GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

# MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

## ANNUAL ACTUARIAL VALUATION REPORT SEPTEMBER 30, 2011

GRS

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May 9, 2012

The Retirement Board
Michigan Public School Employees' Retirement System
General Office Building, Third Floor
P.O. Box 30171
Lansing, Michigan 48909

**Re: Michigan Public School Employees' Retirement System - Actuarial Valuation as of September 30, 2011**

Dear Board Members:

The results of the September 30, 2011 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 2011-2012 fiscal year, and 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.

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 otherwise 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 reproduced 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 contigency, 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 the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

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. The undersigned 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 D. Drazilov, ASA, MAAA

Curtis Powell, EA, MAAA

MDD/CP:mrb

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# EXECUTIVE SUMMARY/BOARD SUMMARY

## 1. Required Employer Contributions to Support Retirement Benefits

The computed employer contribution for the fiscal year beginning October 1, 2011 is shown below. Computed contributions are shown as a percentage of active member payroll and as an annual dollar amount.

| | Total Computed Employer Contribution * | | |
|---|---|---|---|
| | Non-Hybrid Members | Hybrid (PPP) Members | Weighted Average |
| As a percentage of active member payroll | 18.31% | 17.04% | 18.24% |
| As an annual dollar amount | $ 1,665,023,638 | $ 79,488,075 | $ 1,744,511,713 |

** Does not include the cost of the 2010 early retirement incentive provision (see pages A-1 and A-2).*

## 2. 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 | 9/30/2010 | 9/30/2011 |
|---|---|---|
| Contribution % | 14.93% | 18.24% |
| Contribution $ | $1,418,354,753 | $1,744,511,713 |

## 3. 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. The third is the difference during the year between the plan's actual experience and what the assumptions predicted.

There were no benefit changes reported to the actuary for the period ended September 30, 2011. There were no material assumption changes. Experience for the year ended September 30, 2011 was overall unfavorable and is described in more detail in Section B of the report.

# SECTION A

## INTRODUCTION

# CONTRIBUTION REQUIREMENTS

## Development of Employer Contributions for the Indicated Valuation Date

| | | September 30 | | | |
|---|---|---|---|---|---|
| | | 2010 | 2011 | | |
| | Contributions for | Total | Non-Hybrid | Hybrid (PPP) | Total |
| (1) | Total Normal Cost of Benefits (as a % of member pay) | 9.22% | 9.43% | 7.32% | 9.32% |
| (2) | Member Contribution % (weighted average) | 5.38% | 5.49% | 4.65% | 5.45% |
| (3) | Employer Normal Cost % = (1) - (2) | 3.84% | 3.94% | 2.67% | 3.87% |
| (4) | Projected Active Member Payroll for Coming Year | $ 9,500,000,000 | $ 9,093,520,692 | $ 466,479,308 | $ 9,560,000,000 |
| (5) | Employer Normal Cost $ = (3) x (4) | 364,804,753 | 358,284,715 | 12,454,998 | 370,739,713 |
| (6) | Total Accrued Liability | 60,927,136,765 | | | 63,427,057,074 |
| (7) | Funding Value of Assets | 43,293,776,101 | | | 41,038,196,530 |
| (8) | Unfunded Actuarial Accrued Liabilities (UAAL) = (6) - (7) | $ 17,633,360,664 | | | $ 22,388,860,544 |
| | a. Present Value of Budgeted Early Retirement Incentive Payments | - | | | 234,258,299 |
| | b. Present Value of Remaining Early Retirement Incentive Payments | 1,050,186,008 | | | 802,323,529 |
| | c. Present Value of Future Reconciliation Payments | 299,182,614 | | | 569,850,125 |
| | d. Net UAAL to be Amortized = (8) - (8a) - (8b) - (8c) | $ 16,283,992,042 | | | $ 20,782,428,591 |
| (9) | Amortization Period (years) | 26 | | | 25 |
| (10) | Amortization Factor (level percent of payroll payments) | 15.46068455 | | | 15.12855299 |
| (11) | Amortization Payment % = (8d) / (10) / (4) | 11.09% | 14.37% | 14.37% | 14.37% |
| (12) | Amortization Period for Early Retirement Incentive (years) | 5 | | | 4 |
| (13) | Amortization Factor (level dollar payments) | 4.15037009 | | | 3.44291272 |
| (14) | Amortization Payment % | 2.66% * | 2.66% | 2.66% | 2.66% * |
| (15) | Total Amortization Payment % = (11) + (14) | 13.75% | 17.03% | 17.03% | 17.03% |
| (16) | Amortization Payment $ = (15) x (4) | $ 1,306,250,000 | $ 1,548,626,574 | $ 79,441,426 | $ 1,628,068,000 |
| (17) | Total Computed Employer Contribution % = (3) + (15) | 17.59% | 20.97% | 19.70% | 20.90% |
| (18) | Total Computed Employer Contribution $ = (5) + (16) | **$1,671,054,753** | **$1,906,911,289** | **$ 91,896,424** | **$1,998,807,713** |

* *Amortization payments for the Early Retirement Incentive (ERI) are assumed to be first collected in Fiscal Year (FY) 2013. The September 30, 2010 valuation determined the FY 2013 ERI amortization payment. The September 30, 2011 valuation determined the FY 2014 ERI amortization payment.*

# CONTRIBUTION REQUIREMENTS (CONT.)

**Computed Employer Contributions**

Based on the assumptions outlined in Section E, the long term employer contribution rate for the Michigan Public School Employees' Retirement System is expected to be 2.67% of payroll (the employer normal cost rate for the Pension Plus Plan – hybrid plan). However, for the current MPSERS active member population, the weighted average normal cost rate is 3.87%. Also, for the current year, there is a contribution needed to fund the unfunded actuarial accrued liability (UAAL). The sum of these two contributions is the recommended employer contribution rate.

**Effect of 2010 Early Retirement Incentive Program**

For FY 2011-2012, the employer contribution will be the total amounts reported on page A-1, less the contribution for the Early Retirement Incentive Program (as shown in the Executive Summary/Board Summary on page 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 Retirement System. As an example, for the Non-Hybrid Plan members, the employer normal cost rate (expressed as a % of active member payroll reported for this valuation) is 3.94%. Applying the employer normal cost contribution rate of 3.94% to the projected payroll for the coming fiscal year, produces annual employer normal cost contributions of $358,284,715. The amortization payment for funding the UAAL, $1,548,626,574, when added to the normal cost contribution produces a total employer contribution of $1,906,911,289.

**Reconciliation Payments**

The contribution requirements shown on page A-1 are in addition to the reconciliation payments required by subsection 41(9) of the MPSERS statute.

# DISCUSSION OF CHANGES

**Revisions in Benefits**

There have been no revisions in plan benefits reported to GRS.

**Revisions in Actuarial Assumptions or Methods**

There have been no material revisions in actuarial assumptions or methods.

**Actuarial Experience**

Actuarial Experience was less favorable than that anticipated by the actuarial assumptions. The total actuarial loss was $4.0 billion. The loss was primarily due to recognized investment losses during the last plan year.

**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, 2011, the actuarial value of assets was 118% of market value. This means that meeting the actuarial assumption in the next few years will require average future market returns that exceed the 8% investment return assumption.

If the September 30, 2011 valuation results were based on market value instead of smoothed funding value, the funded percent of the plan would be 54.7% (instead of 64.7%), and the weighted average employer contribution requirement would be 25.30% of payroll (instead of 20.90%). If the investment markets do not make up for the losses of the two year period ending September 30, 2009, the funded percent and employer contribution requirement can be expected to head in that direction.

# 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.

**<u>Long Term Solvency</u>**

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 |
|---|---|---|---|
| 9/30/2011 | $41,038,196,530 | $63,427,057,074 | 64.7 % |
| 9/30/2010 [2] | 43,293,776,101 | 60,927,136,765 | 71.1 |
| 9/30/2010 [1] | 43,293,776,101 | 59,876,950,757 | 72.3 |
| 9/30/2010 | 43,293,776,101 | 58,543,339,929 | 74.0 |

[1] *Revised actuarial assumptions and methods.*

[2] *Change in plan provisions.*

# MEASURES OF FINANCIAL SOUNDNESS

**Level Contributions**

The actuarial assumptions and cost methods have been chosen with the intent of producing required employer contributions which remain fairly level as a percentage of active member payroll.

| Valuation Date | Normal Cost | Amortization Payment | Total Contribution |
|---|---|---|---|
| 9/30/2011 | 3.87 % | 17.03 % | 20.90 % |
| 9/30/2010 [2] | 3.84 | 13.75 | 17.59 |
| 9/30/2010 [1] | 3.90 | 11.09 | 14.99 |
| 9/30/2010 | 4.09 | 10.38 | 14.47 |

[1] *Revised actuarial assumptions and methods.*

[2] *Change in plan provisions. Normal cost is a weighted average.*

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 cost of the program while losses tend to cause subsequent costs to rise.

| Year Ending | Actuarial Gain/(Loss) |
|---|---|
| 9/30/2011 | $ (3,980,513,009) |
| 9/30/2010 | (2,727,392,257) |

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

# SECTION B

## FUNDING RESULTS

# PRESENT VALUE OF FUTURE BENEFITS AND ACCRUED LIABILITY

**Determination of Unfunded Accrued Liability**
**as of September 30, 2011**

| | All Divisions |
|---|---|
| A. Accrued Liability | |
| 1. For retirees and beneficiaries | $ 41,042,717,365 |
| 2. For vested and other terminated members | 848,182,830 |
| 3. For present active members | |
| a. Value of expected future benefit payments | 27,972,876,691 |
| b. Value of future normal costs | 6,436,719,812 |
| c. Active member accrued liability: (a) - (b) | 21,536,156,879 |
| 4. Total accrued liability | 63,427,057,074 |
| B. Present Valuation Assets (Funding Value) | 41,038,196,530 |
| C. Unfunded Accrued Liability: (A.4) - (B) | 22,388,860,544 |
| D. Funding Ratio: (B) / (A.4) | 64.7% |

# EXPERIENCE GAIN/(LOSS)

A. Derivation of Actuarial Gain/(Loss):

| | | |
|---|---|---|
| 1. | Unfunded Actuarial Accrued Liability (UAAL) - Previous Valuation | $ 17,633,360,664 |
| 2. | Total Normal Cost (employer plus member) for Year Ending 9/30/2011 | 877,158,098 |
| 3. | Total Contributions (employer plus member) for Year Ending 9/30/2011 | 1,488,270,037 |
| 4. | Interest on: | |
| | a. UAAL: Discount Rate* x (1) | 1,410,668,853 |
| | b. Normal Cost and Contributions: Discount Rate* / 2 x [(2) - (3)] | (24,570,043) |
| | c. Net Total: (a) + (b) | 1,386,098,810 |
| 5. | Change in UAAL due to Benefit Changes | - |
| 6. | Change in UAAL due to Assumption Changes | - |
| 7. | Expected UAAL Current Year: | |
| | (1) + (2) - (3) + (4c) + (5) + (6) | 18,408,347,535 |
| 8. | Actual UAAL Current Year | 22,388,860,544 |
| 9. | Experience Gain/(Loss): (7) - (8) | (3,980,513,009) |

| | |
|---|---|
| B. Approximate Portion of Gain/(Loss) due to Investments | (3,129,071,573) |
| C. Approximate Portion of Gain/(Loss) due to Liabilities: (A.9) - (B) | (851,441,436) |

* *Discount rate is 8% for Non-Hybrid groups and 7% for the Hybrid group*

The schedule above shows the net, aggregate experience for the System. The next page shows this experience in detail.

# DETAILED EXPERIENCE GAIN/(LOSS)

## Gains/(Losses) During the Year Ended September 30, 2011
## 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. | $ 17,590,756 |
| 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. | (29,434,968) |
| 3. **Pay Increases.** If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. | (255,369,513) |
| 4. **Investment Income.** If there is greater investment income than assumed, there is a gain. If less income, a loss. | (3,129,071,573) |
| 5. **Death After Retirement.** If retirants and inactive vested members live longer than assumed, there is a loss. If not as long, a gain. | (707,397,766) |
| 6. **New Entrants/Rehires.** | (74,608,220) |
| 7. **Other.** Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc. | 197,778,275 |
| 8. **Composite Gain/(Loss) During Year.** | $ (3,980,513,009) |

# 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 |
|---|---|---|---|---|
| 2011 | $ (3,981) | $ (3,129) | $ 41,038 | (7.62)% |
| 2010 | (2,727) | (2,718) | 43,294 | (6.28) |
| 2009 | (2,719) | (2,728) | 44,703 | (6.10) |
| 2008 | (1,834) | (1,464) | 45,677 | (3.20) |
| 2007 | 614 | 757 | 45,335 | 1.67 |

| Plan Year Ending September 30 | Gain/(Loss) Due to Liabilities | Actuarial Accrued Liability | Liability Gain/(Loss) as % of Accrued Liability |
|---|---|---|---|
| 2011 | $ (851) | $ 63,427 | (1.34)% |
| 2010 | (9) | 60,927 | (0.02) |
| 2009 | 9 | 56,685 | 0.02 |
| 2008 | (371) | 54,608 | (0.68) |
| 2007 | (143) | 51,107 | (0.28) |

## 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 Member Reported Payroll | Unfunded/(Overfunded) As % of Active Payroll |
|---|---|---|---|---|---|---|
| 1998 | $ 32,137 | $ 31,870 | 99.2 % | $ 267 | $ 8,265 | 3.2% |
| 1998 [2] | 32,863 | 31,870 | 97.0 | 993 | 8,265 | 12.0 |
| 1999 | 34,348 | 34,095 | 99.3 | 253 | 8,644 | 2.9 |
| 2000 | 37,139 | 36,893 | 99.3 | 246 | 8,985 | 2.7 |
| 2001 | 39,774 | 38,399 | 96.5 | 1,375 | 9,264 | 14.8 |
| 2002 | 41,957 | 38,382 | 91.5 | 3,575 | 9,707 | 36.8 |
| 2003 | 44,769 | 38,726 | 86.5 | 6,043 | 10,044 | 60.2 |
| 2004 | 47,055 | 38,784 | 82.4 | 8,271 | 10,465 | 79.0 |
| 2004 [2] | 46,317 | 38,784 | 83.7 | 7,533 | 10,407 | 72.4 |
| 2005 | 48,206 | 38,211 | 79.3 | 9,995 | 10,206 | 97.9 |
| 2006 | 49,136 | 39,893 | 81.2 | 9,243 | 9,806 | 94.3 |
| 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 |

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

# 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 | Actual |
| 1999 | 1998 [2] | 7.18 % | $ 8,447.7 | $ 606.5 | $ 574.4 |
| 2000 | 1999 | 6.63 | 9,169.3 | 607.9 | 655.3 |
| 2001 | 2000 | 6.48 | 9,374.8 | 607.5 | 756.0 |
| 2002 | 2001 | 7.22 | 9,719.6 | 701.8 | 604.0 |
| 2003 | 2002 | 8.37 | 10,021.1 | 838.8 | 697.9 |
| 2004 | 2003 | 9.74 | 10,029.2 | 976.8 | 697.6 |
| 2005 | 2004 | 10.72 | 10,137.4 | 1,086.7 | - |
| 2005 | 2004 [2] | 9.83 | 10,137.4 | 996.5 | 715.0 |
| 2006 | 2005 | 11.38 | 10,242.5 | 1,165.6 | 996.0 |
| 2007 | 2006 | 10.90 | 10,307.6 | 1,123.5 | - |
| 2007 | 2006 [1] | 9.06 | 10,307.6 | 933.9 | - |
| 2007 | 2006 [4] | 8.15 | 10,307.6 | 840.1 | 835.4 |
| 2008 | 2007 | 8.87 | 10,318.9 | 915.3 | 999.4 |
| 2009 | 2008 | 10.15 | 10,412.0 | 1,056.8 | - |
| 2009 | 2008 [3] | 9.60 | 10,412.0 | 999.6 | 1,000.4 |
| 2010 | 2009 | 11.56 | 9,913.6 | 1,146.0 | 1,001.3 |
| 2011 | 2010 | 14.47 | 9,513.1 | 1,376.5 | - |
| 2011 | 2010 [2] | 14.99 | 9,513.1 | 1,426.0 | - |
| 2011 | 2010 [3] | 17.59 | 9,513.1 | 1,673.4 | 1,156.1 |
| 2012 [5] | 2011 | 20.90 | | | |

[1] *Revised asset valuation method.*
[2] *Revised actuarial assumptions and/or methods.*
[3] *Change in plan provisions.*
[4] *Interest-only funding adopted for one year only.*
[5] *For the year ending September 30, 2012, the actual payroll and actual contribution are not yet known.*

## 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] |
|---|---|---|---|---|---|---|---|---|
| 1998 | $ 2,505 | $ 15,689 | $ 13,943 | $ 31,870 | 100.0% | 100.0% | 98.1% | 99.2% |
| 1998 [2] | 2,505 | 15,888 | 14,470 | 31,870 | 100.0 | 100.0 | 93.1 | 97.0 |
| 1999 | 2,706 | 17,291 | 14,351 | 34,095 | 100.0 | 100.0 | 98.2 | 99.3 |
| 2000 | 2,932 | 19,200 | 15,007 | 36,893 | 100.0 | 100.0 | 98.4 | 99.3 |
| 2001 | 3,244 | 20,943 | 15,587 | 38,399 | 100.0 | 100.0 | 91.2 | 96.5 |
| 2002 | 3,490 | 22,480 | 15,987 | 38,382 | 100.0 | 100.0 | 77.6 | 91.5 |
| 2003 | 3,720 | 24,080 | 16,969 | 38,726 | 100.0 | 100.0 | 64.4 | 86.5 |
| 2004 | 3,800 | 26,178 | 17,077 | 38,784 | 100.0 | 100.0 | 51.6 | 82.4 |
| 2004 [2] | 3,800 | 26,178 | 16,339 | 38,784 | 100.0 | 100.0 | 53.9 | 83.7 |
| 2005 | 3,898 | 28,047 | 16,261 | 38,211 | 100.0 | 100.0 | 38.5 | 79.3 |
| 2006 | 4,082 | 29,505 | 15,549 | 39,893 | 100.0 | 100.0 | 40.6 | 81.2 |
| 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 |

[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)

| Valuation September 30 | Valuation Assets | Termination Indicator: Actuarial Present Value of Vested Benefits | Termination Indicator: Funded Ratio | Experience Indicator: Actuarial Gain/(Loss) |
|---|---|---|---|---|
| 1997 [4] | $ 30,051 | $ 23,601 | 127.3 % | $ 1,563 |
| 1998 | 31,870 | 25,838 | 123.3 | (583) |
| 1998 [2] | 31,870 | 26,205 | 121.6 | (583) |
| 1999 | 34,095 | 27,755 | 122.8 | 904 |
| 2000 | 36,893 | 30,264 | 121.9 | 2 |
| 2001 | 38,399 | 32,755 | 117.2 | (1,259) |
| 2002 | 38,382 | 34,686 | 110.7 | (2,096) |
| 2003 | 38,726 | 37,424 | 103.5 | (2,337) |
| 2004 | 38,784 | 39,659 | 97.8 | (2,001) |
| 2004 [2] | 38,784 | 39,737 | 97.6 | (2,001) |
| 2005 | 38,211 | 41,595 | 91.9 | (1,868) |
| 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) |

[1] *Revised asset valuation method.*
[2] *Revised actuarial assumptions and/or methods.*
[3] *Change in plan provisions.*
[4] *Revised actuarial assumptions and asset valuation method.*

# SECTION C

## FUND ASSETS

## STATEMENT OF PLAN NET ASSETS (ASSETS AT MARKET OR FAIR VALUE)

| | September 30 | |
|---|---|---|
| | 2010 | 2011 |
| Equity in Common Cash | $ 51,537,845 | $ 115,573,063 |
| Total Receivables | 394,653,488 | 255,627,644 |
| Short Term Investment Pools | 334,020,337 | 1,246,540,091 |
| Fixed Income Pools | 6,035,961,419 | 5,411,702,431 |
| Domestic Equity Pools | 12,881,119,105 | 10,173,927,306 |
| Real Estate Pool | 3,118,647,580 | 3,716,827,115 |
| Alternative Investment Pools | 7,928,212,319 | 8,129,287,277 |
| International Equity Pools | 4,903,629,695 | 4,421,424,526 |
| Absolute Return Pools | 1,363,921,000 | 2,245,174,519 |
| Securities Lending Collateral less Obligations | (1,115,187,717) | (1,004,817,544) |
| Total Assets | 35,896,515,071 | 34,711,266,428 |
| Other Liabilities | (41,037,226) | (36,613,033) |
| Net Assets Held in Trust for Pension Benefits | $35,855,477,845 | $34,674,653,395 |

Note: Asset amounts exclude assets held for health benefits.

# RECONCILIATION OF PLAN NET ASSETS

| | September 30, 2010 | September 30, 2011 | | |
|---|---|---|---|---|
| | | Non-Pension Plus | Pension Plus | Total |
| Market Value, Beginning of Year | $34,498,379,563 | $35,855,301,533 | $ 176,312 | $35,855,477,845 |
| Additions | | | | |
| Member Contributions | 377,748,755 | 325,857,955 | 6,351,179 | 332,209,134 |
| Employer Contributions | 1,001,251,673 | 1,152,612,768 | 3,448,135 | 1,156,060,903 |
| Net Investment Income* | 3,563,025,960 | 1,332,252,870 | 194,760 | 1,332,447,630 |
| Audit Adjustment | 0 | 0 | 0 | 0 |
| Total Additions | 4,942,026,388 | 2,810,723,593 | 9,994,074 | 2,820,717,667 |
| Deductions | | | | |
| Benefit Payments | 3,525,020,341 | 3,942,027,101 | 0 | 3,942,027,101 |
| Contribution Refunds/Transfers | 33,907,066 | 36,554,464 | 34,159 | 36,588,623 |
| Administrative Expenses* | 26,000,699 | 22,923,042 | 3,351 | 22,926,393 |
| Total Deductions | 3,584,928,106 | 4,001,504,607 | 37,510 | 4,001,542,117 |
| Market Value, End of Year | $35,855,477,845 | $34,664,520,519 | $ 10,132,876 | $34,674,653,395 |

* *Net investment income and administrative expenses are allocated between Pension Plus and Non-Pension Plus assets. These splits are not explicitly provided.*

## DEVELOPMENT OF VALUATION ASSETS – NON-HYBRID

| | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| 1. Beginning of Year Assets | | | | | |
| a. Market Value | $ 35,855,301,533 | | | | |
| b. Valuation Assets | 43,293,601,522 | | | | |
| 2. End of Year Assets at Market Value | 34,664,520,519 | | | | |
| 3. Net Additions to Market Value | | | | | |
| a. Member Contributions | 325,857,955 | | | | |
| b. Employer Contributions | 1,152,612,768 | | | | |
| c. Investment Income | 1,332,252,870 | | | | |
| d. Benefit Payments | (3,942,027,101) | | | | |
| e. Contribution Refunds/Transfers | (36,554,464) | | | | |
| f. Administrative Expenses | (22,923,042) | | | | |
| g. Transfer (to) from stabilization subaccount | 0 | | | | |
| h. Audit Adjustment | 0 | | | | |
| i. Total Additions to Market Value | (1,190,781,014) | | | | |
| 4. Summary of Net Additions to Market Value | | | | | |
| a. Net Contributions and Transfers = 3a + 3b + 3e +3g | 1,441,916,259 | | | | |
| b. Net Investment Income = 3c + 3f | 1,309,329,828 | | | | |
| c. Benefit Payments = 3d | (3,942,027,101) | | | | |
| d. Audit Adjustment = 3h | 0 | | | | |
| e. Total Additions to Market Value | (1,190,781,014) | | | | |
| 5. Average Valuation Assets = 1b + .5 x (4a + 4c) + 4d | 42,043,546,101 | | | | |
| 6. Imputed Income at Valuation Rate = 8.00% x 5 | 3,363,483,688 | | | | |
| 7. Gain (Loss) from Investments = 4b - 6 | (2,054,153,860) | | | | |
| 8. Portion of Gains (Losses) Recognized from Prior Years | | | | | |
| a. From this year = .2 * 7 | (410,830,772) | | | | |
| b. From one year ago | 9,597,984 | $ (410,830,772) | | | |
| c. From two years ago | (1,264,198,605) | 9,597,984 | $ (410,830,772) | | |
| d. From three years ago | (2,220,488,012) | (1,264,198,605) | 9,597,984 | $ (410,830,772) | |
| e. From four years ago | 756,879,917 | (2,220,488,012) | (1,264,198,607) | 9,597,983 | $ (410,830,772) |
| f. Total | (3,129,039,488) | (3,885,919,405) | (1,665,431,395) | (401,232,789) | (410,830,772) |
| 9. Change in Valuation Assets = 4a + 4c + 4d + 6 + 8f | (2,265,666,642) | | | | |
| 10. End of Year Assets | | | | | |
| a. Market Value = 2 | 34,664,520,519 | | | | |
| b. Valuation Assets = 1b + 9 | 41,027,934,880 | | | | |
| 11. Actuarial Rate of Return | 0.56% | | | | |
| 12. Market Rate of Return | 3.78% | | | | |

## DEVELOPMENT OF VALUATION ASSETS – NON-HYBRID (CONTINUED)

| | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| 1. Beginning of Year Assets | | | | | |
| a. Market Value | $ 39,216,068,515 | $ 42,995,406,246 | $ 48,362,932,895 | $ 39,065,741,456 | $ 34,498,379,563 |
| b. Valuation Assets | 38,211,008,964 | 42,995,406,246 | 45,335,413,233 | 45,677,053,757 | 44,702,878,189 |
| 2. End of Year Assets at Market Value | 42,995,406,246 | 48,362,932,895 | 39,065,741,456 | 34,498,379,563 | 35,855,301,533 |
| 3. Net Additions to Market Value | | | | | |
| a. Member Contributions | 518,599,720 | 356,761,212 | 399,256,616 | 357,249,466 | 377,732,355 |
| b. Employer Contributions | 995,996,999 | 835,366,382 | 999,374,879 | 1,000,375,355 | 1,001,100,625 |
| c. Investment Income | 4,927,177,496 | 7,177,114,740 | (7,520,927,313) | (2,712,429,401) | 3,563,017,031 |
| d. Benefit Payments | (2,761,292,217) | (2,944,920,179) | (3,117,434,847) | (3,278,118,116) | (3,525,020,341) |
| e. Contribution Refunds/Transfers | (24,024,234) | (32,241,730) | (32,720,146) | (33,943,530) | (33,907,066) |
| f. Administrative Expenses | (22,501,098) | (24,489,202) | (24,740,628) | (22,793,011) | (26,000,634) |
| g. Transfer (to) from stabilization subaccount | 0 | 0 | 0 | 0 | 0 |
| h. Audit Adjustment | 145,381,065 | (64,574) | 0 | 122,297,344 | 0 |
| i. Total Additions to Market Value | 3,779,337,731 | 5,367,526,649 | (9,297,191,439) | (4,567,361,893) | 1,356,921,970 |
| 4. Summary of Net Additions to Market Value | | | | | |
| a. Net Contributions and Transfers = 3a + 3b + 3e +3g | 1,490,572,485 | 1,159,885,864 | 1,365,911,349 | 1,323,681,291 | 1,344,925,914 |
| b. Net Investment Income = 3c + 3f | 4,904,676,398 | 7,152,625,538 | (7,545,667,941) | (2,735,222,412) | 3,537,016,397 |
| c. Benefit Payments = 3d | (2,761,292,217) | (2,944,920,179) | (3,117,434,847) | (3,278,118,116) | (3,525,020,341) |
| d. Audit Adjustment = 3h | 145,381,065 | (64,574) | 0 | 122,297,344 | 0 |
| e. Total Additions to Market Value | 3,779,337,731 | 5,367,526,649 | (9,297,191,439) | (4,567,361,893) | 1,356,921,970 |
| 5. Average Valuation Assets = 1b + .5 x (4a + 4c) + 4d | 37,648,339,630 | 42,102,824,514 | 44,459,651,484 | 44,822,132,688 | 43,612,830,975 |
| 6. Imputed Income at Valuation Rate = 8.00% x 5 | 3,011,867,170 | 3,368,225,961 | 3,556,772,119 | 3,585,770,615 | 3,489,026,478 |
| 7. Gain (Loss) from Investments = 4b - 6 | 1,892,809,228 | 3,784,399,577 | (11,102,440,060) | (6,320,993,027) | 47,989,919 |
| 8. Portion of Gains (Losses) Recognized from Prior Years | | | | | |
| a. From this year = .2 * 7 | 3,481,017,538 [1] | 756,879,915 | (2,220,488,012) | (1,264,198,605) | 9,597,984 |
| b. From one year ago | 282,966,481 | 0 | 756,879,915 | (2,220,488,012) | (1,264,198,605) |
| c. From two years ago | 221,796,961 | 0 | 0 | 756,879,915 | (2,220,488,012) |
| d. From three years ago | 295,714,940 | 0 | 0 | 0 | 756,879,915 |
| e. From four years ago | (1,383,627,141) | 0 | 0 | 0 | 0 |
| f. Total | 2,897,868,779 | 756,879,915 | (1,463,608,097) | (2,727,806,702) | (2,718,208,718) |
| 9. Change in Valuation Assets = 4a + 4c + 4d + 6 + 8f | 4,784,397,282 | 2,340,006,987 | 341,640,524 | (974,175,568) | (1,409,276,667) |
| 10. End of Year Assets | | | | | |
| a. Market Value = 2 | 42,995,406,246 | 48,362,932,895 | 39,065,741,456 | 34,498,379,563 | 35,855,301,533 |
| b. Valuation Assets = 1b + 9 | 42,995,406,246 | 45,335,413,233 | 45,677,053,757 | 44,702,878,189 | 43,293,601,522 |
| 11. Actuarial Rate of Return | 15.70% | 9.80% | 4.71% | 1.91% | 1.77% |
| 12. Market Rate of Return | 12.69% | 16.99% | (15.89)% | (7.16)% | 10.59% |

[1] *After adjusting to market value as of September 30, 2006.*

## DEVELOPMENT OF VALUATION ASSETS – HYBRID

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| 1. Beginning of Year Assets | | | | | | |
| a. Market Value | $ 0 | $ 176,312 | | | | |
| b. Valuation Assets | 0 | 174,579 | | | | |
| 2. End of Year Assets at Market Value | 176,312 | 10,132,876 | | | | |
| 3. Net Additions to Market Value | | | | | | |
| a. Member Contributions | 16,400 | 6,351,179 | | | | |
| b. Employer Contributions | 151,048 | 3,448,135 | | | | |
| c. Investment Income | 8,929 | 194,760 | | | | |
| d. Benefit Payments | 0 | 0 | | | | |
| e. Contribution Refunds/Transfers | 0 | (34,159) | | | | |
| f. Administrative Expenses | (65) | (3,351) | | | | |
| g. Transfer (to) from stabilization subaccount | 0 | 0 | | | | |
| h. Audit Adjustment | 0 | 0 | | | | |
| i. Total Additions to Market Value | 176,312 | 9,956,564 | | | | |
| 4. Summary of Net Additions to Market Value | | | | | | |
| a. Net Contributions and Transfers = 3a + 3b + 3e +3g | 167,448 | 9,765,155 | | | | |
| b. Net Investment Income = 3c + 3f | 8,864 | 191,409 | | | | |
| c. Benefit Payments = 3d | 0 | 0 | | | | |
| d. Audit Adjustment = 3h | 0 | 0 | | | | |
| e. Total Additions to Market Value | 176,312 | 9,956,564 | | | | |
| 5. Average Valuation Assets = 1b + .5 x (4a + 4c) + 4d | 83,724 | 5,057,157 | | | | |
| 6. Imputed Income at Valuation Rate = 7.00% x 5 | 6,698 | 354,001 | | | | |
| 7. Gain (Loss) from Investments = 4b - 6 | 2,166 | (162,592) | | | | |
| 8. Portion of Gains (Losses) Recognized from Prior Years | | | | | | |
| a. From this year = .2 * 7 | 433 | (32,518) | | | | |
| b. From one year ago | 0 | 433 | $ (32,518) | | | |
| c. From two years ago | 0 | 0 | 433 | $ (32,518) | | |
| d. From three years ago | 0 | 0 | 0 | 433 | $ (32,518) | |
| e. From four years ago | 0 | 0 | 0 | 0 | 434 | $ (32,520) |
| f. Total | 433 | (32,085) | (32,085) | (32,085) | (32,084) | (32,520) |
| 9. Change in Valuation Assets = 4a + 4c + 4d + 6 + 8f | 174,579 | 10,087,071 | | | | |
| 10. End of Year Assets | | | | | | |
| a. Market Value = 2 | 176,312 | 10,132,876 | | | | |
| b. Valuation Assets = 1b + 9 | 174,579 | 10,261,650 | | | | |
| 11. Actuarial Rate of Return | 8.52% | 6.37% | | | | |
| 12. Market Rate of Return | 10.59% | 3.78% | | | | |

# HISTORY OF APPROXIMATE INVESTMENT RETURN RATES

| Plan Year Ending September 30 | Approximate Rate of Return [1] Market | Non-Hybrid Actuarial | Hybrid (PPP) Actuarial |
|---|---|---|---|
| 2002 | (11.41) % | 2.76 % | |
| 2003 | 15.47 | 3.55 | |
| 2004 | 12.76 | 2.87 | |
| 2005 | 12.54 | 2.51 | |
| 2006 | 12.69 | 7.46 | |
| 2006 [2] | 12.69 | 15.70 [2] | |
| 2007 | 16.99 | 9.80 | |
| 2008 | (15.89) | 4.71 | |
| 2009 | (7.16) | 1.91 | |
| 2010 | 10.59 | 1.77 | 8.52 % |
| 2011 | 3.78 | 0.56 | 6.37 |
| **Average Returns:** | | | |
| Last five years: | 0.95 % | 3.70 % | 7.44 % |
| Last ten years: | 4.37 % | 4.53 % | 7.44 % |

[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 (see previous two pages).*

[2] *After adjusting to market value as of September 30, 2006.*

# HISTORICAL GROWTH OF ASSETS AT MARKET VALUE

| Fiscal Year Ended September 30 | Revenues by Source: Member Contributions | Revenues by Source: Employer Contributions | Revenues by Source: Net Investment Income [1] | Expenses by Type: Retirement Benefits | Expenses by Type: Return of Contributions and Transfers | Expenses by Type: Administrative Expenses | Market Value of Assets |
|---|---|---|---|---|---|---|---|
| 1992 | $ 196,103,714 | $ 533,038,202 | $ 784,516,383 [2] | $ 797,152,247 | $ 3,453,420 | $ 17,197,026 | $ 14,520,922,451 |
| 1993 | 223,584,885 | 612,237,315 | 1,134,556,020 [2] | 879,273,565 | 3,940,883 | 15,757,850 | 15,592,328,373 |
| 1994 | 244,086,635 | 809,783,443 | 1,086,059,845 [2] | 977,986,904 | 5,457,370 | 19,759,103 | 16,729,054,919 |
| 1995 | 248,662,424 | 771,888,667 | 1,361,440,148 [2] | 1,100,208,507 | 7,926,131 | 19,663,705 | 17,983,247,815 |
| 1996 | 255,085,948 | 829,601,695 | 6,675,359,302 [2] | 1,268,260,318 | 11,638,709 | 10,381,801 | 24,453,013,932 |
| 1997 | 253,358,290 | 904,817,513 | 5,738,458,322 [2] | 1,317,828,100 | 17,859,063 | 12,102,095 | 30,001,858,799 |
| 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 |

[1] *Includes miscellaneous income.*

[2] *Includes other changes in net assets/reserves/fund balances and, in 1996, a $3,405,165,438 cumulative adjustment due to GASB Statement Nos. 25 and 26.*

*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 | |
|---|---|---|
| | **2010** | **2011** |
| Retirees and beneficiaries currently receiving benefits: | | |
| Regular benefits | 166,749 | 170,961 |
| Survivor benefits | 15,308 | 15,654 |
| Disability benefits | 5,665 | 5,820 |
| Total | 187,722 | 192,435 |
| Current Employees: | | |
| Vested | 113,688 | 114,680 |
| Non-vested | 128,880 | 121,980 |
| Total | 242,568 | 236,660 |
| Inactive employees entitled to benefits and not yet receiving them: | 15,026 | 15,090 |
| Total Participants | 445,316 | 444,185 |

## 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 |
|---|---|---|---|---|---|
| 1992 | 90,201 | $ 831,290 | 4.6% | 10.9% | $ 9,216 |
| 1993 | 93,574 | 911,686 | 3.7 | 9.7 | 9,743 |
| 1994 | 97,989 | 1,018,819 | 4.7 | 11.8 | 10,397 |
| 1995 | 103,151 | 1,141,972 | 5.3 | 12.1 | 11,071 |
| 1996 | 107,465 | 1,251,811 | 4.2 | 9.6 | 11,649 |
| 1997 | 111,842 | 1,371,479 | 4.1 | 9.6 | 12,263 |
| 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 |

[1] *In thousands of dollars.*

# RETIREES AND BENEFICIARIES AS OF SEPTEMBER 30, 2011 BY TYPE OF RETIREMENT AND SELECTED OPTION

| Amount of Monthly Benefit | Number of Retirees | Type of Retirement* | | | | | | Selected Option** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | Opt. 1 | Opt. 2 | Opt. 3 | Opt. 4 | Opt 1E 2E,3E,4E |
| $ 1 - 200 | 13,255 | 11,597 | 1,058 | 89 | 348 | 4 | 159 | 7,318 | 2,901 | 1,908 | 176 | 952 |
| 201 - 400 | 21,302 | 18,029 | 1,438 | 128 | 1,330 | 1 | 376 | 11,794 | 4,213 | 3,630 | 398 | 1,267 |
| 401 - 600 | 16,175 | 13,316 | 1,176 | 100 | 1,198 | 1 | 384 | 8,504 | 3,306 | 2,994 | 391 | 980 |
| 601 - 800 | 12,558 | 10,281 | 882 | 51 | 945 | 2 | 397 | 6,289 | 2,500 | 2,511 | 388 | 870 |
| 801 - 1,000 | 10,521 | 8,582 | 836 | 40 | 706 | 0 | 357 | 5,040 | 2,133 | 2,114 | 372 | 862 |
| 1,001 - 1,200 | 9,144 | 7,571 | 762 | 18 | 502 | 0 | 291 | 4,087 | 1,911 | 1,839 | 357 | 950 |
| 1,201 - 1,400 | 8,245 | 6,779 | 762 | 15 | 425 | 0 | 264 | 3,483 | 1,704 | 1,554 | 355 | 1,149 |
| 1,401 - 1,600 | 7,943 | 6,751 | 653 | 7 | 297 | 0 | 235 | 3,047 | 1,639 | 1,443 | 346 | 1,468 |
| 1,601 - 1,800 | 7,564 | 6,606 | 512 | 3 | 259 | 1 | 183 | 2,826 | 1,540 | 1,298 | 367 | 1,533 |
| 1,801 - 2,000 | 7,808 | 6,955 | 477 | 3 | 217 | 1 | 155 | 2,831 | 1,693 | 1,278 | 386 | 1,620 |
| Over 2,000 | 77,920 | 74,494 | 2,277 | 10 | 439 | 2 | 698 | 33,689 | 15,005 | 16,147 | 5,734 | 7,345 |
| Totals | 192,435 | 170,961 | 10,833 | 464 | 6,666 | 12 | 3,499 | 88,908 | 38,545 | 36,716 | 9,270 | 18,996 |

*** 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

| | September 30, 2010 | September 30, 2011 |
|---|---|---|
| **Basic Members** | | |
| Number | 30,938 | 27,757 |
| Average Age | 53.4 years | 53.8 years |
| Average Service | 22.5 years | 22.9 years |
| Reported Payroll | $ 1,561,234,217 | $ 1,473,755,982 |
| Average Annual Pay | $ 50,463 | $ 53,095 |
| **MIP Members** | | |
| Number | 209,830 | 190,100 |
| Average Age | 44.1 years | 45.1 years |
| Average Service | 9.5 years | 10.7 years |
| Reported Payroll | $ 7,241,007,085 | $ 7,366,492,176 |
| Average Annual Pay | $ 34,509 | $ 38,751 |
| **PPP Members** | | |
| Number | 1,800 | 18,803 |
| Average Age | 32.7 years | 35.0 years |
| Average Service | 0.1 years | 0.4 years |
| Reported Payroll | $ 42,777,919 | $ 315,442,706 |
| Average Annual Pay | $ 23,766 | $ 16,776 |
| **Total** | | |
| Number | 242,568 | 236,660 |
| Average Age | 45.2 years | 45.3 years |
| Average Service | 11.1 years | 11.3 years |
| Reported Payroll | $ 8,845,019,221 | $ 9,155,690,864 |
| Average Annual Pay | $ 36,464 | $ 38,687 |

# ACTIVE MEMBERS

**Members in Active Service as of September 30, 2011**
**by Age and Years of Service**

| | Years of Service | | | | | | | Total | Total | Average |
|---|---|---|---|---|---|---|---|---|---|---|
| Age | 0 - 4 | 5 - 9 | 10 - 14 | 15 - 19 | 20 - 24 | 25 - 29 | 30 & up | Count | Pay | Pay |
| Under 20 | 441 | | | | | | | 441 | $ 4,089,034 | $ 9,272 |
| 20 - 24 | 7,703 | 39 | | | | | | 7,742 | 91,958,746 | 11,878 |
| 25 - 29 | 13,584 | 2,335 | 39 | | | | | 15,958 | 418,085,248 | 26,199 |
| 30 - 34 | 9,347 | 10,335 | 1,901 | 1,044 | | | | 22,627 | 875,413,719 | 38,689 |
| 35 - 39 | 8,671 | 5,485 | 6,252 | 6,060 | 366 | | | 26,834 | 1,210,466,676 | 45,109 |
| 40 - 44 | 10,753 | 5,429 | 4,982 | 8,397 | 3,950 | 227 | | 33,738 | 1,475,541,722 | 43,735 |
| 45 - 49 | 10,119 | 6,082 | 5,210 | 5,328 | 5,870 | 2,563 | 149 | 35,321 | 1,380,863,310 | 39,095 |
| 50 - 54 | 7,725 | 5,779 | 6,551 | 6,277 | 4,718 | 4,840 | 1,829 | 37,719 | 1,458,888,761 | 38,678 |
| 55 - 59 | 5,662 | 3,838 | 5,023 | 6,068 | 4,986 | 3,290 | 4,547 | 33,414 | 1,377,390,658 | 41,222 |
| 60 - 64 | 3,224 | 1,950 | 2,070 | 2,469 | 2,608 | 1,724 | 2,673 | 16,718 | 699,334,509 | 41,831 |
| 65 - 69 | 1,509 | 680 | 463 | 384 | 367 | 279 | 537 | 4,219 | 128,316,171 | 30,414 |
| 70 & Over | 902 | 389 | 202 | 105 | 89 | 74 | 168 | 1,929 | 35,342,310 | 18,322 |
| Total | 79,640 | 42,341 | 32,693 | 36,132 | 22,954 | 12,997 | 9,903 | 236,660 | $ 9,155,690,864 | $ 38,687 |

# ACTIVE AND INACTIVE MEMBERS REPORTED FOR VALUATION HISTORICAL COMPARISON

| Valuation Date September 30 | Number of Inactive Vested Members | Active Members | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | Average | | | |
| | | Number | Reported Payroll[1] | Annual Pay | % Increase | Age | Years of Service |
| 1992 | * | 297,230 | $ 6,427,775 | $ 21,626 | 5.2 % | 41.7 | 9.5 |
| 1993 | * | 296,585 | 6,897,924 | 23,258 | 7.5 | 42.2 | 9.8 |
| 1994 | * | 291,006 | 7,164,807 | 24,621 | 5.9 | 42.5 | 10.0 |
| 1995 | * | 294,911 | 7,564,876 | 25,651 | 4.2 | 43.4 | 10.1 |
| 1996 | * | 295,096 | 7,807,029 | 26,456 | 3.1 | 43.6 | 9.9 |
| 1997 | * | 295,691 | 8,027,450 | 27,148 | 2.6 | 43.6 | 10.0 |
| 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 |

* *Not available.*

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

# 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;

(iii) for Pension Plus Plan members, the normal cost is based on the benefit provisions applicable to new members (under the Pension Plus Plan). For other active members, the normal cost is based on the benefit provisions applicable to members hired from July 1, 2008 through June 30, 2010, consistent with previous actuarial valuations. Because there were so few members reported under the Pension Plus Plan (PPP) at the time of the 2010 valuation – only three months of the new hires – and because the partial year data on these new hires was necessarily incomplete, the employer normal cost rate for PPP members was set equal to the rate computed as if all active members were covered by PPP provisions. For the 2011 valuation, the employer normal cost rate is held at the 2010 level. Over the coming years, as the PPP data becomes representative of the long-term expectation, the regular entry-age normal cost method will be implemented.

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

***Financing of Unfunded Actuarial Accrued Liabilities* -** Unfunded actuarial accrued liabilities (full funding credit if assets exceed liabilities) were amortized by level (principal and interest combined) percent-of-payroll contributions over a reasonable period of future years.

## 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. The net unfunded actuarial accrued liability is then amortized, resulting in the required amortization payment. Please refer to page A-1.

***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 Hybrid portions of the system. The total actuarial value of assets is the sum of these two components.

# VALUATION ASSUMPTIONS

***The rate of investment return*** was 8.0% a year, compounded annually net of investment and administrative expenses for the Non-Hybrid groups and 7.0% a year, compounded annually net of investment and administrative expenses for the Hybrid group (PPP).

The assumed real return is the rate of return in excess of wage inflation. Considering other assumptions used in the valuation, the 8.0% nominal rate translates to a net real return of 4.5% a year for the Non-Hybrid groups. Considering other assumptions used in the valuation, the 7.0% nominal rate translates to a net real return of 3.5% a year for the Hybrid group.

***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, 2004 valuation of the System.

| | Pay Increase Assumptions For an Individual Member | | |
|---|---|---|---|
| **Sample Ages** | **Merit & Seniority** | **Base (Economy)** | **Increase Next Year** |
| 20 | 12.4 % | 3.5 % | 15.9 % |
| 25 | 8.8 | 3.5 | 12.3 |
| 30 | 5.2 | 3.5 | 8.7 |
| 35 | 3.7 | 3.5 | 7.2 |
| 40 | 2.6 | 3.5 | 6.1 |
| 45 | 1.7 | 3.5 | 5.2 |
| 50 | 0.8 | 3.5 | 4.3 |
| 55 | 0.3 | 3.5 | 3.8 |
| 60 | 0.0 | 3.5 | 3.5 |
| 65 | 0.0 | 3.5 | 3.5 |
| Ref | 269 | | |

The charts shown in this section may include a reference number (for example, 269 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 Female Combined Healthy Mortality Table, adjusted for mortality improvements to 2020 using projection scale AA. For men, 140% of the table rates for ages 0-79, 133% of the table rates for ages 80-84, and 121.8% of the table rates for ages over 84 were used. For women, 96% of the table rates were used. The final rates used includes no margin for future mortality improvement. This assumption was first used for the September 30, 2010 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.

| Sample Attained Ages | Probability of Dying Next Year | | Future Life Expectancy (years) | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| 50 | 0.17 % | 0.11 % | 31.95 | 35.01 |
| 55 | 0.32 | 0.22 | 27.27 | 30.25 |
| 60 | 0.64 | 0.44 | 22.82 | 25.67 |
| 65 | 1.23 | 0.84 | 18.70 | 21.36 |
| 70 | 2.12 | 1.45 | 15.00 | 17.38 |
| 75 | 3.35 | 2.30 | 11.73 | 13.75 |
| 80 | 5.30 | 3.83 | 8.88 | 10.48 |
| Ref: | 779 x 1.00 | 455 x 0.96 | | |

***For active members,*** the probabilities of dying before retirement were based upon the RP-2000 Combined Healthy Mortality Table, adjusted for mortality improvements to 2020 using projection scale AA. For men, 101% of the male table rates were used. For women, 82% of the female table rates were used. This assumption was first used for the September 30, 2010 valuation of the System. Sample rates of mortality and years of life expectancy are shown on the following page.

## VALUATION ASSUMPTIONS

| Sample Attained Ages | Probability of Dying Next Year | | Future Life Expectancy (years) | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| 20 | 0.02 % | 0.01 % | 61.77 | 66.00 |
| 25 | 0.03 | 0.01 | 56.85 | 61.03 |
| 30 | 0.04 | 0.02 | 51.94 | 56.08 |
| 35 | 0.07 | 0.03 | 47.07 | 51.14 |
| 40 | 0.09 | 0.04 | 42.25 | 46.23 |
| 45 | 0.12 | 0.07 | 37.45 | 41.34 |
| 50 | 0.15 | 0.10 | 32.68 | 36.49 |
| 55 | 0.25 | 0.19 | 27.96 | 31.70 |
| 60 | 0.49 | 0.37 | 23.39 | 27.08 |
| 65 | 0.97 | 0.72 | 19.09 | 22.70 |
| Ref: | 454 x 1.01 | 455 x 0.82 | | |

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

***The disabled life mortality table*** used in this valuation was developed by the prior actuary pursuant to an experience study. Beginning with the September 30, 2010 valuation of the System, 110% of the table rates were used. 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 | 2.75 % | 1.89 % | 19.84 | 24.11 |
| 55 | 2.95 | 2.24 | 17.48 | 21.42 |
| 60 | 3.48 | 2.68 | 15.05 | 18.88 |
| 65 | 4.33 | 3.12 | 12.72 | 16.44 |
| 70 | 5.52 | 3.56 | 10.55 | 13.98 |
| 75 | 7.24 | 4.14 | 8.55 | 11.42 |
| 80 | 9.61 | 5.85 | 6.76 | 8.78 |
| Ref: | 476 x 1.10 | 477 x 1.10 | | |

# 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, 2010 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 | 60 % | 55 % |
| 31 | 45 | 40 |
| 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 | 1731 | 1733 |

## Early Retirement

| Retirement Ages | Percent of Eligible Members Retiring: Basic Members | MIP Members |
|---|---|---|
| 55 | 7.7 % | 8.4 % |
| 56 | 7.7 | 8.4 |
| 57 | 7.7 | 8.4 |
| 58 | 7.7 | 8.4 |
| 59 | 7.7 | 8.4 |
| Ref | 1729 | 1734 |

## 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, 2010 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 | 28.00 % | 30.00 % | 36.00 % | 37.50 % |
| | 1 | 12.50 | 13.00 | 22.00 | 22.50 |
| | 2 | 7.75 | 8.50 | 14.50 | 13.50 |
| | 3 | 6.20 | 6.80 | 13.50 | 11.00 |
| | 4 | 5.00 | 5.30 | 12.50 | 9.00 |
| 20 | 5 & over | 3.70 | 5.00 | 12.50 | 9.00 |
| 25 | | 3.70 | 4.70 | 12.50 | 9.00 |
| 30 | | 3.28 | 3.90 | 12.50 | 8.10 |
| 35 | | 2.52 | 2.96 | 11.00 | 6.90 |
| 40 | | 1.90 | 2.24 | 8.80 | 5.60 |
| 45 | | 1.46 | 1.85 | 7.40 | 4.70 |
| 50 | | 1.27 | 1.45 | 6.40 | 4.20 |
| 55 | | 1.25 | 1.25 | 6.00 | 4.00 |
| 60 | | 1.25 | 1.25 | 6.00 | 4.00 |
| Svc Ref | | 576 | 574 | 577 | 575 |
| Age Ref | | 1083 | 1081 | 1084 | 1082 |

## 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 | 0.95 years |
| Non-Teachers with Pay Over $20,000 | 0.95 |
| Teachers with Pay Under $20,000 | 0.66 |
| Non-Teachers with Pay Under $20,000 | 0.76 |

***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 35 for MIP/PPP and 31 for Basic members. Active members who were reported without any annual pay were assumed to have pay equal to the average pay of the corresponding active group.

## 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. |
| ***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. |

# SECTION F

## PLAN PROVISIONS

# PLAN PROVISIONS AS OF SEPTEMBER 30, 2011

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 60$^{th}$ birthday and has credited service in each of the last 5 years. For Pension Plus Plan (PPP) members, age 60 with 10 years of credited service.

Mandatory Retirement Age - None.

Annual Amount - Total credited service times 1.5% of final average compensation.

Final Annual Compensation - Average of highest 5 consecutive years. (3 years for MIP members).

**Early Retirement** (age reduction factor used):

Eligibility - Age 55 with 15 or more years of credited service and earned credited service in each of the last 5 years. 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.

# PLAN PROVISIONS AS OF SEPTEMBER 30, 2011

**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% Joint and Survivor election. If no surviving spouse, children under 18 share in benefit; if no spouse or children, a disabled and dependent parent is eligible.

**Non-Duty Death Before Retirement**:

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

Annual Amount - Computed as regular retirement benefit, reduced in accordance with a 100% Joint and 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.

# PLAN PROVISIONS AS OF SEPTEMBER 30, 2011

**Member Contributions**:

Basic Participants – None.

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

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

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

**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 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 – No increases.

# 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

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| ***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. |