Public Employees' Retirement System of the State of Montana

Actuarial Valuation Report

Prepared as of June 30, 2024

CavMac
Actuarial Consulting Services

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Actuarial Consulting Services

September 26, 2024

Public Employees' Retirement Board
100 North Park, Suite 200
Helena, MT 59620-0139

Members of the Board:

In this report are submitted the results of the annual valuation of the assets and liabilities of the Public Employees' Retirement System of the State of Montana (PERS), prepared as of June 30, 2024.

The purpose of this report is to provide a summary of the funded status of the System as of June 30, 2024. While not verifying the data at source, the actuary performed tests for consistency and reasonability. The valuation indicates that the statutory contribution rate reflecting all anticipated contribution increases are sufficient to amortize the unfunded accrued liability within a 27-year period. The asset values used to determine unfunded liabilities 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 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 the report cannot be used to assess a settlement of the obligation.

The promised benefits of the System are included in the actuarially calculated contribution rates, which are developed using the Entry Age Normal Cost Method. Four-year market related value of assets is used for actuarial valuation purposes. Gains and losses are reflected in the unfunded accrued liability that is being amortized by regular annual contributions as a level percentage of payroll, on the assumption that payroll will increase by 3.25% annually. The assumptions recommended by the actuary and adopted by the Board are, in the aggregate, reasonably related to the experience under the Fund and reasonable expectations of anticipated experience under the Fund.

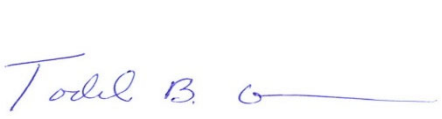
In order to prepare the results in this report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm 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.

This is to certify that the undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. This also certifies that the undersigned have experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

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

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,



Todd B. Green, ASA, EA, FCA, MAAA
President

Bryan Hoge, FSA, EA, FCA, MAAA
Consulting Actuary

Beverly V. Bailey, ASA, EA, FCA, MAAA
Senior Actuary

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SECTION 1 – SUMMARY OF RESULTS

For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below:

VALUATION DATE	June 30, 2024	June 30, 2023
Active Members	30,604	29,622
Retirees and Beneficiaries	25,824	25,468
Disabled Members*	80	86
Terminated Vested Members	5,115	4,982
Terminated Non-Vested Members	26,189	24,636
Total**	87,812	84,794
Covered Payroll of Active Members	$ 1,552,623,897	$ 1,453,317,132
Average Salaries from Covered Payroll	$ 50,733	$ 49,062
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 569,240,689	$ 543,330,879
Assets		
Actuarial value	$ 7,341,304,639	$ 6,999,338,415
Market value	7,249,785,664	6,920,861,726
Actuarial Accrued Liability (AAL)	$ 9,695,548,065	$ 9,361,215,642
Unfunded Actuarial Accrued Liability (UAAL)	$ 2,354,243,426	$ 2,361,877,227
Funded Ratio	75.72%	74.77%
Market Value Rate of Return	8.94%	8.35%
Annual Cost		
Statutory Funding Rate	17.07%	17.07%
Total Normal Rate	9.83%	9.45%
Employee Contribution Rate	7.90%	7.90%
Employer Normal Rate	1.93%	1.55%
Employer Contribution Rate		
Normal Rate	1.93%	1.55%
UAAL Rate	7.20%	7.58%
Transfer to DB Education Fund	0.04%	0.04%
Total Rate***	9.17%	9.17%
Amortization Period****	27 years	28 years
Employer Contribution Rate Necessary to Amortize UAAL over 30 Years		
Normal Rate	1.93%	1.55%
UAAL Rate (30-Year Rate)****	6.72%	7.21%
Transfer to DB Education Fund	0.04%	0.04%
Total Rate	8.69%	8.80%
Shortfall/(Surplus)	(0.48%)	(0.37%)

* Based on PERS categorization for the annual report. For actuarial purposes, 485 members in 2023 and 471 members in 2024 were valued as disabled members with offsetting reductions to the number of retired members.

** A reconciliation between participant counts used for the annual report and counts for the valuation appears at the beginning of Appendix D.

*** The rates shown are for the fiscal year immediately following the valuation date. The schedule on page 3 highlights the statutory contribution rates payable in each fiscal year including scheduled increases.

**** Reflects anticipated increases in employer contribution rates and General Fund Revenue.

SECTION 1 – SUMMARY OF RESULTS

As a result of this actuarial valuation of the benefits in effect under the Public Employees' Retirement System as of June 30, 2024, the statutory employer contributions are sufficient to amortize the Unfunded Actuarial Accrued Liability (UAAL) of the Retirement System within 27 years. The Funded Ratio is 75.72%.

Calculations based on the Market Value of Assets

MCA 19-2-407 requires this report to show how market performance is affecting the actuarial funding of the Retirement System. The June 30, 2024, market value of assets is $91,518,975 less than the actuarial value of assets. This is due to the smoothing of investment gains and losses over a four-year period. If the market value of assets was used, the amortization period would be 29 years, and the Funded Ratio would be 74.77%.

Additional Details

The actuarial costs are calculated using the entry age actuarial cost method. This is the method used by most public plans. It is designed to provide a stable contribution rate as a percent of member pay. This actuarial valuation measures the adequacy of the contribution rates set in Montana State Law.

MCA 19-3-316 requires each employer to contribute 6.90% of total compensation paid to all members employed in a PERS reportable position. This amount increased by 1.27% for fiscal year 2014 and increased by 0.10% each fiscal year through 2024 until the total employer contribution is 9.17% of member compensation. The employer contribution increases may terminate on January 1 following the board's receipt of the system's actuarial valuation if the actuarial valuation determines that terminating the additional employer contribution would not cause the amortization period of the unfunded actuarial accrued liability to exceed 25 years.

MCA 19-3-315 requires each member to contribute 7.90% compensation. Each member's contribution must be reduced to 6.90% on January 1 following the system's annual actuarial valuation if the valuation determines that reducing the employee contribution and reducing the employer contribution would not cause the system's amortization period of the unfunded actuarial accrued liability to exceed 25 years.

HB 648 and HB 2 requires the State statutory appropriation from the state to be $33,035,000 for the fiscal year beginning July 1, 2017, and $33,615,000 for the fiscal year beginning July 1, 2018. Starting in the fiscal year beginning July 1, 2019, the state will contribute 101% of the previous year's contribution.

Beginning July 1, 2013, employers who hire PERS retirees who work less than 960 hours in the calendar year, but do not become active members, contribute the employer's contribution rate on the working retiree's compensation.

The table below summarizes the legislated contribution increases for both the members and the employers.

History of Legislated Contributions
(as a Percent of Pay)

	Members	Employers
July 1, 1999 to June 30, 2007	6.90%	6.90%
July 1, 2007 to June 30, 2009	6.90	7.035
July 1, 2009 to June 30, 2013	6.90	7.17
July 1, 2013 to June 30, 2014	7.90	8.17
July 1, 2014 to June 30, 2015	7.90	8.27
July 1, 2015 to June 30, 2016	7.90	8.37
July 1, 2016 to June 30, 2017	7.90	8.47
July 1, 2017 to June 30, 2018	7.90	8.57
July 1, 2018 to June 30, 2019	7.90	8.67
July 1, 2019 to June 30, 2020	7.90	8.77
July 1, 2020 to June 30, 2021	7.90	8.87
July 1, 2021 to June 30, 2022	7.90	8.97
July 1, 2022 to June 30, 2023	7.90	9.07
July 1, 2023 to June 30, 2024	7.90	9.17

Based on MCA 19-3-1605, for Members hired on or after July 1, 2013, the GABA as of January 1st will be 1.50%, but must be reduced if the funded ratio is less than 90% as of the prior actuarial valuation date. The funded ratio for this purpose is 75.72%. For each full 2% that the unrounded funded ratio is less than 90%, the GABA must be reduced by 0.1%. As a result, the Guaranteed Annual Benefit Adjustment (GABA) rate for those hired on or after July 1, 2013, is 0.80%. In addition, if the amortization period of the unfunded actuarial accrued liability is equal to or exceeds 40 years, the GABA for members hired on or after July 1, 2013, would be equal to 0.00%, regardless of the funded ratio. Since the System amortizes within 27 years which is less than 40 years, the GABA for members hired on or after July 1, 2013 will be 0.80%.

Based on the current statutory funding rate, the amortization period as of the valuation date is 27 years. The 27-year period is likely longer than what will actually occur if all assumptions are met due to the snapshot valuation not reflecting the declining normal cost rate from new lower cost members as well as the funding of the new tier GABA at the maximum rate of 1.5%. Contributions are developed with the intent of being level as a percentage of covered payroll, assuming the number of active members remains stable. Furthermore, the funding policy is expected to accumulate sufficient assets to make all future benefit payments as they become due, if all assumptions are met. Actuarial Standard of Practice Number 4 (ASOP 4) requires the disclosure

of a reasonable actuarial determined contribution rate. While the current statutory funding rate is expected to fully fund the plan, it may not comply with the guidelines of ASOP 4. While there are potentially other reasonable actuarial determined contribution rates, in our professional judgement, one reasonable actuarially determined contribution rate would be 10.91%, which is based on a closed 20-year funding period.

Investment Experience

The market assets earned 8.94% net of investment and administrative expenses. As a result of prior years' unrecognized gains and lossees, the actuarial assets earned 9.03%, which is 1.73% greater than the expected return of 7.30%. The return on the actuarial assets differs from the return on market assets because the actuarial value of assets spreads gains and losses over four years. The chart below shows the annual returns for the past ten years.

Year	Market Return	Actuarial Return	Assumed Investment Return	Market Return over Assumption	Actuarial Return over Assumption
7/1/2014 to 6/30/2015	4.60%	9.63%	7.75%	(3.15)%	1.88%
7/1/2015 to 6/30/2016	2.02	9.27	7.75	(5.73)	1.52
7/1/2016 to 6/30/2017	11.93	8.08	7.75	4.18	0.33
7/1/2017 to 6/30/2018	8.90	6.69	7.65	1.25	(0.96)
7/1/2018 to 6/30/2019	5.65	7.06	7.65	(2.00)	(0.59)
7/1/2019 to 6/30/2020	2.73	7.11	7.65	(4.92)	(0.54)
7/1/2020 to 6/30/2021	27.80	10.76	7.65	20.15	3.11
7/1/2021 to 6/30/2022	(4.18)	8.16	7.65	(11.83)	0.51
7/1/2022 to 6/30/2023	8.35	7.55	7.30	1.05	0.25
7/1/2023 to 6/30/2024	8.94	9.03	7.30	1.64	1.73

Asset gains or losses result when the return on the actuarial value of assets differs from the assumed actuarial investment return.

Recent Contribution Increases

MCA 19-3-316 and MCA 19-3-315 dictate that employers and members are required to make supplemental contributions until the January 1st following an actuarial valuation shows the unfunded actuarial accrued liability can be amortized over a period of no more than 25 years (without considering the supplemental employee and employer contributions). The individual employers are required to contribute an additional 1.27% of compensation. The employer contribution shall increase by an additional 0.10% each year following June 30, 2013, until the total employer supplemental contribution is equal to 2.27% of compensation.

Each member's contribution must be reduced to 6.90% on January 1 following the system's annual actuarial valuation if the valuation determines that reducing the employee contribution would not cause the system's amortization period to exceed 25 years.

Amortization of the UAAL

The June 30, 2023 actuarial valuation calculated a 28-year amortization period for the UAAL. The resulting amortization period at June 30, 2024 is 27 years. The amortization period anticipates future increases in employer supplemental contributions and future General Fund Revenue as projected by the Office of Budget and Program Planning.

Due to the snapshot nature of the valuation, the amortization period does not reflect the anticipated decline in normal cost rate from new lower cost members coming into the plan. In addition, the new tier GABA is funded at the maximum rate of 1.5%, when there is a possibility there will be new tier members receiving a lower GABA, resulting in a lower amortization period. Finally, due to the circular nature of the calculations, the elimination of the supplemental employer and member contributions are not reflected at any point in the future. If the supplemental contributions were removed from the current valuation, the amortization period would not be expected to amortize at any point in the future, if all assumptions were met.

Funding and Benefits Policy

The Montana Public Employees' Retirement Board has adopted a Funding and Benefits Policy to provide general guidelines to help ensure decisions are made based on sound, consistent, and thoroughly examined criteria. The Funding and Benefits Policy includes guidance on the following topics:

1) Funding Requirement
    a) The Funding and Benefits Policy states:
        1. The Entry Age Normal Cost Method shall be applied to the projected benefits in determining the Normal Cost and Actuarial Accrued Liability.
        2. Asset smoothing can be used in the valuation process to spread the recognition of investment gains and losses over a four-year period.
        3. The unfunded actuarial accrued liability should be amortized over a reasonable period of time and should not exceed 30 years on a rolling basis. Generally, the funding period should be constant or decreasing.
    b) Analysis: The liabilities of the System are determined using the Entry Age Normal Cost Method and are compared to the actuarial value of assets, which are developed using asset smoothing that recognizes gains and losses over a four-year period. Finally, the amortization period as of June 30, 2024 is 27 years based on actuarial value of assets. The contributions provided for in statute are sufficient to fully amortize the unfunded actuarially accrued liability within 30 years.

2) Funding Objectives

   a) The Funding and Benefits Policy states: "The primary objectives are to: 1) ensure that the systems are financially sound and pay all benefits promised using assets accumulated from required employer and member contributions and investment income; and 2) achieve a well-funded status with a range of safety to absorb market volatility without creating a UAAL."

   b) Analysis: The contributions provided for in statute are sufficient to fully amortize the unfunded actuarially accrued liability within a 30-year period. It is important to note, that the normal cost rate for new hires is lower than the current active population. As members terminate or retire, and are replaced with a member with a lower normal cost rate, more of the employer contribution will be available to amortize the unfunded accrued liability. As a result the effective amortization period is less than the amortization period calculated in the actuarial valuation which does not reflect new hires.

3) Benefit Enhancements

   a) The Funding and Benefits Policy states: "Proposals must provide funding from sources sufficient to cover future costs. Unfunded liabilities created by the proposal must be amortized over a period of time appropriate to the retirement system, but not more than 30 years."

   b) Analysis: Without supplemental funding, a benefit enhancement would increase the amortization period of the unfunded actuarial accrued liability and further delay the goal of achieving a well-funded status with a range of safety to absorb market volatility without creating a UAAL.

State Debt

Under HB 553, passed during the 2019 Legislative Session, the amount of pension system debt that amortizes over 30 years is to be included in the definition of "state debt". The funding period for the current valuation is 27 years, so there is no state debt amount.

Sensitivity to Future Experience

The valuation results are projections based on the actuarial assumptions. Actual experience will differ from these assumptions, either increasing or decreasing the ultimate cost. The following illustrations provide simple analyses on how the costs are sensitive to changes in the assumed rate of return.

Investment Return – The investment return generally has the largest impact on the funding of the System.

Impact of Assuming 1.0% Higher Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution (Millions $)*
Current Assumption 7.30%	75.72%	27 Years	$144.5
Higher Assumption 8.30%	83.84%	11 Years	66.7
Increase / (Decrease)	8.12%	(16) Years	$ (77.8)

Impact of Assuming 0.5% Higher Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution (Millions $)
Current Assumption 7.30%	75.72%	27 Years	$144.5
Higher Assumption 7.80%	79.75%	17 Years	105.1
Increase / (Decrease)	4.03%	(10) Years	$ (39.4)

Impact of Assuming 0.5% Lower Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution (Millions $)
Current Assumption 7.30%	75.72%	27 Years	$144.5
Lower Assumption 6.80%	71.76%	48 Years	184.7
Increase / (Decrease)	(3.96)%	21 Years	$ 40.2

Impact of Assuming 1.0% Lower Investment Return			
	Funded Ratio	Amortization Period	Actuarially Determined Employer Contribution (Millions $)
Current Assumption 7.30%	75.72%	27 Years	$144.5
Lower Assumption 6.30%	67.88%	Does not amortize	230.0
Increase / (Decrease)	(7.84)%	N/A	$ 85.5

*Amounts reflect estimated increase/(decrease) in FY2025 employer contributions in order to maintain 27 year amortization.

The future funding status of the System will be determined by the System's experience. The System's actual asset returns and retirement rates, as well as member longevity, salary increases, withdrawal rates, disability rates and future legislation will all impact the funding status of the System. The entry age normal cost method and four-year smoothing of asset gains and losses will help to provide a more orderly funding of the System's liabilities, but will not change the actual experience. The amortization period of the UAAL is not likely to decrease by the expected 1.0 year with each passing actuarial valuation. Instead, the amortization period is expected to decrease more or less than 1.0 year each year, reflecting gains and losses due to experience different than the actuarial assumptions.

Assumption Changes

There have been no assumption changes since the previous valuation.

Benefit Changes

There have been no benefit changes since the previous valuation.

Contribution Changes

An employer supplemental contribution of 1.27% of compensation is required beginning in fiscal year 2014 which will increase by 0.10% each subsequent fiscal year through 2024. For fiscal years beginning after June 30, 2024, the supplemental employer contribution will equal 2.27% of compensation.

Method Changes

There have been no method changes since the previous valuation.

Impact of Changes

The following table summarizes how experience has changed the UAAL since the June 30, 2023 Actuarial Valuation. Further detail can be found in Tables 10 and 11.

Changes in the Unfunded Actuarial Accrued Liability (UAAL)

June 30, 2023 Valuation UAAL	$2,361,877,227
Normal Cost	124,590,053
Contributions	(304,249,137)
Interest	170,407,018
Expected June 30, 2024 UAAL	$2,352,625,161
Experience (Gain) / Loss on Actuarial Liabilities	$120,236,175
Experience (Gain) / Loss on Actuarial Assets	(118,617,910)
Assumption & Method Changes	0
Plan Changes	0
Total (Gain) / Loss	$1,618,265
June 30, 2024 Valuation UAAL	$2,354,243,426

Summary

- The System's return on actuarial value of assets of 9.03% for the year ended June 30, 2024 is 1.73% greater than the expected return of 7.30%. This represents an asset gain of $118,617,910 due to investment return being more than anticipated. As of June 30, 2024, the market value of assets was $7,249,785,664. As of June 30, 2024, the actuarial value of assets was $7,341,304,639. The June 30, 2024 deferred asset experience will be recognized in future actuarial valuations unless it is offset by returns greater than 7.30% on an actuarial basis.

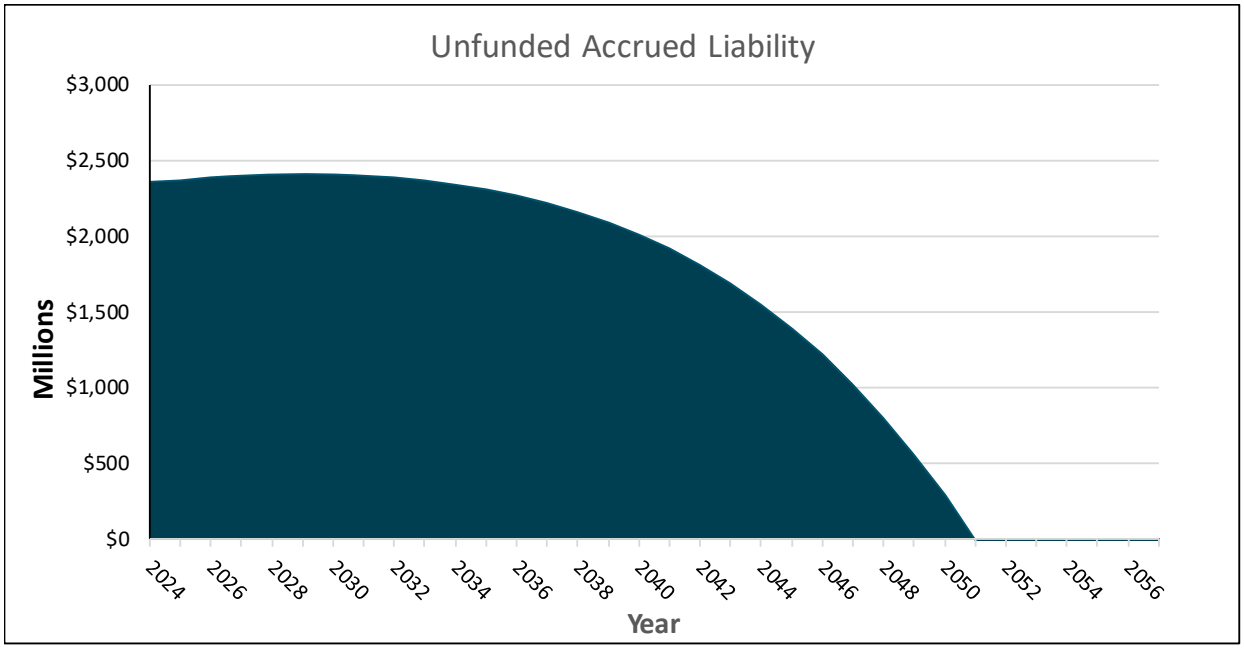
- As of June 30, 2024, the amortization period of the UAAL is 27 years. Prior to this valuation, the funding period was 28 years. The ultimate goal of the Board's Funding and Benefits Policy is to increase the funded status to a level such that the amortization period does not exceed 30 years.

- The funding of the retirement system will be impacted by future experience, which will sometimes be more favorable than the actuarial assumptions and sometimes less favorable. In particular, investment returns larger and smaller than the 7.30% assumption are expected to have significant impacts on the System's funding progress. In the long term, the favorable experience is needed to offset the less favorable experience. This is the reason for using an actuarial value of assets that allows gains and losses to be smoothed over four years.

- The unfunded actuarial accrued liability is amortized using a level percentage of payroll method over the amortization period. Under the level percentage of payroll method, amortization payments will not be large enough to cover interest on the UAAL in the beginning of the amortization schedule, which means that as a dollar amount the UAAL is expected to grow. After a period of time, amortization payments will be large enough that the amortization payments will cover both interest and principal, and the UAAL as a dollar amount will be projected to decrease in each subsequent year. The payroll growth assumption is used to determine the percentage of payroll required over the remaining amortization period to fully amortize the unfunded liability. The payroll growth assumption is 3.25%.

Projected Progress toward 100% Funding

The table below shows the projected progress toward reaching 100%. When the System is 100% funded, the Unfunded Actuarial Accrued Liability will be fully amortized. This is scheduled to occur within 27 years. The ultimate goal of the System is to achieve a well-funded status with a range of safety to absorb market volatility without creating an unfunded actuarial accrued liability.



SECTION 2 - ASSETS

In many respects, an actuarial valuation can be regarded as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is June 30, 2024. On that date, the assets available for the payment of benefits are appraised. These assets are compared with the actuarial liabilities. The actuarial process thus leads to a method of determining what contributions by members and their employers are needed to strike a balance.

The asset valuation method being used is a four-year smoothing method. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years.

Table 1 lists the assets held and their market value for the past two years. Table 2 summarizes the fund's activity during the past two years. Table 3 summarizes the determination of the actuarial value of assets. Table 4 summarizes historical asset returns for the last 10 years including the amount recognized by the actuarial asset valuation method which was greater or lesser than the actuarial investment return assumption. Table 5 summarizes the historical asset values on a market value and actuarial value basis, to the extent it was available. Additional data can be included in this table for future reports, if provided by the System.

Table 1:
Statement of Fiduciary Net Position
Fiscal Year Ended June 30,

	2024	2023
ASSETS		
Cash and Short Term Investments	$ 81,433,580	$ 76,515,726
Securities Lending Collateral	$ 254,914,497	$ 70,366,674
Receivables:		
Interest Receivable	$ 364,645	$ 335,101
Accounts Receivable	3,484,952	3,259,530
Due from Other Funds	994,753	888,746
Due from Primary Government	-	-
Notes Receivable	2,106	4,060
OPEB Def Outflow of Resources	198,718	249,351
Total Receivables	$ 5,045,174	$ 4,736,788
Investments, at fair value:		
Investment Pools	7,164,659,011	6,840,472,784
Other Investments	-	-
Total Investments	$ 7,164,659,011	$ 6,840,472,784
Capital Assets		
Property and Equipment, at cost, net of Accumulated Depreciation	$ 30,481	$ 39,254
Intangible Assets, at cost, net of Amortization Expense	2,593,172	2,946,725
Total Capital Assets	$ 2,623,653	$ 2,985,979
TOTAL ASSETS	$ 7,508,675,915	$ 6,995,077,951
LIABILITIES		
Securities Lending Liability	$ 254,914,497	$ 70,366,674
Accounts Payable	867,760	409,764
Contributions Received in Advance	44,278	17,590
Due to Other Funds	-	-
Compensated Absences	344,779	473,621
OPEB Def Inflow of Resources	272,044	332,403
OPEB Implicit Rate Subsidy LT	81,226	90,279
Leasing Liabilities	2,365,667	2,525,894
TOTAL LIABILITIES	$ 258,890,251	$ 74,216,225
NET POSITION-RESTRICTED FOR PENSION BENEFITS	$ 7,249,785,664	$ 6,920,861,726

Table 2:
Statement of Changes in Fiduciary Net Position
Fiscal Year Ended June 30,

	2024	2023
ADDITIONS		
Contributions:		
Employer	$ 141,949,632	$ 131,911,929
Plan Member	125,723,337	119,169,165
Other	36,576,168	36,176,182
Total Contributions	$ 304,249,137	$ 287,257,276
Misc Income	$ -	$ -
Investment Income:		
Net Appreciation/(Depreciation) in Fair Value of Investments	$ 649,356,001	$ 583,824,255
Investment Earnings	4,581,810	3,019,567
Security Lending Income	9,031,486	3,772,413
Investment Income/(Loss)	$ 662,969,297	$ 590,616,235
Investment Expense	(43,712,642)	(39,017,506)
Security Lending Expense	(7,252,580)	(2,293,199)
Net Investment Income/(Loss)	$ 612,004,075	$ 549,305,530
Total Additions	$ 916,253,212	$ 836,562,806
DEDUCTIONS		
Benefit Payments	$ 562,569,641	$ 541,852,695
Refunds/Distributions	15,223,858	14,699,642
Refunds to Other Plans	664,542	336,442
Transfers to DCRP	2,741,916	2,180,969
Transfers to MUS-RP	524,714	328,675
OPEB Expense	-	35,459
Administrative Expense	5,508,645	5,317,802
Total Deductions	$ 587,233,316	$ 564,751,684
NET INCREASE (DECREASE) IN PLAN NET ASSETS	$ 329,019,896	$ 271,811,122
NET POSITION-RESTRICTED FOR PENSION BENEFITS BEGINNING OF YEAR	$ 6,920,861,726	$ 6,648,898,896
ADJUSTMENT	(95,958)	151,708
END OF YEAR	$ 7,249,785,664	$ 6,920,861,726

Table 3:
Determination of Actuarial Value of Assets

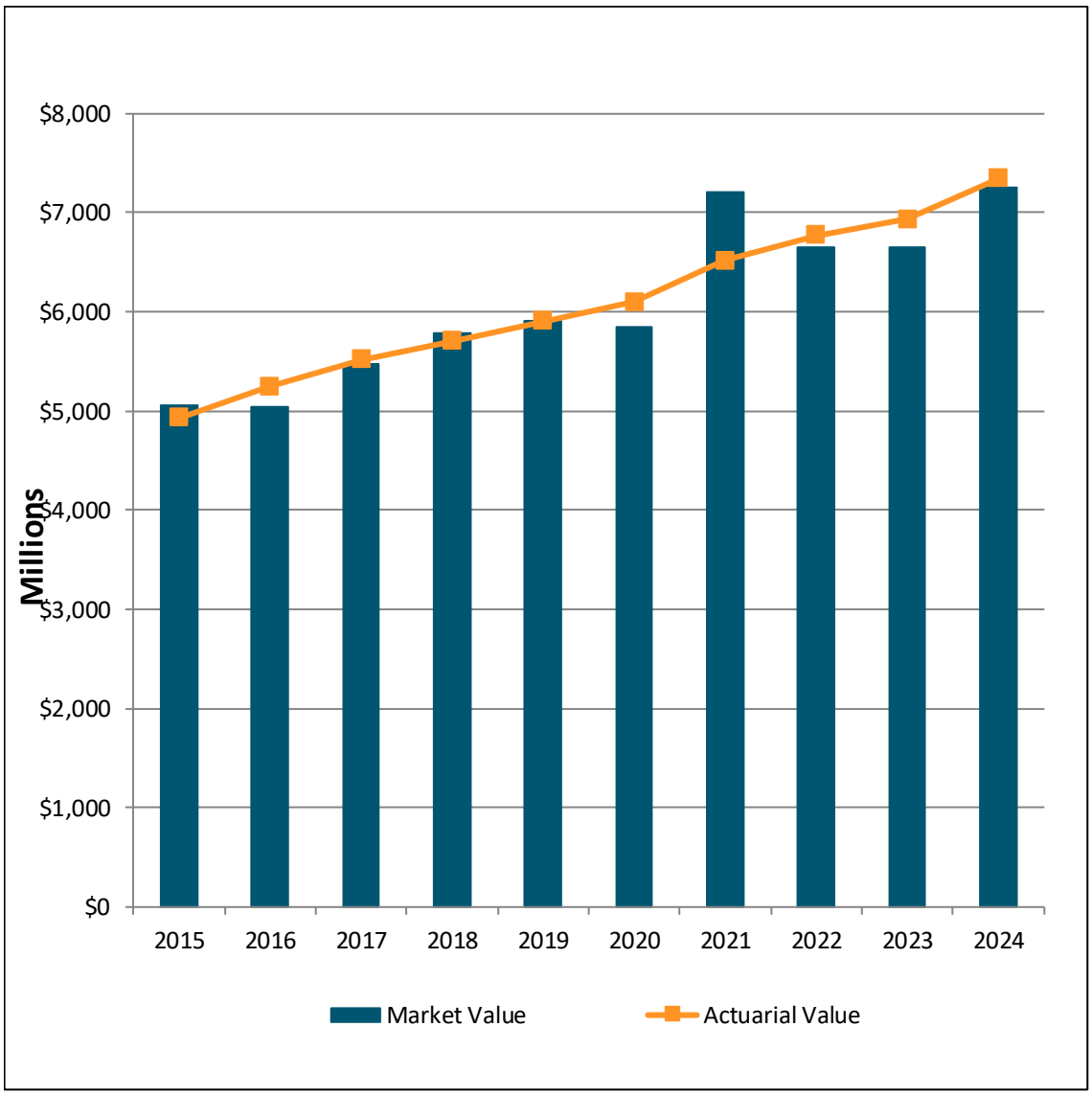
Valuation Date June 30:	2023	2024	2025	2026	2027
A. Actuarial Value Beginning of Year	$6,770,813,514	$6,999,338,415			
B. Market Value End of Year	6,920,861,726	7,249,785,664			
C. Market Value of Beginning of Year	6,648,898,896	6,920,861,726			
D. Cash Flow					
D1. Contributions	287,257,276	304,249,137			
D2. Benefit Payments	(559,398,423)	(581,724,671)			
D3. Administrative Expenses	(5,353,261)	(5,508,645)			
D4. Investment Expenses	(41,310,705)	(50,965,222)			
D5. Net	$ (318,805,113)	$ (333,949,401)			
E. Investment Income					
E1. Market Total: B. - C. - D5.	$ 590,767,943	$ 662,873,339			
E2. Assumed Rate	7.30%	7.30%			
E3. Amount for Immediate Recognition C.*E2. + ((D1.+D2.)*E2.*0.5) - D3. - D4.	522,100,434	551,568,916			
E4. Amount for Phased-in Recognition E1. - E3.	68,667,509	111,304,423			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 * E4.	$ 17,166,877	$ 27,826,106	$ -	$ -	$ -
F2. First Prior Year	(209,331,048)	17,166,877	27,826,106	-	-
F3. Second Prior Year	288,684,774	(209,331,048)	17,166,877	27,826,106	-
F4. Third Prior Year	(71,291,023)	288,684,774	(209,331,048)	17,166,878	27,826,105
F5. Total Recognized Investment Gain	$ 25,229,580	$ 124,346,709	$(164,338,065)	$ 44,992,984	$ 27,826,105
G. Actuarial Value End of Year A. + D5. + E3. + F5.	$6,999,338,415	$7,341,304,639			

Table 4:
Historical Investment Returns*

Fiscal Year Ending	Market Returns	Actuarial Returns	Assumed Rate of Return	Actuarial Return Over Assumption
June 30, 2015	4.60%	9.63%	7.75%	1.88%
June 30, 2016	2.02%	9.27%	7.75%	1.52%
June 30, 2017	11.93%	8.08%	7.75%	0.33%
June 30, 2018	8.90%	6.69%	7.65%	(0.96)%
June 30, 2019	5.65%	7.06%	7.65%	(0.59)%
June 30, 2020	2.73%	7.11%	7.65%	(0.54)%
June 30, 2021	27.80%	10.76%	7.65%	3.11%
June 30, 2022	(4.18)%	8.16%	7.65%	0.51%
June 30, 2023	8.35%	7.55%	7.30%	0.25%
June 30, 2024	8.94%	9.03%	7.30%	1.73%
10 Year Average	7.39%	8.33%		0.72%

* Returns reflect all investment returns, including investment income and realized and unrealized investment gains and losses, and are net of investment expenses and administrative expenses paid by the System.

Table 5:
Market Value of Assets vs. Actuarial Value of Assets



SECTION 3 – ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS

In the previous section, an actuarial valuation was related to an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date. In this section, the discussion will focus on the commitments of the System, which will be referred to as its actuarial liabilities.

Table 6 contains an analysis of the actuarial present value of all future benefits for actives, for retirees, and for beneficiaries. The analysis is given by type of benefit.

The actuarial liabilities summarized in Table 6 include the actuarial present value of all future benefits expected to be paid with respect to each member covered as of the valuation date. For an active member, this value includes a measure of both benefits already earned and future benefits to be earned. Thus, for all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and, if an optional benefit is chosen, for the lives of their surviving beneficiaries.

The actuarial valuation does not recognize liabilities for employees who become members and participate in the System after the valuation date.

Table 6:
Actuarial Present Value of Future Benefits for Actives, Retirees, and Beneficiaries

	June 30, 2024 Total	June 30, 2023 Total
A. Active Members Liability Due to Probability of		
Retirement	$ 3,330,913,133	$ 3,401,530,345
Disability	$ 186,877,687	$ 21,830,083
In-Service Death	$ 53,949,758	$ 54,141,003
Termination	$ 256,033,612	$ 167,811,017
Total	$ 3,827,774,190	$ 3,645,312,448
B. Inactive Members and Annuitants		
Service Retirement	$ 5,975,811,982	$ 5,765,953,037
Disability Retirement	$ 80,674,898	$ 83,285,327
Beneficiaries*	$ 366,145,460	$ 352,557,148
Vested Terminated Members	$ 295,241,967	$ 293,442,504
Refund of Member Contributions	$ 86,536,684	$ 79,687,238
Total	$ 6,804,410,991	$ 6,574,925,254
C. Grand Total	$ 10,632,185,181	$ 10,220,237,702

*Includes survivors of active and retired members.

SECTION 4 – EMPLOYER CONTRIBUTIONS

In the previous two sections, attention has been focused on the assets and the present value of all future benefits of the System. A comparison of Tables 3 and 6 indicates that there is a shortfall in current actuarial assets to meet the present value of all future benefits for current members and beneficiaries.

In an active system, there will always be a difference between the assets and the present value of all future benefits. An actuarial valuation sets a schedule of future contributions that will deal with this funding in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. For this valuation, the entry age actuarial cost method has been used. A description of the entry age actuarial cost method is provided in Appendix A. Under this method, or essentially any actuarial cost method, the contributions required to meet the difference between current assets and the present value of all future benefits are allocated each year between two elements:

- A normal cost amount, which ideally is relatively stable as a percentage of salary over the years; and
- An amount which is used to amortize the UAAL.

The two items described above, normal cost and UAAL, are the keys to understanding the actuarial cost method. Let us first discuss the normal cost.

The normal cost is the theoretical contribution rate, which will meet the ongoing costs of a group of average new employees. Suppose that a group of new employees were covered under a separate fund from which all benefits and to which all contributions and associated investment return were to be paid. Under the entry age actuarial cost method, the normal cost contribution rate is that level percentage of pay which would be exactly right to maintain this fund on a stable basis. If experience were to follow the actuarial assumptions exactly, the fund would be completely liquidated with the last payment to the last survivor of the group.

The assumed investment rate of return is 7.30%, net of investment and administrative expenses.

We have determined the normal cost rates separately by type of benefit under the System. These are summarized in Table 7. In Table 7 we also provide a summary of the member and employer statutory contributions.

SECTION 4 – EMPLOYER CONTRIBUTIONS

The term "fully funded" is often applied to a system where contributions for everyone at the normal cost rate will fully pay for the benefits of existing as well as new employees. Often, systems are not fully funded, either because of benefit improvements in the past that have not been completely paid for or actuarial deficiencies that have occurred because experience has not been as anticipated. Under these circumstances, a UAAL exists.

Table 8 shows how the UAAL was derived for the System. Lines A and B show, respectively, the total present value of future benefits and the portion of the future liability that is expected to be paid from future normal cost contributions, both employer and employee. The future normal cost contributions are the portion of the present value of future benefits that are attributed to future years of service that have not been earned yet by the active membership. Line C shows the actuarial accrued liability. Line D shows the amount of assets available for benefits. Line E shows the UAAL.

The UAAL at any date after establishment of a system is affected by any actuarial gains or losses arising when the actual experience of the system varies from the experience anticipated by the actuarial assumptions used in the valuations. To the extent actual experience as it develops differs from the assumptions used, so also will the actual emerging costs differ from the estimated costs. The impact of these differences in actual experience from the assumptions is included in Section 1, the Summary of Results.

Table 7:
Normal Cost Contribution Rates
As Percentages of Salary

	June 30, 2024 Total	June 30, 2023 Total
Service retirement	6.41%	7.01%
Disability retirement	0.59%	0.08%
In Service death	0.14%	0.15%
Vested retirement	2.69%	2.21%
Total Normal Rate	9.83%	9.45%
Employee Normal Rate	7.90%	7.90%
Employer Normal Rate	1.93%	1.55%
Transfer to DB Education Fund	0.04%	0.04%
Rate Available to Amortize Unfunded Actuarial Accrued Liability	7.20%	7.58%
Statutory Funding Rate*	17.07%	17.07%

* Rates shown are for the fiscal year following the valuation date.

Note: The normal cost rate for members hired on or after July 1, 2011 is 9.49%.

Table 8:

Unfunded Actuarial Accrued Liability

	June 30, 2024	June 30, 2023
A. Actuarial present value of all future benefits for actives and retirees and their survivors (Table 6)	$ 10,632,185,181	$ 10,220,237,702
B. Less actuarial present value of total future normal costs for present members	$ 936,637,116	$ 859,022,060
C. Actuarial accrued liability	$ 9,695,548,065	$ 9,361,215,642
D. Less assets available for benefits	$ 7,341,304,639	$ 6,999,338,415
E. Unfunded actuarial accrued liability	$ 2,354,243,426	$ 2,361,877,227

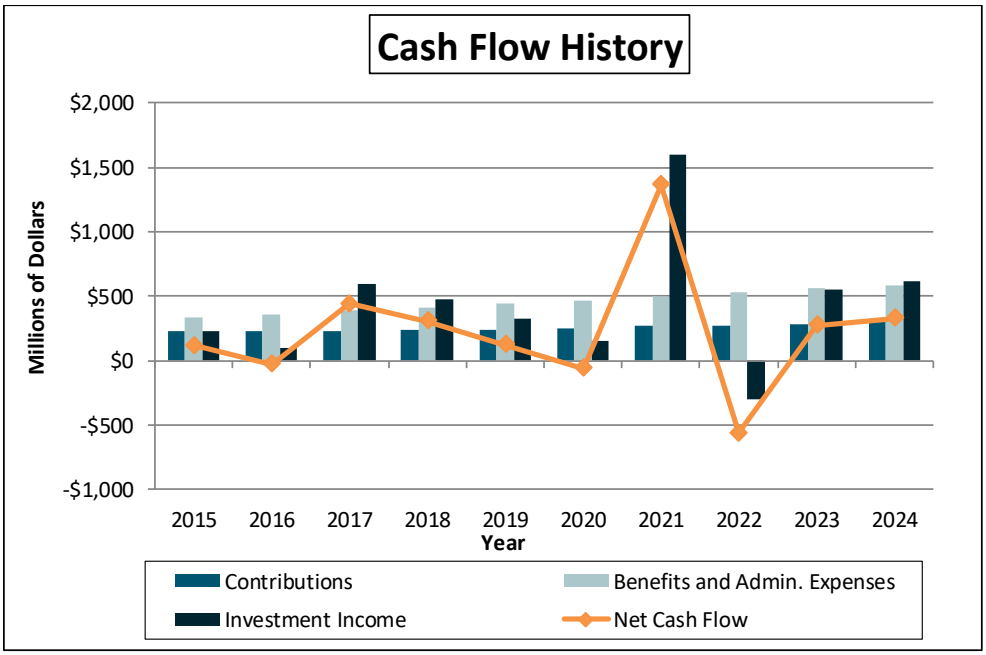
SECTION 5 – CASH FLOW HISTORY

The fundamental equation for funding a retirement system is that benefits and administrative expenses must be provided for by contributions (past and future) and investment income. When a retirement system matures, benefits and administrative expenses often exceed contributions. In this case we say the system has a "negative cash flow." Mature systems are characterized by negative cash flows and large pools of assets. This is natural. Actuarial funding is designed to accumulate large pools of assets which will in turn provide investment income and finance negative cash flows when systems mature. If the fund is looked at as a whole, investment income is usually larger than the difference between contributions and benefit payments. The retirement system's investment strategy should maximize potential returns at a prudent level of risk while providing for needed cash flows.

Table 9 shows the System had a positive cash flow for the year ended June 30, 2024. The System's total cash flow including contributions, benefit payments, administrative expenses and investment earnings was $329.0 million. Of the $329.0 million, $612.0 million was due to investment returns.

As long as the System had a positive cash flow, there would be no need to plan where the funds would come from to pay benefits since benefits could be paid by incoming contributions. A negative cash flow, as defined above, requires planning what funds will be used to pay the difference between benefits and contributions.

Table 9:
Cash Flow History
(Dollar amounts in millions)



Year Ended June 30	Historical Cash Flows: Contributions	Benefits & Administrative Expenses	Investment Income	Net Cash Flow
2015	$ 230.1	$ 337.0	$ 225.1	$ 118.2
2016	230.5	359.9	101.2	(28.2)
2017	233.1	384.8	591.4	439.7
2018	243.4	415.2	478.7	306.9
2019	243.6	441.2	320.9	123.3
2020	252.0	468.0	158.0	(58.0)
2021	267.8	496.4	1,593.1	1,364.5
2022	266.9	532.1	(295.9)	(561.1)
2023	287.3	564.8	549.3	271.8
2024	304.2	587.2	612.0	329.0

SECTION 6 – ACTUARIAL GAINS OR LOSSES

An analysis of actuarial gains or losses is performed in conjunction with all regularly scheduled valuations.

The developments of the gains or losses related to the actuarial liability and the assets are shown in Table 10. The results of our analysis of the financial experience of the System in the three most recent regular actuarial valuations are presented in Table 11. Each gain or loss shown represents our estimate of how much the given type of experience caused the Unfunded Actuarial Accrued Liability or Funding Reserve to change in the period since the previous actuarial valuation.

Gains and losses shown due to demographic sources are approximate. Demographic experience is analyzed in greater detail in our periodic experience studies.

Non-recurring gains and losses result from changes in the actuarial assumptions and benefit improvements.

Table 10:

Analysis of Actuarial (Gains) or Losses*

A. ACTUARIAL ACCRUED LIABILITY (GAIN) / LOSS ANALYSIS	
1. Actual Actuarial Accrued Liability as of June 30, 2023:	$ 9,361,215,642
2. Normal Cost for this Plan Year:	124,590,053
3. Interest on items 1 and 2 [(1+2) x 7.30%]:	692,463,816
4. Benefit Payments for this Plan Year:	(581,724,671)
5. Interest on item [4 x 7.30% x .5]:	(21,232,950)
6. Expected Actuarial Accrued Liability as of June 30, 2024:	$ 9,575,311,890
7. Changes due to:	
a. Assumption Changes:	0
b. Plan Amendments:	0
c. Funding Method:	0
d. Actuarial (Gain) / Loss:	$ 120,236,175
8. Actual Actuarial Accrued Liability as of June 30, 2024:	$ 9,695,548,065
9. Items Affecting Calculation of Actuarial Accrued Liability:	
a. Benefit provisions reflected in the actuarial accrued liability (see Appendix C)	
b. Actuarial assumptions and methods used to determine actuarial accrued liability (see Appendix B)	
B. ASSET (GAIN) / LOSS ANALYSIS	
1. Actuarial Value of Assets as of June 30, 2023:	$ 6,999,338,415
2. Interest on item [1 x 7.30%]:	510,951,704
3. Contributions for this Plan Year:	304,249,137
4. Interest on item [3. x 7.30% x .5]:	11,105,094
5. Benefit Payments for this Plan Year:	(581,724,671)
6. Interest on item [5. x 7.30% x .5]:	(21,232,950)
7. Expected Actuarial Value of Assets as of June 30, 2024:	$ 7,222,686,729
8. Actuarial Value of Assets as of June 30, 2024:	$ 7,341,304,639
9. (Gain) / Loss	$ (118,617,910)
C. UNFUNDED ACTUARIAL ACCRUED LIABILITY (GAIN) / LOSS ANALYSIS	
1. Actual Unfunded Actuarial Accrued Liability as of June 30, 2023:	$ 2,361,877,227
2. Normal Cost for this Plan Year:	124,590,053
3. Contributions for this Plan Year:	(304,249,137)
4. Interest on items 1 - 3: [(1+2) x 7.30% + (3 x 7.30% x .5)]:	170,407,018
5. Expected Unfunded Actuarial Accrued Liability as of June 30, 2024:	$ 2,352,625,161
6. Changes due to:	
a. Assumption Changes:	0
b. Plan Amendments:	0
c. Funding Method:	0
d. Actuarial (Gain) / Loss:	$ 1,618,265
7. Actual Unfunded Actuarial Accrued Liability as of June 30, 2024:	$ 2,354,243,426

* Effects related to gains are shown in parentheses. Numerical results are expressed as a (decrease) increase in the Actuarial Accrued Liability (AAL). Gains decrease the AAL and losses increase the AAL.

Table 11:

Historical Actuarial (Gains) or Losses*

(Dollar amounts in thousands)

	UAAL (Gain)/Loss		
	June 30, 2024	June 30, 2023	June 30, 2022
Investment Income			
Investment income was (greater) less than expected based on actuarial value of assets.	$ (118,617.9)	$ (16,329.8)	$ (32,812.3)
Pay Increases			
Pay increases were (less) greater than expected.	$ 61,004.5	$ 97,023.9	$ (39,735.0)
Age & Service Retirements			
Members retired at (older) younger ages or with (less) greater final average pay than expected	$ 18,830.5	$ 8,527.4	$ 15,580.1
Disability Retirements			
Disability claims were (less) greater than expected	$ 294.0	$ 442.6	$ (693.0)
Death-in-Service Benefits			
Survivor claims were (less) greater than expected	$ (271.2)	$ (38.6)	$ (635.1)
Withdrawal From Employment			
(More) less reserves were released by withdrawals than expected	$ 3,036.3	$ 2,971.1	$ (3,636.1)
Death After Retirement			
Retirees (died younger) lived longer than expected	$ (7,949.1)	$ (9,426.9)	$ (10,744.6)
Data Adjustments and Benefit Payment Timing			
Service purchases, data corrections, etc.	$ 45,568.3	$ 32,055.6	$ 2,976.4
Other			
Miscellaneous (gains) and losses	$ (277.1)	$ (1,240.9)	$ (224.9)
Total (Gain) or Loss During Period From Financial Experience	$ 1,618.3	$ 113,984.4	$ (69,924.5)
Non-Recurring Items.			
Changes in actuarial assumptions and methods	$ -	$ -	$ 296,431.3
Changes in benefits caused a (gain) loss	$ -	$ -	$ -
Composite (Gain) Loss During Period	$ 1,618.3	$ 113,984.4	$ 226,506.8

* Effects related to gains are shown in parentheses. Numerical results are expressed as a (decrease) increase in the Unfunded Actuarial Accrued Liability (UAAL). Gains decrease the UAAL and losses increase the UAAL.

SECTION 7 – RISK CONSIDERATIONS

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If plan assets are depleted, benefits may not be paid which could create legal and litigation risk or the plan could become "pay as you go". The term "risk" is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and contributions that are sufficient to provide the promised benefits. The System is primarily funded by member, employer and state contributions to the trust fund, together with the earnings on these accumulated contributions. These contributions fund benefit accruals for current active members and administrative expenses. The remainder of the contributions amortizes the unfunded actuarial accrued liability. The contribution rates are set in statute and are intended to provide the needed amounts to fund the System over time. The purpose of the valuation is to determine if the fixed contributions are sufficient to fund the System. Due to the fixed nature of the contributions actuarial gains and losses are reflected in the amortization period. Generally, the largest source of actuarial gains and losses are caused by investment volatility. In addition, the unfunded liability is amortized as a level percentage of pay assuming payroll will grow by 3.25% per year. A key risk factor to the System's funding is that over time, the Statutory Contribution Rates will be insufficient to accumulate enough funds, with investment income, to fund the promised benefits. The funding insufficiency can be caused by amortization periods that are too long or by payroll not growing at the assumed rate.

The other significant risk factor for the System is investment return because of the volatility of returns and the size of plan assets compared to payroll. This is to be expected, given the underlying capital market assumptions and the System's asset allocation. 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. Please see the summary of results of this report which demonstrates the sensitivity of valuation results to differing discount rates.

Under the revised Actuarial Standards of Practice (ASOP) No. 4 effective for valuations after February 15, 2023, we include a low-default-risk obligation measure of the System's liability in our funding valuation report. This is an informational disclosure as described below and would not be appropriate for assessing the funding progress or health of the plan. This measure uses the unit credit cost method and reflects all the assumptions and provisions of the funding valuation except that the discount rate is derived from considering low-default-risk fixed income securities. We considered the FTSE Pension Discount Curve based on market bond rates published by the Society of Actuaries as of June 30, 2024 and with the 30-year spot rate used for all durations beyond 30. Using these assumptions, we calculate a liability of $11,007 million. This amount approximates the termination liability if the plan (or all covered employment) ended on the valuation date and all of the accrued benefits had to be paid with cash-flow matched bonds. This assurance of funded status and benefit security is typically more relevant for corporate plans than for governmental plans since governments rarely have the need or option to completely terminate a plan.

A key demographic risk for the Retirement System is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect a margin for improvement in mortality experience these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, which would also be significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

The exhibits on the following pages summarize some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.

Historical Asset Volatility Ratios
(in 1,000's)

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets	Plan Year Payroll	Asset Volatility Ratio
6/30/2015	$ 5,061,058	$ 1,156,855	4.37
6/30/2016	5,032,807	1,185,646	4.24
6/30/2017	5,472,519	1,232,067	4.44
6/30/2018	5,779,994	1,230,105	4.70
6/30/2019	5,903,306	1,247,344	4.73
6/30/2020	5,845,474	1,280,557	4.56
6/30/2021	7,210,027	1,361,590	5.30
6/30/2022	6,648,899	1,349,883	4.93
6/30/2023	6,920,862	1,453,317	4.76
6/30/2024	7,249,786	1,552,624	4.67

The assets at June 30, 2024 are 467% of payroll, so underperforming the investment return assumption by 1.00% (i.e., earn 6.30% for one year) is equivalent to 4.67% of payroll. While the actual impact in the first year is mitigated by the asset smoothing method and amortization of the UAL, this illustrates the risk associated with volatile investment returns.

Historical Cash Flows
(in 1,000's)

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. The System has negative cash flows which ranged from 2% to 4% for previous years. Although, there are no immediate concerns, the trend in the growth of the negative cash flow should be monitored going forward.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/2015	$ 5,061,058	$ 230,067	$ 336,885	$ (106,818)	(2.11%)
6/30/2016	5,032,807	230,471	359,842	(129,371)	(2.57%)
6/30/2017	5,472,519	233,063	384,700	(151,637)	(2.77%)
6/30/2018	5,779,994	243,385	415,158	(171,772)	(2.97%)
6/30/2019	5,903,306	243,613	441,225	(197,612)	(3.35%)
6/30/2020	5,845,474	252,009	468,018	(216,009)	(3.70%)
6/30/2021	7,210,027	267,771	496,392	(228,620)	(3.17%)
6/30/2022	6,648,899	266,891	532,117	(265,226)	(3.99%)
6/30/2023	6,920,862	287,257	559,434	(272,177)	(3.93%)
6/30/2024	7,249,786	304,249	581,725	(277,476)	(3.83%)

Liability Maturity Measurement

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations, and in some cases declining active populations, resulting in an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the remaining baby boomers over the next decade is expected to further exacerbate the aging of the retirement system population. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs. Below are two tables which demonstrate the ratio of the System's retiree liability compared to the total accrued liability and the ratio of the number of retirees and beneficiaries to the number of active members.

Year End	Retiree Liability (a)	Total Actuarial Accrued Liability (b)	Retiree Percentage (a) / (b)
6/30/2015	$ 3,880,797,329	$ 6,470,303,179	60.0%
6/30/2016	4,149,716,390	6,787,923,154	61.1%
6/30/2017	4,720,749,061	7,578,384,779	62.3%
6/30/2018	5,018,408,743	7,730,084,077	64.9%
6/30/2019	5,284,851,700	7,957,037,808	66.4%
6/30/2020	5,569,669,547	8,234,002,983	67.6%
6/30/2021	5,854,333,780	8,534,628,711	68.6%
6/30/2022	6,309,521,420	9,026,784,090	69.9%
6/30/2023	6,574,925,254	9,361,215,642	70.2%
6/30/2024	6,804,410,991	9,695,548,065	70.2%

Historical Member Statistics

Valuation Date June 30,	Number of Active	Number of Retired	Active/ Retired
2015	28,237	20,681	1.37
2016	28,390	21,333	1.33
2017	29,395	21,805	1.35
2018	28,646	22,555	1.27
2019	28,908	23,245	1.24
2020	29,039	23,856	1.22
2021	29,028	24,403	1.19
2022	28,508	25,128	1.13
2023	29,622	25,554	1.16
2024	30,604	25,904	1.18

APPENDIX A – ACTUARIAL PROCEDURES AND METHODS

The assumptions and methods utilized in the valuation were developed in the five-year experience study for the period ending June 30, 2021.

Tables B-3 through B-5 give rates of decrement for service retirement, disablement, mortality, and other terminations of employment.

Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is defined to equal the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

Records and Data

The data used in the valuation consist of financial information; records of age, sex, service, salary, contribution rates, and account balances of contributing members; and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data has been supplied by the System and was accepted for valuation purposes without audit.

Replacement of Terminated Members

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

Administrative and Investment Expenses

The administrative and investment expenses of the System are assumed to be funded by investment earnings in excess of 7.30% per year.

APPENDIX A – ACTUARIAL PROCEDURES AND METHODS

Valuation of Assets

The actuarial asset valuation method spreads asset gains and losses over four years. The expected return is determined each year based on the beginning of year market value and actual cash flows during the year. Any difference between the expected market value return and the actual market value return is recognized evenly over a period of four years.

Investment Earnings

The annual rate of investment earnings of the assets of the System is assumed to be 7.30% per year net of investment and administrative expenses, compounded annually.

Interest on Member Contributions

Interest on member contributions is assumed to accrue at the most recent actual rate granted, or a rate of 3.71% per annum, compounded annually.

Future Salaries

The rates of annual salary increase assumed for the purpose of the valuation are illustrated in Table B-2. In addition to increases in salary due to merit and longevity, this scale includes an assumed 3.50% annual rate of increase in the general wage level of the membership.

Service Retirement

Table B-3 shows the annual assumed rates of retirement for actives members meeting the service retirement eligibilities.

Disablement

The rates of disablement used in this valuation are illustrated in Table B-4.

Mortality

The mortality rates used in this valuation are described in Table B-1.

Other Terminations of Employment

The rates of assumed future withdrawal from active service for reasons other than death, disability or retirement are shown for representative ages in Table B-5.

Probability of Marriage & Dependent Children

If death occurs in active status, all members are assumed to have an eligible surviving spouse with no dependent children.

Records with no Birth Date

New records with no birth date are assumed to be 37 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.

Active Records with a Salary Less than $1,000

These members are included in the active headcounts, however the pay of these members is not included in the Valuation Projected Salaries summarized in Appendix D. The liability for these members is their accumulated member contributions payable on the valuation date.

Table B-1

Summary of Valuation Assumptions

I.	Economic assumptions	
	A. General wage increases	3.50%
	B. Investment return	7.30%
	C. Price inflation assumption	2.75%
	D. Payroll growth	3.25%
	E. Growth in membership	0.00%
	F. Interest on member accounts	3.71%
II.	Demographic assumptions	
	A. Individual salary increase due to promotion and longevity	Table B-2
	B. Retirement	Table B-3
	C. Disablement	Table B-4
	D. Mortality among Active Participants PUB-2010 General Amount Weighted Employee Mortality projected to 2021 for males and females. Projected generationally using MP-2021.	
	E. Mortality among Disabled pensioners PUB-2010 General Amount Weighted Disabled Retiree mortality table set forward 1 year for both males and females.	
	F. Mortality among Contingent Survivor pensioners PUB-2010 Amount Weighted Contingent Survivor Mortality projected to 2021 with ages set forward 1 year for males and females. Projected generationally using MP-2021.	
	G. Mortality among Healthy pensioners PUB-2010 General Amount Weighted Healthy Retiree Mortality Table projected to 2021, with ages set forward one year and adjusted 104% for males and 103% for females. Projected generationally using MP-2021.	
	H. Other terminations of employment	Table B-5

Table B-2

Future Salaries

Years of Service	(a) Individual Merit & Longevity	(b) General Wage Increase	(1+(a))*(1+(b)) Total Salary Increase
1	4.80%	3.50%	8.47%
2	3.80	3.50	7.43
3	2.80	3.50	6.40
4	2.00	3.50	5.57
5	1.40	3.50	4.95
6	0.80	3.50	4.33
7	0.40	3.50	3.91
8	0.00	3.50	3.50
8 & Up	0.00	3.50	3.50

Table B-3

Retirement
Annual Rates

Age	Less than 30 Years of Service	30 Years or more of Service and age 60 with 25 Years of Service
Less than 45		10.0%
45		10.0
46		10.0
47		10.0
48		10.0
49		10.0
50	4.5%	15.8
51	4.5	15.8
52	4.5	15.8
53	4.5	15.8
54	4.5	15.8
55	5.5	15.8
56	6.0	15.8
57	6.0	15.8
58	6.0	15.8
59	7.0	15.8
60	9.0	15.8
61	9.0	15.8
62	15.0	22.0
63	15.0	22.0
64	15.0	22.0
65	30.0	35.0
66	30.0	35.0
67	25.0	35.0
68	25.0	30.0
69	25.0	30.0
70 & Over	100.0	100.0

Table B-4

Disablement
Annual Rates

Age	All Members
22	0.00%
27	0.04
32	0.04
37	0.04
42	0.16
47	0.40
52	0.71
57	1.00
60	1.44
62	0.00

All disabilities are assumed to be permanent and without recovery.

Table B-5

Other Terminations of Employment
Among Members Not Eligible to Retire
Annual Rates

Years of Service	All Members
0	35.0%
1	27.0
2	18.0
3	14.0
4	11.0
5	11.0
6	10.0
7	9.0
8	8.0
9	7.0
10	6.0
11	6.0
12	5.0
13	5.0
14	4.5
15 & Over	3.0

Family Composition

Female spouses are assumed to be three years younger than males. 100% of non-retired employees are assumed married for both male and female employees. Actual marital characteristics are used for retirees.

Vested Benefits for Termination Members

Vested benefits for members who terminated during years ending June 30, 2009 and later were estimated based upon compensation and service information in the census data. For members who terminated prior to June 30, 2008, vested benefits valued were the same as had been calculated by the prior actuary for the June 30, 2008 actuarial valuation. For members hired prior to July, 1, 2011, benefits are assumed to begin at age 60. For members hired on or after July 1, 2011, benefits are assumed to begin at age 65.

Post Retirement Benefit Increases

Guaranteed Annual Benefit Adjustment (GABA) increases for retired members who were hired on or after July 1, 2013 are assumed to be 1.5%.

Service credit	• Service credit is used to determine the amount of a member's retirement benefit. • One month of service credit is earned for each month where the member is paid for 160 hours (240 hours in 3-paycheck months). This includes certain transferred and purchased service.
Membership service	• Membership service is used to determine eligibility for vesting, retirement or other benefits. • One month of membership service is earned for any month member contributions are made, regardless of the number of hours worked. • Eligible members in all systems may purchase service that counts toward membership service. • Additionally, eligible active and inactive Sheriffs' Retirement System (SRS) members may purchase 1 for 5 (additional) service that will count as membership service.
Contributions	• Member contributions are made through an "employer pick-up" arrangement which results in deferral of taxes on the contributions.
Compensation	• Compensation generally means all remuneration paid, excluding certain allowances, benefits, and lump sum payments. Compensation is specifically defined in law and differs amongst the systems. • Bonuses paid **on or after** July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses.
Withdrawal of employee contributions	• A member is eligible for a withdrawal of their contributions when they terminate service and are either not eligible for or have not taken a retirement benefit. • The member receives the accumulated member contributions, which consists of member contributions and regular interest. • Upon receipt of a refund of accumulated contributions a member's vested right to a monthly benefit is forfeited.
Member contributions interest credited (regular interest)	• Interest is credited to member accounts at the rates determined by the Board. • The current interest rate credited to member accounts is 3.71%.

Refunds	• Terminating members eligible to retire may, in lieu of receiving a monthly retirement benefit, refund their accumulated contributions in a lump sum. • Terminating members with accumulated contributions between $200 and $1,000 who wish to rollover their refund must do so **within 90 days** of termination of service. • Trusts, estates, and charitable organizations listed as beneficiaries are entitled to receive only a lump sum payment.
Lump-sum payouts	• Effective July 1, 2017, lump sum payouts in all systems are limited to the member's accumulated contributions rather than the present value of the member's benefit.
Type of Plan	• Multiple-employer cost sharing
Membership eligibility	• Employees of the State and local governments that have contracted for PERS coverage. • Certain employees of the university system and school districts, not covered by a separate retirement system governed by Title 19 of the Montana Code Annotated.
Member contributions	• 7.9% of member's compensation. • Temporary 1% increase for all members effective July 1, 2011. • Reduced to 6.9% when amortization period drops below 25 years and remains below 25 years following the termination of the temporary 1% increase and the additional employer contribution rate.
Employer contributions	• 9.17% of each member's compensation for state and university. Reduced when amortization period drops below 25 years and remains below 25 years following the termination of the additional employer contribution rate and the member's temporary 1% increase. • 9.07% of each member's compensation for local governments • 8.8% of each member's compensation for school districts • Contribution going into the PERS Defined Benefit Plan is reduced by 0.04% of compensation paid into the Educational Fund. • Employers who hire PERS retirees who work less than 960 hours in the calendar year in a PERS-covered position, but do not become active members, contribute the employer's contribution rate on the working retiree's compensation.

State contributions

- 0.1% of compensation from the State for local governments
- 0.37% of compensation from State for School Districts
- Contributions are also made to the system from the State General Fund through a statutory appropriation.

Compensation period used in benefit calculation

- HAC = Highest Average Compensation
- Hired **prior to** July 1, 2011**:** HAC is average of the highest 36 consecutive months (or shorter period of total service) of compensation paid by member.
- Hired **on or after** July 1, 2011**:** HAC is average of the highest 60 consecutive months (or shorter period of total service) of compensation paid to member.
- Hired **on or after** July 1, 2013**:** 110% annual cap on compensation considered as part of a member's HAC.

Service retirement eligibility

Members hired **prior to** July 1, 2011**:**

- Age 60, 5 years membership service
- Age 65, regardless of membership service
- Any age, 30 years membership service

Members hired **on or after** July 1, 2011:

- Age 65, 5 years of membership service
- Age 70, regardless of service

Service retirement benefit formula

Members hired **prior to** July 1, 2011**:**

- Less than 25 years of membership service:
  1.785% of HAC x years of service credit
- 25 years or more of membership service:
  2% of HAC x years of service credit
- **OR,** if greater than either of the above:
  the actuarial equivalent of 2 times the member's regular contributions and interest plus the actuarial equivalent of any additional contributions and interest.

Members hired **on or after** July 1, 2011:

- Less than 10 years of membership service:
  1.5% of HAC x years of service credit
- Between 10 and 30 years of membership service:
  1.785% of HAC x years of service credit
- 30 years or more of membership service:
  2% of HAC x years of service credit
- **OR,** if greater than any of the above:

the actuarial equivalent of 2 times the member's regular contributions and interest plus the actuarial equivalent of any additional contributions and interest.

Second retirement benefit

Members who retire **before January 1, 2016, return to PERS-covered employment, and accumulate less than 2 years of additional service credit receive:**

- A refund of the member's contributions plus regular interest;
- No service credit for second employment;
- The same benefit amount starting the month following termination; **and**
- The member's Guaranteed Annual Benefit Adjustment (GABA) increasing again in January immediately following the member's second retirement.

Members who retire **before January 1, 2016 and return to PERS-covered employment for at least 2 years of additional service credit receive:**

- A re-calculated retirement benefit based on provisions in effect after member's initial retirement; **and**
- GABA on member's re-calculated benefit starting in January after receiving the re-calculated benefit for 12 months.

Members who retire **on or after January 1, 2016, return to PERS service, and accumulate less than 5 years of additional service credit receive:**

- A refund of a member's contributions plus regular interest;
- No service credit for second employment;
- The same benefit amount starting the month following termination; **and**
- The member's GABA increasing again in January immediately following the member's second retirement.

Members who retire **on or after January 1, 2016, return to PERS service, and accumulate 5 or more years of additional service credit receive:**

- The same retirement benefit paid immediately prior to member's return to service;
- A second retirement benefit for member's second period of service based on laws in effect upon the member's rehire date; **and**

- The member's GABA on both benefits starting in January after receiving the original and new benefit for 12 months.

Early retirement eligibility

Members hired **prior to** July 1, 2011:

- Age 50 with 5 years of membership service; or
- Any age under age 60 with 25 years of membership service

Members hired **on or after** July 1, 2011:

- Age 55 with 5 years of membership service.

Early retirement benefit formula

Members hired **prior to** July 1, 2011 **and**

- who retire **prior to** October 1, 2011

The actuarial equivalent of the accrued portion of the service retirement benefit that would have been payable to the member commencing at age 60 or upon completion of 30 years of membership service. The service retirement benefit is reduced by a factor resulting from multiplying 0.5% (for first five years from service retirement eligibility) and 0.3% (for six to 10 years from service retirement eligibility) by the number of months by which the retirement date precedes the date at which the member would have attained age 60 or completed 30 years of membership service.

- who retire **on or after** October 1, 2011

The actuarial equivalent of the accrued portion of the service retirement benefit that would have been payable to the member commencing at age 60 or upon completion of 30 years of membership service. The service retirement benefit must be reduced using actuarially equivalent factors based on the most recent valuation.

Members hired **on or after** July 1, 2011:

The actuarial equivalent of the accrued portion of the service retirement benefit that would have been payable to the member commencing at age 65. The service retirement benefit must be reduced using actuarially equivalent factors based on the most recent valuation.

Disability eligibility and benefit formula

- 5 years of membership service

If hired **on or before** February 24, 1991 **and** did not make a contrary election, the greater of:

- (90% of 1.785% of HAC) x service credit, or
- 25% of HAC

If hired **after** February 24, 1991 **and prior to** July 1, 2011, **or** hired **on or before** February 24, 1991 **and** so elected:

- Less than 25 years of membership service:
  1.785% of HAC x service credit, or
- At least 25 years of membership service:
  2% of HAC x service credit

If hired **on or after** July 1, 2011:

- Less than 10 years of membership:
  1.5% of HAC x years of service credit
- Between 10 and 30 years of membership service:
  1.785% of HAC x years of service credit
- 30 years or more of membership service:
  2% of HAC x years of service credit

Survivor's benefit eligibility

Member's status at time of death:

- active;
- receiving disability benefit for less than six months;
- continuously disabled without receiving a disability benefit; **or**
- inactive

Death payment benefit formula

- Accumulated contributions + (monthly compensation x lesser of years of service credit **or** 6) + interest until benefit paid.
- However, a survivor of an inactive member who was inactive for more than 6 months will receive only accumulated contributions and interest from the date of death until payment.
- A survivor may elect to receive the payment as a non-increasing annuity that is the actuarial equivalent of the death payment amount.

Survivor benefit formula

Members hired **prior to** July 1, 2011:

- The survivorship benefit payable to a vested member's survivor is:
  - the actuarial equivalent of the member's accrued retirement benefit at the time of death; **or**,
- If the member dies **prior to** age 50 **or** 25 years of membership service:
  - the actuarial equivalent of the accrued portion of the early retirement benefit that would have been paid to the member at age 50.

Members hired **on or after** July 1, 2011:

- The survivorship benefit payable to an active vested member's survivor is:
  - the actuarial equivalent of the member's accrued retirement benefit at the time of death; **or**
- If the member dies **prior to** age 55:
  - the actuarial equivalent of the accrued portion of the early retirement benefit that would have been paid to the member at age 55.

Vesting eligibility and benefit

- 5 years of membership service
- Accrued normal retirement benefit, payable when eligible for retirement.
- In lieu of a pension, a member may receive a refund of accumulated contributions.
- Upon receipt of a refund of accumulated contributions, a member's vested right to a monthly benefit is forfeited.

Retirement benefits - Form of payment

Option 1, the normal form of payment is a single life annuity with a refund of any remaining account balance to a designated beneficiary. Optional Benefits:

- Option 2, a life annuity and joint 100% survivor benefit,
- Option 3, a life annuity and joint 50% survivor benefit, and
- Option 4, a life annuity with a period certain.

If a retiring member selects Option 2 or 3 and the contingent annuitant predeceases or is divorced from the member, the retiree may, within 18 months of the death or divorce, choose to revert to the higher Option 1 benefit available at retirement or the retiree may select a different contingent annuitant and/or a different option.

Post retirement benefit increases	For retired members hired **before** July 1, 2013 who have been retired at least 12 months, a Guaranteed Annual Benefit Adjustment (GABA) will be made January 1 of each year equal to: • 3% for members hired **before** July 1, 2007, and • 1.5% for members hired **on or after** July 1, 2007 and **prior to** July 1, 2013. For retired members who were hired **on or after** July 1, 2013 and who have been retired at least 12 months, a Guaranteed Annual Benefit Adjustment (GABA) will be made January 1 of each year equal to: • A maximum of 1.5% for each year PERS is funded at or above 90%, subject to a 0.1% reduction for each 2% PERS is funded below 90%; or • 0% whenever the amortization period for PERS is 40 years or more.
Changes since last valuation	None

APPENDIX D – VALUATION DATA

This chart is presented for informational purposes only. The counts shown in the valuation line were used for preparation of the liabilities disclosed within this report. The counts disclosed for the Annual Financial Report and the Summary of Results (page 1) match the ACFR at the request of the Board. The differences between counts, if any, have no material effect upon the liability calculation.

	Active	Disabled	Retirees and Beneficiaries	Terminated Vested Members	Terminated Non-Vested Members	Total
Participant Counts Used for Valuation	30,595	551	25,353	5,094	26,019	87,612
Disabled Members having attained normal retirement age		(471)	471			-
Receiving Benefit Payments	5			16	14	35
Actively Working				4	24	28
Other Adjustments	4			1	132	137
Participant Counts shown in the Annual Financial Report	30,604	80	25,824	5,115	26,189	87,812

APPENDIX D – VALUATION DATA

This valuation is based upon the membership of the System as of June 30, 2024. Membership data was supplied by the System and has been accepted for valuation purposes without audit. However, tests were performed to ensure that the data is sufficiently accurate for valuation purposes.

The salaries used in the tables and charts which follow are different than the salaries used for the Board Summary on page 1. The valuation projected salaries to be paid for the following fiscal year, whereas the Board Summary, salaries are applicable in the year ending on the valuation date.

Active Members	Number	Valuation Projected Salaries
Full-Time Members	21,614	$ 1,418,699,417
Part-Time Members	8,981	$ 163,900,850
Total Active Members	30,595	$ 1,582,600,267

Table D-1 contains summaries of the data for contributing members. For full-time members, values shown in the tables are the numbers of members and their total and average annual salaries. For part-time members, only the numbers of members are shown.

Table D-2 presents distributions of the following:

- Members receiving service retirement benefits.
- Members receiving disability retirement benefits.
- Survivors of deceased retired members receiving benefits.
- Survivors of deceased active members.
- Terminated vested members.

Table D-3 is a reconciliation of membership data from June 30, 2023 to June 30, 2024.

APPENDIX D – VALUATION DATA

The following is a summary of retired members and beneficiaries currently receiving benefits. The chart reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 51 for an explanation of the number of annuitants used for valuation purposes.

Type of Annuitant	Number	Annual Benefits	Average Annual Benefits
Service Retirement	23,065	$ 522,905,820	$ 22,671
Survivors of Deceased Retired Members	1,722	30,816,515	17,896
Survivors of Deceased Active Members	566	7,827,684	13,830
Total Retirees and Beneficiaries	25,353	$ 561,550,019	$ 22,149
Disability Retirement	551	7,690,670	13,958
Total Annuitants	25,904	$ 569,240,689	$ 21,975

Terminated Members with Contributions Not Withdrawn	Number
Vested Terminated Members	5,094
Non-Vested Terminated Members	26,019
Total Terminated Members	31,113

Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2024

Number of Employees

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	417	236	112	59	9								833
25 to 29	444	381	316	328	229	3							1,701
30 to 34	371	345	259	361	674	144							2,154
35 to 39	292	280	266	409	723	383	111	1					2,465
40 to 44	281	276	225	294	689	484	322	101	1				2,673
45 to 49	214	221	197	278	612	362	386	292	59	2			2,623
50 to 54	217	209	204	263	535	404	338	298	212	52			2,732
55 to 59	173	177	143	223	517	389	379	313	258	150	32	1	2,755
60 to 64	92	119	106	183	483	393	361	316	242	133	84	30	2,542
65 to 69	32	32	20	58	177	133	121	106	71	54	39	24	867
70 and up	22	10	12	17	50	42	37	20	18	11	9	21	269
Totals	2,555	2,286	1,860	2,473	4,698	2,737	2,055	1,447	861	402	164	76	21,614

Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2024

Annual Salaries in Thousands

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	19,450	11,896	5,828	3,116	448								40,737
25 to 29	23,536	20,739	18,033	19,677	14,066	202							96,253
30 to 34	20,858	19,762	16,061	22,544	44,088	9,873							133,186
35 to 39	15,804	16,186	16,400	26,405	50,843	28,603	8,031	60					162,332
40 to 44	15,457	16,517	13,649	19,010	48,027	36,095	26,367	7,998	133				183,253
45 to 49	12,312	12,926	11,775	17,788	41,742	27,160	30,013	23,947	4,994	124			182,781
50 to 54	11,813	12,181	11,761	16,405	34,985	28,798	25,773	24,312	19,170	4,629			189,826
55 to 59	9,376	10,075	8,330	12,983	33,305	26,499	27,541	24,155	20,773	13,585	2,694	89	189,405
60 to 64	4,707	6,853	6,175	10,270	29,770	25,229	24,206	22,027	18,251	10,596	6,374	2,190	166,647
65 to 69	1,555	2,010	933	3,328	10,723	8,601	7,803	7,654	5,656	4,159	3,069	1,970	57,460
70 and up	1,235	566	704	1,000	3,018	2,553	2,162	1,519	1,149	659	679	1,574	16,818
Totals	136,101	129,711	109,648	152,527	311,015	193,614	151,895	111,672	70,126	33,752	12,816	5,823	1,418,699

Table D-1:
Active Members Distribution of
Full-Time Employees and Salaries
as of June 30, 2024

Average Annual Salary

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	46,642	50,406	52,034	52,809	49,822								48,904
25 to 29	53,009	54,433	57,066	59,992	61,423	67,300							56,586
30 to 34	56,220	57,280	62,012	62,449	65,413	68,564							61,832
35 to 39	54,122	57,808	61,655	64,560	70,323	74,681	72,348	60,225					65,855
40 to 44	55,005	59,844	60,664	64,660	69,705	74,576	81,886	79,192	132,959				68,557
45 to 49	57,534	58,489	59,769	63,987	68,206	75,028	77,753	82,011	84,640	61,941			69,684
50 to 54	54,437	58,282	57,650	62,375	65,392	71,283	76,251	81,584	90,426	89,021			69,482
55 to 59	54,195	56,921	58,253	58,220	64,419	68,121	72,669	77,171	80,515	90,568	84,197	89,431	68,750
60 to 64	51,159	57,592	58,251	56,122	61,635	64,195	67,052	69,705	75,419	79,668	75,885	73,006	65,558
65 to 69	48,588	62,809	46,637	57,385	60,582	64,669	64,488	72,205	79,662	77,020	78,685	82,066	66,274
70 and up	56,118	56,592	58,665	58,821	60,367	60,798	58,431	75,947	63,844	59,934	75,410	74,953	62,522
Totals	53,268	56,741	58,950	61,677	66,202	70,739	73,915	77,175	81,448	83,961	78,147	76,621	65,638

Table D-1:
Active Members Distribution of
Part-Time Employees
as of June 30, 2024

Number of Employees

	Completed Years of Service												
Age	0	1	2	3 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40+	Totals
<25	551	141	48	34									774
25 to 29	362	171	100	66	40	2							741
30 to 34	362	154	94	107	109	5							831
35 to 39	313	177	93	121	145	53	7						909
40 to 44	281	154	106	140	181	58	19	3					942
45 to 49	239	138	99	136	186	77	34	16	7				932
50 to 54	223	120	82	122	191	85	60	29	9	1			922
55 to 59	189	102	72	120	202	106	69	43	18	7	1		929
60 to 64	155	106	64	107	205	120	72	54	35	12	9	1	940
65 to 69	113	81	61	75	134	51	44	29	13	10	7	7	625
70 and up	71	50	31	50	99	59	19	28	12	7	6	4	436
Totals	2,859	1,394	850	1,078	1,492	616	324	202	94	37	23	12	8,981

Table D-2:

Distribution of Inactive Lives

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 51 for an explanation of the number of annuitants used for valuation purposes.

Members Receiving Service Retirement Benefits as of June 30, 2024

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	6	$ 231,607	$ 38,601
50 to 54	115	3,718,169	32,332
55 to 59	434	14,141,491	32,584
60 to 64	2,353	59,475,166	25,276
65 to 69	5,308	122,895,326	23,153
70 to 74	5,913	139,299,261	23,558
75 to 79	4,431	101,175,712	22,834
80 to 84	2,567	50,133,273	19,530
85 to 89	1,258	22,001,937	17,490
90 and up	680	9,833,878	14,462
Totals	23,065	$ 522,905,820	$ 22,671

Members Receiving Disability Retirement Benefits as of June 30, 2024

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	12	$ 116,760	$ 9,730
50 to 54	15	209,014	13,934
55 to 59	46	724,732	15,755
60 to 64	90	1,382,194	15,358
65 to 69	108	1,621,034	15,010
70 to 74	115	1,504,241	13,080
75 to 79	79	1,088,520	13,779
80 to 84	53	666,188	12,570
85 to 89	23	262,925	11,432
90 and up	10	115,062	11,506
Totals	551	$ 7,690,670	$ 13,958

Table D-2:

Distribution of Inactive Lives

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 51 for an explanation of the number of annuitants used for valuation purposes.

Survivors of Deceased Retired Members as of June 30, 2024

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	58	$ 447,447	$ 7,715
50 to 54	31	406,675	13,119
55 to 59	41	542,921	13,242
60 to 64	77	1,349,243	17,523
65 to 69	158	2,946,518	18,649
70 to 74	281	5,620,276	20,001
75 to 79	296	5,643,618	19,066
80 to 84	292	5,271,004	18,051
85 to 89	263	4,972,534	18,907
90 and up	225	3,616,279	16,072
Totals	1,722	$ 30,816,515	$ 17,896

Survivors of Deceased Active Members as of June 30, 2024

Age	Number of Persons	Annual Benefits in Thousands	Average Annual Benefits
<50	101	$ 811,824	$ 8,038
50 to 54	32	347,807	10,869
55 to 59	37	524,737	14,182
60 to 64	78	1,092,104	14,001
65 to 69	91	1,323,759	14,547
70 to 74	89	1,468,782	16,503
75 to 79	59	999,591	16,942
80 to 84	41	558,188	13,614
85 to 89	20	310,248	15,512
90 and up	18	390,644	21,702
Totals	566	$ 7,827,684	$ 13,830

Table D-2:

Distribution of Inactive Lives

The charts reflects the counts and benefits used for valuation purposes as a result of data processing. Please refer to the chart on page 51 for an explanation of the number of annuitants used for valuation purposes.

Terminated Vested Members as of June 30, 2024
Number of Persons

Age	Number
<25	1
25 to 29	47
30 to 34	251
35 to 39	524
40 to 44	664
45 to 49	672
50 to 54	744
55 to 59	923
60 to 64	728
65 to 69	384
70 and above	156
Total	5,094

Table D-3:

Data Reconciliation

The following table shows a reconciliation of the participants used in the previous valuation to this valuation. This chart reflects the counts used for valuation purposes as a result of data processing.

	Active Members	Terminated Vested Members	Service Retired Members	Disabled Members	Survivors and Beneficiaries
June 30, 2023 Valuation	29,614	4,964	22,735	571	2,248
Refunds and Non-Vested Terminations	(1,704)	(1)	(205)		
Vested Terminations	(659)	663			
Service Retirements	(769)	(257)	1,027		
Disability Retirements	(5)	(3)		8	
Deaths	(17)	(7)	(385)	(16)	(6)
New Entrants	4,595				177
Rehires	617	(144)	(7)		
Benefits Suspended / Expired	(735)	(123)	(129)	(13)	(131)
Transfer to DC Plan	(342)				
Other		2	29	1	
June 30, 2024 Valuation	30,595	5,094	23,065	551	2,288

APPENDIX E – COMPARATIVE SCHEDULES

Comparative Schedules

This section contains tables that summarize the experience of the System shown in present and past valuation reports.

Table E-1 shows a summary of the active members covered as of the various valuation dates.

Table E-2 shows a summary of the retired and inactive members as of the various valuation dates.

Table E-3 summarizes the contribution rates determined by each annual actuarial valuation.

Table E-1:

Active Membership Data

Valuation Date June 30,	Actives	Annual Salaries in Thousands	Average Annual Salary	Average Age	Average Years of Service	Average Hire Age
2024	30,604	$ 1,552,624	$50,733	46.5	7.9	38.6
2023	29,622	1,453,317	49,062	46.8	8.2	38.6
2022	28,508	1,349,883	47,351	47.3	8.7	38.6
2021	29,028	1,361,590	46,906	47.5	8.9	38.6
2020	29,039	1,280,557	44,098	47.7	9.1	38.6
2019	28,908	1,247,344	43,149	47.9	9.3	38.6
2018	28,646	1,230,105	42,942	48.3	9.8	38.5
2017	29,395	1,232,067	41,914	48.1	9.5	38.5
2016	28,390	1,185,646	41,763	48.3	9.3	39.0
2015	28,237	1,156,855	40,696	48.7	9.6	39.1
2014	28,229	1,129,939	39,709			
2013	28,401	1,098,341	38,673			
2012	28,548	1,078,710	37,786			

Table E-2:

Members in Receipt of Annuities and Inactive Membership Data

		All Annuitants					Terminated Members	
Valuation Date June 30,	Number	Annual Benefits in Thousands	Average Annual Benefit	Average Current Age	Average Age at Retirement	Average Service at Retirement	Number Vested Terminated	Number Non-Vested Terminated
2024	25,904	$ 569,241	$21,975	72.9	61.4	21.6	5,094	26,019
2023	25,554	543,331	21,262	72.5	61.3	21.6	4,964	24,542
2022	25,128	516,971	20,573	72.1	61.2	21.6	4,776	23,016
2021	24,403	484,770	19,865	71.8	61.1	21.5	4,372	21,719
2020	23,856	457,520	19,178	71.5	61.0	21.4	4,053	20,504
2019	23,245	430,545	18,522	71.1	60.9	21.3	3,930	19,272
2018	22,555	402,969	17,866	71.3	60.6	21.1	3,785	17,943
2017	21,805	375,071	17,201	72.0	60.7	21.1	3,674	16,641
2016	21,333	351,708	16,487	72.0	59.5	20.1	3,062	10,031
2015	20,681	331,190	15,782	71.8	58.5	19.9	2,925	8,839
2014	20,081	302,758	15,077				2,825	7,666
2013	19,451	281,466	14,470				2,686	6,712
2012	18,738	258,469	13,794				2,560	6,164

Table E-3:
Contribution Rates

Valuation Date June 30,	Contribution Rates****			Normal Cost Rate**	UAAL Rate***
	Employee	Employer*	Total		
2024	7.90 %	9.17 %	17.07 %	9.87 %	7.20 %
2023	7.90	9.17	17.07	9.49	7.58
2022	7.90	9.07	16.97	9.76	7.21
2021	7.90	8.97	16.87	10.04	6.83
2020	7.90	8.87	16.77	10.13	6.64
2019	7.90	8.77	16.67	10.43	6.24
2018	7.90	8.67	16.57	10.57	6.00
2017	7.90	8.57	16.47	10.16	6.31
2016	7.90	8.47	16.37	11.65	4.72
2015	7.90	8.37	16.27	11.49	4.78
2014	7.90	8.27	16.17	11.94	4.23
2013	7.90	8.17	16.07	10.94	5.13
2012*****	7.01	7.17	14.18	11.84	2.34

* Does not include State Statutory Appropriation.
** Includes DB Educational Fund contribution. Includes Administrative expenses for the 2014 through 2021 Valuation Dates.
*** The UAAL rate is the amount available to amortize the UAAL. It is equal to the total contribution rate, minus the normal cost rate.
**** The rates shown are for the fiscal year following the valuation date.
***** Employees hired prior to July 1, 2011 contributed 6.9%. Employees hired on or after July 1, 2011 contributed 7.90%.

APPENDIX F – FINANCIAL STATEMENT INFORMATION

The information presented in the required supplementary schedules was determined as part of the actuarial valuation as of June 30, 2024. Additional information as of the latest actuarial valuation follows.

Valuation date	June 30, 2024
Actuarial cost method	Entry Age Normal
Amortization method	Open
Remaining amortization period	27 Years
Asset valuation method	Four-year smoothed market
Actuarial assumptions:	
Investment rate of return*	7.30%
General wage growth*	3.50%
Merit salary increases	0.0% - 6.3%
*Includes inflation	2.75%

APPENDIX F – FINANCIAL STATEMENT INFORMATION

Gain and Loss in Accrued Liability During Years Ended June 30 Resulting from Differences Between Assumed Experience and Actual Experience						
	Gain or (Loss) for Year Ending June 30, (expressed in thousands)					
Type of Activity	2019	2020	2021	2022	2023	2024
Investment Income on Actuarial Value of Assets	$ (33,325)	$ (31,116)	$ 186,339	$ 32,812	$ 16,330	$ 118,618
Combined Liability Experience	34,010	(26,718)	(59,716)	37,112	(130,314)	(120,236)
(Loss)/Gain During Year from Financial Experience	$ 685	$ (57,834)	$ 126,623	$ 69,925	$ (113,984)	$ (1,617)
Non-Recurring Items	0	0	0	(296,431)	0	0
Composite Gain or (Loss) During Year	$ 685	$ (57,834)	$ 126,623	$ (226,506)	$ (113,984)	$ (1,617)

Schedule of Funding Progress (expressed in thousands)						
Valuation Date June 30,	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Funded Ratio	Unfunded AAL (UAAL)	Covered Payroll	UAAL as a Percentage of Covered Payroll
2024	$ 7,341,305	$ 9,695,548	76%	$ 2,354,243	$ 1,552,624	152%
2023	6,999,338	9,361,216	75%	2,361,877	1,453,317	163%
2022	6,770,814	9,026,784	75%	2,255,971	1,349,883	167%
2021	6,514,976	8,534,629	76%	2,019,652	1,361,590	148%
2020	6,099,398	8,234,003	74%	2,134,605	1,280,557	167%
2019	5,903,191	7,957,038	74%	2,053,847	1,247,344	165%

APPENDIX F – FINANCIAL STATEMENT INFORMATION

Valuation Date June 30,	Solvency Test Aggregate Accrued Liabilities for (expressed in thousands) Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liability Covered by Reported Assets (1)	(2)	(3)
2024	$ 991,018	$ 6,422,632	$ 2,281,898	$ 7,341,305	100%	99%	0%
2023	934,531	6,201,796	2,224,889	6,999,338	100%	98%	0%
2022	916,114	5,967,163	2,143,507	6,770,814	100%	98%	0%
2021	928,430	5,548,658	2,057,541	6,514,976	100%	100%	2%
2020	924,143	5,289,852	2,020,008	6,099,398	100%	98%	0%
2019	898,554	5,028,352	2,030,132	5,903,191	100%	100%	0%

APPENDIX G –GLOSSARY

The following definitions are largely excerpts from a list adopted in 1981 by the major actuarial organizations in the United States. In some cases the definitions have been modified for specific applicability to the Public Employees' Retirement System. Defined terms are capitalized throughout this Appendix.

Accrued Benefit

The amount of an individual's benefit (whether or not vested) as of a specific date, determined in accordance with the terms of a pension plan and based on compensation and service to that date.

Actuarial Accrued Liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of pension plan benefits and expenses which is not provided for by future Normal Costs.

Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disablement, and retirement; changes in compensation, rates of investment earnings, and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

Actuarial Cost Method

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Gain (Loss)

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

Actuarial Present Value

The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions.

Actuarial Valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan, as used by the actuary for the purpose of an Actuarial Valuation.

APPENDIX G –GLOSSARY

Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

Amortization Payment

That portion of the pension plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Entry Age Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a valuation date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability.

Market Value of Assets

The fair value of cash, investments and other property belonging to a pension plan that could be acquired by exchanging them on the open market.

Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Projected Benefits

Those pension plan benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits.

Unaccrued Benefit

The excess of an individual's Projected Benefits over the Accrued Benefits as of a specified date.

Unfunded Actuarial Accrued Liability

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.