Michigan Public School Employees' Retirement System

Annual Actuarial Valuation Report
September 30, 2017

800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

February 28, 2018

Retirement Board
Michigan Public School Employees' Retirement System
530 W. Allegan
Lansing, Michigan 48933

Re: Michigan Public School Employees' Retirement System - Actuarial Valuation as of September 30, 2017

Dear Board Members:

The results of the September 30, 2017 annual actuarial valuation of the Michigan Public School Employees' Retirement System pension benefits are presented in this report. The purpose of the valuation was to measure the System's funding progress, to determine the employer contribution for the 2019-2020 fiscal year, and to provide actuarial information in connection with the applicable Governmental Accounting Standards Board Statements. The report should not be relied upon for any other purpose. This report may be provided to parties other than the Office of Retirement Services only in its entirety and only with the permission of the Office of Retirement Services. GRS is not responsible for unauthorized use of this report.

The valuation was based upon information furnished by the Office of Retirement Services concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. Data was checked for internal and year-to-year consistency, but was not audited by us. As a result, we are unable to assume responsibility for the accuracy or completeness of the data provided. Year 2005 and prior years' valuation results back to 1993 were not prepared by GRS and are presented for comparison with the current year's results.

The valuation summarized in this report involves actuarial calculations that require making assumptions about future events. We believe that the assumptions and methods used in this report are reasonable and appropriate. However, other assumptions and methods could also be reasonable and could result in materially different results. Some of the numbers in this report are rounded. The use of the rounded numbers for plan liabilities should not imply a lack of precision. In addition, because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications or calculations to facilitate the modeling of future events. We may also exclude factors or data that we deem to be immaterial.

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

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

Sincerely,

Mita Drazilov

Mita D. Drazilov, ASA, FCA, MAAA

Louise Gates

Louise M. Gates, ASA, MAAA

MDD/LMG:sc

Table of Contents

Executive Summary/Board Summary

1. Required Employer Contributions to Support Retirement Benefits

The computed employer contribution for fiscal year 2020 is shown below. Computed contributions are shown as a percentage of active member payroll and as the projected fiscal year 2020 dollar amount.

	Total Computed Employer Contribution			
		Hybrid Members		
	Non-Hybrid Members	Pension Plus Plan (PPP)	Pension Plus 2 Plan (PPP2)	Weighted Average
As a Percentage of Active Member Payroll				
Normal Cost	6.02 %	3.06 %	6.20 %	5.68 %
UAAL Amortization Payment	24.07	24.07	24.07	24.07
As an Annual Dollar Amount				
Normal Cost	$ 394,196,334	$ 32,324,058	$ 69,589,178	$ 496,109,570
UAAL Amortization Payment	1,604,080,670	254,261,463	329,630,628	2,187,972,761
Total	$ 1,998,277,004	$ 286,585,521	$ 399,219,806	$ 2,684,082,331

This valuation report establishes the employer contribution for fiscal year 2020. As a result of Public Act 300 of 2012 and the introduction of the defined contribution (DC) plan option, the employer normal cost rate (i.e., 5.68%) is expressed as a percentage of the defined benefit (DB) plan payroll, while the UAAL amortization payment rate (i.e., 24.07%) is expressed as a percentage of total payroll (i.e., including both DB and DC plan active member payroll).

For purposes of estimating the normal cost dollar contribution, it is assumed that the payroll associated with active DB members as of September 30, 2017 will increase by 3.5% per year to fiscal year 2020. For Non-Hybrid and PPP members, projected payroll to fiscal year 2020 is based upon valuation demographic and salary increase assumptions. The remainder of the projected normal cost payroll in fiscal year 2020 is allocated to PPP2.

2. Public Act 92 of 2017

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

(1) Individuals that become members of MPSERS on or after February 1, 2018 (sometimes referred to as new hires) have the one-time choice between a Defined Contribution (DC) plan and a new Hybrid plan referred to as the Pension Plus 2 Plan (PPP2). The DC plan has an employer contribution of 4% of pay plus a 100% employer matching provision up to an additional 3% of a member's pay. The PPP2 is similar in nature to the Pension Plus Plan (PPP), with the following exceptions:
   a. The employer and member normal cost contribution rates are based upon a 50/50 cost sharing arrangement.
   b. The employer and member contribution rates associated with financing any unfunded actuarial accrued liabilities (UAAL) are based upon a 50/50 cost sharing arrangement.

c. The MPSERS Board of Trustees has the ability to raise the normal retirement age (currently age 60) for active members if the life expectancy for a 65-year old (based upon a unisex blend of 50/50) increases by a certain amount. The review of the age 65 life expectancy is based upon the mortality tables adopted as part of the normal 5-year Experience Study process. If a change to the normal retirement age is adopted, certain members who are near the then current retirement age would not be subject to the updated normal retirement age.
d. Changes to the UAAL are amortized over a 10-year period using level dollar amortization.
e. The discount rate for actuarial valuation purposes is 6%.

(2) The default election for a new hire is the DC plan.
(3) If the actuarial funded ratio of the PPP2 falls below 85% for two consecutive actuarial valuations, the PPP2 has the potential of being closed to new hires going forward. The actuarial funded ratio is based upon the actuarial value of assets (i.e., 5-year smoothing of investment returns).
(4) Members hired on or after February 1, 2013 who selected the DC plan receive the enhanced employer contribution structure of the new DC plan. Members hired before February 1, 2013 who selected the DC plan as part of the Public Act 300 (PA 300) reform do not receive the enhanced employer contribution rate structure.
(5) Beginning with the State's fiscal year ending September 30, 2018 (applicable to Non-Hybrid and PPP only):
a. The normal cost contribution rate must not be less than the normal cost contribution rate in the immediately preceding State fiscal year.
b. The contribution rate associated with financing the UAAL must not be less than the contribution rate associated with financing the UAAL in the immediately preceding State fiscal year. This provision is applicable until such time as the UAAL is "paid off."

3. Public Act 300 of 2012

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

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

(1) Increase their member contribution rate to the pension fund and maintain the 1.5% benefit multiplier in their pension formula for service accrued after the transition date (i.e., February 1, 2013). Basic member contributions increased to 4% (from 0%). MIP member contributions increased to a flat 7% (from 3.9% for MIP-Fixed, from a graded percentage up to 4.3% for MIP-Graded, and from a graded percentage up to 6.4% for MIP-Plus).

(2) Increase their member contribution rate (as noted above) and maintain the 1.5% benefit multiplier in their pension formula for service accrued after the transition date until they reach 30 years of service. Upon reaching 30 years of service, their member contribution rate would return to their current level (pre-Public Act 300 of 2012), and their pension formula for service in excess of 30 years would be based upon a 1.25% benefit multiplier.

(3) Maintain their current member contribution rate to the pension fund. The pension formula for years of service before the transition date is based upon a 1.5% benefit multiplier, while the pension formula for years of service after the transition date is based upon a 1.25% benefit multiplier.

(4) Cease member contributions to the DB portion of the pension fund. In this circumstance, the member would no longer receive future benefit accruals in the DB plan and would become a participant in the DC plan. The pension formula for years of service before the transition date is based upon a 1.5% benefit multiplier. The member's final average compensation would be frozen as of the transition date.

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

Option 1 - Increase member contributions / 1.5% benefit multiplier after transition date	19 %
Option 2 - Increase member contributions and 1.5% benefit multiplier until 30 years of service	2
Option 3 - Current member contributions / 1.25% benefit multiplier after transition date	48
Option 4 - Cease DB member contributions / DC benefit after transition date	2
Option 5 - Not eligible to make an election or new hire who elected PPP	23
Option 6 - New hire who elected pure DC plan	6

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

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

4. Budgeting Process and Reconciliation Process

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

Beginning with the September 30, 2012 valuation, it had been reported to the actuary that the reconciliation process had been suspended. The September 30, 2012 valuation determined the required contribution for fiscal year 2015 for funding and accounting purposes. For the September 30, 2015 valuation, it was reported to the actuary that the reconciliation process has been reinstated with reconciliation payments beginning in fiscal year 2016. The September 30, 2017 valuation determines the required employer contribution for fiscal year 2020 for both funding and accounting purposes.

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

5. 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. The immediate recognition of the market value return is expected to offset the increase in the computed employer contribution from where it otherwise would have been.

For MPSERS, the following is applicable:

(1) The amount of excess investment return for MPSERS does not cover the increase in the normal cost contribution for any year.
(2) It was assumed that the reduction in the investment return assumption would be applicable to the Non-Hybrid portion of the pension plan only.

For the September 30, 2017 valuation, the investment return assumption was reduced from 7.50% to 7.05% as a result of the Policy. Please see page C-3 for additional detail.

6. Contribution Comparison

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

Valuation Date	9/30/2016	9/30/2017
Contribution Percentage		
Normal Cost	4.46 %	5.68 %
UAAL Amortization Payment	24.01	24.07
Total	N/A	N/A
As an Annual Dollar Amount		
Normal Cost	$ 390,317,866	$ 496,109,570
UAAL Amortization Payment	2,178,284,730	2,187,972,761
Total	$ 2,568,602,596	$ 2,684,082,331
Fiscal Year Computed For	2019	2020
Fiscal Year Budgeted For	2019	2020

The computed employer contribution rates presented throughout this report do not reflect the normal cost or UAAL "floor" provisions described in bullet (5) on page 2.

7. Reasons for Change

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

Section Two summarized the benefit changes. In accordance with the Dedicated Gains Policy, the Non-Hybrid plan investment return assumption was lowered from 7.50% to 7.05%. This resulted in an increase in liabilities and employer contribution requirements. This was offset in part by plan experience for the year ended September 30, 2017 which was overall favorable and is described in more detail in Section B of this report.

SECTION A

INTRODUCTION

Contribution Requirements

Development of Employer Contributions for the Indicated Valuation Date

	Contributions for	September 30 2016 Total	2017 Non-Hybrid	2017 Hybrid Pension Plus (PPP)	2017 Hybrid Pension Plus 2 (PPP2)	2017 Total
(1)	Fiscal Year Ending September 30,	2019	2020	2020	2020	2020
(2)	Total Normal Cost of Benefits (as a % of member pay)	9.19%	10.74%	8.00%	12.40%	10.62%
(3)	Member Contribution % (weighted average)	4.73%	4.72%	4.94%	6.20%	4.94%
(4)	Employer Normal Cost % = (2) - (3)	4.46%	6.02%	3.06%	6.20%	5.68%
(5)	Projected Active Member Payroll for Fiscal Year - Normal Cost $	$ 8,761,318,013	$ 6,548,111,855	$ 1,056,341,766	$ 1,122,406,090	$ 8,726,859,711
(6)	Employer Normal Cost $ = (4) x (5)	390,317,866	394,196,334	32,324,058	69,589,178	496,109,570
(7)	Total Actuarial Accrued Liability	72,310,445,826				76,693,475,788
(8)	Funding Value of Assets	43,203,593,340				47,255,286,564
(9)	Unfunded Actuarial Accrued Liabilities (UAAL) = (7) - (8)	$ 29,106,852,486				$ 29,438,189,224
	a. Present Value of Budgeted Early Retirement Incentive Payments	218,442,689				419,754,695
	b. Present Value of Remaining Early Retirement Incentive Payments	388,993,550				104,264,881
	c. Present Value of Future Reconciliation Payments	565,526,993				470,625,169
	d. Net UAAL to be Amortized = (9) - (9a) - (9b) - (9c)	$ 27,933,889,254				$ 28,443,544,479
(10)	Amortization Period (years)	20	19	19	19	19
(11)	Amortization Factor (level percent of payroll payments)		13.79148941	13.84634119	15.01678945	
(12)	Amortization Payment %	22.65%	22.71%	22.71%	22.71%	22.71%
(13)	Early Retirement Incentive Amortization Payment %	1.36%	1.36%	1.36%	1.36%	1.36%
(14)	Total Amortization Payment % = (12) + (13)	24.01%	24.07%	24.07%	24.07%	24.07%
(15)	Projected Active Member Payroll for Fiscal Year - Amortization $ [1]	$ 9,072,406,207	$ 6,664,232,116	$ 1,056,341,766	$ 1,369,466,674	$ 9,090,040,556
(16)	Amortization Payment $ = (14) x (15) [2]	2,178,284,730	1,604,080,670	254,261,463	329,630,628	2,187,972,761
(17)	Total Computed Employer Contribution $ = (6) + (16)	**$ 2,568,602,596**	**$ 1,998,277,004**	**$ 286,585,521**	**$ 399,219,806**	**$ 2,684,082,331**

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

(2) *See page A-3 for a description of how to allocate the Amortization Payment dollars between the Non-Hybrid and Hybrid assets.*

Contribution Requirements

Computed Employer Contributions

Based on the assumptions outlined in Section E, as more of the active membership becomes Pension Plus 2 Plan members and the System pays off its unfunded actuarial accrued liability (UAAL), the long term employer contribution rate for the Michigan Public School Employees' Retirement System is expected to be the long term employer normal cost rate for the Pension Plus 2 Plan. However, for the current total defined benefit MPSERS active member population, the weighted average normal cost rate is 5.68%. Also, for the current year, there is a contribution needed to fund the UAAL. As the normal cost rate and the UAAL amortization payment rate are applied to different payrolls, the two contribution rates cannot be summed to get a total recommended employer contribution rate.

Effect of 2010 Early Retirement Incentive Program

For fiscal year 2020, the amortization payment will include 1.36% of total fiscal year payroll, attributable to the Early Retirement Incentive Program (as shown on page A-1). The valuation reflects that $200 million was contributed by the employer in October 2017 to eliminate the fiscal year 2021 and fiscal year 2022 scheduled Early Retirement Incentive Program contributions. (Please see line items 9a and 9b on page A-1.)

Determining Employer Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollars, then promptly contributed to the System. Please note, the normal cost rates and the UAAL amortization payment rates apply to two different types of payroll. The normal cost rates should be applied to the fiscal year 2020 payroll for those active employees who elected to maintain future benefit accruals in the defined benefit plan, while the UAAL amortization payment rates should be applied to the fiscal year 2020 payroll for the entire MPSERS active employee group.

For the Non-Hybrid Plan members, the employer normal cost rate (expressed as a % of Non-Hybrid payroll) is 6.02%. Applying the employer normal cost rate of 6.02% to the projected payroll for MPSERS active employees participating in the Non-Hybrid portion of the defined benefit plan for fiscal year 2020 produces annual employer normal cost contributions of $394,196,334.

For the PPP members, the employer normal cost rate (expressed as a % of PPP payroll) is 3.06%. Applying the employer normal cost rate of 3.06% to the projected payroll for MPSERS active employees participating in the PPP portion of the defined benefit plan for fiscal year 2020 produces annual employer normal cost contributions of $32,324,058.

For the PPP2 members, the employer normal cost rate (expressed as a % of PPP2 payroll) is 6.20%. Applying the employer normal cost rate of 6.20% to the projected payroll for MPSERS active employees participating in the PPP2 portion of the defined benefit plan for fiscal year 2020 produces annual employer normal cost contributions of $69,589,178.

Contribution Requirements

The amortization payment for funding the UAAL (expressed as a % of the total MPSERS active member payroll reported for this valuation) is 24.07%. Applying the amortization payment rate of 24.07% to the projected payroll for the total MPSERS active employees for fiscal year 2020 produces an annual amortization payment of $2,187,972,761.

The sum of the three normal cost contributions and the amortization payment yields an expected total employer contribution of $2,684,082,331 for fiscal year 2020. Currently, the non-investment cash flow is tracked separately in the assets for the Non-Hybrid and PPP groups. The normal cost contributions should be allocated to each of the respective groups as expected, based on the actual payroll amounts. For the amortization payment of the UAAL, ($467,892) should be allocated to the PPP group, and $2,188,440,653 should be allocated to the Non-Hybrid group. The negative amortization payment to the PPP group implies that the normal cost contribution attributable to the PPP group can be reduced by the amount of overfunded amortization credit.

Reconciliation Payments

Starting with the September 30, 2015 valuation, it was reported to the actuary that the reconciliation process has been reinstated. The contribution requirements shown on page A-1 for fiscal year 2020 are needed in addition to the reconciliation payments required by subsection 41(9) of the MPSERS statute. The scheduled reconciliation payments were prepared and reported by the Office of Retirement Services (ORS) and are presented on page E-13.

Summary of Plan Changes - Public Act 300 of 2012

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

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

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

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

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

Discussion of Changes

Revisions in Benefits

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

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

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

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

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

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

Revisions in Actuarial Assumptions or Methods

In accordance with the Dedicated Gains Policy, the Non-Hybrid plan investment return assumption was lowered from 7.50% to 7.05% effective with this valuation of MPSERS. This assumption change increased the Actuarial Accrued Liability by $3.4 billion.

Actuarial Experience

Actuarial Experience was more favorable than that anticipated by the actuarial assumptions. The total actuarial gain was $3.1 billion. The gain was due primarily to the phase-in of favorable investment experience over the past few years.

Comment on the Investment Markets

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

As of September 30, 2017, the actuarial value of assets was 101% of market value. This means that meeting the actuarial investment return assumption in the next few years will require average future market returns to exceed the 7.05% investment return assumption.

If the September 30, 2017 valuation results were based on the market value of assets instead of the actuarial value of assets, the funded percent of the plan would be 61.3% (instead of 61.6%), and the UAAL amortization payment would be 24.30% of payroll (instead of 24.07%).

Measures of Financial Soundness

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

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

Long Term Solvency

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

Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability	% of AAL Covered by Assets
9/30/2017 [1]	$47,255,286,564	$76,693,475,788	61.6 %
9/30/2017	45,396,962,957	73,327,132,063	61.9
9/30/2016 [1]	43,203,593,340	72,310,445,826	59.7
9/30/2016	43,203,593,340	68,858,082,735	62.7

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

The chart above illustrates the change in the total System funding percent since the prior year. Page B-7 shows the funded percent in greater detail and for a longer period of time. In particular, the funded percent for current benefit recipients is 78.1% as of September 30, 2017.

Measures of Financial Soundness

Level Contributions

The actuarial assumptions and cost method have been chosen with the intent of producing required total contributions which are expected to remain fairly level as a percentage of active member payroll. The following chart shows a brief history of contribution rates:

Valuation Date	Fiscal Year Budgeted For	Normal Cost [4]	Amortization Payment	Total Contribution
9/30/2017 [2]	2020	5.68 %	24.07 %	N/A [3]
9/30/2017 [1]	2020	5.29	24.07	N/A [3]
9/30/2017	2020	4.41	23.67	N/A [3]
9/30/2016 [1]	2019	4.46	24.01	N/A [3]
9/30/2016	2019	3.59	21.91	N/A [3]

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

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

Year Ending	Actuarial Gain/(Loss)
9/30/2017	$ 3,076,844,994
9/30/2016	1,108,274,408

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

Other Observations

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

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.05% on the Non-Hybrid actuarial value of assets, 7.00% on the PPP actuarial value of assets, and 6.00% on the PPP2 actuarial value of assets), it is expected that:

(1) The employer normal cost as a percentage of pay will trend to the level of the PPP2 normal cost rate as the Non-Hybrid and PPP populations decline and are replaced by PPP2 members,
(2) The amortization payment as a percentage of pay will remain level through fiscal year 2020 (when the Early Retirement Incentive is fully amortized), decrease by 1.36%, and remain level through fiscal year 2038. In determining the amortization payment schedule, the amortization payments are expected to increase at the payroll growth assumption regardless of whether the payroll actually grows at that assumption. Stated another way, to finance the existing UAAL based upon current amortization policy, *the amortization payment dollar amounts have to grow at the payroll growth assumption*,
(3) The unfunded actuarial accrued liability will be fully amortized at the end of fiscal year 2038, and
(4) The funded status of the plan will increase gradually towards a 100% funded ratio.

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

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

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

Other Observations (Concluded)

Limitations of Funded Status Measurements

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

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. In addition, the measurement is inappropriate for assessing benefit security for the membership.
(2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy and asset valuation method, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

SECTION B

FUNDING RESULTS

Present Value of Future Benefits and Accrued Liability

Determination of Unfunded Accrued Liability
as of September 30, 2017

	Non-Hybrid	PPP	Total
A. Accrued Liability			
1. For retirees and beneficiaries	$ 51,877,640,917	$ 105,596	$ 51,877,746,513
2. For vested and other terminated members [1]	2,086,035,623	30,061,729	2,116,097,352
3. For other inactive members [2]	107,465,380	0	107,465,380
4. For present active members			
a. Value of expected future benefit payments	28,487,583,342	1,591,422,939	30,079,006,281
b. Value of future normal costs	6,223,655,674	1,263,184,064	7,486,839,738
c. Active member accrued liability: (a) - (b)	22,263,927,668	328,238,875	22,592,166,543
5. Total accrued liability	76,335,069,588	358,406,200	76,693,475,788
B. Present Valuation Assets (Funding Value)	46,891,221,716	364,064,848	47,255,286,564
C. Unfunded Accrued Liability: (A.5) - (B)	29,443,847,872	(5,658,648)	29,438,189,224
D. Funding Ratio: (B) / (A.5)	61.4%	101.6%	61.6%

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

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

Experience Gain/(Loss)

A. Derivation of Actuarial Gain/(Loss):

1.	Unfunded Actuarial Accrued Liability (UAAL) - Previous Valuation	$ 29,106,852,486
2.	Total Normal Cost (employer plus member) for Year Ending 9/30/2017	763,146,945
3.	Total Contributions (employer plus member) for Year Ending 9/30/2017	2,826,938,344
4.	Interest on:	
	a. UAAL: Discount Rate* x (1)	2,183,014,826
	b. Normal Cost and Contributions: Discount Rate* / 2 x [(2) - (3)]	(77,385,420)
	c. Net Total: (a) + (b)	2,105,629,406
5.	Change in UAAL due to Benefit Changes	-
6.	Change in UAAL due to Assumption Changes	3,366,343,725
7.	Expected UAAL Current Year:	
	(1) + (2) - (3) + (4c) + (5) + (6)	32,515,034,218
8.	Actual UAAL Current Year	29,438,189,224
9.	Experience Gain/(Loss): (7) - (8)	3,076,844,994

B. Approximate Portion of Gain/(Loss) due to Investments	2,894,279,366
C. Approximate Portion of Gain/(Loss) due to Liabilities: (A.9) - (B)	182,565,628

** Discount rate is 7.5% for Non-Hybrid group and 7.0% for the PPP group.*

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

Detailed Experience Gain/(Loss)

Gains/(Losses) During the Year Ended September 30, 2017
Resulting from Differences Between Assumed and Actual Experience

Type of Activity

Type of Activity		Gain/(Loss)
1. **Retirements** (including disability retirement). If members retire at older ages or with lower final average pay than assumed, there is a gain. If younger ages or higher average pays, a loss.	$	25,405,638
2. **Withdrawal from Employment** (including death-in-service). If more liabilities are released by withdrawals and deaths than assumed, there is a gain. If smaller releases, a loss.		(64,622,758)
3. **Pay Increases.** If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.		386,037,743
4. **Investment Income.** If there is greater investment income than assumed, there is a gain. If less income, a loss.		2,894,279,366
5. **Death After Retirement.** If retirants and inactive vested members live longer than assumed, there is a loss. If not as long, a gain.		(86,692,661)
6. **Rehires.**		9,113,311
7. **Refund of University Employer Contributions.**		0
8. **Other.** Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc.		(86,675,645)
9. **Composite Gain/(Loss) During Year.**	$	3,076,844,994

Experience Gain/(Loss)

Five-Year History
(Amounts Shown in Millions)

Plan Year Ending September 30	Experience Gain/(Loss)	Gain/(Loss) Due to Investments	Actuarial Value of Investments	Investment Gain/(Loss) as % of Assets
2017 [1]	$ 3,077	$ 2,894	$ 47,255	6.12%
2016	1,108	989	43,204	2.29
2015	111	604	41,006	1.47
2014	1,084	1,047	39,626	2.64
2013	(399)	(861)	38,044	(2.26)

Plan Year Ending September 30	Gain/(Loss) Due to Liabilities	Actuarial Accrued Liability	Liability Gain/(Loss) as % of Accrued Liability
2017	$ 183	$ 76,693	0.24%
2016 [2]	119	72,310	0.16
2015	(493)	67,728	(0.73)
2014	37	66,105	0.06
2013	462	63,840	0.72

[1] *For the plan year ending September 30, 2017, the gain/(loss) due to investments includes the accelerated recognition of investment gains associated with the Dedicated Gains Policy.*

[2] *For the plan year ending September 30, 2016, the gain/(loss) due to liabilities includes a refund of University employer contributions totaling $2,478,596.*

Historical Funding Levels for Actuarial Accrued Liabilities

(Amounts Shown in Millions)

Valuation Date September 30	Actuarial Accrued Liability	Actuarial Value of Assets	Funded Ratio	Unfunded/(Overfunded) Accrued Liability	Active [4] Member Reported Payroll	Unfunded/(Overfunded) As % of Active Payroll
2006 [1]	$ 49,136	$ 42,995	87.5 %	$ 6,141	$ 9,806	62.6%
2007	51,107	45,335	88.7	5,771	9,851	58.6
2008	53,555	45,677	85.3	7,878	9,958	79.1
2008 [3]	54,608	45,677	83.6	8,931	9,958	89.7
2009	56,685	44,703	78.9	11,982	9,884	121.2
2010	58,543	43,294	74.0	15,250	8,845	172.4
2010 [2]	59,877	43,294	72.3	16,583	8,845	187.5
2010 [3]	60,927	43,294	71.1	17,633	8,845	199.4
2011	63,427	41,038	64.7	22,389	9,156	244.5
2012	64,281	38,450	59.8	25,831	8,649	298.7
2012 [2]	63,277	38,450	60.8	24,827	8,649	287.1
2012 [3]	62,716	38,450	61.3	24,266	8,649	280.6
2013 [2]	63,840	38,044	59.6	25,796	8,273	311.8
2014	65,050	39,626	60.9	25,424	8,167	311.3
2014 [2]	66,105	39,626	59.9	26,479	8,167	324.2
2015	67,728	41,006	60.5	26,721	8,264	323.3
2016	68,858	43,204	62.7	25,654	8,206	312.6
2016 [2]	72,310	43,204	59.7	29,107	8,206	354.7
2017	73,327	45,397	61.9	27,930	8,221	339.7
2017 [2]	76,693	47,255	61.6	29,438	8,221	358.1

[1] *Revised asset valuation method.*

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

[3] *Change in plan provisions.*

[4] *Payroll for UAAL purposes (Total MPSERS Payroll).*

Recommended and Actual Employer Contributions
Historical Comparison

(Amounts Shown in Millions)

Fiscal Year Ending September 30	Valuation Date September 30	Contribution Rates As Percents of Valuation Payroll				Actual Payroll	Employer Contribution for Fiscal Year	
							Computed [7]	Actual
	2010	14.47%				$ 9,513.1	$ 1,376.5	-
	2010 [1]	14.99				9,513.1	1,426.0	-
	2010 [2]	17.59				9,513.1	1,673.4	-
2011	2010 [2,3]	14.93				9,513.1	1,420.3	$ 1,156.1
	2011	20.90				9,064.2	1,894.4	-
2012	2011 [3]	18.24				9,064.2	1,653.3	1,454.4
2013	2011 [4]	19.60				8,793.2	1,723.5	1,364.1
	2012	26.00				8,895.1	2,312.7	-
	2012 [1]	25.49				8,895.1	2,267.4	-
		Non-Hybrid Normal Cost	PPP Normal Cost	PPP2 Normal Cost	Amortization Payment			
2014 [5]	2012 [2,4]	4.31 %	3.23 %		18.76 %	8,895.1	2,004.8	1,600.4
2015 [5]	2012 [2,4]	4.31	3.23		18.76	8,426.8	1,917.9	1,967.6
2016 [5]	2013 [1]	4.39	3.17		21.18	8,510.2	2,156.3	2,308.7
	2014	4.41	3.13		21.32	8,453.0	2,149.3	-
2017 [5]	2014 [1]	3.76	3.13		22.30	8,453.0	2,185.5	2,399.0
2018 [5,6]	2015	3.75	3.07		22.18			
	2016	3.75	3.05		21.91			
2019 [5,6]	2016 [1]	4.86	3.05		24.01			
	2017	4.85	3.06		23.67			
	2017 [1]	6.02	3.06		24.07			
2020 [5,6]	2017 [2]	6.02	3.06	6.20 %	24.07			

[1] *Revised actuarial assumptions and/or methods.* [2] *Change in plan provisions.*

[3] *Does not include UAAL amortization payment for ERI.*

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

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

[6] *For the fiscal years ending September 30, 2018 and beyond, the actual payroll and actual contribution are not yet known.*

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

Historical Funding Levels for Prioritized Actuarial Accrued Liability

Valuation Date September 30	Actuarial Accrued Liability ($ in Millions) (1) Active Member Contributions	(2) Retirants and Beneficiaries	(3) Active and Inactive Members (Employer Financed Portion)	Valuation Assets ($ in Millions)	Portion of Actuarial Accrued Liability Covered by Assets (1)	(2)	(3)	(4) [4]
2006 [1]	$ 4,082	$ 29,505	$ 15,549	$ 42,995	100.0%	100.0%	60.5%	87.5%
2007	4,376	31,254	15,477	45,335	100.0	100.0	62.7	88.7
2008	5,168	32,723	15,664	45,677	100.0	100.0	49.7	85.3
2008 [3]	5,168	32,723	16,717	45,677	100.0	100.0	46.6	83.6
2009	5,449	34,159	17,077	44,703	100.0	100.0	29.8	78.9
2010	5,055	38,315	15,173	43,294	100.0	99.8	0.0	74.0
2010 [2]	5,055	38,589	16,233	43,294	100.0	99.1	0.0	72.3
2010 [3]	5,055	39,639	16,233	43,294	100.0	96.5	0.0	71.1
2011	5,217	41,043	17,167	41,038	100.0	87.3	0.0	64.7
2012	5,296	42,076	16,909	38,450	100.0	78.8	0.0	59.8
2012 [2]	5,296	42,076	15,905	38,450	100.0	78.8	0.0	60.8
2012 [3]	5,296	42,076	15,344	38,450	100.0	78.8	0.0	61.3
2013 [2]	4,909	43,198	15,733	38,044	100.0	76.7	0.0	59.6
2014	5,225	44,126	15,699	39,626	100.0	78.0	0.0	60.9
2014 [2]	5,225	45,545	15,335	39,626	100.0	75.5	0.0	59.9
2015	5,738	46,538	15,452	41,006	100.0	75.8	0.0	60.5
2016	6,189	47,431	15,238	43,204	100.0	78.0	0.0	62.7
2016 [2]	6,189	49,299	16,822	43,204	100.0	75.1	0.0	59.7
2017	6,730	50,069	16,528	45,397	100.0	77.2	0.0	61.9
2017 [2]	6,730	51,878	18,085	47,255	100.0	78.1	0.0	61.6

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

Financial Objective Achievement Indicators – Historical Comparison

(Dollar Amounts in Millions)

		Termination Indicator [4]		Experience Indicator
Valuation September 30	Valuation Assets	Actuarial Present Value of Vested Benefits	Funded Ratio	Actuarial Gain/(Loss)
2006	$ 39,893	$ 45,549	87.6 %	$ 539
2006 [1]	42,995	45,549	94.4	3,641
2007	45,335	47,502	95.4	614
2008	45,677	50,286	90.8	(1,834)
2009	44,703	51,936	86.1	(2,719)
2010	43,294	52,901	81.8	(2,727)
2010 [2]	43,294	53,454	81.0	(2,727)
2010 [3]	43,294	54,505	79.4	(2,727)
2011	41,038	56,446	72.7	(3,981)
2012	38,450	57,372	67.0	(2,673)
2012 [2]	38,450	57,372	67.0	(2,673)
2012 [3]	38,450	57,369	67.0	(2,673)
2013 [2]	38,044	58,395	65.1	(399)
2014	39,626	59,505	66.6	1,084
2014 [2]	39,626	61,254	64.7	1,084
2015	41,006	62,735	65.4	111
2016	43,204	63,865	67.6	1,108
2016 [2]	43,204	66,777	64.7	1,108
2017	45,397	67,815	66.9	3,077
2017 [2]	47,255	70,701	66.8	3,077

1 *Revised asset valuation method.*
2 *Revised actuarial assumptions and/or methods.*
3 *Change in plan provisions.*
4 *Based upon the actuarial assumptions used for funding purposes, including the assumed rate of investment return.*

SECTION C

FUND ASSETS

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

	September 30	
	2016	2017
Equity in Common Cash	$ 130,001,542	$ 108,787,853
Total Receivables	244,204,146	247,383,189
Short Term Investment Pools	1,406,212,422	1,820,414,109
Fixed Income Pools	5,691,195,762	5,780,521,942
Domestic Equity Pools	11,292,978,453	11,609,469,708
Real Estate Pool	4,605,048,194	4,541,786,966
Alternative Investment Pools	6,635,193,213	7,341,338,017
International Equity Pools	6,877,766,284	8,559,214,939
Absolute Return Pools	6,577,887,293	7,005,534,209
Securities Lending Collateral less Obligations	4,173,382	1,689,387
Total Assets	43,464,660,691	47,016,140,319
Other Liabilities	(4,081,943)	(4,357,248)
Net Assets Held in Trust for Pension Benefits	$43,460,578,748	$47,011,783,071

Note: Asset amounts exclude assets held for health benefits.

Reconciliation of Plan Assets

	September 30, 2016			September 30, 2017		
	Non-Hybrid	PPP	Total	Non-Hybrid	PPP	Total
Market Value, Beginning of Year	$ 42,204,073,869	$ 178,287,003	$ 42,382,360,872	$ 43,200,578,786	$ 259,999,962	$ 43,460,578,748
Additions						
Member Contributions	360,789,568	38,103,570	398,893,138	380,883,623	47,104,615	427,988,238
Employer Contributions[2]	2,279,403,758	29,253,272	2,308,657,030	2,365,264,891	33,685,215	2,398,950,106
Net Investment Income[1]	3,079,374,500	15,803,000	3,095,177,500	5,544,078,310	39,391,186	5,583,469,496
Audit Adjustment	0	0	0	0	0	0
Total Additions	5,719,567,826	83,159,842	5,802,727,668	8,290,226,824	120,181,016	8,410,407,840
Deductions						
Benefit Payments	4,671,295,533	4,165	4,671,299,698	4,806,948,758	9,996	4,806,958,754
Contribution Refunds/Transfers	23,209,491	1,308,882	24,518,373	24,404,240	1,707,164	26,111,404
Administrative Expenses[1]	26,079,289	133,836	26,213,125	25,948,989	184,370	26,133,359
University Employer Contribution Refund	2,478,596	0	2,478,596	0	0	0
Total Deductions	4,723,062,909	1,446,883	4,724,509,792	4,857,301,987	1,901,530	4,859,203,517
Market Value, End of Year	$ 43,200,578,786	$ 259,999,962	$ 43,460,578,748	$ 46,633,503,623	$ 378,279,448	$ 47,011,783,071

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

[2] *These values differ from the 2016 CAFR by $3,529,631 due to an asset reallocation reported to the actuary that remedied a fiscal year 2014 normal cost discrepancy for the PPP.*

Development of Valuation Assets – Non-Hybrid

Year Ended September 30	2017	2018	2019	2020	2021
A. Funding Value Beginning of Year	$ 42,944,352,572				
B. Market Value					
B1. Market Value End of Year	46,633,503,623				
B2. Market Value Beginning of Year	43,200,578,786				
B3. Audit Adjustment	-				
C. Non-Investment Net Cash Flow					
C1. Member Contributions	380,883,623				
C2. Employer Contributions	2,365,264,891				
C3. Benefit Payments	(4,806,948,758)				
C4. Contribution Refunds / Transfers	(24,404,240)				
C5. Administrative Expenses	Included in D1				
C6. University Employer Contribution Refund	-				
C7. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6	(2,085,204,484)				
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C7	5,518,129,321				
D2. Assumed Rate of Return	7.50%	7.05%			
D3. Market Rate of Return	13.09%				
D4. Dedicated Gains Policy Trigger (Excess Return %)	5.51%				
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C7/2)	2,322,904,508				
D6. Assumed Amount of Return: D2 x (A + B3 + C7/2)	3,142,631,275				
D7. Amount Subject to Phase-In: D1 - D5 - D6	52,593,538				
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	10,518,708				
E2. First Prior Year	(26,156,470)	$ 10,518,708			
E3. Second Prior Year	(432,077,546)	(26,156,470)	$ 10,518,708		
E4. Third Prior Year	642,831,577	(432,077,546)	(26,156,470)	$ 10,518,708	
E5. Fourth Prior Year	371,421,576	642,831,576	(432,077,545)	(26,156,468)	$ 10,518,706
E6. Total Phase-Ins	566,537,845	195,116,268	(447,715,307)	(15,637,760)	10,518,706
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C7 + D5 + D6 + E6	$ 46,891,221,716				
F2. Corridor Percent	30%				
F3. Upper Corridor Limit: (100% + F2) x B1	60,623,554,710				
F4. Lower Corridor Limit: (100% - F2) x B1	32,643,452,536				
F5. Funding Value End of Year	$ 46,891,221,716				
G. Difference Between Market and Funding Value	(257,718,093)				
H. Recognized Rate of Return	14.40 %				
I. Market Rate of Return	13.09 %				
J. Ratio of Funding Value to Market Value	1.0055				

Development of Valuation Assets – Non-Hybrid (Concluded)

Year Ended September 30	2012	2013	2014	2015	2016
A. Funding Value Beginning of Year	$ 41,027,934,880	$ 38,421,416,945	$ 37,975,547,627	$ 39,500,051,337	$ 40,829,364,640
B. Market Value					
B1. Market Value End of Year	37,670,648,117	39,944,214,960	43,638,174,660	42,204,073,869	43,200,578,786
B2. Market Value Beginning of Year	34,664,520,519	37,670,648,117	39,944,214,960	43,638,174,660	42,204,073,869
B3. Audit Adjustment	-	-	-	-	-
C. Non-Investment Net Cash Flow					
C1. Member Contributions	324,327,745	367,423,484	381,152,795	365,145,605	360,789,568
C2. Employer Contributions	1,448,682,399	1,345,883,238	1,575,385,927	1,957,258,280	2,279,403,758
C3. Benefit Payments	(4,082,242,506)	(4,238,482,066)	(4,388,328,518)	(4,530,914,738)	(4,671,295,533)
C4. Contribution Refunds / Transfers	(31,647,304)	(29,876,949)	(28,058,275)	(23,459,269)	(23,209,491)
C5. Administrative Expenses	Included in D1	Included in D1	Included in D1	Included in D1	Included in D1
C6. University Employer Contribution Refund [1]	-	-	-	(112,468,242)	(2,478,596)
C7. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6	(2,340,879,666)	(2,555,052,293)	(2,459,848,071)	(2,344,438,364)	(2,056,790,294)
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C7	5,347,007,264	4,828,619,136	6,153,807,771	910,337,573	3,053,295,211
D2. Assumed Rate of Return	8.00%	8.00%	8.00%	8.00%	8.00%
D3. Market Rate of Return	15.96%	13.27%	15.90%	2.14%	7.42%
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%	0.00%	0.00%	0.00%	0.00%
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C7/2)	-	-	-	-	-
D6. Assumed Amount of Return: D2 x (A + B3 + C7/2)	3,188,599,604	2,971,511,264	2,939,649,887	3,070,725,302	3,184,077,559
D7. Amount Subject to Phase-In: D1 - D5 - D6	2,158,407,660	1,857,107,872	3,214,157,884	(2,160,387,729)	(130,782,348)
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	431,681,532	371,421,574	642,831,577	(432,077,546)	(26,156,470)
E2. First Prior Year	(410,830,772)	431,681,532	371,421,574	642,831,577	(432,077,546)
E3. Second Prior Year	9,597,984	(410,830,772)	431,681,532	371,421,574	642,831,577
E4. Third Prior Year	(1,264,198,605)	9,597,984	(410,830,772)	431,681,532	371,421,574
E5. Fourth Prior Year	(2,220,488,012)	(1,264,198,607)	9,597,983	(410,830,772)	431,681,532
E6. Total Phase-Ins	(3,454,237,873)	(862,328,289)	1,044,701,894	603,026,365	987,700,667
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C7 + D5 + D6 + E6	$ 38,421,416,945	$ 37,975,547,627	$ 39,500,051,337	$ 40,829,364,640	$ 42,944,352,572
F2. Corridor Percent			30%	30%	30%
F3. Upper Corridor Limit: (100% + F2) x B1			56,729,627,058	54,865,296,030	56,160,752,422
F4. Lower Corridor Limit: (100% - F2) x B1			30,546,722,262	29,542,851,708	30,240,405,150
F5. Funding Value End of Year	$ 38,421,416,945	$ 37,975,547,627	$ 39,500,051,337	$ 40,829,364,640	$ 42,944,352,572
G. Difference Between Market and Funding Value	(750,768,828)	1,968,667,333	4,138,123,323	1,374,709,229	256,226,214
H. Recognized Rate of Return	(0.67)%	5.68 %	10.84 %	9.57 %	10.48 %
I. Market Rate of Return	15.96 %	13.27 %	15.90 %	2.14 %	7.42 %
J. Ratio of Funding Value to Market Value	1.0199	0.9507	0.9052	0.9674	0.9941

[1] *The University Employer Contribution Refund was assumed to occur at the end of the year for fiscal year 2015 and in the middle of the year for fiscal year 2016.*

Development of Valuation Assets – PPP

Year Ended September 30	2017	2018	2019	2020	2021
A. Funding Value Beginning of Year	$ 259,240,768				
B. Market Value					
B1. Market Value End of Year	378,279,448				
B2. Market Value Beginning of Year	259,999,962				
B3. Audit Adjustment	-				
C. Non-Investment Net Cash Flow					
C1. Member Contributions	47,104,615				
C2. Employer Contributions	33,685,215				
C3. Benefit Payments	(9,996)				
C4. Contribution Refunds / Transfers	(1,707,164)				
C5. Administrative Expenses	Included in D1				
C6. University Employer Contribution Refund	-				
C7. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6	79,072,670				
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C7	39,206,816				
D2. Assumed Rate of Return	7.00%	7.00%			
D3. Market Rate of Return	13.09%				
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%				
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C7/2)	-				
D6. Assumed Amount of Return: D2 x (A + B3 + C7/2)	20,914,397				
D7. Amount Subject to Phase-In: D1 - D5 - D6	18,292,419				
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	3,658,484				
E2. First Prior Year	193,690	$ 3,658,484			
E3. Second Prior Year	(1,373,952)	193,690	$ 3,658,484		
E4. Third Prior Year	1,747,501	(1,373,952)	193,690	$ 3,658,484	
E5. Fourth Prior Year	611,290	1,747,499	(1,373,950)	193,688	$ 3,658,483
E6. Total Phase-Ins	4,837,013	4,225,721	2,478,224	3,852,172	3,658,483
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C7 + D5 + D6 + E6	$ 364,064,848				
F2. Corridor Percent	30%				
F3. Upper Corridor Limit: (100% + F2) x B1	491,763,282				
F4. Lower Corridor Limit: (100% - F2) x B1	264,795,614				
F5. Funding Value End of Year	$ 364,064,848				
G. Difference Between Market and Funding Value	14,214,600				
H. Recognized Rate of Return	8.62 %				
I. Market Rate of Return	13.09 %				
J. Ratio of Funding Value to Market Value	0.9624				

Development of Valuation Assets – PPP (Concluded)

Year Ended September 30	2012	2013	2014	2015	2016
A. Funding Value Beginning of Year	$ 10,261,650	$ 28,542,947	$ 67,955,907	$ 125,564,156	$ 176,988,329
B. Market Value					
B1. Market Value End of Year	29,763,844	71,324,656	135,014,304	178,287,003	259,999,962
B2. Market Value Beginning of Year	10,132,876	29,763,844	71,324,656	135,014,304	178,287,003
B3. Audit Adjustment	-	-	-	-	-
C. Non-Investment Net Cash Flow					
C1. Member Contributions	11,143,134	17,584,103	24,290,977	30,576,687	38,103,570
C2. Employer Contributions	5,756,508	18,253,224	24,989,205	10,352,416	29,253,272
C3. Benefit Payments	-	-	-	-	(4,165)
C4. Contribution Refunds / Transfers	(217,835)	(565,490)	(782,374)	(974,546)	(1,308,882)
C5. Administrative Expenses	Included in D1	Included in D1	Included in D1	Included in D1	Included in D1
C6. University Employer Contribution Refund	-	-	-	-	-
C7. Total Net Cash Flow: C1 + C2 + C3 + C4 + C5 + C6	16,681,807	35,271,837	48,497,808	39,954,557	66,043,795
D. Investment Return					
D1. Market Return Total: B1 - B2 - B3 - C7	2,949,161	6,288,975	15,191,840	3,318,142	15,669,164
D2. Assumed Rate of Return	7.00%	7.00%	7.00%	7.00%	7.00%
D3. Market Rate of Return	15.96%	13.27%	15.90%	2.14%	7.42%
D4. Dedicated Gains Policy Trigger (Excess Return %)	0.00%	0.00%	0.00%	0.00%	0.00%
D5. Market Return for Immediate Recognition: D4 x (B2 + B3 + C7/2)	-	-	-	-	-
D6. Assumed Amount of Return: D2 x (A + B3 + C7/2)	1,302,179	3,232,521	6,454,337	10,187,900	14,700,716
D7. Amount Subject to Phase-In: D1 - D5 - D6	1,646,982	3,056,454	8,737,503	(6,869,758)	968,448
E. Phased-In Recognition of Investment Return					
E1. Current Year: 0.20 x D7	329,396	611,291	1,747,501	(1,373,952)	193,690
E2. First Prior Year	(32,518)	329,396	611,291	1,747,501	(1,373,952)
E3. Second Prior Year	433	(32,518)	329,396	611,291	1,747,501
E4. Third Prior Year	-	433	(32,518)	329,396	611,291
E5. Fourth Prior Year	-	-	434	(32,520)	329,398
E6. Total Phase-Ins	297,311	908,602	2,656,104	1,281,716	1,507,928
F. Funding Value End of Year					
F1. Preliminary Funding Value End of Year: A + B3 + C7 + D5 + D6 + E6	$ 28,542,947	$ 67,955,907	$ 125,564,156	$ 176,988,329	$ 259,240,768
F2. Corridor Percent			30%	30%	30%
F3. Upper Corridor Limit: (100% + F2) x B1			175,518,595	231,773,104	337,999,951
F4. Lower Corridor Limit: (100% - F2) x B1			94,510,013	124,800,902	181,999,973
F5. Funding Value End of Year	$ 28,542,947	$ 67,955,907	$ 125,564,156	$ 176,988,329	$ 259,240,768
G. Difference Between Market and Funding Value	1,220,897	3,368,749	9,450,148	1,298,674	759,194
H. Recognized Rate of Return	8.60 %	8.97 %	9.88 %	7.88 %	7.72 %
I. Market Rate of Return	15.96 %	13.27 %	15.90 %	2.14 %	7.42 %
J. Ratio of Funding Value to Market Value	0.9590	0.9528	0.9300	0.9927	0.9971

History of Approximate Investment Return Rates

Plan Year Ending September 30	Approximate Rate of Return[1] Market Value	Actuarial Value Non-Hybrid	PPP
2008	(15.89) %	4.71 %	
2009	(7.16)	1.91	
2010	10.59	1.77	8.52 %
2011	3.78	0.56	6.37
2012	15.96	(0.67)	8.60
2013	13.27	5.68	8.97
2014	15.90	10.84	9.88
2015	2.14	9.57	7.88
2016	7.42	10.48	7.72
2017	13.09	14.40	8.62
Average Returns:			
Last five years:	10.25 %	10.16 %	8.61 %
Last ten years:	5.41 %	5.81 %	8.32 %

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

Historical Growth of Assets at Market Value

Fiscal Year Ended September 30	Revenues by Source			Expenses by Type			Market Value of Assets
	Member Contributions	Employer Contributions	Net Investment Income [1]	Retirement Benefits	Return of Contributions and Transfers	Administrative Expenses	
1998	$ 252,672,436	$ 622,437,022	$ 2,409,304,679	$ 1,454,451,439	$ 21,626,704	$ 14,463,339	$ 31,795,731,454
1999	518,861,556	574,436,929	5,075,649,100	1,587,992,361	11,198,300	16,525,359	36,348,963,019
2000	321,557,146	655,258,922	4,755,872,070	1,735,936,328	17,455,802	15,918,143	40,312,340,884
2001	371,548,016	629,924,827	(4,575,630,855)	1,890,812,400	19,835,729	17,312,250	34,810,222,493
2002	413,163,871	603,949,327	(3,733,441,844)	2,041,439,863	20,813,845	23,610,482	30,008,029,657
2003	379,084,549	697,906,265	4,532,071,835	2,180,574,193	13,642,300	23,016,963	33,399,858,850
2004	456,352,606	697,647,338	4,130,642,038	2,358,216,073	18,403,233	19,374,673	36,288,506,853
2005	368,240,837	774,277,778	4,530,606,037	2,558,017,710	22,166,261	19,997,954	39,361,449,580
2006	518,599,720	995,932,425	4,927,177,496	2,761,292,217	24,024,234	22,501,098	42,995,341,672
2007	356,761,212	835,366,382	7,177,114,740	2,944,920,179	32,241,730	24,489,202	48,362,932,895
2008	399,256,616	999,374,879	(7,398,629,969)	3,117,434,847	32,720,146	24,740,628	39,188,038,800
2009	357,249,466	1,000,375,355	(2,712,429,401)	3,278,118,116	33,943,530	22,793,011	34,498,379,563
2010	377,748,755	1,001,251,673	3,563,025,960	3,525,020,341	33,907,066	26,000,699	35,855,477,845
2011	332,209,134	1,156,060,903	1,332,447,630	3,942,027,101	36,588,623	22,926,393	34,674,653,395
2012	335,470,879	1,454,438,907	5,387,076,055	4,082,242,506	31,865,139	37,119,630	37,700,411,961
2013	385,007,587	1,364,136,462	4,859,910,264	4,238,482,066	30,442,439	25,002,153	40,015,539,616
2014	405,443,772	1,600,375,132	6,192,710,860	4,388,328,518	28,840,649	23,711,249	43,773,188,964
2015	395,722,292	1,967,610,696	938,143,040	4,530,914,738	136,902,057 [3]	24,487,325	42,382,360,872
2016	398,893,138	2,308,657,030	3,095,177,500	4,671,299,698	26,996,969 [3]	26,213,125	43,460,578,748
2017	427,988,238	2,398,950,106	5,583,469,496	4,806,958,754	26,111,404	26,133,359	47,011,783,071

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

Note: Data for the year 2007 and prior years was provided by the State of Michigan Department of Technology, Management and Budget - Financial Services.

SECTION D

CENSUS DATA

Summary of Participant Data by Category

	As of September 30	
	2016	**2017**
Retirees and beneficiaries currently receiving benefits:		
Regular benefits	187,546	189,960
Survivor benefits	17,274	17,878
Disability benefits	6,187	6,151
Total	211,007	213,989
Current Employees:		
Vested	102,846	100,135
Non-Vested	86,915	87,600
Total	189,761	187,735
Inactive employees entitled to benefits and not yet receiving them:	22,508	22,234
Total Participants	423,276	423,958

The September 30, 2016 inactive counts include 4,640 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300. All counts exclude 9,878 people hired after PA 300 who elected to participate in the pure defined contribution plan and 3,366 active records with both $0 salary and 0 service provided in the September 30, 2016 valuation data.

The September 30, 2017 inactive counts include 4,230 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300. All counts exclude 12,016 people hired after PA 300 who elected to participate in the pure defined contribution plan and 3,756 active records with both $0 salary and 0 service provided in the September 30, 2017 valuation data.

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

Retirees and Beneficiaries – Historical Comparison

Year Ended September 30	Rolls End of Year: Number	Rolls End of Year: Annual Benefit[1]	Annual % Increase: Number	Annual % Increase: Benefits	Average Annual Benefit
1998	116,620	$ 1,505,362	4.3%	9.8%	$ 12,908
1999	120,913	1,639,825	3.7	8.9	13,562
2000	126,115	1,798,028	4.3	9.6	14,257
2001	130,790	1,943,444	3.7	8.1	14,859
2002	135,277	2,094,382	3.4	7.8	15,482
2003	139,814	2,251,766	3.4	7.5	16,105
2004	145,378	2,431,636	4.0	8.0	16,726
2005	151,706	2,644,700	4.4	8.8	17,433
2006	157,163	2,828,460	3.6	6.9	17,997
2007	162,844	3,013,075	3.6	6.5	18,503
2008	167,265	3,171,261	2.7	5.3	18,960
2009	171,922	3,336,165	2.8	5.2	19,405
2010	187,722	3,814,755	9.2	14.3	20,321
2011	192,435	3,987,227	2.5	4.5	20,720
2012	196,661	4,134,218	2.2	3.7	21,022
2013	200,952	4,289,281	2.2	3.8	21,345
2014	204,512	4,431,065	1.8	3.3	21,667
2015	207,651	4,568,852	1.5	3.1	22,003
2016	211,007	4,709,668	1.6	3.1	22,320
2017	213,989	4,839,414	1.4	2.8	22,615

[1] *In thousands of dollars.*

Retirees and Beneficiaries
as of September 30, 2017
By Type of Retirement and Selected Option

Amount of Monthly Benefit	Number of Retirees	Type of Retirement* 1	2	3	4	5	6	Selected Option** Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt 1E 2E,3E,4E
$ 1 - 200	11,858	10,368	1,046	63	244	3	134	6,329	2,911	1,651	223	744
201 - 400	22,962	19,946	1,415	111	1,164	3	323	12,456	4,977	3,829	571	1,129
401 - 600	17,957	15,160	1,146	91	1,184	2	374	9,351	3,798	3,305	561	942
601 - 800	13,805	11,513	911	68	980	1	332	6,970	2,779	2,657	558	841
801 - 1,000	11,467	9,534	786	46	774	1	326	5,516	2,348	2,334	503	766
1,001 - 1,200	10,065	8,417	787	26	557	0	278	4,599	2,112	2,047	504	803
1,201 - 1,400	8,843	7,275	855	13	468	1	231	3,828	1,898	1,754	481	882
1,401 - 1,600	8,247	6,817	810	14	363	2	241	3,364	1,729	1,662	499	993
1,601 - 1,800	7,915	6,686	732	6	295	0	196	3,066	1,634	1,577	488	1,150
1,801 - 2,000	7,909	6,830	612	6	272	1	188	2,988	1,657	1,494	530	1,240
Over 2,000	92,961	87,414	3,860	9	774	3	901	40,789	17,925	18,641	7,513	8,093
Totals	213,989	189,960	12,960	453	7,075	17	3,524	99,256	43,768	40,951	12,431	17,583

*** Type of Retirement**

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

**** Selected Option**

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

Active Members by Classification (Defined Benefit Only)

	September 30, 2016	September 30, 2017
Basic Members		
Number	15,557	13,885
Average Age	56.0 years	56.5 years
Average Service	25.4 years	25.6 years
Reported Payroll	$ 863,327,485	$ 771,990,674
Average Annual Pay	$ 55,494	$ 55,599
MIP Members		
Number	132,100	126,364
Average Age	48.0 years	48.5 years
Average Service	15.0 years	15.6 years
Reported Payroll	$ 6,163,678,791	$ 6,041,695,591
Average Annual Pay	$ 46,659	$ 47,812
PPP Members		
Number	42,104	47,486
Average Age	36.9 years	37.3 years
Average Service	2.0 years	2.3 years
Reported Payroll	$ 885,558,459	$ 1,066,354,621
Average Annual Pay	$ 21,033	$ 22,456
Total		
Number	189,761	187,735
Average Age	46.2 years	46.2 years
Average Service	13.0 years	13.0 years
Reported Payroll	$ 7,912,564,735	$ 7,880,040,886
Average Annual Pay	$ 41,698	$ 41,974

The above active statistics exclude active members hired after PA 300 who elected the pure defined contribution plan (9,878 as of September 30, 2016 and 12,016 as of September 30, 2017). The above active statistics exclude active members who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result of PA 300 (4,640 as of September 30, 2016 and 4,230 as of September 30, 2017). The above active statistics exclude people provided in the valuation with both $0 salary and 0 service (3,366 as of September 30, 2016 and 3,756 as of September 30, 2017). Annual reported payroll for those employees excluded from the active statistics (above) are $340.7 million as of September 30, 2017 ($293.5 million as of September 30, 2016).

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

Active Members (Defined Benefit Only)

Members in Active Service as of September 30, 2017
by Age and Years of Service

Age	Years of Service 0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 & up	Total Count	Total Pay	Average Pay
Under 20	187							187	$ 2,174,142	$ 11,626
20 - 24	4,844	15						4,859	66,361,137	13,657
25 - 29	10,173	1,180	7					11,360	312,991,233	27,552
30 - 34	8,232	6,058	933	418				15,641	544,789,376	34,831
35 - 39	7,955	4,309	4,168	4,573	1,281			22,286	965,811,993	43,337
40 - 44	7,166	3,274	2,602	5,577	6,568	660		25,847	1,275,630,834	49,353
45 - 49	6,984	3,699	2,906	4,042	7,346	4,671	319	29,967	1,489,730,213	49,712
50 - 54	5,354	3,424	3,324	3,928	4,349	5,513	2,455	28,347	1,299,535,866	45,844
55 - 59	4,065	2,731	3,183	4,597	4,509	3,416	3,685	26,186	1,079,521,284	41,225
60 - 64	2,805	1,813	1,655	2,458	2,758	2,097	2,530	16,116	627,757,916	38,952
65 - 69	1,397	720	463	499	528	482	792	4,881	167,899,596	34,399
70 & Over	836	379	214	173	113	92	251	2,058	47,837,296	23,245
Total	59,998	27,602	19,455	26,265	27,452	16,931	10,032	187,735	$ 7,880,040,886	$ 41,974

The September 30, 2017 active statistics exclude: (1) 4,230 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result PA 300, (2) 12,016 people hired after PA 300 who elected the pure defined contribution plan, and (3) 3,756 people provided in the valuation with both $0 salary and 0 service. UAAL contributions are expected to continue to be collected on the payroll of these members in the future.

Active and Inactive Members Reported for Valuation
Historical Comparison

Valuation Date September 30	Number of Inactive Vested Members	Active Members [2]					
				Average			
		Number	Reported Payroll[1]	Annual Pay	% Increase	Age	Years of Service
1998	*	302,016	$ 8,265,463	$ 27,368	0.8 %	43.5	9.7
1999	*	309,324	8,643,718	27,944	2.1	43.6	9.5
2000	*	312,699	8,984,737	28,733	2.8	43.6	9.7
2001	*	318,538	9,264,183	29,083	1.2	43.6	9.6
2002	14,403	326,350	9,707,281	29,745	2.3	43.6	9.5
2003	14,247	326,938	10,043,862	30,721	3.3	43.8	9.7
2004	15,756	322,494	10,407,072	32,271	5.0	43.8	9.7
2005	16,806	316,151	10,205,972	32,282	0.0	43.7	9.7
2006	15,679	308,233	9,806,452	31,815	(1.4)	44.1	9.9
2007	14,999	295,984	9,851,471	33,284	4.6	44.5	10.3
2008	14,312	278,642	9,958,132	35,738	7.4	44.9	10.8
2009	14,454	268,208	9,883,674	36,851	3.1	45.4	11.4
2010	15,026	242,568	8,845,019	36,464	(1.1)	45.2	11.1
2011	15,090	236,660	9,155,691	38,687	6.1	45.3	11.3
2012	16,167	223,769	8,649,029	38,652	(0.1)	45.7	11.9
2013	16,235	212,525	8,225,140	38,702	0.1	46.0	12.3
2014	23,140	199,674	7,943,922	39,784	2.8	46.1	12.7
2015	22,717	194,957	8,005,009	41,060	3.2	46.1	12.8
2016	22,508	189,761	7,912,565	41,698	1.6	46.2	13.0
2017 [3]	22,234	187,735	7,880,041	41,974	0.7	46.2	13.0

* *Not available.*

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

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

3 *The September 30, 2017 inactive vested statistic includes 4,230 people who elected not to continue future accruals (after the transition date of February 1, 2013) in the defined benefit plan as a result PA 300. The September 30, 2017 active statistics exclude these members as well as 12,016 people hired after PA 300 who elected the pure defined contribution plan and 3,756 people provided in the valuation with both $0 salary and 0 service. UAAL contributions are expected to continue to be collected on the payroll of these members in the future.*

Section E

Methods and Assumptions

Valuation Methods

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

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

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

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

Financing of Unfunded Actuarial Accrued Liabilities - Unfunded actuarial accrued liabilities (full funding credit if assets exceed liabilities) were amortized by level (principal and interest combined) percent-of-payroll contributions over a reasonable period of future years. For amortization purposes, it is assumed that payroll upon which UAAL contributions are collected will increase each year by 3.5%.

Valuation Methods

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

Amortization of UAAL resulting from the Early Retirement Incentive (ERI) program of 2010 – It has been reported that 1.36% of payroll will be contributed beginning in fiscal year 2013 for a 10-year period to amortize the UAAL associated with the ERI program of 2010. In order to avoid duplication of the employer contributions, the present value of future ERI amortization payments is subtracted from the unfunded actuarial accrued liability (UAAL) to determine the remaining UAAL contribution. Please refer to page A-1. The September 30, 2017 valuation reflects that the employer contributed $200 million in October 2017 to eliminate the fiscal year 2021 and fiscal year 2022 scheduled ERI payments.

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

Valuation Assumptions

In accordance with Section 41(1) of the MPSERS statute (Act 300 of the Public Acts of 1980, as amended), the actuarial assumptions are adopted by the Retirement Board and the Department of Technology, Management and Budget after consultation with the actuary and the State Treasurer. The actuarial assumptions were based upon the results of an Experience Study for MPSERS covering the period October 1, 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 investment return assumption was updated again beginning with the September 30, 2017 valuation in accordance with the Dedicated Gains Policy adopted by the Board of Trustees. The actuarial assumptions represent estimates of future experience.

The rate of investment return was 7.05% a year, compounded annually net of investment and administrative expenses for the Non-Hybrid group and 7.00% a year, compounded annually net of investment and administrative expenses for the PPP group. The 7.05% assumption was first used for the September 30, 2017 valuation of the System.

The assumed real rate of investment return is the rate of investment return in excess of either wage inflation or price inflation. Considering a wage inflation assumption of 3.50% and a price inflation assumption of 2.50%, the 7.05% nominal rate of investment return translates into a real rate of investment return of 3.55% over wage inflation and 4.55% over price inflation for the Non-Hybrid group. Considering a wage inflation assumption of 3.50% and a price inflation assumption of 2.50%, the 7.00% nominal rate of investment return translates into a real rate of investment return of 3.50% over wage inflation and 4.50% over price inflation for the PPP group.

Valuation Assumptions

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 the pay upon which System benefits will be based. The current 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 may include a reference number (for example, 423 is used above). These reference numbers are used by GRS to track and identify assumption tables.

Valuation Assumptions

The healthy life post-retirement mortality table used in this valuation of the System 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 of the System. 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 Table, 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.

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 of the System 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		

Valuation Assumptions

The rates of retirement used to measure the probability of eligible members retiring during the next year are shown below. These assumptions were first used for the September 30, 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	Percent of Eligible Members Retiring			
	Basic Members		MIP# and Pension Plus Members	
Ages	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.

Valuation 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 Ages	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

Valuation Assumptions

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

Valuation Assumptions

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

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

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

	Assumed Average Service Credit Accrued Each Year
Teachers with Pay Over $20,000	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.

Valuation Assumptions

Unknown Data:

- Members with unknown gender were assumed to be female.
- Members with unknown dates of birth were assumed to have an entry-age equal to 34 for MIP/PPP and 31 for Basic members.
- Active members with non-zero service who were reported without any annual pay were assumed to have pay equal to the average pay of the corresponding active group.
- Retired members with unknown benefit plan codes were assumed to be MIP.
- Active members with unknown pre-PA 300 benefit plan codes were assumed to be MIP Graded.
- Allocations of total credited service before and after the PA 300 transition date were approximated when not supplied.
- Frozen defined benefit amounts were estimated for active members who elected to participate in the DC Plan prospectively as a result of PA 300, when not supplied.
- Accrued benefits were estimated for inactive participants based upon the service and final average compensation provided in the data.

Miscellaneous and Technical Assumptions

Benefit Service	Exact fractional service is used to determine the amount of benefit payable.
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.
Forfeitures	For vested separations from service, it is assumed that 0% of members separating will withdraw their contributions and forfeit an employer financed benefit. It was further assumed that the liability at termination is the greater of the vested deferred benefit (if any) or the member's accumulated contributions.
Incidence of Contributions	Contributions are assumed to be received continuously throughout the year.
Liability Adjustments	Inactive vested member liabilities were increased by 2% to reflect the value of the death benefit provision.
Marriage Assumption	75% of males and 65% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses for active member valuation purposes.
Normal Form of Benefit	A straight life benefit is the normal form of benefit.
OPEB Contribution Refunds	For purposes of valuing the liabilities associated with OPEB contribution refunds (that are paid out of the pension plan), the Non-Hybrid investment return is used for Non-Hybrid members and the PPP investment return assumption is used for PPP members.
Pay Increase Timing	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.

Miscellaneous and Technical Assumptions

PPP Normal Cost Load

We anticipate that as the PPP population matures, it will take on a pay structure (i.e., an evolution of full-time / part-time membership composition) similar to the current Non-Hybrid population. We have developed a load of 0.35% of payroll to be applied to the PPP normal cost to account for this expectation.

Reconciliation Payments

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

Fiscal Year	Reconciliation Payment
2018	$ 154,016,961
2019	144,256,307
2020	134,495,654
2021	80,259,011
2022	20,186,873
2023	0

Service Purchase Loads

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

$74.9 million for amounts included in the plan's reported assets for purchased service that has not been paid for yet by the members.

$22.3 million estimated for purchased service paid for, but not reported in the valuation. We have estimated this amount based on supplemental data reported for the September 30, 2017 valuation.

SECTION F

PLAN PROVISIONS

Plan Provisions as of September 30, 2017

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

Regular Retirement (no reduction factor for age):

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

Mandatory Retirement Age - None.

Annual Amount

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

Plus

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

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

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

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

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

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

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

Plan Provisions as of September 30, 2017

Early Retirement (age reduction factor used):

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

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

Deferred Retirement (vested benefit):

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

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

Duty Disability Retirement:

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

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

Non-Duty Disability Retirement:

Eligibility - 10 years of credited service.

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

Duty Death Before Retirement:

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

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

Plan Provisions as of September 30, 2017

<u>Non-Duty Death Before Retirement</u>:

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

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

<u>Member Contributions:</u>

<u>Basic and MIP Members</u>

<u>Before Transition Date (February 1, 2013)</u>

<u>Basic members</u> – None.

<u>MIP members hired before January 1, 1990</u> - 3.9% of pay.

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

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

<u>On or After Transition Date (February 1, 2013)</u>

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

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

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

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

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

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

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

Post-Retirement Cost-of-Living Adjustments:

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

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

Currently members receive annual increases based on the following schedule:

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

Plan Provisions as of September 30, 2017

Member Contributions Attributable to the Retiree Health Plan:

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

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

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

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

SECTION G

GLOSSARY

Glossary

Actuarial Accrued Liability The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

Accrued Service The service credited under the plan which was rendered before the date of the actuarial valuation.

Actuarial Assumptions Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

Actuarial Equivalent A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

Actuarial Present Value The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Amortization Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Experience Gain/(Loss) A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

Glossary

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