Michigan Public School Employees' Retirement System

Annual Actuarial Valuation Report

September 30, 2023

March 4, 2024

Mr. Anthony Estell
Director, Office of Retirement Services
530 W. Allegan
Lansing, Michigan 48933

Re: Michigan Public School Employees' Retirement System - Actuarial Valuation as of September 30, 2023

Dear Mr. Estell:

The results of the September 30, 2023 annual actuarial valuation of the Michigan Public School Employees' Retirement System (MPSERS) pension benefits are presented in this report. The purpose of the valuation was to measure the System's funding progress, to determine the employer contribution for the 2025-2026 fiscal year, and to provide actuarial information for the System's financial report. The report should not be relied upon for any other purpose. This report may be provided to parties other than the Office of Retirement Services only in its entirety and only with the permission of the Office of Retirement Services. GRS is not responsible for unauthorized use of this report.

The valuation was based upon information furnished by the Office of Retirement Services concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. Data was checked for internal and year-to-year consistency, but was not audited by us. As a result, we are unable to assume responsibility for the accuracy or completeness of the data provided. Year 2005 and prior years' valuation results were not prepared by GRS and are presented for comparison with the current year's results.

The valuation summarized in this report involves actuarial calculations that require making assumptions about future events. We believe that the assumptions and methods used in this report are reasonable and appropriate. The combined effect of the assumptions, excluding prescribed assumptions or methods set by law, is expected to have no significant bias (i.e., not significantly optimistic or pessimistic). However, other assumptions and methods could also be reasonable and could result in materially different results. Some of the numbers in this report are rounded. The use of the rounded numbers for plan liabilities should not imply a lack of precision. In addition, because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications or calculations to facilitate the modeling of future events. We may also exclude factors or data that we deem to be immaterial.

This report was prepared using our proprietary valuation model and related software, which in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

Future actuarial measurements may differ significantly from those presented in this report due to such factors as experience differing from that anticipated by actuarial assumptions, changes in plan provisions, actuarial assumptions/methods or applicable law. Due to the limited scope of this assignment, we did not perform an analysis of the potential range of future measurements. This valuation was based on the assumption that the plan sponsor will continue to be able to make any contribution necessary to fund the plan in the future. A determination of the plan sponsor's ability to make the necessary contributions in the future is beyond the scope of our expertise and was not performed by us.

To the best of our knowledge, this report is accurate and fairly presents the actuarial position of the Retirement System. The valuation was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board and in compliance with the applicable State statutes. Mita D. Drazilov and Louise M. Gates are independent of the plan sponsor and are Members of the American Academy of Actuaries (MAAA) who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. It is our opinion that the actuarial assumptions used for the valuation produce results which are reasonable.

Sincerely,
Gabriel, Roeder, Smith & Company

Mita Drazilov

Mita D. Drazilov, ASA, FCA, MAAA

Louise Gates

Louise M. Gates, ASA, FCA, MAAA

MDD/LMG:sc

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Executive Summary/Board Summary

1. Required Employer Contributions to Support Retirement Benefits

The computed employer contribution for fiscal year 2026 is shown below. Computed contributions are shown as a percentage of active member payroll and as the projected fiscal year 2026 dollar amount.

	Total Computed Employer Contribution			
		Hybrid Members		
	Non-Hybrid Members	Pension Plus Plan (PPP)	Pension Plus 2 Plan (PPP2)	Weighted Average
As a Percentage of Active Member Payroll				
Normal Cost	10.87 %	6.13 %	6.00 %	9.27 %
UAAL Amortization Payment	27.45	27.45	27.45	27.45
As an Annual Dollar Amount				
Normal Cost	$ 627,244,354	$ 90,742,087	$ 84,347,444	$ 802,333,885
UAAL Amortization Payment	2,950,232,214	21,590,680	-	2,971,822,894
Total	$ 3,577,476,568	$ 112,332,767	$ 84,347,444	$ 3,774,156,779

This valuation report establishes the employer contribution for fiscal year 2026. As a result of Public Act 300 of 2012 (PA 300) and the introduction of the defined contribution (DC) plan option, the employer normal cost rate (i.e., 9.27%) is expressed as a percentage of the defined benefit (DB) plan payroll, while the Unfunded Actuarial Accrued Liability (UAAL) amortization payment rate (i.e., 27.45%) is expressed as a percentage of total payroll (i.e., including both DB and DC plan active member payroll).

2. Budgeting Process and Reconciliation Process

For the September 30, 2011 valuation and prior valuations, an Annual Required Contribution (ARC) for Governmental Accounting Standards Board (GASB) accounting purposes and the required employer contribution for funding purposes were established for the fiscal year following the valuation date. For example, the September 30, 2011 valuation established an ARC and the required employer contribution for funding purposes for fiscal year 2012. However, the 2011 valuation was used for fiscal year 2014 budgeting purposes. Any differences between the required and budgeted employer contribution were handled through a reconciliation process, as established through subsection 41(9) of the MPSERS statute.

Beginning with the September 30, 2012 valuation, it was reported to the actuary that the reconciliation process had been suspended. The September 30, 2012 valuation determined the required contribution for fiscal year 2015 for funding and accounting purposes. For the September 30, 2015 valuation, it was reported to the actuary that the reconciliation process had been reinstated with reconciliation payments beginning in fiscal year 2016. The September 30, 2023 valuation determines the required employer contribution for fiscal year 2026 for both funding and accounting purposes.

The contribution requirements calculated in this report are in addition to any reconciliation payments as required by subsection 41(9) of the MPSERS statute.

3. Dedicated Gains Policy

In 2017, the Board adopted a Dedicated Gains Policy. The purpose of the Policy is to reduce the investment return assumption for actuarial valuation purposes if the fiscal year's market value rate of return exceeds a certain amount. In accordance with discussions with ORS staff for purposes of the September 30, 2021 funding valuation, the excess return first eliminates the amount of the September 30, 2020 funding value of assets that exceeded the September 30, 2020 market value of assets. The remaining excess return is then used to reduce the investment return assumption to offset the increase in the computed employer contribution from where it otherwise would have been. Starting with the September 30, 2021 funding valuation, in accordance with modifications to the Dedicated Gains Policy, the Dedicated Gains Policy cannot lower the investment return assumption below 6.00%.

For MPSERS, the following is applicable:

(1) The amount of excess investment return for MPSERS does not cover the increase in the normal cost contribution for any year.
(2) It was assumed that the reduction in the investment return assumption would be applicable to the Non-Hybrid and PPP portions of the pension plan only. At the direction of ORS staff and effective with the September 30, 2021 funding valuation, after application of the Dedicated Gains Policy, the Non-Hybrid and PPP investment return assumptions should be the same.

For the September 30, 2023 valuation, the investment return assumptions for the Non-Hybrid portion of the pension plan and the PPP portion of the pension plan remained at 6.00% as a result of the Policy. Please see pages C-3 and C-5 for additional detail.

4. Contribution Comparison

The table below compares the results of this valuation of the Retirement System with the results of the prior year's valuation:

Valuation Date	**9/30/2022**	**9/30/2023**
Contribution Percentage		
Normal Cost	8.10 %	9.27 %
UAAL Amortization Payment	30.62	27.45
Total	N/A	N/A
As an Annual Dollar Amount		
Normal Cost	$ 688,755,256	$ 802,333,885
UAAL Amortization Payment	3,186,975,563	2,971,822,894
Total	$ 3,875,730,819	$ 3,774,156,779
Fiscal Year Computed For	2025	2026
Fiscal Year Budgeted For	2025	2026

The computed employer contribution rates presented throughout this report do not reflect the normal cost or UAAL "floor" provisions described in bullet (5) of Public Act 92 of 2017 on page 3 of the Appendix or bullet (4) of Public Act 181 of 2018 on page 4 of the Appendix.

5. Determination of Pension Plus 2 Plan Contribution Rates

The 6.00% employer and member normal cost contributions rates (before application of any employer contribution floors) was determined as part of the 5-year Experience Study (2017-2022). It is our understanding that the employer and member normal cost contribution rates (before application of any employer contribution floors) will remain in effect until the next completed 5-year Experience Study. In addition, based upon the results of the September 30, 2023 valuation, no contribution is required to finance a UAAL for PPP2.

6. Public Act 198 of 2023

The provisions of Public Act 198 of 2023 are included on page 6 of the Appendix. A key feature of Public Act 198 of 2023 is the acceleration in the transition to level dollar amortization in the schedule of the payroll growth assumption for amortization purposes. The accelerated schedule of the payroll growth assumption for amortization purposes is as follows: 0.75% for fiscal year 2024, 0.25% for fiscal year 2025, and 0.00% for fiscal years 2026 and beyond. Historical employer contribution exhibits in this report for fiscal years 2024 and 2025 are based on previously published valuation results.

ORS informed the actuary that an additional $90.8 million employer contribution would be made for fiscal year 2024 in addition to previously disclosed scheduled employer contributions (i.e., $125.0 million disclosed in the September 30, 2022 actuarial valuation report) to account for the increase in employer contributions associated with the acceleration in the scheduled transition to level dollar amortization. Additionally, ORS informed the actuary that an additional 0.77% of payroll employer contribution would be collected for fiscal year 2025 (in addition to previously disclosed scheduled employer contributions) to account for the increase in employer contributions associated with the acceleration in the scheduled transition to level dollar amortization. For purposes of determining the employer contribution requirements for fiscal year 2026, the actuary reflected the inclusion of the above stated amounts.

7. Funding Policy

It was reported to the actuary that the Retirement Board adopted a Funding Policy for use in the September 30, 2023 actuarial valuations. Our understanding of the provisions of this Funding Policy are detailed in Section G of this report.

8. Reasons for Change

There are three general reasons why contribution rates change from one valuation to the next. The first is a change in the benefits or eligibility conditions of the plan. The second is a change in the valuation assumptions used to predict future occurrences and/or a change to the valuation methods. The third is the difference during the year between the plan's actual experience and what the assumptions predicted.

There were no benefit changes reported to the actuary for the year ended September 30, 2023.

Assumption changes, based on the adoption of the findings of the recently completed 5-year Experience Study (2017-2022) decreased the computed liabilities and contribution requirements. Section E of this report includes additional information about these changes.

As part of Public Act 198 of 2023, the scheduled transition from the level percent of payroll method to the level dollar method for purposes of amortizing UAAL was altered from the schedule known at the time of the September 30, 2022 actuarial valuation. In our published September 30, 2022 pension valuation report, the payroll growth assumption for amortization purposes used in determining the fiscal year 2025 employer contribution was 0.75%, with an expected payroll growth assumption for amortization purposes of 0.25% for fiscal year 2026. The changes in the schedule of the payroll growth assumption for amortization purposes results in level dollar amortization (i.e., 0.00% amortization payroll growth assumption) being used in the development of the fiscal year 2026 employer contribution requirements. While the change in the payroll growth assumption for amortization purposes had no impact on the Actuarial Accrued Liability, it did result in increases in employer contribution requirements.

Plan experience for the year ended September 30, 2023 was less favorable than assumed and is described in more detail in Section B of this report.

Th combined impact of the assumption changes and the plan experience is that employer contribution requirements (before application of any employer contribution floors) is projected to be lower in fiscal year 2026 than in fiscal year 2025.

SECTION A

INTRODUCTION

Contribution Requirements

Development of Employer Contributions for the Indicated Valuation Date

	Contributions for	September 30				
		2022	2023			
				Hybrid		
		Total	Non-Hybrid	Pension Plus (PPP)	Pension Plus 2 (PPP2)	Total
(1)	Fiscal Year Ending September 30,	2025	2026	2026	2026	2026
(2)	Total Normal Cost of Benefits (as a % of member pay)	13.26%	15.77%	11.64%	12.00%	14.45%
(3)	Member Contribution % (weighted average)	5.16%	4.90%	5.51%	6.00%	5.18%
(4)	Employer Normal Cost % = (2) - (3)	8.10%	10.87%	6.13%	6.00%	9.27%
(5)	Projected Active Member Payroll for Fiscal Year - Normal Cost $	$ 8,506,117,816	$ 5,770,417,237	$ 1,480,295,058	$ 1,405,790,732	$ 8,656,503,027
(6)	Employer Normal Cost $ = (4) x (5)	688,755,256	627,244,354	90,742,087	84,347,444	802,333,885
(7)	Total Actuarial Accrued Liability	98,142,074,408	93,884,547,831	1,661,306,667	258,215,023	95,804,069,521
(8)	Funding Value of Assets	63,074,990,603	64,143,773,656	1,484,111,815	276,031,663	65,903,917,134
(9)	Unfunded Actuarial Accrued Liabilities (UAAL) = (7) - (8)	$ 35,067,083,805	$ 29,740,774,175	$ 177,194,852	$ (17,816,640)	$ 29,900,152,387
	a. Present Value of Future Reconciliation Payments	48,178,374	26,222,266	-	-	26,222,266
	b. Net UAAL to be Amortized = (9) - (9a)	$ 35,018,905,431	$ 29,714,551,909	$ 177,194,852	$ (17,816,640)	$ 29,873,930,121
(10)	Initial Amortization Payment $ [5]	$ 3,185,390,603	$ 2,950,232,214	$ 21,590,680	$ (3,503,653)	$ 2,968,319,241
(11)	Funded Ratio	64.3%	68.3%	89.3%	106.9%	68.8%
(12)	Final Amortization Payment $ (in accordance with Funding Policy) [1]	$ 3,186,975,563	$ 2,950,232,214	$ 21,590,680	$ -	$ 2,971,822,894
(13)	Projected Active Member Payroll for Fiscal Year - Amortization $ [2]	$ 10,410,910,798				$ 10,827,377,237
(14)	Amortization Payment % = (12) / (13) [(1),(3)]	30.62%				27.45%
(15)	**Total Computed Employer Contribution $ = (6) + (12)** [4]	**$ 3,875,730,819**	**$ 3,577,476,568**	**$ 112,332,767**	**$ 84,347,444**	**$ 3,774,156,779**

(1) *See page A-3 for a description of how to allocate the actual Amortization Payment dollar amounts amongst the Non-Hybrid, the PPP, and the PPP2 groups.*

(2) *The Non-Hybrid and PPP projected amortization payrolls include projected payroll for those members with a Non-Hybrid and PPP liability respectively, regardless of whether the active member is continuing to accrue benefits in the defined benefit plan. The PPP2 projected amortization payroll includes projected payroll for all PPP2 (i.e., $1,405.8 million) and "pure" DC members (i.e., $2,065.5 million).*

(3) *Consistent with MPSERS policy, the Amortization Payment is expressed as a percentage of total payroll (i.e., including both DB and DC active member payroll).*

(4) *The contribution requirements above are in addition to any reconciliation payments as required by subsection 41(9) of MPSERS statute and do not reflect any normal cost or UAAL floors as described in Public Act 92 and Public Act 181. The contribution requirements for fiscal year 2025 do not include additional appropriations noted as part of Public Act 198 of 2023, attributable to an accelerated transition to level dollar amortization for the Non-Hybrid and PPP portions of the plan.*

(5) *See pages A-4 and A-5 for documentation of the layered amortization schedules.*

Contribution Requirements

Computed Employer Contributions

Based on the assumptions outlined in Section E, as more of the active membership becomes Pension Plus 2 Plan members and the System pays off its unfunded actuarial accrued liability (UAAL), the long-term employer contribution rate for the Michigan Public School Employees' Retirement System is expected to be the long-term employer normal cost rate for the Pension Plus 2 Plan. However, for the current total defined benefit MPSERS active member population, the weighted average employer normal cost rate is 9.27%. Also, for the current year, an amortization payment is required to finance the UAAL. As the normal cost rate and the UAAL amortization payment rate are applied to different payrolls, the two contribution rates cannot be summed to get a total computed employer contribution rate.

Determining Employer Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollars, then promptly contributed to the System. Please note, the normal cost rates and the UAAL amortization payment rates apply to two different types of payroll. The normal cost rates should be applied to the fiscal year 2026 payroll for those active employees who elected to maintain future benefit accruals in the defined benefit plan, while the UAAL amortization payment rates should be applied to the fiscal year 2026 payroll for the entire MPSERS active employee group.

For the Non-Hybrid Plan members, the employer normal cost rate (expressed as a % of Non-Hybrid payroll) is 10.87%. Applying the employer normal cost rate of 10.87% to the projected payroll for MPSERS active employees participating in the Non-Hybrid portion of the defined benefit plan for fiscal year 2026 produces annual employer normal cost contributions of $627,244,354.

For the PPP members, the employer normal cost rate (expressed as a % of PPP payroll) is 6.13%. Applying the employer normal cost rate of 6.13% to the projected payroll for MPSERS active employees participating in the PPP portion of the defined benefit plan for fiscal year 2026 produces annual employer normal cost contributions of $90,742,087.

For the PPP2 members, the employer normal cost rate (expressed as a % of PPP2 payroll) is 6.00%. Applying the employer normal cost rate of 6.00% to the projected payroll for MPSERS active employees participating in the PPP2 portion of the defined benefit plan for fiscal year 2026 produces annual employer normal cost contributions of $84,347,444.

The amortization payment for funding the UAAL (expressed as a % of the total MPSERS active member payroll) is 27.45%. Applying the amortization payment rate of 27.45% to the projected payroll for the total MPSERS active employees for fiscal year 2026 produces an annual amortization payment of $2,971,822,894. In accordance with the Funding Policy, there is no reduction to the computed employer normal cost (i.e., amortization credit) in situations where an amortization payment is not required to finance a UAAL until all subgroups of the MPSERS pension plan attain a 120% funding target.

Contribution Requirements

The sum of the three normal cost contributions and the amortization payment yields an expected total employer contribution of $3,774,156,779 for fiscal year 2026. Currently, the non-investment cash flow is tracked separately in the assets for the Non-Hybrid, PPP, and PPP2 groups. The normal cost contributions should be allocated to each of the respective groups as expected, based on the actual payroll amounts. For the amortization payment of the UAAL, $21,590,680 should be allocated to the PPP group, $0 should be allocated to the PPP2 group, and the remainder should be allocated to the Non-Hybrid group.

Reconciliation Payments

Starting with the September 30, 2015 valuation, it was reported to the actuary that the reconciliation process has been reinstated. The contribution requirements shown on page A-1 for fiscal year 2026 are needed in addition to the reconciliation payments required by subsection 41(9) of the MPSERS statute. The scheduled reconciliation payments were prepared and reported by the Office of Retirement Services (ORS) and are presented on page E-13.

Contribution Requirements

Layered Amortization Schedules

The tables below document the layered amortization schedules used in the development of the fiscal year 2026 UAAL contribution requirements by group.

The UAAL as of September 30, 2023 is projected to the beginning of the fiscal year for which the contributions are being calculated for each of the MPSERS structures (e.g., Non-Hybrid, PPP, and PPP2), in this case October 1, 2025. This allows the September 30, 2023 valuation to account for expected future contributions that are based on prior valuations. The UAAL as of the beginning of the fiscal year for which contributions are being calculated is then amortized according to the schedules presented below.

Non-Hybrid

		Amounts for Fiscal Year Beginning October 1, 2025			
Type of UAAL	**Valuation Established**	**Outstanding UAAL Balance as of October 1, 2025**	**Remaining Amortization Period (years)**	**Amortization Factor**	**Annual Amortization Payment**
Experience	9/30/2023	$ 139,891,298	15	10.00078701	$ 13,988,029
Assumption Change	9/30/2023	(3,672,394,729)	15	10.00078701	(367,210,573)
Initial	9/30/2022	30,113,251,054	13	9.11568442	3,303,454,758
Subtotal		$ 26,580,747,623			$ 2,950,232,214

Contribution Requirements

Layered Amortization Schedules (Concluded)

Pension Plus Plan

Type of UAAL	Valuation Established	Amounts for Fiscal Year Beginning October 1, 2025: Outstanding UAAL Balance as of October 1, 2025	Remaining Amortization Period (years)	Amortization Factor	Annual Amortization Payment
Experience	9/30/2023	$ 16,758,575	15	10.00078701	$ 1,675,726
Assumption Change	9/30/2023	40,116,024	15	10.00078701	4,011,287
Initial	9/30/2022	144,972,805	13	9.11568442	15,903,667
Subtotal		$ 201,847,404			$ 21,590,680

Pension Plus 2 Plan

Type of UAAL	Valuation Established	Amounts for Fiscal Year Beginning October 1, 2025: Outstanding UAAL Balance as of October 1, 2025	Remaining Amortization Period (years)	Amortization Factor	Annual Amortization Payment
Experience	9/30/2023	$ (12,003,577)	10	7.57874546	$ (1,583,847)
Assumption Change	9/30/2023	(2,537,705)	10	7.57874546	(334,845)
Experience	9/30/2022	(544,112)	9	7.00376152	(77,689)
Experience	9/30/2021	(6,798,723)	8	6.39427854	(1,063,251)
Experience	9/30/2020	(1,403,895)	7	5.74822658	(244,231)
Experience	9/30/2019	(861,912)	6	5.06341150	(170,224)
Initial	9/30/2018	(128,242)	5	4.33750752	(29,566)
Subtotal		$ (24,278,166)			$ (3,503,653)

Discussion of Changes

Revisions in Benefits

There have been no material revisions in benefits since the last annual actuarial valuation.

Revisions in Actuarial Assumptions or Methods

Assumptions were changed based on the adoption of the findings of the experience study covering the period October 1, 2017 through September 30, 2022. These changes resulted in a decrease of total computed liabilities by approximately $3.5 billion and in decreased employer contribution requirements by approximately $240.3 million.

In accordance with Public Act 198 of 2023, the payroll growth assumption for amortization purposes used in determining the fiscal year 2026 employer contributions decreased from 0.75% to 0.00%. While this assumption change had no impact on the Actuarial Accrued Liability, it did result in an increase in employer contribution requirements of approximately 112.3 million.

Actuarial Experience

Actuarial Experience was less favorable than that anticipated by the actuarial assumptions. The total actuarial loss was $427.9 million. The loss was due primarily to unfavorable investment experience.

Comment on the Investment Markets

Investment markets continue to be volatile. The actuarial value of assets (funding value), used to determine both the funded status and the required employer contribution, is based on a 5-year smoothed value of assets. This reduces the volatility of the valuation results.

As of September 30, 2023, the actuarial value of assets was 103% of market value. This means that meeting the actuarial investment return assumption in the next few years will require average future market returns to exceed the 6.00% investment return assumption.

If the September 30, 2023 valuation results were based on the market value of assets instead of the actuarial value of assets, the funded percent of the plan would be 66.5% (instead of 68.8%).

Measures of Financial Soundness

The purpose of this section of the report is to provide certain measures which indicate the financial soundness of the program. These measures relate to long term solvency and level funding.

The various percentages listed in this section as of a single valuation date are not overly significant standing alone. What is more significant is the trend of the rates over a period of years. It is also important to keep in mind that each time benefits or assumptions are revised, actuarial liabilities are created or diminished. Any newly created liabilities are financed systematically over a period of future years. All actuarially computed values in this analysis are based on the actuarial assumptions utilized in the respective years' actuarial valuations.

Long Term Funding Progress

Over the longer term, the funding progress of an ongoing plan can be measured by comparing the actuarial value of assets to an amount known as the Actuarial Accrued Liability (AAL) under the Entry-Age actuarial cost method. This item has often been called the "past service liability." The AAL is affected immediately by any revisions in benefits or assumptions. The accumulation of assets to equal the AAL can be considered a long-range funding goal. Largely because of periodic benefit increases and poor investment experience since the early 2000's, very few retirement programs have attained this goal.

Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability	% of AAL Covered by Assets
9/30/2023 [1]	$65,903,917,134	$95,804,069,521	68.8 %
9/30/2023	65,903,917,134	99,258,655,506	66.4
9/30/2022	63,074,990,603	98,142,074,408	64.3

[1] *Revised actuarial assumptions and/or methods.*

The chart above illustrates the change in the total System funding percent since the prior year. Page B-7 shows the funded percent in greater detail and for a longer period of time. In particular, the funded percent for current benefit recipients is 90.9% as of September 30, 2023.

Measures of Financial Soundness (Concluded)

Level Contributions

The actuarial assumptions and actuarial cost method have been chosen with the intent of producing required normal cost contributions which are expected to remain fairly level as a percentage of an active member's payroll. Given the Funding Policy, the amortization payment for each amortization layer is expected to remain level in dollar terms until that amortization layer is fully amortized. The following chart shows a brief history of contribution rates:

Valuation Date	Fiscal Year Budgeted For	Normal Cost [2]	Amortization Payment	Total Contribution
9/30/2023 [3]	2026	9.27 %	27.45 %	N/A [1]
9/30/2023	2026	8.03	29.62	N/A [1]
9/30/2022	2025	8.10	30.62	N/A [1]

[1] *Effective with Public Act 300 of 2012, the normal cost rate and the amortization payment rate are applied to different payrolls and can no longer be added together for a total contribution rate.*
[2] *Normal cost is a weighted average rate of the Non-Hybrid, PPP, and PPP2 normal cost rates.*
[3] *Revised actuarial assumptions and/or methods.*

A major factor affecting the stability of the contribution requirements just shown is how well the actual plan experience compares to the actuarial assumptions. The value of the difference between what actually occurred and what was assumed to occur is called the actuarial gain or loss. Gains tend to lower the subsequent contribution requirements of the program while losses tend to cause subsequent contribution requirements to rise.

Year Ending	Actuarial Gain/(Loss)	G/(L) Percent
9/30/2023	$ (427,913,200)	(0.44)%
9/30/2022	(1,783,735,073)	(1.86)%

G/(L) percent represents actuarial gain/(loss) calculated as a percentage of the beginning of year actuarial accrued liability.

Analysis of all the benchmarks noted, over a period of years, will provide an indication of whether the program is becoming financially stronger or weaker.

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure and Funding Policy, if all actuarial assumptions are met (including the assumption of the plan earning 6.00% actuarial value of assets), it is expected that:

(1) The employer normal cost as a percentage of pay will trend to the level of the PPP2 normal cost rate as the Non-Hybrid and PPP populations decline and are replaced by PPP2 members,
(2) In the absence of any applicable payroll growth floor, the amortization payment for each amortization layer is expected to remain level in dollar terms until that amortization layer is fully amortized,
(3) The unfunded actuarial accrued liability for the Non-Hybrid's initial layer is expected to be fully amortized no later than the end of fiscal year 2038, and
(4) The funded status of the plan will gradually trend towards a 100% funded ratio.

When selecting a contribution allocation procedure, the following three items should be considered, including the balance amongst the three items:

(1) Benefit security,
(2) Intergenerational equity, and
(3) Contribution stability and predictability.

Generally, given the nature of public employee retirement systems (e.g., level contribution financing objective and perceived ongoing nature of the plan or plan sponsor), intergenerational equity and contribution stability and predictability have received more consideration than benefit security when contribution allocation procedures are selected. However, given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

Other Observations (Concluded)

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regards to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. In addition, the measurement is inappropriate for assessing benefit security for the membership.

(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy and asset valuation method, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).

(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Risks Associated with Measuring the Actuarial Accrued Liability and the Total Computed Employer Contribution

The determination of the actuarial accrued liability and the total computed employer contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the actuarial accrued liability and the total computed employer contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; 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. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	September 30,				
	2023	**2022**	**2021**	**2020**	**2019**
Ratio of actives to retirees and beneficiaries	0.7	0.7	0.7	0.7	0.8
Ratio of net cash flow to market value of assets	(0.5)%	(2.0)%	(2.9)%	(3.9)%	(3.9)%
Duration of the actuarial accrued liability	11.48	12.00	11.27	11.35	11.41

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of actives to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Duration of the Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, a duration of 10 indicates that the actuarial accrued liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Summary of Other Risk Metrics

Valuation Date September 30,	Funded Ratio Based on AVA	Funded Ratio Based on MVA	UAAL Amortization Period[3]	Total UAAL / Total Payroll[2]	Total Funding Value of Assets / Total Payroll[2]	Total AAL / Total Payroll[2]	Standard Deviation of Investment Return / Total Payroll[2]
2014 [1]	60 %	66 %	22	3.2	4.9	8.1	n/a
2015	61	63	21	3.2	5.0	8.2	n/a
2016 [1]	60	60	20	3.5	5.3	8.8	n/a
2017 [1]	62	61	19	3.6	5.7	9.3	n/a
2018 [1]	61	60	18	3.9	6.1	10.0	80 %
2019	60	60	17	3.9	5.9	9.8	77
2020	61	60	16	3.9	6.0	9.9	78
2021 [1]	64	66	15	3.9	6.9	10.8	94
2022	64	60	14	3.7	6.6	10.2	81
2023 [1]	69	67	Multiple	3.0	6.6	9.6	83

[1] *After changes in actuarial assumptions.*
[2] *Payroll for UAAL purposes (Total MPSERS Payroll).*
[3] *Non-Hybrid and PPP UAAL amortization period. Starting with the September 30, 2023 valuation, layered amortization was introduced for the Non-Hybrid and PPP structures.*

An explanation of the significance of the risk metrics presented above follows:

(1) **Funded Ratio (Funding Value of Assets basis)** – This is the most widely known measure of a plan's financial strength. The trend in the funded ratio and the actual funded ratio are both important metrics. A trend approaching 100% is desirable.
(2) **Funded Ratio (Market Value of Assets basis)** – This is similar to the above, except that the asset value used is the market value.
(3) **UAAL Amortization Period** – Periods above about 17 to 23 years generally indicate that the UAAL payment is less than the interest on the UAAL. This situation is referred to as "negative amortization." Negative amortization is increasingly viewed as undesirable.
(4) **Total UAAL / Total Payroll** – The ratio of UAAL to payroll gives an indication of the plan sponsor's ability to pay off the UAAL. A declining ratio is desirable. A ratio above approximately 3.0 to 4.0 may indicate difficulty in discharging the unfunded liability in some circumstances.
(5) **Total Funding Value of Assets / Total Payroll** – The ratio of assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 5.0 and 7.0. Social Security Replacement Plans may fall above that range. A high ratio can indicate volatility of contribution rates and amortization period.
(6) **Total AAL / Total Payroll** – This is similar to (5). It illustrates the expected ratio of assets to payroll when the plan has a funded ratio of 100%.
(7) **Standard Deviation of Investment Return / Total Payroll** – The portfolio standard deviation measures the volatility of investment return. When divided by payroll, it gives the effect of a one standard deviation asset gain or loss as a percent of payroll. A market value asset loss of this magnitude or larger has roughly a 16% chance of occurring in any particular year.

Low-Default-Risk Obligation Measure

INTRODUCTION

In December 2021, the Actuarial Standards Board (ASB) adopted a revision to Actuarial Standard of Practice (ASOP) No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*. The revised ASOP No. 4 requires the calculation and disclosure of a liability referred to by the ASOP as the "Low- Default-Risk Obligation Measure" (LDROM). The rationale that the ASB cited for the calculation and disclosure of the LDROM was included in the Transmittal Memorandum of ASOP No. 4 and is presented below (emphasis added):

"The ASB believes that the calculation and disclosure of this measure provides **appropriate, useful information for the intended user regarding the funded status of a pension plan**. The calculation and disclosure of this additional measure is **not intended to suggest that this is the "right" liability measure** for a pension plan. However, the ASB does believe that **this additional disclosure provides a more complete assessment of a plan's funded status and provides additional information regarding the security of benefits that members have earned as of the measurement date.**"

COMPARING THE ACCRUED LIABILITIES AND THE LDROM

One of the fundamental financial objectives of MPSERS is to finance each member's retirement benefits over the period from the member's date of hire until the member's projected date of retirement (entry age actuarial cost method) as a level percentage of payroll. To fulfill this objective, the discount rate that is used to value the accrued liabilities of MPSERS is set equal to the expected return on the System's diversified portfolio of assets (referred to sometimes as the investment return assumption). For MPSERS, the investment return assumption is 6.00%.

The LDROM is meant to approximately represent the lump sum cost to a plan to purchase low-default-risk fixed income securities whose resulting cash flows essentially replicate in timing and amount the benefits earned (or the costs accrued) as of the measurement date. The LDROM is very dependent upon market interest rates at the time of the LDROM measurement. The lower the market interest rates, the higher the LDROM, and vice versa. The LDROM results presented in this report are based on the projected unit credit actuarial cost method and discount rates based upon the September 2023 Treasury Yield Curve Spot Rates (monthly average). The 1-, 5-, 10-, and 30-year rates follow: 5.46%, 4.53%, 4.28%, and 4.42%.

Presented below are the actuarial accrued liability and the LDROM as of September 30, 2023 for MPSERS.

Type of Member	Valuation Accrued Liabilities	LDROM
Retirees	$ 62,555,744,414	$ 71,368,590,474
Deferreds	2,895,232,629	3,434,940,372
Actives	30,353,092,478	37,915,416,298
Totals	**$ 95,804,069,521**	**$ 112,718,947,144**

Low-Default-Risk Obligation Measure (Concluded)

COMMENTARY REGARDING THE LDROM

Some ways in which the LDROM can assist the MPSERS Board of Trustees in a decision-making process include:

(1) It provides information to potentially allow for better risk management for MPSERS.
(2) It places the appropriateness of potential employer contribution rate reductions or benefit enhancements in a better context.
(3) It provides more complete information regarding the benefit security of the membership's benefits earned as of the measurement date.
(4) It brings into consideration a potential value for a "withdrawal liability" for employers that may want to leave MPSERS.

Potentially Allows for Better Risk Management: A very useful risk metric to exhibit potential contribution rate volatility (or amortization period volatility for fixed rate plans) is the ratio of assets to payroll or AAL to payroll. How could we reduce that potential contribution rate volatility (or amortization period volatility for fixed rate plans)? The LDROM and liability driven investing (LDI) are closely related concepts.

Other than reducing benefits, all other things being equal, the only way to reduce that volatility is to immunize (i.e., LDI) a portion of the System's liability. This does not mean that the System needs to immunize all of the liability. For example, if they could immunize half of it, they could reduce the contribution rate volatility in half. This would require the actuary to use a cash flow matching method to value that portion of the liabilities. This means that the actuary would not use the System's investment return assumption for this portion of the liability, but the yield curve resulting from the fixed income portfolio that is being used to immunize the liability. The value of the assets (i.e., fixed income portfolio) and the value of the immunized liability would move in tandem with any changes (up or down) in future interest rates. The result being that the immunized portion of the System's liability would reduce the potential of producing new unfunded actuarial accrued liabilities. However, the fixed income portfolio would still have the minor potential for credit default risk.

Places the Appropriateness of Potential Employer Contribution Rate Reductions or Benefit Enhancements in a Better Context: Many PERS have adopted a funding policy. Many funding policies already take into account the System's funded ratio (based upon the AAL) when considering whether to allow for benefit enhancements or contribution rate reductions. For example, a System may not allow for a benefit enhancement if the funded ratio does not exceed a certain threshold. Similarly, a System may not allow for an employer contribution rate reduction in some circumstances. For example, a reduction to the employer normal cost contribution may not be allowed until the System reaches a funded ratio of 120%. Given the fact that most criteria are based upon the expectation of earning the investment return assumption, a System may want to consider extending these criteria to a funded ratio based upon the LDROM in addition to the AAL.

Provides more Complete Information Regarding the Benefit Security of the Membership's Benefits Earned as of the Measurement Date: Too often a high funded ratio (e.g., 100% funded) on an AAL basis is interpreted as benefit security for the participants. The fact that this funded ratio is based upon an expected measure is many times overlooked. If the AAL and LDROM measures are relatively close, then the System at least has the opportunity to make benefits payable in the future more secure.

SECTION B

FUNDING RESULTS

Present Value of Future Benefits and Accrued Liability

Determination of Unfunded Accrued Liability
as of September 30, 2023

	Non-Hybrid	PPP	PPP2	Total
A. Accrued Liability				
1. For retirees and beneficiaries	$ 62,537,178,302	$ 18,566,112	$ 0	$ 62,555,744,414
2. For vested and other terminated members [1]	2,633,235,831	146,952,475	9,838,607	2,790,026,913
3. For other inactive members [2]	105,205,716	0	0	105,205,716
4. For present active members				
a. Value of expected future benefit payments	35,897,043,390	3,911,799,459	2,008,103,578	41,816,946,427
b. Value of future normal costs	7,288,115,408	2,416,011,379	1,759,727,162	11,463,853,949
c. Active member accrued liability: (a) - (b)	28,608,927,982	1,495,788,080	248,376,416	30,353,092,478
5. Total accrued liability	93,884,547,831	1,661,306,667	258,215,023	95,804,069,521
B. Present Valuation Assets (Funding Value)	64,143,773,656	1,484,111,815	276,031,663	65,903,917,134
C. Unfunded Accrued Liability: (A.5) - (B)	29,740,774,175	177,194,852	(17,816,640)	29,900,152,387
D. Funding Ratio: (B) / (A.5)	68.3%	89.3%	106.9%	68.8%

[1] *Starting with the September 30, 2015 valuation, pending refunds of employee contributions for former employees who terminated without a vested benefit will be summarized with the vested and other terminated members. Prior to the September 30, 2015 valuation, these liabilities were summarized with the active liability.*

[2] *Includes liabilities for employees who transferred to the DC pension plan in connection with PA 300.*

Experience Gain/(Loss)

A. Derivation of Actuarial Gain/(Loss):		
1.	Unfunded Actuarial Accrued Liability (UAAL) - Previous Valuation	$ 35,067,083,805
2.	Total Normal Cost (employer plus member) for Year Ending 9/30/2023	1,171,798,336
3.	Total Contributions (employer plus member) for Year Ending 9/30/2023	5,292,462,085
4.	Interest on:	
	a. UAAL: Discount Rate* x (1)	2,104,025,029
	b. Normal Cost and Contributions: Discount Rate* / 2 x [(2) - (3)]	(123,619,913)
	c. Net Total: (a) + (b)	1,980,405,116
5.	Change in UAAL due to Benefit Changes	-
6.	Change in UAAL due to Assumption Changes	(3,454,585,985)
7.	Expected UAAL Current Year:	
	(1) + (2) - (3) + (4c) + (5) + (6)	29,472,239,187
8.	Actual UAAL Current Year	29,900,152,387
9.	Experience Gain/(Loss): (7) - (8)	(427,913,200)
B.	Approximate Portion of Gain/(Loss) due to Investments	(642,994,990)
C.	Approximate Portion of Gain/(Loss) due to Liabilities: (A.9) - (B)	215,081,790

** Discount rate is 6.00% for the Non-Hybrid group, the PPP group, and the PPP2 group.*

The schedule above shows the net, aggregate experience for the System. The next page shows this experience in detail. Please note that row B above includes the accelerated recognition of investment gains associated with the Dedicated Gains Policy, if applicable.

Detailed Experience Gain/(Loss)

Gains/(Losses) During the Year Ended September 30, 2023
Resulting from Differences Between Assumed and Actual Experience

Type of Activity	Gain/(Loss)
1. **Retirements** (including disability retirement). If members retire at older ages or with lower final average pay than assumed, there is a gain. If younger ages or higher average pays, a loss.	$ 85,340,117
2. **Withdrawal from Employment** (including death-in-service). If more liabilities are released by withdrawals and deaths than assumed, there is a gain. If smaller releases, a loss.	(32,476,683)
3. **Pay Increases.** If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	83,167,050
4. **Investment Income.** If there is greater investment income than assumed, there is a gain. If less income, a loss.	(642,994,990)
5. **Death After Retirement.** If retirants and inactive vested members live longer than assumed, there is a loss. If not as long, a gain.	99,585,867
6. **Rehires.**	7,479,499
7. **Other.** Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.	(28,014,060)
8. **Composite Gain/(Loss) During Year.**	$ (427,913,200)

Experience Gain/(Loss)

Five-Year History
(Amounts Shown in Millions)

Plan Year Ending September 30 [1]	Experience Gain/(Loss)	Gain/(Loss) Due to Investments	Actuarial Value of Investments	Investment Gain/(Loss) as % of Assets
2023	$ (428)	$ (643)	$ 65,904	(0.98)%
2022	(1,784)	(854)	63,075	(1.35)
2021	7,075	7,245	61,480	11.78
2020	(67)	(321)	52,587	(0.61)
2019	(1,101)	(577)	51,422	(1.12)

Plan Year Ending September 30	Gain/(Loss) Due to Liabilities	Actuarial Accrued Liability	Liability Gain/(Loss) as % of Accrued Liability
2023	$ 215	$ 95,804	0.22%
2022	(930)	98,142	(0.95)
2021	(170)	95,903	(0.18)
2020	254	86,338	0.29
2019	(524)	85,202	(0.61)

[1] *The gain/(loss) due to investments includes the accelerated recognition of investment gains associated with the Dedicated Gains Policy, if applicable.*

Historical Funding Levels for Actuarial Accrued Liabilities

(Amounts Shown in Millions)

Valuation Date September 30	Actuarial Accrued Liability	Actuarial Value of Assets	Funded Ratio	Unfunded/(Overfunded) Accrued Liability	Active [3] Member Reported Payroll	Unfunded/(Overfunded) As % of Active Payroll
2012	$ 64,281	$ 38,450	59.8 %	$ 25,831	$ 8,649	298.7%
2012 [1]	63,277	38,450	60.8	24,827	8,649	287.1
2012 [2]	62,716	38,450	61.3	24,266	8,649	280.6
2013 [1]	63,840	38,044	59.6	25,796	8,273	311.8
2014	65,050	39,626	60.9	25,424	8,167	311.3
2014 [1]	66,105	39,626	59.9	26,479	8,167	324.2
2015	67,728	41,006	60.5	26,721	8,264	323.3
2016	68,858	43,204	62.7	25,654	8,206	312.6
2016 [1]	72,310	43,204	59.7	29,107	8,206	354.7
2017	73,327	45,397	61.9	27,930	8,221	339.7
2017 [1]	76,693	47,255	61.6	29,438	8,221	358.1
2018	77,865	49,313	63.3	28,552	8,300	344.0
2018 [1]	83,375	50,630	60.7	32,745	8,300	394.5
2019	85,202	51,422	60.4	33,780	8,691	388.7
2020	86,338	52,587	60.9	33,750	8,716	387.2
2021	87,773	55,985	63.8	31,788	8,901	357.1
2021 [1]	95,903	61,480	64.1	34,424	8,901	386.7
2022	98,142	63,075	64.3	35,067	9,607	365.0
2023	99,259	65,904	66.4	33,355	9,991	333.9
2023 [1]	95,804	65,904	68.8	29,900	9,991	299.3

1 *Revised actuarial assumptions and/or methods.*

2 *Change in plan provisions.*

3 *Payroll for UAAL purposes (Total MPSERS Payroll).*

Computed and Actual Employer Contributions
Historical Comparison

(Amounts Shown in Millions)

Fiscal Year Ending September 30 [4]	Valuation Date September 30	Contribution Rates As Percents of Valuation Payroll: Non-Hybrid Normal Cost	PPP Normal Cost	PPP2 Normal Cost	Amortization Payment	Actual Payroll	Employer Contribution for Fiscal Year: Computed [6]	Actual
2014	2012 [2,3]	4.31 %	3.23 %		18.76 %	$ 8,895.1	$ 2,004.8	$ 1,600.4
2015	2012 [2,3]	4.31	3.23		18.76	8,426.8	1,917.9	1,967.6
2016	2013 [1]	4.39	3.17		21.18	8,510.2	2,156.3	2,308.7
	2014	4.41	3.13		21.32	8,453.0	2,149.3	-
2017	2014 [1]	3.76	3.13		22.30	8,453.0	2,185.5	2,399.0
2018	2015	3.75	3.07	6.20 %	22.18	8,583.7	2,204.6	2,791.5
	2016	3.75	3.05	6.20	21.91	8,801.1	2,233.5	-
2019	2016 [1]	4.86	3.05	6.20	24.01	8,801.1	2,495.5	2,706.7
	2017	4.85	3.06	6.20	23.67	8,916.3	2,492.0	-
	2017 [1]	6.02	3.06	6.20	24.07	8,916.3	2,607.2	-
2020	2017 [2]	6.02	3.06	6.20	24.07	8,916.3	2,607.2	2,808.8
	2018	6.03	3.09	6.20	22.77	9,084.5	2,533.1	-
2021	2018 [1]	6.39	3.43	6.20	26.70	9,084.5	2,918.5	3,081.0
2022	2019	6.41	3.49	6.20	28.29	9,769.3	3,281.8	3,843.2
2023	2020	6.41	3.49	6.20	30.14	10,127.8	3,571.7	4,842.6
	2021	6.42	3.52	6.20	28.54			
2024 [5]	2021 [1]	9.13	5.27	6.20	30.56			
2025 [5]	2022 [1]	9.15	5.31	6.20	30.62			
	2023	9.17	5.34	6.20	29.62			
2026 [5]	2023 [1]	10.87	6.13	6.00	27.45			

1 *Revised actuarial assumptions and/or methods.*

2 *Change in plan provisions.*

3 *Incorporates re-amortization of ERI over a 10-year period, rather than a 5-year period.*

4 *Effective with fiscal year 2014, the normal cost rate and the amortization payment rate are applied to different payrolls and cannot be added.*

5 *For the fiscal years ending September 30, 2024 and beyond, the actual payroll and actual contribution are not yet known.*

6 *Computed amounts do not include reconciliation payments required by subsection 41(9) of the MPSERS Statute.*

Historical Funding Levels for Prioritized Actuarial Accrued Liability

Valuation Date September 30	Actuarial Accrued Liability ($ in Millions) (1) Active Member Contributions	(2) Retirants and Beneficiaries	(3) Active and Inactive Members (Employer Financed Portion)	Valuation Assets ($ in Millions)	Portion of Actuarial Accrued Liability Covered by Assets (1)	(2)	(3)	(4) [3]
2012	$ 5,296	$ 42,076	$ 16,909	$ 38,450	100.0%	78.8%	0.0%	59.8%
2012 [1]	5,296	42,076	15,905	38,450	100.0	78.8	0.0	60.8
2012 [2]	5,296	42,076	15,344	38,450	100.0	78.8	0.0	61.3
2013 [1]	4,909	43,198	15,733	38,044	100.0	76.7	0.0	59.6
2014	5,225	44,126	15,699	39,626	100.0	78.0	0.0	60.9
2014 [1]	5,225	45,545	15,335	39,626	100.0	75.5	0.0	59.9
2015	5,738	46,538	15,452	41,006	100.0	75.8	0.0	60.5
2016	6,189	47,431	15,238	43,204	100.0	78.0	0.0	62.7
2016 [1]	6,189	49,299	16,822	43,204	100.0	75.1	0.0	59.7
2017	6,730	50,069	16,528	45,397	100.0	77.2	0.0	61.9
2017 [1]	6,730	51,878	18,085	47,255	100.0	78.1	0.0	61.6
2018	7,479	52,633	17,753	49,313	100.0	79.5	0.0	63.3
2018 [1]	7,479	56,834	19,062	50,630	100.0	75.9	0.0	60.7
2019	8,106	57,716	19,380	51,422	100.0	75.1	0.0	60.4
2020	8,329	58,699	19,310	52,587	100.0	75.4	0.0	60.9
2021	8,550	59,769	19,454	55,985	100.0	79.4	0.0	63.8
2021 [1]	8,550	64,089	23,264	61,480	100.0	82.6	0.0	64.1
2022	8,851	65,070	24,221	63,075	100.0	83.3	0.0	64.3
2023	9,013	65,807	24,439	65,904	100.0	86.5	0.0	66.4
2023 [1]	9,013	62,556	24,235	65,904	100.0	90.9	0.0	68.8

[1] *Revised actuarial assumptions and/or methods.*
[2] *Change in plan provisions.*
[3] *Percent funded on a total valuation asset and total actuarial accrued liability basis.*

Financial Objective Achievement Indicators – Historical Comparison

(Dollar Amounts in Millions)

Valuation September 30	Valuation Assets	Termination Indicator [3] Actuarial Present Value of Vested Benefits	Funded Ratio	Experience Indicator Actuarial Gain/(Loss)
2012	$ 38,450	$ 57,372	67.0 %	$ (2,673)
2012 [1]	38,450	57,372	67.0	(2,673)
2012 [2]	38,450	57,369	67.0	(2,673)
2013 [1]	38,044	58,395	65.1	(399)
2014	39,626	59,505	66.6	1,084
2014 [1]	39,626	61,254	64.7	1,084
2015	41,006	62,735	65.4	111
2016	43,204	63,865	67.6	1,108
2016 [1]	43,204	66,777	64.7	1,108
2017	45,397	67,815	66.9	3,077
2017 [1]	47,255	70,701	66.8	3,077
2018	49,313	71,937	68.6	1,863
2018 [1]	50,630	77,740	65.1	1,863
2019	51,422	79,612	64.6	(1,101)
2020	52,587	80,838	65.1	(67)
2021	55,985	82,397	67.9	7,075
2021 [1]	61,480	89,675	68.6	7,075
2022	63,075	91,973	68.6	(1,784)
2023	65,904	93,559	70.4	(428)
2023 [1]	65,904	90,350	72.9	(428)

[1] *Revised actuarial assumptions and/or methods.*

[2] *Change in plan provisions.*

[3] *Based upon the actuarial assumptions used for funding purposes, including the assumed rate of investment return.*

SECTION C

FUND ASSETS

Statement of Plan Net Assets (Assets at Market or Fair Value)

	September 30	
	2022	2023
Equity in Common Cash	$ 206,201,402	$ 242,060,614
Total Receivables	231,246,438	180,991,188
Short Term Investment Pools	490,200,302	2,554,453,919
Fixed Income Pools	5,529,843,358	5,640,289,589
Domestic Equity Pools	10,709,751,720	12,191,484,942
Real Estate and Infrastructure Pools	6,486,403,247	6,422,748,109
Private Equity Pools	15,113,203,439	14,921,770,592
International Equity Pools	7,310,055,716	8,207,996,557
Absolute Return Pools	6,060,061,917	6,585,074,010
Real Return and Opportunistic Pools	7,078,411,436	6,783,566,138
Securities Lending Collateral less Obligations	0	0
Total Assets	59,215,378,975	63,730,435,658
Other Liabilities	(18,824,092)	(7,618,862)
Net Assets Held in Trust for Pension Benefits	$59,196,554,883	$63,722,816,796

Note: Asset amounts exclude assets held for health benefits.

Reconciliation of Plan Assets

	September 30, 2023			
	Non-Hybrid	PPP	PPP2	Total
Market Value, Beginning of Year	$ 57,822,968,577	$ 1,203,964,069	$ 169,622,237	$ 59,196,554,883
Additions				
Member Contributions	328,859,848	75,934,357	45,112,159	449,906,364
Employer Contributions	4,745,618,647	51,824,915	45,112,159	4,842,555,721
Net Investment Income[1]	4,708,699,228	103,498,659	17,537,729	4,829,735,616
Audit Adjustment[2]	0	0	0	0
Other Additions	37,120	0	0	37,120
Total Additions	9,783,214,843	231,257,931	107,762,047	10,122,234,821
Deductions				
Benefit Payments	5,533,790,065	1,159,277	0	5,534,949,342
Contribution Refunds/Transfers	30,165,953	3,352,882	564,038	34,082,873
Administrative Expenses[1]	26,265,541	577,325	97,827	26,940,693
Total Deductions	5,590,221,559	5,089,484	661,865	5,595,972,908
Market Value, End of Year	$ 62,015,961,861	$ 1,430,132,516	$ 276,722,419	$ 63,722,816,796

	September 30, 2022			
	Non-Hybrid	PPP	PPP2	Total
Market Value, Beginning of Year	$ 62,075,494,850	$ 1,146,405,511	$ 110,255,112	$ 63,332,155,473
Additions				
Member Contributions	329,590,831	71,584,106	33,236,370	434,411,307
Employer Contributions	3,763,813,341	46,166,620	33,236,370	3,843,216,331
Net Investment Income[1]	(2,869,080,058)	(56,242,576)	(6,697,254)	(2,932,019,888)
Audit Adjustment[2]	0	0	0	0
Other Additions	89,080	89	0	89,169
Total Additions	1,224,413,194	61,508,239	59,775,486	1,345,696,919
Deductions				
Benefit Payments	5,423,761,240	569,551	0	5,424,330,791
Contribution Refunds/Transfers	29,904,430	2,923,894	354,033	33,182,357
Administrative Expenses[1]	23,273,797	456,236	54,328	23,784,361
Total Deductions	5,476,939,467	3,949,681	408,361	5,481,297,509
Market Value, End of Year	$ 57,822,968,577	$ 1,203,964,069	$ 169,622,237	$ 59,196,554,883

1 *Net investment income and administrative expenses are allocated amongst Non-Hybrid, PPP, and PPP2 assets, since this information was not provided.*

2 *Includes any adjustment for the difference between the amount submitted as Net Position Beginning of Year for the current report and the amount submitted as Net Position End of Year for the prior report. The adjustment was allocated amongst Non-Hybrid, PPP, and PPP2 in proportion to prior year's end of year market values.*

Development of Valuation Assets – Non-Hybrid

Year Ended September 30	2023	2024	2025	2026	2027
A. Funding Value Beginning of Year	$ 61,603,976,359				
B. Market Value					
B1. Market Value End of Year	62,015,961,861				
B2. Market Value Beginning of Year	57,822,968,577				
B3. Audit Adjustment	-				
C. Non-Investment Net Cash Flow					
C1. Member Contributions	328,859,848				
C2. Employer Contributions	4,745,618,647				
C3. Benefit Payments	(5,533,790,065)				
C4. Contribution Refunds / Transfers	(30,165,953)				
C5. Administrative Expenses	(26,265,541)				
C6. University Employer Contribution Refund	-				
C7. Other	37,120				
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	(515,705,944)				
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	4,708,699,228				
D2. Assumed Rate of Return	6.00%	6.00%			
D3. Market Rate of Return	8.18%				
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%				
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	-				
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	3,680,767,403				
D7. Amount Subject to Phase-In: D1 - D5 - D6	1,027,931,825				
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	205,586,365				
E2. First Prior Year	(1,288,456,200)	$ 205,586,365			
E3. Second Prior Year	457,605,673	(1,288,456,200)	$ 205,586,365		
E4. Third Prior Year	-	457,605,673	(1,288,456,200)	$ 205,586,365	
E5. Fourth Prior Year	-	-	457,605,673	(1,288,456,201)	$ 205,586,365
E6. Total Phase-Ins	(625,264,162)	(625,264,162)	(625,264,162)	(1,082,869,836)	205,586,365
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 64,143,773,656				
F2. Corridor Percent	30%				
F3. Upper Corridor Limit: (100% + F2) x B1	80,620,750,419				
F4. Lower Corridor Limit: (100% - F2) x B1	43,411,173,303				
F5. Funding Value End of Year	$ 64,143,773,656				
G. Difference Between Market and Funding Value	(2,127,811,795)				
H. Recognized Rate of Return	4.98%				
I. Market Rate of Return	8.18%				
J. Ratio of Funding Value to Market Value	1.0343				

Development of Valuation Assets – Non-Hybrid (Concluded)

Year Ended September 30	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	$ 46,891,221,716	$ 50,124,791,376	$ 50,760,412,779	$ 51,738,405,932	$ 60,245,072,158
B. Market Value					
B1. Market Value End of Year	49,825,244,512	50,193,099,454	50,617,204,251	62,075,494,850	57,822,968,577
B2. Market Value Beginning of Year	46,633,503,623	49,825,244,512	50,193,099,454	50,617,204,251	62,075,494,850
B3. Audit Adjustment	-	-	76,441,034	-	-
C. Non-Investment Net Cash Flow					
C1. Member Contributions	334,921,638	334,818,461	324,476,861	325,836,072	329,590,831
C2. Employer Contributions	2,754,634,743	2,656,469,201	2,746,627,196	2,999,023,749	3,763,813,341
C3. Benefit Payments	(4,934,628,372)	(5,058,614,101)	(5,183,108,849)	(5,309,327,012)	(5,423,761,240)
C4. Contribution Refunds / Transfers	(26,587,845)	(27,490,889)	(25,468,541)	(24,426,836)	(29,904,430)
C5. Administrative Expenses	Included in D1	(27,416,895)	(22,778,986)	(22,815,023)	(23,273,797)
C6. University Employer Contribution Refund	-	-	-	-	-
C7. Other	502,593	202,305	73,860	132,020	89,080
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	(1,871,157,243)	(2,122,031,918)	(2,160,178,459)	(2,031,577,030)	(1,383,446,215)
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	5,062,898,132	2,489,886,860	2,507,842,222	13,489,867,629	(2,869,080,058)
D2. Assumed Rate of Return	7.05%	6.80%	6.80%	6.80%	6.00%
D3. Market Rate of Return	11.08%	5.11%	5.10%	27.20%	(4.67)%
D4. Dedicated Gains Policy Trigger (Excess Return %)	3.57%	0.00%	0.00%	15.63%	0.00%
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	1,631,415,923	-	-	7,752,701,280	-
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	3,239,872,838	3,336,336,728	3,383,459,992	3,449,137,984	3,573,200,943
D7. Amount Subject to Phase-In: D1 - D5 - D6	191,609,371	(846,449,868)	(875,617,770)	2,288,028,365	(6,442,281,001)
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	38,321,874	(169,289,974)	(175,123,554)	457,605,673	(1,288,456,200)
E2. First Prior Year	10,518,708	38,321,874	(169,289,974)	(700,494,216)	457,605,673
E3. Second Prior Year	(26,156,470)	10,518,708	38,321,874	(507,869,920)	-
E4. Third Prior Year	(432,077,546)	(26,156,470)	10,518,708	76,643,749	-
E5. Fourth Prior Year	642,831,576	(432,077,545)	(26,156,468)	10,518,706	-
E6. Total Phase-Ins	233,438,142	(578,683,407)	(321,729,414)	(663,596,008)	(830,850,527)
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 50,124,791,376	$ 50,760,412,779	$ 51,738,405,932	$ 60,245,072,158	$ 61,603,976,359
F2. Corridor Percent	30%	30%	30%	30%	30%
F3. Upper Corridor Limit: (100% + F2) x B1	64,772,817,866	65,251,029,290	65,802,365,526	80,698,143,305	75,169,859,150
F4. Lower Corridor Limit: (100% - F2) x B1	34,877,671,158	35,135,169,618	35,432,042,976	43,452,846,395	40,476,078,004
F5. Funding Value End of Year	$ 50,124,791,376	$ 50,760,412,779	$ 51,738,405,932	$ 60,245,072,158	$ 61,603,976,359
G. Difference Between Market and Funding Value	(299,546,864)	(567,313,325)	(1,121,201,681)	1,830,422,692	(3,781,007,782)
H. Recognized Rate of Return	11.11%	5.62%	6.15%	20.78%	4.60%
I. Market Rate of Return	11.08%	5.11%	5.10%	27.20%	(4.67)%
J. Ratio of Funding Value to Market Value	1.0060	1.0113	1.0222	0.9705	1.0654

Development of Valuation Assets – PPP

Year Ended September 30	2023	2024	2025	2026	2027
A. Funding Value Beginning of Year	$ 1,298,445,330				
B. Market Value					
B1. Market Value End of Year	1,430,132,516				
B2. Market Value Beginning of Year	1,203,964,069				
B3. Audit Adjustment	-				
C. Non-Investment Net Cash Flow					
C1. Member Contributions	75,934,357				
C2. Employer Contributions	51,824,915				
C3. Benefit Payments	(1,159,277)				
C4. Contribution Refunds / Transfers	(3,352,882)				
C5. Administrative Expenses	(577,325)				
C6. University Employer Contribution Refund	-				
C7. Other	-				
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	122,669,788				
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	103,498,659				
D2. Assumed Rate of Return	6.00%	6.00%			
D3. Market Rate of Return	8.18%				
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%				
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	-				
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	81,586,813				
D7. Amount Subject to Phase-In: D1 - D5 - D6	21,911,846				
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	4,382,369				
E2. First Prior Year	(25,563,805)	$ 4,382,369			
E3. Second Prior Year	2,591,320	(25,563,805)	$ 4,382,369		
E4. Third Prior Year	-	2,591,320	(25,563,805)	$ 4,382,369	
E5. Fourth Prior Year	-	-	2,591,318	(25,563,804)	$ 4,382,370
E6. Total Phase-Ins	(18,590,116)	(18,590,116)	(18,590,118)	(21,181,435)	4,382,370
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 1,484,111,815				
F2. Corridor Percent	30%				
F3. Upper Corridor Limit: (100% + F2) x B1	1,859,172,271				
F4. Lower Corridor Limit: (100% - F2) x B1	1,001,092,761				
F5. Funding Value End of Year	$ 1,484,111,815				
G. Difference Between Market and Funding Value	(53,979,299)				
H. Recognized Rate of Return	4.63%				
I. Market Rate of Return	8.18%				
J. Ratio of Funding Value to Market Value	1.0377				

Development of Valuation Assets – PPP (Concluded)

Year Ended September 30	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	$ 364,064,848	$ 503,115,658	$ 643,828,805	$ 800,373,912	$ 1,136,040,233
B. Market Value					
B1. Market Value End of Year	515,794,960	646,368,116	790,728,659	1,146,405,511	1,203,964,069
B2. Market Value Beginning of Year	378,279,448	515,794,960	646,368,116	790,728,659	1,146,405,511
B3. Audit Adjustment	-	-	984,379	-	-
C. Non-Investment Net Cash Flow					
C1. Member Contributions	56,952,770	60,839,621	62,566,214	66,112,960	71,584,106
C2. Employer Contributions	35,687,730	42,961,053	47,786,982	60,408,727	46,166,620
C3. Benefit Payments	(9,996)	(9,996)	(20,457)	(186,876)	(569,551)
C4. Contribution Refunds / Transfers	(2,044,166)	(1,830,190)	(2,379,689)	(2,150,221)	(2,923,894)
C5. Administrative Expenses	Included in D1	(318,571)	(324,701)	(392,179)	(456,236)
C6. University Employer Contribution Refund	-	-	-	-	-
C7. Other	1,262	-	-	-	89
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	90,587,600	101,641,917	107,628,349	123,792,411	113,801,134
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	46,927,912	28,931,239	35,747,815	231,884,441	(56,242,576)
D2. Assumed Rate of Return	7.00%	6.80%	6.80%	6.80%	6.00%
D3. Market Rate of Return	11.08%	5.11%	5.10%	27.20%	(4.67)%
D4. Dedicated Gains Policy Trigger (Excess Return %)	3.52%	0.00%	0.00%	18.80%	0.00%
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	14,909,778	-	-	160,293,475	-
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	28,655,105	37,667,690	47,506,660	58,634,368	71,576,448
D7. Amount Subject to Phase-In: D1 - D5 - D6	3,363,029	(8,736,451)	(11,758,845)	12,956,598	(127,819,024)
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	672,606	(1,747,290)	(2,351,769)	2,591,320	(25,563,805)
E2. First Prior Year	3,658,484	672,606	(1,747,290)	(9,407,076)	2,591,320
E3. Second Prior Year	193,690	3,658,484	672,606	(5,241,871)	-
E4. Third Prior Year	(1,373,952)	193,690	3,658,484	1,345,211	-
E5. Fourth Prior Year	1,747,499	(1,373,950)	193,688	3,658,483	-
E6. Total Phase-Ins	4,898,327	1,403,540	425,719	(7,053,933)	(22,972,485)
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 503,115,658	$ 643,828,805	$ 800,373,912	$ 1,136,040,233	$ 1,298,445,330
F2. Corridor Percent	30%	30%	30%	30%	30%
F3. Upper Corridor Limit: (100% + F2) x B1	670,533,448	840,278,551	1,027,947,257	1,490,327,164	1,565,153,290
F4. Lower Corridor Limit: (100% - F2) x B1	361,056,472	452,457,681	553,510,061	802,483,858	842,774,848
F5. Funding Value End of Year	$ 503,115,658	$ 643,828,805	$ 800,373,912	$ 1,136,040,233	$ 1,298,445,330
G. Difference Between Market and Funding Value	12,679,302	2,539,311	(9,645,253)	10,365,278	(94,481,261)
H. Recognized Rate of Return	11.84%	7.05%	6.86%	24.57%	4.07%
I. Market Rate of Return	11.08%	5.11%	5.10%	27.20%	(4.67)%
J. Ratio of Funding Value to Market Value	0.9754	0.9961	1.0122	0.9910	1.0785

Development of Valuation Assets – PPP2

Year Ended September 30	2023	2024	2025	2026	2027
A. Funding Value Beginning of Year	$ 172,568,914				
B. Market Value					
B1. Market Value End of Year	276,722,419				
B2. Market Value Beginning of Year	169,622,237				
B3. Audit Adjustment	-				
C. Non-Investment Net Cash Flow					
C1. Member Contributions	45,112,159				
C2. Employer Contributions	45,112,159				
C3. Benefit Payments	-				
C4. Contribution Refunds / Transfers	(564,038)				
C5. Administrative Expenses	(97,827)				
C6. University Employer Contribution Refund	-				
C7. Other	-				
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	89,562,453				
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	17,537,729				
D2. Assumed Rate of Return	6.00%	6.00%			
D3. Market Rate of Return	8.18%				
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%				
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	-				
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	13,041,008				
D7. Amount Subject to Phase-In: D1 - D5 - D6	4,496,721				
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	899,344				
E2. First Prior Year	(2,919,474)	$ 899,344			
E3. Second Prior Year	2,955,194	(2,919,474)	$ 899,344		
E4. Third Prior Year	(58,587)	2,955,194	(2,919,474)	$ 899,344	
E5. Fourth Prior Year	(17,189)	(58,589)	2,955,196	(2,919,474)	$ 899,345
E6. Total Phase-Ins	859,288	876,475	935,066	(2,020,130)	899,345
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 276,031,663				
F2. Corridor Percent	30%				
F3. Upper Corridor Limit: (100% + F2) x B1	359,739,145				
F4. Lower Corridor Limit: (100% - F2) x B1	193,705,693				
F5. Funding Value End of Year	$ 276,031,663				
G. Difference Between Market and Funding Value	690,756				
H. Recognized Rate of Return	6.40%				
I. Market Rate of Return	8.18%				
J. Ratio of Funding Value to Market Value	0.9975				

Development of Valuation Assets – PPP2 [1] (Concluded)

Year Ended September 30	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	$ 0	$ 2,426,660	$ 17,747,076	$ 48,565,425	$ 98,636,406
B. Market Value					
B1. Market Value End of Year	2,458,933	17,702,525	48,295,645	110,255,112	169,622,237
B2. Market Value Beginning of Year	-	2,458,933	17,702,525	48,295,645	110,255,112
B3. Audit Adjustment	-	-	26,960	-	-
C. Non-Investment Net Cash Flow					
C1. Member Contributions	1,184,765	7,488,483	14,583,213	21,581,473	33,236,370
C2. Employer Contributions	1,186,390	7,282,283	14,425,234	21,581,473	33,236,370
C3. Benefit Payments	-	-	-	-	-
C4. Contribution Refunds / Transfers	(219)	(23,552)	(68,631)	(150,682)	(354,033)
C5. Administrative Expenses	Included in D1	(5,527)	(14,908)	(32,099)	(54,328)
C6. University Employer Contribution Refund	-	-	-	-	-
C7. Other	-	-	-	-	-
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	2,370,936	14,741,687	28,924,908	42,980,165	66,064,379
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	87,997	501,905	1,641,252	18,979,302	(6,697,254)
D2. Assumed Rate of Return	6.00%	6.00%	6.00%	6.00%	6.00%
D3. Market Rate of Return	11.08%	5.11%	5.10%	27.20%	(4.67)%
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%	0.00%	0.00%	0.00%	0.00%
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	-	-	-	-	-
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	47,656	587,850	1,934,189	4,203,330	7,900,116
D7. Amount Subject to Phase-In: D1 - D5 - D6	40,341	(85,945)	(292,937)	14,775,972	(14,597,370)
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	8,068	(17,189)	(58,587)	2,955,194	(2,919,474)
E2. First Prior Year	-	8,068	(17,189)	(58,587)	2,955,194
E3. Second Prior Year	-	-	8,068	(17,189)	(58,587)
E4. Third Prior Year	-	-	-	8,068	(17,189)
E5. Fourth Prior Year	-	-	-	-	8,069
E6. Total Phase-Ins	8,068	(9,121)	(67,708)	2,887,486	(31,987)
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 2,426,660	$ 17,747,076	$ 48,565,425	$ 98,636,406	$ 172,568,914
F2. Corridor Percent	30%	30%	30%	30%	30%
F3. Upper Corridor Limit: (100% + F2) x B1	3,196,613	23,013,283	62,784,339	143,331,646	220,508,908
F4. Lower Corridor Limit: (100% - F2) x B1	1,721,253	12,391,768	33,806,952	77,178,578	118,735,566
F5. Funding Value End of Year	$ 2,426,660	$ 17,747,076	$ 48,565,425	$ 98,636,406	$ 172,568,914
G. Difference Between Market and Funding Value	32,273	(44,551)	(269,780)	11,618,706	(2,946,677)
H. Recognized Rate of Return	7.02%	5.91%	5.79%	10.12%	5.98%
I. Market Rate of Return	11.08%	5.11%	5.10%	27.20%	(4.67)%
J. Ratio of Funding Value to Market Value	0.9869	1.0025	1.0056	0.8946	1.0174

[1] *In fiscal year 2018, the formulas have been adjusted to account for the PPP2 beginning February 1, 2018.*

History of Approximate Investment Return Rates

Plan Year Ending September 30	Approximate Rate of Return [1] Market Value	Actuarial Value Non-Hybrid	PPP	PPP2
2014	15.90 %	10.84 %	9.88 %	
2015	2.14	9.57	7.88	
2016	7.42	10.48	7.72	
2017	13.09	14.40	8.62	
2018	11.08	11.11	11.84	7.02 %
2019	5.11	5.62	7.05	5.91
2020	5.10	6.15	6.86	5.79
2021	27.20	20.78	24.57	10.12
2022	(4.67)	4.60	4.07	5.98
2023	8.18	4.98	4.63	6.40
Average Returns:				
Last five years:	7.70 %	8.26 %	9.18 %	6.83 %
Last ten years:	8.76 %	9.75 %	9.18 %	6.86 %

[1] *Approximate return based on ratio of total investment return to average asset value, using an assumed beginning-of-year timing of audit adjustments (if any) and an assumed mid-year timing of other asset flows, unless otherwise noted.*

Please note, starting in fiscal year 2017, the return on the actuarial value of assets may be impacted by the accelerated recognition of investment return under the Dedicated Gains Policy.

Historical Growth of Assets at Market Value

Fiscal Year Ended September 30	Revenues by Source			Expenses by Type			Market Value of Assets
	Member Contributions	Employer Contributions	Net Investment Income [1]	Retirement Benefits	Return of Contributions and Transfers	Administrative Expenses	
2004	$ 456,352,606	$ 697,647,338	$ 4,130,642,038	$ 2,358,216,073	$ 18,403,233	$ 19,374,673	$ 36,288,506,853
2005	368,240,837	774,277,778	4,530,606,037	2,558,017,710	22,166,261	19,997,954	39,361,449,580
2006	518,599,720	995,932,425	4,927,177,496	2,761,292,217	24,024,234	22,501,098	42,995,341,672
2007	356,761,212	835,366,382	7,177,114,740	2,944,920,179	32,241,730	24,489,202	48,362,932,895
2008	399,256,616	999,374,879	(7,398,629,969)	3,117,434,847	32,720,146	24,740,628	39,188,038,800
2009	357,249,466	1,000,375,355	(2,712,429,401)	3,278,118,116	33,943,530	22,793,011	34,498,379,563
2010	377,748,755	1,001,251,673	3,563,025,960	3,525,020,341	33,907,066	26,000,699	35,855,477,845
2011	332,209,134	1,156,060,903	1,332,447,630	3,942,027,101	36,588,623	22,926,393	34,674,653,395
2012	335,470,879	1,454,438,907	5,387,076,055	4,082,242,506	31,865,139	37,119,630	37,700,411,961
2013	385,007,587	1,364,136,462	4,859,910,264	4,238,482,066	30,442,439	25,002,153	40,015,539,616
2014	405,443,772	1,600,375,132	6,192,710,860	4,388,328,518	28,840,649	23,711,249	43,773,188,964
2015	395,722,292	1,967,610,696	938,143,040	4,530,914,738	136,902,057 [2]	24,487,325	42,382,360,872
2016	398,893,138	2,308,657,030	3,095,177,500	4,671,299,698	26,996,969 [2]	26,213,125	43,460,578,748
2017	427,988,238	2,398,950,106	5,583,469,496	4,806,958,754	26,111,404	26,133,359	47,011,783,071
2018	393,059,173	2,791,508,863	5,136,369,857	4,934,638,368	28,632,230	25,951,961	50,343,498,405
2019	403,146,565	2,706,712,537	2,519,522,309	5,058,624,097	29,344,631	27,740,993	50,857,170,095
2020	401,626,288	2,808,839,412	2,622,757,522	5,183,129,306	27,916,861	23,118,595	51,456,228,555
2021	413,530,505	3,081,013,949	13,740,863,392	5,309,513,888	26,727,739	23,239,301	63,332,155,473
2022	434,411,307	3,843,216,331	(2,931,930,719)	5,424,330,791	33,182,357	23,784,361	59,196,554,883
2023	449,906,364	4,842,555,721	4,829,772,736	5,534,949,342	34,082,873	26,940,693	63,722,816,796

[1] *Includes miscellaneous income and other changes in net assets/reserves/fund balances and net of investment expenses.*
[2] *Includes University employer contribution refund.*

Note: Data for the year 2005 and prior years was provided by the State of Michigan Department of Technology, Management and Budget – Financial Services.

SECTION D

CENSUS DATA

Summary of Participant Data by Category

	As of September 30	
	2022	**2023**
Retirees and beneficiaries currently receiving benefits:		
Regular benefits	199,831	200,440
Survivor benefits	19,870	20,272
Disability benefits	5,514	5,375
Total	225,215	226,087
Current Employees:		
Vested	86,386	84,797
Non-Vested	68,843	67,439
Total	155,229	152,236
Inactive employees entitled to benefits and not yet receiving them:	18,144	17,699
Total Participants	398,588	396,022

The September 30, 2022 inactive counts include 2,664 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300. All counts exclude 41,876 people hired after PA 300 who elected to participate in the pure defined contribution plan and 6,874 active records (6,673 reported with a DB plan code and 201 reported with a DC plan code) with both $0 salary and 0 service provided in the September 30, 2022 valuation data. It is our understanding that active records with both $0 salary and 0 service correspond to recently hired members who are still within the PPP2/DC election window. UAAL contributions are expected to continue to be collected on the payroll of these members in the future.

The September 30, 2023 inactive counts include 2,452 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300. All counts exclude 48,792 people hired after PA 300 who elected to participate in the pure defined contribution plan and 6,808 active records (6,575 reported with a DB plan code and 233 reported with a DC plan code) with both $0 salary and 0 service provided in the September 30, 2023 valuation data. It is our understanding that active records with both $0 salary and 0 service correspond to recently hired members who are still within the PPP2/DC election window. UAAL contributions are expected to continue to be collected on the payroll of these members in the future.

Retirees and Beneficiaries – Historical Comparison

Year Ended September 30	Rolls End of Year		Annual % Increase		Average Annual Benefit
	Number	Annual Benefit[1]	Number	Benefits	
2004	145,378	$ 2,431,636	4.0%	8.0%	$ 16,726
2005	151,706	2,644,700	4.4	8.8	17,433
2006	157,163	2,828,460	3.6	6.9	17,997
2007	162,844	3,013,075	3.6	6.5	18,503
2008	167,265	3,171,261	2.7	5.3	18,960
2009	171,922	3,336,165	2.8	5.2	19,405
2010	187,722	3,814,755	9.2	14.3	20,321
2011	192,435	3,987,227	2.5	4.5	20,720
2012	196,661	4,134,218	2.2	3.7	21,022
2013	200,952	4,289,281	2.2	3.8	21,345
2014	204,512	4,431,065	1.8	3.3	21,667
2015	207,651	4,568,852	1.5	3.1	22,003
2016	211,007	4,709,668	1.6	3.1	22,320
2017	213,989	4,839,414	1.4	2.8	22,615
2018	216,618	4,967,055	1.2	2.6	22,930
2019	218,937	5,087,367	1.1	2.4	23,237
2020	221,478	5,212,106	1.2	2.5	23,533
2021	223,767	5,334,628	1.0	2.4	23,840
2022	225,215	5,447,652	0.6	2.1	24,189
2023	226,087	5,548,627	0.4	1.9	24,542

[1] *In thousands of dollars.*

Retirees and Beneficiaries
as of September 30, 2023
By Type of Retirement and Selected Option

Amount of Monthly Benefit	Number of Retirees	Type of Retirement*						Selected Option**				
		1	2	3	4	5	6	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt 1E 2E,3E,4E
$ 1 - 400	32,476	28,258	2,692	115	1,027	4	380	16,756	8,529	4,971	866	1,354
401 - 800	33,732	29,015	2,179	144	1,818	3	573	17,148	7,708	6,107	1,341	1,428
801 - 1,200	22,420	18,953	1,661	69	1,230	3	504	10,419	5,038	4,551	1,134	1,278
1,201 - 1,600	17,686	14,715	1,755	27	779	1	409	7,504	4,055	3,573	1,133	1,421
1,601 - 2,000	15,598	12,956	1,694	16	573	3	356	6,056	3,589	3,270	1,114	1,569
2,001 - 2,400	16,075	14,056	1,304	3	438	2	272	5,987	3,776	3,292	1,285	1,735
2,401 - 2,800	17,217	15,590	1,087	5	296	1	238	6,399	4,162	3,337	1,524	1,795
2,801 - 3,200	17,395	16,157	933	2	165	0	138	6,740	4,032	3,494	1,598	1,531
3,201 - 3,600	15,416	14,463	773	1	70	1	108	6,476	3,320	3,141	1,355	1,124
3,601 - 4,000	11,984	11,312	571	1	35	0	65	5,557	2,413	2,353	977	684
Over 4,000	26,088	24,965	991	0	16	0	116	13,988	4,183	4,715	2,256	946
Totals	226,087	200,440	15,640	383	6,447	18	3,159	103,030	50,805	42,804	14,583	14,865

*** Type of Retirement**

1 – Normal retirement for age & service
2 – Survivor payment – normal retirement
3 – Duty disability retirement (including survivors)
4 – Non-duty disability retirement (including survivors)
5 – Survivor payment – duty death in service
6 – Survivor payment – non-duty death in service

**** Selected Option**

Opt. 1 – Straight life allowance
Opt. 2 – 100% survivor option
Opt. 3 – 50% survivor option
Opt. 4 – 75% survivor option
Opt. 1E, 2E, 3E, 4E – equated retirement plans

Active Members by Classification (Defined Benefit Only)

	September 30, 2022	September 30, 2023
Basic Members		
Number	6,835	5,974
Average Age	59.1 years	59.7 years
Average Service	25.6 years	25.4 years
Reported Payroll	$ 425,735,003	$ 376,838,709
Average Annual Pay	$ 62,287	$ 63,080
MIP Members		
Number	98,685	94,446
Average Age	50.6 years	51.2 years
Average Service	18.0 years	18.4 years
Reported Payroll	$ 6,070,607,523	$ 6,015,448,057
Average Annual Pay	$ 61,515	$ 63,692
PPP Members		
Number	33,185	31,377
Average Age	41.7 years	42.5 years
Average Service	6.5 years	7.3 years
Reported Payroll	$ 1,344,493,537	$ 1,384,426,878
Average Annual Pay	$ 40,515	$ 44,122
PPP2 Members		
Number	16,524	20,439
Average Age	35.4 years	35.9 years
Average Service	1.9 years	2.2 years
Reported Payroll	$ 590,875,496	$ 783,868,496
Average Annual Pay	$ 35,759	$ 38,352
Total		
Number	155,229	152,236
Average Age	47.5 years	47.7 years
Average Service	14.2 years	14.2 years
Reported Payroll	$ 8,431,711,559	$ 8,560,582,140
Average Annual Pay	$ 54,318	$ 56,232

The above active statistics exclude the following records:

- Active members hired after PA 300 who elected the pure defined contribution plan (41,876 as of September 30, 2022 and 48,792 as of September 30, 2023).
- Active members who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300 (2,664 as of September 30, 2022 and 2,452 as of September 30, 2023).
- Active records provided in the valuation with both $0 salary and 0 service (6,874 as of September 30, 2022 and 6,808 as of September 30, 2023). It is our understanding that active records with both $0 salary and 0 service correspond to recently hired members who are still within the PPP2/DC election window.

The total annual payroll reported in the valuation data (including payroll for those employees excluded from the active statistics above) is $9,990.8 million as of September 30, 2023 ($9,607.3 million as of September 30, 2022). UAAL contributions are expected to continue to be collected on the payroll of all MPSERS active members in the future.

Active Members (Defined Benefit Only)

Members in Active Service as of September 30, 2023
by Age and Years of Service

Age	Years of Service 0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 & up	Total Count	Total Pay	Average Pay
Under 20	59							59	$ 1,022,583	$ 17,332
20 - 24	1,985	13						1,998	59,684,625	29,872
25 - 29	5,561	1,189	5					6,755	277,755,650	41,119
30 - 34	4,389	5,478	889	11				10,767	503,509,241	46,764
35 - 39	5,100	4,706	4,850	880	169			15,705	825,153,824	52,541
40 - 44	5,693	4,760	3,673	4,074	3,537	1,090		22,827	1,362,726,044	59,698
45 - 49	4,417	4,039	2,623	2,539	4,743	6,430	667	25,458	1,666,006,638	65,441
50 - 54	3,782	3,663	2,783	2,472	3,258	6,690	3,532	26,180	1,691,281,967	64,602
55 - 59	2,656	2,818	2,513	2,557	2,744	3,664	4,227	21,179	1,229,632,655	58,059
60 - 64	1,839	1,905	1,658	1,773	2,044	2,010	2,311	13,540	659,997,150	48,744
65 - 69	1,086	893	640	478	663	620	818	5,198	209,281,692	40,262
70 & Over	835	573	304	182	168	152	356	2,570	74,530,071	29,000
Total	37,402	30,037	19,938	14,966	17,326	20,656	11,911	152,236	$ 8,560,582,140	$ 56,232

The September 30, 2023 active statistics exclude: (1) 2,452 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result PA 300, (2) 48,792 people hired after PA 300 who elected the pure defined contribution plan, and (3) 6,808 people provided in the valuation with both $0 salary and 0 service. It is our understanding that active records with both $0 salary and 0 service correspond to recently hired members who are still within the PPP2/DC election window.

The total annual payroll reported in the valuation data (including payroll for those employees excluded from the active statistics above) is $9,990.8 million as of September 30, 2023. UAAL contributions are expected to continue to be collected on the payroll of all MPSERS active members in the future.

Active and Inactive Members Reported for Valuation
Historical Comparison

Valuation Date September 30	Number of Inactive Vested Members	Active Members [2]					
				Average			
		Number	Reported Payroll[1]	Annual Pay	% Increase	Age	Years of Service
2004	15,756	322,494	$ 10,407,072	$ 32,271	5.0 %	43.8	9.7
2005	16,806	316,151	10,205,972	32,282	0.0	43.7	9.7
2006	15,679	308,233	9,806,452	31,815	(1.4)	44.1	9.9
2007	14,999	295,984	9,851,471	33,284	4.6	44.5	10.3
2008	14,312	278,642	9,958,132	35,738	7.4	44.9	10.8
2009	14,454	268,208	9,883,674	36,851	3.1	45.4	11.4
2010	15,026	242,568	8,845,019	36,464	(1.1)	45.2	11.1
2011	15,090	236,660	9,155,691	38,687	6.1	45.3	11.3
2012	16,167	223,769	8,649,029	38,652	(0.1)	45.7	11.9
2013	16,235	212,525	8,225,140	38,702	0.1	46.0	12.3
2014	23,140	199,674	7,943,922	39,784	2.8	46.1	12.7
2015	22,717	194,957	8,005,009	41,060	3.2	46.1	12.8
2016	22,508	189,761	7,912,565	41,698	1.6	46.2	13.0
2017	22,234	187,735	7,880,041	41,974	0.7	46.2	13.0
2018	22,447	182,930	7,884,550	43,101	2.7	46.4	13.1
2019	21,771	174,189	8,039,478	46,154	7.1	47.0	13.6
2020	20,241	165,015	7,979,260	48,355	4.8	47.3	14.0
2021	18,994	157,021	8,032,377	51,155	5.8	47.4	14.3
2022	18,144	155,229	8,431,712	54,318	6.2	47.5	14.2
2023 [3]	17,699	152,236	8,560,582	56,232	3.5	47.7	14.2

1 *Reported payroll in thousands. Beginning with the September 30, 2006 valuation, the payroll is no longer adjusted, and the payroll is the sum of the actual pays reported for each active member.*

2 *Active members hired after PA 300 who elected the pure defined contribution plan are excluded from the statistics above. Beginning with the September 30, 2014 valuation, active members who elected not to continue future accruals in the defined benefit plan as a result of PA 300 are included in the number of inactive vested members.*

3 *The September 30, 2023 inactive vested statistic includes 2,452 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result PA 300. The September 30, 2023 active statistics exclude these members as well as 48,792 people hired after PA 300 who elected the pure defined contribution plan and 6,808 people provided in the valuation with both $0 salary and 0 service. It is our understanding that active records with both $0 salary and 0 service correspond to recently hired members who are still within the PPP2/DC election window. The total annual payroll reported in the valuation data (including payroll for those employees excluded from the active statistics above) is $9,990.8 million as of September 30, 2023. UAAL contributions are expected to continue to be collected on the payroll of all MPSERS active members in the future.*

SECTION E

METHODS AND ASSUMPTIONS

Valuation Methods

Actuarial Cost Method - Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an Individual Entry-Age Actuarial Cost Method having the following characteristics:

(i) The annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement; and

(ii) Each annual normal cost is a constant percentage of the member's year by year projected covered pay.

Actuarial gains (losses), as they occur, reduce (increase) the Unfunded Actuarial Accrued Liability (UAAL).

Financing of Unfunded Actuarial Accrued Liabilities:

The Unfunded Actuarial Accrued Liabilities (UAAL) as of September 30, 2023 are projected to the beginning of the fiscal year for which the contributions are being determined, in this case October 1, 2025 (i.e., the beginning of fiscal year 2026). The projection procedure increases the UAAL as of September 30, 2023 with interest and decreases it with the expected UAAL contributions for each of the two years between the actuarial valuation date and the beginning of the fiscal year for which contributions are being determined. For MPSERS, the UAAL is projected separately for each of the Non-Hybrid, the PPP, and the PPP2 groups.

Non-Hybrid and Pension Plus Plan – Unfunded actuarial accrued liabilities as of the beginning of fiscal year 2026 were amortized by level (principal and interest combined) dollar contributions over a reasonable period of future years. The Non-Hybrid and PPP groups use layered amortization. Amortization periods by source of UAAL are specified in the Funding Policy as disclosed in Section G of this report. Remaining amortization periods are shown in Section A of this report.

Pension Plus 2 Plan – Unfunded actuarial accrued liabilities as of the beginning of fiscal year 2026 were amortized by level (principal and interest combined) dollar contributions over a reasonable period of future years. The PPP2 uses layered amortization. For each valuation, changes in the UAAL are amortized as a level dollar amount over a new, closed 10-year period consistent with the provisions of Public Act 92 of 2017.

Valuation Methods

Present value of future reconciliation payments – Subsection 41(9) of the MPSERS statute provides for a process to reconcile actual employer contributions to the actuarially computed contribution requirements. In order to avoid duplication of the employer contributions, the present value of future reconciliation payments is subtracted from the unfunded actuarial accrued liability (UAAL) to determine the remaining UAAL contribution. Please refer to pages A-1 and E-13.

Actuarial Value of System Assets - The actuarial value of assets recognizes assumed investment income fully each year. Differences between actual and assumed investment income are phased in over a closed five-year period. During periods when investment performance exceeds the assumed rate, actuarial value of assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, actuarial value of assets will tend to be greater than market value. The actuarial value of assets was reset to market value as of September 30, 2006, with five-year smoothing restarted at that time. The actuarial value of assets is developed separately for the Non-Hybrid, the PPP, and the PPP2 portions of the System. The total actuarial value of assets is the sum of these three components. The actuarial value of assets is not permitted to deviate from the market value of assets by more than 30%.

Valuation Assumptions

In accordance with Section 41(1) of the MPSERS statute (Act 300 of the Public Acts of 1980, as amended), the actuarial assumptions are adopted by the Retirement Board and the Department of Technology, Management and Budget after consultation with the actuary and the State Treasurer. The actuarial assumptions were based upon the results of an Experience Study for MPSERS covering the period October 1, 2017 through September 30, 2022. A report dated August 24, 2023 presented the results of the Experience Study. The actuarial assumptions represent estimates of future experience.

The rate of investment return was 6.00% a year, compounded annually net of investment expenses for the Non-Hybrid, the PPP, and the PPP2 groups. This assumption was first used for the September 30, 2021 funding valuation of the System.

The assumed real rate of investment return is the rate of investment return in excess of either wage inflation or price inflation. Considering a wage inflation assumption of 2.75% and a price inflation assumption of 2.35%, the 6.00% nominal rate of investment return translates into a real rate of investment return of 3.25% over wage inflation and 3.65% over price inflation.

Valuation Assumptions

The rates of salary increase used for individual members are in accordance with the table below. This assumption is used to project a member's current pay to the pay upon which System benefits will be based. The current assumption was first used for the September 30, 2018 valuation of the System.

Sample Ages	Salary Increase Assumptions For an Individual Member		
	Merit & Seniority	**Base (Economy)**	**Increase Next Year**
20	8.80 %	2.75 %	11.55 %
25	8.80	2.75	11.55
30	4.96	2.75	7.71
35	3.10	2.75	5.85
40	1.90	2.75	4.65
45	1.14	2.75	3.89
50	0.54	2.75	3.29
55	0.18	2.75	2.93
60	0.00	2.75	2.75
65	0.00	2.75	2.75
Ref	510		

The charts shown in this section may include a reference number (for example, 510 is used above). These reference numbers are used by GRS to track and identify assumption tables.

Valuation Assumptions

The mortality tables: The mortality tables described below were first used in the September 30, 2023 valuation:

Healthy Male Retirees:	PubT-2010 Retiree Mortality Male Table, scaled by 116% and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
Healthy Female Retirees:	PubT-2010 Retiree Mortality Female Table, scaled by 116% and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
Disabled Male Retirees:	PubNS-2010 Disabled Retiree Mortality Male Table, scaled by 100% and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
Disabled Female Retirees:	PubNS-2010 Disabled Retiree Mortality Female Table, scaled by 100% and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
Male Active Members:	PubT-2010 Employee Mortality Male Table, scaled by 100% and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.
Female Active Members:	PubT-2010 Employee Mortality Female Table, scaled by 100% and projected with mortality improvements using the fully generational MP-2021 projection scale from a base year of 2010.

Sample Attained Ages	Future Life Expectancy (years)*					
	Pre-Retirement		Healthy Post-Retirement		Disabled Retirement	
	Men	Women	Men	Women	Men	Women
45	44.72	46.69	41.80	44.09	30.12	33.17
50	39.58	41.53	36.61	38.87	26.29	29.23
55	34.51	36.40	31.51	33.74	22.79	25.64
60	29.53	31.33	26.59	28.81	19.62	22.31
65	24.69	26.36	21.88	24.03	16.69	19.04
70	20.03	21.49	17.42	19.39	13.88	15.67
75	15.49	16.79	13.31	15.01	11.12	12.37
80	11.15	12.38	9.68	11.08	8.53	9.43

* *Life expectancy in future years is determined by the fully generational MP-2021 projection scale. The sample values shown are for individuals with the indicated attained ages in 2023. Active member deaths are assumed to be non-duty related.*

Valuation Assumptions

The rates of retirement used to measure the probability of eligible members retiring during the next year are shown below. These assumptions were first used for the September 30, 2023 valuation of the System.

A Basic member is eligible for normal retirement after attaining age 55 with 30 or more years of credited service, or after attaining age 60 with 10 or more years of credited service.

A MIP member is eligible for normal retirement after 30 years of service, or after attaining age 60 with 5 or more years of service.

A Basic or MIP member is eligible for early retirement after attaining age 55 with 15 but less than 30 years of credited service.

A Pension Plus member is eligible for normal retirement after attaining age 60 with 10 or more years of credited service. Pension Plus members are not eligible for early retirement. Currently, Pension Plus 2 members have the same retirement eligibility and retirement rates as Pension Plus members.

Normal Retirement

Retirement Ages	Percent of Eligible Members Retiring			
	Basic Members		MIP# and Pension Plus Members	
	Teachers	Non-Teachers	Teachers	Non-Teachers
55	25 %	20 %		
56	21	20		
57	16	18		
58	16	18		
59	18	18		
60	20	18	20 %	17 %
61	20	18	20	17
62	29	29	23	24
63	29	29	23	24
64	25	24	23	20
65	25	24	25	20
66	30	30	30	26
67	25	28	25	20
68	25	23	25	16
69	25	20	25	16
70	25	20	25	16
71	21	20	25	16
72	21	20	25	16
73	21	20	20	16
74	21	20	20	16
75 & Over	100	100	100	100
Ref	2835	2836	2837	2838

 # Applies to MIP members with fewer than 30 years of service.

Valuation Assumptions

Normal Retirement

Years of Service	Percent of Eligible Members Retiring — MIP Members with 30+ Years of Service	
	Teachers	Non-Teachers
30	25 %	20 %
31	20	20
32	20	18
33	18	18
34	19	18
35	19	18
36	21	18
37	24	18
38	24	25
39	27	25
40	30	25
41	30	25
42	30	30
43	30	30
44	30	30
45	30	30
46	30	30
47	30	30
48	30	30
49	30	30
50	100	100
Ref	2833	3414

Early Retirement

Retirement Ages	Percent of Eligible Members Retiring	
	Basic Members	MIP Members
55	3.0 %	3.0 %
56	4.0	4.0
57	4.5	4.5
58	4.5	4.5
59	6.0	6.0
Ref	3413	3413

Valuation Assumptions

Rates of separation from active membership used in the valuation are shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment, and was first used for the September 30, 2023 valuation of the System.

Non-Pension Plus 2 Plan Members

Sample Ages	Years of Service	Percent Separating Within Next Year			
		Pay More Than $20,000		Pay Less Than $20,000	
		Teachers	Non-Teachers	Teachers	Non-Teachers
All	0	12.00 %	35.00 %	24.00 %	40.00 %
	1	9.00	14.00	22.00	26.00
	2	6.00	8.20	22.00	19.00
	3	5.00	6.80	22.00	16.00
	4	4.00	5.70	22.00	14.00
20	5 & over	3.00	5.00	22.00	14.00
25		3.00	4.76	22.00	14.00
30		2.46	3.76	22.00	14.00
35		1.62	2.48	20.80	13.40
40		1.12	1.70	18.20	11.80
45		0.88	1.44	16.40	9.80
50		0.80	1.34	16.00	8.40
55		0.80	1.30	16.00	8.00
60		0.80	1.30	16.00	8.00
Svc Ref		1484	877	1483	1137
Age Ref		1629	1630	1450	1451

Pension Plus 2 Members

Sample Ages	Years of Service	Percent Separating Within Next Year			
		Pay More Than $20,000		Pay Less Than $20,000	
		Teachers	Non-Teachers	Teachers	Non-Teachers
All	0	6.00 %	14.00 %	24.00 %	23.00 %
	1	5.00	6.00	22.00	17.00
	2	4.00	5.00	22.00	15.00
	3	3.00	4.00	22.00	13.00
	4	2.00	3.00	22.00	8.00
20	5 & over	2.01	3.35	16.50	10.50
25		2.01	3.19	16.50	10.50
30		1.65	2.52	16.50	10.50
35		1.09	1.66	15.60	10.05
40		0.75	1.14	13.65	8.85
45		0.59	0.96	12.30	7.35
50		0.54	0.90	12.00	6.30
55		0.54	0.87	12.00	6.00
60		0.54	0.87	12.00	6.00
Svc Ref		1485	1487	1483	1486
Age Ref		1629	1630	1450	1451
Age Mult		67%	67%	75%	75%

Valuation Assumptions

Rates of disability among active members used in the valuation are shown below, and were first used in the September 30, 2010 valuation of the System. Disabilities are assumed to be non-duty related.

Sample Ages	Percent Becoming Disabled Within Next Year
20	0.00 %
25	0.01
30	0.01
35	0.02
40	0.05
45	0.10
50	0.18
55	0.26
60	0.36
Ref.	393 x 0.80

Service Credit Accrual Rates: Members were assumed to accrue service credit each year as described in the table below:

	Assumed Average Service Credit Accrued Each Year
Teachers with Pay Over $20,000	1.00 years
Non-Teachers with Pay Over $20,000	1.00
Teachers with Pay Under $20,000	0.68
Non-Teachers with Pay Under $20,000	0.68

These accrual rates were first used for the September 30, 2023 valuation of the System.

Valuation Assumptions

Unknown Data:

- Members with unknown gender were assumed to be female.

- Members with unknown dates of birth were assumed to have an entry-age equal to 34 for Basic members, 32 for MIP members, 34 for PPP members, and 33 for PPP2 members.

- Active members with non-zero service who were reported without any annual pay were assumed to have pay equal to the average pay of the corresponding active group.

- Retired members with unknown benefit plan codes were assumed to be MIP.

- Active members with unknown pre-PA 300 benefit plan codes were assumed to be MIP Graded.

- Allocations of total credited service before and after the PA 300 transition date were approximated when not supplied.

- Frozen defined benefit amounts were estimated for active members who elected to participate in the DC Plan prospectively as a result of PA 300, when not supplied.

- Accrued benefits were estimated for inactive participants based upon the service and final average compensation provided in the data.

Miscellaneous and Technical Assumptions

Administrative Expenses	The normal cost contribution includes a load for administrative expenses based upon actual administrative expenses from the prior fiscal year.
Benefit Service	Exact fractional service is used to determine the amount of benefit payable.
Cost-of-Living Assumption	MIP members are assumed to receive 3.0% cost-of-living increases. Basic members who retired on or before January 1, 1987 are assumed to receive 3.8% cost-of-living increases. All other members are assumed not to receive cost-of-living increases.
Decrement Operation	Disability and withdrawal decrements do not operate during retirement eligibility.
Decrement Timing	Retirement decrements are assumed to occur on July 1. All other decrements are assumed to occur mid-year.
Eligibility Testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Employee Contribution Interest Crediting	Employee contributions to the pension plan are assumed to be credited at the investment return assumption for each group.
Forfeitures	For vested separations from service, it is assumed that 0% of members separating will withdraw their contributions and forfeit an employer financed benefit. It was further assumed that the liability at termination is the greater of the vested deferred benefit (if any) or the member's accumulated contributions.
Incidence of Contributions	Contributions are assumed to be received continuously throughout the year.
Liability Adjustments	Inactive vested member liabilities were increased by 2% to reflect the value of the death benefit provision.
Marriage Assumption	75% of males and 65% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes.
Normal Form of Benefit	A straight life benefit is the normal form of benefit.

Miscellaneous and Technical Assumptions

OPEB Contribution Refunds	For purposes of valuing the liabilities associated with OPEB contribution refunds (that are paid out of the pension plan), the Non-Hybrid investment return is used for Non-Hybrid members and the PPP investment return assumption is used for PPP members.
PPP2 Accrued Liability Load	The PPP2 accrued liability includes $1.7 million for employee and employer contribution amounts collected and included in the plan's reported assets attributable to participants not yet included in the pension valuation due to PPP2/DC election waiting periods. ORS reported that contributions (12.4% of payroll) had been collected on payroll totaling approximately $13.7 million.
PPP/PPP2 Normal Cost Load	We anticipate that as the PPP and PPP2 populations mature, they will take on a pay structure (i.e., an evolution of full-time / part-time membership composition) similar to the current Non-Hybrid population. We have developed a load of 0.35% of payroll for the PPP group and 0.38% of payroll for the PPP2 group to be applied to their respective normal costs to account for this expectation.
Procedure for Estimating Fiscal Year Employer Dollar Contributions	For purposes of determining the dollar contribution amounts, it is assumed that the total payroll will increase by 2.75% per year through fiscal year 2026. For purposes of amortizing the UAAL, a 0.00% payroll growth assumption is used for all MPSERS structures. For people active as of September 30, 2023, projected payroll through fiscal year 2026 is based upon valuation demographic and salary increase assumptions. The remainder of the projected payroll in fiscal year 2026 (due to new hires after September 30, 2023) is allocated as follows: 40% to PPP2 members and 60% to DC members. The allocation of new entrants between PPP2 members and DC members was supplied by ORS in conjunction with the 30-year contribution projection for MPSERS as of September 30, 2022 and issued in July 2023.

Miscellaneous and Technical Assumptions

Reconciliation Payments

ORS provided the following schedule of reconciliation payments. For purposes of determining the present value of the reconciliation payments, it was assumed that payments occur in the middle of the fiscal period.

Fiscal Year	Reconciliation Payment
2024	$ 22,627,568
2025	4,628,054
2026	0
2027	0
2028	0
2029	0

Salary Increase Timing

Salary increases were assumed to be at the beginning of the fiscal year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

Service Purchase Loads

The following two loads have been included in the accrued liability to account for service purchases:

$12.8 million for amounts included in the plan's reported assets for purchased service that has not been paid for yet by the members. This amount is provided by ORS for each valuation.

$9.1 million estimated for purchased service paid for, but not reported in the valuation. We have estimated this amount based on supplemental data reported for the September 30, 2023 valuation.

Teacher / Non-Teacher Assumption Classification

For purposes of the assumptions in this report differentiated between Teachers and Non-Teachers, a Teacher designation includes any active record with a job classification code in the 1200s. For retiree records, the job classification code is not supplied.

SECTION F

PLAN PROVISIONS

Plan Provisions as of September 30, 2023

Our actuarial valuation of the System is based on the present provisions of the Public School Employees' Retirement Act (Act 300 of 1980, as amended).

Regular Retirement (no reduction factor for age):

Eligibility – For Basic members, age 55 with 30 years of credited service; or age 60 with 10 years credited service. For Member Investment Plan (MIP) members, any age with 30 years of credited service; or age 60 with 10 years credited service; or age 60 with 5 years of credited service provided member worked through 60th birthday and has credited service in each of the last 5 years. For Pension Plus Plan (PPP) and Pension Plus 2 Plan (PPP2) members, age 60 with 10 years of credited service.

Mandatory Retirement Age - None.

Annual Amount

Basic and MIP – Credited Service as of the Transition Date (i.e., February 1, 2013) times 1.5% times Final Average Compensation (FAC),

Plus

An amount determined by the member's election of Option 1, 2, 3 or 4 described below:

Option 1 – Credited Service after the Transition Date times 1.5% times FAC.

Option 2 – Credited Service after the Transition Date (until total service reaches 30 years) times 1.5% times FAC, PLUS Credited Service after the Transition Date and over 30 years times 1.25% times FAC.

Option 3 – Credited Service after the Transition Date times 1.25% times FAC.

Option 4 – None (Member will receive a benefit through a Defined Contribution plan).

PPP and PPP2 – Credited Service times 1.5% times FAC.

Final Average Compensation (FAC) - Average of highest 60 consecutive months. (36 months for MIP members). FAC is calculated as of the last day worked unless the member elected Option 4, in which case FAC is calculated as of the Transition Date.

Plan Provisions as of September 30, 2023

Early Retirement (age reduction factor used):

Eligibility - Age 55 with 15 or more (but less than 30) years of credited service and earned credited service in each of the last 5 years. At least 10 of the 15 years of credited service has to be earned service. PPP and PPP2 members are not eligible for early retirement benefits.

Annual Amount - Regular retirement benefit, reduced by 1/2% for each month by which the commencement age is less than 60.

Deferred Retirement (vested benefit):

Eligibility - 10 years of credited service. Benefit commences at the time age qualification is met.

Annual Amount - Regular retirement benefit based on service and final average compensation at time of termination.

Duty Disability Retirement:

Eligibility - No age or service requirement; in receipt of workers' disability compensation.

Annual Amount - Computed as regular retirement benefit with minimum benefit based on 10 years of credited service. Additional limitation such that disability benefits plus authorized outside earnings limited to 100% of final average compensation (increased by 2% each year retired).

Non-Duty Disability Retirement:

Eligibility - 10 years of credited service.

Annual Amount - Computed as regular retirement benefit based on credited service and final average compensation at time of disability. Additional limitation such that disability benefits plus authorized outside earnings limited to 100% of final average compensation (increased by 2% each year retired).

Duty Death Before Retirement:

Eligibility – No age or service requirement. Beneficiary is in receipt of workers' compensation. Also applies to "duty disability" retirees during first three years of disability.

Annual Amount – Spouse benefit computed as regular retirement benefit with minimum benefit based on 10 years of credited service, reduced for 100% Survivor election. If no surviving spouse, children under 18 share in benefit; if no spouse or children, a disabled and dependent parent is eligible.

Plan Provisions as of September 30, 2023

Non-Duty Death Before Retirement:

Eligibility – For Basic members, 15 years of credited service, or age 60 and 10 years of credited service. For MIP members, 10 years of credited service, or age 60 and 5 years of credited service. For PPP and PPP2 members, 10 years of credited service.

Annual Amount - Computed as regular retirement benefit, reduced in accordance with a 100% Survivor election, with payments commencing the first of month following death. For the beneficiary of a deferred member, benefit commences at time member would have attained the minimum age qualification.

Member Contributions:

Basic and MIP Members

Before Transition Date (February 1, 2013)

Basic members – None.

MIP members hired before January 1, 1990 - 3.9% of pay.

MIP members hired on or after January 1, 1990 and before July 1, 2008 - 3.0% of first $5,000 of pay, plus 3.6% of next $10,000 of pay, plus 4.3% of pay in excess of $15,000.

MIP members hired on or after July 1, 2008 - 3.0% of first $5,000 of pay, plus 3.6% of next $10,000 of pay, plus 6.4% of pay in excess of $15,000.

On or After Transition Date (February 1, 2013)

Contributions depend on member election of Option 1, 2, 3, or 4.

Option 1 – Basic Members – 4%
All MIP Members – 7%

Option 2 – Contribution as in Option 1 until member reaches 30 years of service. At 30 years of service, contribution reverts to pre-transition date level.

Option 3 – Post-transition date contribution is the same as the pre-transition date contribution.

Option 4 – None (Member will receive a benefit through a Defined Contribution plan).

PPP Members – 3.0% of first $5,000 of pay, plus 3.6% of next $10,000 of pay, plus 6.4% of pay in excess of $15,000.

PPP2 Members – The member contribution rate will be based upon a 50/50 cost sharing arrangement with the employer with respect to the normal cost and the financing of any unfunded actuarial accrued liabilities associated with PPP2 participants.

Post-Retirement Cost-of-Living Adjustments:

One-time upward adjustments have been made in 1972, 1974, 1976, and 1977 for members retired on or after July 1, 1956 and prior to July 1, 1976 for members who were eligible for Social Security benefits. For members who retired prior to July 1, 1956 and were not eligible for Social Security benefits based upon membership service, the minimum base pension was increased in 1965, 1971, 1972, 1974, and 1981, and in 1976 and 1977 one-time upward adjustments were made.

Beginning in 1983, some benefit recipients received an annual distribution of investment earnings in excess of 8% (supplemental payment). On January 1, 1986, all members who retired prior to January 1, 1986 were given a permanent 8% increase. On January 1, 1990, a one-time upward adjustment for members who retired prior to October 1, 1981 was made.

Currently members receive annual increases based on the following schedule:

Retired before January 1, 1987 - Greater of supplemental payment or automatic 3% increases.
Retired on or after January 1, 1987 under MIP - Automatic 3% increases only.
Retired on or after January 1, 1987 under Basic plan - Supplemental payment only.
Retired under PPP or PPP2 – No increases.

Optional Forms of Payment:

The normal form of payment for a member who retires is a straight life annuity.

Section 85 of the MPSERS statute allows the member to choose from the following optional forms of payment: 100% joint and survivor annuity with pop-up, 75% joint and survivor annuity with pop-up, or 50% joint and survivor annuity with pop-up. Additionally, the straight life benefit and the joint and survivor optional forms can be paired with a Social Security equated option at age 62.

The optional forms of payment are actuarially equivalent to the straight life annuity. Option factors are based upon the following: (1) investment return assumption of 6.75%, (2) valuation mortality assumptions for healthy retirees, (3) unisex percent of 30% and (4) calculation year of 2021. The pop-up provision and any applicable COLA are reflected in the factors.

Plan Provisions as of September 30, 2023

Member Contributions Attributable to the Retiree Health Plan:

Under Public Act 300 of 2012, members were given the choice between i. and ii. below:

i. Maintaining eligibility for premium subsidy retiree medical coverage, and contributing 3% of their compensation while still working, or
ii. Entering the Personal Healthcare Fund (PHF).

Members not making an election will default into the premium subsidy arrangement.

If a member who elected the subsidy terminates prior to becoming eligible for the subsidy, dies before the total value of the subsidy received equals the total value of contributions made, or retires and declines coverage, the member or beneficiary may request a refund of unused funds. Refunds of member contributions to the healthcare funding account are issued as a supplemental pension benefit (payable at age 60 and payable from the pension plan) paid out over a 60-month period.

SECTION G

FUNDING POLICY

Funding Policy

The goal of the Funding Policy is to ensure adequate funding of the plans and to set a funding target that will allow the plans to remain at or above that target during successive years of investment or actuarial losses.

Funding Security

1. Until the pension plan is at or above 120% funded or the Other Post-Employment Benefits (OPEB) plan is at or above 140% funded [hereafter funding target], as determined in its annual actuarial valuation, the employer contribution rate cannot be less than the actuarially determined employer normal cost.
    a. For systems with multiple subplans (i.e., MPSERS, SPRS), until all of the subplans are at or above the funding target, the employer contribution rate cannot be less than the actuarially determined employer normal cost.
2. Once the pension plan or the OPEB plan is at or above the funding target, the employer normal cost contribution for any fiscal year will be reduced by the negative UAAL in excess of the funding target. The employer normal cost contribution rate can be reduced to no less than 0%.
    a. The negative UAAL payments for any fiscal year will not be greater than the total amount of contributions for that year.

Layered Amortization

3. Layered Amortization Principles
    a. Once 15 years for open plans (10 years for closed plans) remain in the current amortization period for the existing UAAL, the existing UAAL will be frozen and amortized by the end of the plan's amortization period, unless the period is extended.
    b. Beginning with the actuarial valuation where the amortization period of the existing UAAL is less than 15 years for open plans (10 years for closed plans), and for subsequent annual actuarial valuations, changes in the UAAL due to actuarial gains or losses or from changes to actuarial assumptions will be amortized over a closed 15-year amortization period for open plans (10 years for closed plans).
    c. Regardless of funded %, once plans have reached layered amortization, negative UAAL layers will be recognized (i.e., offset positive UAAL layers).
    d. If the plan is more than 100% funded, all the layers will be eliminated, and an open 20-year amortization period will be used.
    e. Increases in the UAAL due to changes in benefit provisions will be amortized over a closed 15-year period for active members and a closed 5-year period for non-active members (i.e., retired members and deferred members), unless specified otherwise in statute.
    f. Decreases in the UAAL due to changes in benefit provisions will be amortized over a closed 20-year period for all members, unless specified otherwise in statute.
4. These provisions will be applied separately to the pension and OPEB plans.
5. MPSERS Pension Plus 2 is exempt from the UAAL amortization provisions of this policy due to its amortization method being defined in Section 41b(2) of PA 300 of 1980, as amended.
    a. Pension Plus 2 members will pay 50% of the total NC rate. Employers will pay the greater of 50% of the total NC rate or the employer NC contribution rate from the previous fiscal year, pursuant to Section 41(2)(c).

Funding Policy (Concluded)

Considerations for MPSERS Pension Actuarial Valuation

6. According to the Funding Policy, layered amortization for the MPSERS pension actuarial valuation begins effective with the September 30, 2023 valuation date.
7. While the MPSERS Non-Hybrid and Pension Plus Plans are closed to new members, because the MPSERS pension plan is considered to be "open" on an overall basis, the layered amortization period for MPSERS Non-Hybrid and Pension Plus Plans will be 15 years.
8. In accordance with the MPSERS Retirement Act (Public Act 300 of 1980 as amended), the payroll growth assumption used to calculate the UAAL contribution will be gradually reduced to 0% effectively transitioning the UAAL amortization method from a level percent of payroll method to a level dollar method.
9. The Funding Policy was adopted by the Retirement Board for use in the September 30, 2023 and later actuarial valuations.

SECTION H

GLOSSARY

Glossary

Actuarial Accrued Liability	The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”
Accrued Service	The service credited under the plan which was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”
Actuarial Equivalent	A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.
Actuarial Present Value	The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
Amortization	Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
Experience 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, in accordance with the actuarial cost method being used.

Glossary

Normal Cost	The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.
Reserve Account	An account used to indicate that funds have been set aside for a specific purpose and is not generally available for other uses.
Unfunded Actuarial Accrued Liability	The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."
Valuation Assets	The value of current plan assets recognized for valuation purposes. Generally based on market value plus a portion of unrealized appreciation or depreciation.

APPENDIX

PUBLIC ACT SUMMARY OF PLAN CHANGES

Public Act 300 of 2012

A brief summary of the plan changes resulting from Public Act 300 of 2012 follows:

Basic and MIP active members were given the following options to increase, maintain, or cease their contributions to the pension plan:

(1) Increase their member contribution rate to the pension fund and maintain the 1.5% benefit multiplier in their pension formula for service accrued after the transition date (i.e., February 1, 2013). Basic member contributions increased to 4% (from 0%). MIP member contributions increased to a flat 7% (from 3.9% for MIP-Fixed, from a graded percentage up to 4.3% for MIP-Graded, and from a graded percentage up to 6.4% for MIP-Plus).
(2) Increase their member contribution rate (as noted above) and maintain the 1.5% benefit multiplier in their pension formula for service accrued after the transition date until they reach 30 years of service. Upon reaching 30 years of service, their member contribution rate would return to their current level (pre-Public Act 300 of 2012), and their pension formula for service in excess of 30 years would be based upon a 1.25% benefit multiplier.
(3) Maintain their current member contribution rate to the pension fund. The pension formula for years of service before the transition date is based upon a 1.5% benefit multiplier, while the pension formula for years of service after the transition date is based upon a 1.25% benefit multiplier.
(4) Cease member contributions to the DB portion of the pension fund. In this circumstance, the member would no longer receive future benefit accruals in the DB plan and would become a participant in the DC plan. The pension formula for years of service before the transition date is based upon a 1.5% benefit multiplier. The member's final average compensation would be frozen as of the transition date.

Members who did not make an election before the deadline were deemed to have elected Option (3), maintain their current member contribution rate and receive future accruals based upon a 1.25% benefit multiplier. There was no change in pension benefits to Pension Plus Plan (PPP) members. New members were given the option of electing between the PPP and the DC plan.

An additional provision of Public Act 300 of 2012 is that the impact of the Early Retirement Incentive (ERI) program of 2010 was re-amortized over a 10-year period, rather than a 5-year period. It is our understanding that the plan changes first affected the fiscal year 2014 budgeted employer contribution rates.

Public Act 300 of 2012 (Concluded)

Members who did not make an election before the deadline were deemed to have elected Option (3), maintain their current member contribution rate and receive future accruals based upon a 1.25% benefit multiplier. There was no change in pension benefits to Pension Plus Plan (PPP) members. As a result of Public Act 300 of 2012, new members were given the option of electing between the PPP and the DC plan. With the adoption of Public Act 92 of 2017, new members were given the option of electing between the Pension Plus 2 Plan (PPP2) and the DC plan. The current distribution of option elections for the total active membership (DB plus DC) as of September 30, 2023 is presented below:

Option 1 - Increase member contributions / 1.5% benefit multiplier after transition date	13 %
Option 2 - Increase member contributions and 1.5% benefit multiplier until 30 years of service	1
Option 3 - Current member contributions / 1.25% benefit multiplier after transition date	35
Option 4 - Cease DB member contributions / DC benefit after transition date	1
Option 5 - Not eligible to make an election or elected PPP	15
Option 6 - New hire who elected pure DC plan	25
Option 7 - New hire who elected PPP2	10

An additional provision of Public Act 300 of 2012 is that the impact of the Early Retirement Incentive (ERI) program of 2010 was re-amortized over a 10-year period, rather than a 5-year period.

It is our understanding that the plan changes first affected the fiscal year 2014 budgeted employer contribution rates.

Public Act 92 of 2017

A brief summary of the plan changes resulting from Public Act 92 of 2017 follows:

(1) Individuals that become members of MPSERS on or after February 1, 2018 (sometimes referred to as new hires) have the one-time choice between a Defined Contribution (DC) plan and a new Hybrid plan referred to as the Pension Plus 2 Plan (PPP2). The DC plan has an employer contribution of 4% of pay plus a 100% employer matching provision up to an additional 3% of a member's pay. The PPP2 is similar in nature to the Pension Plus Plan (PPP), with the following exceptions:
   a. The employer and member normal cost contribution rates are based upon a 50/50 cost sharing arrangement.
   b. The employer and member contribution rates associated with financing any unfunded actuarial accrued liabilities (UAAL) are based upon a 50/50 cost sharing arrangement.
   c. The MPSERS Board of Trustees has the ability to raise the normal retirement age (currently age 60) for active members if the life expectancy for a 65-year-old (based upon a unisex blend of 50/50) increases by a certain amount. The review of the age 65 life expectancy is based upon the mortality tables adopted as part of the normal 5-year Experience Study process. If a change to the normal retirement age is adopted, certain members who are near the then current retirement age would not be subject to the updated normal retirement age.
   d. Changes to the UAAL are amortized over a 10-year period using level dollar amortization.
   e. The discount rate for actuarial valuation purposes is 6%.

(2) The default election for a new hire is the DC plan.

(3) If the actuarial funded ratio of the PPP2 falls below 85% for two consecutive actuarial valuations, the PPP2 has the potential of being closed to new hires going forward. The actuarial funded ratio is based upon the actuarial value of assets (i.e., 5-year smoothing of investment returns).

(4) Members hired on or after February 1, 2013 who selected the DC plan receive the enhanced employer contribution structure of the new DC plan. Members hired before February 1, 2013 who selected the DC plan as part of the Public Act 300 of 2012 reform do not receive the enhanced employer contribution rate structure. (Public Act 169 of 2018 later extended the enhanced DC structure to members hired before February 1, 2013 who selected the DC plan as part of Public Act 300 of 2012.)

(5) Beginning with the State's fiscal year ending September 30, 2018 (applicable to Non-Hybrid and PPP only):
   a. The normal cost contribution rate must not be less than the normal cost contribution rate in the immediately preceding State fiscal year.
   b. The contribution rate associated with financing the UAAL must not be less than the contribution rate associated with financing the UAAL in the immediately preceding State fiscal year. This provision is applicable until such time as the UAAL is "paid off."

The normal cost and UAAL floors described in bullet (5) are not reflected in the contribution requirements shown in this valuation report.

Public Act 181 of 2018

A brief summary of the plan changes resulting from Public Act 181 of 2018 follows:

(1) For purposes of amortizing the UAAL, the legislation requires a transition from level percentage of payroll amortization to level dollar amortization by reducing the payroll growth assumption for amortization purposes according to the following schedule: 3.50% for the September 30, 2017 and 2018 valuations, dropping 0.50% each subsequent year starting with the September 30, 2019 valuation, until an ultimate payroll growth assumption for amortization purposes of 0.00% is reached beginning with the September 30, 2025 valuation.

(2) Starting with the determination of the fiscal year 2025 employer contribution requirements, ORS is allowed to reduce the payroll growth assumption in 25 basis point increments, rather than in 50 basis point increments, if the cost of reducing the payroll growth assumption by 50 basis points would increase the amortization payment by more than 7% of the prior year's UAAL payment.

(3) The basis over which the UAAL contribution rate will be applied is changing to payroll adjusted by the growth rate of "payroll plus purchased services." (Public Act 512 of 2018 later reversed this provision.)

(4) The UAAL contribution floor is changing from a rate floor to a dollar floor starting with the employer contributions in fiscal year 2022.

Public Act 220 of 2022

A brief summary of the provisions resulting from Public Act 220 of 2022 follows:

(1) For fiscal year 2023, the UAAL contribution dollar floor is being reset to the actuarially determined UAAL contribution for University reporting units only.
(2) For purposes of determining the UAAL actuarially determined contribution for University reporting units for fiscal years 2023 and 2024, the calculations should recognize an additional $300 million employer contribution made in fiscal year 2022 as appropriated in Public Act 144 of 2022 to reduce University UAAL.
(3) For purposes of amortizing the UAAL, the legislation requires an acceleration in the transition to level dollar amortization in the schedule of the amortization payroll growth assumption. The accelerated amortization payroll growth schedule is as follows: 1.75% for fiscal year 2023, dropping 0.50% each subsequent fiscal year starting with fiscal year 2024, until an ultimate payroll growth assumption for amortization purposes of 0.00% is reached in fiscal year 2027.

Public Act 144 of 2022

Public Act 144 of 2022 includes some funding appropriation provisions that are relevant to the pension valuation. A brief summary of select funding provisions of Public Act 144 of 2022, relevant to the pension valuation, follows:

(1) For fiscal year 2022, an additional employer contribution of $300 million was appropriated to reduce the University UAAL.
(2) For fiscal year 2023, an additional employer contribution of $1 billion was appropriated to reduce the MPSERS UAAL.
(3) An additional $425 million to be contributed before the end of fiscal year 2026 was appropriated to offset the increase in the MPSERS UAAL employer contributions associated with the accelerated transition to level dollar amortization adopted as part of Public Act 220 of 2022.

Public Act 198 of 2023

A brief summary of the provisions resulting from Public Act 198 of 2023 follows:

(1) For fiscal year 2023 and 2024, the UAAL contribution dollar floor is being reset to the actuarially determined UAAL contribution for University reporting units only.
(2) For purposes of determining the UAAL actuarially determined contribution for University reporting units for fiscal years 2024 and 2025, the calculations should recognize an additional $200 million employer contribution made in fiscal year 2023 to reduce University UAAL, in addition to existing additional appropriations outlined in PA 220 of 2022.
(3) For purposes of amortizing the UAAL, the legislation requires an acceleration in the transition to level dollar amortization in the schedule of the amortization payroll growth assumption. The accelerated amortization payroll growth schedule is as follows: 0.75% for fiscal year 2024, 0.25% for fiscal year 2025, and 0.00% for fiscal years 2026 and beyond.