

ACTUARIAL VALUATION REPORT

as of

JUNE 30, 2015



New York State Teachers' Retirement System

Office of the Actuary
July 13, 2016

NEW YORK STATE TEACHERS' RETIREMENT SYSTEM

Actuarial Valuation Report as of June 30, 2015

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NEW YORK STATE TEACHERS' RETIREMENT SYSTEM

Actuarial Valuation Report as of June 30, 2015

A. INTRODUCTION

This report presents the results of the annual actuarial valuation of assets and liabilities of the New York State Teachers' Retirement System as of June 30, 2015. The purpose of this report is to summarize the determination of the Employer Contribution Rate which will be applied to member salaries earned during the July 1, 2016 to June 30, 2017 fiscal year and to review the funded status of the Retirement System. Use of the valuation results contained herein for purposes other than those stated above may not be appropriate.

B. EMPLOYER CONTRIBUTION RATE

The Employer Contribution Rate to be applied to member salaries for the July 1, 2016 to June 30, 2017 fiscal year and collected in the fiscal year ending June 30, 2018 consists of four components. These components may be described as follows:

The **Normal Rate** represents the annual cost of accruing active member benefits as well as incorporating actuarial gains and losses. The active member component includes the cost of benefits accruing on account of retirement, withdrawal, disability, death (except for the first \$50,000 of death benefits which are funded by the group life insurance rate) and the cost-of-living benefit provided during retirement. The Normal Rate is calculated in accordance with the Aggregate Actuarial Cost Method.

The **Expense Rate** is a one-year term rate representing the administrative cost of the Retirement System and is set during the budget process.

The **Group Life Insurance Rate** is a one-year term rate representing the cost of the first \$50,000 of member death benefits.

The **Excess Benefit Plan Rate** is a one-year term rate representing the cost of benefit payments in excess of the Internal Revenue Code Section 415 limits.

The actuarially computed Employer Contribution Rate to be applied to the member salaries for the fiscal year ending June 30, 2017 is **11.72%**. The Employer Contribution Rates determined by the actuarial valuations as of June 30, 2015 and June 30, 2014 and the changes between the two are summarized below:

	As of <u>6/30/2015</u>	As of <u>6/30/2014</u>	<u>Change</u>
Normal Rate	11.31%	12.85%	-1.54%
Expense Rate	0.27	0.27	0.00
Group Life Insurance Rate	0.13	0.13	0.00
Excess Benefit Plan Rate	<u>0.01</u>	<u>0.01</u>	<u>0.00</u>
Employer Contribution Rate	11.72%	13.26%	-1.54%

The actuarial assumptions in use for the June 30, 2015 actuarial valuation were developed primarily based upon Retirement System experience and were adopted by the Retirement Board on October 29, 2015. In accordance with Sections 501, 508 and 517 of the Education Law, the Retirement Board has the authority to adopt the actuarial assumptions as recommended by the Actuary.

As in prior years, the actual employer contributions made by participating employers during the fiscal year ending June 30, 2015 were equal to the employer contributions determined in accordance with the annual actuarial valuation. Additional payments are made by certain participating employers as required by statute for participation in early retirement incentives.

C. GAIN/LOSS IN THE EMPLOYER CONTRIBUTION RATE

The Employer Contribution Rate of 11.72% represents a 154 basis point decrease from the prior year's rate of 13.26%.

NORMAL RATE

The Normal Rate component of the Employer Contribution Rate has decreased by 154 basis points over the prior year's rate. This change may be broken down as follows:

<u>New Assumptions:</u>	The new actuarial assumptions and actuarial value of assets method adopted by the Retirement Board on October 29, 2015 had the net effect of increasing the normal rate for the June 30, 2015 valuation.	+2.00
<u>Salary/Service:</u>	This gain is due to salary and service data coming in lower than expected.	-0.62
<u>Net Investment Gain:</u>	The recognition of prior investment gains and losses over a five year period in accordance with the asset valuation method resulted in a net investment gain.	-2.69
<u>New Entrants:</u>	New entrants joined the Retirement System as Tier 6 members with a long-term expected normal rate of approximately 4.6% which compares favorably to the current normal rate.	-0.13
<u>Withdrawal:</u>	More members withdrew than expected.	-0.03
<u>Mortality:</u>	Members are living slightly longer than expected and receiving benefits for a longer period.	+0.02
<u>Retirement:</u>	There were fewer retirements than expected.	-0.01
<u>Pension Payments:</u>	Actual payments to retirees were less than expected.	-0.01
<u>Cost of Living Adjustment:</u>	The actual COLA increase of 1.0% was lower than the expected increase of 1.625%.	<u>-0.07</u>
<u>TOTAL CHANGE IN THE NORMAL RATE</u>		-1.54%

OTHER COMPONENTS

The **Expense Rate** is set during the budget process and is unchanged from the previous year. This is the seventh straight year the Expense Rate will remain equal to 0.27%.

The **Group Life Insurance Rate** is unchanged from the previous year. Although the premiums collected have generally been more than sufficient to cover payments over the past several years, this rate is being held constant in anticipation of rising payouts in the future due to Tier 2, 3, 4, 5 and 6 post-retirement death benefits and the inactive death benefit.

The **Excess Benefit Plan Rate** remains unchanged from the previous year. This rate represents the retirement benefits paid in excess of the Internal Revenue Code Section 415 limits. These payments are made exclusively from the Excess Benefit Plan. This fund was established in accordance with the Excess Benefit Plan which received final IRS approval in August 2001. The rate has been set to 1 basis point in order to replenish the fund and ensure that the fund balance does not go below zero.

D. EMPLOYER CONTRIBUTION RATE HISTORY

The following chart summarizes the Employer Contribution Rate for the last 20 years:

<i>Salary Year</i>	<i>Employer Contribution Rate</i>	<i>Salary Year</i>	<i>Employer Contribution Rate</i>
1997-1998	1.25%	2007-2008	8.73%
1998-1999	1.42	2008-2009	7.63
1999-2000	1.43	2009-2010	6.19
2000-2001	0.43	2010-2011	8.62
2001-2002	0.36	2011-2012	11.11
2002-2003	0.36	2012-2013	11.84
2003-2004	2.52	2013-2014	16.25
2004-2005	5.63	2014-2015	17.53
2005-2006	7.97	2015-2016	13.26
2006-2007	8.60	2016-2017	11.72

The complete Employer Contribution Rate history is presented in Appendix 14.

E. EMPLOYER CONTRIBUTION RATE DECREASE

The Employer Contribution Rate has decreased this year from 13.26% to 11.72%, representing a decrease of approximately 12%. The Normal Rate component equals 11.31%, a decrease of approximately 12% from the prior year's Normal Rate of 12.85%. The rate of return on the System's market value of assets for the fiscal year ending June 30, 2015 was 5.2%, and the System's five-year market value rate of return now stands at 12.4%. Continued strength in the System's five-year rate of return led to an actuarial gain on investments. This was the primary reason for the decline in the Normal Rate.

The Normal Rate component of the Employer Contribution Rate is calculated in accordance with the Aggregate Actuarial Cost Method, as required by statute (New York State Education Law Section 517). Under the Aggregate Actuarial Cost Method gains and losses resulting from differences between actual and expected experience, as well as changes to assumptions or plan provisions, are amortized as part of the normal cost rate, over the expected future working lifetime of active members. Aggregate is a reasonable and accepted actuarial cost method to use for ongoing plan funding purposes and is consistent with the System's goal of accumulating sufficient assets to pay benefits as they come due.

F. REVISED ACTUARIAL ASSUMPTIONS

All actuarial assumptions were revised effective with the June 30, 2015 actuarial valuation in order to make them more reflective of recent experience and future expectations. The System's assumed rate of return was lowered from 8.0% to 7.5% per annum primarily due to lower projected long-term returns for the System's asset classes as well as continued record low returns in the fixed income (bonds) environment. This had the impact of increasing the plan's liability measures.

Also increasing the plan's liability was the adoption of a new Healthy Annuitant Mortality table, including the Society of Actuaries MP-2014 mortality improvement scale. The underlying mortality table is based on System experience, but the MP-2014 scale is based primarily on Social Security data and is applied on a generational basis in order to account for future mortality improvement.

Decreasing the plan’s liability was the new salary scale. Projected salary increases going forward are lower than they were previously reflecting school districts’ efforts to contain costs.

More detailed information about the actuarial assumptions and the rationale behind their development can be found in the “*Report on the 2015 Recommended Actuarial Assumptions*”.

G. MEMBER DATA

The member data for the valuation was determined as of June 30, 2015. Compared with the previous year, the total number of members increased slightly from 425,970 to 426,173; the number of active members decreased from 270,039 to 267,715; the number of retired members increased from 150,268 to 152,608; and the number of beneficiaries receiving monthly benefits increased from 5,663 to 5,850.

The number of retirements decreased from 6,547 during the 2013-2014 fiscal year to 6,161 during the 2014-2015 fiscal year. There was no early retirement incentive offered in the 2014-2015 fiscal year. The number of retirements over each of the last ten years is as follows:

<i>Fiscal Year</i>	<i>Total Number of Retirements</i>	<i>Fiscal Year</i>	<i>Total Number of Retirements</i>
2005-2006	7,281	2010-2011*	8,423
2006-2007	6,900	2011-2012	6,033
2007-2008	6,330	2012-2013	6,330
2008-2009	5,644	2013-2014	6,547
2009-2010	5,501	2014-2015	6,161

*Denotes an early retirement incentive offered during that fiscal year.

Historical member statistics, including statistics specific to retired members, appear in the appendices to this report. Additional member statistics may also be found in the Retirement System’s most recent Comprehensive Annual Financial Report.

H. FUNDED STATUS

As of June 30, 2015, the actuarial value of plan assets was equal to \$99.3 billion. The accrued pension benefit liability calculated in accordance with the Entry Age Normal Cost Method was equal to \$105.4 billion. These two values produced a funded ratio of 94.2% as of June 30, 2015. If the market value of plan assets is used instead of the actuarial value of plan assets, the funded ratio as of June 30, 2015 would be equal to 104.1%.

For purposes of this funded ratio calculation, the plan liabilities have been calculated in accordance with the Entry Age Normal Cost Method as required by Governmental Accounting Standards Board (GASB) Statement No. 67. The Retirement System is funded in accordance with the Aggregate Cost Method. GASB Statement No. 67 requires that the Entry Age Normal Cost Method be used to calculate the accrued liability for purposes of presenting the funded ratio calculation for all plans, regardless of the cost method being used for funding purposes. Both Aggregate and Entry Age Normal are appropriate contribution allocation procedures for purposes of ongoing plan funding and are accepted actuarial cost methods.

The funded ratios provided here are an appropriate measurement of the System's funded status and can be used to generally assess the need for future contributions. While the funded ratio will fluctuate from year to year, a funded ratio of 100% is desirable and indicative of a well-funded system, although does not imply that future contributions will not be required. The funded status measurement provided here is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the System's benefit obligations such as in a plan termination situation.

Future actuarial measurements such as the funded ratio and employer contribution rate may differ significantly from the current measurements presented in this report due to such factors as: future plan experience that differs significantly from that predicted by the actuarial assumptions; changes in the actuarial assumptions; and changes in plan provisions or applicable law.

A history of the Retirement System's funded status is provided in Appendix 4 of this report.

I. ACTUARIAL EXPERIENCE

Each year the Retirement System completes an experience study in order to regularly monitor the reasonableness and appropriateness of the actuarial assumptions used in the actuarial valuation. These assumptions are used to estimate the probability a member will cease teaching due to retirement, withdrawal, disability, or death. In addition, the assumptions are used to estimate future salary increases, future investment earnings, and the probability of death for retired members and beneficiaries. A summary of the results of the most recent experience study is contained in Appendix 10. The current actuarial assumptions were adopted by the Retirement Board on October 29, 2015, and first effective with the actuarial valuation of the Retirement System's assets and liabilities as of June 30, 2015. Specific details regarding the development of the present actuarial assumptions can be found in the "*Report on the 2015 Recommended Actuarial Assumptions*".

The Retirement Board, in consultation with Retirement System staff and the System's external investment consultant AON Hewitt, annually reviews the asset allocation to determine if any changes are appropriate. No changes to the System's asset allocation were made as of June 30, 2015. According to AON Hewitt, the System's asset allocation as of June 30, 2015 produces a long-term (30-year) expected annual geometric rate of return of 6.6%, and an expected annual arithmetic rate of return of 7.3%.

The Retirement System's asset allocation, including targets and ranges, can be found in Appendix 12. Historical rate of return information can be found in Appendix 11. Detailed investment information is available in the System's Comprehensive Annual Financial Report.

J. NEW LEGISLATION

There was no legislation signed into law during the 2015 Legislative Session that had a significant financial impact on the Retirement System.

K. STABLE CONTRIBUTION OPTION

Chapter 57 of the Laws of 2013, enacted on March 29, 2013, provided the Retirement System with the ability to offer a seven-year Stable Contribution Option (SCO) to public school districts and BOCES in New York State. Eligible employers had the choice of either continuing to pay the actuarially required contribution (ARC) or electing to participate in the SCO and thereby pay a stable contribution rate for up to seven years and defer payment of the difference between the ARC and the SCO to later years. At a special Retirement Board Meeting held on April 9, 2013, the Retirement Board voted to make the SCO available to eligible employers in accordance with Chapter 57. Ten participating employers elected to participate in the SCO out of 717 that were eligible. Currently, seven out of the ten participating employers who elected to participate in the SCO have opted out of the plan.

The following chart summarizes the provisions under the SCO:

Year	Stable Rate¹ (per statute)	Applicable Payroll (school year)	Adopted Stable Rate	Interest Rate Applied to Deferral³
One	14.0%	2013-14	14.13%	2.91%
Two	14.0%	2014-15	14.13%	3.71%
Three	16.0% ²	2015-16	14.13%	3.21%
Four	16.0%	2016-17	-	-
Five	18.0% ²	2017-18	-	-
Six	18.0%	2018-19	-	-
Seven	18.0%	2019-20	-	-

¹ Rates shown are base rates as per statute. The actual rate will include a small additional charge to account for the group life insurance rate (currently 0.13%).

² The law grants the Retirement System's Board discretion to increase the rate by up to 2.0% in year three (to a maximum of 16.0%) and year five (to a maximum of 18.0%) if necessary to meet fiduciary obligations.

³ The interest rate is determined based upon the monthly average yield on 10-year U.S. Treasury securities for the 12-month period that precedes August 1 of the deferral year, plus 1%.

Employers electing to participate in the SCO may opt out of the plan at any time. Those opting out will resume payment of the ARC and will be required to begin repaying any deferred amounts plus interest, over a period not to exceed five years. Should the Retirement System's funded status fall below 80%, the SCO will terminate and all participating employers will resume paying the actuarially required contribution. In addition, employers will be required to repay any deferred amounts plus interest, over a period not to exceed five years. The window

period in which eligible employers could opt into the SCO ran from July 1, 2013 to June 30, 2014. Given the very low participation rate, the financial impact of the SCO is minimal.

L. SENSITIVITY ANALYSIS

Included in Appendix 13 is a Sensitivity Analysis. The purpose of this exhibit is to illustrate what the Employer Contribution Rate would have been had various actuarial assumptions been altered. The chart also gives the reader a feel for the significance of the assumptions on the valuation results, and the potential impact of modifying them.

M. FUTURE EXPECTATIONS

The next Employer Contribution Rate will be determined based upon the actuarial valuation as of June 30, 2016. The capital markets had a very challenging year during the fiscal year ending June 30, 2016, with our main domestic equity index (S&P 1500) returning 3.6% for the fiscal year, and the international equity index (ACWI ex-US) returning -10.2% for the fiscal year. With respect to fixed income, the Barclay's US Aggregate Float Adjusted Bond index returned 6.1% for the year. This will mark the second straight year of a total fund rate of return that is below the System's assumed rate of return, and the System's five-year annualized rate of return will decrease markedly from last year's 12.4%. This will likely lead to an increase in the employer contribution rate in the next year or the following year.

N. CERTIFICATION

This actuarial valuation relies on member data provided by the participating employers to the Retirement System's administrative staff. The administrative and actuarial staffs review this data for reasonability as well as reconcile it against prior data. In addition, the valuation relies on financial data provided by the Retirement System's Finance Department. All data is reviewed by the Retirement System's independent auditors as part of the annual audit.

The benefits recognized in this actuarial valuation are prescribed by New York State statute (Article 11 of the Education Law and Articles 11, 14, 15, 18, 19, and 20 of the Retirement and Social Security Law), and are summarized in Appendix 18. All benefits are included in the actuarial valuation. The actuarial methods, calculations, and actuarial assumptions are in accordance with standards of practice prescribed by the Actuarial Standards Board and generally accepted actuarial principles and procedures. The assumptions used in determining the liabilities and costs are internally consistent and reasonably related to actual and anticipated future experience of the Retirement System. The undersigned meet the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.



Richard A. Young, ASA, EA, MAAA, FCA
Actuary



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Manager, Office of the Actuary



New York State Teachers' Retirement System
Office of the Actuary
July 13, 2016

APPENDIX 1

RECONCILIATION OF THE MARKET VALUE OF ASSETS

From June 30, 2014 to June 30, 2015

	Market Value* <u>(in thousands)</u>
1. Market Value of Assets as of June 30, 2014	\$108,155,083
2. Contributions and Transfers	
Employer contributions	2,633,682
Member contributions	119,411
Net transfers (in/out)	<u>3,213</u>
Subtotal	2,756,306
3. Net Investment Income/(Loss)	5,400,265
4. Distributions	
Benefit payments	6,531,140
Administrative expenses	<u>56,948</u>
Subtotal	6,588,088
5. Cumulative effect of change in accounting principle	<u>(4,649)</u>
6. Market Value of Assets as of June 30, 2015	\$109,718,917

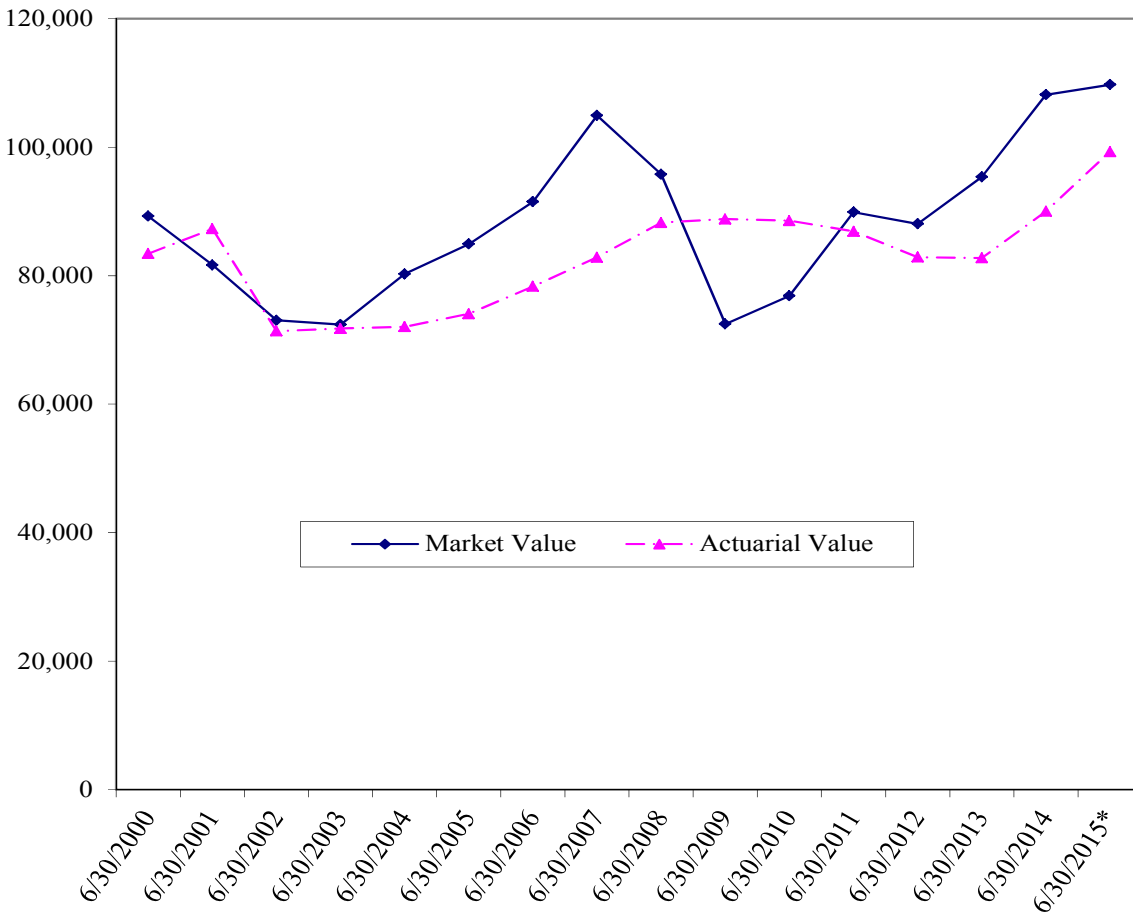
*Totals may not add due to rounding.

APPENDIX 2

COMPARISON OF MARKET VALUE TO ACTUARIAL VALUE OF ASSETS
(in Millions)

Fiscal Year Ending	Market Value	Actuarial Value	Fiscal Year Ending	Market Value	Actuarial Value
6/30/2000	\$ 89,247.3	\$ 83,421.8	6/30/2008	\$ 95,769.3	\$ 88,254.7
6/30/2001	81,664.2	87,295.3	6/30/2009	72,471.8	88,805.5
6/30/2002	73,041.2	71,374.4	6/30/2010	76,844.9	88,544.4
6/30/2003	72,391.5	71,780.4	6/30/2011	89,889.7	86,892.2
6/30/2004	80,276.2	72,044.4	6/30/2012	88,056.3	82,871.4
6/30/2005	84,908.5	74,074.3	6/30/2013	95,367.0	82,742.5
6/30/2006	91,492.2	78,335.8	6/30/2014	108,155.1	90,007.1
6/30/2007*	104,912.9	82,858.9	6/30/2015*	109,718.9	99,301.8

Market Value vs. Actuarial Value
(in Millions)



*The Retirement System's asset valuation method was changed effective with the June 30, 2007 and June 30, 2015 actuarial valuations.

APPENDIX 3

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS

as of June 30, 2015 and June 30, 2014
(in Thousands)

Each year an actuarial valuation determines the actuarial present value of future benefits (PVB), which is the present value of retirement and ancillary benefit payments, excluding group life insurance benefits, that the Retirement System can expect to pay in the future to current retirees and members. The PVB is based upon both service and salary projected to retirement. The results of the two most recent actuarial valuations are displayed in the following table.

	2015	2014
Present Value of Benefits Currently Being Paid:		
Service Retirement Benefits.....	\$58,061,673	\$53,207,739
Disability Retirement Benefits.....	322,369	287,227
Death Benefits.....	1,869	3,039
Survivor Benefits.....	883,930	778,357
Cost-of-Living Allowance.....	<u>4,990,575</u>	<u>4,695,873</u>
Total Present Value of Benefits Presently Being Paid	64,260,416	58,972,236
 Present Value of Benefits Payable in the Future to Current Active Members:		
Service Retirement Benefits.....	48,422,365	49,824,429
Disability Retirement Benefits.....	202,511	228,420
Termination Benefits.....	1,955,951	1,823,736
Death and Survivor Benefits.....	349,156	448,673
Cost-of-Living Allowance.....	<u>1,255,059</u>	<u>1,027,072</u>
Total Active Member Liabilities	52,185,042	53,352,330
 Present Value of Benefits Payable in the Future to Current Inactive (Vested) Members:		
Retirement Benefits.....	315,058	265,413
Death Benefits.....	300	359
Cost-of-Living Allowance.....	<u>26,660</u>	<u>5,471</u>
Total Vested Liabilities	342,018	271,243
 Unclaimed Funds.....	 13,098	 12,687
 Total Actuarial Present Value of Future Benefits	 \$116,800,574	 \$112,608,496

Note: Totals may not sum due to rounding

APPENDIX 4

FUNDING PROGRESS

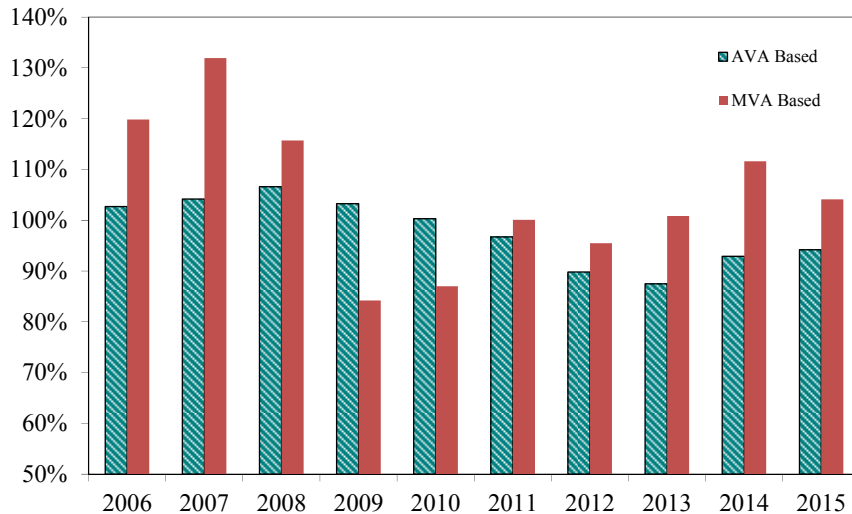
The portion of the actuarial present value of future benefits that is attributed to service rendered as of the valuation date is known as the actuarial accrued liability. In order to effectively assess the funding progress of a retirement system, it is necessary to compare the actuarial value of assets and the actuarial accrued liabilities over a period of time.

The Retirement System’s funding method has allowed the accumulation of assets appropriate for the funding of its liabilities in a systematic and reasonable manner.

**Analysis of Funding Progress
(in Millions)**

<u>Fiscal Year Ended</u>	<u>Market Value of Assets (MVA)</u>	<u>Actuarial Value of Assets (AVA)¹</u>	<u>Actuarial Accrued Liability²</u>	<u>Percent Funded based on</u>	
				<u>MVA</u>	<u>AVA</u>
2006	\$91,492.2	\$78,335.8	\$76,353.0	119.8%	102.6%
2007	104,912.9	82,858.9	79,537.2	131.9	104.2
2008	95,769.3	88,254.7	82,777.5	115.7	106.6
2009	72,471.8	88,805.5	86,062.0	84.2	103.2
2010	76,844.9	88,544.4	88,318.8	87.0	100.3
2011	89,889.7	86,892.2	89,824.9	100.1	96.7
2012	88,056.3	82,871.4	92,250.9	95.5	89.8
2013	95,367.0	82,742.5	94,583.8	100.8	87.5
2014	108,155.1	90,007.1	96,904.5	111.6	92.9
2015	109,718.9	99,301.8	105,401.8	104.1	94.2

Percent Funded



¹ The Retirement System’s asset valuation method was changed effective with the June 30, 2007 and June 30, 2015 actuarial valuations.

² Effective June 30, 2006, the Actuarial Accrued Liability is calculated under the Entry Age Normal Cost Method as was required by Governmental Accounting Standards Board (GASB) Statement No. 50 prior to its replacement by GASB Statement No. 67. The Retirement System is funded in accordance with the Aggregate Cost Method. GASB Statement No. 50 required that the Entry Age Normal Cost Method be used to calculate the accrued liability for purposes of presenting the funded percentage.

APPENDIX 5

EMPLOYER CONTRIBUTION RATE

2015 Valuation
7.50% Interest

Normal Rate	11.31%
Group Life Insurance Rate	0.13
Excess Benefit Plan Rate	0.01
Expense Rate	0.27
Computed Contribution Rate as of June 30, 2015	11.72%

NORMAL RATE CALCULATION2015 Valuation
7.50% Interest**Liabilities****Active Tier 1**

Service Pension	\$514,871,198
Disability Pension	0
Vested Pension	0
Active Death over \$50,000	4,814,735
Death Benefit After 10-Yr Withdrawal over \$50,000	0
Annuity Savings Fund	1,027,913
COLA	7,153,665
Total	\$527,867,511

Active Tier 2

Service Pension	\$699,718,106
Post Retired Death over \$50,000	516,942
Disability Pension	730
Post Disabled Death over \$50,000	10
Vested Pension	13,618
Active Death over \$50,000	1,983,625
Death Benefit After 10-Yr Withdrawal over \$50,000	1
COLA	11,885,645
Total	\$714,118,677

Active Tier 3

Service Pension	\$3,480,131,175
Post Retired Death over \$50,000	2,011,496
Disability Pension	115,265
Post Disabled Death over \$50,000	1,483
Refund on Active Death	2,263,601
Active Death over \$50,000	7,747,720
Refund on Quit	43,438
Vested Pension	1,036,993
Death Benefit After 10-Yr Withdrawal over \$50,000	210
Refund on Death after Vested Withdrawal	103
COLA	71,210,596
Total	\$3,564,562,080

NORMAL RATE CALCULATION (Cont'd.)2015 Valuation
7.50% Interest**Liabilities (Cont'd.)****Active Tier 4**

Service Pension	\$42,291,250,889
Post Retired Death over \$50,000	26,188,359
Disability Pension	193,850,907
Post Disabled Death over \$50,000	3,798,356
Refund on Active Death	35,911,635
Active Death over \$50,000	234,864,975
Refund on Quit	81,768,840
Vested Pension	1,750,774,142
Death Benefit After 10-Yr Withdrawal over \$50,000	2,572,952
Refund on Death after Vested Withdrawal	1,309,835
COLA	1,094,740,617
Total	\$45,717,031,507

Active Tier 5

Service Pension	\$530,157,532
Post Retired Death over \$50,000	381,176
Disability Pension	4,293,653
Post Disabled Death over \$50,000	76,875
Refund on Active Death	2,291,519
Active Death over \$50,000	6,127,685
Refund on Quit	29,121,823
Vested Pension	30,555,112
Death Benefit After 10-Yr Withdrawal over \$50,000	83,282
Refund on Death after Vested Withdrawal	83,944
COLA	16,680,480
Total	\$619,853,081

Active Tier 6

Service Pension	\$462,860,559
Post Retired Death over \$50,000	418,380
Disability Pension	4,224,408
Post Disabled Death over \$50,000	71,190
Refund on Active Death	3,818,739
Active Death over \$50,000	7,131,228
Refund on Quit	33,926,830
Vested Pension	23,445,485
Death Benefit After 10-Yr Withdrawal over \$50,000	72,225
Refund on Death after Vested Withdrawal	96,205
COLA	15,987,252
Total	\$552,052,501

APPENDIX 5 (Cont'd.)

NORMAL RATE CALCULATION (Cont'd.)

2015 Valuation

7.50% Interest

Liabilities (Cont'd.)**Retirees**

Retired Pension	\$57,933,111,519
Retired Annuity	128,561,402
Disability Pension	321,664,008
Disability Annuity	704,622
Beneficiary Pension	870,002,776
Beneficiary Annuity	8,548,110
DBA Pension	5,043,274
DBA Annuity	336,217
Escalation	4,882,782
Post Retired Death over \$50,000	1,626,885
COLA	4,523,751,037
Catch-Up & Prior §532 Supp	461,941,219
Total	\$64,260,173,851

Vesteds

Inactive Vested	\$315,057,913
Death Benefit After 10-Yr Withdrawal over \$50,000	299,572
Active Vested	438,796,756
Death Benefit After 10-Yr Withdrawal over \$50,000	1,005,768
COLA	63,791,169
Total	\$818,951,178

TIAA

Service Pension	\$3,550,889
Disability Pension	26,462
Vested Pension	39,788
Active Death over \$50,000	5,643
COLA	269,860
Total	\$3,892,642

Miscellaneous

Incurred Death but not Paid	\$8,972,710
Unclaimed Non-Member Funds	13,097,779
Total	\$22,070,489

Total Liabilities	\$116,800,573,517
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APPENDIX 5 (Cont'd.)

NORMAL RATE CALCULATION (Cont'd.)

2015 Valuation
7.50% Interest

Assets for Valuation

Current Total Assets		\$106,997,313,385
Less:	Expense Fund	<u>58,851,291</u>
	Sub-total	\$106,938,462,094
Less:	5 Year Smoothing Adjustment	<u>7,636,645,717</u>
	Assets for Valuation Purposes	\$99,301,816,377
Less:	Group Life Insurance Fund Net Asset Value	<u>255,144,068</u>
	Assets for Normal Rate Valuation Purposes	\$99,046,672,309

Receivables

Assets receivable from Normal Rate in 2015-2016 fiscal year (2014-2015 paybase)(2013 Normal Rate)(1.0750) ^{-7/24} (15,021,356,756)(0.1713)(1.0750) ^{-7/24}		\$2,519,449,870
Assets receivable from Normal Rate in 2016-2017 fiscal year (2015-2016 paybase)(2014 Normal Rate)(1.0750) ^{-1 7/24} (15,284,000,000)(0.1285)(1.0750) ^{-1 7/24}		\$1,788,837,499
Assets receivable from the amortization of Article 18		\$0
Present Value of Future Member Contributions		
(Tier 4 Present Value of Future Employee Contributions)(1.0750) ^{-7/24} (152,843,197)(1.0750) ^{-7/24}		\$149,652,960
(Tier 5 Present Value of Future Employee Contributions)(1.0750) ^{-7/24} (188,852,147)(1.0750) ^{-7/24}		\$184,910,309
(Tier 6 Present Value of Future Employee Contributions)(1.0750) ^{-7/24} (303,317,750)(1.0750) ^{-7/24}		\$296,986,716
Assets receivable from Retirement Incentive Payments		
Chapter 105 of the Laws of 2010		
Receivable in 2015-2016 (9,998,209)(1.0750) ^{-7/24}		<u>\$9,789,520</u>
	Total Receivables	\$4,949,626,874

APPENDIX 5 (Cont'd.)

NORMAL RATE CALCULATION (Cont'd.)

2015 Valuation
7.50% Interest

Present Value of Future Salaries

	<u>Total PVFS</u>	
Tier 1	\$146,238,024	
Tier 2	223,793,212	
Tier 3	1,162,012,293	
Tier 4	103,833,829,620	
Tier 5	4,613,695,121	
Tier 6	<u>5,657,664,201</u>	
	\$115,637,232,471	$\times (1.0750)^{-7/24} =$
		\$113,223,581,169

Normal Rate

$$\frac{\text{Total Liabilities - (Assets + Receivables)}}{\text{Present Value of Future Salaries}} = 11.3088\%$$

$$\frac{\$12,804,274,334}{\$113,223,581,169} = 11.3088\%$$

11.31% (rounded)

APPENDIX 5 (Cont'd.)

GROUP LIFE INSURANCE FUND

2015 Valuation

7.50% Interest

A) Calculation of June 30, 2015 Balance

Actuarial Value as of July 1, 2014		\$285,753,911
Interest	[285,753,911 x .0750]	\$21,431,543
October 15, 2014 actual premium	\$19,063,335	
October 15, 2014 deferred premium	<u>(\$18,710,900)</u>	
Premium Gain/(Loss)		\$352,435
Interest	[352,435 x (1.0750 ^{8.5/12} -1)]	\$18,525
Death Benefits paid in 2014-2015		(\$14,963,901)
Interest	[(14,963,901) x (1.0750 ⁻⁵ -1)]	(\$551,002)
October 15, 2017 deferred premium [from B]		\$20,267,000
Interest discount	[20,267,000 x (1.0750 ^{-(2+3.5/12)} -1)]	<u>(\$3,095,362)</u>
Actuarial Value as of June 30, 2015		\$309,213,149

B) Calculation of Required Premium, GLIF Rate and Deferred Premium

Death benefits	[14,963,901 x 1.0750 ^{2+9.5/12}]	\$18,311,621
Interest	[(21,431,543) x 1.0750 ^{2+3.5/12}]	(\$25,294,795)
Premium Loss/(Gain)	[(352,435) x 1.0750 ³]	(\$437,829)
Adjustment to the GLIF reserve		<u>\$27,688,003</u>
Total required premium		\$20,267,000

$$\begin{aligned} \text{GLIF Rate} &= \frac{\text{Required premium}}{\text{Estimated 2016-2017 paybase}} \\ &= \frac{\$20,267,000}{\$15,590,000,000} \\ &= 0.13\% \end{aligned}$$

October 15, 2017 deferred premium	[15,590,000,000 x 0.0013]	\$20,267,000
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C) Summary of Deferred Premiums

	<u>Deferred Premium</u>	<u>Present Value as of 6/30/2015</u>
Due October 15, 2015	\$19,444,100	\$19,038,251
Due October 15, 2016	\$19,607,900	\$17,859,192
Due October 15, 2017	\$20,267,000	<u>\$17,171,638</u>
		\$54,069,081

D) GLIF Net Asset Value (A - C)

$$\$309,213,149 - \$54,069,081 = \$255,144,068$$

APPENDIX 5 (Cont'd.)

EXCESS BENEFIT PLAN FUND*
2015 Valuation

Balance as of July 1, 2015 (Cash Basis)		\$2,516,706
plus	Final Adjustment for the 2015 Fiscal Year	\$145,635
plus	Employer contribution (paid 10/15/2015) [0.0000 X \$15,021,356,756 (6/30/2013 Excess Benefit Plan rate of 0.00% times 2014 - 2015 paybase)]	\$0
less	Annual Estimated Payments	<u>\$600,000</u>
Expected Balance as of June 30, 2016		\$2,062,341
plus	Employer contribution (payable 10/15/2016) [0.0001 X \$15,284,000,000 (6/30/2014 Excess Benefit Plan rate of 0.01% times est'd. 2015 - 2016 paybase)]	\$1,528,400
less	Annual Estimated Payments	<u>\$600,000</u>
Expected Balance as of June 30, 2017		\$2,990,741

* Fund is in a zero-interest checking account

APPENDIX 5 (Cont'd.)

The Administrative Rate and Employer Contributions¹

The administrative portion (Rate) of the employer contribution rate is adopted annually by the Retirement Board in the amount necessary to defray Retirement Administration related expenses for the following fiscal year. The first step in determining the rate is to divide the projected Retirement Administration related expenses by the projected member salary base. Consideration is also given to the overall status of the fund balance.

It is anticipated that there will be no change to the Rate in 2017-18 and it is projected to be sustained for at least the next four years at 0.27% of member salary.

Member Salary Base		Rate (%)	Employer Contributions (Net of Billing Adjustments)		Increase/Decrease in Contributions to the Administrative Fund
Year	Amount		Year Collected	Amount	Percent
2017-18	\$15,941,000,000 *	0.27 *	2018-19	\$43,041,000 *	2.25% *
2016-17	15,590,000,000 *	0.27 *	2017-18	42,093,000 *	2.00% *
2015-16	15,284,000,000 *	0.27	2016-17	41,267,000 *	1.75% *
2014-15	15,021,357,000	0.27	2015-16	40,558,000 *	1.65% *
2013-14	14,771,301,000	0.27	2014-15	39,899,000	0.85%
2012-13	14,647,830,000	0.27	2013-14	39,561,000	0.08%
2011-12	14,640,764,000	0.27	2012-13	39,530,000	(0.68%)

*Estimated.

Estimated Member Salary Base

The member salary base is actuarially determined; it increases as new members join the System and as members receive pay increases from their employers. Annual retirements and other forms of separation from service mitigate this increase. The member salary base is projected to increase 2.0% on average per year from 2016 through 2018.

The Proposed Administrative Rate Calculation (2017 – 18)

Several factors are considered when anticipating expenses used in calculating the administrative rate, which include general price increases, an estimated 12% increase in ERS and capital asset additions.

Rate Calculation

$$\frac{\text{Projected 2017-18 Administrative Expenses}}{\text{Estimated 2016-17 Member Salary Base}} = \frac{\$47,173,000}{\$15,590,000,000} = 0.30\%$$

$$\text{Proposed Administrative Expense Rate for 2017-18 Collections:} = \underline{0.27\%}$$

¹ From the NYSTRS 2016-17 Operating Budget Report

APPENDIX 5 (Cont'd.)

**ASSET VALUATION METHOD
DEVELOPMENT OF SMOOTHING ADJUSTMENT**

<u>FYE</u>	<u>Market Value</u>	<u>Contributions</u>	<u>Benefit Payments</u>	<u>Average Market Value¹</u>
6/30/2010	75,829,228,763	1,260,000,256	5,399,946,740	
6/30/2011	88,414,049,393	1,072,744,659	5,751,514,083	73,713,332,522
6/30/2012	86,303,987,073	1,479,186,529	5,979,984,123	86,471,814,456
6/30/2013	93,531,255,172	1,765,812,556	6,194,057,011	84,457,742,461
6/30/2014	105,671,560,226	1,858,234,634	6,399,153,913	91,647,927,748
6/30/2015	106,997,313,385	2,499,130,479	6,588,088,885	104,147,733,206

<u>FYE</u>	<u>Actual Gain²</u>	<u>Expected Gain³</u>	<u>Unexpected Gain⁴</u>	<u>Smoothing Adjustment⁵</u>
6/30/2010	6,776,647,973			
6/30/2011	15,395,104,554	2,211,399,976	13,183,704,578	
6/30/2012	659,956,804	2,594,154,434	(1,934,197,630)	
6/30/2013	9,635,631,237	2,533,732,274	7,101,898,963	
6/30/2014	14,601,733,266	2,749,437,832	11,852,295,434	
6/30/2015	5,400,265,487	7,811,079,990	(2,410,814,503)	7,636,645,717

¹ Average Market Value = Market Value_(previous yr) - (.5 x Benefit Payments) + ((8.5/12) x Contributions)

² Actual Gain = Net Appreciation for fiscal years ending prior to 6/30/2015
Actual Gain = Net Investment Income for fiscal years ending on or after 6/30/2015

³ Expected Gain = 3.0% x Average Market Value for fiscal years ending prior to 6/30/2015
Expected Gain = 7.5% x Average Market Value for fiscal years ending on or after 6/30/2015

⁴ Unexpected Gain = Actual Gain - Expected Gain

⁵ Smoothing Adjustment = (.20 x Unexpected Gain 6/30/2012)
+ (.40 x Unexpected Gain 6/30/2013)
+ (.60 x Unexpected Gain 6/30/2014)
+ (.80 x Unexpected Gain 6/30/2015)

APPENDIX 6

MEMBER RECONCILIATION

ACTIVE MEMBERS:

	Male	Female	Total
June 30, 2014.....	64,265	205,774	270,039
Changes During Year:			
Added.....	1,985	7,186	9,171
Withdrawn.....	1,334	3,828	5,162
Retired.....	1,331	4,830	6,161
Died.....	54	118	172
June 30, 2015.....	63,531	204,184	267,715

MEMBERS RETIRED FOR:

	Service*			Disability			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
June 30, 2014.....	50,325	97,858	148,183	495	1,590	2,085	50,820	99,448	150,268
Changes During Year:									
Retired.....	1,316	4,715	6,031	15	115	130	1,331	4,830	6,161
Died.....	1,463	2,105	3,568	31	79	110	1,494	2,184	3,678
Lump Sum.....	34	108	142	0	0	0	34	108	142
Restored to Active Membership....	0	0	0	0	1	1	0	1	1
June 30, 2015.....	50,144	100,360	150,504	479	1,625	2,104 **	50,623	101,985	152,608

BENEFICIARIES OF DECEASED:

	Service Annuitants			Disability Annuitants			Active Members			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
June 30, 2014.....	1,159	4,088	5,247	95	170	265	28	123	151	1,282	4,381	5,663
Changes During Year:												
Added.....	145	361	506	8	4	12	0	0	0	153	365	518
Died.....	85	230	315	1	3	4	0	12	12	86	245	331
June 30, 2015.....	1,219	4,219	5,438	102	171	273	28	111	139	1,349	4,501	5,850

SUMMARY:

	Male	Female	Total
Active Members.....	63,531	204,184	267,715
Retired Members.....	50,623	101,985	152,608
Beneficiaries.....	1,349	4,501	5,850
Total.....	115,503	310,670	426,173

*Also includes vested retirees.

**Includes 28 males and 50 females retired for disability who receive a service benefit.

APPENDIX 7

DISTRIBUTION OF ACTIVE MEMBERS

Distribution by Age as of June 30, 2015

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Total Members</u>
15-19	11	22	33
20-24	1,101	3,891	4,992
25-29	6,014	19,799	25,813
30-34	8,746	27,333	36,079
35-39	9,890	28,387	38,277
40-44	10,068	28,565	38,633
45-49	9,460	29,076	38,536
50-54	7,710	27,126	34,836
55-59	5,595	21,909	27,504
60-64	3,387	13,595	16,982
65-69	1,123	3,621	4,744
70-74	294	643	937
75-79	88	165	253
80-84	33	43	76
85 or older	<u>11</u>	<u>9</u>	<u>20</u>
Total	63,531	204,184	267,715

Average Male age is 43 years 1 months

Average Female age is 43 years 8 months

APPENDIX 7 (Cont'd.)

Distribution by Age and Tier of Membership as of June 30, 2015

<u>Age</u>	<u>Tier 1</u>	<u>Tier 2</u>	<u>Tier 3</u>	<u>Tier 4</u>	<u>Tier 5</u>	<u>Tier 6</u>	<u>Total Members</u>
15-19	0	0	0	0	0	33	33
20-24	0	0	0	101	301	4,590	4,992
25-29	0	0	0	8,329	8,127	9,357	25,813
30-34	0	0	0	28,528	3,936	3,615	36,079
35-39	0	0	0	34,270	1,698	2,309	38,277
40-44	0	0	0	35,271	1,384	1,978	38,633
45-49	0	0	3	35,489	1,272	1,772	38,536
50-54	0	2	180	32,488	964	1,202	34,836
55-59	4	82	3,372	22,646	630	770	27,504
60-64	103	938	2,331	12,855	399	356	16,982
65-69	699	281	264	3,272	121	107	4,744
70-74	212	30	53	576	34	32	937
75-79	59	12	17	148	9	8	253
80-84	29	2	1	39	3	2	76
85 or older	10	1	1	8	0	0	20
Total	1,116	1,348	6,222	214,020	18,878	26,131	267,715
Average Age (yrs. – mos.)	68-4	63-6	59-3	44-11	34-9	32-11	43-6

APPENDIX 7 (Cont'd.)

Distribution of Active Members by Age and New York State Service as of June 30, 2015

Male

<u>Age</u>	<u>Less Than 10 Years New York State Service</u>	<u>10 or More Years New York State Service</u>	<u>Total New York State Service</u>
15-19	11	0	11
20-24	1,101	0	1,101
25-29	6,014	0	6,014
30-34	7,729	1,017	8,746
35-39	4,176	5,714	9,890
40-44	2,605	7,463	10,068
45-49	2,029	7,431	9,460
50-54	1,616	6,094	7,710
55-59	1,219	4,376	5,595
60-64	862	2,525	3,387
65-69	438	685	1,123
70-74	158	136	294
75-79	59	29	88
80-84	22	11	33
85 or older	5	6	11
Total	28,044	35,487	63,531

Female

<u>Age</u>	<u>Less Than 10 Years New York State Service</u>	<u>10 or More Years New York State Service</u>	<u>Total New York State Service</u>
15-19	22	0	22
20-24	3,891	0	3,891
25-29	19,799	0	19,799
30-34	24,147	3,186	27,333
35-39	12,926	15,461	28,387
40-44	9,765	18,800	28,565
45-49	9,600	19,476	29,076
50-54	7,786	19,340	27,126
55-59	5,007	16,902	21,909
60-64	2,504	11,091	13,595
65-69	852	2,769	3,621
70-74	222	421	643
75-79	73	92	165
80-84	21	22	43
85 or older	3	6	9
Total	96,618	107,566	204,184

APPENDIX 7 (Cont'd.)

Distribution of Active Members by Total Service and by Gender as of June 30, 2015

<u>Years of Service</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
0-4	17,192	55,724	72,916
5-9	10,302	38,295	48,597
10-14	11,763	39,037	50,800
15-19	11,248	32,734	43,982
20-24	6,098	18,062	24,160
25-29	4,090	13,142	17,232
30-34	2,024	5,689	7,713
35 or more	<u>814</u>	<u>1,501</u>	<u>2,315</u>
Total	63,531	204,184	267,715

Average Male has 12 Years of Total Service

Average Female has 12 Years of Total Service

APPENDIX 7 (Cont'd.)

Distribution of Active Members by Total Service and Tier of Membership as of June 30, 2015

<u>Years of Service</u>	<u>Tier 1</u>	<u>Tier 2</u>	<u>Tier 3</u>	<u>Tier 4</u>	<u>Tier 5</u>	<u>Tier 6</u>	<u>Total</u>
0-4	120	50	49	29,951	16,700	26,046	72,916
5-9	56	65	144	46,135	2,150	47	48,597
10-14	79	105	297	50,270	22	27	50,800
15-19	84	101	419	43,366	4	8	43,982
20-24	113	180	564	23,301	0	2	24,160
25-29	161	256	865	15,948	1	1	17,232
30-34	146	181	2,389	4,996	1	0	7,713
35 or more	357	410	1,495	53	0	0	2,315
Total	1,116	1,348	6,222	214,020	18,878	26,131	267,715
Average Service (yrs. – mos.)	26-6	26-8	28-8	13-1	2-1	1-0	11-6

APPENDIX 7 (Cont'd.)

Total and Average Earnings by Tier of Membership
for Active Members as of June 30, 2015

	<u>Total Earnings</u>	<u>Average Earnings*</u>
Tier 1	\$90,290,456	\$96,361
Tier 2	\$116,188,744	\$98,215
Tier 3	\$571,054,510	\$98,696
Tier 4	\$13,101,144,051	\$75,158
Tier 5	\$410,777,045	\$37,435
Tier 6	<u>\$554,378,440</u>	<u>\$25,525</u>
Total	\$14,843,833,246	\$69,069

*Average earnings calculated using only those active members with earnings during the 2014-15 school year.

APPENDIX 8

HISTORICAL MEMBER STATISTICS

Active Members and Annuitants 1925-2015

As of <u>June 30</u>	Active <u>Members</u>	Retirees & <u>Beneficiaries</u>
1925	29,057	1,815
1930	39,663	2,732
1935	45,031	3,919
1940	48,193	4,771
1945	52,359	5,637
1950	56,504	6,374
1955	71,273	7,897
1960	99,555	10,796
1965	129,543	16,043
1970	186,914	22,700
1975	227,038	35,252
1980	203,330	46,812
1985	178,516	57,366
1990	195,194	69,127
1995	199,398	82,459
2000	224,986	100,839
2005	260,356	125,325
2010	285,774	141,716
2015	267,715	158,458

Number of Active Members by Tier

As of <u>June 30</u>	<u>Tier 1</u>	<u>Tier 2</u>	<u>Tier 3</u>	<u>Tier 4</u>	<u>Tier 5</u>	<u>Tier 6</u>	<u>Total</u>
1996	58,850	16,596	24,546	100,926	--	--	200,918
1997	53,502	16,186	23,861	110,167	--	--	203,716
1998	49,266	15,860	23,302	120,652	--	--	209,080
1999	50,859	15,776	20,726	128,906	--	--	216,267
2000	47,234	15,700	20,159	141,893	--	--	224,986
2001	41,169	15,472	19,914	157,795	--	--	234,350
2002	35,601	15,121	19,674	172,438	--	--	242,834
2003	28,327	14,463	19,083	185,374	--	--	247,247
2004	22,986	13,947	18,835	198,747	--	--	254,515
2005	17,901	13,210	18,535	210,710	--	--	260,356
2006	13,621	12,084	18,173	220,532	--	--	264,410
2007	10,838	10,178	17,743	231,286	--	--	270,045
2008	8,630	8,171	17,007	241,093	--	--	274,901
2009	6,943	6,752	16,111	250,532	--	--	280,338
2010	5,582	5,706	14,942	255,966	3,578	--	285,774
2011	3,814	4,137	12,690	247,530	12,264	--	280,435
2012	2,756	3,253	11,180	239,199	19,969	916	277,273
2013	1,968	2,447	9,450	231,258	19,452	8,753	273,328
2014	1,439	1,810	7,753	222,545	19,124	17,368	270,039
2015	1,116	1,348	6,222	214,020	18,878	26,131	267,715

APPENDIX 9

RETIREMENT STATISTICS

RETIREMENT STATISTICS 2014-15 MEMBERS RETIRED FOR:

	Service*	Disability
Number Retired.....	6,031	130
Age at Retirement:		
Average.....	60 yrs., 11 mos.	51 yrs., 2 mos.
Median.....	61 yrs., 3 mos.	51 yrs., 10 mos.
Years of Service:		
Average.....	25 yrs., 4 mos.	17 yrs., 6 mos.
Median.....	27 yrs., 2 mos.	16 yrs., 5 mos.
**Benefit:		
Average.....	\$44,487	\$24,971
Median.....	\$45,510	\$22,717
Final Average Salary (FAS):		
Average.....	\$84,362	\$70,817
Median.....	\$83,623	\$67,786
***Benefit as % of FAS:		
Average.....	47.62%	34.30%
Median.....	52.64%	33.33%

2014-15 MEMBERS RETIRED FOR SERVICE* WITH:

	Less Than 20 Yrs. N.Y.	Between 20 Yrs. N.Y. and 35 Yrs. Total	35 Yrs. Total or More
Number Retired.....	1,400	3,997	634
Age at Retirement:			
Average.....	61 yrs., 4 mos.	60 yrs., 7 mos.	62 yrs., 7 mos.
Median.....	61 yrs., 10 mos.	60 yrs., 10 mos.	62 yrs., 0 mos.
Years of Service:			
Average.....	12 yrs., 2 mos.	27 yrs., 8 mos.	38 yrs., 7 mos.
Median.....	12 yrs., 6 mos.	29 yrs., 2 mos.	37 yrs., 4 mos.
**Benefit:			
Average.....	\$9,393	\$50,818	\$82,065
Median.....	\$6,984	\$50,225	\$78,796
Final Average Salary (FAS):			
Average.....	\$48,076	\$92,909	\$110,603
Median.....	\$40,952	\$90,015	\$105,230
***Benefit as % of FAS:			
Average.....	18.03%	53.80%	73.97%
Median.....	18.03%	57.11%	72.44%

*Also includes vested retirees.

**The Maximum, even though the member may have chosen an option.

***The average and median of individual benefits as percentages of final average salary.

APPENDIX 9 (Cont'd.)

RETIREMENT STATISTICS ALL RETIREES AS OF JUNE 30, 2015 RETIRED FOR:

	Service*	Disability
Number Retired.....	150,582	2,026
Age at Retirement:		
Average.....	58 yrs., 7 mos.	49 yrs., 6 mos.
Median.....	57 yrs., 6 mos.	50 yrs., 4 mos.
Age at June 30, 2015:		
Average.....	72 yrs., 0 mos.	64 yrs., 8 mos.
Median.....	70 yrs., 3 mos.	64 yrs., 9 mos.
Years of Service:		
Average.....	28 yrs., 3 mos.	18 yrs., 5 mos.
Median.....	30 yrs., 4 mos.	17 yrs., 8 mos.
**Benefit:		
Average.....	\$40,689	\$19,549
Median.....	\$40,606	\$17,843
Final Average Salary (FAS):		
Average.....	\$68,832	\$53,599
Median.....	\$67,842	\$51,922
***Benefit as % of FAS:		
Average.....	54.70%	35.70%
Median.....	60.50%	33.33%

ALL RETIREES AS OF JUNE 30, 2015 RETIRED FOR SERVICE* WITH:

	Less Than 20 Yrs. N.Y.	Between 20 Yrs. N.Y. and 35 Yrs. Total	35 Yrs. Total or More
Number Retired.....	25,365	89,759	35,458
Age at Retirement:			
Average.....	58 yrs., 10 mos.	58 yrs., 4 mos.	58 yrs., 10 mos.
Median.....	57 yrs., 3 mos.	57 yrs., 1 mo.	58 yrs., 3 mos.
Years of Service:			
Average.....	13 yrs., 7 mos.	28 yrs., 7 mos.	37 yrs., 4 mos.
Median.....	13 yrs., 8 mos.	30 yrs., 0 mos.	36 yrs., 8 mos.
**Benefit:			
Average.....	\$8,111	\$40,500	\$64,473
Median.....	\$6,072	\$39,552	\$60,558
Final Average Salary (FAS):			
Average.....	\$38,265	\$70,462	\$86,570
Median.....	\$31,647	\$68,301	\$81,990
***Benefit as % of FAS:			
Average.....	20.80%	56.57%	74.22%
Median.....	19.60%	59.78%	73.56%

*Also includes vested retirees.

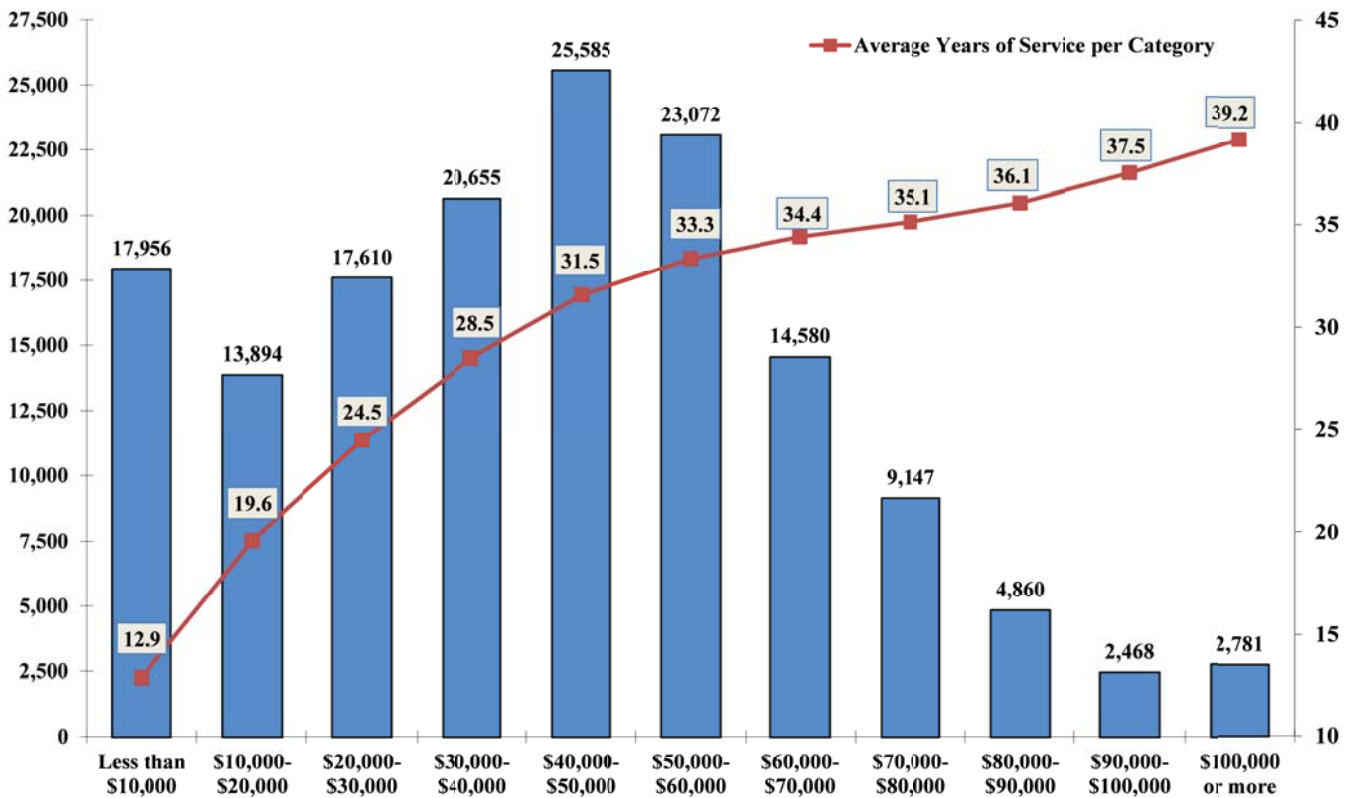
**The Maximum, even though the member may have chosen an option.

***The average and median of individual benefits as percentages of final average salary.

**Retired Members' Characteristics¹
By Year of Retirement**

Retired in Fiscal Year Ended	Number of Retired Members	Average Age at Retirement (yrs.- mos.)	Average Service at Retirement (yrs.- mos.)	Average Final Average Salary	Average Maximum Annual Benefit
2006	7,281	58-4	28-2	\$71,840	\$43,914
2007	6,900	58-7	28-1	74,185	44,204
2008	6,330	58-11	27-8	77,066	45,779
2009	5,644	59-6	27-7	78,050	46,061
2010	5,501	60-0	27-5	79,615	46,489
2011	8,423	60-3	28-7	85,010	51,200
2012	6,033	60-9	26-3	82,461	45,759
2013	6,330	60-10	25-6	81,987	44,768
2014	6,547	61-0	25-4	84,545	44,978
2015	6,161	60-11	25-4	84,362	44,487

Distribution of the Annual Benefit² of All Retired Members



¹ Averages are for service and vested retirees.

² Maximum annual retirement benefit as of June 30, 2015 including supplementation and COLA.

APPENDIX 10

2011 – 2015 EXPERIENCE STUDY
 NUMBER OF SERVICE RETIREMENTS
 TIER 1 AND TIERS 2, 3, 4 AT LEAST AGE 62 OR WITH 30 YEARS OF SERVICE
 AND TIER 5 AT LEAST AGE 62
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

AGE	MALE				FEMALE			
	EXPOSURES	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	EXPOSURES	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED
50	8	0	0.00	N/A	18	0	0.00	N/A
51	29	0	0.00	N/A	69	0	0.00	N/A
52	254	0	0.00	N/A	570	0	0.00	N/A
53	649	0	0.00	N/A	1,549	4	0.00	N/A
54	1,129	56	0.00	N/A	2,615	104	0.00	N/A
55	1,488	481	456.36	1.054	3,510	1,183	1,102.11	1.073
56	1,422	433	399.27	1.084	3,249	1,031	936.09	1.101
57	1,387	344	350.15	0.982	3,080	864	829.98	1.041
58	1,473	401	382.15	1.049	3,112	902	812.28	1.110
59	1,444	425	413.77	1.027	3,130	927	841.30	1.102
60	1,333	419	414.58	1.011	3,172	1,013	886.29	1.143
61	1,224	425	391.96	1.084	3,061	944	848.41	1.113
62	3,134	790	847.13	0.933	12,381	3,359	3,183.86	1.055
63	2,373	534	544.25	0.981	8,709	2,017	2,028.73	0.994
64	1,746	361	361.18	1.000	6,350	1,342	1,392.07	0.964
65	1,350	297	283.06	1.049	4,529	1,118	1,079.13	1.036
66	987	227	214.61	1.058	3,047	814	745.06	1.093
67	707	165	153.38	1.076	2,095	515	496.08	1.038
68	486	103	101.23	1.017	1,483	330	326.81	1.010
69	371	73	69.41	1.052	1,101	256	254.26	1.007
70	277	56	45.30	1.236	807	197	185.04	1.065
71	194	28	28.46	0.984	590	130	125.11	1.039
72	159	30	26.97	1.112	408	74	73.62	1.005
73	128	26	21.42	1.214	296	62	54.20	1.144
74	90	13	14.78	0.880	224	47	43.03	1.092
75	71	7	9.51	0.736	180	34	34.31	0.991
76	300	46	300.00	0.153	553	107	553.00	0.193
TOTAL	24,213	5,740	5,828.93	0.985	69,888	17,374	16,830.77	1.032

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF SERVICE RETIREMENTS
 TIERS 2,3,4 LESS THAN AGE 62 AND WITH LESS THAN 30 YEARS OF SERVICE
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

AGE	EXPOSURES	MALE			FEMALE			RATIO OF ACTUAL TO EXPECTED	
		ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	EXPOSURES	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	
50	6,338	1	0.00	N/A	22,475	1	0.00	N/A	
51	6,059	2	0.00	N/A	22,452	3	0.00	N/A	
52	5,754	2	0.00	N/A	21,874	4	0.00	N/A	
53	5,271	2	0.00	N/A	20,998	6	0.00	N/A	
54	4,813	31	0.00	N/A	19,814	132	0.00	N/A	
55	4,434	158	141.73	1.115	18,826	675	650.72	1.037	
56	4,070	143	129.35	1.106	17,801	658	636.58	1.034	
57	3,658	120	132.65	0.905	17,044	669	711.59	0.940	
58	3,372	161	148.03	1.088	16,215	758	751.55	1.009	
59	3,151	162	177.71	0.912	15,203	860	917.33	0.938	
60	2,790	157	177.38	0.885	13,716	956	965.81	0.990	
61	2,416	187	174.48	1.072	11,687	1,026	965.23	1.063	
TOTAL	52,126	1,126	1,081.33	1.041	218,105	5,748	5,598.81	1.027	

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF SERVICE RETIREMENTS
 TIER 5 LESS THAN AGE 62 AND WITH LESS THAN 30 YEARS OF SERVICE
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

AGE	EXPOSURES	MALE			FEMALE			
		ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	
50	115	0	0.00	N/A	470	0	0.00	N/A
51	112	0	0.00	N/A	407	0	0.00	N/A
52	109	0	0.00	N/A	371	0	0.00	N/A
53	97	0	0.00	N/A	353	0	0.00	N/A
54	99	0	0.00	N/A	339	0	0.00	N/A
55	94	0	1.50	0.000	296	0	5.12	0.000
56	109	0	1.73	0.000	252	1	4.51	0.222
57	96	0	1.74	0.000	235	0	4.91	0.000
58	95	0	2.09	0.000	193	0	4.47	0.000
59	91	0	2.57	0.000	180	0	5.43	0.000
60	75	0	2.38	0.000	160	0	5.63	0.000
61	71	0	2.56	0.000	128	0	5.29	0.000
TOTAL	1,163	0	14.57	0.000	3,384	1	35.36	0.028

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF SERVICE RETIREMENTS
 TIER 6
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

AGE	EXPOSURES	MALE			FEMALE			RATIO OF ACTUAL TO EXPECTED	
		ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	EXPOSURES	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	
50	40	0	0.00	N/A	184	0	0.00	N/A	
51	46	0	0.00	N/A	157	0	0.00	N/A	
52	39	0	0.00	N/A	165	0	0.00	N/A	
53	35	0	0.00	N/A	143	0	0.00	N/A	
54	33	0	0.00	N/A	130	0	0.00	N/A	
55	39	0	0.62	0.000	116	0	2.00	0.000	
56	42	0	0.67	0.000	99	0	1.77	0.000	
57	34	0	0.62	0.000	90	0	1.88	0.000	
58	32	0	0.70	0.000	69	0	1.60	0.000	
59	25	0	0.70	0.000	70	0	2.11	0.000	
60	16	0	0.51	0.000	71	0	2.50	0.000	
61	15	0	0.54	0.000	60	0	2.48	0.000	
62	15	0	0.60	0.000	29	0	1.35	0.000	
63	17	0	5.21	0.000	24	0	7.54	0.000	
64	11	0	3.09	0.000	24	0	6.91	0.000	
65	8	0	2.02	0.000	19	0	5.12	0.000	
66	5	0	1.30	0.000	7	0	1.83	0.000	
67	10	1	2.87	0.348	4	0	1.08	0.000	
68	11	0	3.42	0.000	5	0	1.40	0.000	
69	6	0	1.92	0.000	5	0	1.39	0.000	
70	4	0	1.08	0.000	6	0	1.54	0.000	
71	4	0	0.92	0.000	3	0	0.70	0.000	
72	3	0	0.62	0.000	0	0	0.00	N/A	
73	0	0	0.00	N/A	2	0	0.48	0.000	
74	0	0	0.00	N/A	3	0	0.73	0.000	
75	1	0	0.22	0.000	0	0	0.00	N/A	
76	5	0	5.00	0.000	1	0	1.00	0.000	
TOTAL	496	1	32.63	0.031	1,486	0	45.41	0.000	

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF DEATHS AMONG ACTIVE MEMBERS
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

CENTRAL AGE	MALE			FEMALE		
	<u>ACTUAL</u>	<u>EXPECTED</u>	<u>RATIO OF ACTUAL TO EXPECTED</u>	<u>ACTUAL</u>	<u>EXPECTED</u>	<u>RATIO OF ACTUAL TO EXPECTED</u>
20	0	0.31	0.000	1	0.52	1.923
25	8	5.76	1.389	5	7.45	0.671
30	11	9.97	1.103	16	12.97	1.234
35	13	14.57	0.892	16	16.56	0.966
40	16	21.17	0.756	22	25.95	0.848
45	25	25.91	0.965	48	43.51	1.103
50	26	27.21	0.956	63	64.29	0.980
55	35	33.46	1.046	86	83.53	1.030
60	41	42.05	0.975	89	85.33	1.043
65	22	28.24	0.779	33	35.79	0.922
70	8	11.07	0.723	8	10.63	0.753
75	7	3.55	1.972	9	2.82	3.191
TOTAL	212	223.27	0.950	396	389.35	1.017

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF DISABILITY RETIREMENTS
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

CENTRAL AGE	MALE			FEMALE		
	<u>ACTUAL</u>	<u>EXPECTED</u>	<u>RATIO OF ACTUAL TO EXPECTED</u>	<u>ACTUAL</u>	<u>EXPECTED</u>	<u>RATIO OF ACTUAL TO EXPECTED</u>
30	0	0.20	0.000	0	0.49	0.000
35	4	2.92	1.370	9	9.47	0.950
40	15	9.86	1.521	38	26.02	1.460
45	11	17.87	0.616	52	56.11	0.927
50	28	28.87	0.970	120	114.61	1.047
54	15	15.00	1.000	62	63.28	0.980
TOTAL	73	74.72	0.977	281	269.98	1.041

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
COMPARISON OF SALARY SCALE TO ACTUAL SALARY INCREASES
ASSUMPTIONS ADOPTED OCTOBER 2015

MALE

<u>PREVIOUS YEAR'S SERVICE</u>	<u>PREVIOUS YEAR'S DURATION*</u>	<u>PREVIOUS YEAR'S SALARIES</u>	<u>ACTUAL SALARIES</u>	<u>EXPECTED SALARIES**</u>	<u>RATIO OF ACTUAL TO EXPECTED</u>
0-0 to 0-4	0	188,088,737	228,577,026	206,897,611	1.105
0-5 to 1-4	1	385,470,418	426,286,458	424,017,460	1.005
1-5 to 2-4	2	378,415,349	401,439,291	404,904,423	0.991
2-5 to 3-4	3	412,614,624	432,245,160	437,619,070	0.988
3-5 to 4-4	4	464,802,005	486,143,535	489,064,670	0.994
4-5 to 5-4	5	527,288,334	547,026,732	552,176,343	0.991
5-5 to 6-4	6	596,907,242	619,300,800	623,469,614	0.993
6-5 to 7-4	7	660,156,503	685,754,351	688,609,248	0.996
7-5 to 8-4	8	730,341,218	755,686,491	761,161,617	0.993
8-5 to 9-4	9	797,828,265	824,919,516	830,938,138	0.993
9-5 to 10-4	10	894,467,156	924,975,592	930,871,969	0.994
10-5 to 11-4	11	949,564,417	980,061,061	987,357,081	0.993
11-5 to 12-4	12	988,608,689	1,020,997,649	1,026,867,845	0.994
12-5 to 13-4	13	985,037,703	1,015,467,653	1,021,976,617	0.994
13-5 to 14-4	14	963,083,345	990,971,085	997,850,654	0.993
14-5 to 15-4	15	896,161,148	921,750,560	927,168,324	0.994
15-5 to 16-4	16	822,927,218	845,404,659	850,166,109	0.994
16-5 to 17-4	17	740,963,294	760,325,527	764,451,830	0.995
17-5 to 18-4	18	672,703,048	689,124,634	693,153,221	0.994
18-5 to 19-4	19	591,041,198	605,613,382	608,358,705	0.995
19-5 to 20-4	20	537,325,348	549,674,392	552,477,923	0.995
20-5 to 21-4	21	496,990,525	507,249,658	510,508,667	0.994
21-5 to 22-4	22	472,158,493	481,654,488	484,576,261	0.994
22-5 to 23-4	23	443,020,204	451,649,424	454,272,917	0.994
23-5 to 24-4	24	448,290,435	457,482,460	459,273,551	0.996
24-5 to 25-4	25	436,362,178	444,137,884	446,703,962	0.994
25-5 to 26-4	26	412,970,803	419,874,531	422,427,834	0.994
26-5 to 27-4	27	380,922,565	387,342,857	389,379,046	0.995
27-5 to 28-4	28	349,952,061	354,862,236	357,476,030	0.993
28-5 to 29-4	29	321,099,630	325,580,836	327,842,722	0.993
29-5 to 30-4	30	261,721,016	262,831,278	267,112,469	0.984
30-5 to 31-4	31	217,421,284	219,662,838	221,813,194	0.990
31-5 to 32-4	32	189,952,878	190,814,826	193,751,936	0.985
32-5 to 33-4	33	156,791,998	157,931,787	159,849,442	0.988
33-5 to 34-4	34	122,252,058	122,661,109	124,611,523	0.984
34-5 to 35-4	35	107,053,969	107,151,694	109,087,994	0.982
35-5 to 36-4	36	94,025,947	94,390,284	95,774,830	0.986
36-5 to 37-4	37	77,555,258	78,228,970	78,951,253	0.991
37-5 to 38-4	38	59,086,957	58,708,039	60,126,887	0.976
38-5 or more	39	184,020,692	182,868,189	187,259,456	0.977
TOTAL		19,415,444,210	20,016,828,942	20,130,358,447	0.994

*For service less than 5 months duration is set to one.

**Totals may not add due to rounding.

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
COMPARISON OF SALARY SCALE TO ACTUAL SALARY INCREASES
ASSUMPTIONS ADOPTED OCTOBER 2015

FEMALE

PREVIOUS YEAR'S <u>SERVICE</u>	PREVIOUS YEAR'S <u>DURATION*</u>	PREVIOUS YEAR'S <u>SALARIES</u>	ACTUAL <u>SALARIES</u>	EXPECTED <u>SALARIES**</u>	RATIO OF ACTUAL TO EXPECTED
0-0 to 0-4	0	554,545,969	675,201,157	610,000,566	1.107
0-5 to 1-4	1	1,141,940,964	1,262,082,130	1,256,135,060	1.005
1-5 to 2-4	2	1,130,661,003	1,203,255,614	1,209,807,273	0.995
2-5 to 3-4	3	1,261,018,662	1,322,822,445	1,337,436,393	0.989
3-5 to 4-4	4	1,437,065,454	1,497,805,105	1,512,080,271	0.991
4-5 to 5-4	5	1,611,512,436	1,674,790,096	1,687,575,823	0.992
5-5 to 6-4	6	1,809,051,843	1,874,834,996	1,889,554,650	0.992
6-5 to 7-4	7	1,968,744,564	2,041,906,870	2,053,597,455	0.994
7-5 to 8-4	8	2,121,589,287	2,199,380,491	2,211,120,355	0.995
8-5 to 9-4	9	2,305,932,965	2,389,884,164	2,401,629,183	0.995
9-5 to 10-4	10	2,518,758,985	2,608,041,713	2,621,272,476	0.995
10-5 to 11-4	11	2,649,012,191	2,741,585,166	2,754,442,876	0.995
11-5 to 12-4	12	2,691,907,744	2,784,097,523	2,796,084,574	0.996
12-5 to 13-4	13	2,642,766,451	2,733,579,125	2,741,870,193	0.997
13-5 to 14-4	14	2,522,484,869	2,606,994,820	2,613,546,573	0.997
14-5 to 15-4	15	2,291,051,159	2,361,228,512	2,370,321,529	0.996
15-5 to 16-4	16	2,103,516,680	2,165,722,794	2,173,143,082	0.997
16-5 to 17-4	17	1,919,773,596	1,973,316,225	1,980,630,419	0.996
17-5 to 18-4	18	1,752,323,010	1,798,350,229	1,805,593,630	0.996
18-5 to 19-4	19	1,620,550,634	1,663,501,046	1,668,032,768	0.997
19-5 to 20-4	20	1,549,190,791	1,586,707,554	1,592,877,971	0.996
20-5 to 21-4	21	1,453,948,936	1,486,978,776	1,493,496,347	0.996
21-5 to 22-4	22	1,403,336,970	1,435,066,179	1,440,244,732	0.996
22-5 to 23-4	23	1,387,843,853	1,416,608,745	1,423,095,087	0.995
23-5 to 24-4	24	1,375,615,635	1,404,390,681	1,409,318,218	0.997
24-5 to 25-4	25	1,315,134,591	1,340,589,498	1,346,303,281	0.996
25-5 to 26-4	26	1,227,112,122	1,250,447,698	1,255,212,990	0.996
26-5 to 27-4	27	1,101,200,867	1,121,205,572	1,125,647,526	0.996
27-5 to 28-4	28	969,815,027	985,714,860	990,666,050	0.995
28-5 to 29-4	29	845,467,069	859,545,765	863,221,877	0.996
29-5 to 30-4	30	669,887,560	675,967,073	683,687,244	0.989
30-5 to 31-4	31	507,679,452	513,287,161	517,934,577	0.991
31-5 to 32-4	32	410,194,311	413,711,895	418,398,197	0.989
32-5 to 33-4	33	317,781,586	319,771,631	323,978,327	0.987
33-5 to 34-4	34	240,006,603	241,653,542	244,638,730	0.988
34-5 to 35-4	35	176,581,390	177,917,201	179,936,436	0.989
35-5 to 36-4	36	135,166,251	136,311,692	137,680,343	0.990
36-5 to 37-4	37	97,546,808	98,100,409	99,302,651	0.988
37-5 to 38-4	38	68,397,520	68,735,778	69,601,316	0.988
38-5 or more	39	181,450,725	181,563,774	184,644,258	0.983
TOTAL		53,487,566,533	55,292,655,705	55,493,761,307	0.996

*For service less than 5 months duration is set to one.

**Totals may not add due to rounding.

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF WITHDRAWALS
 EXPOSURE BASED ON ACTIVE TEACHERS
 ASSUMPTIONS ADOPTED OCTOBER 2015

CENTRAL AGE	MALE			FEMALE		
	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED
20	355	350.18	1.014	1,003	1,002.18	1.001
25	3,457	3,415.38	1.012	10,892	10,596.08	1.028
30	2,744	2,467.06	1.112	8,459	8,032.79	1.053
35	1,584	1,462.45	1.083	5,741	5,417.75	1.060
40	1,130	1,080.45	1.046	4,285	4,127.19	1.038
45	933	914.54	1.020	3,842	3,748.41	1.025
50	821	789.10	1.040	3,542	3,338.23	1.061
54	280	285.93	0.979	1,137	1,121.14	1.014
TOTAL	11,304	10,765.09	1.050	38,901	37,383.77	1.041

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF DEATHS AMONG MEMBERS RETIRED FOR DISABILITY
 MORTALITY ADOPTED OCTOBER 2015

CENTRAL AGE	MALE			FEMALE		
	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED
30	0	0.00	N/A	0	0.00	N/A
35	3	0.93	3.226	4	2.34	1.709
40	8	5.80	1.379	6	9.71	0.618
45	2	4.80	0.417	19	15.35	1.238
50	8	11.96	0.669	36	36.94	0.975
55	19	12.36	1.537	50	53.78	0.930
60	17	17.09	0.995	60	56.14	1.069
65	23	22.55	1.020	46	50.61	0.909
70	17	18.63	0.913	36	34.10	1.056
75	16	13.87	1.154	31	22.85	1.357
80	11	13.56	0.811	38	27.32	1.391
85	11	11.23	0.980	17	24.27	0.700
90	8	4.95	1.616	14	17.69	0.791
95	1	0.52	1.923	7	7.12	0.983
100	0	0.00	N/A	4	2.13	1.878
105	0	0.00	N/A	1	0.91	1.099
110	0	0.00	N/A	0	0.00	N/A
TOTAL	144	138.25	1.042	369	361.26	1.021

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF DEATHS AMONG MEMBERS RETIRED FOR SERVICE
 MORTALITY ADOPTED OCTOBER 2015

CENTRAL AGE	MALE			FEMALE		
	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED
55	21	14.01	1.499	47	30.01	1.566
60	133	123.84	1.074	215	230.89	0.931
65	407	428.80	0.949	603	597.16	1.010
70	635	635.67	0.999	688	727.90	0.945
75	825	823.23	1.002	820	844.17	0.971
80	1,345	1,309.15	1.027	1,292	1,284.33	1.006
85	1,454	1,512.70	0.961	1,856	1,859.50	0.998
90	1,146	1,090.26	1.051	1,974	1,976.13	0.999
95	449	381.38	1.177	1,476	1,449.69	1.018
100	77	65.15	1.182	519	473.80	1.095
105	5	5.27	0.949	86	72.76	1.182
110	0	0.00	N/A	2	0.89	2.247
TOTAL	6,497	6,389.46	1.017	9,578	9,547.23	1.003

APPENDIX 10 (Cont'd.)

2011-2015 EXPERIENCE STUDY
 NUMBER OF DEATHS AMONG BENEFICIARIES
 MORTALITY ADOPTED OCTOBER 2015

CENTRAL AGE	MALE			FEMALE		
	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED	ACTUAL	EXPECTED	RATIO OF ACTUAL TO EXPECTED
5	0	0.00	N/A	0	0.00	N/A
10	0	0.00	N/A	0	0.00	N/A
15	0	0.00	N/A	0	0.00	N/A
20	0	0.00	N/A	0	0.00	N/A
25	0	0.00	N/A	0	0.00	N/A
30	0	0.00	N/A	0	0.00	N/A
35	0	0.00	N/A	0	0.00	N/A
40	0	0.00	N/A	0	0.00	N/A
45	0	0.03	0.000	0	0.06	0.000
50	0	0.14	0.000	0	0.13	0.000
55	2	0.42	4.762	0	0.61	0.000
60	4	1.49	2.685	5	2.66	1.880
65	9	5.38	1.673	19	9.74	1.951
70	15	10.14	1.479	32	23.90	1.339
75	20	18.43	1.085	61	52.21	1.168
80	54	44.81	1.205	140	110.21	1.270
85	90	78.98	1.140	217	227.34	0.955
90	103	109.64	0.939	319	330.40	0.965
95	66	73.42	0.899	237	220.45	1.075
100	15	20.49	0.732	70	69.95	1.001
105	0	0.80	0.000	8	11.72	0.683
110	0	0.00	N/A	2	1.83	1.093
TOTAL	378	364.17	1.038	1,110	1,061.21	1.046

APPENDIX 11

RATES OF RETURN

Investment Rate of Return¹
on
Market and Actuarial Value of Assets
as of June 30, 2015

Annualized rates of return over the last:

	<u>Based Upon Market Value of Assets</u>	<u>Based Upon Actuarial Value of Assets²</u>
1 Year:	5.2%	15.1%
3 Years:	12.2%	11.6%
5 Years:	12.4%	7.6%
10 Years:	7.2%	8.4%
15 Years:	5.9%	6.2%
20 Years:	8.4%	
25 Years:	8.9%	

Annualized inflation over the last:

	<u>Inflation Assumption</u>		<u>COLA Benefit</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected³</u>
1 Year:	-0.07%	2.5%	1.0 %	1.5%
3 Years:	0.97%	2.5%	1.0%	1.5%
5 Years:	1.64%	2.5%	1.2%	1.5%

¹ The interest rate for valuation purposes is a level 7.5%.

² The Retirement System's asset valuation method was changed effective with the June 30, 2007 and June 30, 2015 actuarial valuations.

³ The annual percentage for estimating future COLA benefit payments is 1.5%. The COLA percentage is one-half of the increase in the CPI with a floor of 1.0% and a cap of 3.0%. Therefore the estimate of inflation for the COLA benefit is the result of analyzing available CPI data with percentages bounded between 2.0% and 6.0%, and reduced by 50%. The COLA benefit was first initiated in 2001.

APPENDIX 11 (Cont'd.)

RATES OF RETURN (Cont'd.)

Annual Rates of Return on Market Value of Assets through June 30, 2015

<u>Year Ending June 30th</u>	<u>Annual Rate of Return</u>	<u>Year Ending June 30th</u>	<u>Annual Rate of Return</u>
1983	37.1%	2006	11.8%
1984	-4.8%	2007	19.4%
1985	31.3%	2008	-6.3%
1986	28.4%	2009	-20.5%
1987	14.6%	2010	12.1%
1988	-1.5%	2011	23.2%
1989	16.8%	2012	2.8%
1990	11.4%	2013	13.7%
1991	8.3%	2014	18.2%
1992	13.0%	2015	5.2%
1993	13.6%		
1994	1.8%		
1995	19.3%		
1996	18.8%		
1997	22.0%		
1998	21.5%		
1999	14.0%		
2000	6.8%		
2001	-5.7%		
2002	-6.8%		
2003	4.0%		
2004	16.1%		
2005	10.6%		

APPENDIX 12

ASSET ALLOCATION

The table below displays the Retirement System’s asset allocation targets, actual allocation percentages, and ranges as of June 30, 2015.

	Target	Actual	Range
Domestic Equity	37%	38.7%	32-42%
International Equity	18%	18.4%	14-22%
Real Estate	10%	10.6%	6-14%
Private Equity	<u>7%</u>	<u>7.7%</u>	4-12%
<i>Total Equities</i>	72%	75.4%	
Domestic Fixed Income	17%	15.5%	13-22%
Global Bonds	2%	1.5%	0-3%
Mortgages	8%	5.2%	5-11%
Cash Equivalents	<u>1%</u>	<u>2.4%</u>	0-4%
<i>Total Fixed Income</i>	28%	24.6%	

APPENDIX 13

SENSITIVITY ANALYSIS

Valuation results are highly dependent on the actuarial assumptions used to project future events. If actual experience emerges differently from the assumptions used in the valuation process, actuarial gains or losses will result, and future Employer Contribution Rates will be higher or lower. In this section, results of a sensitivity analysis are presented in order to illustrate how deviations in specific assumptions would have changed the current Employer Contribution Rate of 11.72%.

It is important to note that the results displayed here, with the exception of those for the investment return, are the consequence of altering each assumption individually without accounting for possible correlation between assumptions. Therefore, these results are presented in order to provide an illustration as to the order of magnitude that a variation in key assumptions could have on valuation results. There is no guarantee that future experience will be consistent with either our current or the following alternative set of assumptions.

<u>Assumption</u>	<u>Adjustment Made</u>	<u>Calculated Employer Contribution Rate</u>
Current Assumptions		11.72%
Investment Return¹	Decrease from 7.50% to 7.25%	14.49%
Investment Return¹	Decrease from 7.50% to 7.00%	17.32%
Investment Return¹	Decrease from 7.50% to 6.50%	23.24%
Salary Scale	Decrease of 10%	10.88%
Salary Scale	Increase of 10%	12.56%
Service Retirement Rates	Decrease of 10%	10.84%
Service Retirement Rates	Increase of 10%	12.51%
Healthy Annuitant Mortality	Decrease of 10%	13.34%
Healthy Annuitant Mortality	Increase of 10%	10.22%
Active Mortality	Decrease of 10%	11.73%
Active Mortality	Increase of 10%	11.71%

¹ In the event that a change to the long term investment return assumption would be warranted, it is likely that a related change to the salary scale assumption would also be necessary in order for these assumptions to remain consistent with overall inflation. Therefore, for the results presented here, the salary scale assumption was decreased by one-half of the reduction in the investment return assumption.

APPENDIX 14

HISTORY OF THE EMPLOYER CONTRIBUTION RATE

<u>Salary Year</u>	<u>Employer Contribution Rate</u>	<u>Salary Year</u>	<u>Employer Contribution Rate</u>	<u>Salary Year</u>	<u>Employer Contribution Rate</u>
1921-22	5.10 %	1956-57	10.90 %	1991-92	6.64 %
1922-23	5.10	1957-58	11.20	1992-93	8.00
1923-24	5.20	1958-59	13.40	1993-94	8.41
1924-25	5.20	1959-60	14.00	1994-95	7.24
1925-26	5.20	1960-61	18.35	1995-96	6.37
1926-27	5.20	1961-62	18.55	1996-97	3.57
1927-28	5.20	1962-63	19.55	1997-98	1.25
1928-29	5.30	1963-64	21.13	1998-99	1.42
1929-30	5.50	1964-65	17.67	1999-00	1.43
1930-31	5.50	1965-66	17.70	2000-01	0.43
1931-32	5.50	1966-67	17.72	2001-02	0.36
1932-33	5.50	1967-68	18.50	2002-03	0.36
1933-34	5.50	1968-69	18.80	2003-04	2.52
1934-35	5.60	1969-70	18.60	2004-05	5.63
1935-36	5.70	1970-71	18.80	2005-06	7.97
1936-37	5.80	1971-72	18.80	2006-07	8.60
1937-38	5.93	1972-73	18.80	2007-08	8.73
1938-39	6.03	1973-74	18.80	2008-09	7.63
1939-40	6.13	1974-75	18.80	2009-10	6.19
1940-41	6.23	1975-76	19.40	2010-11	8.62
1941-42	6.33	1976-77	19.40	2011-12	11.11
1942-43	6.43	1977-78	20.40	2012-13	11.84
1943-44	6.53	1978-79	21.40	2013-14	16.25
1944-45	7.10	1979-80	22.49	2014-15	17.53
1945-46	7.20	1980-81	23.49	2015-16	13.26
1946-47	7.50	1981-82	23.49	2016-17	11.72
1947-48	7.80	1982-83	23.49		
1948-49	8.00	1983-84	22.90		
1949-50	8.40	1984-85	22.80		
1950-51	8.80	1985-86	21.40		
1951-52	9.60	1986-87	18.80	Average	10.96 %
1952-53	9.90	1987-88	16.83		
1953-54	9.90	1988-89	14.79		
1954-55	10.30	1989-90	6.87		
1955-56	10.40	1990-91	6.84		

HISTORY OF THE MEMBER CONTRIBUTION RATE

<u>Year of Membership</u>	<u>Required Contribution</u>
1921	4%
1948	5% (new members - 1948 and after)
1948	Voluntary 4% <u>could</u> be contributed (all members eligible)
1951	If member elected special retirement allowance: 4% went to 6.5%, 5% went to 8% (all members eligible)
1957	If member elected 1/120th plan: 6.5% went to 9%, 8% went to 11% (all members eligible)
1968	0%
1976	3% (new members - 1976 and after)
2000	3% employee contribution ceases after ten years of service or membership
2010	3.5% throughout career for members joining 1/1/2010 – 3/31/2012
2012	Throughout career for members joining on or after 4/1/2012: <ul style="list-style-type: none"> - 3.0% if salary less than or equal to \$45,000 - 3.5% if salary greater than \$45,000 and less than or equal to \$55,000 - 4.5% if salary greater than \$55,000 and less than or equal to \$75,000 - 5.75% if salary greater than \$75,000 and less than or equal to \$100,000 - 6.0% if salary greater than \$100,000 and less than or equal to \$179,000

As of August 1, 1921, when the Retirement System was established, members contributed 4% of salary. These contributions were used to fund a separate annuity, over and above the regular pension. New members on or after July 1, 1948 were required to contribute 5% of salary. Additional contributions, not in excess of 4% of salary, were permitted during the five-year period beginning July 1, 1948.

Under the provisions of a law passed in 1950, members could elect before July 1, 1951, or within one year of their date of membership, if later, to contribute towards a special service retirement allowance that would allow them to retire up to five years earlier. If their rate of contribution had been 4%, their new rate would be 6.5%. If their rate of contribution had been 5%, their new rate would be 8%. In 1956, an amendment was passed which provided additional benefits for service in excess of 25 years, but not in excess of 35 years, for those members who elected to contribute an additional 2.5% or 3% of their salaries. This increased the rate of contribution to 9% or 11% depending on whether the member's rate of contribution had been 6.5% or 8%.

Throughout the 1960's the advent of the "take-home pay" program effectively reduced the required contribution rate to zero for many members. As of July 1, 1968, all members were no longer required to make contributions, nor permitted to make voluntary contributions unless they had been making them previously.

HISTORY OF THE MEMBER CONTRIBUTION RATE (Cont'd.)

The law that created Tier 3 in 1976 reinstated member contributions and required members who joined the System after July 26, 1976 to contribute 3% of their annual salary. This money, however, helps fund the member's pension and does not fund a separate annuity as before. Effective October 1, 2000, however, in accordance with Chapter 126 of the Laws of 2000, the 3% required member contribution ceases upon the attainment of the earlier of 10 years of service credit or 10 years of membership.

In accordance with Tier 5, enacted in 2009, members joining on or after January 1, 2010 and prior to April 1, 2012 must contribute 3.5% of salary throughout their working career towards the funding of their pension. Tier 6, enacted in 2012, requires members joining on or after April 1, 2012 to contribute between 3.0% and 6.0% of salary throughout their working career towards the funding of their pension. The contribution percentage for Tier 6 members can vary during their working career depending on the salary received.

ACTUARIAL VALUATION INFORMATION1. Actuarial Cost Method

The cost method used to determine the liabilities and normal cost in this valuation is the Aggregate Cost Method. This funding method is required by statute, specifically Section 517 of the New York State Education Law.

Each year a normal rate percentage is developed as a level percentage of total member compensation. This percentage equals the portion of the actuarial present value of projected benefits which exceeds the actuarial value of assets divided by one percent of the present value of future compensation of the active members, as of the valuation date.

The cost of death benefits up to \$50,000, Retirement System administrative expenses, and benefits in excess of the IRC §415 limits are each determined using a one-year term cost method.

Each year, actuarial gains and losses will occur because actual experience will vary from the actuarial assumptions. All gains and losses are automatically amortized as part of the normal rate, over the expected future working lifetime of active members.

The average expected future working lifetime for our active population as determined by the actuarial valuation as of June 30, 2015 is 13.25 years.

2. Asset Valuation Method

The actuarial value of assets for the normal rate is determined by recognizing each year's net investment income/loss in excess of (or less than) 7.50% at a rate of 20% per year, until fully recognized after five years. For fiscal years ending prior to June 30, 2015, realized and unrealized appreciation in excess of (or less than) the assumed inflationary rate of 3% is recognized at a rate of 20% per year, until fully recognized after five years.

The actuarial value of assets for the expense and group life insurance rates is equal to the fair market value of assets.

3. Actuarial Assumptions

The current actuarial assumptions were adopted by the Retirement Board on October 29, 2015 and were effective with the June 30, 2015 actuarial valuation. Specific details regarding the development of the present actuarial assumptions can be found in the "*Report on the 2015 Recommended Actuarial Assumptions.*"

ACTUARIAL VALUATION INFORMATION (Cont'd.)

The withdrawal rates are the assumed rates of termination of employment from all causes other than death, disability or retirement. The withdrawal rates vary by gender, age and service. The withdrawal rates for active members age 55 or older are set to the age 54 withdrawal rates.

The healthy annuitant mortality rates are the assumed rates of death for service and deferred retired members and beneficiaries. The healthy annuitant mortality rates vary by gender and age. Future mortality improvement was projected on a generational basis using the Society of Actuaries Mortality Projection Scale MP-2014.

The salary scale is the assumed annual rate of increase in compensation. The rates are based upon salary experience for members, vary by service and are independent of the member's gender. Cost-of-living, merit and productivity increases are included in these rates.

PRESENT ACTUARIAL ASSUMPTIONS

Actuarial assumptions have been developed based upon actual member experience. Various actuarial and graduation techniques are applied to experience data and tables are developed. An experience study is performed annually and assumptions are revised when warranted. The current actuarial assumptions were adopted by the Retirement Board on October 29, 2015. Specific details regarding the development of the present actuarial assumptions can be found in the “*Report on the 2015 Recommended Actuarial Assumptions*”.

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APPENDIX 17 (Cont'd.)

Mortality Rates
for Active Members

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
20	0.000189	20	0.000108
21	0.000212	21	0.000112
22	0.000233	22	0.000112
23	0.000258	23	0.000112
24	0.000281	24	0.000112
25	0.000286	25	0.000112
26	0.000286	26	0.000112
27	0.000287	27	0.000112
28	0.000288	28	0.000119
29	0.000290	29	0.000124
30	0.000293	30	0.000129
31	0.000298	31	0.000132
32	0.000305	32	0.000135
33	0.000314	33	0.000137
34	0.000326	34	0.000140
35	0.000342	35	0.000144
36	0.000361	36	0.000151
37	0.000384	37	0.000160
38	0.000410	38	0.000174
39	0.000441	39	0.000191
40	0.000474	40	0.000213
41	0.000510	41	0.000239
42	0.000548	42	0.000269
43	0.000586	43	0.000302
44	0.000624	44	0.000338
45	0.000661	45	0.000374
46	0.000697	46	0.000412
47	0.000732	47	0.000450
48	0.000765	48	0.000487
49	0.000800	49	0.000523
50	0.000836	50	0.000559
51	0.000876	51	0.000595
52	0.000923	52	0.000632
53	0.000979	53	0.000671
54	0.001050	54	0.000711

APPENDIX 17 (Cont'd.)

Mortality Rates
for Active Members
(cont'd.)

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
55	0.001139	55	0.000755
56	0.001251	56	0.000802
57	0.001391	57	0.000854
58	0.001565	58	0.000911
59	0.001779	59	0.000973
60	0.002039	60	0.001042
61	0.002349	61	0.001117
62	0.002716	62	0.001199
63	0.003143	63	0.001291
64	0.003636	64	0.001393
65	0.004197	65	0.001509
66	0.004828	66	0.001642
67	0.005370	67	0.001797
68	0.006058	68	0.001981
69	0.006834	69	0.002350
70	0.007709	70	0.002550
71	0.008696	71	0.002864
72	0.009810	72	0.003217
73	0.011066	73	0.003613
74	0.012483	74	0.004058
75	0.014082	75	0.004558

APPENDIX 17 (Cont'd.)

Disability Retirement Rates
for Active Members

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
30	0.000003	30	0.000005
31	0.000008	31	0.000008
32	0.000015	32	0.000010
33	0.000024	33	0.000037
34	0.000040	34	0.000076
35	0.000062	35	0.000098
36	0.000091	36	0.000102
37	0.000126	37	0.000105
38	0.000164	38	0.000126
39	0.000196	39	0.000159
40	0.000226	40	0.000214
41	0.000245	41	0.000274
42	0.000278	42	0.000310
43	0.000330	43	0.000376
44	0.000398	44	0.000452
45	0.000470	45	0.000501
46	0.000530	46	0.000522
47	0.000569	47	0.000568
48	0.000611	48	0.000666
49	0.000707	49	0.000818
50	0.000889	50	0.000986
51	0.001091	51	0.001187
52	0.001190	52	0.001325
53	0.001250	53	0.001380
54	0.001225	54	0.001375

APPENDIX 17 (Cont'd.)

Withdrawal Rates
for Active Members

Males

<u>Age</u>	<u>0 Years of Service</u>	<u>1 Year of Service</u>	<u>2 Years of Service</u>	<u>3 Years of Service</u>	<u>4 Years of Service</u>	<u>5 Years of Service</u>	<u>6 Years of Service</u>	<u>7 Years of Service</u>	<u>8 Years of Service</u>	<u>9 Years of Service</u>	<u>10 or more Years of Service</u>
20	0.254275	0.165892	0.116327	0.094647	0.057858	0.035354	0.020319	0.011763	0.010924	0.007796	0.008873
21	0.254275	0.139607	0.116327	0.094647	0.057858	0.035354	0.020319	0.011763	0.010924	0.007796	0.008873
22	0.258777	0.126464	0.116327	0.094647	0.057858	0.035354	0.020319	0.011763	0.010924	0.007796	0.008873
23	0.267780	0.124274	0.116327	0.094647	0.057858	0.035354	0.020319	0.011763	0.010924	0.007796	0.008873
24	0.281285	0.133035	0.119082	0.088647	0.057858	0.035354	0.020319	0.011763	0.010924	0.007796	0.008873
25	0.294790	0.168083	0.124171	0.081761	0.057858	0.035354	0.020319	0.011763	0.010924	0.007796	0.008873
26	0.308295	0.185606	0.128845	0.077761	0.057858	0.036379	0.020319	0.011763	0.011922	0.007796	0.008873
27	0.319549	0.194368	0.131962	0.080715	0.059296	0.036635	0.020319	0.011763	0.012975	0.007796	0.008873
28	0.325176	0.196558	0.134039	0.083668	0.061071	0.036892	0.020319	0.011763	0.013931	0.007796	0.008873
29	0.328927	0.194368	0.135424	0.086621	0.064622	0.037533	0.021368	0.012912	0.014537	0.007796	0.008873
30	0.330803	0.190091	0.136168	0.089575	0.068227	0.040481	0.025825	0.019809	0.015106	0.007796	0.008873
31	0.322070	0.187568	0.131286	0.093049	0.069540	0.043533	0.031397	0.022317	0.015955	0.007796	0.008873
32	0.313337	0.185045	0.125654	0.096523	0.070854	0.046585	0.036969	0.023571	0.018078	0.007796	0.008873
33	0.304605	0.182523	0.123777	0.099997	0.072167	0.049638	0.039754	0.023884	0.020201	0.008513	0.008873
34	0.295872	0.180000	0.126812	0.103470	0.073481	0.052690	0.041147	0.023963	0.022323	0.011216	0.008873
35	0.287140	0.177477	0.133047	0.105207	0.074794	0.055742	0.041993	0.023963	0.023738	0.015946	0.008508
36	0.286690	0.171821	0.138075	0.104196	0.077092	0.060321	0.041209	0.023963	0.024021	0.019585	0.008299
37	0.286241	0.166165	0.135561	0.101447	0.076326	0.064899	0.040425	0.023963	0.024163	0.020908	0.008091
38	0.285791	0.160509	0.130616	0.098699	0.075560	0.067189	0.039641	0.025293	0.024233	0.021664	0.007882
39	0.285342	0.154853	0.130202	0.095950	0.074219	0.067761	0.038857	0.034440	0.024269	0.021916	0.007673
40	0.284892	0.152025	0.129787	0.093202	0.069959	0.067904	0.038073	0.037085	0.025711	0.021664	0.007464
41	0.289068	0.152732	0.132358	0.094006	0.067933	0.064863	0.035133	0.037747	0.027438	0.021286	0.007534
42	0.293244	0.156266	0.134928	0.094810	0.066920	0.057260	0.033664	0.037747	0.029166	0.020625	0.007638
43	0.297420	0.159800	0.137499	0.095614	0.065907	0.053458	0.035133	0.037747	0.030893	0.018971	0.007795
44	0.301596	0.163334	0.140070	0.096418	0.064894	0.052983	0.038073	0.037747	0.032620	0.016781	0.008147
45	0.303684	0.166868	0.142640	0.086769	0.063881	0.052698	0.045610	0.037747	0.033484	0.015314	0.008659
46	0.297917	0.169216	0.142902	0.077120	0.064110	0.054366	0.053147	0.037747	0.032404	0.014047	0.008915
47	0.290062	0.171564	0.143164	0.073904	0.067541	0.055072	0.060684	0.037747	0.029166	0.014943	0.009043
48	0.282207	0.173912	0.143426	0.077120	0.070973	0.057785	0.064453	0.038438	0.027546	0.020435	0.009106
49	0.274352	0.176260	0.143687	0.092398	0.072689	0.059956	0.065709	0.042311	0.028356	0.022630	0.009170
50	0.266497	0.178609	0.143949	0.099585	0.072689	0.061041	0.065709	0.044893	0.032404	0.023728	0.009227
51	0.258643	0.178609	0.144211	0.106772	0.072689	0.061041	0.065709	0.045754	0.036452	0.023728	0.009227
52	0.250788	0.178609	0.144211	0.110366	0.072689	0.061041	0.065709	0.047475	0.037465	0.023728	0.009227
53	0.246860	0.178609	0.144211	0.110366	0.072689	0.061041	0.065709	0.048336	0.037754	0.023728	0.009227
54	0.246860	0.178609	0.144211	0.110366	0.072689	0.061041	0.065709	0.051133	0.037754	0.023728	0.009227

APPENDIX 17 (Cont'd.)

Withdrawal Rates
for Active Members

Females

Age	10 or more Years of Service										
	0 Years of Service	1 Year of Service	2 Years of Service	3 Years of Service	4 Years of Service	5 Years of Service	6 Years of Service	7 Years of Service	8 Years of Service	9 Years of Service	10 Years of Service
20	0.221624	0.111743	0.100290	0.059871	0.079156	0.057015	0.041279	0.030151	0.037037	0.022766	0.019527
21	0.222584	0.102302	0.100290	0.059871	0.079156	0.057015	0.041279	0.030151	0.037037	0.022766	0.019527
22	0.227539	0.100414	0.100290	0.059871	0.079156	0.057015	0.041279	0.030151	0.037037	0.022766	0.019527
23	0.241991	0.107967	0.100290	0.059871	0.079156	0.057015	0.041279	0.030151	0.037037	0.022766	0.019527
24	0.306350	0.130625	0.100290	0.059474	0.079156	0.057015	0.041279	0.030151	0.037037	0.022766	0.019527
25	0.332325	0.175943	0.102290	0.064680	0.042156	0.051015	0.040469	0.030151	0.037037	0.022766	0.019527
26	0.353217	0.189852	0.106684	0.072489	0.048382	0.047684	0.039012	0.030151	0.037037	0.022766	0.019527
27	0.360933	0.198520	0.127538	0.080297	0.051495	0.039255	0.037846	0.030151	0.037037	0.022766	0.019527
28	0.360817	0.202853	0.141441	0.088106	0.054608	0.042029	0.037458	0.030151	0.035810	0.022766	0.019527
29	0.354235	0.205020	0.141602	0.095915	0.057721	0.048963	0.039012	0.031232	0.032407	0.022766	0.019527
30	0.346747	0.202316	0.139988	0.099819	0.073286	0.053123	0.042120	0.033722	0.029005	0.022766	0.019527
31	0.343752	0.199612	0.136830	0.106115	0.076094	0.060404	0.051611	0.036984	0.029725	0.024035	0.019527
32	0.335848	0.195888	0.133673	0.109263	0.078901	0.067684	0.056356	0.040686	0.032607	0.026574	0.019527
33	0.327944	0.192164	0.130516	0.112411	0.081709	0.071845	0.058505	0.043387	0.035489	0.027589	0.019527
34	0.320040	0.188440	0.127358	0.113290	0.084516	0.072885	0.060654	0.045088	0.038371	0.030635	0.019527
35	0.312137	0.181656	0.124201	0.113729	0.087323	0.073130	0.061088	0.046793	0.039811	0.033681	0.018793
36	0.304496	0.174543	0.122312	0.110640	0.086076	0.070552	0.058894	0.048497	0.040833	0.035204	0.017327
37	0.296856	0.167429	0.120422	0.105598	0.084828	0.067974	0.056701	0.048838	0.040413	0.034443	0.015860
38	0.289215	0.160316	0.118533	0.100557	0.082956	0.065396	0.054507	0.049179	0.039994	0.033681	0.014393
39	0.281575	0.153202	0.116644	0.095515	0.080149	0.062819	0.052314	0.049213	0.039574	0.031777	0.012192
40	0.273935	0.146089	0.114754	0.092994	0.073750	0.060241	0.050120	0.049359	0.039155	0.030254	0.011459
41	0.269779	0.144793	0.111172	0.091252	0.074162	0.059860	0.048675	0.044929	0.037437	0.030242	0.011182
42	0.265623	0.143498	0.107590	0.092030	0.074575	0.059479	0.047230	0.040499	0.035718	0.030230	0.010905
43	0.261467	0.142203	0.104009	0.092809	0.074987	0.059098	0.045785	0.036070	0.034000	0.030218	0.010628
44	0.257311	0.140908	0.100427	0.093587	0.075400	0.058717	0.044339	0.035516	0.032282	0.030207	0.010351
45	0.253155	0.140260	0.098636	0.094366	0.075812	0.058336	0.043617	0.038284	0.030564	0.030195	0.010074
46	0.257124	0.142616	0.099349	0.095174	0.074383	0.058048	0.044604	0.038381	0.030284	0.029256	0.009941
47	0.267047	0.143794	0.101854	0.095983	0.072954	0.057761	0.046315	0.038478	0.030004	0.028317	0.009808
48	0.276970	0.147033	0.104358	0.096791	0.071525	0.057474	0.048025	0.038574	0.029724	0.027377	0.009675
49	0.286893	0.151626	0.106862	0.097600	0.070096	0.057187	0.049735	0.038671	0.029444	0.026438	0.009542
50	0.296815	0.154630	0.109367	0.098408	0.068667	0.056900	0.051446	0.038767	0.029164	0.025499	0.009409
51	0.299296	0.157633	0.111871	0.098408	0.067238	0.056900	0.051446	0.038767	0.029164	0.025499	0.009409
52	0.299296	0.160636	0.111871	0.098408	0.067238	0.056900	0.051446	0.038767	0.029164	0.025499	0.009409
53	0.299296	0.162138	0.111871	0.098408	0.067238	0.056900	0.051446	0.038767	0.029164	0.025499	0.009409
54	0.299296	0.162138	0.111871	0.098408	0.067238	0.056900	0.051446	0.038767	0.029164	0.025499	0.009409

APPENDIX 17 (Cont'd.)

Service Retirement Rates
 For Tier 1 Members and Tier 2, 3, and 4 Members
 at Least Age 62 or with 30 Years of Service
 and Tier 5 Members at Least Age 62

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
55	0.306695	55	0.313992
56	0.280779	56	0.288116
57	0.252448	57	0.269473
58	0.259437	58	0.261016
59	0.286545	59	0.268785
60	0.311011	60	0.279410
61	0.320232	61	0.277166
62	0.270303	62	0.257157
63	0.229352	63	0.232947
64	0.206863	64	0.219224
65	0.209678	65	0.238272
66	0.217437	66	0.244523
67	0.216934	67	0.236791
68	0.208294	68	0.220367
69	0.187086	69	0.230935
70	0.163555	70	0.229295
71	0.146721	71	0.212056
72	0.169602	72	0.180451
73	0.167377	73	0.183107
74	0.164226	74	0.192125
75	0.133890	75	0.190633
76+	1.000000	76+	1.000000

APPENDIX 17 (Cont'd.)

Service Retirement Rates
 For Tier 2, 3, and 4 Members Less Than Age 62
 and with Less Than 30 Years of Service

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
55	0.031965	55	0.034565
56	0.031782	56	0.035761
57	0.036262	57	0.041750
58	0.043899	58	0.046349
59	0.056398	59	0.060339
60	0.063578	60	0.070415
61	0.072217	61	0.082590

APPENDIX 17 (Cont'd.)

Service Retirement Rates
 For Tier 5 Members Less Than Age 62
 and with Less Than 30 Years of Service

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
55	0.015983	55	0.017283
56	0.015891	56	0.017881
57	0.018131	57	0.020875
58	0.021950	58	0.023175
59	0.028199	59	0.030170
60	0.031789	60	0.035208
61	0.036109	61	0.041295

APPENDIX 17 (Cont'd.)

Service Retirement Rates
 For Tier 5 Members Less Than Age 62
 and with 30 Years of Service

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
55	0.015983	55	0.017283
56	0.015891	56	0.017881
57	0.306695	57	0.313992
58	0.280779	58	0.288116
59	0.252448	59	0.269473
60	0.259437	60	0.261016
61	0.286545	61	0.268785

APPENDIX 17 (Cont'd.)

Service Retirement Rates
For Tier 6 Members

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
55	0.015983	55	0.017283
56	0.015891	56	0.017881
57	0.018131	57	0.020875
58	0.021950	58	0.023175
59	0.028199	59	0.030170
60	0.031789	60	0.035208
61	0.036109	61	0.041295
62	0.039942	62	0.046683
63	0.306695	63	0.313992
64	0.280779	64	0.288116
65	0.252448	65	0.269473
66	0.259437	66	0.261016
67	0.286545	67	0.268785
68	0.311011	68	0.279410
69	0.320232	69	0.277166
70	0.270303	70	0.257157
71	0.229352	71	0.232947
72	0.206863	72	0.219224
73	0.209678	73	0.238272
74	0.217437	74	0.244523
75	0.216934	75	0.236791
76+	1.000000	76+	1.000000

APPENDIX 17 (Cont'd.)

Mortality Base Rates for Service
and Deferred Annuity and Beneficiaries

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
1	0.000410	1	0.000361
2	0.000277	2	0.000236
3	0.000230	3	0.000176
4	0.000179	4	0.000132
5	0.000157	5	0.000119
6	0.000141	6	0.000110
7	0.000124	7	0.000102
8	0.000105	8	0.000094
9	0.000085	9	0.000087
10	0.000072	10	0.000082
11	0.000076	11	0.000084
12	0.000113	12	0.000097
13	0.000149	13	0.000110
14	0.000183	14	0.000121
15	0.000218	15	0.000132
16	0.000253	16	0.000142
17	0.000290	17	0.000150
18	0.000256	18	0.000144
19	0.000288	19	0.000148
20	0.000317	20	0.000148
21	0.000351	21	0.000148
22	0.000381	22	0.000148
23	0.000397	23	0.000152
24	0.000403	24	0.000155
25	0.000378	25	0.000158
26	0.000361	26	0.000164
27	0.000351	27	0.000171
28	0.000347	28	0.000179
29	0.000348	29	0.000189
30	0.000353	30	0.000199

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Mortality Base Rates for Service
and Deferred Annuity and Beneficiaries
(cont'd.)

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
31	0.000361	31	0.000211
32	0.000372	32	0.000223
33	0.000384	33	0.000236
34	0.000397	34	0.000249
35	0.000408	35	0.000262
36	0.000418	36	0.000275
37	0.000430	37	0.000291
38	0.000445	38	0.000310
39	0.000464	39	0.000334
40	0.000490	40	0.000362
41	0.000524	41	0.000396
42	0.000566	42	0.000436
43	0.000619	43	0.000484
44	0.000684	44	0.000539
45	0.000760	45	0.000601
46	0.000849	46	0.000671
47	0.000949	47	0.000747
48	0.001060	48	0.000829
49	0.001183	49	0.000916
50	0.001316	50	0.001008
51	0.001461	51	0.001104
52	0.001618	52	0.001203
53	0.001951	53	0.001419
54	0.002311	54	0.001645
55	0.002522	55	0.001805
56	0.002753	56	0.001980
57	0.003004	57	0.002172
58	0.003279	58	0.002382
59	0.003579	59	0.002613
60	0.003906	60	0.002866

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Mortality Base Rates for Service
and Deferred Annuitants and Beneficiaries
(cont'd.)

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
61	0.004264	61	0.003053
62	0.004654	62	0.003298
63	0.005050	63	0.003604
64	0.005564	64	0.003976
65	0.006204	65	0.004417
66	0.006976	66	0.004931
67	0.007886	67	0.005524
68	0.008942	68	0.006203
69	0.010151	69	0.006979
70	0.011524	70	0.007864
71	0.013074	71	0.008874
72	0.014821	72	0.010029
73	0.016788	73	0.011349
74	0.019009	74	0.012863
75	0.021524	75	0.014602
76	0.024380	76	0.016603
77	0.027633	77	0.018909
78	0.031346	78	0.021567
79	0.035590	79	0.024631
80	0.040445	80	0.028162
81	0.045997	81	0.032228
82	0.052342	82	0.036904
83	0.059585	83	0.042268
84	0.067844	84	0.048410
85	0.077246	85	0.055421
86	0.087929	86	0.063404
87	0.100040	87	0.072465
88	0.113741	88	0.082724
89	0.129208	89	0.094308
90	0.141713	90	0.107360

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Mortality Base Rates for Service
and Deferred Annuitants and Beneficiaries
(cont'd.)

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
91	0.158130	91	0.122037
92	0.175288	92	0.138518
93	0.193131	93	0.157000
94	0.211674	94	0.177701
95	0.230976	95	0.191477
96	0.251106	96	0.210235
97	0.272113	97	0.229998
98	0.293848	98	0.250723
99	0.313988	99	0.270858
100	0.334365	100	0.291040
101	0.354599	101	0.311444
102	0.374524	102	0.331900
103	0.393982	103	0.352232
104	0.412831	104	0.372273
105	0.430946	105	0.391860
106	0.448227	106	0.410849
107	0.464592	107	0.429112
108	0.479987	108	0.446544
109	0.494376	109	0.463061
110	0.500000	110	0.478604

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Mortality Base Rates for
Disabled Annuitants

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
30	0.180013	30	0.106487
31	0.180013	31	0.106487
32	0.180013	32	0.106487
33	0.180013	33	0.103280
34	0.173269	34	0.100083
35	0.166522	35	0.096905
36	0.159773	36	0.093763
37	0.153024	37	0.090676
38	0.146284	38	0.087665
39	0.139576	39	0.084746
40	0.132936	40	0.081925
41	0.126401	41	0.079198
42	0.120012	42	0.076550
43	0.113802	43	0.073965
44	0.107801	44	0.071430
45	0.102029	45	0.068936
46	0.096503	46	0.066480
47	0.091236	47	0.064061
48	0.086231	48	0.061677
49	0.081479	49	0.059314
50	0.076958	50	0.056949
51	0.072640	51	0.054543
52	0.068494	52	0.052046
53	0.064498	53	0.049422
54	0.060638	54	0.046664
55	0.056938	55	0.043813
56	0.053442	56	0.040949
57	0.050216	57	0.038174
58	0.047308	58	0.035582
59	0.044759	59	0.033251

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Mortality Base Rates for
Disabled Annuitants
(cont'd.)

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
60	0.042595	60	0.031256
61	0.040829	61	0.029665
62	0.039455	62	0.028522
63	0.038461	63	0.027851
64	0.037830	64	0.027664
65	0.037550	65	0.027957
66	0.037620	66	0.028701
67	0.038040	67	0.029851
68	0.038798	68	0.031348
69	0.039890	69	0.033140
70	0.041328	70	0.035196
71	0.043137	71	0.037505
72	0.045337	72	0.040079
73	0.047925	73	0.042938
74	0.050890	74	0.046105
75	0.054216	75	0.049628
76	0.057882	76	0.053557
77	0.061871	77	0.057934
78	0.066162	78	0.062794
79	0.070742	79	0.068155
80	0.075602	80	0.074002
81	0.080733	81	0.080289
82	0.086134	82	0.086960
83	0.087929	83	0.093972
84	0.100040	84	0.101322
85	0.113741	85	0.109018
86	0.129208	86	0.117066
87	0.141713	87	0.122037
88	0.158130	88	0.138518
89	0.175288	89	0.157000

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Mortality Base Rates for
Disabled Annuitants
(cont'd.)

<u>Males</u>		<u>Females</u>	
<u>Age</u>	<u>Rate</u>	<u>Age</u>	<u>Rate</u>
90	0.193131	90	0.177701
91	0.211674	91	0.191477
92	0.230976	92	0.210235
93	0.251106	93	0.229998
94	0.272113	94	0.250723
95	0.293848	95	0.270858
96	0.313988	96	0.291040
97	0.334365	97	0.311444
98	0.354599	98	0.331900
99	0.374524	99	0.352232
100	0.393982	100	0.372273
101	0.412831	101	0.391860
102	0.430946	102	0.410849
103	0.448227	103	0.429112
104	0.464592	104	0.446544
105	0.479987	105	0.463061
106	0.494376	106	0.478604
107	0.500000	107	0.478604
108	0.500000	108	0.478604
109	0.500000	109	0.478604
110	0.500000	110	0.478604

Society of Actuaries Mortality Improvement Scale MP-2014 will be applied on a generational basis to base table rates.

APPENDIX 17 (Cont'd.)

Salary Scale

<u>Duration</u>	<u>Rate</u>	<u>Duration</u>	<u>Rate</u>
1	1.1000	21	1.0272
2	1.0700	22	1.0263
3	1.0606	23	1.0254
4	1.0522	24	1.0245
5	1.0472	25	1.0237
6	1.0445	26	1.0229
7	1.0431	27	1.0222
8	1.0422	28	1.0215
9	1.0415	29	1.0210
10	1.0407	30	1.0206
11	1.0398	31	1.0202
12	1.0387	32	1.0200
13	1.0375	33	1.0195
14	1.0361	34	1.0193
15	1.0346	35	1.0190
16	1.0331	36	1.0186
17	1.0317	37	1.0180
18	1.0304	38	1.0176
19	1.0293	39	1.0176
20	1.0282		

Valuation Rate of Interest Assumption

The interest rate for valuation purposes is a level 7.5%. This valuation rate of interest is made up of a 2.5%¹ annual rate of inflation and a 5.0% real rate of return.

The valuation rate of interest assumption represents our best estimate of the anticipated annual rate of return on plan assets over a very long-term horizon.

The valuation rate of interest assumption is developed based upon the Retirement System's specific asset allocation, and capital market assumptions, based upon recommendations from AON Hewitt, the System's investment consultant. Using expected returns and standard deviations for each asset class, and including anticipated correlation between the classes, a long-term anticipated rate of return is developed. As of June 30, 2015, AON Hewitt has estimated the geometric annual rate of return to be 6.6%, and the arithmetic annual rate of return to be 7.3%, given the System's asset allocation. This analysis is performed annually, and intended to be over a 30-year time horizon.

For a complete explanation of the rationale behind the System's valuation rate of interest assumption, please see pages 28 through 33 of the "*Report on the 2015 Recommended Actuarial Assumptions*".

Projected COLA Assumption

The annual percentage for estimating future COLA benefit payments is 1.5%.²

IRC Section 415(b) and 401(a)(17)

For purposes of the normal rate, the limitations under IRC Section 415(b) were not reflected due to immateriality. The IRC Section 401(a)(17) limit for the fiscal year ending June 30, 2015 was reflected for members with a membership date on or after July 1, 1996.

¹ The average annual rate of increase in the Consumer Price Index (CPI) for 1925 – 2015 was 2.95%.

² The COLA percentage is one-half of the increase in the CPI with a floor of 1.0% and a cap of 3.0%. Therefore the estimate of inflation for the COLA benefit is the result of analyzing available CPI data with percentages bounded between 2.0% and 6.0%, and reduced by 50%.

SUMMARY OF BENEFIT PROVISIONS1. Membership

Membership is mandatory for all full-time New York State public school teachers, outside New York City, except those employed under the Comprehensive Employment and Training Act (CETA). Membership is optional for teachers employed on other than a full-time basis and for certain employees of the State University of New York, community colleges, and the State Education Department. Generally, the membership of any person credited with less than 5 years of service will terminate when seven years have elapsed since (s)he last rendered at least 20 days of credited service in a school year.

Tiers are determined by a member's most recent date of membership in the Retirement System as follows:

Tier 1:	Membership prior to 7/1/1973;
Tier 2:	Membership 7/1/1973 – 7/26/1976;
Tier 3:	Membership 7/27/1976 – 8/31/1983;
Tier 4:	Membership 9/1/1983 – 12/31/2009;
Tier 5:	Membership 1/1/2010 – 3/31/2012;
Tier 6:	Membership on or after 4/1/2012.

Tier 3 members are entitled to receive the benefits of either Tier 3 or Tier 4, however, they may not mix the provisions of the two tiers. For valuation purposes, Tier 3 members are assumed to receive the Tier 4 benefit at retirement, as that is generally always the larger benefit.

2. Service Retirement

The service retirement benefits are payable for life generally as follows:

Tier 1:Non-Contributory Plan

For Tier 1 members with a date of membership prior to July 1, 1970 the benefit is generally calculated as:

For New York State service prior to 7/1/1959 and all out-of-state service:

1/100th of final average salary (FAS) per year for each of the first 25 years of service, plus 1/120th of FAS per year for each of the next 10 years of service, plus 1/140th of FAS per year for each year of NYS service in excess of 35, *plus*

For New York State service subsequent to 7/1/1959:

1/50th of final average salary (FAS) per year for each of the first 25 years of NYS service, plus 1/60th of FAS per year for each of the next 10 years of NYS service, plus 1/70th of FAS per year for each year of NYS service in excess of 35.

APPENDIX 18 (Cont'd.)

Non-Contributory Plan members generally may retire at:

- Age 55 with 20 years of total service or
- Any age with 35 years of total service.

Career Plan

If 20 or more years of NYS service: 2% of final average salary (FAS) per year of NYS service after July 1, 1959, plus 1.8% of FAS per year of NYS service prior to that date, plus 1% of FAS per year of out-of-state service. Out-of-state service is allowed only up to a maximum of 10 years, and only to the extent that it does not raise the total service credit to greater than 35 years. The maximum pension permitted is 75% of FAS.

If less than 20 years of NYS service, the above formula is used except the benefit is reduced by 5% for each year of service less than 20, subject to a maximum reduction of 50%.

Career Plan members generally may retire at:

- Age 55 with 2 years of NYS service or
- Any age with 35 years of total service.

The provisions of Article 19 of the Retirement and Social Security Law, effective July 11, 2000, provides to eligible Tier 1 and 2 members additional service credit of one-twelfth of a year of service for each year of retirement credit as of the date of retirement or death, up to a maximum of two additional years. The maximum pension, as a result of Article 19, can be 79% of FAS.

Tier 2: Computed under the Tier 1 Career Plan formula, but may be reduced for early retirement, as noted below.

Tier 2 members generally may retire at:

- Age 62 with 5 years of service,
- Age 55 with 30 years of service, or
- Age 55 with 5 years of service, with benefit reduced by 6% for each of the first 2 years under age 62 and 3% for each of the next 5 years.

Tier 3: 1 $\frac{2}{3}$ % of FAS per year of NYS service (if less than 20 years) or 2% of FAS per year of NYS service (if 20 to 30 years). There is no additional benefit for more than 30 years of service. At age 62 the benefit is reduced by 50% of the primary Social Security benefit accrued while in NYS public employment. A member may be eligible for automatic cost-of-living adjustments.

Tier 3 members generally may retire at:

- Age 62 with 5 years of service,
- Age 55 with 30 years of service, or
- Age 55 with 5 years of service, with benefit reduced by 1/15th for each of the first 2 years under age 62 and 1/30th for each of the next 5 years.

APPENDIX 18 (Cont'd.)

Tier 4: $1\frac{2}{3}\%$ of FAS per year of NYS service (if less than 20 years), or 2% of FAS per year of NYS service (if 20 to 30 years), plus $1\frac{1}{2}\%$ of FAS per year of NYS service in excess of 30 years.

Tier 4 members generally may retire at:

- Age 62 with 5 years of service,
- Age 55 with 30 years of service, or
- Age 55 with 5 years of service, with benefit reduced by 6% for each of the first 2 years under age 62 and 3% for each of the next 5 years.

Tier 5: $1\frac{2}{3}\%$ of FAS per year of NYS service (if less than 25 years), or 2% of FAS per year of NYS service (if 25 to 30 years), plus $1\frac{1}{2}\%$ of FAS per year of NYS service in excess of 30 years.

Tier 5 members generally may retire at:

- Age 62 with 10 years of service,
- Age 57 with 30 years of service, or
- Age 55 with 10 years of service, with benefit reduced by $6\frac{2}{3}\%$ for each of the first 2 years under age 62 and 5% for each of the next 5 years.

Tier 6: $1\frac{2}{3}\%$ of FAS per year of NYS service (if less than 20 years), 1.75% of FAS per year of NYS service (if credited with 20 years) or 35% plus 2% per year of NYS service in excess of 20 years (if beyond 20 years).

Tier 6 members generally may retire at:

- Age 63 with 10 years of service,
- Age 55 with 10 years of service, with benefit reduced by 6.5% for each year under age 63.

3. Disability Retirement

Generally a member with at least 10 years of service may qualify for a disability retirement benefit of the smaller of 1) $1\frac{2}{3}\%$ of FAS per year of projected service to age 60 or 2) $\frac{1}{3}$ of FAS; but the benefit shall not be less than $1\frac{2}{3}\%$ of FAS per year of completed service.

4. Death Benefits

a) Active Service

The Tier 1 death benefit is generally equal to the greater of 1) 3 times annual salary after 36 years of service (proportionately reduced for less than 36 years) or 2) for members who are at least age 55 with 20 years of service, the pension reserve calculated under a prior, lower service retirement formula.

APPENDIX 18 (Cont'd.)

The death benefit for Tier 2, 3, 4, 5 and 6 members is generally equal to one of the following two options based on the member's election at entry: 1) 3 times annual salary after 3 years of service (proportionately reduced for service under 3 years) or 2) the greater of (1) above or the Tier 1 death benefit.

b) Not in Active Service

The death benefit for members of all tiers with at least ten years of service credit who die when not in active service is equal to one-half the active member death benefit.

5. Deferred Retirement

Tiers 1-4:

A member with at least 5 years of credited service who ceases teaching has a vested right to receive a deferred service retirement benefit. A member with at least five, but less than ten years of service credit, has the choice of receiving a refund of their member contributions with interest or a deferred service retirement benefit. A member with ten or more years of service credit will receive the deferred service retirement benefit.

Tiers 5 and 6:

A member with at least 10 years of credited service who ceases teaching has a vested right to receive a deferred service retirement benefit. Members with less than 10 years of credited service who cease teaching may receive a refund of their member contributions with interest.

6. Member Contributions

Certain Tier 1 and 2 members may elect to contribute in order to receive an additional benefit upon retirement. Tier 3 and 4 members are required to contribute 3% of pay to fund a portion of their benefit. Effective October 1, 2000, such contributions cease upon the attainment of the earlier of 10 years of service credit or 10 years of membership. Tier 5 members are required to contribute 3.5% of their salary throughout their active membership.

Tier 6 members are required to contribute throughout their active membership. From 4/1/2012 through 3/31/2013, all Tier 6 members were required to contribute 3.5%. Beginning 4/1/2013 members are required to contribute in accordance with the following schedule:

<u>Salary</u>	<u>Contribution Rate</u>
\$45,000 and less	3.00%
More than \$45,000 to \$55,000	3.50%
More than \$55,000 to \$75,000	4.50%
More than \$75,000 to \$100,000	5.75%
More than \$100,000 to \$179,000 (the limit currently equal to the NYS governor's salary)	6.00%

APPENDIX 18 (Cont'd.)

For purposes of administration, a Tier 6 member's contribution rate in any given year is based on regular compensation earned two years prior. During the member's first three years of membership, he/she will contribute a percentage based on a salary projection provided by the employer.

7. Cost-of-Living Adjustment (COLA)

A permanent, annually-adjusted cost-of-living benefit is provided to both current and future retired members. This benefit was first paid commencing September 2001, and is increased every September thereafter, to retired members who meet one of the following eligibility criteria:

- Age 62 and retired for 5 years,
- Age 55 and retired for 10 years, or
- Retired for 5 years under a disability retirement.

The annual COLA percentage is equal to 50% of the increase in the annual CPI; not to exceed 3% nor be lower than 1%. It is applied to the first \$18,000 of annual benefit. Additionally, commencing September 2000, members retired before 1997 are eligible for a "Catch-Up" supplemental benefit upon satisfaction of the above eligibility criteria.