2,500,750,392	$2,635,004,675	$2,755,593,924	$2,875,483,858
Added	132,970,248	123,938,697	121,870,115	129,095,132	121,134,338	133,897,944	140,675,196
Removed	(59,603,335)	(62,470,173)	(64,186,324)	(67,416,138)	(76,727,172)	(93,663,207)	(94,287,872)
Benefit increase due to annual COLA	59,355,139	64,233,789	68,319,584	72,575,289	76,182,083	79,655,197	83,654,923
Benefit increase due to plan amendments	0	0	0	0	0	0	0
End of Year	$2,249,044,704	$2,374,747,017	$2,500,750,392	$2,635,004,675	$2,755,593,924	$2,875,483,858	$3,005,526,105

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, 2021 to June 30, 2022									
Average Monthly Benefit	$475.58	$863.97	$1,133.43	$1,885.21	$2,040.43	$2,379.10	$2,552.70	$3,086.65	$1,735.15
Average Final Salary	$35,214	$42,232	$42,668	$51,950	$51,494	$57,956	$58,253	$61,825	$49,732
Number of Active Retirants	740	1,008	918	1,339	424	1,209	173	823	6,634
July 1, 2020 to June 30, 2021									
Average Monthly Benefit	$484.13	$797.70	$1,170.70	$1,723.73	$2,080.55	$2,202.62	$2,731.08	$3,198.31	$1,678.95
Average Final Salary	$34,676	$39,370	$43,511	$49,033	$52,995	$54,445	$62,496	$62,914	$48,259
Number of Active Retirants	775	1,026	971	1,186	365	1,098	200	881	6,502
July 1, 2019 to June 30, 2020									
Average Monthly Benefit	$495.24	$780.45	$1,218.15	$1,881.34	$1,994.68	$2,307.13	$2,634.63	$3,166.16	$1,762.99
Average Final Salary	$34,969	$38,904	$45,180	$52,942	$51,515	$56,787	$60,150	$61,884	$49,926
Number of Active Retirants	641	844	787	1,037	339	1,062	192	838	5,645
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

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, 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
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

Section IX: Projection Results

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.

As mentioned earlier in the report, the intended purpose of the projection results is to help assess the Plan's funding progress and to provide information to decision makers to help ensure that the applicable pension liabilities and funding mechanisms are managed in a manner that promotes sustainability.

The projection process should be viewed as an enhancement to the actuarial valuation control cycle by providing additional evaluation metrics to assess the need for further, in-depth analysis of the risks to the Plan's sustainability. The actuarial valuation control cycle is a key component of managing a long-term liability whose ultimate value is based upon uncertain future events. As the ultimate value of future cash flows cannot be predicted with certainty, pension liabilities are managed in the short-term through the continuous monitoring of economic and demographic assumptions, with a keen eye on the identification, measurement, and management of risks.

The projection process, like other actuarial modeling, is not intended to provide absolute results. The intended purpose of the projection process is to identify anticipated trends and to compare various outcomes, under a given methodology, rather than predicting certain future events. The results produced by the projection process do not predict the financial condition of the Plan or the Plan's ability to pay benefits in the future and do not provide any guarantee of future financial soundness of the Plan. Because actual experience will not unfold exactly as expected, actual results can be expected to differ from the results presented herein. To the extent actual experience deviates significantly from the assumptions, results could be significantly better or significantly worse than the expected outcome indicated in this report.

Section IX: Projection Results

SPECIAL ASSUMPTIONS

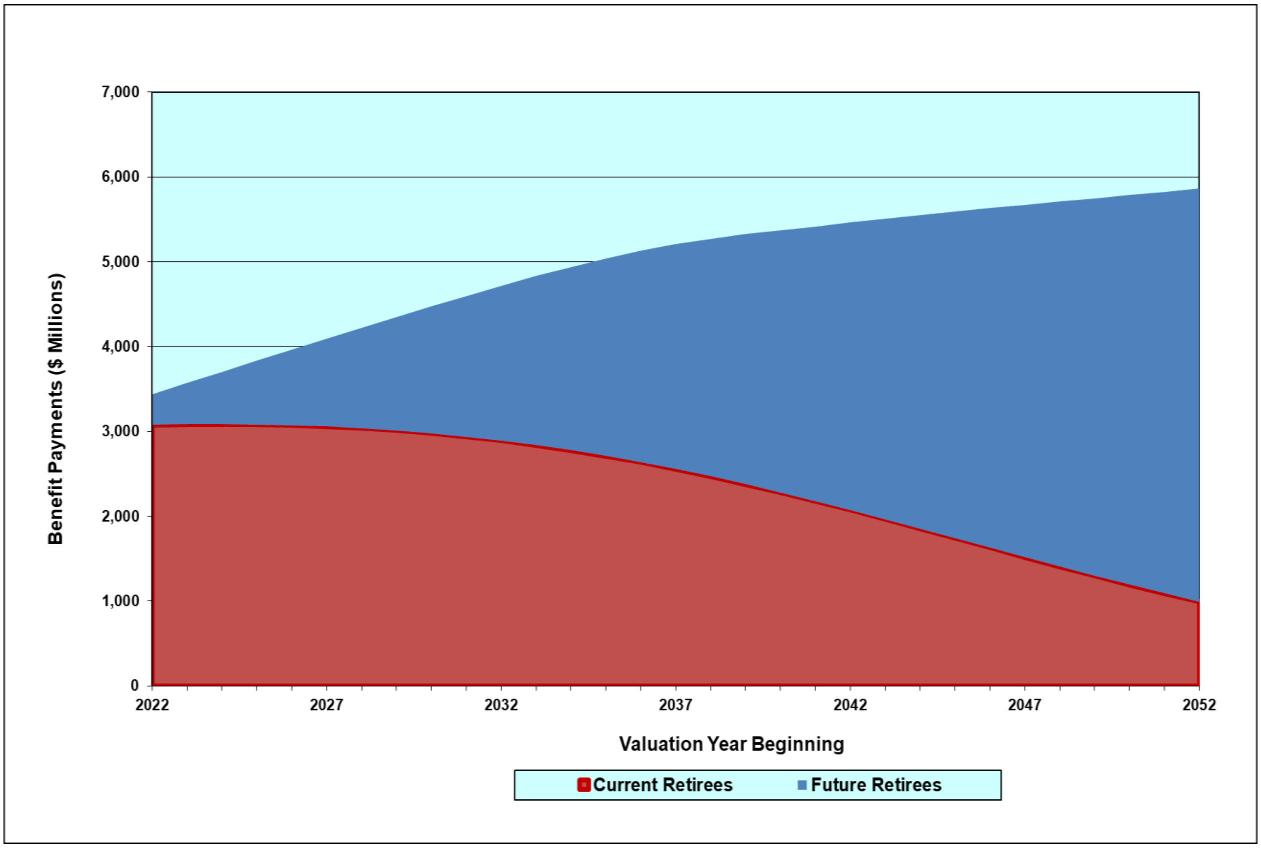
In addition to the regular valuation assumptions used in performing the annual actuarial valuations of PERS, additional assumptions must be made that are unique to projections. The first of these is what, if any, change in the overall active membership will be anticipated. For this projection, it was assumed that the number of active members would remain static over the 30-year projection period.

But since we assume active members will leave the system through termination, death, disability, or retirement, we need to make some assumptions as to the composition of new hires that will replace departing members in order to maintain the membership at a constant number. The new entrant profile we developed was based on the new hires over the 3-year period prior to the projection start date of June 30, 2022. That profile is summarized in the table below.

Age	Average Pay	Percent Male	Weight
19	$29,900	66%	1.1%
23	$32,300	39	19.8
27	$35,800	36	20.3
32	$35,800	35	12.9
37	$36,200	33	10.7
42	$35,600	34	9.0
47	$35,600	36	7.7
52	$35,600	38	6.9
57	$35,600	41	5.6
62	$35,600	46	3.4
69	$31,400	55	2.6

Section IX: Projection Results

For the projection results presented in this section of the report, it was further assumed that the benefit structure as it exists on June 30, 2022 would remain in place for the following 30 years. The following graph shows the projection of benefit payments of PERS members. The red area of the graph represents the benefit payments for current retirees and the blue area represents the benefit payments for any future retirees. PERS currently pays approximately $3.1 billion in benefit payments to its retirees but over the 30-year period, that amount is expected to nearly double.



Section IX: Projection Results

FUTURE MEMBERSHIP

The following chart and graph show the headcounts of active participants and retired members over the projection period. The actives are broken down into those existing as of June 30, 2022 and those who are hired after June 30, 2022. Even though the membership at PERS has been trending downward over the past few years, we believe that the active membership will continue at or around its current population of 144,416 active members over the projected period.

By the end of the projection period, we estimate that about 97.9% of those active employees will have been hired after June 30, 2022 and be included in the Tier 4 benefit structure.

Member	2022	2027	2032	2042	2047	2052
Active – Existing Employees	144,416	81,984	49,033	16,450	8,487	3,067
Active – New Entrants	0	62,432	95,383	127,966	135,929	141,349
Retired/Deferred Vesteds	131,318	143,668	150,945	149,863	145,089	140,769
Total	275,734	288,084	295,361	294,279	289,505	285,185

Section IX: Projection Results

PROJECTION RESULTS

The baseline valuation and projection results shown below use the same actuarial assumptions as used in the June 30, 2022 actuarial valuation. In addition, the projection results using different long-term investment return assumptions for future valuations (7.25% and 7.00%) are included.

Baseline Projection Results (7.55%)
($ in Thousands)

	2022	2027	2032	2042	2047	2052
Total Payroll	$6,454,760	$7,265,923	$8,085,028	$10,274,787	$11,686,712	$13,318,743
UAAL	$20,126,943	$23,529,893	$26,198,307	$32,263,869	$35,408,411	$38,408,116
Normal Cost Rate	1.60%	1.58%	1.63%	1.72%	1.77%	1.83%
UAAL Rate	15.80%	15.82%	15.77%	15.68%	15.63%	15.57%
FCR Rate	17.40%	17.40%	17.40%	17.40%	17.40%	17.40%
Funding Ratio	61.3%	58.8%	57.1%	51.2%	48.6%	47.0%
Amortization Period	49 years	68 years	69 years	58 years	50 years	43 years
ADC	21.72%	25.61%	29.35%	41.19%	47.44%	27.99%
ADC/FCR Ratio	124.8%	147.2%	168.7%	236.7%	272.7%	160.8%
Cash Flow Percentage	-5.2%	-6.2%	-7.1%	-7.7%	-7.2%	-6.3%

Projection Results Assuming 7.25% Long-Term Investment Return
($ in Thousands)

	2022	2027	2032	2042	2047	2052
Total Payroll	$6,454,760	$7,265,923	$8,085,028	$10,274,787	$11,686,712	$13,318,743
UAAL	$20,126,943	$25,080,614	$28,799,860	$38,205,923	$44,001,018	$50,702,717
Normal Cost Rate	1.60%	2.14%	2.24%	2.39%	2.46%	2.52%
UAAL Rate	15.80%	15.26%	15.16%	15.01%	14.94%	14.88%
FCR Rate	17.40%	17.40%	17.40%	17.40%	17.40%	17.40%
Funding Ratio	61.3%	57.0%	53.9%	43.9%	38.1%	32.5%
Amortization Period	49 years	Infinite	Infinite	Infinite	Infinite	Infinite
ADC	21.72%	27.08%	31.84%	46.42%	54.68%	35.13%
ADC/FCR Ratio	124.8%	155.6%	183.0%	266.8%	314.2%	201.9%
Cash Flow Percentage	-5.2%	-6.3%	-7.4%	-8.7%	-8.9%	-8.8%

Section IX: Projection Results

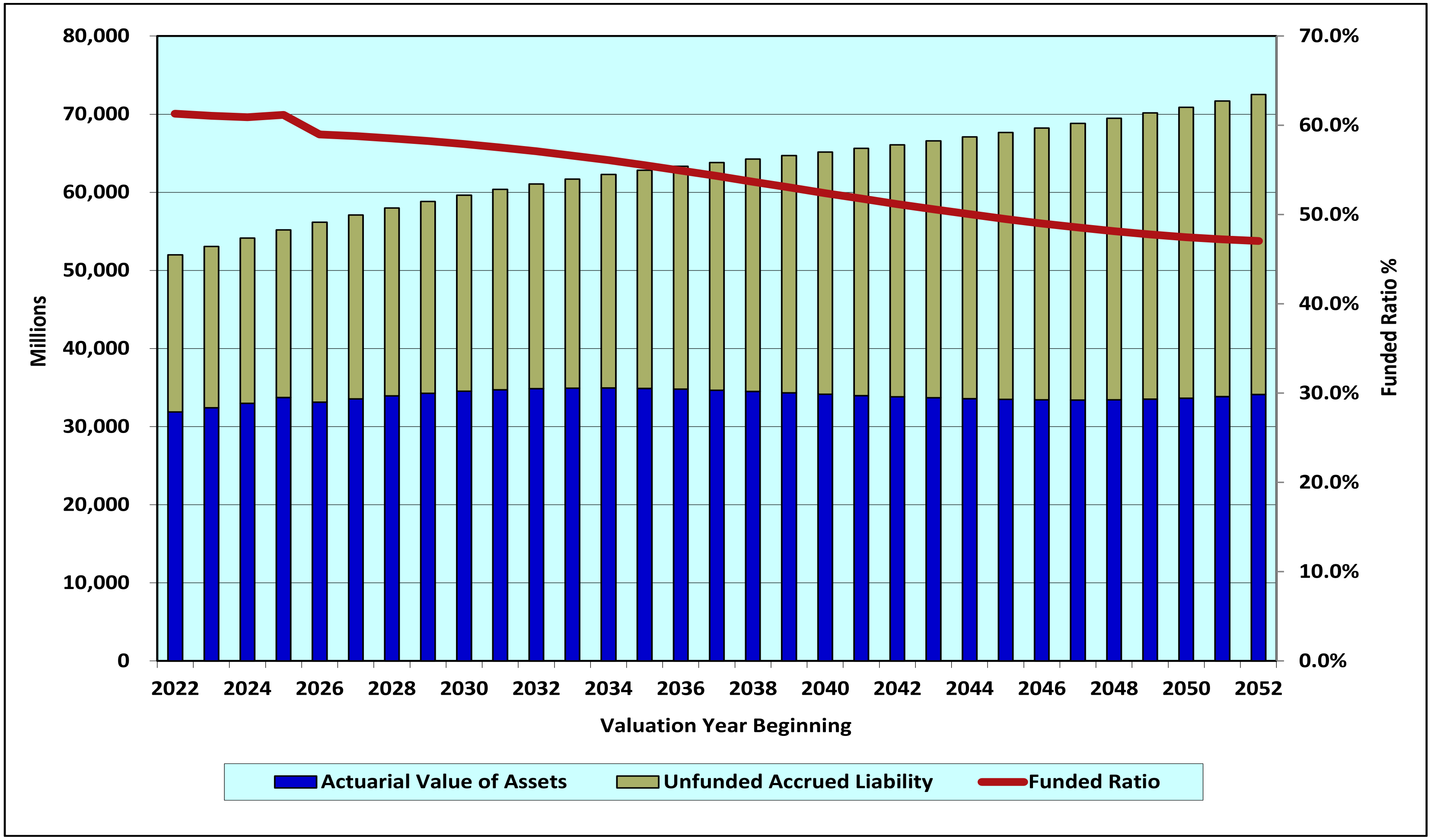
Projection Results Assuming 7.00% Long-Term Investment Return
($ in Thousands)

	2022	2027	2032	2042	2047	2052
Total Payroll	$6,454,760	$7,265,923	$8,085,028	$10,274,787	$11,686,712	$13,318,743
UAAL	$20,126,943	$26,450,856	$31,038,314	$43,077,331	$50,873,737	$60,290,102
Normal Cost Rate	1.60%	2.62%	2.77%	2.95%	3.03%	3.10%
UAAL Rate	15.80%	14.78%	14.63%	14.45%	14.37%	14.30%
FCR Rate	17.40%	17.40%	17.40%	17.40%	17.40%	17.40%
Funding Ratio	61.3%	55.4%	51.3%	38.3%	30.4%	22.1%
Amortization Period	49 years	Infinite	Infinite	Infinite	Infinite	Infinite
ADC	21.72%	28.34%	33.92%	50.59%	60.32%	40.59%
ADC/FCR Ratio	124.8%	162.9%	194.9%	290.7%	346.7%	233.3%
Cash Flow Percentage	-5.2%	-6.4%	-7.6%	-9.8%	-11.0%	-12.7%

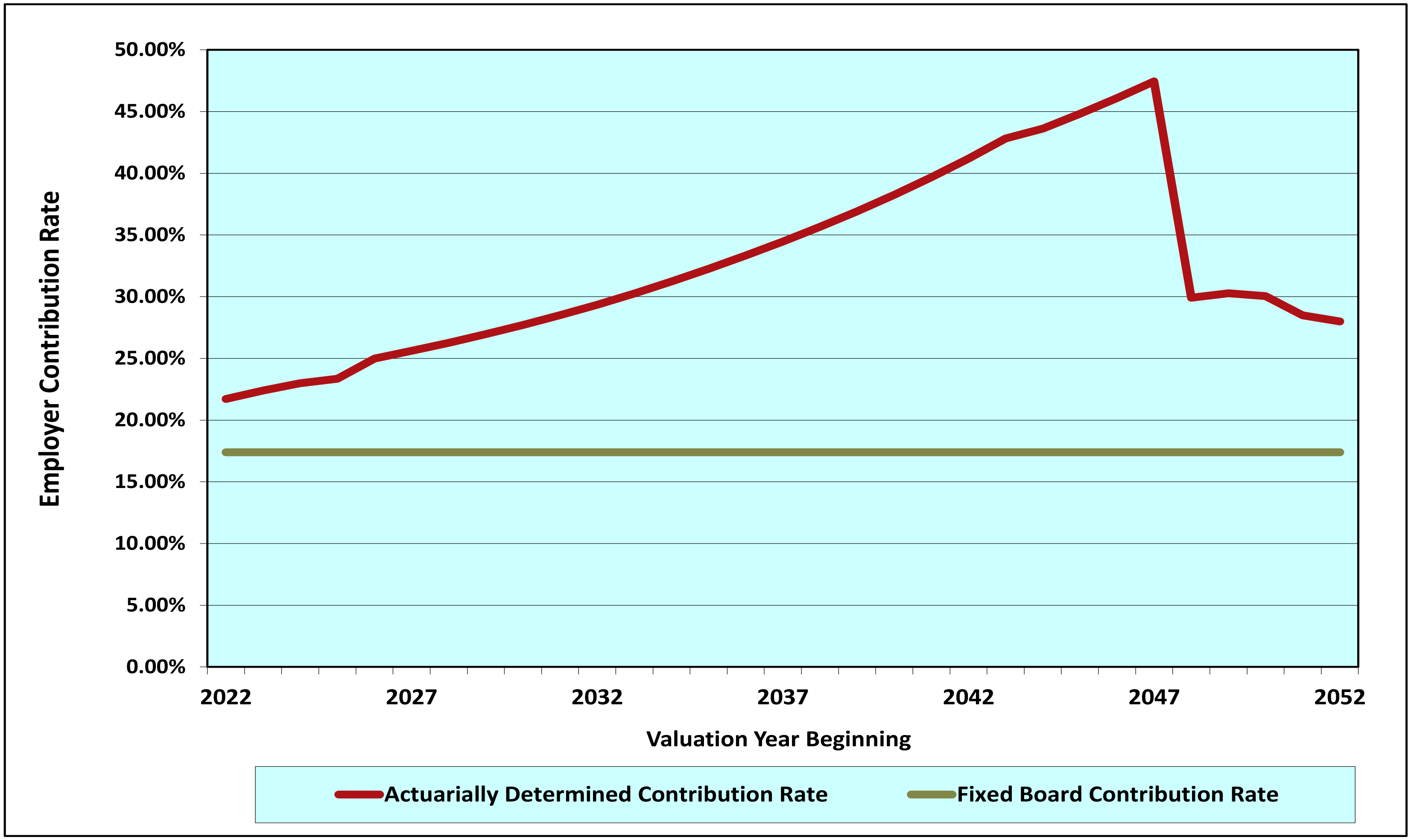
The first graph that follows shows the projection of the Unfunded Accrued Liability (UAL), Actuarial Value of Assets and the Funded Ratio under the baseline valuation (assuming 7.55%) from the amounts shown in the baseline table on the previous page. As you can see from the graph, under the current assumptions, the funded ratio is expected to decrease to nearly 57% within the next ten years and then remain on a downward trend over the remaining projection period, declining to about 47% funded by the 2052 valuation year.

The second graph shows the projection of the calculated Actuarially Determined Contribution (ADC) based on the Board's Funding Policy and the current Fixed Contribution Rate (FCR) of 17.40% under the baseline valuation. As you can see from the graph, the ADC is expected to increase over the next five years as the investment losses from the fiscal year ending June 30, 2022 are fully recognized. After this initial period, the ADC is then expected to increase even further for the remaining projection period, as the valuation results continue to include contribution deficiency shortfalls due to the difference between the ADC and FCR. The drop in the ADC near the end of the projection period is a result of the initial 2018 UAL base of $16.9 Billion being paid off, based on the closed amortization period per the Board's Funding Policy.

Mississippi PERS – PERS Plan
30 Year Projection of Funded Ratio on Actuarial Asset Value
Based on June 30, 2022 Valuation Results



Mississippi PERS – PERS Plan
30 Year Projection of the Employer Contribution Rates
Based on June 30, 2022 Valuation Results



Section X: Cash Flow Projections

CASH FLOW PROJECTIONS

The funded ratio is the primary measure of funded status of a pension plan and, thereby, the most common measurement used for drawing conclusions on funding progress. The funded ratio is the ratio of the actuarial value of assets to the actuarial or accrued liability of the system as calculated by the funding method used in developing system contribution levels. When using the funded ratio in assessing trends over several valuations, we recommend that the basis for determining both the assets and liabilities in the ratio are taken into consideration and reasonable efforts are made to adjust the ratio to reflect these differences when they are known. On a consistent basis, an increasing funded ratio would typically indicate progress in meeting the obligations of the system. In most cases, other measures should also be considered in a trend assessment. These may include the trend in the length of the amortization period, the required contribution rate, percentage of required contributions funded, and the unfunded actuarial liability as a percentage of payroll. Focusing solely on any one measure as the indication of funding progress is an over-simplification of a complex and dynamic system.

Another of those additional metrics is an outlook on the cash flow as a percentage of assets for the System. Most retirement systems are funded with an advance-funding mechanism, meaning contributions and investment earnings are earned during a member's active lifetime in order to pay for the benefit payments during his retirement years. Many mature retirement systems, like PERS, have negative cash flow, where benefit payments paid out of the trust are more than the contributions being collected by employers and employees.

Section X: Cash Flow Projections

For the fiscal year ending June 30, 2023, we are projecting PERS to have a negative cash flow of approximately $1.59 Billion (benefit payments of $3.43 Billion and contributions of $1.84 Billion). With a market value of assets of $30.8 Billion as of June 30, 2022, the cash flow as a percentage of assets is estimated to be negative 5.17% for the 2023 fiscal year. While the market value of assets is assumed to earn 7.55% each year, the difference between the investment return assumption and the negative cash flow percentage is positive, meaning assets are projected to grow for the 2023 fiscal year. When assets do not earn a positive return enough to cover this negative cash flow percentage, assets are expected to decline for the year. If the negative cash flow percentage does not grow more than the assumed investment return assumption, the System's assets will continue to increase, and sustainability of the plan may be achieved.

The tables on the following two pages demonstrate the open group projection of cash flow on the baseline assumption and then a sensitivity analysis, using a one-year investment return of negative 5.00% for the fiscal year ending June 30, 2023. These results demonstrate the projection of this metric if PERS experiences one significant bad investment year in one of the next five years without a correction in the market. As can be seen from the table on page 38, the cash flow as a percentage of market value of assets worsens through most of the projection period and assets remain relatively flat on the baseline assumption.

Then, if there is a significant negative investment experience in one of the next five years (as seen on the table on page 39), the negative cash flow will be significantly more than the investment experience of the Plan and PERS' assets will decrease to almost insolvency levels at the end of the projection period.

This metric will continue to be monitored as part of the funding policy under the baseline assumptions to ensure the continued growth of PERS' assets during the projection period.

Section X: Cash Flow Projections

Mississippi PERS
30-year Open Group Projection of Cash Flow
PERS Plan
Based on June 30, 2022 Valuation Results

Projection of Cash Flow

Contribution Methodology:	Employee and Employer Contributions
Investment Return Methodology:	As Programmed

Valuation Year Beginning July 1	Expected Short-term Investment Return	Valuation Annual Payroll	Market Value of Assets July 1	Total Contributions	Projected Benefit Payments	Ratio of Cash Flow to MVA	Expected Investment Return	Net Cash Flow	Market Value of Assets June 30	Valuation Year Ending June 30
2022	*7.55%*	*6,775,673,079*	*30,791,115,000*	*1,842,237,753*	*(3,432,889,324)*	-5.17%	*2,265,774,607*	*675,123,036*	*31,466,238,036*	**2023**
2023	*7.55%*	*6,863,543,800*	*31,466,238,036*	*1,866,128,924*	*(3,570,352,440)*	-5.42%	*2,312,537,061*	*608,313,545*	*32,074,551,581*	**2024**
2024	*7.55%*	*6,987,641,354*	*32,074,551,581*	*1,899,869,808*	*(3,700,007,371)*	-5.61%	*2,354,909,856*	*554,772,293*	*32,629,323,874*	**2025**
2025	*7.55%*	*7,122,670,369*	*32,629,323,874*	*1,936,582,847*	*(3,831,872,436)*	-5.81%	*2,393,268,529*	*497,978,940*	*33,127,302,813*	**2026**
2026	*7.55%*	*7,265,922,952*	*33,127,302,813*	*1,975,531,791*	*(3,965,205,438)*	-6.01%	*2,427,367,768*	*437,694,122*	*33,564,996,935*	**2027**
2027	*7.55%*	*7,415,147,185*	*33,564,996,935*	*2,016,104,368*	*(4,092,027,797)*	-6.18%	*2,457,216,984*	*381,293,555*	*33,946,290,490*	**2028**
2028	*7.55%*	*7,572,949,515*	*33,946,290,490*	*2,059,009,244*	*(4,220,617,862)*	-6.37%	*2,482,828,884*	*321,220,266*	*34,267,510,756*	**2029**
2029	*7.55%*	*7,736,889,449*	*34,267,510,756*	*2,103,582,872*	*(4,347,217,025)*	-6.55%	*2,504,040,888*	*260,406,735*	*34,527,917,491*	**2030**
2030	*7.55%*	*7,907,039,614*	*34,527,917,491*	*2,149,845,001*	*(4,474,928,495)*	-6.73%	*2,520,682,827*	*195,599,333*	*34,723,516,824*	**2031**
2031	*7.55%*	*8,085,028,387*	*34,723,516,824*	*2,198,238,368*	*(4,595,704,122)*	-6.90%	*2,532,767,861*	*135,302,107*	*34,858,818,930*	**2032**
2032	*7.55%*	*8,267,549,489*	*34,858,818,930*	*2,247,864,031*	*(4,715,624,794)*	-7.08%	*2,540,377,815*	*72,617,051*	*34,931,435,982*	**2033**
2033	*7.55%*	*8,455,075,436*	*34,931,435,982*	*2,298,850,460*	*(4,830,248,649)*	-7.25%	*2,543,501,798*	*12,103,609*	*34,943,539,591*	**2034**
2034	*7.55%*	*8,648,716,683*	*34,943,539,591*	*2,351,499,579*	*(4,938,713,259)*	-7.40%	*2,542,346,922*	*(44,866,758)*	*34,898,672,833*	**2035**
2035	*7.55%*	*8,850,320,313*	*34,898,672,833*	*2,406,313,590*	*(5,039,133,554)*	-7.54%	*2,537,269,169*	*(95,550,795)*	*34,803,122,038*	**2036**
2036	*7.55%*	*9,060,655,461*	*34,803,122,038*	*2,463,501,613*	*(5,127,890,036)*	**-7.66%**	*2,528,885,057*	*(135,503,365)*	*34,667,618,672*	**2037**
2037	*7.55%*	*9,281,830,260*	*34,667,618,672*	*2,523,636,829*	*(5,204,094,591)*	**-7.73%**	*2,518,058,972*	*(162,398,790)*	*34,505,219,883*	**2038**
2038	*7.55%*	*9,514,797,749*	*34,505,219,883*	*2,586,978,360*	*(5,269,429,589)*	**-7.77%**	*2,505,723,979*	*(176,727,250)*	*34,328,492,633*	**2039**
2039	*7.55%*	*9,758,298,749*	*34,328,492,633*	*2,653,183,847*	*(5,324,541,129)*	**-7.78%**	*2,492,792,249*	*(178,565,033)*	*34,149,927,600*	**2040**
2040	*7.55%*	*10,011,809,642*	*34,149,927,600*	*2,722,110,924*	*(5,370,355,671)*	**-7.75%**	*2,480,167,212*	*(168,077,536)*	*33,981,850,064*	**2041**
2041	*7.55%*	*10,274,786,592*	*33,981,850,064*	*2,793,611,726*	*(5,414,388,316)*	**-7.71%**	*2,468,495,415*	*(152,281,174)*	*33,829,568,890*	**2042**
2042	*7.55%*	*10,543,329,112*	*33,829,568,890*	*2,866,625,752*	*(5,459,183,461)*	**-7.66%**	*2,458,044,067*	*(134,513,641)*	*33,695,055,248*	**2043**
2043	*7.55%*	*10,817,874,820*	*33,695,055,248*	*2,941,271,985*	*(5,504,033,688)*	**-7.61%**	*2,448,992,622*	*(113,769,081)*	*33,581,286,167*	**2044**
2044	*7.55%*	*11,099,252,529*	*33,581,286,167*	*3,017,775,770*	*(5,548,117,759)*	-7.53%	*2,441,604,633*	*(88,737,356)*	*33,492,548,811*	**2045**
2045	*7.55%*	*11,388,589,127*	*33,492,548,811*	*3,096,443,498*	*(5,590,462,328)*	-7.45%	*2,436,251,214*	*(57,767,617)*	*33,434,781,195*	**2046**
2046	*7.55%*	*11,686,712,054*	*33,434,781,195*	*3,177,500,140*	*(5,631,419,241)*	-7.34%	*2,433,375,981*	*(20,543,119)*	*33,414,238,076*	**2047**
2047	*7.55%*	*11,993,381,342*	*33,414,238,076*	*3,260,880,453*	*(5,668,558,818)*	-7.21%	*2,433,538,804*	*25,860,439*	*33,440,098,515*	**2048**
2048	*7.55%*	*12,310,030,554*	*33,440,098,515*	*3,346,974,207*	*(5,707,340,858)*	-7.06%	*2,437,244,789*	*76,878,139*	*33,516,976,653*	**2049**
2049	*7.55%*	*12,636,076,729*	*33,516,976,653*	*3,435,622,902*	*(5,746,041,983)*	-6.89%	*2,444,900,303*	*134,481,221*	*33,651,457,875*	**2050**
2050	*7.55%*	*12,972,130,599*	*33,651,457,875*	*3,526,992,589*	*(5,783,514,740)*	-6.71%	*2,457,051,226*	*200,529,075*	*33,851,986,949*	**2051**
2051	*7.55%*	*13,318,743,376*	*33,851,986,949*	*3,621,233,137*	*(5,824,804,736)*	-6.51%	*2,474,153,686*	*270,582,086*	*34,122,569,036*	**2052**
2052	*7.55%*	*13,674,255,265*	*34,122,569,036*	*3,717,893,264*	*(5,859,754,588)*	-6.28%	*2,496,869,811*	*355,008,487*	*34,477,577,522*	**2053**

Mississippi PERS
30-year Open Group Projection of Cash Flow
PERS Plan
Based on June 30, 2022 Valuation Results

Projection of Cash Flow

Contribution Methodology: Employee and Employer Contributions

Investment Return Methodology: As Programmed

Valuation Year Beginning July 1	Expected Short-term Investment Return	Valuation Annual Payroll	Market Value of Assets July 1	Total Contributions	Projected Benefit Payments	Ratio of Cash Flow to MVA	Expected Investment Return	Net Cash Flow	Market Value of Assets June 30	Valuation Year Ending June 30
2022	*-5.00%*	*6,775,673,079*	*30,791,115,000*	*1,842,237,753*	*(3,432,889,324)*	-5.17%	*(1,499,279,553)*	*(3,089,931,124)*	*27,701,183,876*	**2023**
2023	*7.55%*	*6,863,543,800*	*27,701,183,876*	*1,866,128,924*	*(3,570,352,440)*	-6.15%	*2,028,275,472*	*324,051,956*	*28,025,235,832*	**2024**
2024	*7.55%*	*6,987,641,354*	*28,025,235,832*	*1,899,869,808*	*(3,700,007,371)*	-6.42%	*2,049,186,517*	*249,048,954*	*28,274,284,786*	**2025**
2025	*7.55%*	*7,122,670,369*	*28,274,284,786*	*1,936,582,847*	*(3,831,872,436)*	-6.70%	*2,064,463,078*	*169,173,489*	*28,443,458,274*	**2026**
2026	*7.55%*	*7,265,922,952*	*28,443,458,274*	*1,975,531,791*	*(3,965,205,438)*	-7.00%	*2,073,737,505*	*84,063,859*	*28,527,522,133*	**2027**
2027	*7.55%*	*7,415,147,185*	*28,527,522,133*	*2,016,104,368*	*(4,092,027,797)*	-7.28%	*2,076,887,637*	*964,208*	*28,528,486,341*	**2028**
2028	*7.55%*	*7,572,949,515*	*28,528,486,341*	*2,059,009,244*	*(4,220,617,862)*	**-7.58%**	*2,073,784,670*	*(87,823,948)*	*28,440,662,393*	**2029**
2029	*7.55%*	*7,736,889,449*	*28,440,662,393*	*2,103,582,872*	*(4,347,217,025)*	**-7.89%**	*2,064,113,837*	*(179,520,316)*	*28,261,142,077*	**2030**
2030	*7.55%*	*7,907,039,614*	*28,261,142,077*	*2,149,845,001*	*(4,474,928,495)*	**-8.23%**	*2,047,541,283*	*(277,542,211)*	*27,983,599,866*	**2031**
2031	*7.55%*	*8,085,028,387*	*27,983,599,866*	*2,198,238,368*	*(4,595,704,122)*	**-8.57%**	*2,023,904,131*	*(373,561,623)*	*27,610,038,242*	**2032**
2032	*7.55%*	*8,267,549,489*	*27,610,038,242*	*2,247,864,031*	*(4,715,624,794)*	**-8.94%**	*1,993,094,873*	*(474,665,891)*	*27,135,372,352*	**2033**
2033	*7.55%*	*8,455,075,436*	*27,135,372,352*	*2,298,850,460*	*(4,830,248,649)*	**-9.33%**	*1,954,898,994*	*(576,499,195)*	*26,558,873,157*	**2034**
2034	*7.55%*	*8,648,716,683*	*26,558,873,157*	*2,351,499,579*	*(4,938,713,259)*	**-9.74%**	*1,909,304,606*	*(677,909,074)*	*25,880,964,083*	**2035**
2035	*7.55%*	*8,850,320,313*	*25,880,964,083*	*2,406,313,590*	*(5,039,133,554)*	**-10.17%**	*1,856,432,158*	*(776,387,806)*	*25,104,576,277*	**2036**
2036	*7.55%*	*9,060,655,461*	*25,104,576,277*	*2,463,501,613*	*(5,127,890,036)*	**-10.61%**	*1,796,644,852*	*(867,743,570)*	*24,236,832,706*	**2037**
2037	*7.55%*	*9,281,830,260*	*24,236,832,706*	*2,523,636,829*	*(5,204,094,591)*	**-11.06%**	*1,730,534,632*	*(949,923,130)*	*23,286,909,577*	**2038**
2038	*7.55%*	*9,514,797,749*	*23,286,909,577*	*2,586,978,360*	*(5,269,429,589)*	**-11.52%**	*1,658,741,551*	*(1,023,709,678)*	*22,263,199,899*	**2039**
2039	*7.55%*	*9,758,298,749*	*22,263,199,899*	*2,653,183,847*	*(5,324,541,129)*	**-12.00%**	*1,581,862,647*	*(1,089,494,635)*	*21,173,705,264*	**2040**
2040	*7.55%*	*10,011,809,642*	*21,173,705,264*	*2,722,110,924*	*(5,370,355,671)*	**-12.51%**	*1,500,462,426*	*(1,147,782,322)*	*20,025,922,942*	**2041**
2041	*7.55%*	*10,274,786,592*	*20,025,922,942*	*2,793,611,726*	*(5,414,388,316)*	**-13.09%**	*1,414,822,917*	*(1,205,953,672)*	*18,819,969,270*	**2042**
2042	*7.55%*	*10,543,329,112*	*18,819,969,270*	*2,866,625,752*	*(5,459,183,461)*	**-13.78%**	*1,324,819,296*	*(1,267,738,412)*	*17,552,230,857*	**2043**
2043	*7.55%*	*10,817,874,820*	*17,552,230,857*	*2,941,271,985*	*(5,504,033,688)*	**-14.60%**	*1,230,209,380*	*(1,332,552,323)*	*16,219,678,534*	**2044**
2044	*7.55%*	*11,099,252,529*	*16,219,678,534*	*3,017,775,770*	*(5,548,117,759)*	**-15.60%**	*1,130,803,257*	*(1,399,538,732)*	*14,820,139,802*	**2045**
2045	*7.55%*	*11,388,589,127*	*14,820,139,802*	*3,096,443,498*	*(5,590,462,328)*	**-16.83%**	*1,026,484,334*	*(1,467,534,497)*	*13,352,605,306*	**2046**
2046	*7.55%*	*11,686,712,054*	*13,352,605,306*	*3,177,500,140*	*(5,631,419,241)*	**-18.38%**	*917,171,702*	*(1,536,747,398)*	*11,815,857,908*	**2047**
2047	*7.55%*	*11,993,381,342*	*11,815,857,908*	*3,260,880,453*	*(5,668,558,818)*	**-20.38%**	*802,861,101*	*(1,604,817,264)*	*10,211,040,644*	**2048**
2048	*7.55%*	*12,310,030,554*	*10,211,040,644*	*3,346,974,207*	*(5,707,340,858)*	**-23.12%**	*683,450,919*	*(1,676,915,731)*	*8,534,124,912*	**2049**
2049	*7.55%*	*12,636,076,729*	*8,534,124,912*	*3,435,622,902*	*(5,746,041,983)*	**-27.07%**	*558,694,996*	*(1,751,724,086)*	*6,782,400,827*	**2050**
2050	*7.55%*	*12,972,130,599*	*6,782,400,827*	*3,526,992,589*	*(5,783,514,740)*	**-33.27%**	*428,437,419*	*(1,828,084,732)*	*4,954,316,094*	**2051**
2051	*7.55%*	*13,318,743,376*	*4,954,316,094*	*3,621,233,137*	*(5,824,804,736)*	**-44.48%**	*292,379,536*	*(1,911,192,064)*	*3,043,124,031*	**2052**
2052	*7.55%*	*13,674,255,265*	*3,043,124,031*	*3,717,893,264*	*(5,859,754,588)*	**-70.38%**	*150,371,713*	*(1,991,489,611)*	*1,051,634,419*	**2053**

Section XI: Sensitivity Analysis

SENSITIVITY ANALYSIS

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 actual 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 fixed contribution rates.

Section XI: Sensitivity Analysis

Investment Risk

In this section of the report, we will demonstrate the variability in achieving funding goals based on sensitivity around the three key variables listed above. Earlier in this section, we reviewed the projections if the long-term investment return assumption was lowered to rates below 7.55% (7.25% and 7.00%). In this section, we keep the long-term investment return assumption at 7.55% but review the sensitivity of short-term investment returns as a single year event (and then 7.55% for all years thereafter) and simulate the next 10-year periods of returns (and then 7.55% for all years thereafter).

Projected Funded Ratio in 2047

Single Year Event	2022 Valuation	2021 Valuation
• 1.55% for the next fiscal year	33.5%	74.5%
• 3.55% for the next fiscal year	38.5%	80.8%
• 5.55% for the next fiscal year	43.6%	87.2%
• **7.55% for the next fiscal year (Baseline)**	**48.6%**	**93.5%**
• 9.55% for the next fiscal year	53.6%	99.8%
• 11.55% for the next fiscal year	58.6%	106.2%
• 13.55% for the next fiscal year	63.6%	112.5%
• Negative 5% for the next fiscal year	17.2%	53.8%
• Simulate 2008 loss using -15% for the next fiscal year	Insolvency	22.1%
Average Returns over next 10-Year Period (Simulated returns using mean and standard deviations from PERS' Investment Consultant's Capital Market Assumptions)*	**2022 Valuation**	**2021 Valuation**
• 6.00%	19.9%	55.9%
• 7.00%	38.5%	80.1%
• 8.00%	64.3%	112.7%

* *6.00% Average Returns over the next 10-Year Period: 7.04%, 10.32%, 2.25%, 5.45%, 8.52%, 0.00%, 5.44%, 11.49%,-7.04%, 18.53%*
7.00% Average Returns over the next 10-Year Period: 3.61%, 20.67%,-0.02%, 11.58%,-4.84%, 8.13%, 18.10%, 2.04%, 0.83%, 12.67%
8.00% Average Returns over the next 10 Year Period: 9.00%, 9.01%, 16.24%, 4.84%, 16.62%, 6.78%,-3.74%, 6.19%, 18.57%,-1.19%

Section XI: Sensitivity Analysis

As can be seen from the projected funded ratios on the table above, the sensitivity of short-term investment returns could have a significant impact to the funding of PERS in the long-term, especially another repeat of the Great Recession of 2008. We believe it demonstrates the importance of these continued projection reports and the continued monitoring of this sensitivity analysis because short-term differences in investment returns can have a major impact on the projection of funded ratios.

Section XI: Sensitivity Analysis

Demographic Risk

While actual investment returns compared to that assumed is the most critical driver of funding, many other assumptions are used in the actuarial projections to review sensitivity, such as population growth and wage inflation. Variances in these other assumptions over the long-term may also have an impact on the funding of the Plan.

For PERS, there has been a significant decline in active membership since 2008. In the baseline projections we assume a static population, meaning the active membership will be the same in each of the projections than it is in 2022. For sensitivity analysis, we have performed the projections assuming both a 0.25% and 0.50% increase and decrease each year around this static assumption. For PERS, a 0.50% decrease in active population each year of the projection results in the active population dropping to 124,000 (it is currently near 144,000). In the table below, we review these alternatives to the static active membership growth:

Projected Funded Ratio in 2047

Active Membership Growth	2022 Valuation	2021 Valuation
• Increase 0.50% each year	56.1%	100.7%
• Increase 0.25% each year	52.4%	97.1%
• **Static Population (Baseline Assumption)**	**48.6%**	**93.5%**
• Decrease 0.25% each year	44.9%	90.0%
• Decrease 0.50% each year	41.2%	86.5%

Section XI: Sensitivity Analysis

Assumption Risk

We also performed a sensitivity analysis for the wage inflation assumption. As a result of the experience study presented in April 2021, the Board adopted a reduction in the wage inflation assumption from 3.00% to 2.65%, which is 0.25% above the price inflation of 2.40%. Wage inflation is major component of the underlying salary increase assumptions, as well as the amortization of the Unfunded Accrued Liability which is based on the level percent of payroll amortization methodology.

In the table below, the second scenario lowers the discount rate to 7.30% but does not change the price inflation or wage inflation. The third scenario lowers the price and wage inflation by 0.30% and lowers the discount rate to 7.30%.

Projected Funded Ratio in 2047

Scenario	Price Inflation	Discount Rate	Wage Inflation	2022 Valuation	2021 Valuation
1 - Baseline	2.40%	7.55%	2.65%	**48.6%**	**93.5%**
2	2.40%	7.30%	2.65%	39.8%	79.8%
3	2.10%	7.30%	2.35%	37.8%	79.4%

Section XI: Sensitivity Analysis

Contribution Risk

To demonstrate the contribution risk of making the Fixed Contribution Rates (FCR) for PERS, we have calculated the projected funded ratios if the FCRs were 1% higher or 1% lower than the current rates for all future years.

Projected Funded Ratio in 2047

Change in Fixed Contribution Rate (FCR)	2022 Valuation	2021 Valuation
• Baseline	**48.6%**	**93.5%**
• 1.00% increase in FCR	56.1%	101.0%
• 1.00% decrease in FCR	41.0%	86.0%

Over a long projection period, gains and losses due to population growth and wage inflation assumptions will be relatively concentrated around the expected value of these assumptions. So, the impact of the sensitivity around these baseline assumptions is small when compared to the investment return assumption.

Section XII: Projection Summary

Utilizing the funding policy for PERS and with a fixed contribution rate as a percentage of annual compensation of 17.40% of payroll, the projection results for 2022 show that the Plan will have a "Red" light status for all metrics.

Metrics	2022 Baseline Projection (7.55%)	2022 Status	2021 Baseline Projection (7.55%)	2021 Status
Funding Ratio in 2047	48.6%	Red	93.5%	Green
Cash Flow as a Percentage of Assets	-7.8%	Red	-5.6%	Green
ADC/FCR Ratio from 2022 Valuation	124.8%	Red	118.4%	Red
ADC/FCR Ratio from 2023 Valuation	128.7%	Red	113.3%	Red

As shown above, all three of the metrics are in the "Red Status" for the 2022 valuation and projections, and per the Funding Policy, the actuary should recommend an increase in the Fixed Contribution Rate (FCR). While the Actuarially Determined Contribution (ADC) for the 2022 valuation is 21.72%, there is still some negative investment experience built up in the smoothing of assets over the next four valuations that will most likely lead to higher ADC rates. **Therefore, our recommendation is to increase the FCR from 17.40% to 22.40% beginning July 1, 2024**. This increase will improve the projected funding ratio, the cash flow outlook and the ADC/FCR Ratio immediately and get all three metrics to "Green Status" within a year. The table below shows the metrics with an FCR of 22.40% beginning July 1, 2024.

Metrics	2022 Projection with 22.40% FCR (7.55%)	2022 Status
Funding Ratio in 2047	86.1%	Green
Cash Flow as a Percentage of Assets	-5.4%	Green
ADC/FCR Ratio from 2022 Valuation	124.8%	Red
ADC/FCR Ratio from 2023 Valuation	100.0%	Green

Schedule A: Development of Assets

($ thousands)

	Valuation Date June 30:	2021	2022	2023	2024	2025	2026
A.	Actuarial Value Beginning of Year	$28,629,205	$30,768,251				
B.	Market Value End of Year	35,216,597	30,791,115				
C.	Market Value Beginning of Year	27,827,394	35,216,597				
D.	Cash Flow						
	D1. Contributions	1,764,555	1,826,424				
	D2. Other Revenue	0	0				
	D3. Benefit Payments	(2,995,255)	(3,134,860)				
	D4. Refunds	(101,044)	(120,806)				
	D5. Administrative Expenses	(15,691)	(15,926)				
	D6. Net	(1,347,435)	(1,445,168)				
E.	Investment Income						
	E1. Market Total: B.-C.-D6.	8,736,638	(2,980,314)				
	E2. Assumed Rate	7.75%	7.55%				
	E3. Amount for Immediate Recognition	2,104,410	2,604,298				
	E4. Amount for Phased-In Recognition	6,632,228	(5,584,612)				
F.	Phased-In Recognition of Investment Income						
	F1. Current Year: 0.20*E4.	1,326,446	(1,116,922)				
	F2. First Prior Year	(256,231)	1,326,446	(1,116,922)			
	F3. Second Prior Year	(81,275)	(256,231)	1,326,446	(1,116,922)		
	F4. Third Prior Year	73,801	(81,275)	(256,231)	1,326,446	(1,116,922)	
	F5. Fourth Prior Year	319,330	73,801	(81,275)	(256,231)	1,326,446	(1,116,920)
	F6. Total Recognized Investment Gain	1,382,071	(54,181)	(127,982)	(46,707)	209,524	(1,116,920)
G.	Actuarial Value End of Year:						
	A.+D6.+E3.+F6.	$30,768,251	$31,873,200				
H.	Difference Between Market & Actuarial Values	$(4,448,346)	$1,082,085	$954,103	$907,396	$1,116,920	$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 Assets

	Asset Summary June 30, 2022 ($ in Thousands)	
	Market Value	**Actuarial Value**
(1) Assets at June 30, 2021	$35,216,597	$30,768,251
(2) Contributions and Misc. Revenue	1,826,424	1,826,424
(3) Investment Increment	(2,980,314)	2,550,117
(4) Benefit Payments	(3,134,860)	(3,134,860)
(5) Refunds	(120,806)	(120,806)
(6) Administrative Expenses	(15,926)	(15,926)
(7) Assets at June 30, 2022 (1) + (2) + (3) + (4) + (5) + (6)	$30,791,115	$31,873,200
(8) Net Investment Return* [2 x (3)] / [(7) + (1) – (3)]	(8.64)%	8.49%

* Calculated assuming middle of year cash flow experience.

Schedule A: Development of Assets

The net investment returns for the past five valuations are summarized in the table below:

Period Ending June 30	Market Value	Actuarial Value
2018	9.6%	9.2%
2019	6.3%	6.8%
2020	3.1%	6.7%
2021	32.2%	12.5%
2022	(8.6)%	8.5%

Since 1986, PERS' assets have experienced better than assumed investment returns overall. As you can see from the table below, for the period ending June 30, 2022, the annualized returns for all but the 25-year period is above the current assumption of 7.55%. The historical rolling returns are as follows (these returns are gross returns):

Period Ending June 30	10-Year Annualized Rate of Return	20-Year Annualized Rate of Return	25-Year Annualized Rate of Return	30-Year Annualized Rate of Return
2019	10.5	6.0	8.1	8.3
2020	9.4	5.8	7.5	8.0
2021	10.1	7.7	8.1	8.7
2022	9.0	7.6	7.0	8.0

Schedule B: Statement of Actuarial Assumptions & Methods

The assumptions and methods used in the valuation are based on the results of the experience Investigation for the four-year period ending June 30, 2020, dated April 20, 2021, and adopted by the Board in August 2021.

INTEREST RATE: 7.55% per annum, compounded annually (net of investment expense only). The expected return on assets consists of 2.40% price inflation and 5.15% 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			
	Death*		Disability	
Age	Male	Female	Male	Female
20	0.0483%	0.0126%	0.006%	0.006%
25	0.0567	0.0189	0.011	0.011
30	0.0630	0.0259	0.016	0.016
35	0.0714	0.0350	0.020	0.020
40	0.0893	0.0483	0.090	0.050
45	0.1218	0.0665	0.170	0.100
50	0.1764	0.0917	0.260	0.170
55	0.2594	0.1274	0.370	0.290
60	0.3980	0.1757	0.310	0.250
65	0.6353	0.2429	0.280	0.220
70	1.1655	0.4739	0.200	0.150
75	2.1389	0.9247	0.200	0.150
79	3.4755	1.5785	0.200	0.150

* Adjusted Base Rates

AGE	Annual Rates of Withdrawal* Years of Service											
	0		5		10		15		20		24	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
20	40.00%	45.00%	13.00%	14.00%								
25	34.50	37.00	13.00	12.50	9.00%	9.00%						
30	34.00	35.00	12.00	12.50	6.50	6.50	5.00%	5.00%				
35	33.75	30.00	12.00	12.00	6.50	6.25	4.00	4.25	4.00%	3.50%		
40	33.50	28.00	9.50	9.50	6.00	6.00	4.00	4.25	4.00	3.50	4.00%	3.50%
45	32.00	27.50	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50
50	28.00	27.50	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50
55	25.00	25.00	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50
60	25.00	25.00	9.50	9.50	5.50	5.75	4.00	4.25	4.00	3.50	4.00	3.50

*Rates stop at eligibility for retirement. For Tier 4, rates at 24 years of service are extended out to 29 years of service.

Schedule B: Statement of Actuarial Assumptions & Methods

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		25.00%		21.00%
50		19.00		14.50
55		18.00		19.75
60	11.25%	19.00	13.25%	21.50
62	21.00	29.00	18.75	34.00
65	25.50	32.00	30.00	42.25
70	19.50	26.00	23.00	30.00
75	22.00	24.00	21.50	25.00
80	100.00	100.00	100.00	100.00

*For Tier 4 members, 30 years of service.

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

		Annual Rates of	
Service	Merit & Seniority	Base (Economy)	Increase Next Year
0	15.25%	2.65%	17.90%
1	5.25	2.65	7.90
2	2.75	2.65	5.40
3	1.75	2.65	4.40
4	1.25	2.65	3.90
5-7	0.75	2.65	3.40
8-27	0.25	2.65	2.90
28 and Over	0.00	2.65	2.65

DEATH AFTER RETIREMENT:

*Service Retirees**

Membership Table	Adjustment to Rates	Projection Scale
PubS.H-2010(B) Retiree	Male: 95% up to age 60, 110% for ages 61 to 75, and 101% for ages above 77 Female: 84% up to age 72, 100% for ages above 76	MP-2020

*Contingent Annuitants**

Membership Table	Adjustment to Rates	Projection Scale
PubS.H-2010(B) Contingent Annuitant	Male: 97% for all ages Female: 110% for all ages	MP-2020

*Disabled Retirees**

Membership Table	Adjustment to Rates	Projection Scale
PubG.H-2010 Disabled	Male: 134% for all ages Female: 121% for all ages	MP-2020

* Please note that none of the recommended tables have any setbacks or setforwards.

Representative values of the assumed rates of death after retirement are as follows:

	Rates of Death After Retirement*					
	Service Retirees		Contingent Annuitants		Disabled Retirees	
AGE	Male	Female	Male	Female	Male	Female
45	0.2983%	0.0983%	0.7692%	0.5104%	1.4660%	1.1919%
50	0.4190%	0.1638%	0.8837%	0.6556%	2.2780%	1.7956%
55	0.5197%	0.2738%	1.0156%	0.7843%	2.9855%	2.1078%
60	0.7771%	0.4578%	1.2397%	1.0131%	3.6475%	2.4684%
65	1.3211%	0.7652%	1.6286%	1.4157%	4.5426%	2.9730%
70	2.1758%	1.2785%	2.4153%	1.9998%	5.8129%	3.8127%
75	3.8566%	2.3659%	3.7209%	3.0052%	7.6661%	5.2683%
80	6.2640%	4.2530%	5.7734%	4.7289%	10.8125%	7.7779%
85	11.0605%	7.3240%	9.2228%	7.8562%	15.7785%	11.9947%
90	17.6902%	12.6470%	14.6577%	13.4530%	22.7224%	17.5353%

*Adjusted Base Rates

PAYROLL GROWTH: 2.65% per annum, compounded annually.

ADMINISTRATIVE EXPENSES: 0.28% of payroll.

TIMING OF DECREMENTS AND PAY INCREASES: Middle of Year.

ACTIVE MEMBER DISABILITY ASSUMPTION: 12% of active member disabilities are assumed to be in the line of duty and 88% of active member disabilities are assumed to not be in the line of duty.

ACTIVE MEMBER DEATH ASSUMPTION: 4% of active deaths are assumed to be in the line of duty and 96% 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.

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: 2.65%

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.

AMORTIZATION METHOD: Level Percentage of Payroll Method using closed amortization periods 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.

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 7.55%). 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.

Under the entry age normal cost method, the actuarial present value of each member's projected benefits is allocated on a level basis over the member's compensation between the entry age of the member and the assumed exit ages. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial liability. The unfunded actuarial liability represents the difference between the actuarial liability and the actuarial value of assets as of the valuation date. The unfunded actuarial liability is calculated each year and reflects experience gains/losses. 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 June 30, 2022, 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 the 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 last ten 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
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
7/1/20	6/30/21	17.40	285,000	9.00	285,000
7/1/21	6/30/22	17.40	290,000	9.00	290,000
7/1/22	6/30/23	17.40	305,000	9.00	305,000

Schedule C: Summary of Main Benefit & Contribution Provisions

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, 2007) 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.

Ordinary 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

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.

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.

Schedule C: Summary of Main Benefit & Contribution Provisions

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 with interest 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	148,450	71,481	15,494	95,936	6,246	12,369	349,976
Return to Active Status							
Deceased			(17)	(3)		(3)	(23)
Certain Period Ended						(137)	(137)
Added Back			44	43	5	6	98
Pay less than $100	(1,316)	1,246	70				
Not Contributing	(2,718)	2,240	453				(25)
Balance = 0		(926)					(926)
Status Change		(7)	(14)				(21)
In Retiree Status			(40)				(40)
In Disabled Status			(7)				(7)
Pending Retirees			860				860
Suspended Beneficiaries			13				13
For Valuation	144,416	74,034	16,856	95,976	6,251	12,235	349,768

Schedule D: Detailed Tabulations of the Data

STATUS RECONCILIATION FROM 2021 TO 2022

Reconciliation of Data from Last Year to This Year	Actives	Retirees	Disableds	Survivors	Inactives		Total
					Vested	Non-Vested	
As of June 30, 2021	145,673	93,630	6,394	12,134	16,887	68,026	342,744
Retirement	(3,650)	5,459	(2)		(1,804)	(3)	
Disabled	(149)	(7)	194		(35)	(3)	
Death with Survivor	(113)	(621)	(61)	947	(50)	(42)	60
Terminated Vested	(3,220)			(11)	3,305	(74)	
Terminated Non-Vested	(8,588)					8,588	
Return to Active Service	3,863	(87)	(6)		(945)	(2,825)	
Refunded	(5,997)				(477)	(3,325)	(9,799)
Death No Survivor	(14)	(2,402)	(269)	(621)	(15)	(11)	(3,332)
Benefit Ended				(252)	(10)		(262)
Removed/Cleanup					(5)	(151)	(156)
New	16,611						16,611
Pickups		4	1	38	5	3,854	3,902
As of June 30, 2022	144,416	95,976	6,251	12,235	16,856	74,034	349,768

Schedule D: Detailed Tabulations of the Data

Retirants & Beneficiaries as of June 30, 2022
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
2022	5,490	$121,530,812	$85,913	$121,616,725	$1,846
2021	5,455	116,583,644	1,398,949	117,982,593	1,802
2020	5,079	112,590,120	4,846,621	117,436,741	1,927
2019	5,209	113,979,327	8,420,826	122,400,153	1,958
2018	5,283	110,983,252	11,563,414	122,546,666	1,933
2017	5,166	106,364,342	14,435,470	120,799,812	1,949
2016	5,302	111,397,985	18,809,899	130,207,884	2,047
2015	4,915	99,869,954	20,419,444	120,289,398	2,039
2014	5,383	107,716,835	25,848,083	133,564,918	2,068
2013	5,082	101,426,085	28,153,901	129,579,986	2,125
2012	5,317	106,491,556	33,532,461	140,024,017	2,195
2011	5,198	106,363,694	37,830,524	144,194,218	2,312
2010	4,387	85,216,478	33,452,717	118,669,195	2,254
2009	3,665	70,130,211	30,458,746	100,588,957	2,287
2008	3,933	75,396,229	35,642,351	111,038,580	2,353
2007	3,626	67,763,698	34,886,678	102,650,376	2,359
2006	3,598	63,409,143	35,316,582	98,725,725	2,287
2005	3,250	58,885,239	35,492,592	94,377,831	2,420
2004	3,377	59,878,110	39,283,634	99,161,744	2,447
2003	3,040	53,761,526	37,758,752	91,520,278	2,509
2002	2,985	49,897,852	37,500,666	87,398,518	2,440
2001	2,811	47,712,651	38,234,126	85,946,777	2,548
2000	2,131	35,505,225	30,471,543	65,976,768	2,580
1999	1,798	28,153,429	25,693,743	53,847,172	2,496
1998	1,794	27,484,728	26,406,533	53,891,261	2,503
1997	1,727	25,085,579	25,741,093	50,826,672	2,453
1996	1,659	24,042,731	26,184,588	50,227,319	2,523
1995	1,288	17,155,236	19,676,936	36,832,172	2,383
1994	1,131	14,703,801	17,751,282	32,455,083	2,391
1993	1,142	15,622,939	20,116,561	35,739,500	2,608
1992	1,154	15,433,686	20,753,141	36,186,827	2,613
1991	616	7,688,010	10,982,473	18,670,483	2,526
1990	598	6,250,619	9,373,916	15,624,535	2,177
1989	213	1,902,284	2,923,506	4,825,790	1,888
1988	288	2,863,272	4,630,380	7,493,652	2,168
1987 & Prior	1,372	10,965,568	21,242,211	32,207,779	1,956
Totals	114,462	$2,180,205,850	$825,320,255	$3,005,526,105	$2,188

Schedule D: Detailed Tabulations of the Data

Schedule of Retired Members by Type of Retirement

Benefits Payable June 30, 2022

Amount of Monthly Benefit**	Number of Rets.	Ret. Type 1*	Ret. Type 2*	Ret. Type 3*
$1-$500	21,224	15,860	777	4,587
501-1,000	22,398	16,992	2,055	3,351
1,001-1,500	19,888	16,363	1,597	1,928
1,501-2,000	17,063	15,125	945	993
2,001-2,500	13,058	12,021	461	576
2,501-3,000	8,062	7,558	202	302
3,001-3,500	5,096	4,796	95	205
3,501-4,000	2,811	2,644	57	110
4,001-4,500	1,793	1,689	37	67
4,501-5,000	961	916	9	36
Over 5,000	2,108	2,012	16	80
Totals	114,462	95,976	6,251	12,235

*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 Type of Option

Benefits Payable June 30, 2022

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	21,224	15,366	664	2,566	212	193	432	1,766	144	25	577	473	2,152
501-1,000	22,398	15,738	663	2,940	226	289	904	1,598	660	40	933	657	2,192
1,001-1,500	19,888	12,993	623	3,055	239	359	1,093	1,479	829	47	935	780	3,103
1,501-2,000	17,063	10,660	470	2,778	165	407	1,206	1,355	372	22	815	849	3,692
2,001-2,500	13,058	7,893	315	2,155	110	300	1,169	1,102	104	14	854	735	3,129
2,501-3,000	8,062	4,914	175	1,257	49	225	735	696	39	11	631	490	1,790
3,001-3,500	5,096	3,050	115	839	27	144	498	417	14	6	497	356	999
3,501-4,000	2,811	1,705	61	468	17	67	267	226	8	0	284	187	489
4,001-4,500	1,793	1,008	29	324	5	62	226	139	3	0	178	122	329
4,501-5,000	961	556	15	166	4	30	120	70	1	0	85	46	177
Over 5,000	2,108	1,028	23	482	9	108	297	161	2	0	176	100	325
Totals	114,462	74,911	3,153	17,030	1,063	2,184	6,947	9,009	2,176	165	5,965	4,795	18,377

<u>Option Selected</u>

Life	-	Return of Contributions
Opt. 1	-	Return of Value 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, 2022
Tabulated by Attained Ages

Attained Age	Service Retirement No.	Service Retirement Annual Benefits	Disability Retirement No.	Disability Retirement Annual Benefits	Survivors and Beneficiaries No.	Survivors and Beneficiaries Annual Benefits	Total No.	Total Annual Benefits
Under 20					450	$2,270,692	450	$2,270,692
20 – 24					145	958,429	145	958,429
25 – 29					77	809,120	77	809,120
30 – 34			1	18,305	128	1,369,256	129	1,387,561
35 – 39			38	648,098	186	2,342,210	224	2,990,308
40 – 44	17	408,115	119	2,352,585	283	3,203,300	419	5,964,000
45 – 49	521	15,662,118	252	4,952,982	355	4,138,013	1,128	24,753,113
50 – 54	2,896	91,136,731	549	11,434,441	542	7,881,339	3,987	110,452,511
55 – 59	5,346	172,324,564	914	19,818,302	674	9,431,866	6,934	201,574,732
60 – 64	13,413	357,239,769	1,272	26,827,534	1,092	18,263,512	15,777	402,330,815
65 – 69	20,720	542,142,277	1,270	27,070,299	1,339	24,507,929	23,329	593,720,505
70 – 74	21,420	589,071,006	960	19,568,483	1,747	36,331,208	24,127	644,970,697
75 – 79	15,593	436,473,133	522	11,130,025	1,805	40,299,136	17,920	487,902,294
80 – 84	9,009	246,084,045	229	4,394,412	1,511	37,550,146	10,749	288,028,603
85 – 89	4,515	120,393,932	94	1,533,889	1,126	29,301,112	5,735	151,228,933
90 – 94	1,935	51,644,912	28	379,425	585	14,424,606	2,548	66,448,943
95	193	4,741,105	1	11,806	53	1,110,294	247	5,863,205
96	122	3,249,461			38	974,373	160	4,223,834
97	96	2,448,803			35	958,625	131	3,407,428
98	67	1,521,580	1	16,670	17	391,310	85	1,929,560
99	40	1,309,169			13	218,412	53	1,527,581
100 & Over	73	1,940,022	1	22,203	34	821,016	108	2,783,241
Totals	95,976	$2,637,790,742	6,251	$130,179,459	12,235	$237,555,904	114,462	$3,005,526,105

Average Age:	70.8 years
Average Age at Retirement:	59.3 years
Average Age at Death:	80.4 years
Average Years Since Retirement:	12.4 years

Schedule D: Detailed Tabulations of the Data

Total Active Members as of June 30, 2022
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	361							361	$ 7,476,006
20 to 24	6,071	41						6,112	191,368,167
25 to 29	10,678	2,113	22					12,813	482,530,738
30 to 34	7,310	6,293	1,657	35				15,295	637,260,295
35 to 39	6,040	4,471	4,957	1,843	37			17,348	785,830,349
40 to 44	5,330	3,779	3,607	5,155	1,732	28		19,631	951,304,295
45 to 49	4,569	3,343	3,037	3,396	4,164	994	9	19,512	969,208,075
50 to 54	4,292	3,034	2,828	2,998	3,216	2,303	481	19,152	927,712,270
55 to 59	3,575	2,691	2,359	2,566	2,627	1,521	957	16,296	733,019,319
60 to 64	2,353	2,134	1,683	1,739	1,650	1,031	952	11,542	504,672,156
65 to 69	946	919	632	530	455	307	388	4,177	178,065,922
70 & Over	543	409	346	287	226	139	227	2,177	86,312,571
Total Count	52,068	29,227	21,128	18,549	14,107	6,323	3,014	144,416	$ 6,454,760,163

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

Age:	45.1 years
Service:	10.4 years
Entry Age:	35 years
Annual Payroll:	$44,696

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 6/30/2022	$ Gain (or Loss) For Year Ending 6/30/2021
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	$ 0.2	$ 12.4
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	(1.9)	1.4
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a	(2.7)	(1.5)
Withdrawal From Employment. If more liabilities are released by withdrawals than assumed, there is a gain. If smaller releases, a loss.	(97.2)	(213.5)
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	(376.9)	50.4
New Members. Additional unfunded accrued liability will produce a loss.	(97.7)	(63.8)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a	281.7	1,319.9
Death After Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	33.6	72.9
Other. Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	(119.4)	(146.1)
Gain (or Loss) During Year From Financial	$ (380.3)	$ 1,032.1
Non-Recurring Items. Adjustments for plan amendments, software changes, assumption changes, or method changes.	0.0	(1,405.0)
Composite Gain (or Loss) During Year	$ (380.3)	$ (372.9)

Schedule F: Funding Policy of PERS

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

Schedule F: Funding Policy of PERS

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 5.80% (-5.80%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.80% (-5.80%) and negative 7.55% (-7.55%) during the projection period
Red	Net Cash Flow Percentage below negative 7.55% (-7.55%) during the projection period

Schedule F: Funding Policy of PERS

- **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, 2020 (State of Mississippi Retirement Systems Experience Investigation for the Four-Year Period Ending June 30, 2020). The long-term investment return assumption adopted by the PERS' Board in conjunction with the experience investigation is 7.55 percent and, upon approval by the Board, 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.

Schedule F: Funding Policy of PERS

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.

Schedule G: History of PERS Plan Provisions

Since 1985, the benefit structure of the Public Employees Retirement System (PERS) of Mississippi has undergone significant changes as noted in the table below.

Fiscal Year Beginning	Benefit Modifications
July 1, 1985	• Final average compensation calculated using the highest four consecutive years (reduced from highest five consecutive years) • Liberalized survivor benefit provision to reduce the marriage requirement from 5 years to 1 year and to allow a member to designate a child as beneficiary • Minimum benefit increased from \$5.00 to \$7.50 per month for each year of creditable service for current and future retirees • Eligibility for service retirement reduced from 10 years to 4 years at age 60 • Established "discretionary" COLA provision in addition to the base COLA provision to be paid to eligible retirees based on sufficient actuarial gains • 3% ad hoc increase for all retirees
July 1, 1986	• Eligibility for non-duty related disability retirement reduced from 10 years to 4 years • Permanent exemption from 3% penalty for those required to retire at age 60 • Retirement incentive granted – one additional year of credit to any member with 30 years of service credit or age 60
July 1, 1987	• Established service retirement eligibility based on 25 & out with reduced benefits • Benefit accrual increased from 1-5/8% to 1-3/4% for the first 20 years • Minimum benefit increased from \$7.50 to \$10.00 per month for each year of service for current and future retirees • 5% ad hoc increase for all retirees • Provided elected official leave credit
July 1, 1989	• Unreduced retirement at age 55 with 25 years of service • Benefit accrual increased from 1-3/4% to 1-7/8% for the first 30 years of service • Unreduced retirement lowered from age 65 to age 60 • 5% ad hoc increase for all retirees
July 1, 1990	• Provided that base COLA percentage granted shall be cumulative from year to year
July 1, 1991	• Unreduced retirement at any age with 25 years of service • Benefit accrual increased to 2% for all years of service over 25

Schedule G: History of PERS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
July 1, 1992	• Ad hoc increase for those retired prior to July 1, 1991, with more than 25 years of service • Tiered disability benefit • Expanded survivor benefits to include automatic spousal and dependent child benefits • Liberalized definition of average compensation to provide that the highest four years did not have to be consecutive years • Expanded military service credit to include all active duty military • Removed reference to "Governor's Salary" and established maximum compensation cap at $125,000
July 1, 1994	• Benefits for all retirees under Options 2(5) and 4A(5) were recalculated to remove the reduction imposed for the right to revert to the Maximum
July 1, 1999	• Benefit accrual increased from 2% to 2-1/4% for all years of service over 25 for current and future retirees • Base COLA increased to 3% simple up to age 55 and 3% compounded after age 55 • Reemployed retiree COLA will be based on all fiscal years in retirement, not just the fiscal years in retirement since the last retirement. • Provided that the COLA will be prorated and paid to the beneficiary of a retiree or beneficiary who is receiving the COLA in a lump sum and who dies between July 1 and December 1
July 1, 2000	• Benefit accrual increased from 1-7/8% to 2% for all years of service over 10 and less than 25 for current and future retirees
July 1, 2001	• Benefit accrual increased from 1-7/8% to 2% for all years of service over 5 and less than 25 for current and future retirees
July 1, 2002	• Benefit accrual increased from 1-7/8% to 2% for all years of service up to and including 25 and from 2-1/4% to 2-1/2% for all years of service over 25 for current and future retirees • Increased maximum compensation cap to $150,000 • Provided for free active duty military service for pre-1972 service in the Commissioned Corps of the U.S. Public Health Service for those retiring on or after July 1, 2002 • Reemployed retiree who has previously been retired for at least one full fiscal year no longer has to wait another full fiscal year for his or her COLA to resume • A local county or municipal elected official who is receiving retirement benefits may receive a salary for the elected position that does not exceed 25% of the retiree's average compensation

Schedule G: History of PERS Plan Provisions

Fiscal Year Beginning	Benefit Modifications
July 1, 2004	• Removed remarriage penalty on certain spouse / survivor benefits and provided upon application for the reinstatement of spouse survivor benefits previously terminated due to remarriage
July 1, 2008	• Maximum reportable earned compensation was increased from $150,000 to $230,000 to coincide with the compensation limit set pursuant to Section 401(a)(17) of the Internal Revenue Code • Vesting requirement for those employees hired on or after July 1, 2007 was increased from 4 to 8 years of service.
July 1, 2010	• Members who retire on or after July 1, 2010 receive additional credit toward retirement for one-half day of leave for each full fiscal year of membership service accrued after June 30, 2010 • Option 4, a 75% joint and survivor annuity, made available to members who retire on or after January 1, 2011
July 1, 2011	• For members hired on or after July 1, 2011, 30 years of creditable service will be required for retirement regardless of age. • For members hired on or after July 1, 2011, 33 years of creditable service will be required to select a partial lump sum option at retirement. • For members hired on or after July 1, 2011, the retirement formula will be 2% of average compensation for the first 30 years of creditable service plus 2.5% of average compensation for each year beyond 30 years of creditable service. • For members hired on or after July 1, 2011, the actuarial reduction for early retirement will be the lesser of the number of years below 30 years of creditable service or the number of years in age a member is below age 65. • For members hired on or after July 1, 2011, the COLA will be a simple 3% of the annual retirement allowance at retirement up to the fiscal year in which the retired member reaches age 60. Thereafter, the COLA will be a compounded 3% for all future years.
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.