Michigan Public School Employees' Retiree Health Benefits

Annual Actuarial Valuation Report
as of September 30, 2022

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March 3, 2023

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

Dear Mr. Estell:

Submitted in this report are the results of an actuarial valuation of the assets and liabilities associated with the defined benefit portion of the retiree health benefits provided to Michigan public school employees by the Michigan Public School Employees' Retirement System (MPSERS). Computed liabilities are net of any expected retiree paid premiums required to receive retiree health benefits. The date of the valuation was September 30, 2022. The actuarially computed employer contribution has been calculated for the fiscal year beginning October 1, 2024.

This report was prepared at the request of the Office of Retirement Services (ORS) and those designated or approved by the Office of Retirement Services. 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 purpose of the valuation was to measure the System's funding progress, determine the actuarially computed employer contribution for the 2024-2025 fiscal year and to provide actuarial information for the System's financial report. This report should not be relied on for any other purpose.

The valuation was based upon information furnished by the Office of Retirement Services, concerning retiree health benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We are not responsible for the accuracy or completeness of the information provided by the Office of Retirement Services.

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.

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.

To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the Plan as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Mita D. Drazilov and Louise M. Gates are Members of the American Academy of Actuaries (MAAA), are independent of the plan sponsor and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

Mita D. Drazilov, ASA, FCA, MAAA

Louise M. Gates, ASA, FCA, MAAA

MDD/LMG:cs

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EXECUTIVE SUMMARY/BOARD SUMMARY

Executive Summary/Board Summary

Actuarially Computed Employer Contribution

It was reported that full funding of the retiree health benefit program began in fiscal year 2013. It was also reported that the September 30, 2022 annual actuarial valuation is used to establish the employer contribution for fiscal year 2025. Therefore, this report presents the actuarially computed employer contribution for fiscal year 2025 (based upon a 6.00% investment return assumption). Plan changes resulting from Public Act 300 of 2012 are reflected in this valuation. (They were first reflected in the September 30, 2012 valuation.) A brief summary of the plan changes follows:

(1) 90% employer subsidy for benefit recipients already Medicare eligible as of January 1, 2013;
(2) 80% employer subsidy for other members not covered by a grading provision;
(3) 80% maximum employer subsidy for members covered by a grading provision;
(4) Members hired prior to September 4, 2012 had the option to elect to forfeit employer subsidized retiree health coverage and participate in the Personal Healthcare Fund (PHF); and
(5) Members hired on or after September 4, 2012 participate in the PHF with defined benefit retiree health coverage essentially limited to a lump sum payment at termination ($1,000 or $2,000 depending on age at termination), except in cases of duty death-in-service.

In addition to the above changes, future 3% of payroll active member contributions required to participate in the defined benefit retiree health program have been reflected in this valuation. A potential refund of a member's 3% contributions is assumed to occur from the pension portion of the Retirement System.

The actuarially computed employer contribution for fiscal year 2025 was determined to be $65,347,086.

The actuarially computed employer contribution for the fiscal year beginning October 1, 2024, has been calculated using a 6.00% investment return assumption. Below is a summary of the actuarially computed employer contributions for the 2024 and the 2025 fiscal years. The use of a 6.00% investment return assumption in this valuation of the plan is based upon the full funding of the retiree health benefit program in conjunction with the Dedicated Gains Policy.

Actuarially Computed Employer Contribution	Full Funding (6.00% Interest)
Fiscal Year Beginning 10/1/2024	$ 65,347,086
Fiscal Year Beginning 10/1/2023	133,654,025

For additional details please see Section A of the report. Please note, the actuarially computed employer contribution shown in this report does not reflect any contribution floors as described in Public Act 92 of 2017 and Public Act 181 of 2018 and is in addition to any reconciliation payments as required by subsection 41(9) of MPSERS statute, unless otherwise indicated.

Executive Summary/Board Summary

Liabilities and Assets

The present value of all benefits expected to be paid to current plan members, as of September 30, 2022, is $13.3 billion. The actuarial accrued liability, which is the portion of the $13.3 billion attributable to service accrued by plan members as of September 30, 2022, is $11.5 billion. As of September 30, 2022, there is $11.4 billion in valuation assets available to offset the liabilities of the plan.

The funded status of the plan, which is the ratio of plan assets to actuarial accrued liabilities as of September 30, 2022, is 99.2%.

Comparison with Prior Year Valuation

The actuarial accrued liability decreased from $12.4 billion to $11.5 billion, and the actuarially computed employer contribution decreased from $133.7 million to $65.3 million.

The medical and prescription drug trend rates used in the valuation were re-set to better reflect anticipated future experience. The change in medical and drug trend rates increased the Actuarial Accrued Liability by $369.6 million and increased the actuarially computed employer contribution by $7.3 million.

In accordance with Public Act 181 of 2018, the payroll growth assumption for amortization purposes used in determining the fiscal year 2025 employer contributions decreased from 2.00% to 1.50%. In accordance with Public Act 220 of 2022, the payroll growth assumption for amortization purposes used in determining the fiscal year 2025 employer contributions further decreased from 1.50% to 0.75%. These assumption changes had no impact on the Actuarial Accrued Liability or the actuarially computed employer contribution. In accordance with discussions with ORS staff, 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. As MPSERS is projected to be over 100% funded as of the beginning of fiscal year 2025, no amortization payment is required in the determination of the fiscal year 2025 actuarially computed employer contribution; therefore, there is no impact associated with reducing the amortization payroll growth assumption.

In addition, there was an overall actuarial gain (i.e., favorable plan experience) during the fiscal year ending September 30, 2022. The primary source of this actuarial gain was that the employer subsidized October 1, 2022 per person health benefit costs were lower than projected by the 2021 valuation assumptions. The lower-than-projected per person health benefit costs decreased the Actuarial Accrued Liability by $1.6 billion and decreased the actuarially computed employer contribution by $17.5 million. Actual fiscal year 2022 employer paid benefits were, to a lesser extent, an additional source of favorable experience.

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%. In accordance with direction provided by ORS, due to the normal cost floor provision for MPSERS, the amount of excess investment return for MPSERS does not cover the increase in the first year employer normal cost contribution.

For the September 31, 2022 valuation, the investment return assumption remained at 6.00% as a result of the Policy. Please see page D-3 for additional detail.

SECTION A

VALUATION RESULTS

Development of the Actuarially Computed Employer Contribution

Contributions for	Fiscal Year Beginning October 1, 2024
	6.00% Interest
	Total
Employer Normal Cost	$ 65,347,086
Amortization of UAAL [1]	$ 0
Actuarially Computed Employer Contribution	$ 65,347,086
	Fiscal Year Beginning October 1, 2023
	6.00% Interest
	Total
Employer Normal Cost	$ 74,979,696
Amortization of UAAL [1]	$ 58,674,329
Actuarially Computed Employer Contribution	$ 133,654,025

[1] *Unfunded Actuarial Accrued Liabilities (UAAL) were amortized over 14 years from October 1, 2024 (15 years in the 2021 valuation from October 1, 2023).*

The UAAL was amortized as a level percent of active member payroll over a period of 14 years and a payroll growth assumption (for amortization purposes only) of 0.75%. The actuarially computed employer contribution amounts presented throughout this report do not reflect the normal cost or UAAL "floor" provisions of Public Act 92 of 2017 and Public Act 181 of 2018 and are in addition to any reconciliation payments as required by subsection 41(9) of MPSERS statute, unless otherwise indicated.

Determination of Unfunded Actuarial Accrued Liability

	September 30, 2022		
	6.00% Interest		
	Gross Prior to Payments From Medicare	Offset for Payments From Medicare	Total
A. Present Value of Future Benefits			
i) Retirees and Beneficiaries	$ 44,570,880,234	$ (38,098,760,781)	$ 6,472,119,453
ii) Inactive Vested Members	590,102,964	(519,166,518)	70,936,446
iii) Active Members	26,885,633,846	(20,172,778,687)	6,712,855,159
Total Present Value of Future Benefits	$ 72,046,617,044	$ (58,790,705,986)	$ 13,255,911,058
B. Present Value of Future Normal Costs	7,150,060,161	$ (5,402,289,463)	1,747,770,698
C. Actuarial Accrued Liabilities (A-B)	$ 64,896,556,883	$ (53,388,416,523)	$ 11,508,140,360
D. Actuarial Value of Assets	11,419,552,510		11,419,552,510
E. Unfunded Actuarial Accrued Liability (C-D)	$ 53,477,004,373	$ (53,388,416,523)	$ 88,587,850
F. Funded Ratio (D/C)			99.23%

	September 30, 2021		
	6.00% Interest		
	Gross Prior to Payments From Medicare	Offset for Payments From Medicare	Total
A. Present Value of Future Benefits			
i) Retirees and Beneficiaries	$ 41,598,194,762	$ (34,463,939,813)	$ 7,134,254,949
ii) Inactive Vested Members	521,060,784	(449,945,220)	71,115,564
iii) Active Members	25,354,364,431	(18,335,766,933)	7,018,597,498
Total Present Value of Future Benefits	$ 67,473,619,977	$ (53,249,651,966)	$ 14,223,968,011
B. Present Value of Future Normal Costs	6,737,324,280	$ (4,890,305,586)	1,847,018,694
C. Actuarial Accrued Liabilities (A-B)	$ 60,736,295,697	$ (48,359,346,380)	$ 12,376,949,317
D. Actuarial Value of Assets	10,547,883,872		10,547,883,872
E. Unfunded Actuarial Accrued Liability (C-D)	$ 50,188,411,825	$ (48,359,346,380)	$ 1,829,065,445
F. Funded Ratio (D/C)			85.22%

Experience Gain/(Loss)

Gains/(Losses) During the Year Ended September 30, 2022
Resulting from Differences Between Assumed and Actual Experience

A. Derivation of Actuarial Gain/(Loss):	
1. Unfunded Actuarial Accrued Liability (UAAL) - Previous Valuation	$ 1,829,065,445
2. Total Normal Cost (employer plus member) for Year Ending 9/30/2022	242,456,134
3. Total Contributions (employer plus member) for Year Ending 9/30/2022	977,166,922
4. Interest on:	
a. UAAL: Discount Rate* x (1)	109,743,927
b. Normal Cost and Contributions: Discount Rate / 2 x [(2) - (3)]	(22,041,324)
c. Net Total: (a) + (b)	87,702,603
5. Change in UAAL due to Benefit Changes	-
6. Change in UAAL due to Assumptions (Trend/Discount Rate)	369,581,958
7. Expected UAAL Current Year: (1) + (2) - (3) + (4c) + (5) + (6)	1,551,639,218
8. Actual UAAL Current Year	88,587,850
9. Experience Gain/(Loss): (7) - (8)	1,463,051,368
B. Approximate Portion of Gain/(Loss) due to Investments	(188,051,967)
C. Approximate Portion of Gain/(Loss) due to Liabilities: (A.9) - (B)	1,651,103,335

** Discount rate is 6.00%.*

Please note that row B above includes the accelerated recognition of investment gains associated with the Dedicated Gains Policy, if applicable.

Type of Activity

	Gain/(Loss)
1. **Premiums.** Gains and losses resulting from actual premiums in valuation year versus that assumed from prior valuation.	$ 1,568,983,993
2. **Investment Income.** If there is greater investment income than assumed, there is a gain. If less income, a loss.	(188,051,967)
3. **Demographic and Other.** Gains and losses resulting from demographic experience, data adjustments, timing of financial transactions, etc.	82,119,342
4. **Composite Gain/(Loss) During Year.**	$ 1,463,051,368

Comments

Comment A: It was reported that full funding of the retiree health benefit program began in fiscal year 2013. It was also reported that the September 30, 2022 annual actuarial valuation is used to establish the employer contribution for fiscal year 2025. Therefore, this report presents the actuarially computed employer contribution for fiscal year 2025 (based upon a 6.00% discount rate). Plan changes resulting from Public Act 300 of 2012 are reflected in this valuation. (They were first reflected in the September 30, 2012 valuation.) A brief summary of the plan changes follows:

(1) 90% employer subsidy for benefit recipients already Medicare eligible as of January 1, 2013;
(2) 80% employer subsidy for other members not covered by a grading provision;
(3) 80% maximum employer subsidy for members covered by a grading provision;
(4) Members hired prior to September 4, 2012 had the option to elect to forfeit employer subsidized retiree health coverage and participate in the Personal Healthcare Fund (PHF); and
(5) Members hired on or after September 4, 2012 participate in the PHF with defined benefit retiree health coverage essentially limited to a lump sum payment at termination ($1,000 or $2,000 depending on age at termination), except in cases of duty death-in-service.

In addition to the above changes, future 3% of payroll active member contributions required to participate in the defined benefit retiree health program have been reflected in this valuation. A potential refund of a member's 3% contributions is assumed to occur from the pension portion of the Retirement System.

The actuarially computed employer contribution for fiscal year 2025 was determined to be $65,347,086. Please note, the actuarially computed employer contribution shown in this report does not reflect any contribution floors as described in Public Act 92 of 2017 and Public Act 181 of 2018 and is in addition to any reconciliation payments as required by subsection 41(9) of MPSERS statute, unless otherwise indicated.

Comment B: One of the key assumptions used in any valuation of the cost of post-employment benefits is the investment rate of return on Plan assets. Higher assumed investment returns will result in a lower actuarially computed employer contribution. Lower returns will tend to increase the actuarially computed employer contributions. We have calculated the liability and the resulting actuarially computed employer contribution based on a 6.00% assumed rate of return, and based on the employer's funding policy of contributing the full actuarially computed employer contribution into a qualified trust.

In accordance with the Dedicated Gains Policy, the investment return remained 6.00%.

Comment C: Starting with the September 30, 2018 valuation, the actuarial value of assets was developed using an asset smoothing method. The actuarial value of assets recognizes assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over a closed 5-year period. Prior to the September 30, 2018 valuation, the actuarial value of assets was equal to the market value of assets. The market value of assets as of September 30, 2022 was $10.6 billion, while the actuarial value of assets as of September 30, 2022 was $11.4 billion.

Comments

Comment D: Because retiree health benefits are not related to active member payroll, full funding employer contributions are reported as a dollar amount, instead of expressed as a percentage of payroll. Some readers, however, are interested in the actuarially computed employer contributions expressed as a percentage of payroll. The non-PHF active member payroll is projected to be $6,050.7 million for the year beginning October 1, 2024, and the PHF active member payroll is projected to be $4,360.2 million for the year beginning October 1, 2024. With the introduction of the PHF, the employer normal cost percent (i.e., 1.08%) is expressed as a percentage of non-PHF active member payroll, while the UAAL percent (i.e., 0.00%) is expressed as a percentage of total payroll (i.e., including both non-PHF and PHF active member payroll) based on current administrative practice. The actuarially computed employer contribution amounts expressed as percentages of payroll do not reflect the normal cost or UAAL "floor" provisions of Public Act 92 of 2017 and Public Act 181 of 2018 and is in addition to any reconciliation payments as required by subsection 41(9) of the MPSERS statute.

Comment E: The fiscal year 2025 employer contribution rate shown includes the amortization of the unfunded actuarial accrued liability over 14 years, beginning October 1, 2024.

Comment F: The employer subsidized October 1, 2022 per person health benefit costs were lower than projected by the 2021 valuation assumptions. The lower actual increases from 2021 to 2022 resulted in a lower-than-projected actuarially computed employer contribution and accrued liability.

Comment G: Beginning with the September 30, 2019 valuation, it was reported to the actuary that a reconciliation process, similar to that used for the pension valuation, had been implemented with respect to the employer retiree health contributions, with reconciliation payments beginning in fiscal year 2021. The contribution requirements shown on page A-1 are in addition to any reconciliation payments as 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 F-13.

Comment H: In accordance with Public Act 181 of 2018, the payroll growth assumption for amortization purposes used in determining the fiscal year 2025 employer contributions decreased from 2.00% to 1.50%. In accordance with Public Act 220 of 2022, the payroll growth assumption for amortization purposes used in determining the fiscal year 2025 employer contributions further decreased from 1.50% to 0.75%. These assumption changes had no impact on the Actuarial Accrued Liability or the actuarially computed employer contribution. In accordance with discussions with ORS staff, 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. As MPSERS is projected to be over 100% funded as of the beginning of fiscal year 2025, no amortization payment is required in the determination of the fiscal year 2025 actuarially computed employer contribution; therefore, there is no impact associated with reducing the amortization payroll growth assumption.

Comments

Comment I: It is our understanding that the plan is participating in the Medicare Advantage program for calendar year 2023. The September 30, 2022 actuarial valuation was completed under the assumption that the plan will participate in the Medicare Advantage program for each year following the valuation date.

Comment J: In a Medicare Advantage program, the liability is based on the difference between the present value of future claims minus the present value of future Medicare reimbursements. For purposes of this valuation, future growth in Medicare reimbursements was assumed to be equal to future growth in post-65 medical and prescription drugs claims.

Comment K: Future trends in health costs defy accurate prediction. To the extent that future costs increase more (or less) than projected in this report, the computed liabilities and the actuarially computed employer contributions will be higher (or lower) than shown in this report.

Comment L: Governmental Accounting Standards Board (GASB) Statement No. 74 was effective for the plan year ending September 30, 2017. A separate report was issued to comply with the actuarial requirements of this Statement.

Comment M: 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.

SECTION B

RETIREE PREMIUM RATE DEVELOPMENT

Retiree Premium Rate Development

Background

The System's eligible retirees and their dependents may elect to receive benefits from a number of health care plans, including the self-funded Blue Cross Blue Shield of Michigan (BCBSM) PPO plan for Non-Medicare retirees, the BCBSM Medicare Advantage Plan for Medicare retirees and the OPTUMRx prescription drug plan, and the fully-insured HMO plans from Blue Care Network (BCN), and Priority Health. For the MESSA retirees, a fully-insured BCBSM plan is provided. Dental benefits are self-funded, provided by Delta Dental. Vision benefits are self-funded, provided by BCBSM under a Blue Vision / VSP platform.

Rate Development

For the fully-insured programs, initial per capita costs were developed separately for pre-65 and post-65 retirees using the January 1, 2023 premium rates provided by the System.

For the self-funded programs, calendar year premium rates are developed by an independent actuarial firm using the self-funded medical and Rx claims experience for a recent twelve month period in conjunction with exposure data for retired members of the health care program and administrative expenses, CMS reimbursements (Medicare offset payments) and Prescription Drug Plan (PDP) reimbursements.

These self-insured rates are evaluated for suitableness in the valuation process using the claim and administrative expenses, reimbursements from CMS and PDP provided by the independent actuarial firm.

These self-insured, calendar year premium rates are projected to the valuation period (i.e., October 1, 2022 to September 30, 2023), adjusted for plan design changes and then blended with the fully-insured rates, based on actual enrollment. A dependent load of 9.7% was added to pre-65 spousal rates to account for retirees with dependent coverage.

Age graded and gender distinct premiums and Medicare offset payments are utilized by this valuation. The initial costs developed are appropriate for the unique age and gender distribution currently existing. Over the future years covered by this valuation, the age and gender distribution will most likely change. Therefore, our process "distributes" the average premium over all age/gender combinations and assigns a unique premium for each combination. This process more accurately reflects health care costs in the retired population over the projection period.

In a Medicare Advantage Program, the liability is based on the difference between the present value of future claims minus the present value of future reimbursements from CMS. CMS' reimbursement is based on a very competitive bid process and has resulted in recent Medicare Advantage premiums trending at low rates of increase. Traditionally, a margin has been added to Medicare Advantage rates to recognize that increases in CMS reimbursements may lag behind the trends for healthcare costs. For the near term, we believe this margin is no longer necessary, and we will monitor the Medicare Advantage environment and revisit the need for an additional margin at the time of the next valuation.

Retiree Premium Rate Development

The tables below show a subset of the resulting one-person combined gross medical and prescription drug monthly premiums (employer paid subsidy plus member paid subsidy), as well as the Medicare Payments (Medicare Advantage Plan and Prescription Drug Plan) offset at select ages. The premium (or per capita cost) rates shown below reflect the use of age grading.

Monthly One-Person Rates
For Medical and Prescription Drug Coverage

Per Capita Costs for Retirees Not Eligible for Medicare				
	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
Age	Male	Female	Male	Female
50	$ 506.74	$ 624.25	N/A	N/A
60	861.22	848.01	N/A	N/A
64	1,047.27	988.34	N/A	N/A

Per Capita Costs for Retirees Eligible for Medicare				
	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
Age	Male	Female	Male	Female
65	$ 948.08	$ 894.23	$ 841.45	$ 793.65
75	1,109.25	1,082.39	984.49	960.65
85	1,172.97	1,186.78	1,041.04	1,053.30

Per Capita Costs for Beneficiaries Not Eligible for Medicare				
	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
Age	Male	Female	Male	Female
50	$ 474.73	$ 584.82	N/A	N/A
60	806.82	794.44	N/A	N/A
64	981.12	925.91	N/A	N/A

Per Capita Costs for Beneficiaries Eligible for Medicare				
	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
Age	Male	Female	Male	Female
65	$ 911.05	$ 859.30	$ 808.59	$ 762.66
75	1,065.92	1,040.11	946.04	923.13
85	1,127.15	1,140.43	1,000.38	1,012.17

The dental and vision premium rates used in this valuation of the Plan were not “age graded” since these claims do not vary significantly by age. The gross monthly one and two person combined dental/vision premiums used in this valuation are $31.20 and $62.40, respectively.

Retiree Premium Rate Development

Health Care Cost Trend Assumption

The health care cost trend rate is the rate of change in per capita health care claims over time as a result of factors such as medical inflation, utilization of health care services, plan design, and technological improvements. It is a crucial economic assumption that is required for measuring retiree health care benefit obligations.

Retiree health care valuations use a health care cost trend assumption (trend vector) that changes over the years. The trend vector used in this valuation begins with a near-term trend assumption and declines over a time to an ultimate trend rate. The near-term rates reflect the increases in the current cost of health care goods and services. The process of trending down to a lower ultimate trend relies on the theory that premiums will moderate over the long-term otherwise the healthcare sector would eventually consume the entire GDP. It is on this basis that we project premium rate increases will continue to exceed wage inflation for the next fifteen years, but by less each year until leveling off at a rate assumed to be 3.50% in this valuation.

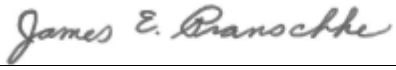
While experience is often the best starting point for future costs, GRS does not rely on a group's experience in setting the near-term trend assumptions since trends vary significantly from year to year and are not credible for most groups. Therefore, professional judgment, trends from GRS's book of business and industry benchmarks (e.g., trend reports from various Pharmacy Benefit Management (PBM) organizations and national healthcare benefit consulting firms) are used in conjunction with a group's historical experience to establish the trend assumptions.

Actuarial Disclosures

The premium rates used in this valuation were developed using the proprietary Excel models which, in James E. Pranschke's professional judgment, provide the initial projected costs which are consistent with the purposes of the valuation. We performed tests to ensure that the models, in their entirety, reasonably represent that which is intended to be modeled.

Aging factors used in the premium development models were developed based on the information and data from a 2013 study commissioned by the Society of Actuaries entitled "Health Care Costs – From Birth to Death."

James E. Pranschke is a Member of the American Academy of Actuaries (MAAA) and meets the Qualification Standards of the American Academy of Actuaries to certify the per capita retiree health care rates (shown on pages B-2, B-4, and B-5) and the health care trend rates (shown on page F-11).



James E. Pranschke, FSA, FCA, MAAA

Retiree Premium Rate Development

Gross Monthly One-Person Retiree Rates for Medical and Prescription Drug Coverage

Age	Gross Rate		Age	Gross Rate		Age	Gross Rate	
	Male	Female		Male	Female		Male	Female
16	$ 226.28	$ 228.02	51	$ 536.17	$ 645.86	86	$1,168.64	$1,191.04
17	224.69	238.50	52	566.83	667.04	87	1,163.87	1,194.18
18	217.70	245.33	53	598.73	687.66	88	1,159.20	1,196.59
19	206.63	249.60	54	632.04	707.88	89	1,154.95	1,198.26
20	193.82	253.62	55	666.81	728.06	90	1,151.23	1,198.67
21	181.61	260.03	56	703.06	748.74	91	1,147.98	1,196.99
22	171.80	270.91	57	740.73	770.55	92	1,145.02	1,192.25
23	165.47	287.30	58	779.65	794.05	93	1,142.09	1,183.49
24	162.97	309.15	59	819.75	819.75	94	1,138.92	1,169.83
25	164.09	335.45	60	861.22	848.01	95	1,135.27	1,150.57
26	168.22	364.58	61	904.47	879.04	96	1,130.99	1,125.14
27	174.62	394.66	62	949.79	912.87	97	1,125.97	1,093.22
28	182.56	423.78	63	997.38	949.35	98	1,120.18	1,054.69
29	191.48	450.27	64	1,047.27	988.34	99	1,120.18	1,054.69
30	200.92	472.80	65	948.08	894.23	100	1,120.18	1,054.69
31	210.56	490.50	66	964.00	916.22	101	1,120.18	1,054.69
32	220.22	503.05	67	980.44	937.81	102	1,120.18	1,054.69
33	229.93	510.67	68	997.35	958.97	103	1,120.18	1,054.69
34	239.89	514.07	69	1,014.83	979.58	104	1,120.18	1,054.69
35	250.34	514.35	70	1,032.81	999.40	105	1,120.18	1,054.69
36	261.49	512.70	71	1,050.60	1,018.29	106	1,120.18	1,054.69
37	273.41	510.34	72	1,067.43	1,036.14	107	1,120.18	1,054.69
38	286.03	508.31	73	1,082.77	1,052.85	108	1,120.18	1,054.69
39	299.14	507.38	74	1,096.63	1,068.27	109	1,120.18	1,054.69
40	312.61	507.97	75	1,109.25	1,082.39	110	1,120.18	1,054.69
41	326.43	510.18	76	1,121.13	1,095.41	111	1,120.18	1,054.69
42	340.75	514.02	77	1,132.74	1,107.82	112	1,120.18	1,054.69
43	355.81	519.60	78	1,144.18	1,120.03	113	1,120.18	1,054.69
44	371.83	527.18	79	1,155.02	1,132.21	114	1,120.18	1,054.69
45	389.17	537.10	80	1,164.50	1,144.13	115	1,120.18	1,054.69
46	408.20	549.66	81	1,171.76	1,155.23	116	1,120.18	1,054.69
47	429.35	564.98	82	1,176.14	1,165.11	117	1,120.18	1,054.69
48	452.89	582.91	83	1,177.48	1,173.74	118	1,120.18	1,054.69
49	478.81	602.95	84	1,176.18	1,181.03	119	1,120.18	1,054.69
50	506.74	624.25	85	1,172.97	1,186.78	120	1,120.18	1,054.69

Aging factors were based on the 2013 SOA Study "Health Care Costs – From Birth to Death." While not shown, per capita costs for beneficiaries are based on the same aging factor tables as those of the retirees.

Retiree Premium Rate Development

Medical Payments Retiree Offset (MA and PDP)

Age	Gross Rate		Age	Gross Rate		Age	Gross Rate	
	Male	Female		Male	Female		Male	Female
16	N/A	N/A	51	N/A	N/A	86	$1,037.20	$1,057.08
17	N/A	N/A	52	N/A	N/A	87	1,032.97	1,059.86
18	N/A	N/A	53	N/A	N/A	88	1,028.82	1,062.00
19	N/A	N/A	54	N/A	N/A	89	1,025.05	1,063.49
20	N/A	N/A	55	N/A	N/A	90	1,021.75	1,063.85
21	N/A	N/A	56	N/A	N/A	91	1,018.87	1,062.36
22	N/A	N/A	57	N/A	N/A	92	1,016.24	1,058.16
23	N/A	N/A	58	N/A	N/A	93	1,013.63	1,050.38
24	N/A	N/A	59	N/A	N/A	94	1,010.82	1,038.26
25	N/A	N/A	60	N/A	N/A	95	1,007.58	1,021.16
26	N/A	N/A	61	N/A	N/A	96	1,003.78	998.59
27	N/A	N/A	62	N/A	N/A	97	999.33	970.26
28	N/A	N/A	63	N/A	N/A	98	994.19	936.07
29	N/A	N/A	64	N/A	N/A	99	994.19	936.07
30	N/A	N/A	65	$ 841.45	$ 793.65	100	994.19	936.07
31	N/A	N/A	66	855.58	813.17	101	994.19	936.07
32	N/A	N/A	67	870.16	832.33	102	994.19	936.07
33	N/A	N/A	68	885.17	851.11	103	994.19	936.07
34	N/A	N/A	69	900.69	869.40	104	994.19	936.07
35	N/A	N/A	70	916.64	886.99	105	994.19	936.07
36	N/A	N/A	71	932.44	903.76	106	994.19	936.07
37	N/A	N/A	72	947.37	919.60	107	994.19	936.07
38	N/A	N/A	73	960.99	934.43	108	994.19	936.07
39	N/A	N/A	74	973.29	948.12	109	994.19	936.07
40	N/A	N/A	75	984.49	960.65	110	994.19	936.07
41	N/A	N/A	76	995.03	972.20	111	994.19	936.07
42	N/A	N/A	77	1,005.33	983.22	112	994.19	936.07
43	N/A	N/A	78	1,015.49	994.05	113	994.19	936.07
44	N/A	N/A	79	1,025.11	1,004.87	114	994.19	936.07
45	N/A	N/A	80	1,033.52	1,015.45	115	994.19	936.07
46	N/A	N/A	81	1,039.97	1,025.30	116	994.19	936.07
47	N/A	N/A	82	1,043.86	1,034.06	117	994.19	936.07
48	N/A	N/A	83	1,045.05	1,041.73	118	994.19	936.07
49	N/A	N/A	84	1,043.89	1,048.20	119	994.19	936.07
50	N/A	N/A	85	1,041.04	1,053.30	120	994.19	936.07

Aging factors were based on the 2013 SOA Study "Health Care Costs – From Birth to Death." While not shown, per capita costs for beneficiaries are based on the same aging factor tables as those of the retirees.

SECTION C

SUMMARY OF POST-RETIREMENT HEALTH BENEFITS COVERAGE

Summary of Post-Retirement Health Benefits Coverage

Members hired before September 4, 2012 have the option of subsidized health coverage, which was funded on a cash disbursement basis by the employers through fiscal year 2012. Beginning fiscal year 2013, it is funded on a prefunded basis. The Michigan Public School Employees' Retirement System (MPSERS) has contracted to provide comprehensive group medical, prescription drug, hearing, dental and vision coverage for retirees and beneficiaries. Health care benefits are provided both on a self-funded and fully insured basis. A portion of the premium is paid by the System with the balance paid by the benefit recipient.

Pension recipients hired before July 1, 2008 are eligible for 80% employer paid Master Health Plan and Dental and Vision coverage for themselves and their dependents. However, those retirees Medicare eligible on January 1, 2013 receive 90% employer subsidy. Certain eligibility requirements are described below:

a. In order to receive the subsidy, a member must meet the definition of an active member immediately preceding their retirement. A member is considered active and eligible if they have earned one-tenth (0.1) or more years of service in each of the five school fiscal years immediately before their retirement effective date, or at least one-half (0.5) years of service within the two school fiscal years immediately before their retirement effective date.

b. If a member initiated a service credit purchase on or after July 1, 2008, they are subject to a delayed insurance subsidy if the service credit purchase allows a member to retire for a benefit for which they would not have been eligible without the service credit purchase.

Members hired before July 1, 2008 who retire from deferred vested status with less than 30 years of service, who terminate employment after October 31, 1980 with vested deferred benefits, are eligible for partially MPSERS paid health benefit coverage (no payment if less than 21 years of service, 10% of the maximum MPSERS payment for each year of service over 20 years up to 100% of the maximum employer payment for 30 or more years of service). Members who retire from deferred status and terminated employment before October 31, 1980, are entitled to 100% of the subsidy allowed by law.

Summary of Post-Retirement Health Benefits Coverage

Pension recipients hired after June 30, 2008, but before September 4, 2012 are eligible for 80% MPSERS paid Master Health Plan and Dental and Vision coverage for themselves and their dependents, but the premium subsidy is graded based on career length as described below:

a. Member is age 60 or older at retirement

- If member has 10 or more years of total service, MPSERS pays 30% of the monthly premium for the first 10 years of total service. The subsidy increases by an additional 4% for each additional year of service, up to the maximum of 80% of the monthly premium if 23 years of total service or more.
- If member has fewer than 10 years of total service, there is no MPSERS paid coverage.

b. Member is under age 60 at retirement

- If member has 25 years of actual service, the employer pays 80% of the monthly premium.
- If the member has under 25 years of actual service, upon attainment of age 60 the member may apply for employer paid coverage (as described by the schedule shown above in a.).

Coverage for eligible dependents is the same as the member's subsidy.

Members hired on or after September 4, 2012 become participants of the Personal Healthcare Fund (PHF) and will not be eligible for an insurance premium subsidy in retirement. For members hired on or after September 4, 2012, the maximum insurance premium subsidy is payable to the surviving spouse and health dependents of members who die as a result of injury or illness resulting from job activities. For all other members hired on or after September 4, 2012, their post-retirement health benefits coverage is limited to a credit into a Health Reimbursement Account at termination if they have at least 10 years of service. The credit will be $2,000 for participants who are at least age 60 at termination or $1,000 for participants who are less than age 60 at termination.

Summary of Post-Retirement Health Benefits Coverage

Public Act 300 of 2012 granted all members of MPSERS, who earned service credit in the 12 months ending September 4, 2012, or were on an approved professional services or military leave of absence on September 4, 2012, a voluntary election regarding their retirement healthcare. Any changes to a member's healthcare benefit are effective as of the member's *transition date*, which is defined as the first day of the pay period that begins on or after February 1, 2013.

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

i. Maintaining eligibility for the premium subsidy described above, and contributing 3% of their compensation while still working, or
ii. Entering the PHF.

Members not making an election defaulted into the premium subsidy arrangement.

These contributions are refundable in certain cases:

- If you leave public school employment and do not qualify for any premium subsidy.
- If you die before becoming eligible for the subsidy benefit and your beneficiary is not eligible for a premium subsidy.
- If you die with retiree healthcare fund contributions still on account, and no survivor benefits are payable, any remaining contributions will be refunded to your refund beneficiary or your estate.

Refunds of member contributions to the healthcare funding account are issued as a supplemental retirement allowance (payable at age 60 and payable from the pension plan) paid out over a 60 month period.

A delayed subsidy applies to retirees who purchased service credit on or after July 1, 2008. Such individuals are eligible for premium subsidy benefits at age 60 or when they would have been eligible to retire without having made a service purchase, whichever comes first. They may enroll in the insurances earlier, but are responsible for the full premium until the premium subsidy begins.

SECTION D

FUND ASSETS

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

	September 30	
	2021	2022
Equity in Common Cash	$ 30,941,067	$ 42,108,237
Total Receivables	504,175,066	399,515,947
Short Term Investment Pools	246,054,491	97,242,973
Fixed Income Pools	1,057,960,010	981,232,637
Domestic Equity Pools	2,405,232,377	1,900,147,505
Real Estate and Infrastructure Pools	735,414,436	1,150,644,772
Private Equity Pools	2,437,065,812	2,679,987,311
International Equity Pools	1,701,570,655	1,296,940,131
Absolute Return Pools	559,922,951	1,075,096,683
Real Return and Opportunistic Pools	1,270,643,382	1,255,654,704
Securities Lending Collateral less Obligations	0	0
Total Assets	10,948,980,247	10,878,570,900
Other Liabilities	(206,782,470)	(259,804,731)
Net Assets Held in Trust for Pension Benefits	$10,742,197,777	$10,618,766,169

Note: The assets shown above are assumed to not include any assets associated with the Personal Healthcare Fund.

Reconciliation of Market Value of Assets

	For the One Year Period Ending	
	September 30, 2021	September 30, 2022
Market Value, Beginning of Year	$ 8,019,027,188	$ 10,742,197,777
Audit Adjustment, Beginning of Year	$ -	-
Additions		
Contributions		
Employer Contributions	$ 749,590,728	$ 771,570,875
Nonemployer Contributing Entities	-	-
Member Contributions	203,769,106	205,596,047
Other Governmental Contributions	236,167,771	251,588,645
Total Contributions	$ 1,189,527,605	$ 1,228,755,567
Investment Income		
Net Appreciation in Fair Value of Investments	$ 2,009,764,013	$ (709,698,083)
Interest and Dividends	184,969,010	211,127,560
Other Net Investment Income	1,140,269	1,582,691
Less Investment Expense	(41,250,724)	(40,858,895)
Net Investment Income	$ 2,154,622,568	$ (537,846,727)
Other	$ 115,671	$ 79,098
Total Additions	$ 3,344,265,844	$ 690,987,938
Deductions		
Health Benefit Payments	$ 612,652,552	$ 807,104,071
OPEB Plan Administrative Expense [(1)]	8,442,703	7,315,475
Other	-	-
Total Deductions	$ 621,095,255	$ 814,419,546
Market Value, End of Year	$ 10,742,197,777	$ 10,618,766,169
Net, Market Rate of Return	25.95%	(4.91)%

[(1)] *Administrative expenses include staff salaries and benefits, consulting, printing, postage, telephone, and other.*

Note: The assets shown above are assumed to not include any assets associated with the Personal Healthcare Fund.

Determination of Actuarial Value of Assets

Year Ended September 30	2022	2023	2024	2025	2026
A. Funding Value Beginning of Year	$ 10,547,883,872				
B. Market Value					
B1. Market Value End of Year	10,618,766,169				
B2. Market Value Beginning of Year	10,742,197,777				
B3. Audit Adjustment	-				
C. Non-Investment Net Cash Flow					
C1. Member Contributions	205,596,047				
C2. Employer Contributions	771,570,875				
C3. Other Governmental Contributions	251,588,645				
C4. Benefit Payments	(806,955,727)				
C5. Contribution Refunds / Transfers	(148,344)				
C6. Administrative Expenses	(7,315,475)				
C7. Other	79,098				
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	414,415,119				
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C8	(537,846,727)				
D2. Assumed Rate of Return	6.00%	6.00%			
D3. Market Rate of Return	(4.91)%				
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)	645,305,486				
D7. Amount Subject to Phase-In: D1 - D5 - D6	(1,183,152,213)				
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	(236,630,443)				
E2. First Prior Year	48,578,476	$ (236,630,443)			
E3. Second Prior Year	-	48,578,476	$ (236,630,443)		
E4. Third Prior Year	-	-	48,578,476	$ (236,630,443)	
E5. Fourth Prior Year	-	-	-	48,578,477	$ (236,630,441)
E6. Total Phase-Ins	$ (188,051,967)	$ (188,051,967)	$ (188,051,967)	$ (188,051,966)	$ (236,630,441)
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 11,419,552,510				
F2. Corridor Percent	30%				
F3. Upper Corridor Limit: (100% + F2) x B1	13,804,396,020				
F4. Lower Corridor Limit: (100% - F2) x B1	7,433,136,318				
F5. Funding Value End of Year	$ 11,419,552,510				
G. Difference Between Market and Funding Value	(800,786,341)				
H. Recognized Rate of Return	4.25%				
I. Market Rate of Return	(4.91)%				
J. Ratio of Funding Value to Market Value	1.0754				

Determination of Actuarial Value of Assets (Concluded)

Year Ended September 30	2018	2019	2020	2021
A. Funding Value Beginning of Year	$ 5,177,774,602	$ 6,089,485,632	$ 6,957,871,742	$ 8,178,804,782
B. Market Value				
B1. Market Value End of Year	6,111,241,252	6,892,098,528	8,019,027,188	10,742,197,777
B2. Market Value Beginning of Year	5,177,774,602	6,111,241,252	6,892,098,528	8,019,027,188
B3. Audit Adjustment	-	283	34,921,939	-
C. Non-Investment Net Cash Flow				
C1. Member Contributions	210,679,559	208,197,137	204,752,249	203,769,106
C2. Employer Contributions	663,708,218	707,714,341	708,508,889	749,590,728
C3. Other Governmental Contributions	96,707,671	233,196,225	324,598,151	236,167,771
C4. Benefit Payments	(628,361,484)	(700,257,338)	(514,214,731)	(612,545,011)
C5. Contribution Refunds / Transfers	(344,297)	(33,591)	(112,571)	(107,541)
C6. Administrative Expenses	Included in D1	(4,097,557)	(6,213,573)	(8,442,703)
C7. Other	96,020	74,340	118,171	115,671
C8. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6 + C7	342,485,687	444,793,557	717,436,585	568,548,021
D. Investment Return				
D1. Market Return Total: B1 - B2 - B3 - C8	590,980,963	336,063,436	374,570,136	2,154,622,568
D2. Assumed Rate of Return	7.15%	6.95%	6.95%	6.95%
D3. Market Rate of Return	11.05%	5.31%	5.14%	25.95%
D4. Dedicated Gains Policy Trigger (Excess Return %)	3.39%	0.00%	0.00%	15.94%
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C8/2)	181,331,691	-	-	1,323,546,211
D6. Assumed Amount of Return: D2 x (A + B3 + C8/2)	382,454,747	438,675,847	510,930,082	588,183,976
D7. Amount Subject to Phase-In: D1 - D5 - D6	27,194,525	(102,612,411)	(136,359,946)	242,892,381
E. Phased-In Recognition of Investment Return				
E1. Current Year: 0.20 x D7	5,438,905	(20,522,482)	(27,271,989)	48,578,476
E2. First Prior Year	-	5,438,905	(20,522,482)	(109,087,957)
E3. Second Prior Year	-	-	5,438,905	(61,567,447)
E4. Third Prior Year	-	-	-	10,877,810
E5. Fourth Prior Year	-	-	-	-
E6. Total Phase-Ins	5,438,905	$ (15,083,577)	$ (42,355,566)	$ (111,199,118)
F. Funding Value End of Year				
F1. Preliminary Funding Value End of Year: A + B3 + C8 + D5 + D6 + E6	$ 6,089,485,632	$ 6,957,871,742	$ 8,178,804,782	$ 10,547,883,872
F2. Corridor Percent	30%	30%	30%	30%
F3. Upper Corridor Limit: (100% + F2) x B1	7,944,613,628	8,959,728,086	10,424,735,344	13,964,857,110
F4. Lower Corridor Limit: (100% - F2) x B1	4,277,868,876	4,824,468,970	5,613,319,032	7,519,538,444
F5. Funding Value End of Year	$ 6,089,485,632	$ 6,957,871,742	$ 8,178,804,782	$ 10,547,883,872
G. Difference Between Market and Funding Value	21,755,620	(65,773,214)	(159,777,594)	194,313,905
H. Recognized Rate of Return	10.64 %	6.71%	6.37%	21.28%
I. Market Rate of Return	11.05 %	5.31%	5.14%	25.95%
J. Ratio of Funding Value to Market Value	0.9964	1.0095	1.0199	0.9819

SECTION E

SUMMARY OF REPORTED PARTICIPANT DATA

Summary of Reported Participant Data as of the Indicated Valuation Date

Reported Program Participants	September 30, 2021	September 30, 2022
Active Members [5]		
Graded Premium		
Number	113,012	108,282
Average age	50.1	50.5
Average service	17.7	17.9
Reported payroll (millions) [4]	$6,468.9	$6,599.7
Average annual pay	$57,241	$60,949
Personal Healthcare Fund		
Number [3]	79,154	91,487
Reported payroll (millions) [4]	$2,429.5	$2,993.3
Average annual pay	$30,692	$32,719
Inactive Vested Members		
Number [1]	2,216	2,271
Average age	55.7	54.9
Retirees and Beneficiaries		
Number [2]	223,767	225,215
Average age	73.4	73.7

1 *Only includes inactive vested persons with 21 or more years of service at termination (10 or more years for MIPP/PPP members).*

2 *Includes alternate payees and other individuals not eligible for or otherwise receiving subsidized retiree health benefits.*

3 *Of the 91,487 PHF actives as of September 30, 2022, 83,069 were hired on or after September 4, 2012 and are eligible for the $1,000/$2,000 lump sum at termination benefit.*

4 *The total annual payroll reported in the valuation data (including payroll for those employees excluded from the active data statistics above) is $9,607.3 million as of September 30, 2022 ($8,901.4 million as of September 30, 2021). UAAL contributions are expected to continue to be collected on the payroll of all active members in the future.*

5 *The active member statistics exclude people provided in the valuation with both $0 pay and 0 service (5,980 as of September 30, 2021 and 6,874 as of September 30, 2022).*

SECTION F

ACTUARIAL COST METHOD AND ACTUARIAL 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.

Financing of unfunded actuarial accrued liabilities – Unfunded actuarial accrued liabilities (UAAL) as of September 30, 2022 are projected to the beginning of the fiscal year for which the contributions are being determined, in this case October 1, 2024 (i.e., the beginning of fiscal year 2025). The projection procedure increases the UAAL as of September 30, 2022 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.

Unfunded actuarial accrued liabilities as of the beginning of fiscal year 2025 were amortized by level (principal & interest combined) percent-of-payroll contributions over a reasonable period of future years. For amortization purposes only, the payroll growth assumption is based upon the following schedule outlined in Public Act 220 of 2022: 1.75% for fiscal year 2023, 1.25% for fiscal year 2024, 0.75% for fiscal year 2025, 0.25% for fiscal year 2026, and 0.00% for fiscal years 2027 and thereafter.

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 is not permitted to deviate from the market value of assets by more than 30%. The actuarial value of assets was adopted for use in the annual valuations beginning with the September 30, 2018 funding valuation for the System.

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 UAAL to determine the remaining UAAL contribution. Please refer to page F-13.

Actuarial 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, 2012 through September 30, 2017. A report dated May 15, 2018 presented the results of the Experience Study. The investment return assumption was updated beginning with the September 30, 2018 funding valuation in accordance with the Dedicated Gains Policy adopted by the Board of Trustees. The investment return assumption was further updated beginning with the September 30, 2021 funding valuation in accordance with the Dedicated Gains Policy. The actuarial assumptions represent estimates of future experience.

The rate of investment return, compounded annually net of investment expenses and including a component of 2.25% for price inflation, was assumed to be 6.00%. This assumption was first used for the September 30, 2021 funding valuation of the System.

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 pay at retirement. This 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 of the report may include a reference number (for example 510 is used above). These reference numbers are used by GRS to track and identify assumption tables.

Actuarial Assumptions

The healthy life post-retirement mortality table is used to measure the probabilities of each benefit payment being made after retirement for healthy lives.

Healthy Male Retirees:	RP-2014 Male Healthy Annuitant Mortality Table scaled by 82% and adjusted for mortality improvements using projection scale MP-2017 from 2006.
Healthy Female Retirees:	RP-2014 Female Healthy Annuitant Mortality Table scaled by 78% and adjusted for mortality improvements using projection scale MP-2017 from 2006.

This assumption was first used for the September 30, 2018 valuation of the System. Sample rates of mortality and years of life expectancy are shown below.

Sample Attained Ages	Probability of Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women
50	0.32 %	0.21 %	36.75	39.74
55	0.46	0.29	31.91	34.72
60	0.65	0.44	27.22	29.83
65	0.94	0.66	22.74	25.14
70	1.40	1.00	18.50	20.65
75	2.20	1.62	14.55	16.42
80	3.69	2.77	10.98	12.56

Applicable to calendar year 2022. Rates and life expectancies in future years are determined by the fully generational MP-2017 projection scale.

For active members, the probabilities of dying before retirement (i.e., pre-retirement mortality) are as follows:

Male Active Members:	RP-2014 Male Employee Mortality Table scaled by 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006.
Female Active Members:	RP-2014 Female Employee Mortality Table scaled by 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006.

This assumption was first used for the September 30, 2018 valuation of the System. Sample rates of mortality and years of life expectancy are shown on the next page.

Actuarial Assumptions

Sample Attained Ages	Probability of Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women
20	0.04 %	0.02 %	68.30	72.47
25	0.05	0.02	62.97	67.14
30	0.05	0.02	57.64	61.81
35	0.06	0.03	52.32	56.51
40	0.07	0.05	47.02	51.22
45	0.10	0.07	41.74	45.97
50	0.16	0.11	36.53	40.76
55	0.27	0.17	31.43	35.63
60	0.48	0.27	26.49	30.61
65	0.87	0.39	21.83	25.71

Applicable to calendar year 2022. Rates and life expectancies in future years are determined by the fully generational MP-2017 projection scale. Active member deaths are assumed to be non-duty related.

The disabled life mortality table is used to measure the probabilities of each benefit payment being made after retirement for disabled lives.

Disabled Male Retirees:	RP-2014 Male Disabled Annuitant Mortality Table scaled by 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006.
Disabled Female Retirees:	RP-2014 Female Disabled Annuitant Mortality Table scaled by 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006.

This assumption was first used for the September 30, 2018 valuation of the System. Sample rates of mortality and years of life expectancy are shown below.

Sample Attained Ages	Probability of Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women
50	1.97 %	1.14 %	24.73	29.14
55	2.27	1.49	21.58	25.31
60	2.72	1.86	18.50	21.72
65	3.31	2.18	15.59	18.27
70	4.10	2.80	12.81	14.89
75	5.43	4.06	10.17	11.71
80	7.71	6.23	7.77	8.94

Applicable to calendar year 2022. Rates and life expectancies in future years are determined by the fully generational MP-2017 projection scale.

Actuarial 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, 2018 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.

Actuarial Assumptions

Normal Retirement

Years of Service	Percent of Eligible Members Retiring MIP Members with 30+ Years of Service	
	Teachers	Non-Teachers
30	25 %	25 %
31	20	25
32	20	20
33	18	20
34	19	20
35	19	20
36	21	20
37	24	20
38	24	20
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	2834

Early Retirement

Retirement Age	Percent of Eligible Members Retiring	
	Basic Members	MIP Members
55	4.0 %	4.0 %
56	5.0	5.0
57	5.5	5.5
58	5.5	5.5
59	6.0	6.0
Ref	2832	2832

Actuarial 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, 2018 valuation of the System.

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	15.00 %	35.00 %	30.00 %	40.00 %
	1	10.00	14.00	25.00	26.00
	2	6.50	8.20	22.00	19.00
	3	6.00	6.80	22.00	16.00
	4	4.50	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		2.58	3.76	22.00	14.00
35		1.82	2.78	20.80	13.40
40		1.32	2.20	18.20	11.80
45		1.08	1.88	16.40	9.80
50		1.00	1.80	16.00	8.40
55		1.00	1.80	16.00	8.00
60		1.00	1.80	16.00	8.00
Svc Ref		1136	877	1135	1137
Age Ref		1453	1454	1450	1451

Pension Plus 2 members are assumed to experience 50% of the assumed withdrawal rates above.

Actuarial 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	0.93 years
Non-Teachers with Pay Over $20,000	0.93
Teachers with Pay Under $20,000	0.60
Non-Teachers with Pay Under $20,000	0.65

These accrual rates were first used for the September 30, 2014 valuation of the System.

Actuarial 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, 33 for MIP members, 35 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.
- Members with unknown pre-Public Act 300 of 2012 benefit plan codes were assumed to be MIP Graded.
- Employer-paid medical and dental/vision coverage percentages were estimated when not provided for retirees.

Actuarial Assumptions

Election of two-person retiree health coverage - When retiree health costs are valued, an assumption must be made regarding the probability that the plan will be providing coverage during the retiree's lifetime to the retiree only or to the retiree and spouse. For those who are assumed to participate in the retiree health care plan, the assumptions used in this valuation are as follows:

Participant Type	% Election of Two-Person Coverage
Active and Inactive members (future retirees)	75% male/60% female
Retirees	Actual member data used

Election of joint and survivor form of payment - Retiree health benefits are continued to the eligible beneficiary of a qualifying retiree after the retiree's death if the beneficiary receives a continuation of the pension due to an optional benefit election. When retiree health costs are valued, an assumption must be made regarding the probability that the retiring member will have coverage for a surviving beneficiary or spouse. The assumption for active and inactive members is that 80% of male retirees and 67% of female retirees electing two-person coverage will have coverage continuing to a surviving beneficiary or spouse.

Opt-out assumption - We have assumed that 21% of future pension recipients hired before July 1, 2008 and 30% of future pension recipients hired on or after July 1, 2008 will opt out of the retiree health care plan. The assumption for future pension recipients hired before July 1, 2008 is based on the number of current health contracts compared to the number of current retirees and beneficiaries eligible for retiree medical coverage. The assumption for future pension recipients hired after July 1, 2008 is estimated, under the assumption that more retirees will opt out, given the lower employer subsidy. This assumption will be monitored closely in the future as experience becomes available.

Actuarial Assumptions

Health Care Cost Trend Rates – The reported per person premium is projected to increase as shown in the table below:

Health Care Cost Trend Rates			
	Medical / Prescription Drug Premium Increase		
October 1	Pre-65	Post-65*	Dental / Vision Premium Increase
2023	7.50 %	6.25 %	3.50 %
2024	7.25	6.00	3.50
2025	7.00	5.75	3.50
2026	6.75	5.75	3.50
2027	6.50	5.50	3.50
2028	6.00	5.25	3.50
2029	5.75	5.00	3.50
2030	5.50	4.75	3.50
2031	5.25	4.75	3.50
2032	5.00	4.50	3.50
2033	4.75	4.25	3.50
2034	4.25	4.00	3.50
2035	4.00	4.00	3.50
2036	3.75	3.75	3.50
2037-2141	3.50	3.50	3.50
2142	3.00	3.00	3.00

** Trend used for purposes of the Medicare Offset Payment as well.*

The retiree share of the per person medical/prescription drug premium was assumed to increase at the same rate as the medical/prescription drug premiums.

Health care cost trend rates are established for each annual actuarial valuation. These assumptions are used to determine how much per capita costs are expected to increase from one year to the next. In general, the trend rates are higher in the years immediately following the valuation, grading down over the next 10 to 15 years to the "ultimate health care trend rate." Prior to the most recent Experience Study covering the period 2012 through 2017, the ultimate health care trend rate would be set equal to the wage inflation assumption. However, with the wage inflation assumption being set at 2.75%, we were uncomfortable having an ultimate health care trend rate below 3.00%. Therefore, we recommended an ultimate health care trend rate of 3.00% be adopted. Subsequent to the Experience Study, the GRS retiree health care actuary that establishes the health care trend rates for the annual actuarial valuation established a "floor" for the ultimate health care trend rate of 3.50%. Therefore, to comply with the adopted assumption of 3.00% and the recently established floor, for this valuation, the adopted ultimate health care trend rate of 3.00% becomes effective in the 120th year following the valuation date.

Miscellaneous and Technical Assumptions

Administrative Expenses	The normal cost contribution includes a 0.05% of payroll load for administrative expenses.
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.
Health Care Reform	Health care reform was considered in the valuation to the extent that reported per capita costs reflect plan changes due to health care reform.
Incidence of Contributions	Contributions are assumed to be received continuously throughout the year.
Liability Adjustments	None.
Marriage Assumption	75% of males and 65% of females were 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 and inactive vested member valuation purposes.
Medicare MA and PDP Payments	MA payments from Medicare were assumed to continue indefinitely and increase in accordance with the rates shown on the prior page.
Normal Cost Adjustment	The normal cost has been loaded by 0.5% of payroll to reflect the potential for retiree health trend adjustments in future valuations.
Pure DC Demographic Assumptions	For purposes of the $1,000/$2,000 credit to a Health Reimbursement Account, those who elected a pure defined contribution pension benefit were assumed to follow the service accrual rates and withdrawal decrements for those with greater than $20,000 pay.

Miscellaneous and Technical Assumptions

Reconciliation Payments

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

Fiscal Year	Reconciliation Payment
2023	$ 12,274,355
2024	11,575,740
2025	10,877,124
2026	4,164,781
2027	3,129,358
2028	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.

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 job classification code in the 1200s. For retiree records, the job classification code is not supplied.

APPENDIX

SUPPLEMENTARY INFORMATION

Supplementary Information

Schedule of Health Funding Progress
($ Amounts in Millions)

Valuation Date September 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	UAAL Covered Payroll (c)	UAAL as a % of Covered Payroll ((b-a)/c)
2013	$ 2,040.7	$ 14,534.1	$ 12,493.4	14.04 %	$ 8,273.0	151.0 %
2014	2,981.7	14,161.4	11,179.7	21.06	8,166.7	136.9
2015	3,530.6	12,832.4	9,301.9	27.51	8,263.9	112.6
2016	4,279.1	13,105.1	8,826.1	32.65	8,206.1	107.6
2016 [1]	4,279.1	13,776.4	9,497.3	31.06	8,206.1	115.7
2017	5,177.8	13,115.7	7,938.0	39.48	8,220.8	96.6
2017 [1]	5,177.8	13,587.7	8,409.9	38.11	8,220.8	102.3
2018	5,944.4	12,872.7	6,928.3	46.18	8,300.0	83.5
2018 [1]	6,089.5	13,748.9	7,659.5	44.29	8,300.0	92.3
2019	6,957.9	13,009.7	6,051.8	53.48	8,690.8	69.6
2020	8,178.8	11,884.9	3,706.1	68.82	8,716.3	42.5
2021	9,606.5	11,077.1	1,470.6	86.72	8,901.4	16.5
2021 [1]	10,547.9	12,376.9	1,829.1	85.22	8,901.4	20.6
2022	11,419.6	11,508.1	88.6	99.23	9,607.3	0.9

[1] *Change in assumptions shown for years where assumptions other than the trend assumption have changed. Beginning with the September 30, 2021 valuation, results as of the same valuation date prior to the assumption change reflect expected trend from the prior year's valuation.*

Supplementary Information

Schedule of Employer Health Contributions

Fiscal Year Ended September 30	Actuarially Computed Employer Contribution [4]	Actual Contributions [3]	Percentage Contributed
2014	$ 944,571,363 [2]	$ 1,000,169,741	105.9%
2015	974,957,230	969,631,394	99.5
2016	911,687,353	886,354,172	97.2
2017	815,984,986	794,666,783	97.4
2018	673,996,085	663,708,218	98.5
2019	711,059,338	707,714,341	99.5
2020	638,384,571	708,508,889	111.0
2021	605,290,358	749,590,728	123.8
2022	500,203,569	771,570,875	154.3
2023	293,916,193	[1]	[1]

[1] *Not Available.*

[2] *Based upon 2012 valuation results.*

[3] *Prior to fiscal year 2018, includes Other Governmental Contributions.*

[4] *The actuarially computed employer contribution amounts presented throughout this report do not reflect the normal cost or UAAL "floor" provisions of Public Act 92 of 2017 and Public Act 181 of 2018. Any reconciliation payments as required by subsection 41(9) of MPSERS statute are included above.*

Supplementary Information

The following assumptions and methods were used in the September 30, 2022 actuarial valuation results shown on the previous page:

Valuation Date	September 30, 2022
Actuarial Cost Method	Entry-Age
Amortization Method	Level Percent of Payroll, Closed
Remaining Amortization Period	14 years, Ending September 30, 2038
Asset Valuation Method	5-Year Smoothed Market Value
Actuarial Assumptions:	
Investment Rate of Return (discount rate)	6.00% per year
Wage Inflation Rate	2.75%
Payroll Growth (Actual Payroll)	2.75%
Payroll Growth (Amortization Purposes)	0.75%
Health Care Cost Trend Rates	
Medical / Prescription Drug Premiums (Pre-65)	7.50% Year 1 graded to 3.50% Year 15; 3.00% Year 120
Medical / Prescription Drug Premiums (Post-65)	6.25% Year 1 graded to 3.50% Year 15; 3.00% Year 120
Medicare Offset Payments	6.25% Year 1 graded to 3.50% Year 15; 3.00% Year 120
Dental / Vision Premiums	3.50% each year; 3.00% Year 120