

**MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREE HEALTH BENEFITS
ANNUAL ACTUARIAL VALUATION REPORT
AS OF SEPTEMBER 30, 2016**

March 16, 2017

Ms. Kerrie Vanden Bosch
Director, Office of Retirement Services
530 W. Allegan
Lansing, Michigan 48909

Dear Ms. Vanden Bosch:

Submitted in this report are the results of an actuarial valuation of the assets and liabilities associated with the defined benefit portion of the employer financed retiree health benefits provided to Michigan public school employees by the Michigan Public School Employees' Retirement System. The date of the valuation was September 30, 2016. The actuarially computed employer contribution has been calculated for the fiscal year beginning October 1, 2018.

This report was prepared at the request of the Office of Retirement Services 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 2018-2019 fiscal year and to provide information in connection with the applicable Governmental Accounting Standards Board (GASB) Statements. 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.

Ms. Kerrie Vanden Bosch

March 16, 2017

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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

Handwritten signature of Mita Drazilov in black ink.

Mita D. Drazilov, ASA, FCA, MAAA

Handwritten signature of Louise M. Gates in black ink.

Louise M. Gates, ASA, MAAA

MDD/LMG:sc

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EXECUTIVE SUMMARY/BOARD SUMMARY

EXECUTIVE SUMMARY/BOARD SUMMARY

Actuarially Computed Employer Contribution

It has been reported that full funding of the retiree health benefit program began in fiscal year 2013. It has also been reported that the September 30, 2016 annual actuarial valuation is used to establish the employer contribution for fiscal year 2019. Therefore, this report presents the actuarially computed employer contribution for fiscal year 2019 (based upon a 7.5% 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
- (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)
- (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 2019 was determined to be \$711,059,338.

EXECUTIVE SUMMARY/BOARD SUMMARY

Actuarially Computed Employer Contribution (Concluded)

The actuarially computed employer contribution for fiscal year 2017 is based upon the September 30, 2014 annual valuation (using an 8.0% investment return assumption) and is presented in Appendix A.

The actuarially computed employer contribution for the fiscal year beginning October 1, 2018, has been calculated using a 7.5% investment return assumption, while the actuarially computed employer contribution for the fiscal year beginning October 1, 2017 has been calculated using an 8.0% investment return assumption. Below is a summary of the actuarially computed employer contributions for the 2018 and the 2019 fiscal years. The use of a 7.5% investment return assumption in this valuation of the plan is based upon the full funding of the retiree health benefit program.

<u>Actuarially Computed Employer Contribution</u>	<u>Full Funding (7.5%* Interest)</u>
Fiscal Year Beginning 10/1/2018	\$711,059,338
Fiscal Year Beginning 10/1/2017	673,996,085

** 8.0% for fiscal year beginning 10/1/2017*

For additional details please see Section A of the report.

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, 2016, is \$15.3 billion. The actuarial accrued liability, which is the portion of the \$15.3 billion attributable to service accrued by plan members as of September 30, 2016, is \$13.8 billion. As of September 30, 2016, there is \$4.3 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, 2016, is 31.1%.

Comparison with Prior Year Valuation

The actuarial accrued liability increased from \$12.8 billion to \$13.8 billion. Similarly, the actuarially computed employer contribution increased from \$674.0 million to \$711.1 million.

A change to the investment return assumption from 8.0% to 7.5% is reflected in this valuation. The assumption change increased the Actuarial Accrued Liability by \$671.3 million and increased the actuarially computed employer contribution by \$42.8 million.

SECTION A

VALUATION RESULTS

**DEVELOPMENT OF THE
ACTUARIALLY COMPUTED EMPLOYER CONTRIBUTION**

Contributions for	Fiscal Year Beginning October 1, 2018
	Full Funding (7.5% Interest)
	<u>Total</u>
Employer Normal Cost	\$ 24,514,017
Amortization of UAAL ¹	\$ 686,545,321
Actuarially Computed Employer Contribution	\$ 711,059,338
	Fiscal Year Beginning October 1, 2017
	Full Funding (8.0% Interest)
	<u>Total</u>
Employer Normal Cost	\$ 6,351,247
Amortization of UAAL ¹	\$ 667,644,838
Actuarially Computed Employer Contribution	\$ 673,996,085

¹ *Unfunded Actuarial Accrued Liabilities (UAAL) were amortized over 20 years from October 1, 2018 (21 years in the 2015 valuation from October 1, 2017).*

The actuarially computed employer contribution shown in this report has been calculated to increase at the same rate as the projected increase in active member payroll (3.50% per year). The unfunded actuarial accrued liabilities were amortized as a level percent of active member payroll over a period of 20 years.

DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

	September 30, 2016		
	<u>Full Funding (7.5% Interest)</u>		
	Gross Prior to Payments <u>From Medicare</u>	Offset for Payments <u>From Medicare</u>	<u>Total</u>
A. Present Value of Future Benefits			
i) Retirees and Beneficiaries	\$ 35,319,191,649	\$ (26,771,090,130)	\$ 8,548,101,519
ii) Inactive Vested Members	392,987,678	(317,133,510)	75,854,168
iii) Active Members	20,112,616,405	(13,410,766,048)	6,701,850,357
Total Present Value of Future Benefits	\$ 55,824,795,732	\$ (40,498,989,688)	\$ 15,325,806,044
B. Present Value of Future Normal Costs	4,634,607,300	\$ (3,085,191,071)	1,549,416,229
C. Actuarial Accrued Liabilities (A-B)	\$ 51,190,188,432	\$ (37,413,798,617)	\$ 13,776,389,815
D. Actuarial Value of Assets	4,279,052,407		4,279,052,407
E. Unfunded Actuarial Accrued Liability (C-D)	\$ 46,911,136,025	\$ (37,413,798,617)	\$ 9,497,337,408
F. Funded Ratio (D/C)			31.06%
	September 30, 2015		
	<u>Full Funding (8.0% Interest)</u>		
	Gross Prior to Payments <u>From Medicare</u>	Offset for Payments <u>From Medicare</u>	<u>Total</u>
A. Present Value of Future Benefits			
i) Retirees and Beneficiaries	\$ 33,864,918,638	\$ (25,997,420,561)	\$ 7,867,498,077
ii) Inactive Vested Members	359,636,369	(287,598,112)	72,038,257
iii) Active Members	18,835,413,271	(12,523,013,194)	6,312,400,077
Total Present Value of Future Benefits	\$ 53,059,968,278	\$ (38,808,031,867)	\$ 14,251,936,411
B. Present Value of Future Normal Costs	4,201,819,285	\$ (2,782,288,443)	1,419,530,842
C. Actuarial Accrued Liabilities (A-B)	\$ 48,858,148,993	\$ (36,025,743,424)	\$ 12,832,405,569
D. Actuarial Value of Assets	3,530,551,414		3,530,551,414
E. Unfunded Actuarial Accrued Liability (C-D)	\$ 45,327,597,579	\$ (36,025,743,424)	\$ 9,301,854,155
F. Funded Ratio (D/C)			27.51%

Actuarial Value of Assets as of September 30, 2016 does not include \$553.1 million resulting from 3% member contributions collected prior to the passage of Public Act 300 (\$552.8 million for 2015).

EXPERIENCE GAIN/(LOSS)

Gains/(Losses) During the Year Ended September 30, 2016 Resulting from Differences Between Assumed and Actual Experience

A. Derivation of Actuarial Gain/(Loss):

1. Unfunded Actuarial Accrued Liability (UAAL) - Previous Valuation	\$ 9,301,854,155
2. Total Normal Cost (employer plus member) for Year Ending 9/30/2016	190,912,660
3. Total Contributions (employer plus member) for Year Ending 9/30/2016	1,108,387,965
4. Interest on:	
a. UAAL: Discount Rate* x (1)	744,148,332
b. Normal Cost and Contributions: Discount Rate / 2 x [(2) - (3)]	(36,699,012)
c. Net Total: (a) + (b)	707,449,320
5. Change in UAAL due to Benefit Changes	-
6. Change in UAAL due to Assumptions (Trend/Discount Rate)	992,604,863
7. Expected UAAL Current Year:	
(1) + (2) - (3) + (4c) + (5) + (6)	10,084,433,033
8. Actual UAAL Current Year	9,497,337,408
9. Experience Gain/(Loss): (7) - (8)	587,095,625

B. Approximate Portion of Gain/(Loss) due to Investments (13,774,197)

C. Approximate Portion of Gain/(Loss) due to Liabilities: (A.9) - (B) 600,869,822

* Discount rate is 8.0%.

TYPE OF ACTIVITY

	<u>Gain/(Loss)</u>
1. Premiums Gains and losses resulting from actual premiums in valuation year versus that assumed from prior valuation.	\$ 439,562,586
2. Investment Income. If there is greater investment income than assumed, there is a gain. If less income, a loss.	(13,774,197)
3. Demographic and Other. Gains and losses resulting from demographic experience, data adjustments, timing of financial transactions, etc.	161,307,236
8. Composite Gain/(Loss) During Year.	\$ 587,095,625

COMMENTS

Comment A: It has been reported that full funding of the retiree health benefit program began in fiscal year 2013. It has also been reported that the September 30, 2016 annual actuarial valuation is used to establish the employer contribution for fiscal year 2019. Therefore, this report presents the actuarially computed employer contribution for fiscal year 2019 (based upon a 7.5% 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
- (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)
- (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 2019 was determined to be \$711,059,338.

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 7.5% assumed rate of return, and based on the employer's funding policy of contributing the full actuarially computed employer contribution into a qualified trust.

COMMENTS

Comment C: Based on information from the plan sponsor, \$4,832.2 million of assets were held in trust for OPEB benefits as of September 30, 2016. However, at the direction of the Office of Retirement Services, \$553.1 million attributable to 3% active member contributions collected prior to the passage of Public Act 300 was not included in valuation assets for purposes of determining the funded status and the actuarially computed employer contribution. Therefore, the final asset value used for valuation purposes was \$4,279.1 million.

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 \$6,809.4 million for the year beginning October 1, 2018, and the PHF active member payroll is projected to be \$2,263.0 million for the year beginning October 1, 2018. With the introduction of the PHF, the employer normal cost percent (i.e., 0.36%) is expressed as a percentage of non-PHF active member payroll, while the UAAL percent (i.e., 7.57%) is expressed as a percentage of total payroll (i.e., including both non-PHF and PHF active member payroll) based on current administrative practice.

Comment E: The fiscal year 2019 employer contribution rate shown includes the amortization of the unfunded actuarial accrued liability over 20 years, beginning October 1, 2018. A shorter amortization period would result in a higher actuarially computed employer contribution.

Comment F: The reported employer subsidized October 1, 2016 per person health benefit costs were lower than projected by the 2015 valuation assumptions. The 2015 valuation assumptions projected annual increases of 7.5% for the year ended October 1, 2016 and 7.0% for the year ending October 1, 2017, trending down to 3.5% annual increases beginning October 1, 2027. The lower actual increases from 2015 to 2016 resulted in a lower-than-projected actuarially computed employer contribution and accrued liability.

COMMENTS

Comment G: It is our understanding that the plan is participating in the Medicare Advantage program for calendar year 2017. The September 30, 2016 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 H: 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 overall claims.

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

Comment K: Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the market 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, and
- (2) The measurement is inappropriate for assessing the need for or the amount of future employer contributions.

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 Health Alliance Plan (HAP), 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 October 1, 2016 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 suitability in the valuation process using the claim and administrative expenses, reimbursements from CMS and PDP provided by the actuarial firm.

These self-insured, calendar year premium rates are projected to the valuation period (i.e., October 1, 2016 to September 30, 2017), adjusted for plan design changes and then blended with the fully-insured rates, based on actual enrollment. A child load of 9.1% was added to pre-65 spousal rates to account for retirees with dependent children.

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.

RETIREE PREMIUM RATE DEVELOPMENT

The tables below show 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 costs) 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				
Age	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
	Male	Female	Male	Female
50	\$ 420.65	\$ 518.19	N/A	N/A
60	714.91	703.94	N/A	N/A
64	869.35	820.43	N/A	N/A

Per Capita Costs for Retirees Eligible for Medicare				
Age	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
	Male	Female	Male	Female
65	\$ 943.61	\$ 890.01	\$ 735.46	\$ 693.68
75	1,104.02	1,077.28	860.49	839.64
85	1,167.43	1,181.18	909.91	920.63

Per Capita Costs for Beneficiaries Not Eligible for Medicare				
Age	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
	Male	Female	Male	Female
50	\$ 390.81	\$ 481.44	N/A	N/A
60	664.20	654.01	N/A	N/A
64	807.69	762.24	N/A	N/A

Per Capita Costs for Beneficiaries Eligible for Medicare				
Age	Gross Medical and Prescription Drug		Medicare Payments Offset (MA and PDP)	
	Male	Female	Male	Female
65	\$ 849.54	\$ 801.29	\$ 662.15	\$ 624.54
75	993.96	969.88	774.71	755.95
85	1,051.05	1,063.43	819.21	828.86

RETIREE PREMIUM RATE DEVELOPMENT

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 \$28.47 and \$56.94, respectively.

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 page B-2.



James E. Pranschke, FSA, MAAA

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 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 at January 1, 2013 receive 90% employer subsidy.

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.

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.

SUMMARY OF POST-RETIREMENT HEALTH BENEFITS 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 on the previous page 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.

Public Act 300 of 2012 granted all members of the Michigan Public School Employees' Retirement System, 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.

SUMMARY OF POST-RETIREMENT HEALTH BENEFITS COVERAGE

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

RECONCILIATION OF PLAN NET ASSETS

	For the One Year Period Ending	
	September 30, 2015	September 30, 2016
Market Value, Beginning of Year	\$3,534,220,774	\$4,083,302,170
Additions		
Member Contributions	381,630,848	382,257,166
Employer Contributions ⁽¹⁾	969,631,394	886,354,172
Net Investment Income	52,230,648	289,803,067
Audit Adjustment	0	0
Total Additions	\$1,403,492,890	\$1,558,414,405
Deductions		
Health Benefit Payments	617,493,539	567,230,086
Dental/Vision Benefit Payments	83,411,124	85,856,112
Contribution Refunds/Transfers	95,860	93,387
Administrative Expenses ⁽²⁾	153,410,971	156,358,057
Total Deductions	854,411,494	809,537,642
Market Value, End of Year (Total)	\$4,083,302,170	\$4,832,178,933
3% Member Contributions Collected Prior to PA 300	(552,750,756)	(553,126,526)
Market Value, End of Year (for Valuation Purposes)	\$3,530,551,414	\$4,279,052,407
Net, Market Rate of Return ⁽³⁾	1.32%	7.63%

(1) Includes other governmental contributions.

(2) For purposes of the Net, Market Rate of Return calculation, only \$2,302 thousand was considered Administrative Expenses for fiscal year 2016 (\$2,357 thousand for fiscal year 2015).

(3) The value of the 3% member contributions (both principal and investment earnings) collected prior to PA 300 and held in escrow has been excluded for purposes of determining the net market rate of return.

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

SECTION E

SUMMARY OF REPORTED PARTICIPANT DATA

**SUMMARY OF REPORTED PARTICIPANT DATA
AS OF THE INDICATED VALUATION DATE**

Reported Program Participants	September 30, 2015	September 30, 2016
Active Members		
Graded Premium		
Number	158,818	149,366
Average age	47.6	48.0
Average service	14.9	15.5
Reported payroll (millions) ⁴	\$7,218.7	\$6,999.7
Average annual pay	\$45,453	\$46,863
Personal Healthcare Fund		
Number ³	49,325	54,913
Reported payroll (millions) ⁴	\$1,045.2	\$1,206.4
Average annual pay	\$21,190	\$21,969
Inactive Vested Members		
Number ¹	2,298	2,334
Average age	55.8	56.0
Retirees and Beneficiaries		
Number ²	207,651	211,007
Average age	71.9	72.2

¹ Only includes inactive vested persons with 21 or more years of service at termination.

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

³ Of the 54,913 PHF actives as of September 30, 2016, 40,092 were hired on or after September 4, 2012 and are eligible for the \$1,000/\$2,000 lump sum at termination benefit.

⁴ UAAL contributions are expected to continue to be collected on the payroll of all active members in the future.

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 (full funding credit if assets exceed liabilities) were amortized by level (principal & interest combined) percent-of-payroll contributions over a reasonable period of future years.

Actuarial value of system assets - The actuarial value of assets is equal to the reported market value of assets as of the valuation date.

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 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, 2007 through September 30, 2012. A report dated May 7, 2014 presented the results of the Experience Study. In addition, the investment return assumption was updated beginning with the September 30, 2016 valuation to reflect reductions in capital market assumptions for the asset classes in which the System invests. The actuarial assumptions represent estimates of future experience.

The rate of investment return, compounded annually net of investment and administrative expenses and including a component of 2.5% for price inflation, was assumed to be 7.5%. This assumption was first used for the September 30, 2016 valuation of the System.

The rates of pay 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, 2014 valuation of the System.

Sample Ages	Pay Increase Assumptions For an Individual Member		
	Merit & Seniority	Base (Economy)	Increase Next Year
20	8.8 %	3.5 %	12.3 %
25	8.8	3.5	12.3
30	5.4	3.5	8.9
35	3.3	3.5	6.8
40	2.1	3.5	5.6
45	1.3	3.5	4.8
50	0.6	3.5	4.1
55	0.2	3.5	3.7
60	0.0	3.5	3.5
65	0.0	3.5	3.5
Ref	423		

The charts shown in this section of the report may include a reference number (for example 423 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 used in this valuation was the RP-2000 Male and Female Combined Healthy Mortality Tables, adjusted for mortality improvements to 2025 using projection scale BB. This assumption was first used for the September 30, 2014 valuation. Sample rates of mortality and years of life expectancy are shown below. This assumption is used to measure the probabilities of each benefit payment being made after retirement. With regard to a margin for mortality improvement, based upon the results of the last Experience Study, the assumed rates assume 10% fewer deaths for males and 5% fewer deaths for females than those observed during the period 2007-2012.

Sample Attained Ages	Probability of Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women
50	0.20 %	0.16 %	33.54	36.08
55	0.34	0.24	28.92	31.39
60	0.57	0.39	24.49	26.82
65	0.94	0.72	20.27	22.44
70	1.52	1.24	16.31	18.35
75	2.59	2.08	12.68	14.62
80	4.41	3.39	9.48	11.27
Ref:	1091 x 1.00	1092 x 1.00		

For active members, the probabilities of dying before retirement were based upon the RP-2000 Male and Female Combined Healthy Mortality Tables, adjusted for mortality improvements to 2025 using projection scale BB. For men, 80% of the male table rates were used. For women, 70% of the female table rates were used. This assumption was first used for the September 30, 2014 valuation of the System. Sample rates of mortality and years of life expectancy are shown on the following page.

ACTUARIAL ASSUMPTIONS

Sample Attained Ages	Probability of Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women
20	0.03 %	0.01 %	64.67	68.94
25	0.03	0.01	59.75	63.98
30	0.03	0.02	54.84	59.03
35	0.06	0.03	49.95	54.09
40	0.08	0.05	45.11	49.19
45	0.11	0.07	40.30	44.32
50	0.16	0.11	35.54	39.50
55	0.27	0.17	30.87	34.74
60	0.45	0.28	26.36	30.07
65	0.75	0.50	22.04	25.56
Ref:	1091 x 0.80	1092 x 0.70		

Active member deaths are assumed to be non-duty related.

The disabled life mortality table used in this valuation was the RP-2000 Male and Female Combined Healthy Mortality Tables, adjusted for mortality improvements to 2025 using projection scale BB, set forward 10 years. This assumption was first used for the September 30, 2014 valuation of the System. For disabled retirees, the 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	0.57 %	0.39 %	24.49	26.82
55	0.94	0.72	20.27	22.44
60	1.52	1.24	16.31	18.35
65	2.59	2.08	12.68	14.62
70	4.41	3.39	9.48	11.27
75	7.59	5.73	6.76	8.35
80	13.91	9.99	4.59	5.97
Ref:	1091 x 1.00	1092 x 1.00		

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, 2014 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.

Normal Retirement

Retirement Ages	Percent of Eligible Members Retiring			
	Basic Members		MIP# and Pension Plus Members	
	Teachers	Non-Teachers	Teachers	Non-Teachers
55	25 %	30 %		
56	21	26		
57	16	24		
58	16	22		
59	18	22		
60	18	16	23 %	23 %
61	20	21	20	19
62	26	29	22	24
63	26	29	22	27
64	23	24	22	21
65	22	24	22	23
66	28	35	25	26
67	24	28	22	20
68	21	23	22	20
69	21	25	15	18
70	21	25	15	18
71	21	25	15	18
72	21	25	15	18
73	21	25	15	18
74	21	25	15	18
75 & Over	100	100	100	100
Ref	1727	1728	1730	1732

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	25	25
32	25	25
33	18	23
34	19	23
35	19	23
36	21	26
37	25	29
38	23	29
39	27	32
40	30	33
41	30	33
42	30	33
43	30	33
44	30	33
45	30	33
46	30	33
47	30	33
48	30	33
49	30	33
50	100	100
Ref	2352	2353

Early Retirement

Retirement Age	Percent of Eligible Members Retiring	
	Basic Members	MIP Members
55	6.5 %	6.5 %
56	6.5	6.5
57	6.5	6.5
58	6.5	6.5
59	6.5	6.5
Ref	2354	2354

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, 2014 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	21.00 %	35.00 %	40.00 %	40.00 %
	1	11.00	14.00	28.00	26.00
	2	7.00	8.20	21.00	17.00
	3	6.00	6.80	20.00	14.00
	4	5.00	5.70	19.00	12.00
20	5 & over	3.00	5.00	18.00	12.00
25		3.00	4.76	18.00	12.00
30		2.82	4.24	18.00	11.40
35		2.22	3.40	16.20	10.40
40		1.66	2.70	14.40	8.80
45		1.32	2.20	12.80	7.40
50		1.20	2.00	12.00	6.40
55	1.20	2.00	12.00	6.00	
60	1.20	2.00	12.00	6.00	
Svc Ref		876	877	878	879
Age Ref		1302	1303	1304	1305

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 MIP/PPP and 31 for Basic members.
- Active members 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 MIPG.

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:

<u>Participant Type</u>	<u>% Election of 2 Person Coverage</u>
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.

Active employee group size - The number of active employees was assumed to remain constant.

ACTUARIAL ASSUMPTIONS

Medical inflation assumption – The reported per person premium is projected to increase as shown in the table below:

Medical Inflation Assumption			
October 1	Medical/Prescription Premium Payment Increase	Medicare Payment Increase	Dental/Vision Premium Increase
2017	7.50 %	7.50 %	3.50 %
2018	7.00	7.00	3.50
2019	6.50	6.50	3.50
2020	6.00	6.00	3.50
2021	5.50	5.50	3.50
2022	5.00	5.00	3.50
2023	4.75	4.75	3.50
2024	4.50	4.50	3.50
2025	4.25	4.25	3.50
2026	4.00	4.00	3.50
2027	3.75	3.75	3.50
2028 & after	3.50	3.50	3.50

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

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

<i>Decrement Operation</i>	Disability and withdrawal decrements do not operate during retirement eligibility.
<i>Decrement Timing</i>	Retirement decrements are assumed to occur on July 1. All other decrements are assumed to occur mid-year.
<i>Eligibility Testing</i>	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.
<i>Health Care Reform</i>	Health care reform was considered in the valuation to the extent that reported per capita costs reflect plan changes due to health care reform.
<i>Incidence of Contributions</i>	Contributions are assumed to be received continuously throughout the year.
<i>Liability Adjustments</i>	None.
<i>Marriage Assumption</i>	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 member valuation purposes.
<i>Pay Increase Timing</i>	Pay 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.
<i>Medicare MA and PDP Payments</i>	MA payments from Medicare were assumed to continue indefinitely and increase in accordance with the rates shown on the prior page.
<i>Normal Cost Adjustment</i>	The normal cost has been loaded by 0.5% of payroll to reflect the potential for retiree health trend adjustments in future valuations.
<i>Pure DC Demographic Assumptions</i>	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.

APPENDIX A

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)
2007	\$ 776.3	\$ 25,732.7	\$ 24,956.4	3.02%	\$ 9,851.5	253.3%
2008 ¹	709.8	26,811.3	26,101.5	2.65	9,958.1	262.1
2009	713.3	28,294.8	27,581.5	2.52	9,883.7	279.1
2010	999.3	28,626.5	27,627.2	3.49	8,845.0	312.4
2011	1,155.9	27,046.1	25,890.2	4.27	9,155.7	282.8
2012	1,347.7	26,199.0	24,851.3	5.14	8,649.0	287.3
2012 ^{2,4}	1,347.7	16,593.8	15,246.1	8.12	8,649.0	176.3
2012 ³	1,347.7	14,787.8	13,440.1	9.11	8,649.0	155.4
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 ⁴	4,279.1	13,776.4	9,497.3	31.06	8,206.1	115.7

¹ Restated based on revised reported asset values.

² Assumes pre-funding begins fiscal year 2013.

³ Change in plan provisions.

⁴ Change in assumptions (not including trend assumption).

Schedule of Employer Health Contributions

Fiscal Year Ended September 30	Actuarially Computed Employer Contribution	Actual Contributions ²	Percentage Contributed
2008	\$ 2,425,676,758	\$ 649,673,186	26.8%
2009	2,501,979,818	705,519,600	28.2
2010	2,363,039,053	715,096,868	30.3
2011	2,149,488,837	958,788,206	44.6
2012	2,038,873,189	813,001,836	39.9
2013	1,466,840,465 ³	973,011,827	66.3
2014	944,571,363 ⁴	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	¹	¹

¹ Not Available.

² Pay-go employer contributions for fiscal years 2012 and before.

³ Based upon 2011 valuation results. The actuarially computed employer contribution of 14.84% of payroll (based upon an 8% interest discount) multiplied by projected payroll of \$9.88 billion. The 8% interest discount was used due to the fact that pre-funding of the retiree health was reported to begin in February of fiscal year 2013.

⁴ Based upon 2012 valuation results.

SUPPLEMENTARY INFORMATION

The following assumptions and methods were used in the September 30, 2016 actuarial valuation results shown on the previous page:

Valuation Date	September 30, 2016
Actuarial Cost Method	Entry-Age
Amortization Method	Level Percent of Payroll, Closed
Remaining Amortization Period	20 years
Asset Valuation Method	Market Value
Actuarial Assumptions:	
Investment Rate of Return (discount rate)	7.5% per year
Wage Inflation Rate	3.5%
Health Care Cost Trend Rate	7.50% Year 1 graded to 3.50% Year 12 (Medical / Prescription Premium Payment)
	7.50% Year 1 graded to 3.50% Year 12 (Medicare Payment)
	3.50% each year (Dental / Vision Premium)